NASA Core

NASA Core 1

\*\*\*NASA Info 5

Augustine Conclusions 6

NASA Space Centers – Research Centers 7

NASA Space Centers – Ames Research Center – Flight Simulation Unique 8

NASA Space Centers – Goddard Space Flight Center 9

\*\*\*Agent Issues 10

NASA – Civil Space Policy 11

Department of Defense – Military Space Policy 12

Space Policy Agencies 13

Office of Science and Technology Policy – Constellation Jurisdiction 14

National Space Policy CP – Solvency 15

Executive Order – Solvency (1/2) 16

Executive Order – Solvency (2/2) 17

\*\*\*NASA Funding 18

NASA Funding – Status Quo Budget 19

NASA Funding – Mechanism 20

NASA Funding – NASA Shift to Development (1/2) 21

NASA Funding – NASA Shift to Development (2/2) 22

NASA Funding – Obama Shift to Long-term Development 23

NASA Funding – Earth Sciences Rising 24

NASA Funding – Aeronautics Declining 25

NASA Funding – Expenditure Breakdown 26

NASA Funding – Space Center – Jet Propulsion Lab 27

NASA Funding – Space Center – Marshall Space Flight Center 28

\*\*\*Spending & Tradeoff 29

Spending Link – Moon 30

Tradeoff Link – Resources (1/3) 31

Tradeoff Link – Resources (2/3) 32

Tradeoff Link – Resources (3/3) 33

Tradeoff Link – Cost Overruns 34

Tradeoff Link – Mission Focus Swamps Independent Projets 35

Tradeoff Link – Focus Tradeoff 36

Tradeoff Link – Vehicles 37

Tradeoff – AT – Plan Net Increases Budget 38

Tradeoff Impact – Moon Vision Good 39

Aff – Tradeoff Answer 40

\*\*\*NASA Good Impacts\*\*\* 41

NASA Good – Key to Economy (1/2) 42

NASA Good – Key to Economy (2/2) 43

NASA Good – Key to Economic Leadership (1/2) 44

NASA Good – Key to Economic Leadership (2/2) 45

NASA Good – Key to Jobs 46

NASA Good – Key to Private Sector (1/2) 47

NASA Good – Key to Private Sector (2/2) 48

NASA Good – Key to Competitiveness 49

NASA Good – Technology Innovation (1/2) 50

NASA Good – Technology Innovation (2/2) 51

NASA Good – Technology Spill-over 52

NASA Good – Key to Technological Research 53

NASA Good – Key to Aerospace Industry 54

NASA Spending Key to Aerospace Leadership 55

NASA Good – Key to Space Industry 56

NASA Spending Key to Space Leadership 57

Heavy Lift Capability Key to Space Leadership 58

\*\*\*NASA Good – AT – NASA Fails 59

NASA Good – AT – Researchers Fail 60

NASA Good – AT – Bureaucracy (1/4) 61

NASA Good – AT – Bureaucracy (2/4) 62

NASA Good – AT – Bureaucracy (3/4) 63

NASA Good – AT – Bureaucracy (4/4) 64

NASA Good – Bureaucracy Good – Efficient (1/2) 65

NASA Good – Bureaucracy Good – Efficient (2/2) 66

NASA Good – Can Reform – Reforming Now (1/2) 67

NASA Good – Can Reform – Reforming Now (1/2) 68

NASA Good – Can Reform – Private Industry Cooperation 69

NASA Good – Can Reform – Funding/Support Key (1/2) 70

NASA Good – Can Reform – Funding/Support Key (2/2) 71

NASA Good – Can Reform – AT – Safety 72

\*\*\*NASA Good – Particular Programs/Areas 73

NASA Solvency – Mars (One Way) Mission 74

NASA Solvency – Space Based Solar Power – Viability 75

NASA Solvency – Climate (1/2) 76

NASA Solvency – Climate (2/2) 77

NASA Solvency – Asteroids (1/3) 78

NASA Solvency – Asteroids (2/3) 79

NASA Solvency – Asteroids (3/3) 80

\*\*\*AT – Streamlining Counterplan 81

AT – Streamlining CP – Solvency Deficit 82

AT – Streamlining CP – Downsizing Bad (1/3) 83

AT – Streamlining CP – Downsizing Bad (2/3) 84

AT – Streamlining CP – Downsizing Bad (3/3) 85

\*\*\*NASA Fails 86

NASA Fails – General (1/2) 87

NASA Fails – General (2/2) 88

NASA Fails – Lack of Vision 89

NASA Fails – Administration (1/2) 90

NASA Fails – Administration (2/2) 91

NASA Fails – Funding Issues 92

NASA Fails – Innovation (1/2) 93

NASA Fails – Innovation (2/2) 94

NASA Fails – Research Decline 95

NASA Fails – Research Facility Decline 96

NASA Fails – Research Funds are Wasted 97

NASA Fails – Researchers Waste Time 98

NASA Fails – AT – Tech/Competitiveness 99

NASA Fails – Capabilities – Restructuring Key to Space Exploration 100

NASA Fails – Staffing (1/2) 101

NASA Fails – Staffing (2/2) 102

NASA Fails – Space Centers – Equipment/Facilities (1/3) 103

NASA Fails – Space Centers – Equipment/Facilities (2/3) 104

NASA Fails – Space Centers – Equipment/Facilities (3/3) 105

NASA Fails – Safety (1/2) 106

NASA Fails – Safety (2/2) 107

\*\*\*NASA Fails – Bureaucracy 108

NASA Fails – Bureaucracy – Generic (1/2) 109

NASA Fails – Bureaucracy – Generic (2/2) 110

NASA Fails – Bureaucracy – Mismanagement (1/2) 111

NASA Fails – Bureaucracy – Mismanagement (2/2) 112

NASA Fails – Bureaucracy – Privatization Better 113

Bureaucracy Bad – Fails (1/4) 114

Bureaucracy Bad – Fails (2/4) 115

Bureaucracy Bad – Fails (3/4) 116

Bureaucracy Bad – Fails (4/4) 117

\*\*\*NASA Fails – Particular Programs/Areas 118

NASA Fails – Skylabs Prove 119

NASA Fails – Education 120

NASA Fails – Human Flight Fails (1/2) 121

NASA Fails – Human Flight Fails (2/2) 122

NASA Fails – Extend Shuttle (1/2) 123

NASA Fails – Extend Shuttle (2/2) 124

NASA Fails – International Space Station 125

NASA Fails – Mars – Bureaucracy (1/2) 126

NASA Fails – Mars – Bureaucracy (2/2) 127

NASA Fails – Climate 128

NASA Fails – Science & Exploration Directorate Underfunded 129

NASA Fails – Research Opportunities in Space and Earth Sciences (ROSES) 130

NASA Fails – Aeronautics Resources 131

NASA Fails – Space Centers – Ames Research Center 132

NASA Fails – Space Centers – Glenn Research Center 133

NASA Fails – Space Centers – Glenn Research Center 134

NASA Fails – Space Centers – Goddard Space Flight Center 135

NASA Fails – Space Centers – Langley Research Center 136

NASA Fails – Space Centers – Marshall Space Flight Center 137

\*\*\*NASA Fails – AT – Reforms 138

NASA Reform Fails – AT – Accident Prevention 139

NASA Reform Fails – AT – Private Industry Cooperation 140

NASA Reform Fails – AT – Reform Happening Now 141

NASA Reform Fails – AT – Reforms Solve 142

\*\*\*Streamlining Counterplan 143

Streamlining CP – 1NC Shell 144

CP Competition – AT – Perm Do Both 145

CP Competition – AT – Perm Do the CP 146

Net Benefit – Politics 147

CP Solvency Extensions 148

CP Solvency – Empirical 149

CP Solvency – Economy 150

CP Solvency – Tech Leadership (1/2) 151

CP Solvency – Tech Leadership (2/2) 152

CP Solvency – Innovation 153

CP Solvency – Colonization 154

CP Solvency – Asteroid Mining 155

CP Solvency – Air Power 156

\*\*\*Human v. Robotic Exploration 157

Human Exploration Good – AT – Robotic Key 158

Rollback Link – Human Exploration 159

AT – Human Exploration Key – Robotic Exploration Is Precursor 160

AT – Robotic or Human Key – Complementary 161

\*\*\*International Space Station 162

US Key to International Space Station 163

International Space Station Key to Coop 164

\*\*\*NASA Info

Augustine Conclusions

Augustine conclusions – current budget means no exploration, should coop on ISS, commercial within reach, Ares V Lite most capable, extend shuttle key to solve gap, and Mars is ultimate destination

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 10,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Although the committee’s report did not recommend any particular one of these options, it made a number of findings and comments that put the options into context:34

• Option 1 and Option 2 fit within the current budget profile, but “neither allows for a viable exploration program. In fact, the Committee finds that no plan compatible with the FY2010 budget profile permits human exploration to continue in any meaningful way.” The additional funding contemplated in Options 3, 4, and 5 is necessary for “an exploration program that will be a source of pride for the nation.”

• “The return on investment to both the United States and our international partners would be significantly enhanced by an extension of the life of the [International Space Station]. A decision not to extend its operation would significantly impair U.S. ability to develop and lead future international spaceflight partnerships.”

• Commercial services to launch crews into Earth orbit “are within reach. While this presents some risk, it could provide an earlier capability at lower initial and life-cycle costs than the government could achieve.”

• Of the heavy-lift alternatives, Ares V Lite is “the most capable.” The commercial EELV derivative “has an advantage of potentially lower operating costs, but requires significant restructuring of NASA” including “a different (and significantly reduced) role.” A shuttle-derived vehicle would “take maximum advantage of existing infrastructure, facilities, and production capabilities.”

• Variant 4B, which extends operation of the space shuttle to 2015, is “the only foreseeable way to eliminate the gap in U.S. human-launch capability.”

• “Mars is the ultimate destination for human exploration of the inner solar system; but it is not the best first destination. Visiting the ‘Moon First’ and following the ‘Flexible Path’ are both viable exploration strategies. The two are not necessarily mutually exclusive; before traveling to Mars, we could extend our presence in free space and gain experience working on the lunar surface.”

NASA Space Centers – Research Centers

Research for programs is done by four main research centers: LaRC, ARC, GRC and DFRC.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.22, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

Fundamental aeronautics research in each program emphasizes research through collaboration and partnerships, shared ideas and knowledge, and solutions that benefit the public. In planning the future research programs, NASA receives input from the National Research Council (NRC) in its decadal surveys and other reports. These reports represent the broad consensus of the nation’s scientific communities in their respective areas. Roadmaps in each of the aeronautics programs are then developed to define the pathways for implementing the NRC-defined priorities. The research in these programs is executed by the four aeronautics research centers within NASA: LaRC, ARC, GRC, and DFRC. Each of these programs—FAP, ATP, AvSP, and ASP—has program and project managers, principal investigators (PIs), and researchers assigned from across the four research centers. The research conducted in these programs is primarily at TRL 1-3, fundamental research. In FY 2010, a new program, the Integrated Systems Research Program, was started to conduct research at an integrated system level on promising concepts and technologies. It is intended to explore and demonstrate in a relevant environment the four programs by transitioning their results to higher TRLs. The TRL 1-3 research in aeronautics supports the fundamental needs of the projects and includes research in materials and structures, aerodynamics, propulsion, acoustics, fuels, avionics, airspace traffic management, crash/impact, and instrumentation and controls.

[NOTE: LaRC = Langley Research Center, ARC = Ames Research Center, GRC = Glenn Research Center, DFRC = Dryden Flight Research Center, FAP = Fundamental Aeronautics Program, ATP = Aeronautics Test Program, AvSP = Aviation Safety Program, ASP = Airspace Systems Program, TRL 1-3 = Technology Readiness Level 1-3]

NASA Space Centers – Ames Research Center – Flight Simulation Unique

Ames Research Center flight simulation facilities are unique in the U.S.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.31, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

The crew vehicle systems research facility has three components: an ATC laboratory that is linked to FAA for flexible low-fidelity research; the advanced concepts simulator, which was built in 1985 and had motion added in 1992; and a 747-400 simulator that was built with motion in 1985 and has the highest fidelity. Both simulators have new visual simulations and get funding from ASP. They are housed in a building built in 1985. In the 747 simulator researchers are using AvSP-IRAC funding to investigate landing a damaged airplane. The simulators are owned by SCAP but have not gotten any SCAP money for maintenance. There is no known facility in the United States with similar integrated flight/ATC simulation capability.

[NOTE: ATC = Air Traffic Control, FAA = Federal Aviation Administration, ASP = Airspace Systems Program, AvSP = Aviation Systems Program, IRAC = Integrated Resilient Aircraft Control, SCAP = Strategic Capabilities Asset Program]

NASA Space Centers – Goddard Space Flight Center

The Goddard Space Flight Center is the biggest organization for space and Earth research center in the U.S.

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.41, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

GSFC is a large NASA space and Earth research center in Greenbelt, Maryland. It was established as NASA’s first spaceflight center on May 1, 1959, less than a year after the formation of NASA itself. GSFC employs approximately 3,200 civil servants and 5,400 contractors. It is named in recognition of Robert H. Goddard (1882-1945), the pioneer of modern rocket propulsion in the United States. NASA describes GSFC’s mission as follows: “… to expand knowledge of the Earth and its environment, the solar system and the universe through observations from space. To assure that our nation maintains leadership in this endeavor, we are committed to excellence in scientific investigation, in the development and operation of space systems and in the advancement of essential technologies.”4 In fulfilling its mission, GSFC has developed and launched nearly 300 missions (satellites and primary instruments) that have studied Earth, the Sun, the planets, asteroids and comets, the interplanetary medium, and the universe. GSFC is the largest organization of scientists and engineers in the United States dedicated to this mission. More than 60 percent of the center’s personnel are scientists and engineers.

\*\*\*Agent Issues

NASA – Civil Space Policy

NASA has jurisdiction over civil space missions

Gabrynowicz, Journal of Space Law Editor-in-Chief and National Center for Remote Sensing, Air and Space Law Director, 10

[Joanne Irene Gabrynowicz has been teaching U.S. and international space law since 1987. She is the Editor-in-Chief of the Journal of Space Law, a professor of Space Law and Remote Sensing, and the Director of the National Center for Remote Sensing, Air, and Space Law at the University of Mississippi School of Law. Professor Gabrynowicz was the recipient of the 2001 Women in Aerospace Outstanding International Award, is a Director of the International Institute of Space Law, and is a member of the American Bar Association Forum on Air and Space Law, July 21, 2010, 4 Harv. L. & Pol'y Rev. 405, Harvard Law & Policy Review, “One Half Century and Counting: The Evolution of U.S. National Space Law and Three Long-Term Emerging Issues”, Lexis]

Congress addressed the second basic question, the appropriate relationship between the civil and military space programs, when it declared: Aeronautical and space activities . . . shall be the responsibility of, and shall be directed by, a civilian agency . . . except activities peculiar to or primarily associated with development of weapons systems, military operations, or the defense of the United States . . . shall be the responsibility of, and shall be directed by, the Department of Defense. n16 The characteristics of this relationship were strongly influenced by the former Supreme Allied Commander, President Dwight D. Eisenhower. He was determined that the U.S. space program should be the opposite of the overtly militaristic Soviet program and that it would not create a national deficit. n17 Therefore, Eisenhower resisted popular sentiment and military pressure and endeavored to place the national space program under civil control. By executive order, Eisenhower transferred all space-related civilian personnel, property, and funds not primarily related to military operations and weapon system development from the Department of Defense (DoD) to NASA. n18 The civil-military relationship has ebbed and flowed over the years, with the relative closeness of purpose waxing and waning as political forces [\*409] changed. It continues to be a source of tension for both NASA and DoD. n19 Nonetheless, NASA remains a civil agency committed to civil missions.

Department of Defense – Military Space Policy

DOD has jurisdiction over national security space programs

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 36,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

U.S. National Security Space Programs

National security space programs, conducted by the Department of Defense (DOD) and the intelligence community, are less visible than NASA, but their budgets are comparable to NASA’s. A key issue for them is how to avoid the cost growth and schedule delays that have characterized several recent projects. A shared industrial base and other areas of common concern sometimes result in NASA issues affecting national security programs and vice versa. For example, some policy makers have expressed concern about the impact of the proposed cancellation of Ares I on the industrial base for solid rocket motors used by DOD.161 Further discussion of national security space programs is beyond the scope of this report.

DOD has jurisdiction over military space missions

Gabrynowicz, Journal of Space Law Editor-in-Chief and National Center for Remote Sensing, Air and Space Law Director, 10

[Joanne Irene Gabrynowicz has been teaching U.S. and international space law since 1987. She is the Editor-in-Chief of the Journal of Space Law, a professor of Space Law and Remote Sensing, and the Director of the National Center for Remote Sensing, Air, and Space Law at the University of Mississippi School of Law. Professor Gabrynowicz was the recipient of the 2001 Women in Aerospace Outstanding International Award, is a Director of the International Institute of Space Law, and is a member of the American Bar Association Forum on Air and Space Law, July 21, 2010, 4 Harv. L. & Pol'y Rev. 405, Harvard Law & Policy Review, “One Half Century and Counting: The Evolution of U.S. National Space Law and Three Long-Term Emerging Issues”, Lexis]

Congress addressed the second basic question, the appropriate relationship between the civil and military space programs, when it declared: Aeronautical and space activities . . . shall be the responsibility of, and shall be directed by, a civilian agency . . . except activities peculiar to or primarily associated with development of weapons systems, military operations, or the defense of the United States . . . shall be the responsibility of, and shall be directed by, the Department of Defense. n16 The characteristics of this relationship were strongly influenced by the former Supreme Allied Commander, President Dwight D. Eisenhower. He was determined that the U.S. space program should be the opposite of the overtly militaristic Soviet program and that it would not create a national deficit. n17 Therefore, Eisenhower resisted popular sentiment and military pressure and endeavored to place the national space program under civil control. By executive order, Eisenhower transferred all space-related civilian personnel, property, and funds not primarily related to military operations and weapon system development from the Department of Defense (DoD) to NASA. n18 The civil-military relationship has ebbed and flowed over the years, with the relative closeness of purpose waxing and waning as political forces [\*409] changed. It continues to be a source of tension for both NASA and DoD. n19 Nonetheless, NASA remains a civil agency committed to civil missions.

Space Policy Agencies

Various agencies coordinate US space policy – OSTP, NSTC, and other non-governmental groups

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 35,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

U.S. Space Policy Governance

A variety of governmental and nongovernmental organizations help to coordinate and guide U.S. space policy. These include the Office of Science and Technology Policy (OSTP) and the National Science and Technology Council (NSTC), both in the Executive Office of the President, as well as outside advisory groups, such as the NASA Advisory Council,154 committees of the National Academies,155 and independent committees such as the Augustine committee.

Office of Science and Technology Policy – Constellation Jurisdiction

OSTP has jurisdiction over Constellation policies

Holdren, Office of Science and Technology Policy Director, 5-4-11

[John, CQ Transcriptions, “REP. FRANK R. WOLF HOLDS A HEARING ON THE OFFICE OF SCIENCE AND TECHNOLOGY BUDGET”, Lexis]

HOLDREN: ...the -- the essence of the matter is, in part, you are right that we've known since early in the previous administration that -- that the shuttle program needed to come to an end. It needed to come to an end for a number of reasons, one of them being that this is basically 1970s technology which, in some sense, is -- is -- is so complicated and so fragile you see the results in the fraction of the time that we end up having to postpone launches for the safety of the astronauts which, obviously, has to remain paramount.

But it was also the case that the shuttle is so expensive to operate that while you're operating it you can't find the money in any plausible NASA budget to develop its replacement. And so it was recognized already in the Bush administration. They made that decision that the shuttle would be phased out.

And the problem was that the successor program to the shuttle, the Constellation Program -- that was going to provide both access to low Earth orbit and the heavier capabilities for -- for deeper space missions -- never got the budgets it needed to stay on track. And the result was, by the time we came into office the Constellation Program was in danger of being three to four times over budget -- that is, over the originally anticipated costs -- for those vehicles.

And in addition, it was so far behind schedule that no amount of money poured into it at this point could erase the gap in the capability to put American astronauts on the space station on -- on U.S. rockets. At the same time, the attempt within NASA to find enough money to keep Constellation on track had sapped the resources available for many of NASA's other programs.

But we had a further problem. We had a problem that the end post (ph) program, the successor program for these polar-orbiting satellites, was a joint venture of the Department of Defense, NASA, and NOAA. And for a whole variety of reasons, those folks were proving not to be playing very well together, and that contributed to delays and cost overruns in the end post (ph) program itself, which we were charged when we can into office with fixing.

I say "we." I was charged, in my confirmation hearings, with fixing it, and then I was charged by the president with fixing it. Because it is an interagency science and technology program that falls under the jurisdiction of OSTP. And we worked very hard with those three agencies to fix it, and we figured out a way -- I thought, we thought, the best possible way -- to fix it in terms of dividing certain responsibilities more clearly between the Department of Defense on the one hand and NOAA and NASA on the other.

National Space Policy CP – Solvency

President can alter space policy when issuing national space policy statements

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 35,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Some aspects of space policy are documented in a formal presidential statement of national space policy. In 2006, the Bush Administration issued such a statement,158 replacing a previous one that had been in place for 10 years.159 The 2006 policy established principles and goals for U.S. civilian and national security space programs and set guidelines for a few specific issues such as the use of nuclear power in space and the hazard of debris in orbit. It defined the space-related roles, responsibilities, and relationships of NASA and other federal agencies, such as the Department of Defense and the Department of Commerce. The Obama Administration issued an updated national space policy in June 2010.160 The new policy reiterates the policy changes proposed in the Administration’s FY2011 budget and places new emphasis on international cooperation and development of the commercial space industry.

Executive Order – Solvency (1/2)

Executive order can determine NASA priorities – Eisenhower proves

Gabrynowicz, Journal of Space Law Editor-in-Chief and National Center for Remote Sensing, Air and Space Law Director, 10

[Joanne Irene Gabrynowicz has been teaching U.S. and international space law since 1987. She is the Editor-in-Chief of the Journal of Space Law, a professor of Space Law and Remote Sensing, and the Director of the National Center for Remote Sensing, Air, and Space Law at the University of Mississippi School of Law. Professor Gabrynowicz was the recipient of the 2001 Women in Aerospace Outstanding International Award, is a Director of the International Institute of Space Law, and is a member of the American Bar Association Forum on Air and Space Law, July 21, 2010, 4 Harv. L. & Pol'y Rev. 405, Harvard Law & Policy Review, “One Half Century and Counting: The Evolution of U.S. National Space Law and Three Long-Term Emerging Issues”, Lexis]

Congress addressed the second basic question, the appropriate relationship between the civil and military space programs, when it declared: Aeronautical and space activities . . . shall be the responsibility of, and shall be directed by, a civilian agency . . . except activities peculiar to or primarily associated with development of weapons systems, military operations, or the defense of the United States . . . shall be the responsibility of, and shall be directed by, the Department of Defense. n16 The characteristics of this relationship were strongly influenced by the former Supreme Allied Commander, President Dwight D. Eisenhower. He was determined that the U.S. space program should be the opposite of the overtly militaristic Soviet program and that it would not create a national deficit. n17 Therefore, Eisenhower resisted popular sentiment and military pressure and endeavored to place the national space program under civil control. By executive order, Eisenhower transferred all space-related civilian personnel, property, and funds not primarily related to military operations and weapon system development from the Department of Defense (DoD) to NASA. n18 The civil-military relationship has ebbed and flowed over the years, with the relative closeness of purpose waxing and waning as political forces [\*409] changed. It continues to be a source of tension for both NASA and DoD. n19 Nonetheless, NASA remains a civil agency committed to civil missions.

Executive Order – Solvency (2/2)

Executive order can be used to alter NASA programs and reallocate resources

Gabrynowicz, Journal of Space Law Editor-in-Chief and National Center for Remote Sensing, Air and Space Law Director, 4

[Joanne Irene Gabrynowicz has been teaching U.S. and international space law since 1987. She is the Editor-in-Chief of the Journal of Space Law, a professor of Space Law and Remote Sensing, and the Director of the National Center for Remote Sensing, Air, and Space Law at the University of Mississippi School of Law. Professor Gabrynowicz was the recipient of the 2001 Women in Aerospace Outstanding International Award, is a Director of the International Institute of Space Law, and is a member of the American Bar Association Forum on Air and Space Law, Suffolk University Law Review, 2004, 37 Suffolk U. L. Rev. 1041, ARTICLE: Space Law: Its Cold War Origins and Challenges in the Era of Globalization\*,\* This Article is based on a speech that Ms. Gabrynowicz delivered on November 13, 2003, as part of the Donahue Lecture Series., Lexis]

The National Aeronautics and Space Act of 1958 (NAS Act) established the United States civil space program and NASA. n53 Among the purposes of the NAS Act are the expansion of human knowledge of space and atmospheric phenomena, the development of aeronautical and space vehicles, the establishment of long-term studies of potential benefits from the peaceful use of space, and the promotion of international cooperation. The most controversial aspect of the law when it was passed was the stark separation of military and civilian space activities. Adamant that the U.S. space program should stand in sharp contrast to the overtly military Soviet program and determined that space activities would not create a national deficit, President Eisenhower placed the national space program under civil control, resisting both popular sentiment and military pressure. By executive order, he transferred from the Defense Department to NASA all space-related civilian personnel, functions, facilities, equipment, records, property, and funds not primarily related to military operations and weapon system development. $ 117 [\*1048] million was provided to facilitate these transfers. n54 Reflecting the importance of NASA in waging the Cold War, the NAS Act gives NASA broad authority that is generally not available to other civil federal agencies.

\*\*\*NASA Funding

NASA Funding – Status Quo Budget

NASA’s entire budget costs less than air conditioning the military.

Praetorius, Huffington Post Traffic and Trends editor, 2011

(David, The Huffington Post, “Air Conditioning The Military Costs More Than NASA's Entire Budget”, 6/21/11, http://www.huffingtonpost.com/2011/06/21/air-conditioning-military-cost-nasa\_n\_881828.html, accessed 6/25/11, EK)

[NASA](http://www.huffingtonpost.com/news/nasa)'s annual budget is dwarfed by a lot of other programs, but this may be the most incredible. It costs $1 billion more than NASA's budget just to provide air conditioning for temporary tents and housing in [Iraq](http://www.huffingtonpost.com/news/iraq) and [Afghanistan](http://www.huffingtonpost.com/news/Afghanistan), according to [Gizmodo](http://gizmodo.com/5813257/air-conditioning-our-military-costs-more-than-nasas-entire-budget). The total cost of keeping troops cool comes to roughly $20 billion. That figure comes from Steve Anderson, a retired brigadier general who was Gen. Petraeus' chief logistician in Iraq. NASA's total budget is just $19 billion. The huge cost comes from the fuel used to power the units, according to [Gizmodo](http://gizmodo.com/5813257/air-conditioning-our-military-costs-more-than-nasas-entire-budget). Even worse, the trucks used to transport the fuel have also become targets for insurgent IEDs, which leads to casualties in addition to upping the costs.

NASA Funding – Mechanism

NASA research is funded by two main pathways

Space Studies Board et al. 2010 (Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.13, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

There are several mechanisms for funding fundamental research programs and the associated laboratory equipment, facilities, and support services. As shown in Figure 3.2, there are two main pathways by which NASA Headquarters might supply funding. One pathway is from one or more project offices, located at various centers that direct funds to research for a specific mission directorate. Each project office can pick and choose from among the centers which center is appropriate for a particular research program. The mission directorates fund targeted work in a technology “pull” manner. Another pathway is the CAS funds that are sent to each NASA center. As mentioned previously, CAS funding includes the CM&O and CoF institutional investment funds, which are distributed at the discretion of the center director. Each center determines how the CM&O funds will be used. For example, GSFC allocates CM&O funds for several investment categories, including bid and proposal (B&P), independent research and development (IRAD), strategic investments, and technical equipment. The GRC does not allocate any CM&O funds for B&P or IRAD. Secondary mechanisms exist for funding facilities, equipment, and support services. One of these mechanisms is reimbursable work with industry and other federal agencies, which can be used to augment and support continued operations in a particular laboratory, allowing it to be more fully utilized and able to maintain technical staff. Another mechanism is to utilize equipment that has been developed through the Small Business Innovation Research (SBIR) program. A more limited source of research funding is direct funding from Congress.

NASA Funding – NASA Shift to Development (1/2)

NASA funding is shifting from basic and applied research to development funding

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.10, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

Several conclusions can be drawn from these data. While the total funding for R&D encompasses roughly half of the total NASA annual budget, the funding for basic research decreased by 23 percent, or $542 million; the funding for applied research decreased by 47 percent, or $913 million; and the funding for development activities increased by 78.7 percent, or $2.75 billion, from FY 2005 through FY 2009. The reduction of $1.455 billion in basic and applied research support over this 5-year period is equivalent to the loss of roughly 1,200 scientists and engineers working on fundamental science projects. In 2005, the combination of basic and applied research funding amounted to 55.4 percent of the total R&D, whereas in 2009 the same combination of basic and applied research amounted to only 31.4 percent of the total R&D budget. Clearly, there has been a significant reduction in basic and applied research funding and a shift toward development funding that more directly and immediately benefits programs and missions.

[NOTE: R&D = Research and Development]

NASA Funding – NASA Shift to Development (2/2)

NASA is shifting from spaceflight to technology development and science in the next 5 years.

Wakeman, Editor in chief of Washington Technology, ’11

(Nick, “NASA shifts funds to new priorities”, *Federal Computer Week,* 6/8/11, <http://fcw.com/articles/2011/06/08/nasa-budget-priorities-shift.aspx>, accessed 6/25/11, EK)

Washington DC, June 7, 2011 - Euroconsult, the leading international consulting and analyst firm specializing in the space sector, along with the consulting firm Omnis, today announced the findings of a study today foreseeing a significant shift in NASA spending toward Earth science and R&D programs and away from legacy spaceflight activities. According to the report "NASA Spending Outlook: Trends to 2016," NASA's budget, which will remain flat at around $18.7 billion for the next five years, will also be characterized by significant shifts from space operations to technology development and science. With the shift in budget authority, NASA Centers focused on Earth observation, space technology, and aeronautics will see increases in funding, while those involved in human spaceflight will see major funding reductions. Indeed, the termination of the Space Shuttle program will lead to a budget cut over $1 billion for Space Operations, resulting in a 21% budget cut for the Johnson Space Center. Overall, the agency's budget for R&D will account for about 50% of all NASA spending. "Budget allocation across Centers will vary greatly," said Steve Bochinger, President of Euroconsult North America. "As NASA shifts priorities for human spaceflight from Shuttle operations to Human Exploration Capabilities and commercial spaceflight, the budget will be redirected to a range of technology development programs. Likewise, as NASA shifts its science mission focus away from space science to Earth science, the science budget will be redistributed among centers." This shift in NASA's priorities will also affect the agency's contract spending. As large legacy programs end, new research and development programs will be initiated. This turnover of programs should provide many new contracting opportunities over the next five years, especially at Research Centers. The Euroconsult/Omnis report details these changes. "The uniqueness of this report is that it brings together in one picture NASA's budget, spending and contracting, providing insights into opportunities created by the new NASA direction," said Bretton Alexander, Senior Consultant for Omnis. Some of the findings include: . Following an 11% increase in 2011, the Science Mission Directorate budget will remain at the $5 billion level through 2016. This increase, however, is entirely within the Earth science theme, reflecting the Administration's priority on climate change research. Goddard Space Flight Center and Langley Research Center, which manage and Implement Earth science projects, will thus benefit from this increase as will contractors who develop Earth observation spacecraft and instruments

NASA Funding – Obama Shift to Long-term Development

Obama shifting emphasis from Constellation to long term tech development and Mars

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. i ,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

In its FY2011 budget request, the Obama Administration proposed cancelling the Constellation spacecraft development program and eliminating the goal of returning humans to the Moon. NASA would instead rely on commercial providers to transport astronauts to Earth orbit, and its ultimate goal beyond Earth orbit would be human exploration of Mars, with missions to other destinations, such as visiting an asteroid in 2025, as intermediate goals. Operation of the International Space Station would be extended to at least 2020, and long-term technology development would receive increased emphasis.

Obama pushing for elimination of Constellation and Moon mission, adopting “Flexible Path” to Mars

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 11,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Human Spaceflight: Administration Proposals

In its FY2011 budget request, the Obama Administration proposed cancelling the Constellation program and eliminating the return of humans to the Moon as NASA’s primary goal.36 Instead, NASA would encourage the private sector to develop commercial space transportation services to carry astronauts to and from the International Space Station. For spaceflight beyond Earth orbit, NASA would emphasize long-term technology development rather than near-term development of specific flight systems. Operation of the International Space Station would continue until at least 2020. When asked about destinations for future human exploration of space, NASA officials stated that Mars would be the ultimate goal, but that other intermediate destinations would come first. They described these proposals as consistent with the “Flexible Path” option identified by the Augustine committee.

NASA Funding – Earth Sciences Rising

NASA devoting more resources to Earth science

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 13,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Science

About two-thirds of NASA’s budget is associated with human spaceflight. Most of the rest is devoted to unmanned science missions. These science missions fall into four categories: Earth science, planetary science, heliophysics, and astrophysics. The latter three are sometimes known collectively as space science.

In part because of concerns about climate change, both Congress and the Administration have recently placed increased emphasis on Earth science. In the FY2006 and FY2007 budget cycles NASA had no separate budget for Earth science, and supporters became concerned that this was adversely affecting the field. In late 2006, NASA reorganized the Science Mission Directorate, creating a separate Earth Science Division. The National Research Council recommended in early 2007 that the United States “should renew its investment in Earth observing systems and restore its leadership in Earth science and applications.”43 In response, Congress and the Administration increased the share of NASA’s science funding devoted to Earth science from 26% in FY2008 to 32% in FY2010. In addition, NASA allocated 81% of the science funding it received under the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) to Earth science. The Administration’s FY2011 budget would provide substantial increases for Earth science funding, including a five-year, $2.1 billion global climate initiative.

NASA Funding – Aeronautics Declining

Aeronautics program has decreased 72% over the last decade and present funding bars U.S. space leadership.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.12-13, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

Especially notable in Table 3.3 is the significant overall reduction of 48 percent for aeronautics programs over FY 2005 through FY 2009, which affected both NASA centers and external organizations. This provides a disconnect with the overarching mission of the ARMD, which is to advance U.S. technological leadership in aeronautics in partnership with industry, academia, and other government agencies that conduct aeronautics-related research. Beginning in FY 1999, there was a steady decline in the funding of the aeronautics programs, as shown in Figure 3.1, resulting in a 72 percent decrease over the past decade 1999-2009. In FY 2005, aeronautics programs received 6 percent of the total NASA budget, but by FY 2009, that share had been reduced to only 2.8 percent. This reflects the current funding of approximately $500 million per year, in sharp contrast to the $900 million annual funding experienced some 5 years ago. The research funded within the aeronautics program is primarily TRL 1-3, fundamental research, and raises the question of whether that amount is sufficient to keep U.S. aeronautics in the lead internationally, because it constrains the transitioning of TRL 1-3 results to higher TRLs. In most cases the research leads only to the development of multidisciplinary design, analysis, and optimization tools for others to use in moving the research to higher TRLs. The transition to system-level experiments is unaffordable.

NASA Funding – Expenditure Breakdown

NASA research expenditure breakdown.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.13, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

TABLE 3.3 NASA Budget Structure for FY 2005 Through FY 2009 ($ million)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 2005 | 2006 | 2007 | 2008 | 2009 |
| NASA total budget | 16,070 | 16,270 | 16,100 | 17,372 | 17,782 |
| Exploration capabilities | 8,419 | 6,520 | 6,144 | 6,569 | — |
| Exploration systems | 1,431 | — | — | — | — |
| Spaceflight | 6,988 | — | — | — | — |
| Space operations | — | 6,520 | 6,144 | 6,569 | 5,765 |
| Science, aeronautics, and exploration | 7,620 | 9,718 | 9,924 | 10,770 | 11,983 |
| Space science | 4,019 | — | — | — | — |
| Science | — | 5,243 | 5,284 | 5,590 | 4,503 |
| Exploration systems | — | 3,049 | 3,414 | 4,003 |  |
| Exploration | — | — | — | — | 3,505 |
| Biological and physical science | 925 | — | — | — | — |
| Earth science | 1,535 | — | — | — | — |
| Aeronautics | 962 | 893 | 709 | 623 | 500 |
| Education programs | 179 | — | — | — | 169 |
| Cross-agency support (CAS) programs | — | 533 | 517 | 554 | 3,306 |
| Inspector General | 31 | 32 | 32 | 33 | 34 |
| SOURCE: Richard Keegan, Office of Programs and Institutional Integration, NASA Headquarters, presentation to the committee, September 8, 2009. | | | | | |

NASA Funding – Space Center – Jet Propulsion Lab

The Jet Propulsion Laboratory has an annual budget of 1.6 billion dollars.

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.52, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

JPL’s annual budget is $1.6 billion. The intent at NASA Headquarters has been to maintain JPL with 5,000 employees. In the current environment, JPL must compete for new missions, many of which will be smaller than the Voyager, Galileo, and Cassini-class missions that have traditionally helped maintain institutional capabilities at JPL, including the science and technology laboratories. JPL’s ability to maintain its laboratory capabilities has been adversely affected by the erosion of its investment in TRL 1-3 research. JPL has no CM&O allocation from Headquarters and uses overhead to generate the approximately $100 million or so that it invests every year in IRAD, B&P, test equipment and facilities infrastructure management (TEFIM), test facilities, capital investments, computing, strategic hires, and business process improvements. Of the total, $5.5 million supports TRL 1-3 research. Table 5.5 estimates direct and internal investments in TRL 1-3 research at JPL from FY 2005 through FY 2009.

[NOTE: GSFC = Goddard Space Flight Center

IRAD = Independent/Internal Research and Development

B&P = Bid and Proposal

CM&O = Center Management And Operations]

$4 million dollars annually is necessary to update the Jet Propulsion Lab’s equipment.

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.53, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

The age distribution of research equipment at JPL is as follows: 42 percent, more than 20 years; 11 percent, 10 to 20 years; 34 percent, 5 to 10 years; and 13 percent, 0 to 5 years. One of the challenges that JPL faces is the aging of 20,000 pieces of equipment. The current average age is more than 11 years (JPL management believes that it should be 7 years). A $4 million investment would be required every year to meet this need, but the planned expenditures are only $1 million per year.

NASA Funding – Space Center – Marshall Space Flight Center

Marshall Space Flight Center has a total budget of 2.528 billion dollars.

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.62, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

Overall funding for MSFC comes from a variety of sources. In FY 2009 MSFC received $302.5 million in CM&O, as shown in Table 3.4 in Chapter 3. The total MSFC budget for FY 2009 was $2.528 billion, as reported in an e-mail from the MSFC deputy manager, Advanced Concepts Office, on January 20, 2010, so the CM&O was 12 percent of the total budget. The CM&O-funded B&P work in FY 2009 was $595,000, but it is unclear what percentage was spent on research activities that were only TRL 1-3. MSFC funds an IRAD program that it refers to as the Marshall Technology Investment Fund. In FY2010 the amount will be $2.4 million; in FY 2009 it was at $5.1 million, and it had been as high as $10 million in earlier years.16 Competition is fierce for this funding, which supports research in strategic technologies. Other sources of funding for basic research come in limited quantities from NASA Headquarters’ ROSES, ETDP, and the Innovative Partnership Program. Collaborative research is also conducted with DARPA, DOE, and the Department of Defense (DOD). And finally, a small amount of research is funded through reimbursable contracts.

[NOTE: GSFC = Goddard Space Flight Center, IRAD = Independent/Internal Research and Development, B&P = Bid and Proposal, CM&O = Center Management And Operations, TRL = Technology Readiness Level, ETDP = Exploration Technology Development Program, DARPA = Defense Advanced Research Projects Agency, DOE = Department of Energy, ROSES = Research Opportunities in Space and Earth Sciences]

\*\*\*Spending & Tradeoff

Spending Link – Moon

Moon mission will cost in the hundreds of billions

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p.6,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

NASA has not provided a cost estimate for the Vision as a whole. In 2004, it projected that developing capabilities for human exploration, not including robotic support missions, would cost a total of $64 billion up through the first human return to the Moon.19 The Congressional Budget Office (CBO) concluded that, based on historical trends, the actual cost could be much higher.20 In its 2005 implementation plan, NASA estimated that returning astronauts to the Moon would cost $104 billion, not including the cost of robotic precursor missions or the cost of servicing the ISS after the end of the shuttle program.21 In 2007, the Government Accountability Office (GAO) estimated the total cost for the Vision as $230 billion over two decades.22 In April 2009, as directed in the 2008 authorization act, the CBO updated its 2004 budgetary analysis of the Vision. It found that NASA would need an additional $2 billion per year through FY2025 to keep the Vision activities on schedule, not counting probable cost growth in other activities.23 In October 2009, the Augustine report stated that executing NASA’s current plans would require an additional $3 billion per year, even with some schedule delays.24

Tradeoff Link – Resources (1/3)

Formulation of NASA policy requires prioritization and balancing of competing interests

NASA issues trigger debate over major issues in Congress – including mission, priorities, and methods

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p.2-3,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

What Is NASA For?

During the Eisenhower Administration, after the Soviet Union’s launch of the first artificial satellite, Sputnik, but before the establishment of NASA, the President’s Science and Advisory Committee identified four “principal reasons for undertaking a national space program”:

• “the compelling urge of man to explore and to discover”;

• “defense ... to be sure that space is not used to endanger our security ... [and to] be prepared to use space to defend ourselves”;

• to “enhance the prestige of the United States ... and create added confidence in our scientific, technological, industrial, and military strength”; and

• “scientific observation and experiment which will add to our knowledge and understanding of the Earth, the solar system, and the universe.”6

To these objectives, analysts today add

• the potential for technologies developed for the space program to have direct and indirect (“spinoff”) economic benefits;

• the opportunity to use space activities as a tool of international relations, through collaboration on projects such as the International Space Station; and

• the ability of the space program to inspire students and promote education in science, technology, engineering, and mathematics (STEM).

These goals form a foundation for U.S. space policies, but policy makers differ in how they should be balanced against each other. Is the urge to discover a sufficient reason to explore space, or must exploration also meet needs here on Earth? Should economic benefits be an explicit focus for NASA or just a positive side effect? To what extent should improving STEM education be a NASA function, as opposed to a consequence of its other functions? Should the emphasis of international space programs be competition or cooperation?

The priorities that Congress assigns to these objectives may determine how it balances the competing demands of NASA’s programs. For example, if Congress believes that national prestige is a high priority, it could choose to emphasize NASA’s high-profile human exploration activities, such as establishing a Moon base or exploring Mars. If scientific knowledge is a high priority, Congress could emphasize unmanned missions such as the Hubble telescope and the Mars rovers. If international relations are a high priority, Congress could encourage joint space activities with other nations. If economic benefits are of interest, Congress could focus on technological development, linking NASA programs to the needs of business and industry.

Tradeoff Link – Resources (2/3)

Limited resources force trade-offs within NASA programing

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p.6,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Issue for Congress: Cost and Schedule

Cost is likely to play a central role as congressional policy makers oversee the Vision’s progress and consider proposals to modify it. During the Bush Administration, NASA stressed that its strategy was to “go as we can afford to pay,” with the pace of the program set, in part, by the available funding.18 The original plan in 2004 proposed adding a total of just $1 billion to NASA’s budget for FY2005 through FY2009 to help pay for the Vision, with increases thereafter limited to the rate of inflation. Subsequent Administration budgets more than eliminated this increase, and actual appropriations by Congress were even less. As a result, most funding for the Vision has been redirected from other NASA activities, such as the planned termination of the space shuttle program.

Competing interpretations of NASA’s purpose ensure priorities compete

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 17,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Balancing these competing priorities depends on answering questions, raised earlier in this report, about NASA’s purpose. More than 50 years ago, President Eisenhower’s advisors were aware that a space program was justified both by “the compelling urge of man to explore and to discover” and by “scientific observation and experiment which will to add to our knowledge and understanding.” Today, there is still no consensus about how to balance these purposes. Some policy makers believe that a space program can best be justified by tangible benefits to economic growth and competitiveness. Others believe that its most important role is to be a source of national pride, prestige, and inspiration.

Tradeoff Link – Resources (3/3)

Resources tradeoff – shuttle proves

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p 17-18,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Why the Shuttle Program Is Ending

The oldest shuttle is approaching 30 years old; the youngest is approaching 20. Although many shuttle components have been refurbished and upgraded, the shuttles as a whole are aging systems. Most analysts consider the shuttle design to be based, in many respects, on obsolete or obsolescent technology. The original concept of the shuttle program was that a reusable launch vehicle would be more cost-effective than an expendable one, but many of the projected cost savings depended on a flight rate that has never been achieved. Over the years, NASA has attempted repeatedly, but unsuccessfully, to develop a second-generation reusable launch vehicle to replace the shuttle. In 2002, NASA indicated that the shuttle would continue flying until at least 2015 and perhaps until 2020 or beyond.

The Columbia disaster in 2003 forced NASA to revise that plan. Within hours of the loss of the space shuttle Columbia and its seven astronauts, NASA established the Columbia Accident Investigation Board to determine the causes of the accident and make recommendations for how to proceed.68 The board concluded that the shuttle “is not inherently unsafe” but that several actions were necessary “to make the vehicle safe enough to operate in the coming years.”69 It recommended 15 specific actions to be taken before returning the shuttle to flight. In addition, it found that

because of the risks inherent in the original design of the space shuttle, because the design was based in many aspects on now-obsolete technologies, and because the shuttle is now an aging system but still developmental in character, it is in the nation’s interest to replace the shuttle as soon as possible as the primary means for transporting humans to and from Earth orbit.70

The board recommended that if the shuttle is to be flown past 2010, NASA should “develop and conduct a vehicle recertification at the material, component, subsystem, and system levels” as part of a broader and “essential” Service Life Extension Program.71

The announcement of the Vision for Space Exploration in 2004 created another reason to end the shuttle program: money. Before the shuttle program began to ramp down, it accounted for about 25% of NASA’s budget. Making those funds available for the Vision became a primary motivation for ending the program.

Tradeoff Link – Cost Overruns

Cost overruns sap resources from other NASA programs

Holdren, Office of Science and Technology Policy Director, 5-4-11

[John, CQ Transcriptions, “REP. FRANK R. WOLF HOLDS A HEARING ON THE OFFICE OF SCIENCE AND TECHNOLOGY BUDGET”, Lexis]

HOLDREN: ...the -- the essence of the matter is, in part, you are right that we've known since early in the previous administration that -- that the shuttle program needed to come to an end. It needed to come to an end for a number of reasons, one of them being that this is basically 1970s technology which, in some sense, is -- is -- is so complicated and so fragile you see the results in the fraction of the time that we end up having to postpone launches for the safety of the astronauts which, obviously, has to remain paramount.

But it was also the case that the shuttle is so expensive to operate that while you're operating it you can't find the money in any plausible NASA budget to develop its replacement. And so it was recognized already in the Bush administration. They made that decision that the shuttle would be phased out.

And the problem was that the successor program to the shuttle, the Constellation Program -- that was going to provide both access to low Earth orbit and the heavier capabilities for -- for deeper space missions -- never got the budgets it needed to stay on track. And the result was, by the time we came into office the Constellation Program was in danger of being three to four times over budget -- that is, over the originally anticipated costs -- for those vehicles.

And in addition, it was so far behind schedule that no amount of money poured into it at this point could erase the gap in the capability to put American astronauts on the space station on -- on U.S. rockets. At the same time, the attempt within NASA to find enough money to keep Constellation on track had sapped the resources available for many of NASA's other programs.

Tradeoff Link – Mission Focus Swamps Independent Projets

NASA has difficulty promoting projects independent of missions

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 13-14,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

In recent years, Congress has sought to ensure that NASA’s science program includes a balanced variety of approaches to R&D rather than focusing only on certain types of missions. For example, the NASA Authorization Act of 2008 stated that the science program should include space science missions of all sizes as well as mission-enabling activities such as technology development, suborbital research, and research and analysis (R&A) grants to individual investigators.44 According to the National Research Council, “practically all relevant external advisory reports have emphasized the importance of mission-enabling activities,” but determining their proper scale has been challenging “throughout NASA’s history.”45 In the past few years, funding for planetary science technology has increased significantly, but funding for Earth science technology has increased only slightly; the astrophysics and heliophysics programs do not have dedicated technology subprograms. Funding for suborbital rocket operations increased from $51 million in FY2008 to $66 million in FY2010, but the trend is unclear as the latter amount was down from $77 million in FY2009. Funding for R&A grants, which NASA controversially proposed to reduce significantly as recently as FY2007, has recovered as the result partly of the Administration’s own initiatives and partly of congressional action on appropriations legislation. In December 2009, the National Research Council recommended ways to make the mission-enabling activities of NASA’s science programs more effective through more active management. These recommendations included establishing explicit objectives and metrics, making budgets more transparent, and clearly articulating the relationships between mission-enabling activities and the ensemble of missions they are intended to support.46 The NASA Authorization Act of 2008 stated that the technology development program should include long-term activities that are “independent of the flight projects under development.”47 NASA may sometimes find it challenging to balance this independence against the goal of linking mission-enabling activities to the missions they support.

Tradeoff Link – Focus Tradeoff

Plan forces a tradeoff in funds and focus – erodes other programs

Enderle, president and principal analyst of the Enderle Group, 4-15-10

(Rob went to California State University, the Enderle group is a forward-looking emerging technology advisory firm Long Beach and got a B.S. in Manpower Management, MBA “NASA Re-Mission Illustrates Good, Bad Business Practice” IT Business edge, <http://www.itbusinessedge.com/cm/blogs/enderle/nasa-re-mission-illustrates-good-bad-business-practice/?cs=40703> accessed: 6-27-11) TJL

The primary goal for the space race wasn’t scientific advancement or even exploration, it was getting a foothold first on a potential strategic military asset -- space -- and focusing a nation on something other than its problems. But as each milestone was achieved, the reason for the program became increasingly muddy. As a result, milestones started drifting out and funding also became increasingly elusive.   This is true of many, if not most, long-term projects that last longer than the executives who started them. It is actually kind of amazing that the United States made it to the moon given that the president who started the effort died prematurely well before that goal was achieved.   As governments and companies age, the executives who run them change. The motivations for projects can erode, and companies can lose focus. NASA went from being a national program firmly based on national security to one that seemed far less focused, [had more problems](http://www.popsci.com/military-aviation-amp-space/gallery/2009-03/top-10-nasa-probe-failures) and became more difficult to fund. Early Warning:  Drifting Milestones While the United States arrived at the moon reasonably quickly, its later milestones -- moon bases, space stations, manned expeditions to Mars -- started drifting out massively.  It took less than a decade to put the first man on the moon, but the shuttle likely should have been a commercial project in the first place given that it was more like a scheduled delivery and repair service. Probes and robots continued to go out, but the program's energy had largely evaporated.   While it might not have been externally clear what was broken, when milestones start shifting out by years or especially decades, it indicates a program that needs to be rethought or shut down. Otherwise, such projects become a money hole with little or no chance of achieving their remaining goals and  objectives.   Starting Over When those funding a project lose track of the program's goals or no longer find them compelling, it's generally best to pull the plug on the project or radically redesign it. From that point on, it'll be tough to get funding and those remaining backers will be increasingly dissatisfied. It is generally better to significantly change direction on a project and focus the remaining funds on achievable goals.   Large companies and governments tend to suffer from too many projects that are all underfunded and failing. It is always better to have fewer fully funded projects because it increases the chance of success with some of them. That means either cutting underfunded projects or redesigning them against current goals and resources.   Wrapping Up:  The NASA Lesson Like any major project, once the initial goal is achieved, the effort needs to be revalidated. Long-term projects need to be under constant review to make sure their goals remain achievable with the available funding. If they aren’t, the hard choices are to increase funding to make the goals achievable, to alter the goals to match the funding or to cut funding entirely. The world often changes a great deal in a decade. Programs that last longer than this likely need to be heavily altered to assure they remain relevant or they are likely to be discontinued outright.   Management is paid to make hard decisions. Sometimes the hardest is to realize that you simply can’t afford to do anything and to pick those things you can do. It is generally better to do a few things well than a lot of things poorly.

Tradeoff Link – Vehicles

New vehicles ensure focus tradeoff – history proves new vehicles result in cancellation of vehicles in progress

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 30,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

NASA has a history of new vehicle development programs ending before their completion. The National Aerospace Plane, intended as a replacement for the space shuttle, was announced in 1986 and cancelled in 1992.138 The X-33 and X-34 projects, intended to demonstrate technology for a commercial space shuttle replacement, were announced in 1996 and cancelled in 2001.139 Congress may wish to consider whether there is an inherent risk in abandoning the agency’s current plans even if another alternative seems preferable on its merits. The potential for this risk may be reduced for the heavy-lift alternatives currently being considered because they are all closely related either to the currently planned systems (Ares V Lite to Ares I and Ares V) or to existing operational systems (shuttle-derived rockets to the space shuttle and EELV-derived rockets to the Delta IV or Atlas V).

Tradeoff – AT – Plan Net Increases Budget

NASA doesn’t fight for budget – takes what it can get budget-wise, which has trended toward cuts

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p.6,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Issue for Congress: Cost and Schedule

Cost is likely to play a central role as congressional policy makers oversee the Vision’s progress and consider proposals to modify it. During the Bush Administration, NASA stressed that its strategy was to “go as we can afford to pay,” with the pace of the program set, in part, by the available funding.18 The original plan in 2004 proposed adding a total of just $1 billion to NASA’s budget for FY2005 through FY2009 to help pay for the Vision, with increases thereafter limited to the rate of inflation. Subsequent Administration budgets more than eliminated this increase, and actual appropriations by Congress were even less. As a result, most funding for the Vision has been redirected from other NASA activities, such as the planned termination of the space shuttle program.

Budget affects schedule timelines

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p.6-7,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Schedule is closely related to cost. For example, the 2009 CBO analysis found that NASA could maintain its currently planned budget by delaying its return to the Moon by approximately three years.25 The tradeoffs can be difficult to quantify, however. The Augustine report, unlike the CBO analysis, found that under NASA’s current budget plans, “human exploration beyond low-Earth orbit is not viable” and currently planned budgets would delay a return to the Moon “well into the 2030s, if ever.”26 Schedule delays are already evident. For example, the initial operating capability for Orion and Ares I was originally planned for 2012; it is now planned for 2015; the Augustine committee concluded that 2017 is more likely.

Tradeoff Impact – Moon Vision Good

Failure to complete Vision undermines NASA

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 7,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Supporters counter that the Moon is the closest destination beyond Earth orbit and could serve as a stepping stone for subsequent destinations. As Earth’s nearest neighbor, the Moon is of great scientific interest. Missions to the Moon would provide an opportunity to develop and test technologies and gain experience working in space. According to some advocates, the Moon might literally be a staging point for future missions. For some in Congress, concerned about national security or national prestige, the prospect of a manned Chinese mission to the Moon is a strong motivation to reestablish a U.S. presence. For many who have supported the Vision up to this point, completing it may have become important in itself; part of the Vision’s original purpose was to set a goal for NASA that would give the agency direction and enhance its public support, and supporters may fear that changing plans at this point would weaken NASA, whether or not a better plan could be devised.

Aff – Tradeoff Answer

Congress funds and fiats balance in order to prevent tradeoffs

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 16-17,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Balancing Competing Priorities

Ever since the announcement of the Vision, NASA’s emphasis on exploration has created concerns about the balance between human spaceflight and NASA’s other activities, especially science and aeronautics. Because most funding for the Vision has been redirected from other NASA activities, advocates of science and aeronautics have feared that their programs will be cut in order to pay for human exploration activities. Congress, while fully supporting the Vision, has been clear about the need for balance. The NASA Authorization Act of 2005 directed NASA to carry out “a balanced set of programs,” including human space flight in accordance with the Vision, but also aeronautics R&D and scientific research, the latter to include robotic missions and research not directly related to human exploration.65 The NASA Authorization Act of 2008 found that NASA “is and should remain a multimission agency with a balanced and robust set of core missions in science, aeronautics, and human space flight and exploration” and “encouraged” NASA to coordinate its exploration activities with its science activities.66 In January 2010, NASA Administrator Charles Bolden assured a group of scientists that “the future of human spaceflight will not be paid for out of the hide of our science budget.”67

**\*\*\*NASA Good Impacts\*\*\***

NASA Good – Key to Economy (1/2)

NASA helps the economy – opens new markets

Griffin, NASA Administrator, 7

(Michael D., “The Space Economy” NASA, September 17, pg. 1

<http://www.nasa.gov/pdf/189537main_mg_space_economy_20070917.pdf> Accessed June 22, 2011 EJONES)

NASA opens new frontiers and creates new opportunities, and because of that is a critical driver of innovation. We don’t just create new jobs, we create entirely new markets and possibilities for economic growth that didn’t previously exist. This is the emerging Space Economy, an economy that is transforming our lives here on Earth in ways that are not yet fully understood or appreciated. It is not an economy in space. Not yet. But space activities create products and markets that provide benefits right here on Earth, benefits that have arisen from our efforts to explore, understand, and utilize this new medium. In its last Space Report, in November 2006, the U.S. Space Foundation estimated the Space Economy at $180 B in 2005, with over 60% of that figure coming from commercial goods and services. This growing economy affects just about every aspect of how we live, work, and play, and other emerging new markets are just around the corner. It enables satellite communications including radio and television, telemedicine, point-to-point GPS navigation, weather and climate monitoring, and space-based national security assets. It also includes the nascent space tourism industry and the development of space logistics services that will transform space transportation into a viable commercial enterprise.

NASA simulates the economy – it’s a catalyst

Griffin, NASA Administrator, 7

(Michael D., “The Space Economy” NASA, September 17, pg. 5

<http://www.nasa.gov/pdf/189537main_mg_space_economy_20070917.pdf> Accessed June 22, 2011 EJONES)

To stimulate economic growth, increase our international competitiveness, and create better lives for our citizens, we must stimulate technological innovation. NASA’s own programs accomplish this in one way, but as we have seen, the Space Economy today is much bigger than NASA and becoming more so. But NASA has another role to play, that of an important catalyst for new ideas and new technology by setting extraordinary goals and engaging the imagination and drive of entrepreneurs in the private sector. One such effort is our program to enable the creation of new, low-cost commercial space launch capability, using as an anchor market the logistics for the International Space Station. The COTS – for Commercial Orbital Transportation Services – program is intended to demonstrate capabilities to provide low-cost transportation services to orbit for cargo and crew. If this experimental program is successful, NASA will purchase commercial services for delivery of cargo and crew to the ISS. We envision multiple flights per year beginning after 2010.

NASA Good – Key to Economy (2/2)

NASA aeronautics programs key to the economy

Press Release by House Committee on Science and Technology's Space and Aeronautics Subcommittee Chair Mark Udall (D-CO), 08

[Mark, 5-15-8, Capitol Hill Press Releases, “Subcommittee Chairman Udall`s Statement on the NASA Authorization Act”, LexisNexis, Accessed 6/23/11, LGK]

NASA`s aeronautics research program is one of the most relevant activities that NASA undertakes as it impacts both public safety and our national economy, and the bill provides guidance to ensure that that aeronautics program will regain its former health and focus so that it can continue to contribute to the wellbeing of the nation. That guidance takes several forms. For example, the legislation provides enhanced funding for aeronautics, but it makes clear that the additional funding is to be used to take NASA`s aeronautics research activities to a sufficiently mature state so that the results of that research can be transitioned to the commercial sector as well as to key public sector users. One of the most important examples of the latter is the interagency initiative to develop the next generation air transportation system for the nation, known as NextGen - a program that will improve both the safety and efficiency of our air travel system. The bill makes it clear that we need to do all we can to ensure that the aircraft of the future leave as small an impact on the environment as possible, whether it be noise, energy consumption, or harmful emissions and that NASA has a critical role to play in that effort. And the bill requires an external review of NASA`s aviation safety research to make sure that it is doing all that it can to protect the flying public.

NASA Good – Key to Economic Leadership (1/2)

Investment in NASA allows us to secure economic leadership

Peck, Hunstville Times editor, 1/27/11 (John – Written as an editorial, NASA key to research push, Huntsville Times, Pg. 9A, Lexis) AC

At a science lab in Moscow, six researchers are locked inside a windowless mock spaceship on a simulated 520-day flight to Mars - a study aimed at helping real space travelers learn to cope with the confinement and stress of interplanetary travel. They've been there since June, communicating with the outside world via delayed transmissions, showering once a week and eating food similar to that on the International Space Station. "Landing" is scheduled for Feb. 12. After that the cocooned "astronauts" will begin the months-long faux journey back. Mars missions, of course, are still far into the future. But the experiment illustrates the kind of long-term investment in research that America - and NASA specifically - must have to keep the United States globally competitive in the sciences. President Obama invoked the importance of science during his State of the Union address Tuesday night. What better way to lure young Americans into the sciences than to support a strong space program that sparks wonder and innovation. "This is our generation's Sputnik moment," Obama said, referring to the Soviet satellite launch in 1957 that both scared and inspired Americans to become technologically superior. "Two years ago, I said that we needed to reach a level of research and development we haven't seen since the height of the space race," the president continued. "And in a few weeks, I will be sending a budget to Congress that helps us meet that goal. We'll invest in biomedical research, information and technology, and especially clean energy technology, and an investment that will strengthen our security, protect our planet and create countless new jobs for our people." Sputnik led to the formation of NASA and its crowning achievement, the moon landing. "After investing in better research and education, we didn't just surpass the Soviets, we unleashed a wave of innovation that created new industries and millions of new jobs," Obama said. Continuing, he challenged America's scientists and engineers that "if they assemble teams of the best minds in their fields and focus on the hardest problems in clean energy, we'll fund the Apollo projects of our time." Those who were looking for a commitment to NASA didn't hear it in the president's speech. But his space references and call to strengthen America's innovative spirit show he sees the value of having a viable space program. Currently, NASA's budget is in limbo and it remains uncertain whether the space agency will get the money to fly three more space shuttle missions as scheduled before the orbiters are retired. Republicans controlling the U.S. House have promised to try to cut non-defense and non-entitlement spending this year to at least 2008 levels, which would mark a $1.4 billion loss for NASA's budget. That would essentially wipe out the money NASA hoped to spend this year on the new heavy-lift rocket Constellation. NASA warned Congress this month it doesn't think the new rocket can be built as fast or cheaply as Congress wants, even with no spending cuts. Lest space buffs think powerful representatives from space states like Alabama, Florida, Ohio and Texas will just muscle NASA programs into the budget, Obama vowed to veto legislation containing pet projects known as earmarks. Rather, they will have to sell such programs on their merits, And certainly, there are plenty of selling points for having a robust space policy such as breakthroughs in pharmaceuticals, materials processing, biology, microtechnology and earth sciences, and yes, inspiring future innovators. A strong NASA could work hand in hand with Obama's goal to invest more in education, research and technology to groom a new wave of entrepreneurs who will make the discoveries of tomorrow. China and India are outpacing the U.S. economy in growth and seriously competing on the education and innovation fronts. A recent state Education Department report found that less than half of U.S. students are proficient in science. Obama is right that improving the education system, stimulating more math and science graduates, pioneering new industries, investing in R&D and encouraging entrepreneurship will put the U.S. back on the fast track in the world economy. "We need to out-innovate, out-educate, and out-build the rest of the world," he said. A strong NASA would help America reach that goal.

NASA Good – Key to Economic Leadership (2/2)

NASA space exploration key to US economic and technological edge

Acosta, Coalition for Space Exploration Public Affairs Team chair, 9

(Dean, 5-7-9, Business Wire, “Coalition for Space Exploration Calls for Definitive Plan upon Announcement of 2010 NASA Budget”, LexisNexis, Accessed 6/23/11, LGK]

"The [Coalition for Space Exploration](http://cts.businesswire.com/ct/CT?id=smartlink&url=http%3A%2F%2Fwww.spacecoalition.com%2F&esheet=5960228&lan=en_US&anchor=Coalition+for+Space+Exploration&index=1) is encouraged by the president's $18.7 billion budget for NASA in fiscal year 2010. Yet, the uncertainty of NASA's future direction, specifically in exploration, leaves many unanswered questions. Fundamental concerns linger regarding our ability to remain a leader as a space-faring nation and the resulting issues surrounding workforce transition from the space shuttle program. While we are pleased to see a balanced budget for science and exploration, we must not lose our progress in achieving a seamless transition from current to future space vehicle programs. A focus on space exploration is vital for maintaining tens of thousands of high-tech jobs that drive our nation's economic engine and maintain our technical edge. "We urge the administration to take additional key steps that maintain our global leadership position in space exploration. First, name a NASA administrator to execute a robust space exploration agenda. Second, announce a definitive plan for how we intend to solve the nation's multi-year inability to launch humans into space following space shuttle retirement. "We must remember that space, science and technology are essential components of our nation's economy."

NASA key to space industry and US competitiveness

Phillips & Company, a leading consulting firm 5/3/10

(Phillips & Company is a leading consulting firm that helps companies achieve sustainable growth through the creation and execution of strategic communications and business development campaigns, 5-3-10, Business Wire, “One-day summit to discuss technology and economic policy that will transform the Space Economy”, LexisNexis, Accessed 6/23/11, LGK]

Said Phillips & Company President and summit host Rich Phillips, "U.S. competitiveness depends on a vital economic engine of job creation-and one of the greatest opportunities for job growth is fueled by our commitment to scientific discovery and our leadership position in the global Space Economy. The Space Economy promises to be a $1 trillion industry within 10 years, rivaling the Internet economy's early days and a critical component to job growth and economic leadership. Our ability to leverage this opportunity depends on a renewed partnership between NASA and the private sector and our willingness to come together on issues of principle that we all share."

NASA Good – Key to Jobs

NASA is key to thousands of jobs – prefer our studies

Hanner, Ames Research Center, 10

(Karen, “NASA Ames Stimulates Economy with Jobs, Innovation” National Aeronautics and Space Administration Documents and Publications May 10, Lexis Accessed June 22, 2011, EJONES)

NASA's Ames Research Center generated 5,300 jobs and $877 million in total annual economic activity in the nine-county San Francisco Bay Area in 2009, according to a new economic benefits study. The study found that nationally, NASA Ames supports more than 8,400 jobs and generates $1.3 billion in annual economic activity. Coordinated by the NASA Research Park Office and prepared by Emeryville-based Bay Area Economics (BAE) in association with Architecture, Engineering, Consulting, Operations and Management's San Francisco office, the study also reported that NASA Ames produced 5,900 jobs and contributed $932 million to California's economy in 2009. The study also forecast that NASA Ames' total economic impacts will grow significantly as its NASA Research Park (NRP) is completed. "As Ames explores space and our planet, it stimulates economic growth by employing scientists and engineering professionals, promoting technology innovation, and preparing the workforce of the future - all to enhance the health, growth, and long-term competitiveness of the Bay Area and the nation," said Ames Director S. Pete Worden. Currently host to more than 70 on-site industry, university and non-profit partners, NRP will ultimately comprise 5.7 million square feet of new construction for research and development offices, university classrooms and laboratories, rental housing, museums, and a conference and education center. New construction at NRP is expected to total approximately $2.8 billion, generating an average of 1,700 construction jobs annually over the next 15 years in the Bay Area, 1,900 in California, and more than 2,800 nationally. "With the unemployment rate in the Bay Area for construction workers at 30 per cent, the development of the NASA Research Park may create thousands of jobs that will help put people to work and stimulate the local economy. It is these types of projects that create a triple bottom line: higher education, economic development and good jobs," said Neil Struthers, chief executive officer of the Santa Clara and San Benito Building and Construction Trades Council. Upon full occupancy, NRP partners may further stimulate the local, state, and national economy with new jobs and economic activity. Bay Area Economics estimated that NRP would trigger $4 billion in new annual economic activity resulting in an additional 21,400 jobs in the Bay Area region. The study also predicted that nationally, NRP will contribute $5.8 billion in new annual economic activity and 33,800 new permanent jobs. The NRP was developed in partnership with the neighboring cities of Mountain View and Sunnyvale. "For many years the City of Mountain View and NASA Ames have enjoyed a close partnership. This Economic Benefits Study quantifies Ames', and particularly the Research Park's, employment and economic output contribution to our region, and the city looks forward to continuing this partnership to enhance these benefits for our community," said Mountain View City Manager Kevin C. Duggan. The study concluded that NASA Ames also plays a critical role in supporting the nation's drive to promoting future economic growth. NASA Ames has forged numerous partnerships with private industry, educational institutions, and nonprofit organizations that have contributed to breakthroughs in climate change research, disaster response capacity, commercialization of space, robotics, supercomputing, nanotechnology, small satellites, and green/clean technology. "NASA Ames fuels innovation through exploration that creates jobs and helps power the Silicon Valley economy," said Silicon Valley Leadership Group Chief Executive Officer Carl Guardino. "This is but one more stellar example of NASA Ames' contributions to our region, state and nation." NASA is working to educate the next generation of scientists, engineers, and technical professionals, and operates a comprehensive set of educational programs that teach students and train teachers in science, technology, engineering and math. The NRP's educational partners include the University of California Santa Cruz, Carnegie Mellon University, Santa Clara University, Foothill / De Anza Community College, United Negro College Fund Special Programs Corporation, and Singularity University. "In addition to the NRP research and development collaborations, we are developing more formal multi-party relationships, including science, technology, engineering and math education and regional disaster assistance, with the fundamental premise of leveraging all parties' expertise, facilities and resources to accomplish more than we can as individual organizations," said NRP Director Michael Marlaire. NASA Ames Research Center is one of 10 NASA centers with an annual budget of approximately $750 million and more than 2,500 onsite civil servant and contractor employees. NASA Ames is located on approximately 2,000 acres adjacent to the cities of Mountain View and Sunnyvale in California's Silicon Valley. NASA Ames conducts scientific research and research and development in the fields of astrobiology; Earth and life sciences; artificial intelligence; information technology; supercomputing; airspace systems; entry, descent, and landing systems; and small satellites and related technologies.

NASA Good – Key to Private Sector (1/2)

NASA is key to the private sector – engages private companies

PR Newswire, 8

(“Space Economy to Exceed $250 Billion in 2008 as World Embraces Next Business Frontier;

Texas Consulting Firm Launches Space Technology Practice to Help Companies Reach for the Stars” April 9, Lexis, EJONES)

According to NASA Deputy Administrator Shana Dale, "The Space Economy impacts just about every aspect of how we live, work, and play, including weather and climate monitoring and space-based security applications that keep us safe. When we pay for gas at the pump, draw cash from an ATM or enjoy listening to satellite radio, we experience the benefits of the Space Economy." NASA reports that the space economy has provided more than 1,500 kinds of technology that have worked themselves into our lives, most notably satellite radio, cell phones, global communication and laser technology. The Space Foundation Space Index published by the Space Foundation, tracks the market performance of 31 public companies with predominantly space-related revenues. Since its inception in 2005, the Space Foundation Space Index has grown by 29 percent and outpaced S&P 500. High-technology leaders are embracing the growth opportunities of the Space Economy. Since 2003, Cisco Systems has demonstrated a commitment to space-based networking extending the Internet to satellites with onboard routing. Google Company Dossier has also weighed in on the role of the Space Economy in a presentation to NASA and government leaders this January. "Isn't it obvious that spacecraft should have an Internet on them, too?" said Google CEO Eric Schmidt. NASA, which turns 50 this year, has been shifting its focus in recent years in support of a public-private partnership model that fosters increased collaboration with commercial enterprise. According to NASA Administrator Michael D. Griffin, "The Space Economy today is much bigger than NASA and becoming more so. But NASA has another role to play, that of an important catalyst for new ideas and new technology by setting extraordinary goals and engaging the imagination and drive of entrepreneurs in the private sector." The Federal Aviation Administration Office of Commercial Space Transportation issues licenses for the operations of non-federal launch sites, or "spaceports." There are currently 14 spaceports in the United States with eight more currently in the planning or construction phase, including Spaceport America in New Mexico. According to the FAA, space tourism could generate more than $1 billion in annual revenue by 2021, the largest share comprising suborbital flights, like the ones proposed by Richard Branson's Virgin Galactic.

NASA is key to the private sector – contracts

Amadeo, economic analyst, No Date

(Kimberly, “How Much Does NASA Cost” About.com, <http://useconomy.about.com/od/usfederalbudget/p/nasa_budget_cost.htm>, accessed June 22, 2011, EJONES)

A report by the Space Foundation estimated that NASA contributed $180 billion to the economy in 2005. More than 60% of this came from commercial goods and services created by companies related from space techonology. This means that each dollar of NASA spending creates $10 of benefit in the economy. NASA spending created the satellite communications which allows not only radio and television, but also telemedicine, GPS navigation, weather forecasts, and defense. A 2002 study by Professor H.R. Hertzfeld of George Washington University showed there is a large return to the companies work with NASA on its research contracts. These companies are able to commercialize the products developed and market them. The 15 companies studied received $1.5 billion in benefits from a NASA R&D investment of $64 million. Small companies didn't receive as much benefit, because they didn't have the ability to market the technology on a larger scale. The study concludes that NASA could create greater economic benefit by continuing the relationship with the companies they work with. NASA could also help open additional financial and marketing doors for these companies.

NASA Good – Key to Private Sector (2/2)

NASA key to private industry- it just needs US funding

Meade, National Research Council Committee for the Assessment of NASA's Aeronautics Research Program co-chair, 8

[Carl J, Committee for the Assessment of NASA's Aeronautics Research Program National Research Council 5-1-8, CQ Congressional Testimony, “NASA Aeronautic Research and Development Program”) LexisNexis, accessed 6/23/11, LGK]

NASA has a critical part to play in preserving the role of the United States as a leader in aeronautics. NASA research facilities and expertise support research by other federal agencies and industry, and the results of research conducted and/or sponsored by NASA are embodied in key elements of the air transportation system, military aviation, and the U.S. space program. NASA aeronautics research will carry on this tradition as long as its research is properly prioritized and research tasks are executed with enough depth and vigor to produce meaningful results in a timely fashion. Accordingly, the effectiveness of NASA's aeronautics research would be enhanced by Congressional direction to implement the high-priority research challenges in the Decadal Survey of Civil Aeronautics. Congress may also choose to relax the constraints that limit the ability of NASA to implement a more robust aeronautics research program. As noted above, constraints of particular interest include the budget, facilities, workforce composition, and related federal policies.

NASA Good – Key to Competitiveness

NASA solves competitiveness – innovation

Griffin, NASA Administrator, 7

(Michael D., “The Space Economy” NASA, September 17, pg. 3

<http://www.nasa.gov/pdf/189537main_mg_space_economy_20070917.pdf> Accessed June 22, 2011 EJONES)

But if technological innovation drives competitiveness and growth, what drives innovation? There are many factors, but the exploration and exploitation of the space frontier is one of them. The money we spend – half a cent of the Federal budget dollar – and the impact of what we do with it, doesn’t happen “out there.” It happens here, and the result has been the Space Economy. So if America is to remain a leader in the face of burgeoning global competition, we must continue to innovate, and we must continue to innovate in space. There is another factor driving innovation as well, too often overlooked, or if seen, too often dismissed. Success in an economic competition depends upon image as well as substance. Companies the world over have a choice as to where to do deals, and with whom to do them. The nation that appears to be at the top of the technical pyramid has taken a large step toward being there in fact. Developing countries like China recognize the value of space activities as a driver of innovation, a source of national pride, and a membership in the most exclusive of clubs – that of spacefaring societies. And it is no coincidence that we’re seeing thousands of high-tech start-ups in China. NASA is uniquely positioned to drive the Space Economy with both substance and style, because our mission requires us to push the technological envelope every day, and to do it in the most publicly visible manner of any human enterprise. Our human and robotic ventures into the solar system, our attempts to fathom the mysteries of the Universe, require for their accomplishment a voyage of discovery beyond the limits of knowledge, and they are accomplished for all to see on a stage of breathtaking scope and grandeur. At once, we have an endeavor which places the highest possible demands on technical ingenuity, requires a calculated yet stunning audacity for its success, and returns a product with which all the world is fascinated. And even when we fail, we do so, in Teddy Roosevelt’s immortal words, “while daring greatly”. This is why, each year, the National Air and Space Museum is the world’s most visited museum.

NASA Good – Technology Innovation (1/2)

NASA is key to technology – tech sharing programs

Moon and back, 4-19-11

(“NASA Selects Small Business Technology Transfer Proposals” <http://moonandback.com/2011/04/19/nasa-selects-small-business-technology-transfer-proposals/> accessed June 22, 2011, EJONES)

NASA has selected 27 STTR small business proposals that address critical research and technology needs for agency programs and projects for final contract negotiations. The proposals have a combined value of approximately $16.2 million. Proposals were submitted by 27 high-tech firms in 18 states, partnering with 24 research institutions in 19 states. Negotiated individual awards, each with a value of up to $600,000, will be for research projects for two years. The proposals are included in Phase II of NASA’s Small Business Technology Transfer program. The agency’s Office of the Chief Technologist manages the program as part of its focus on emerging technologies and efforts to advance technological innovation for NASA and the government. “Through programs like this, NASA is investing in innovation in America’s small businesses and universities,” said NASA Chief Technologist Bobby Braun at the agency’s headquarters in Washington. “There is no shortage of technological innovators in this country; we simply need to invest in them. Investing in research and technology, the U.S. will not only extend its technological superiority, but also will stimulate our economy, creating new high-tech jobs, products and services all across our country.” The program’s innovations address specific technology gaps in NASA missions; provide a foundation for future technology needs; and are complementary to other agency research investments. innovative technologies in the program include Information technologies that enable planetary robots to better support human exploration. Advanced space power and propulsion technologies that will result in durable, long-life, lightweight, high performance space power and in-space systems to fulfill the nation’s exploration goals. Modern computational fluid dynamics codes to solve fluid motion equations and enhance the modeling required for a wide range of NASA missions, including subsonic commercial aircraft, rotorcraft, supersonic and hypersonic vehicles and planetary exploration vehicles. The highly competitive program is a three-phase award system. It provides qualified small businesses, including women-owned and disadvantaged firms, with opportunities to propose innovative ideas meeting specific research and development needs of the federal government. The program requires a collaborative research effort between small businesses and research institutions. The criteria used to select the winning proposals included technical merit and innovation, Phase I program results, value to NASA, commercial potential and company capabilities. Phase I is a feasibility study to evaluate the scientific and technical merit of an idea. Awards are for up to 12 months in amounts up to $100,000. Phase II expands on the results of the development in Phase I. Phase III is for the commercialization of the results of Phase II and requires the use of private sector funding. NASA is required by statue to reserve a portion of agency research and development funds for awards to small businesses. NASA works closely with the Small Business Administration ensuring compliance with federal regulations related to the program. The Office of the Chief Technologist manages the program through NASA’s Ames Research Center at Moffett Field, Calif. Individual projects are managed by NASA’s field centers.

NASA Good – Technology Innovation (2/2)

NASA is key to technology – NASA programs and contracting

Targeted News Service, 9

(“Subcommittee Examines Technology Development at NASA” October 22, Lexis, accessed June 22, 2011, EJONES)

The House Science and Technology Committee issued the following news release: Since its creation in 1958, NASA has been one of the nation's leading technology development engines through its investments in advanced aeronautics and space research and technology. Concepts and advanced technologies such as high-energy cryogenic engines, thermal protection for reusable launch vehicles, electric propulsion, solar and nuclear energy power systems, automation and robotics, and sophisticated sensors enabled landing on the moon, travel to other planets, and monitoring of the Earth's environment. These technologies have spawned applications such as satellite communications, space-based weather observations, and advanced aviation navigation systems, that have become part of our basic national infrastructure. One example cited by Chairwoman Giffords at the hearing is the extensive set of NASA-developed technologies that have made possible the commercial aircraft that are so vital our economy and quality of life. Chairwoman Giffords cited an image on the NASA website that illustrated the contributions that NASA-developed technologies have made possible safer, cleaner, and more energy-efficient commercial aircraft--aircraft that are vital to our economy and quality of life. http://www.aeronautics.nasa.gov/contributions/index.htm "Many Members of Congress get in an aircraft like this several times a week, and yet I bet very few of them--or members of the public at large--recognize that NASA R&D made that plane possible," said Giffords. "This picture is just one illustration of the impact of NASA's research on our society and our economy. I have no doubt that each of NASA's other enterprises could provide similar examples--and I hope they will--it's a story that needs telling and re-telling." "I don't think any of the Members here today need to be convinced that NASA should pursue a vigorous program of technology development," said Giffords. "Rather, we want to explore what it will take to get such a revitalized program in place at the agency." NASA's technology development efforts and programs have included objectives ranging from soliciting visionary advanced technology concepts to developing technologies for mission-specific requirements, advancing instrument capabilities, and qualifying hardware for space flight. The 2008 NASA reauthorization (PL 110-422) focused attention on this issue, and included the language: "NASA should make a sustained commitment to a robust long-term technology development activity. Such investments represent critically important 'seed corn' on which NASA's ability to carry out challenging and productive missions in the future will depend." Chairwoman Giffords also cited the finding in the summary report of the Augustine panel on human spaceflight, which acknowledged the importance of technology development: "The Committee strongly believes it is time for NASA to reassume its crucial role of developing new technologies for space." Members and witnesses discussed: the opportunities, challenges, and issues associated with NASA's analysis of advanced concepts and long-term development of technology; NASA's progress in responding to the provisions in NASA Authorization Acts and recommendations from external reviews associated with technology development; and NASA's efforts to collaborate and coordinate with other federal agencies on technology development issues. "I suspect that there may not be a "one-size-fits-all" organizational structure for technology development at NASA," Giffords said. "But it's not just a question of money or how the organizational deck chairs are arranged--NASA has to be smart and opportunistic in seeking out ways to get its technologies out to the private sector and to other potential government users."

NASA Good – Technology Spill-over

NASA tech spills over – spinoffs

Wall, senior writer for SPACE.com, 4-1-11

(Mike, “NASA space inventions benefit all our lives on Earth”

<http://www.msnbc.msn.com/id/42384202/ns/technology_and_science-space/t/nasa-space-inventions-benefit-all-our-lives-earth/> accessed June 22, 2011, EJONES)

Contrary to popular belief, NASA didn’t invent Tang. But the space agency's contributions to people's everyday lives here on Earth still run wide and deep. NASA's primary charter is to explore and better understand the cosmos. But much of the technology NASA developed in reaching for the stars has filtered down to the masses, leading to innovations such as more nutritious infant formula and sunglasses that block harmful ultraviolet light. "We get better airplanes, or we get better weather forecasting from space stuff, sure," said Daniel Lockney, program executive in technology transfer and spinoff partnerships at NASA headquarters in Washington, D.C. "But we also get better-fed children. That kind of stuff, people don't necessarily associate." Some of the highlights Some of the technologies most closely associated with NASA were utilized — and in some cases popularized — by the space agency rather than invented by its scientists. There's the orange-flavored drink Tang, for instance, which was developed by General Foods in 1957. Or Velcro, a Swiss invention from the 1940s. Or Teflon, a synthetic polymer that has found widespread use as an industrial lubricant and a nonstick coating for pots and pans. "Teflon we get all the time," Lockney told Space.com. "But that was DuPont." But the list of NASA inventions that have benefited the public is long and storied. There's " memory foam," for example, which today pads the helmets of football players and is used to manufacture prosthetic limbs. NASA scientists invented the substance in 1966 to make airplane seats safer and more comfortable. NASA research investigating the nutritional value of algae led to the discovery of a nutrient that had previously been found only in human breast milk. The compound, which is thought to be important to eye and brain development, has since found its way into 95 percent of the infant formula sold in the United States, Lockney said. There are many more. NASA research led to the development of sunglasses that block damaging blue and ultraviolet light, for example. One-third of all cell phone cameras use technology originally developed for NASA spacecraft. And in the 1960s, NASA scientists who wanted to enhance pictures of the moon invented digital image processing. The technology later found many other applications — particularly in the medical field, where it helped enable body-imaging techniques such as CAT scans and Magnetic Resonance Imaging (MRI). A secondary benefit Since 1976, NASA has been publishing a magazine called "Spinoff" that describes some of the technologies that have found their way into ordinary folks' lives. "Spinoff" has detailed 1,723 such inventions to date, Lockney said — and that list is far from exhaustive. "We've got a very limited page count," Lockney said. "So there's stuff that doesn't get put in the book." Science editor Alan Boyle's Weblog: The past decade has brought a whole new frontier of icy worlds to explore — and now you can get in on the exploration as well, through IceHunters.org. Private-sector space age turns 7 Giffords' astronaut husband will retire Summer solstice starts with solar storm Last year alone, Lockney added, NASA recorded more than 1,400 new inventions within the agency. While the journey from invention to useful product is long and difficult — and many technologies fail to make it all the way — that number gives an idea of the creative juices flowing within NASA. Of course, that creativity is focused mainly on trying to understand what makes the universe tick, and on figuring out how to explore our neck of the cosmic woods safely and efficiently. While the agency is happy that much of its technology eventually finds some application here on Earth — transferring technologies for the good of the public is part of NASA's charter, Lockney said — it's always aiming higher. "The real emphasis is on exploration technology and innovation," Lockney said. "This is kind of the sauce on the plate. This isn't the entree."

NASA Good – Key to Technological Research

US commitment to NASA is key to technological research

Senator Allen, R-VA, press release, 04

[Sen. George, 9-23-4, US Fed News, The office of Sen. George Allen, R-Va., issued the following press release,“Sen. Allen Focuses Nasa Spending On Aeronautics”) LexisNexis, Accessed 6/23/11, LGK]

Sen. George Allen (R-VA) today urged the Senate to direct NASA to focus resources on advanced aeronautics research and development through an amendment to the NASA reauthorization bill. The Allen amendment has passed the Committee on Commerce, Science and Transportation and reported to the full Senate for action. "The United States must maintain its leadership in aeronautics and aviation through strong support of NASA's research and development programs. Only through a clearer picture of where NASA is directing resources can we hope to maintain our competitive edge in this vital area of science and technology," says Senator Allen. The amendment directs NASA to report to the Congress the total amount it spends on aeronautics research and development and science research related to aeronautics. In this regard, the amendment focuses NASA's priorities through better budget and cost accounting. Currently, because of accounting methods, it is difficult to differentiate between how much NASA spends on staff salaries, equipment, and other operating expenses. This initiative allows for better tracking of the percentage of funding going into actual aeronautics research and development. "Given the decline in aeronautics funding in the last ten years, I believe it is more important than ever for Congress to understand exactly how much of appropriated funding is going into actual research. We need every dollar accounted for to know where we stack up in a very competitive global market in aeronautics. This directive will add discipline and accountability to NASA's use of taxpayer dollars to make sure the agency is spending where Congress intends," says Allen. S. 2541 also includes a section directing NASA to undertake feasibility studies on the next generation of aeronautic technology include supersonic civilian aircraft as well as scholarship funding for aeronautical engineers. The bill now goes to the full Senate. A date for consideration has not been decided. "I am confident that this legislation will help NASA keep innovating, striving and keeping America on the leading edge of civil and defense aviation," says Allen.

NASA Good – Key to Aerospace Industry

The Glenn Research Center key to US aerospace

Press Release from Senator Sherrod Brown (D-OH), 9

[U.S. Senator George V. Voinovich (R-OH) and Sherrod Brown (D-OH), 3-10-9, Congressional Documents and Publications “Sens. Voinovich, Brown Lead Letter To President Obama On Strengthening NASA In Ohio”, LexisNexis, Accessed 6/23/11, LGK]

U.S. Senator George V. Voinovich (R-OH) and Sherrod Brown (D-OH) led a letter today with the Ohio delegation expressing a desire to work with President Obama to strengthen the presence of the National Aeronautics and Space Administration (NASA) in Ohio. Ohio is home to the Glenn Research Center, one of only ten NASA research centers in the country. "We would encourage you to pay particular attention to the Glenn Research Center and its testing facility, Plum Brook Station," the letter states. "While we are excited by all the work that has been done to date, it is but the beginning of opportunities that will span generations. Ohio has a skilled engineering labor force and manufacturers that have proven themselves on multiple NASA flight projects. When combined with NASA Glenn's experienced federal workforce and world-class facilities, Ohio is a competitive choice for the location of additional contract and sub-contract work in design, development, manufacturing and testing." With the impending retirement of the Space Shuttle program, the delegation expressed the importance of strong leadership at NASA. They wrote to President Obama to encourage him to assemble a management team at NASA comprised of individuals versed in the research, science and technology components of NASA. Please find full text of the letter below: March 9, 2009 President Barack H. Obama White House 1600 Pennsylvania Avenue, NW Washington, DC 20500 Dear Mr. President: We are writing today to express a desire to work with your administration to strengthen the presence of the National Aeronautics and Space Administration (NASA) in the State of Ohio. As you know, Ohio is home to the Glenn Research Center, one of only ten NASA research centers in the country. The Center is unique among its peers due to the fact it demonstrates experience in both aeronautics and spaceflight. Its portfolio includes expertise in aerospace power, propulsion, communications and microgravity. The Center has taken a lead in critical manned space flight programs, including the Crew Exploration Vehicle Service Module, the Crew Launch Vehicle Upper Stage Systems, and Lunar station power, communications and thermal management. Glenn's research has played a pivotal role in furthering American dominance in the aerospace sector. Strong and continued investment in space and aeronautics research and development has also had a long-term beneficial economic impact both in Ohio and nationwide; contributing to a growth in new jobs and industrial development. Today, Glenn's benefits extend to every corner of Ohio. NASA's economic impact to the state exceeds $1.2 billion, and acts as a catalyst for the 1,200 aerospace related companies in our state, that are employing more than 100,000 Ohioans. This allows Ohio to carry on a tradition of excellence and leadership in the aerospace industry that began over a hundred years ago with the birth of aviation in Dayton, Ohio. With the impending retirement of the Space Shuttle program, NASA finds itself at a crossroads and in need of strong leadership to guide it through the transition to future missions. As you work to assemble NASA's management team, we would respectfully ask that you seek out experienced individuals, who will remain committed to the "10 Healthy Centers" concept, and who can balance the many unique challenges inherent in an organization that consistently pushes the boundaries of science and technology. We would encourage you to pay particular attention to the Glenn Research Center and its testing facility, Plum Brook Station. While we are excited by all the work that has been done to date, it is but the beginning of opportunities that will span generations. Ohio has a skilled engineering labor force and manufacturers that have proven themselves on multiple NASA flight projects. When combined with NASA Glenn's experienced federal workforce and world-class facilities, Ohio is a competitive choice for the location of additional contract and sub-contract work in designdevelopment, manufacturing and testing.

NASA Spending Key to Aerospace Leadership

NASA can do the plan best- just needs federal funds

Romanowski, Civil Aviation Aerospace Industries Association of America Vice President, 6

(Dr. Michael, 7-18-6, CQ Congressional Testimony, Committee on House Science Subcommittee on Space and Aeronautics , NASA Aeronautics, LexisNexis, Accessed 6/23/11, LGK]

This committee showed its leadership and concern for the state of aeronautics last year when it mandated in the 2006 NASA Reauthorization Act that the administration create a National Aeronautics Policy that reflects the critical role of aeronautics to U.S. long-term competitiveness. This document, scheduled to be completed by November 2006, needs to provide a framework and a roadmap that sets the path for answering the questions that this committee determined as key for the long-term future of domestic aeronautics research and not just the next budget cycle. Instead, significant cuts are being made to the ARMD before the policy is written. Excessive decreases in funding endanger the future of U.S. leadership in the global aviation industry. The risk is compounded by NASA's redirection and internalization of planned research. If NASA is to remain at the forefront of aeronautics research, it is critical that significant changes are made to the proposed aeronautics funding levels and research plans. The recently marked-up appropriations bill cuts almost $88 million in ARMD funding from last year's enacted level. While NASA is sustaining cuts, critical research for the Next Generation Air Transportation System (NGATS) is unfunded and missing from the work plans of any governmental agency. It is estimated that an additional $200-300 million of transitional research is needed each year in vital areas such as air traffic modernization, environment and safety in order to implement this important multi- agency system. With the U.S. air traffic system close to the point of gridlock, only the transformational improvements of NGATS can address capacity shortfalls and other long-term growth needs. The U.S. air transportation system and aviation industry are national assets that directly impact the U.S. economy and drive its long- term growth. They are also integral to national security. Approximately 10 percent of the U.S. economy is directly tied to aviation. The new NASA ARMD research direction largely eliminates cutting- edge demonstration or validation activities (including X planes) that have proven both highly valuable and inspiring. Abandoning transitional R&D demonstrations removes a major tool used to validate fundamental research projects and to conduct research that cannot be performed in laboratories or on computers. Cutting- edge demonstration or validation programs are also vital for establishing the standards and regulations necessary to field many new capabilities.

NASA Good – Key to Space Industry

NASA key to US space leadership

Press Release from Senator Kay Bailey Hutchinson (R-TX), 9

(Sen. Kay Bailey Hutchison (R-Texas), Targeted News Service 6-20-9, “Sen. Hutchison Issues Opening Statement To NASA's Human Space Flight Review Panel”, LexisNexis, Accessed 6/23/11, LGK]

The 2005 Act designated the space station as a National Laboratory, and began its evolution to a facility that not only can meet NASA's research needs, but those of other government agencies, educational consortia, and private research and development concerns. "Both bills conveyed the concern of the Congress regarding the pending gap in US human spaceflight capability-a gap that would begin voluntarily with the end of space shuttle operations-mandated not by technical, engineering, structural or systemic issues, but by a zero-sum budget plan that would require transferring the funds being spent on the shuttle to the efforts to develop its replacement vehicles, the Ares launch vehicles and the Orion Crew Exploration Vehicle. "Both bills also demonstrated a serious degree of concern for the difficult transition from one launch system to the next, and the potential impacts to the highly-and in many cases uniquely-qualified and dedicated people across the country who support our nation's human spaceflight programs, whether they be civil servants, contractors, vendors or suppliers."The potential loss of many of those skilled resources represents a severe disturbance within the 'Gathering Storm' that the Chairman so clearly outlined in his most recent contribution to the US policy arena in the areas of Science, Technology, Engineering and Mathematics excellence and competitiveness.  It has long term implications, not only in places like Houston and the Johnson Space Center in my part of the country, but across a broad spectrum of the country's industrial capabilities and to the vitality of its most skilled workforce. "We must also not forget that America'sleadership in space plays an important role in our nation's national security. We have already seen the preeminent role that space based technology plays in modern warfare and intelligence gathering. Maintaining our efforts in human space flight is an essential part of sustaining the nation's overall space leadership. "There is not adequate time today to give you more than this brief overview of the primary intentions behind the actions and legislation of our Subcommittee and the Congress that I believe you need to be aware of and factor into your deliberations. My Committee staff has prepared a collection of the relevant language, supporting and related information from NASA, the General Accountability Office and the Congressional Budget Office, and a broader description of the issues and concerns we have addressed and continue to address as we draft a 2009 Authorization bill, which we will provide to you. My staff will be available to provide any further detailed information you feel is needed. "Finally, I want to stress my belief that you must be able to consider any and all possible options and alternatives to ensure the continuation and future success of the US human spaceflight programs. I believe it is essential for your review to be unconstrained by any binding consideration, whether budgetary or programmatic. We in the Congress and, I believe, the Administration, must be given a clear picture of what is attainable and what resources would be required. We will then be in a position to make the judgments necessary to achieve the best possible and most affordable result for the American taxpayer. "

NASA Spending Key to Space Leadership

NASA needs to invest in facilities, equipment and personnel to maintain space leadership.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.26, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

GRC is home to several unique and important facilities for fundamental aeronautics, aeroacoustics, and propulsion-related research. Facilities such as the IRT and the AAPL have no equals for conducting TRL 1-3 research. Many of the smaller laboratories with one PI could at least in theory be duplicated at a reasonable cost; however, the larger facilities would require a much larger investment. For NASA to maintain its leadership in aeronautics, aeroacoustics, and propulsion, increased investments in facilities, equipment, and support staff will be needed. GRC has some very specialized aeronautics facilities and personnel, and these assets should be preserved if NASA is to achieve its goals.

[NOTE: GRC = Glenn Research Center, PI = Principal Investigator, IRT = Icing Research Tunnel, AAPL = Aero-Acoustic Propulsion Laboratory, TRL 1-3 = Technology Readiness Level 1-3]

Heavy Lift Capability Key to Space Leadership

A heavy lift rocket is key to our space leadership, without one we won’t be able to do the missions we need without relying on other countries

Smith, National Journal Technology Reporter, 5/18/11

(Josh, “As Shuttle Program Winds Down”, Uncertainty Looms for NASA, National Journal, Lexis) AC

As the space shuttle program nears its final mission, Congress is criticizing NASA for moving too slowly to take the next step. But in many ways, it's still not entirely clear what that next step is. "I'm worried that NASA's inaction and indecision in making this transition could hurt America's space leadership something that would cost us billions of dollars and years to repair," Senate Commerce Chairman Jay Rockefeller, D-W.Va., said in an opening statement for a subcommittee hearing Wednesday. He said he is concerned that the agency is not effectively implementing legislation passed last year that outlined a new focus for NASA. Senate Commerce ranking member Kay Bailey Hutchison, R-Texas, also questioned the speed of NASA's transition. "I think we are all concerned about how slow everything seems to be moving," she told the hearing of the Senate Commerce Subcommittee on Science and Space, called to examine how space exploration aligns with national goals. Congress has yet to fully decide what that next step is. NASA often finds itself squeezed between competing interests in Washington. In 2009, President Obama halted a plan to send astronauts back to the moon, but this year Congress with an eye to home-state jobs appropriated $3.8 billion to fund a so-called "heavy lift" rocket program for an undetermined destination. Obama has called for more spending on climate science, commercial rockets, the International Space Station, and a new generation of space-exploration technology. Congress has generally been skeptical of plans to use more commercial space services. The space shuttle Endeavour took off Monday; the last shuttle mission is scheduled for July. NASA could be vulnerable, as the end of the space shuttle program coincides with efforts to slash government spending. Lawmakers and witnesses at the hearing pointed fingers at congressional and White House proposals to cut NASA's budget. Obama's latest budget proposal froze NASA's budget at 2010 levels while House Republicans called for up to $379 million in cuts. Reducing space budgets may be an attractive option, but in the long term it could hurt the U.S. economy, said Frank Slazer, vice president of the Aerospace Industries Association. "While cutting the federal deficit is essential to assuring our economic future, cutting back on exploration investments is a penny-wise but pound-foolish approach that will have infinitesimal impact on the budget deficit," he said. "Cutting exploration further threatens our economic growth potential and risks our continued national technical leadership overall, even as emerging world powers increase their investments in this important arena." Space exploration has real impact back on earth, said Republican Sen. Marco Rubio, who represents Florida, which hosts the Kennedy Space Center and other NASA facilities and space industries. "America's space program is not something we simply do for fun," he said. "Many industries exist because of the space program." Rubio called for a better-defined goal for NASA. And losing the competitive edge in space could undermine American economic power and national security, said Elliot Pulham, CEO of the Space Foundation. "The mastery of space has always carried with it a not-so-subtle message to friend and foe: 'This is what we are capable of. You want to work with us. You want to be our friend. You want to follow our lead. You do not want to challenge us,'" he said.

\*\*\*NASA Good – AT – NASA Fails

NASA Good – AT – Researchers Fail

NASA researchers are dedicated and will not leave

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.59, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

Despite the frustration expressed over this challenging environment, the passion of all of the personnel was clear to the committee. Many of them persevere at NASA because of the highly specialized research that they can perform to support NASA’s unique mission needs. The researchers understand that NASA must try to do too many things with too small a budget, so they do not fear the tough choices that lie ahead even if they are affected directly. In fact one of the most senior and well-recognized researchers at ARC may have put it best when he said, “I would rather see NASA do three things well than 10 things poorly” as they risk doing when they spread their efforts too thinly.

NASA Good – AT – Bureaucracy (1/4)

Conservatives have over exaggerated the problem – they oppose agencies not for waste but on ideological grounds and don’t take into account private sector inefficiencies

Amy, Professor of Politics at Mount Holyoke College, 7

(Douglas J., “The Case FOR Bureaucracy” Government is Good, An Unapologetic Defense of a Vital Institution, <http://governmentisgood.com/articles.php?aid=20&print=1> accessed June 24, 2011, EJONES)

A few years ago, local officials in my town were holding a public meeting to promote a referendum that would raise taxes to pay for vital city services. A man in the audience rose to object to the tax increase, arguing that instead the city should first get rid of all the waste in the city bureaucracy. The mayor explained that after years of cutbacks in city government, there really was no “fat” left to cut from the budget, and then asked the man what specific cuts he was suggesting. The man said that he didn’t know much about the city budget, but that he “knew” that there “had to be” some waste that could be cut out instead of raising taxes. Such is the strength of the notion that government bureaucracies are inherently wasteful. Even if we don’t know much about government, we are absolutely certain that government agencies are wasteful. In fact, waste is the number one citizen complaint about government – and bureaucracy usually takes most of the blame for this. Seventy percent of Americans agree that when something is run by government, it is usually wasteful and inefficient.2 And conservatives never tire of taking advantage of this view to lambaste the government. As two conservative economists have explained: “As every taxpayer knows, government is wasteful and inefficient; it always has been and always will be.” Cutting bureaucratic waste has become a constant theme of conservatives, and it has become a major rationale for cutting taxes. They argue that we can have the best of both worlds: we can reduce taxes and also not cut back on needed government programs. How? By simply cutting out all the “fat” in government. In the public’s view, government agencies are not only wasteful, they are enormously wasteful. Surveys reveal that Americans believe that 48 cents of every tax dollar going to bureaucracies like the Social Security Administration are wasted.3 Yet investigations by the Government Accounting Office and various blue-ribbon commissions have found that waste amounts to only a small fraction of that figure. Al Gore’s National Performance Review, conducted when he was vice-president, examined the federal bureaucracy in great detail and discovered that waste consisted of less than two cents of every tax dollar.4 Of course we should be ever vigilant about waste and try to eliminate it wherever we can find it, but it seems clear that the extent of this problem is being highly exaggerated by conservative critics of government. As one set of scholars who examined a wide variety of the studies on government waste concluded: “There is … little evidence to support the widespread impression that government inefficiency squanders huge amounts of money.”5 People tend to think there is a large amount of waste in government in part because of the loose way this term is used. For instance, some conservative critics of government count as waste those programs they simply don’t like – such as the Legal Services Corporation, the National Endowment for the Arts, Americorp, and subsidies for public television. But to use the term “waste” in this way makes it entirely a political judgment and renders it essentially meaningless. Normally the term “government waste” refers to the inefficient use of funds because of overstaffing, poor productivity, etc. But conservatives are not opposed to the National Endowment for the Arts because that agency is inefficient; they oppose it on ideological grounds. They wouldn’t support the NEA no matter how “lean and mean” it was. It is a misleading, then, to use the term “waste” in this way. Another problem is that critics of bureaucracy often lump together “fraud” and “abuse” with “waste” to come up with high figures for government losses. But does it really make sense to blame government when doctors defraud the Medicare program, criminals scam the food stamp system, or private contractors cheat the Pentagon? We usually don’t consider it the fault of business that they lose over $15 billion a year to employee theft and $10 billion to shoplifting. Most people blame the thieves for these losses and few consider these thefts to be an indication of something inherently wrong with capitalism. Similarly, it is unfair to consider the problems of fraud and abuse of government programs to be a product of inherently “wasteful” bureaucracies. Naturally, government should do everything it can to reduce these losses, but we should not be blaming the victim.

NASA Good – AT – Bureaucracy (2/4)

No warrant for why NASA fails – government programs have less overhead and are not always worse

Amy, Professor of Politics at Mount Holyoke College, 7

(Douglas J., “The Case FOR Bureaucracy” Government is Good, An Unapologetic Defense of a Vital Institution, <http://governmentisgood.com/articles.php?aid=20&print=1> accessed June 24, 2011, EJONES)

Another of the more persistent myths about bureaucracy is that “business is better” – that businesses are always more efficient than government efforts. Since government bureaucracies don’t have to produce a profit and they are not subject to market competition, it is argued, they have much less incentive to be cost-efficient in their management and delivery of services. The assumed superiority of business has become so commonsensical that it is hardly ever questioned at all. This notion has also become an important argument for conservatives in their effort to reduce government and to privatize many of its functions. But are public agencies always less efficient than businesses? A careful look at this issue casts doubt on this common belief. There have been many empirical studies examining the efficiency of government bureaucracies versus business in a variety of areas, including refuse collection, electrical utilities, public transportation, water supply systems, and hospital administration. The findings have been mixed. Some studies of electric utilities have found that publicly owned ones were more efficient and charged lower prices than privately owned utilities. Several other studies found the opposite, and yet others found no significant differences.6 Studies of other services produced similar kinds of mixed results. Charles Goodsell is a professor of Public Administration and Public Affairs at Virginia Polytechnic Institute and State University who has spent much of his life studying bureaucracy. After examining these efficiency studies, he concluded: “In short, there is much evidence that is ambivalent. The assumption that business always does better than government is not upheld. … When you add up all these study results, the basis for the mantra that business is always better evaporates.”7 Further evidence that business is not always superior to government bureaucracy can be found in the area of health care. This is a critical issue today and it is well worth examining in some detail the question of whether market-based health care is superior to government run programs. Conservatives constantly warn us that adopting “socialized” medicine would put health care in the hands of government bureaucracies, which would be a recipe for incredible waste and inferior care. But is this really the case? We can answer this question by comparing the performance of public versus private health care systems. Every other developed country has some form of universal health care with a substantial amount of public funding and administration. In contrast, while the U.S. has a few programs like Medicare and Medicaid, most of our health care system is privately funded and administered. According to conservative mythology, this market-based system should produce better health care and do so more efficiently. But neither of these claims hold up when we look at studies of the actual performance of public and private approaches to providing health care. First, studies have found that the U.S. health care system is by far the most expensive in the world. We spend 13.6% of our gross domestic product on health care – the highest in the world. The average for the other 13 industrialized countries in the OECD is 8.2%.8 We also rank number one in terms of health care expenditures per capita, with U.S. spending $4,090 a year for every citizen. The highest figures for other industrialized nations are $2,547 per year for Switzerland, $2,339 for Germany, $2,340 for Luxembourg, and $2,095 for Canada.9 But while we clearly have the most expensive health care system in the world, it does not always deliver the best health care nor does it provide health care in the most efficient way. Research has shown that the U.S. ranks poorly compared to many other countries in terms of some common measures of health. For example, we rank 26th among industrialized countries for infant mortality rates.10 We also do much less well in terms of life expectancy. In one typical study, the World Health Organizations (WHO) looked at “disability adjusted life expectancy”– the number of years that one can expect to lead a healthy life. The U.S. came in a disappointing 24th on this measure. As one WHO official concluded: “The position of the United States is one of the major surprises of the new rating system. … Basically, you die earlier and spend more time disabled if you’re an American rather than a member of most other advanced countries.”11 Moreover, an article in the Journal of the American Medical Association in 2000 noted with concern the results of a comprehensive study that compared how 13 industrialized nations were ranked on 16 different measures of health. The U.S. ranked an average of 12th – second to last.12 Why do Americans spend so much on health care but not get superior care? There are several reasons. One is that doctors tend to make more in the U.S. than in other countries, and another is that governments in other countries negotiate better deals with pharmaceutical companies on drug prices. But the other major reason is that our private, multi-payer system is much less efficient than the public single-payer systems in other countries. Consider this: the New England Journal of Medicine estimates that administrative costs take 31 cents out of every health care dollar in the U.S., compared to only 17 cents in Canada.13 Why is this the

**[CARD CONTINUES, NO TEXT DELETED]**

NASA Good – AT – Bureaucracy (3/4)

**[CARD CONTINUED, NO TEXT DELETED]**

case? Private insurance companies spend much more on paperwork and administrative overhead. The sheer number of people that are working in these private insurance bureaucracies far outstrips those required in government-funded programs. In Massachusetts alone, Blue Cross/Blue Shield employs 6,682 workers to cover 2.7 million subscribers. This is more people than work in all of Canada’s provincial health care plans, which cover over 25 million

people.14 Why do insurance companies need so many workers? One reason, as Paul Krugman explains, is that millions of health insurance personnel in the U.S. are employed not to help deliver health care at all, but to try to get someone else to pay the bills instead of their company.

Another source of administrative inefficiency in our private multi-payer health care system is the enormous amount of overlap between companies. Each insurance company must maintain its own records and develop its own billing processes. This is much more expensive than using a single government administrative structure. Moreover, our multi-payer system drives up the administrative costs for doctors and hospitals. They must deal with dozens of different insurance plans, each with their own coverage, payment rules, etc. We then need to add to all of this excessive overhead the need for private insurers to make a profit – something that government needn’t do. This makes our private system become more expensive. It has been estimated that higher overhead and the need for profit together add from 15% to 25% to the costs of private insurance plans, while the overhead for the government-run Medicare program is a mere 3%. Given all this, it should not come as a shock to find that a 2004 study by researchers at Harvard Medical School and Public Citizen concluded that the U.S. could save up to $286 billion a year on paperwork if we switched to a single-payer, national health insurance program.15 This money saved from eliminating the private health care bureaucracy would be more than enough to offset the costs of extending coverage to the millions of Americans who now have no health insurance at all. (Unfortunately, this single-payer plan was blocked by Republicans and conservative Democrats in the 2010 health care reform bill.) To sum up, government-funded universal health care plans provide better care to more people at a lower cost. This one example by itself should be enough to explode the myth that business and privatization are always better than government bureaucracy in providing vital services to the public.

The government is best – private sector ignores safety for profit

Amy, Professor of Politics at Mount Holyoke College, 7

(Douglas J., “The Case FOR Bureaucracy” Government is Good, An Unapologetic Defense of a Vital Institution, <http://governmentisgood.com/articles.php?aid=20&print=1> accessed June 24, 2011, EJONES)

The astronaut John Glenn tells a story about his first trip into space. As he sat in the capsule, waiting nervously on the launching pad, he couldn’t stop thinking about the fact that NASA had given the contract for the rocket to the lowest bidder. This raises another important point about government bureaucracies: we don’t always want them to act like businesses. Conservatives are constantly saying that we would all be better off if government were run like a business. But would we? Businesses are obsessed with their bottom lines and are always looking for the cheapest way to make a product or deliver a service. But in many cases, we don’t want government services to be as cheap as possible. Often, with government, the main concern is the quality of the service, not its costs. For example, do we really want to spend the least amount of money possible on our air traffic control system? Obviously not – the main goal should be maximizing the safety of the aviation system. Also, do we want the cheapest possible workforce in charge of security at our airports? Again, of course not – and this point was even acknowledged by Republicans when they agreed to abandon private security companies in favor of a federalized system in the wake of the 9/11 tragedy. Private security had certainly cost less, but it is clearly better to have a federal program that spends more money on training personnel and pays higher salaries to attract employees who are more capable. Similarly, we don’t really want the cheapest system for dispensing justice in our society. We could certainly save a lot on court costs if we didn’t pay for lawyers for those who can’t afford them and if we got rid of jury trials and lengthy appeal processes. But this would undermine the main goal of providing justice. The point here is clear: unlike businesses, public agencies are not just concerned with the bottom line. We expect our government organizations to pursue a wide variety of important goals, and often cost is not the most important consideration. In this sense, it is unfair to expect many government bureaucracies to be as cheap to run as businesses.

[INSERT NASA GOOD - PROVE THAT NASA IS A GOOD FORM OF BUREAUCRACY]

NASA Good – AT – Bureaucracy (4/4)

Conservatives have over exaggerated the problem – their attacks are only based on myth

Amy, Professor of Politics at Mount Holyoke College, 7

(Douglas J., “The Case FOR Bureaucracy” Government is Good, An Unapologetic Defense of a Vital Institution, <http://governmentisgood.com/articles.php?aid=20&print=1> accessed June 24, 2011, EJONES)

The negative stereotypes of bureaucracy that we have looked at in this article contribute to a political atmosphere that legitimizes the right-wing attack on government. The problem with these stereotypes is not simply that they are exaggerated and mistaken, but that conservatives and libertarians are able to exploit these misperceptions to justify their attempts to defund and hamstring the public sector. The more Americans believe that bureaucracies are bad, the more likely they are to agree with efforts to slash taxes and gut government programs. That is why it is increasingly important that we begin to see that most of the criticisms of government bureaucracy are based more on myth than reality, and that these administrative agencies play a central role in promoting the important missions of a modern democratic government.

NASA Good – Bureaucracy Good – Efficient (1/2)

Bureaucracies are the most rational and efficient organization – several reasons

Borgatti, University of Kentucky management professor, ’02

(Stephen P., professor in the management department at the Gatton College of Business and Economics, “Bureaucracy” 4/2/02, <http://www.analytictech.com/mb021/bureau.htm>, accessed 6/25/11, EK)

Weber concluded that all these new large-scale organizations were similar. Each was a bureaucracy. Today many of us regard bureaucracy as a dirty word, suggesting red tape, inefficiency, and officiousness As we shall see, bureaucracies can develop these features, especially if authority is highly centralized. Weber's purpose, however, was to define the essential features of new organizations and to indicate why these organizations worked so much better than traditional ones. Let us examine the features that Weber found in bureaucracies. Above all, Weber emphasized that bureaucratic organizations were an attempt to subdue human affairs to the rule of reason-to make it possible to conduct the business of the organization "according to calculable rules." For people who developed modern organizations, the purpose was to find rational solutions to the new problems of size Weber saw bureaucracy as the rational product of social engineering, just as the machines of the Industrial Revolution were the rational products of mechanical engineering. He wrote: "The decisive reason for the advance of bureaucratic organization has always been its purely technical superiority over any former organization. The fully developed bureaucratic mechanism compares with other organizations exactly as does the machine with non-mechanical modes of production." [Weber, 1946]. For Weber the term bureaucracy was inseparable from the term rationality. And we may speak of his concept as a "rational bureaucracy" But what were the features developed to make bureaucracies rational? We have already met them: (1) functional specialization (2) clear lines of hierarchical authority, (3) expert training of managers, and (4) decision making based on rules and tactics developed to guarantee consistent and effective pursuit of organizational goals. Weber noted additional features of rational bureaucracies that are simple extensions of the four just outlined, To ensure expert management, appointment and promotion are based on merit rather than favoritism, and those appointed treat their positions as full-time, primary careers. To ensure order in decision making, business is conducted primarily through written rules records, and communications. Weber's idea of functional specialization applies both to persons within an organization and to relations between larger units or divisions of the organization. We have already seen how this applied to Swift & Co. Within a Swift packing plant, work was broken down into many special tasks, and employees were assigned to one or a few such tasks, including the tasks involved in coordinating the work of others. (Such coordination is called administration or management.) Furthermore, Swift was separated into a number of divisions, each specializing in one of the tasks in the elaborate process of bringing meat from the ranch to the consumer. Weber argued that such specialization is essential to a rational bureaucracy and that the specific boundaries separating one functional division from another must be fixed by explicit rules, regulations, and procedures. For Weber it was self-evident that coordinating the divisions of large organizations requires clear lines of authority organized in a hierarchy. That means there are clear "levels of graded authority." All employees in the organization must know who their boss is, and each person should always respect the chain of command; that is, people should give orders only to their own subordinates and receive orders only through their own immediate superior In this way, the people at the top can be sure that directives arrive where they are meant to go and know where responsibilities lie. Furthermore, hierarchical authority is required in bureaucracies so that highly trained experts can he properly used as managers. It does little good to train someone to operate a stockyard, for example, and then have that manager receive orders from someone whose training is in advertising. Rational bureaucracies can be operated, Weber argued, only by deploying managers at all levels who have been selected and trained for their specific jobs. Persons ticketed for top positions in bureaucracies are often rotated through many divisions of an organization to gain firsthand experience of the many problems that their future subordinates must face. [Recall how Moltke rotated his General Staff officers through various regiments.] Finally, Weber stressed that rational bureaucracies must be managed in accordance with carefully developed rules and principles that can be learned and applied and that transactions and decisions must be recorded so that rules can he reviewed. Only with such rules and principles can the

**[CARD CONTINUES]**

NASA Good – Bureaucracy Good – Efficient (2/2)

**[CARD CONTINUED, NO TEXT REMOVED]**

activities of hundreds of managers at different levels in the organization be predicted and

coordinated. If we cannot predict what others will do, then we cannot count on them. Moltke had to be sure that staff officers faced with an unexpected crisis would solve it as he would. To ensure that, officers had to be trained in Moltke's tactical principles and rules. Similarly Gustavus Swift had to know that his stockyards would not buy meat faster than his packing plants could process it or that more meat would not be shipped than his eastern refrigerators could accommodate, of course, it is impossible to spell out detailed rules to fit all contingencies. Therefore, decision makers must be highly trained and must report their decisions promptly and accurately to their superiors.

[NOTE: Weber = Max Weber, German sociologist and political economist, 1864-1920]

NASA Good – Can Reform – Reforming Now (1/2)

NASA can reform – recent reforms by Congress have put NASA on the road to recovery

**House Committee on Science, Space, and Technology Democrats, 11**

(The Committee has exclusive jurisdiction over NASA, 4-30-11, “Subcommittee Democrats Urge Clarity and Realism in NASA's Exploration Plans” <http://www.spaceref.com/news/viewpr.html?pid=33139>, accessed 6/25/11, LGK]

NASA's Douglas Cooke said that NASA understands the direction provided by the NASA Authorization Act of 2010 and is honoring those requirements. And while the agency has not yet finalized its development plans for the Space Launch System and Multipurpose Crew Vehicle, Mr. Cooke told the Subcommittee that NASA "is working expeditiously to ensure it has a credible and integrated plan with which to move forward." He also said that NASA recognizes that Congress wanted more information than the agency was able to provide in a January 2011 interim report and identified late June as the timeframe the agency is targeting for providing Congress with a final report.

NASA is reforming now – IT reforms prove

Hopkins, Chief of Staff, Office of the NASA Chief Information Officer 06/05/11 (John, “IT Reform at the National Aeronautics and Space Administration” <http://blogs.nasa.gov/cm/blog/NASA-CIO-Blog/posts/post_1307320108341.html>, accessed 6/27/11) TJL

I remember in high School one of the coaches used to tell us that when the going got tough, the tough got going. The CIO Council has certainly got going early and with vigor to undertake a reshaping of the Federal IT environment which is indeed tough going. The undertaking is sometimes daunting. I can almost hear Calvin and Hobbs cartoonist Bill Watterson saying his favorite quote, “God put me on this earth to accomplish a certain number of things. Right now I am so far behind that I will never die.” The truth is that the “To-Be” vision of the Federal IT environment in our minds-eye is actually similar from one agency to another. No matter how hard the going gets, it is critical that we have a plan to get there. OMB’s 25-Point Plan and the TechStat reviews make participation a ‘no-brainer’. The activities in the plan and the TechStat reviews help propel us toward our goal of a more efficient and effective IT enterprise. NASA was an early adopter of a key element in the plan, the “cloud-first” approach. NASA became one of the first federal agencies to have a Cloud implementation. Tuesday, September 15, 2009, Vivek Kundra, the Federal Chief Information Officer, toured the NASA Nebula Container and the Security Operations Center (SOC) at NASA Ames Research Center in California. He commented on the NASA Nebula Cloud project as he announced the launch of the Apps.gov platform, an online storefront for Federal agencies to browse and purchase cloud-based information technology (IT) services at a significantly lower cost to the Government. Nebula now serves dozens of customers with centralized services. In addition, NASA has expanded cloud availability with a second instance at Goddard Space Center in Maryland, and is actively adding new customers. This “Cloud-First” philosophy is central to our department’s strategic plan. NASA held their first Tech Stat session on March 24, 2011 for the Integrated Collaborative Environment (ICE), a program that provides a common repository for authoritative data from the Exploration System Mission Directorate (ESMD). ICE is a web-centric environment designed for use by industry, academia and government for sharing, collaborating, integrating, NASA conducting a tech stat review accessing and controlling management information and product data definitions for all ESMD products. The key outcomes included requirements to develop performance metrics, consolidate applications. It also included a discussion of investment opportunities, lifecycle costs, and customer usability. The next TechStat will review the Enterprise Service Desk (ESD), a major component of NASA’s IT Infrastructure Integration Program (I3P) which is designed to transform NASA's IT Infrastructure services from a Center-based model to an enterprise-based management and provisioning model. The scope of I3P is broad, entailing consolidation and central management of IT Services. In addition, NASA’s

**[CARD CONTINUES]**

NASA Good – Can Reform – Reforming Now (1/2)

**[CARD CONTINUED, NO TEXT REMOVED]**

participation and performance under the Federal Data Center Consolidation Initiative (FDCCI) has resulted in the closing of 13 data centers since February 2010 with plans to close one more by the end of calendar year 2011. The remaining 54 NASA data centers will be reduced to 25 by 2015, which actually exceeds the OMB requirement under FDCCI. NASA plans to continually assess data center requirements as these consolidations evolve and after current and future data center requirements become better understood.We intend to not only meet, but to exceed our tasking to, “…drive business process improvement, investment management, and technical decisions.”

NASA Good – Can Reform – Private Industry Cooperation

NASA reform happening – cooperation with the private industry makes NASA for efficient and cost effective

Morring, Aviation Week senior editor, 11

(Frank, Jr., 5-20-11, Aviation Week, “Panelist: SpaceX Costs Offer Hope For NASA”, <http://www.aviationweek.com/aw/generic/story_channel.jsp?channel=space&id=news/asd/2011/05/19/01.xml&headline=Panelist:%20SpaceX%20Costs%20Offer%20Hope%20For%20NASA>, accessed 6/25/11, LGK]

A comparison of what it cost Space Exploration Technologies, Inc. (SpaceX) to develop the Falcon 9 launch vehicle, and the estimate of what it would cost NASA to do the same job, offers hope that NASA can focus on deep-space exploration and leave flights to low Earth orbit (LEO) to the private sector, according to a member of the outside panel that reviewed U.S. human spaceflight plans for President Barack Obama. Christopher Chyba, a professor of astrophysics and international affairs at Princeton University, who played a key role in the 2009 deliberations of the panel headed by former Lockheed Martin CEO Norman Augustine, told the Senate Commerce Committee May 18 that the agency’s confirmation of SpaceX costs are “encouraging about the future.” Chyba, who counseled against NASA trying to operate spaceflight vehicles and developing new ones simultaneously as a member of the Augustine panel subcommittee on exploration beyond low Earth orbit, said the SpaceX experience developing a launch vehicle that has successfully orbited its Dragon capsule for a splashdown recovery bodes well for NASA’s plan to turn over cargo and crew transport to the International Space Station (ISS) to commercial operators. He cited an analysis contained in NASA’s report to Congress on the market for commercial crew and cargo services to LEO that found it would cost NASA between $1.7 billion and $4 billion to do the same job with Falcon 9 that cost SpaceX $390 million. In its analysis, which contained no cost estimates for the future cost of commercial transportation services to the ISS beyond those already under contract, NASA said it had verified the SpaceX cost figures. For comparison, agency experts used the NASA-Air Force Cost Model – “a parametric cost estimating tool with a historical database of over 130 NASA and Air Force spaceflight hardware projects” – to generate estimates of what it would cost the civil space agency to match the SpaceX accomplishment. Using the “traditional NASA approach,” the agency analysts found the cost would be $4 billion. That would drop to $1.7 billion with different assumptions representative of “a more commercial development approach,” NASA said.

NASA Good – Can Reform – Funding/Support Key (1/2)

NASA is on the path to recovery – they just need more money

Potter, director of award-winning documentary “Orphans of Apollo,” 9

(Michael, 7-24-9, LA Times, “A leaner, meaner NASA can take us to the moon and beyond,” <http://www.latimes.com/news/opinion/opinionla/la-oew-potter-nye24-2009jul24,0,1961674.story>, accessed 6/25/11, LGK]

NASA continues to pursue the George W. Bush-initiated "Vision for Space Exploration," which calls for a return to the moon and an eventual human presence on Mars. If these goals of returning to the moon and going on to Mars can be accomplished in a coherent, sustainable and efficient fashion, they should be robustly supported. Supporters of this plan view the moon as a logical stepping stone to Mars, arguing that a sustainable moon base would provide fuel for space vehicles and help us move up the critical learning curve of enabling humans to live beyond low-Earth orbit. In this climate of budgetary pressures and domestic distractions, it is possible that either NASA or a weak-willed Congress may choose a planet destination and skip returning to the moon. If NASA intends to be serious about these ambitious goals, the agency has to immediately tighten its controls on plans, logistics and cost. If the agency is unable to demonstrate this ability to focus, Congress is likely to impose its own will, which would likely result in a scaled-down vision.

NASA can reform – funding and Congressional support required

Schmitt, former U.S. Senator from New Mexico, 11

(Harrison, 5-25-11, “Former Senator Schmitt Proposes Dismantling of NASA and Creation of a New, National Space Exploration Administration (NSEA),” <http://americasuncommonsense.com/>, accessed 6/25/11, LGK]

Immense difficulties now have been imposed on the Nation and NASA by the budgetary actions and inactions of the Bush and Obama Administrations between 2004 and 2012. Space policy gains relevance today comparable to 50 years ago as the dangers created by the absence of a coherent national space policy have been exacerbated by subsequent adverse events. Foremost among these events have been the Obama Administration’s and the Congress’s spending and debt spree, the continued aggressive rise of China, and, with the exception of operations of the Space Shuttle and International Space Station, the loss of focus and leadership within NASA headquarters. The bi-partisan, patriotic foundations of NASA underpinned the remarkable Cold War and scientific success of the Apollo Program in meeting the goal of “landing a man on the Moon and returning him safely to the Earth”. Those foundations gradually disappeared during the 1970s as geopolitical perspectives withered and NASA aged. For Presidents and the media, NASA’s activities became an occasional tragedy or budgetary distraction rather than the window to the future envisioned by Eisenhower, Kennedy and the Apollo generation. For Congress, rather than being viewed as a national necessity, NASA became a source of politically acceptable “pork barrel spending” in states and districts with NASA Centers, large contractors, or concentrations of sub-contractors.

NASA Good – Can Reform – Funding/Support Key (2/2)

NASA’s failures are only because a lack of funding – plan’s extra money solves back ineffectiveness

Messier, Space Journalist, 10

(Doug, “Report: NASA’s Research Facilities Decaying From Lack of Funding” Parabolic Arc, May 11, 2010, <http://www.parabolicarc.com/2010/05/11/report-nasas-research-facilities-decaying-lack-funding/> accessed June 24, 2011, EJONES)

NASA’s to meet major mission goals such as advancing aeronautics, exploring the outer planets, and understanding the beginnings of the universe are being seriously jeopardized by a steady and significant decrease in the agency’s basic research capabilities, says a new report from the National Research Council. Congress and NASA should provide the support necessary for needed equipment and services to conduct fundamental high-quality research. “Solid basic research has always been a critical component for advancing NASA’s missions,” said John T. Best, co-chair of the committee that wrote the report and technical director of the Plans and Programs Directorate at Arnold Engineering Development Center, Arnold Air Force Base, Tennessee. “To ensure future success, it’s imperative that NASA restore and maintain its basic research laboratories.” The report examines laboratories at Goddard Space Flight Center, Glenn Research Center, Langley Research Center, Ames Research Center, Marshall Space Flight Center, and the Jet Propulsion Laboratory. With the exception of a new science building at Goddard, over 80 percent of the research laboratories at these facilities are more than 40 years old and need significant annual maintenance and upgrades. Laboratory equipment and services are inadequate to address immediate and long-term research needs, and the agency is increasingly relying on contractors to support the labs and facilities. “These research capabilities have taken years to develop and depend on highly competent and experienced personnel and infrastructure,” said Joseph B. Reagan, co-chair of the committee and retired corporate vice president, Lockheed Martin Corp., Bethesda, Md. “Without adequate resources, laboratories can deteriorate very quickly and will not be easily reconstituted. Yet despite all the challenges, we found the majority of researchers remained dedicated to their work and focused on NASA’s future.” NASA’s deferred maintenance budget has grown from $1.77 billion in 2004 to $2.46 billion in 2009, presenting a “staggering” repair and maintenance bill for the future, the report says. Facilities typically require more maintenance than current funding permits, and NASA is spending well below accepted industry guidelines on annual maintenance, repairs, and upgrades. The lack of timely maintenance presents safety issues, particularly with large, high-powered equipment. NASA should find a solution to these issues before any catastrophic failures occur that could seriously impact missions and research operations, the report says. To restore these laboratories, NASA should strike a better balance of funding and leadership between long-term research and development and short-term mission programs, the report says. These areas would be improved if they were managed separately. In recent years, administrative and budgeting changes have led to a substantial reduction of long-term investment in fundamental technology. NASA should improve the quality and equipment of its basic research laboratories to make them at least comparable with those at the U.S. departments of Energy and Defense, top-tier universities, and corporate laboratories, the report says. A strategy to ensure continuity and retention of technical knowledge is also needed, especially if the agency continues to rely on contractors to support the labs and facilities. In particular, NASA should increase resources to its aeronautics labs and facilities. Funding for NASA’s aeronautics programs has been reduced by 48 percent from fiscal years 2005 to 2009, impeding NASA’s ability to advance U.S. technological leadership in this area.

NASA Good – Can Reform – AT – Safety

NASA can reform – Challenger accident addressed a lot of problems in NASA’s safety issues

Cowing, astrobiologist and former rocket scientist, 8

(Keith, 12-30-8, “NASA Report: Understanding Columbia's Loss”, <http://www.spaceref.com/news/viewnews.html?id=1314>, accessed 6/25/11, LGK]

The executive summary of the report closes by placing the report itself into context: "In summary, many findings, conclusions, and recommendations have resulted from this investigation that will be valuable both to spacecraft designers and accident investigators. This report provides the reader an expert level of knowledge regarding the sequence of events that contributed to the loss of Columbia's crew on February 1, 2003 and what can be learned to improve the safety of human space flight for all future crews. It is the team's expectation that readers will approach the report with the respect and integrity that the subject and the crew of Columbia deserve." At first glance, the timing of the release of this report is curious - and seems to follow a pattern set on 31 December 2007 when NASA PAO snuck out a less than flattering report on air safety data hoping that they could catch the news media off guard. Of course, that backfired on them. The operative word here is "seems". According to individuals closely familiar with the development of the report, this date was indeed specifically chosen - but not for reasons of trying to slip something under the media's radar. Rather, it was done at the request of the families of Columbia's crew - specifically such that their children would not have to publicly face pressures at school as the report was being released.

NASA focused on ongoing safety improvements

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 29-30,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

NASA argues that it continues to implement initiatives to improve safety. These include greater emphasis on training and qualification of safety professionals; an emphasis on “safety culture,” including more open communication and clear appeal paths to the Administrator for safety-related for knowledge and requirements management.134 The design process for Orion and Ares I is “riskinformed,” including the systematic identification and elimination of hazards and the mitigation of remaining risks via effective abort systems.135

\*\*\*NASA Good – Particular Programs/Areas

NASA Solvency – Mars (One Way) Mission

NASA can do the mission now – also proves NASA has jurisdiction now

Smith, Journalist, 10

(Sandy, “NASA contemplates manned mission to Mars - one-way”, HULIQ, October 28, <http://www.huliq.com/8738/nasa-contemplates-manned-mission-mars-one-way>. accessed June 23, 2011, EJONES)

Depending on Mars' position in its orbit around the sun, the distance between it and Earth varies from 34 million to 250 million miles. NASA's last unmanned Mars mission, the Phoenix lander mission of 2007, took nine months to reach the planet; scientists say that nuclear-powered rockets could make the trip in four months. Recent research has shown that a one-way mission to Mars is technologically feasible and would cost less than a round-trip voyage. The astronauts who would volunteer to be left on the planet would receive supplies from Earth periodically but would be expected to become self-sufficient as soon as they could. Of all the other planets in the solar system, only Mars is believed to have sufficient quantities of water to sustain life. But even with the water, doing so would still be difficult. The planet is forbiddingly cold, with temperatures well below freezing in places, and its atmosphere is mostly carbon dioxide, which would mean oxygen supplies would have to be furnished

NASA Solvency – Space Based Solar Power – Viability

We have the technology to make SBSP viable – recent NASA advancements

Adams, Logistics Manager at NASA Research & Education Support Service, 8

(Denise, “Mankins Returns to NASA with a Space-Based Solar Powered Solution” Researcher News, February 27, <http://www.nasa.gov/centers/langley/news/researchernews/rn_mankins.html> accessed June 22, 2011 EJONES)

A few years ago, space-based solar power was expensive and impractical. But now things have changed. “The topic appeared to be dead several years ago, but it has received new life in the last year and a half,” said John C. Mankins, former head of Advanced Concepts Studies at NASA Headquarters, at a "Green Series" lecture in the Pearl Young Theatre today. New trends of concern, a “perfect storm situation” has brought the need for energy solutions back to life. Mankins focused on the potential pathways by which affordable and abundant space solar power may be realizable. “He has long operated at the heart of many NASA space missions,” said Dennis Bushnell, chief scientist at NASA Langley, as he introduced Mankins. According to Mankins, the Earth’s population is expected to rise to 9 billion in the next several decades. Energy security is at stake because the supply needs to match the demand. Increased carbon dioxide production is already affecting the Earth’s climate. “There is currently no obvious single solution to assure the availability of energy we need,” Mankins said. Nuclear, fossil and solar energy are the most talked about, according to Mankins, but he believes that space-based solar power is the best solution. Peter Glaser, a vice president at Arthur D. Little, invented the “Solar Power Satellite” in 1968. The patent for that satellite was received in 1973. The basic design concept of a space-based solar power system in the 1970s was inefficient, difficult to launch, had no automation and received negative feedback from the National Research Council (NRC) and the Congressional Office of Technology Assessment (OTA). We have increased solar power generation efficiency, increased efficiency in wireless power transmission, created easier launch capabilities and have a more retractable design that does not require any astronauts or space factories, as the 1970s version did. Mankins made the point that “you don’t need hundreds of billions of dollars to see if these new systems are economically viable.” He admits that we are faced with a “grand challenge,” in part because there is no U.S. organization responsible for both space programs and solar energy security. That lack has allowed that concept to “fall through the cracks.” “It’s nobody’s job in the U.S.,” Mankins said. Mankins is making it his “purpose” to inform people of the new concepts regarding space-based solar power and its possible impact on the Earth’s energy needs.

NASA Solvency – Climate (1/2)

NASA is making progress in Climate research, their program is successful

Vastag, Science Reporter for The Washington Post 6/10/11

(Brian, Nasa’s Salt-sniffing Climate Satellite Successfully Launched, Washington Post, <http://www.washingtonpost.com/national/nasas-salt-sniffing-climate-satellite-successfully-launched/2011/06/10/AGY1RUPH_story.html>, Access: 6/23/11) AC

NASA’s ocean-watching Aquarius sensor soared into space Friday morning on a mission to fill critical gaps in understanding how the Earth’s oceans affect the planet’s climate. In a key success for NASA’s climate science program, the Aquarius device achieved orbit aboard an Argentine-built satellite, called SAC-D. Two previous Earth-watching NASA craft crashed after launching from the same site, Vandenberg Air Force Base in California. A rocket carrying a NASA satellite launched early Friday from Vandenberg Air Force Base on a mission to measure the saltiness of the ocean from space. “Elated would be an understatement,” said Gary Lagerloef, chief scientist for Aquarius, shortly after launch engineers confirmed that the satellite was circling Earth in the proper orbit. “Of course, everyone was really apprehensive.” In March, NASA’s Glory climate satellite splashed into the South Pacific when its nose cone covering failed to detach. In 2009, the agency’s Orbiting Carbon Observatory suffered the same fate, for the same reason. Both launch failures occurred aboard Taurus rockets, made by Orbital Sciences Corp. of Dulles. But this time, NASA chose the more reliable Delta II rocket, built by Boeing, which has sent about 150 payloads into orbit, including seven NASA missions to Mars. Late this summer, Lagerloef, a scientist at the nonprofit Earth and Space Research institute in Seattle, expects Aquarius to begin delivering the most detailed map ever made of the salt content of the world’s oceans. Circling pole-to-pole about 400 miles above the Earth, the device’s three sensors are exquisitely sensitive, sniffing the equivalent of a pinch of salt in a bucket of water. Aquarius senses salinity by bouncing microwaves off the ocean’s surface. Mapping ocean salinity will provide vital clues to ocean circulation patterns while simultaneously mapping rainfall and evaporation. As rain falls over the ocean, salinity decreases; evaporation increases it. Buoys and other Earth-bound sensors have already painted a picture of rapidly changing ocean salinity patterns, said Kevin Trenberth, a climate scientist at the National Center for Atmospheric Research in Boulder, Colo., who is not involved in the mission. These altered rainfall and evaporation patterns are “changing the structure of the ocean, which can have impacts on fisheries and ultimately, climate,” Trenberth said.

NASA Solvency – Climate (2/2)

NASA Climate Projects will make huge advances in Climate Change

PR Newswire 10

(PR Newswire, Final Instruments on NASA Climate/Weather Satellite Integrated, 7/22/10, Lexis) AC

The last of five instruments slated to fly on the upcoming NPOESS Preparatory Project (NPP) climate and weather satellite have been successfully integrated, according to NASA officials. The polar-orbiting satellite is scheduled to launch in late 2011. The NPP satellite was a pre-cursor mission to the National Polar-orbiting Operational Environmental Satellite System (NPOESS) that has recently been restructured. The last instrument, Cross-track Infrared Sounder (CrIS), is an advanced atmospheric sensor built by ITT Corporation, Fort Wayne, Ind. Ball Aerospace & Technologies Corp., Boulder, Colo., built the NPP spacecraft and is performing the integration and checkout of the NPP satellite. The CrIS mechanical, electrical and performance testing was successfully completed and the NPP Satellite team is now working to finish the satellite Pre-Environmental Test baseline performance phase. The Environmental Test flow, which includes Dynamics, Electromagnetic Compatibility, and Thermal testing, is scheduled to begin this October. The five-instrument suite will collect and distribute remotely sensed land, ocean, and atmospheric data to the meteorological and global climate change communities. It will provide atmospheric and sea surface temperatures, humidity sounding, land and ocean biological productivity, cloud and aerosol properties and total/profile ozone measurements. Data produced by the CrIS instrument combined with data from the Advanced Technology Microwave Sounder, another NPP instrument, will provide global atmospheric temperature, moisture and pressure profiles from space. The other three instruments include: the Visible/Infrared Imager/Radiometer Suite, which will collect information about atmospheric clouds, the earth radiation budget, clear-air land/water surfaces, sea surface temperature, ocean color, and produces low light visible imagery; the Ozone Mapping and Profiler Suite, which will monitor ozone and continue the daily global data produced by the current ozone monitoring systems, but with higher fidelity and the Cloud and Earth Radiant Energy System that will measure the Earth's radiant energy balance and help researchers to develop improved weather forecasts and climate model predictions.

NASA Solvency – Asteroids (1/3)

NASA Asteroid research means they’ll be able to conduct Detection and Mining missions

Poeter, PC Magazine 5/26/11

(Damon – Staff Writer for PC Magazine, NASA Preps Asteroid-Mining Spacecraft for 2014 Launch, <http://www.pcmag.com/article2/0,2817,2385949,00.asp>, Access: 6/23/11) AC

NASA will bring a beloved arcade game to life in 2014 when it deploys an unmanned spacecraft capable of busting up asteroids. Actually, the OSIRIS-REx spacecraft won't exactly be capable of blowing up the small, rocky leftovers from the solar system's birth let alone possess an energy shield or the ability to jump into hyperspace. But the vessel will be equipped with a robotic arm built to pluck samples from a near-Earth asteroid designated 1999 RQ36 when it reaches its destination in 2020. NASA announced its first-ever mission to retrieve asteroid samples and bring them back to Earth on Thursday. "This is a critical step in meeting the objectives outlined by President Obama to extend our reach beyond low-Earth orbit and explore into deep space," NASA Administrator Charlie Bolden said in a statement. "It's robotic missions like these that will pave the way for future human space missions to an asteroid and other deep space destinations." Asteroids contain material left over from the cloud of gas and dust that cohered some 4.5 billion years ago to form the solar system we enjoy today original material from the solar nebula that scientists believe contains important clues about the solar system's birth. NASA picked RQ36 for its relative closeness to Earth and primitive makeup. "This asteroid is a time capsule from the birth of our solar system and ushers in a new era of planetary exploration," said Jim Green, director of NASA's Planetary Science Division. "The knowledge from the mission also will help us to develop methods to better track the orbits of asteroids." The Origins-Spectral Interpretation-Resource Identification-Security-Regolith Explorer mission, or OSIRIS-REx for short, involves a four-year trip to the designated asteroid. When the Lockheed Martin Space Systems-built spacecraft gets to within three miles of the asteroid, it will conduct comprehensive mapping of RQ36's surface, which is approximately 1,900 feet in diameter, for six months. Scientists will then move the spacecraft in closer to a selected site where the robotic arm will pluck about two ounces of material, turn around and head back to Earth. The mission, excluding the launch vehicle, will cost about $800 million meaning an ounce of asteroid material is worth about 263,000 times the current price of gold. After collecting the sample, which NASA believes could contain organic molecules, the robot arm will place it in a capsule that will land at Utah's Test and Training Range in 2023 in much the same way that NASA collected and recovered particles from come Wild 2 in 2006 with its Stardust spacecraft. Once it's arrived, the sample will then go to a dedicated research facility where hopefully it will yield up its secrets. The OSIRIS-REx mission, the third in NASA's New Frontiers Program, will also measure the "Yarkovsky effect" for the first time, according to the space agency. The Yarkovsky effect is a "small push" to an asteroid's orbit that builds up over time as it absorbs sunlight and re-emits the energy as heat. It is important for scientists to understand because even such small changes to the orbits of asteroids must be measurable to calculate whether one may someday strike the Earth.

NASA Solvency – Asteroids (2/3)

NASA OSIRIS-Rex Mission will allow them to solve for asteroid detection and mining in the future

Wall, Senior Space.Com Writer 5/25/11

(Mike, NASA to Launch Asteroid-Sampling Spacecraft in 2016, <http://www.space.com/11788-nasa-asteroid-mission-osiris-rex-1999-rq36.html>, Access: 6/23/11) AC

NASA will launch a sample-return mission to an asteroid in 2016, agency officials announced today (May 25). The mission, called Origins-Spectral Interpretation-Resource Identification-Security-Regolith Explorer (OSIRIS-Rex) will reach an asteroid called 1999 RQ36 in 2020. The unmanned spacecraft will use a robotic arm to snag some samples. According to the plan, the probe will return these bits of space rock to Earth in 2023 so scientists can study them for clues about the solar system's origin and, possibly, how life may have begun on our planet. [Video: The OSIRIS-Rex Mission to 1999 RQ36] The $800 million OSIRIS-Rex will be the United States' first asteroid sample-return effort and only the second mission in history to retrieve samples from an asteroid. Japan's Hayabusa spacecraft successfully returned tiny grains of the asteroid Itokawa to Earth in June 2010. [Infographic: How Japan's Asteroid Mission Worked] Itokawa is a relatively run-of-the-mill stony asteroid. 1999 RQ36, however, appears to be packed full of carbon-based material. If an asteroid seeded Earth with life's building blocks long ago, as many scientists suspect, it likely looked a lot like 1999 RQ36. "We're going for something rich in organics, which might have had something to do with life getting started," OSIRIS-Rex principal investigator Mike Drake, of the University of Arizona, told reporters today. "That's the idea — time capsule, containing probably the building blocks of life." There's also likely another reason asteroid 1999 RQ36 has drawn the attention of scientists: The space rock has been classified as a potentially hazardous asteroid, since its orbit brings it close to Earth in the year 2182. There is an extremely remote chance (a recent study pegs it at about 1-in-1000) that the 1,900-foot-wide (579-meter) asteroid could pose a threat to Earth. A mission to an asteroid NASA selected OSIRIS-Rex as part of its New Frontiers program, which prioritizes low-cost science missions that explore the solar system. OSIRIS-Rex beat out two other finalists, a sample-return mission from the far side of the moon and a mission to the surface of Venus. Asteroids are bits and pieces left over from the solar system's formation more than 4.5 billion years ago, the dregs that didn't get swept up into the sun and planets. They therefore serve as a sort of time capsule, containing ancient material that can tell scientists a lot about the solar system's birth. Researchers hope OSIRIS-Rex will help them learn more about those long-ago days, as well the possibility that an asteroid jump-started life on Earth. 1999 RQ36 is a good study target in this regard; telescope observations suggest it contains large amounts of organics, Drake said. Pristine organics from space are hard to come by on Earth; they get scorched during their passage through the atmosphere or contaminated by the bountiful life on our planet. That's why it's so important, and so exciting, to snag some samples of the stuff from an asteroid in space, according to Drake. "We're bringing back something that's essentially untouched by human hands, has not seen the Earth's biota and will be a pristine sample of what's out there," he said. The OSIRIS-Rex probe is not NASA's only mission to an asteroid. The space agency's Dawn spacecraft is currently closing in on Vesta, the second-largest asteroid in the solar system, and will arrive at the space rock later this year. But Dawn will simply orbit Vesta, not gather samples. It will also eventually leave Vesta and rendezvous with Ceres, the largest asteroid in the solar system, for a similar orbiting campaign. [Photos: Asteroids in Deep Space] OSIRIS-Rex, meanwhile, will get up close and personal with asteroid 1999 RQ36 and return samples to Earth. But the mission has a long road ahead. Long journey and lots of reconnaissance OSIRIS-Rex will launch in 2016 and approach 1999 RQ36 beginning about three years later. But it won't pluck its samples immediately. Rather, the spacecraft will study the asteroid for about a year, so scientists can better understand its characteristics, choose the best sampling site and map out a good strategy. The need for such a prolonged observation period is one lesson learned from the Hayabusa mission, which had to do quite a bit of troubleshooting, Drake said. "They did not have enough time at their target asteroid, Itokawa, to really understand the environment they were operating in and safely conduct proximity operations leading to sample return," Drake said. After performing its reconnaissance, OSIRIS-Rex will gradually move closer to its sampling site,

**[CARD CONTINUES]**

NASA Solvency – Asteroids (3/3)

**[CARD CONTINUED, NO TEXT REMOVED]**

and the arm will extend to collect at least 2 ounces (60 grams) of material. The spacecraft will never actually land on 1999 RQ36. "We kiss the surface," Drake said. The acquired sample will be stored in a capsule, which will eventually land at Utah's Test and Training Range in 2023. The capsule's design will be similar to that used by NASA's Stardust spacecraft, which returned the world's first comet particles from comet Wild 2 in 2006. The OSIRIS-Rex spacecraft, meanwhile, will be redirected into a new solar orbit, likely with enough fuel to perform another mission in the future if NASA wishes, researchers said. Studying the sample Once the asteroid bits come down to Earth, researchers will study them to learn as much as they can about the solar system's formation and the organic molecules that asteroids may be ferrying throughout the solar system. But OSIRIS-Rex also has other potential benefits, researchers said. "The knowledge from the mission also will help us to develop methods to better track the orbits of asteroids," said Jim Green, director of NASA's Planetary Science Division in Washington, D.C., in a statement. Specifically, the mission should help scientists accurately measure the "Yarkovsky effect" for the first time. This phenomenon is the tiny push the sun gives an asteroid, as it absorbs sunlight and re-emits that energy as heat. The small push adds up over time, but it's tough to predict in detail because asteroids' shapes, compositions and rotations can vary so much. If scientists hope to predict a potentially hazardous asteroid's path, they must understand the Yarkovsky effect, researchers said. OSIRIS-Rex should help refine 1999 RQ36's orbit, allowing scientists to get a better handle on its trajectory and possibly understand how to mitigate or prevent potential Earth impacts.

\*\*\*AT – Streamlining Counterplan

AT – Streamlining CP – Solvency Deficit

Solvency deficit – NASA will fight and obstruct implementation

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 4) TJL

A reform of this magnitude is possible only by legislative fiat. NASA will of course fight it by every means available, but perhaps the Congress will take the necessary action once it is realized that transfer to the private sector can make human spaceflight a source rather than a sink for tax revenues.

The management at NASA is too concerned with political infighting to see the writing on the wall – they will fight the CP

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 2) TJL

The worst mistake made by NASA managers was that they allowed disputes over who would be in charge to influence the direction of the program. Their preoccupation with intercenter turf wars obscured the writing on the wall.

AT – Streamlining CP – Downsizing Bad (1/3)

Mass downsizing is destructive for the economy – empirics prove conventional wisdom wrong

Pfeffer, Stanford University Professor of Organizational Behavior, 10

(Jeffrey received his B.S. and M.S. degrees from Carnegie-Mellon University and his Ph.D. from Stanford, 2-5-10, Newsweek, “Lay Off the Layoffs” accessed: 6/25/11 <http://www.newsweek.com/2010/02/04/lay-off-the-layoffs.html> p. 2) TJL

For many managers, these actions feel unavoidable. But even if downsizing, right-sizing, or restructuring (choose your euphemism) is an accepted weapon in the modern management arsenal, it's often a big mistake. In fact, there is a growing body of academic research suggesting that firms incur big costs when they cut workers. Some of these costs are obvious, such as the direct costs of severance and outplacement, and some are intuitive, such as the toll on morale and productivity as anxiety ("Will I be next?") infects remaining workers.But some of the drawbacks are surprising. Much of the conventional wisdom about downsizing—like the fact that it automatically drives a company's stock price higher, or increases profitability—turns out to be wrong. There's substantial research into the physical and health effects of downsizing on employees—research that reinforces the seemingly hyperbolic notion that layoffs are literally killing people. There is also empirical evidence showing that labor-market flexibility isn't necessarily so good for countries, either. A recent study of 20 Organization for Economic Cooperation and Development economies over a 20-year period by two Dutch economists found that labor-productivity growth was higher in economies having more highly regulated industrial-relations systems—meaning they had more formal prohibitions against the letting go of workers.

Downsizing doesn’t cut costs – multiple warrants

Pfeffer, Stanford University Professor of Organizational Behavior, 10

(Jeffrey received his B.S. and M.S. degrees from Carnegie-Mellon University and his Ph.D. from Stanford, 2-5-10, Newsweek, “Lay Off the Layoffs” accessed: 6/25/11 <http://www.newsweek.com/2010/02/04/lay-off-the-layoffs.html> p. 2) TJL

Layoffs don't even reliably cut costs. That's because when a layoff is announced, several things happen. First, people head for the door—and it is often the best people (who haven't been laid off) who are the most capable of finding alternative work. Second, companies often lose people they didn't want to lose. I had a friend who worked in senior management for a large insurance company. When the company decided to downsize in the face of growing competition in financial services, he took the package—only to be told by the CEO that the company really didn't want to lose him. So, he was "rehired" even as he retained his severance. A few years later, the same thing happened again. One survey by the American Management Association (AMA) revealed that about one third of the companies that had laid people off subsequently rehired some of them as contractors because they still needed their skills.

AT – Streamlining CP – Downsizing Bad (2/3)

Downsizing is like bloodletting- it damages the entire body and could kill it

Pfeffer, Stanford University Professor of Organizational Behavior, 10

(Jeffrey received his B.S. and M.S. degrees from Carnegie-Mellon University and his Ph.D. from Stanford, 2-5-10, Newsweek, “Lay Off the Layoffs” accessed: 6/25/11 <http://www.newsweek.com/2010/02/04/lay-off-the-layoffs.html> p. 2) TJL

Some managers compare layoffs to amputation: that sometimes you have to cut off a body part to save the whole. As metaphors go, this one is particularly misplaced. Layoffs are more like bloodletting, weakening the entire organism. That's because of the vicious cycle that typically unfolds. A company cuts people. Customer service, innovation, and productivity fall in the face of a smaller and demoralized workforce. The company loses more ground, does more layoffs, and the cycle continues. That's part of the story of now-defunct Circuit City, the electronics retailer that decided it needed to get rid of its 3,400 highest-paid (and almost certainly most effective sales associates to cut its costs. Fewer people with fewer skills in the Circuit City stores permitted competitors such as Best Buy to gain ground, and once the death spiral started, it was hard to stop. Circuit City filed for bankruptcy in 2008 and closed its doors last March.

Massive downsizing devastates the economy – airline industry prove

Pfeffer, Stanford University Professor of Organizational Behavior, 10

(Jeffrey received his B.S. and M.S. degrees from Carnegie-Mellon University and his Ph.D. from Stanford, 2-5-10, Newsweek, “Lay Off the Layoffs” accessed: 6/25/11 <http://www.newsweek.com/2010/02/04/lay-off-the-layoffs.html> p. 2) TJL

Beyond the companies where layoffs take place, widespread downsizing can have a big impact on the economy—a phenomenon that John Maynard Keynes taught us about decades ago, but one that's almost certainly going on now. The people who lose jobs also lose incomes, so they spend less. Even workers who don't lose their jobs but are simply fearful of layoffs are likely to cut back on spending too. With less aggregate demand in the economy, sales fall. With smaller sales, companies lay off more people, and the cycle continues. That's why places where it is harder to shed workers—such as (can I dare say it?) France—have held up comparatively better during the global economic meltdown. Workers there are confident that they'll remain employed, so they needn't pull back on spending so dramatically.The airline industry provides a case study of the downside of retrenchment. After the layoffs following 9/11, airline service deteriorated and flying became a truly unpleasant experience. That carried predictable consequences: the number of "premium" passenger trips, defined as full-fare coach, first-, or business-class fares (where airlines make their biggest margins), declined by 47 percent between 2000 and 2007. According to an industry survey published in 2008, in the preceding 12 months airlines had lost $9.6 billion in revenue as people voluntarily flew less because they found the experience so noxious. In a fixed-cost industry like airlines, that was the difference between an industrywide loss and profitability.

Overzealous downsizing will permanently affect the economy even if it’s recovering

Pfeffer, Stanford University Professor of Organizational Behavior, 10

(Jeffrey received his B.S. and M.S. degrees from Carnegie-Mellon University and his Ph.D. from Stanford, 2-5-10, Newsweek, “Lay Off the Layoffs” accessed: 6/25/11 <http://www.newsweek.com/2010/02/04/lay-off-the-layoffs.html> p. 2) TJL

The facts seem clear. Layoffs are mostly bad for companies, harmful for the economy, and devastating for employees. This is not news, or should not be. There is substantial research literature in fields from epidemiology to organizational behavior documenting these effects. The damage from overzealous downsizing will linger even as the economy recovers—and as it does, perhaps managers will learn from their mistakes.

AT – Streamlining CP – Downsizing Bad (3/3)

When companies downsize as a reaction to internal failures- investors pull out and the economy gets hurt-multiple sources prove

Abraham, State University New York-Oswego associate professor of Management and Marketing, 4

(Steven E holds a B.S. from Cornell University (1980), a J.D. degree from New York University School of Law (1983) and Ph. D. degree in Industrial Relations from the University of Wisconsin-Madison (1992). “Layoff announcements and employment guarantee announcements: How do shareholders respond?” International Journal of Manpower, 25(8) accessed: 6/27/11 proquest) TJL

Similarly, the results from the subsamples agree with the existing literature as well. As discussed above, Worrel et al. (1991), Gunderson et al. (1997), and Palmon et al. (1997) all report results that are similar to those reported here. When firms announce layoffs for reactive reasons, the market responds more negatively than when LAs are made for proactive reasons.

[LA= layoff announcements]

\*\*\*NASA Fails

NASA Fails – General (1/2)

NASA’s labs and research centers are on decline – their capabilities cannot support future goals.

Space Studies Board et al. 2010 (Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.1, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

The National Research Council (NRC) selected and tasked the Committee on the Assessment of NASA Laboratory Capabilities to assess the status of the laboratory capabilities of the National Aeronautics and Space Administration (NASA) and to determine whether they are equipped and maintained to support NASA’s fundamental research activities. Over the past 5 years or more, there has been a steady and significant decrease in NASA’s laboratory capabilities, including equipment, maintenance, and facility upgrades. This adversely affects the support of NASA’s scientists, who rely on these capabilities, as well as NASA’s ability to make the basic scientific and technical contributions that others depend on for programs of national importance. The fundamental research community at NASA has been severely impacted by the budget reductions that are responsible for this decrease in laboratory capabilities, and as a result NASA’s ability to support even NASA’s future goals is in serious jeopardy. This conclusion is based on the committee’s extensive reviews conducted at fundamental research laboratories at six NASA centers (Ames Research Center, Glenn Research Center, Goddard Space Flight Center, the Jet Propulsion Laboratory, Langley Research Center, and Marshall Space Flight Center), discussions with a few hundred scientists and engineers, both during the reviews and in private sessions, and in-depth meetings with senior technology managers at each of the NASA centers.

NASA’s equipment, research centers, and funds are inadequate.

Space Studies Board et al. 2010 (Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.1-2, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

NASA personnel at the centers reported that reductions in budgets supporting fundamental research have had several consequences: Equipment and support have become inadequate. Centers are unable to provide adequate and stable funding and manpower for the fundamental science and technology advancements needed to support long-term objectives. Research has been deferred. Researchers are expending inordinate amounts of time writing proposals seeking funding to maintain their laboratory capabilities. Efforts are diverted as researchers seek funding from outside NASA for work that may not be completely consistent with NASA’s goals.

NASA Fails – General (2/2)

NASA is not likely to make a comeback

Space Studies Board et al. 2010 (Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.1-2, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

The institutional capabilities of the NASA centers, including their laboratories, have always been critical to the successful execution of NASA’s flight projects. These capabilities have taken years to develop and depend very strongly on highly competent and experienced personnel and the infrastructure that supports their research. Such capabilities can be destroyed in a short time if not supported with adequate resources and the ability to hire new people to learn from those who built and nurtured the…

…laboratories. Capabilities, once destroyed, cannot be reconstituted rapidly at will. Laboratory capabilities essential to the formulation and execution of NASA’s future missions must be properly resourced.

NASA is not capable now, they don’t have enough funds, staff or equipment

Space Studies Board et al. 2010 (Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.26, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

GRC is home to several unique and important facilities for fundamental aeronautics, aeroacoustics, and propulsion-related research. Facilities such as the IRT and the AAPL have no equals for conducting TRL 1-3 research. Many of the smaller laboratories with one PI could at least in theory be duplicated at a reasonable cost; however, the larger facilities would require a much larger investment. For NASA to maintain its leadership in aeronautics, aeroacoustics, and propulsion, increased investments in facilities, equipment, and support staff will be needed. GRC has some very specialized aeronautics facilities and personnel, and these assets should be preserved if NASA is to achieve its goals.

[NOTE: IRT = Icing Research Tunnel, AAPL = Aero-Acoustic Propulsion Laboratory, TRL-1 = Technology Readiness Levels 1, GRC = Glenn Research Center]

NASA Fails – Lack of Vision

NASA has produced nothing but futility and budget problems

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

After wasting three decades (and a perfectly good Cold War), frustrating the dreams of a whole generation of space enthusiasts, and spending hundreds of billions of dollars, NASA's net achievement is a space station that has no definable purpose except to serve as a destination for shuttle flights. We would not need the shuttle missions if we did not have the station, and we would not need the station if we did not need something for the shuttles to do. The entire human spaceflight program has thus become an exercise in futility.

NASA Fails – Administration (1/2)

NASA has significantly declined because of financial and administrative reasons over the past 20 years

Space Studies Board et al. 2010 (Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.1, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

Several changes since the mid-1990s have had a significant adverse impact on NASA’s funding for laboratory equipment and support services: Control of the research and technology “seed corn” investment was moved from an associate administrator focused on strategic technology investment and independent of important flight development programs’ short-term needs, to an associate administrator responsible for executing such flight programs. The predictable result was a substantial reduction over time in the level of fundamental—lower technology readiness level, TRL—research budgets, which laboratories depend on to maintain and enhance their capabilities, including the procurement of equipment and support services. The result was a greater emphasis on higher TRL investments, which would reduce project risk. A reduction in funding of 48 percent for the aeronautics programs over the period fiscal year (FY) 2005-FY 2009 has significantly challenged NASA’s ability to achieve its mission to advance U.S. technological leadership in aeronautics in partnership with industry, academia, and other government agencies that conduct aeronautics-related research and to keep U.S. aeronautics in the lead internationally. Institutional responsibility for maintaining the health of the research centers was changed from the associate administrator responsible for also managing the technology investment to the single associate administrator to whom all the center directors now report. NASA changed from a budgeting and accounting system in which all civil service manpower was covered in a single congressional appropriation to one in which all costs, including manpower, had to be budgeted and accounted for against a particular program or overhead account.

[NOTE: TRL = Technology Readiness Level]

NASA Fails – Administration (2/2)

NASA is so inefficient that we have less space flight capability than in 1970

Chapman PhD Science in Instrumentation at MIT 05/30/2003

(Phillip K., “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

Despite cutbacks, NASA has spent a total of $450 billion since Apollo 11 (adjusted for inflation to 2003 dollars). That very large sum was more than enough to fund the developments that Wernher von Braun predicted for the end of the 20th Century, but we have not even started on any of them. If it had been spent wisely, as seed money to stimulate commercial development, we could have established a growing, self-sustaining extraterrestrial enterprise, offering opportunities for thousands of people to live and work off Earth - but the sad truth is that we have less capability in human spaceflight now than in 1970. In 1969, we landed on the Moon, but now we cannot leave low Earth orbit (LEO). NASA claimed that the shuttle would be fifteen times cheaper to fly (per pound of payload) than the Saturn vehicles used in Apollo, but it is actually three times more expensive.

No solvency for NASA failure – poor management is the root cause

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 2) TJL

The lack of progress has not been due to insufficient funding or to technological problems, but to a series of blunders by NASA management. NASA engineers did not understand the popular enthusiasm aroused by Apollo. They thought the Giant Leap for Mankind was not the lunar landing itself, but the technological prowess it displayed. This led to the mistaken inference that the way to maintain popular support, and hence generous funding, was to propose megaprojects of great technical complexity, regardless of whether they were intrinsically interesting.

NASA Fails – Funding Issues

No meaningful space exploration possible without significant increase in NASA budget

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. i ,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

For the past several years, the priorities of the National Aeronautics and Space Administration (NASA) have been governed by the Vision for Space Exploration. The Vision was announced by President Bush in January 2004 and endorsed by Congress in the 2005 and 2008 NASA authorization acts (P.L. 109-155 and P.L. 110-422). It directed NASA to focus its efforts on returning humans to the Moon by 2020 and some day sending them to Mars and “worlds beyond.” The resulting efforts are now approaching major milestones, such as the end of the space shuttle program, design review decisions for the new spacecraft intended to replace the shuttle, and decisions about whether to extend the operation of the International Space Station. At the same time, concerns have grown about whether NASA can accomplish the planned program of human exploration of space without significant growth in its budget. A high-level independent review of the future of human space flight, chaired by Norman R. Augustine, issued its final report in October 2009. It presented several options as alternatives to the Vision and concluded that for human exploration to continue “in any meaningful way,” NASA would require an additional $3 billion per year above current plans.

NASA Fails – Innovation (1/2)

NASA is the case study for bureaucracy – crushes innovation

Simberg, Aerospace Engineer and Competitive Space Task Force Chair, 6/14/11

(Rand, An Out-of-This-World Debate Question, <http://www.nationalreview.com/corner/269585/out-world-debate-question-rand-simberg>, Access: 6/21/11) AC

Space-policy analysts were as surprised as everyone else at one of the more obscure, but also more intelligent, questions asked in last night’s Republican debate. It was intelligent in both the nature of the question itself and in the candidate at whom it was directed. Space-policy analyst and journalist Jeff Foust has the story over at the Space Politics web site: The discussion was kicked off by a question about the impending retirement of the space shuttle and that, in the words of WMUR-TV’s Jean Mackin, “President Obama effectively killed government-run spaceflight to the International Space Station and wants to turn it over to private companies.” Thus, she asked, “what role should the government play in future space exploration?” Shockingly, given the ignorant hysteria on this subject over the past year and a half, she actually stated the policy accurately. The new policy does effectively kill government-run spaceflight to the ISS. But critics have drawn the grand and hyperbolic inference from this simple fact that the Obama administration proposes to end all government-funded human spaceflight, when in fact the intent was to let competitive commercial enterprise take over the now-mundane (after 50 years) task of getting people to and from orbit, and refocus NASA on the hard stuff — getting humans beyond earth orbit. But beyond the question itself, what was even more interesting was Mackin’s apparent knowledge that former House speaker Newt Gingrich would have something interesting to say on this subject, and neither she nor the audience was likely disappointed with his answer: Well, sadly—and I say this sadly because I’m a big fan of going into space, and I actually worked to get the shuttle program to survive at one point—NASA has become an absolute case study in why bureaucracy can’t innovate. If you take all the money we spent at NASA since we landed on the Moon, and you apply that money for incentives for the private sector, we would today probably have a permanent station on the Moon, three or four permanent stations in space, a new generation of lift vehicles, and instead, what we’ve had is bureaucracy after bureaucracy after bureaucracy, and failure after failure. I think it’s a tragedy, because younger Americans ought to have the excitement of thinking that they, too, could be part of reaching out to a new frontier. You know, you had asked earlier, John [King, the moderator], about this idea of limits because we’re a developed country. We’re not a developed country. The scientific future is going to open up and we’re at the beginning of a whole new cycle of extraordinary opportunities, and unfortunately NASA is standing in the way of it, when NASA ought to be getting out of the way and encouraging the private sector.

Recent shutdown of NASA’s think tank is a death sentence for innovation at NASA

McKee, New Scientist editor, 7

(Maggie, 3-20-7, “Futuristic NASA think tank to be shut down,” <http://www.newscientist.com/article/dn11422>, accessed 6/25/11, LGK]

NASA will likely shut down its Institute for Advanced Concepts, which funds research into futuristic - and often far-out - ideas in spaceflight and aeronautics, officials say. The controversial move highlights the budgetary pressures the agency is facing as it struggles to retire the space shuttles by 2010 and develop their replacement. The NASA Institute for Advanced Concepts (NIAC) was established to "give an opportunity for people outside of NASA to develop really revolutionary and creative concepts for future aeronautics and space missions", says Robert Cassanova, who has served as the institute's director since its inception in February 1998. The institute, which operates from an office in Atlanta, Georgia, US, receives about $4 million per year from NASA. Most of that is used to fund research into innovative technologies; recent grants include the conceptual development of spacecraft that could surf the solar system on magnetic fields, motion-sensitive spacesuits that could generate power and tiny, spherical robots that could explore Mars. Now, the future development of those and other projects has been thrown into doubt, since NIAC was unofficially told by NASA last week that it was to be shut down, perhaps in August.

NASA Fails – Innovation (2/2)

No innovation leads to second class capabilities – technologies are developed to specifically fit NASA’s current plans.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.30, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

During conversations with the staff of the facilities, it became clear that new test technologies and capabilities are not being developed because all that is being worked on are the research topics that directly support the current specific goals of NASA programs. In years past, technologies were developed that were not necessarily needed to satisfy a program objective; now they are vital for these current programs. In the not-too-distant future, NASA will have to depend on old test capabilities and those that can somehow be procured; this enforced reliance will make NASA aerodynamics and aeroacoustics testing capabilities second class when compared to those of other testing organizations around the world.

**NASA Fails – Research Decline**

NASA’s researchers are cheating on NASA because NASA is not satisfying them.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.28, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

One omen of future problems is that non-NASA-reimbursable work at LaRC accounts for about 2 percent of the workforce,9 and it was reported that the staff there are continually looking for more non-NASA reimbursable work to sustain themselves and their laboratory or facility. The result is that efforts are diverted as researchers seek funding from outside NASA for work that may not be completely consistent with NASA’s goals.

[NOTE: LaRC = Langley Research Center]

NASA Fails – Research Facility Decline

Repair parts are difficult to find because the facilities are outdated, which results in bad data.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.29, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

It should be noted that in the past CoF funds were used for long-range investment planning for maintenance and upgrade projects on large research facilities. With deferred maintenance at all NASA centers at a level of approximately $2.5 billion, as noted earlier, the amount of approximately $150 million of CoF funds available for all of the NASA facilities, including the repair by replacement program being implemented, leaves many large maintenance projects and upgrades uncompleted. Thus, when a large facility fails (the LaRC air station, for example), the facility will be nonoperational or operating at less than its needed capability for a long time while the center gathers the needed resources any way that it can.

The research data acquisition systems for most of the large facilities that support this area of research are old (the average age is 13 years).11 Parts, even second-hand parts, are very hard to find, even at organizations such as e-Bay. Thus, as these data acquisition systems eventually fail, the laboratory may have to be shut down for extended periods; there is also an increased risk that with time the data produced may not be of the highest quality.

[NOTE: LaRC = Langley Research Center

CoF = Construction of Facilities]

**NASA Fails – Research Funds are Wasted**

NASA’s policies are to “operate to failure”, which wastes funds.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.29, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

The focus of the work in these laboratories is the assessment of the aerodynamics and aeroacoustics performance provided by new technology. There are two distinct groups of laboratories/facilities at LaRC: (1) small laboratories with a few staff to support them, such as the liner technology facility, and (2) large facilities, such as wind tunnels, with complex equipment requiring several staff to operate them. Most of the facilities that support aerodynamics and aeroacoustics research are in the second class. All of the laboratories that the committee visited that support these areas of research rely on support services, such as high-pressure air. The apparent NASA practice on research facility operation is to “operate to failure,” which was obvious at the air compressor station. As an example, about 4 years ago the LaRC compressor station had serious failures, and the station has not operated at full capacity since that time. During those years, about $10 million was invested in repair and maintenance.10 Clearly the costs of maintaining this facility properly would have been less than those of repairing it after failure. There were some repairs, such as foundation repair, that would have been avoided, and there are costs associated with the delay of testing and inefficiencies in air production that occurred as a result of the failure. Although no data were provided, the continued low maintenance investments make it likely that some other laboratory/facility support system, such as the electrical distribution system, is also being operated to failure.

[NOTE: LaRC = Langley Research Center]

NASA research is so mismanaged it is capable of little better than high school science fair projects

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

The cutbacks gutted the research program, by eliminating much of the scientific equipment aboard the station, reducing the scheduled shuttle flights in support from six to four per year, and leaving the small crew with very little time to spare from housekeeping tasks. If there are no unusual maintenance problems, the lone American may average 90 minutes per day working on the research that is the alleged purpose of the facility. He or she will conduct experiments by following a checklist, because the small crew precludes specialists in relevant disciplines. The scientific program is thus perfunctory at best, with rote experiments of a kind that might win prizes at a high school science fair. (2) The life-cycle cost of the ISS, including development expenses and shuttle flights, amounts to at least $8 billion per year (2003 dollars). This is 60% more than the entire budget of the National Science Foundation, which supports thousands of earthbound scientists. US taxpayers have a right to expect that such expensive research will be of a quality that wins Nobel Prizes, but what we are actually getting are pro forma experiments that occupy a small fraction of the time of one person. The cost is preposterous: it amounts to nearly fifteen million dollars ($15,000,000!) for each hour of scientific work by the American crewmember. NASA has no chance whatsoever of convincing scientists that this is a reasonable allocation of scarce research funds.

NASA Fails – Researchers Waste Time

Researchers are forced to spend 30 to 50 percent of their time searching for maintenance funds

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.31, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

Larger facilities also have these challenges. However, relative to the smaller laboratories, which are contained within a larger building, the larger facilities can have additional maintenance issues—for example, basic systems such as heating, ventilation, and air conditioning. For example, during the site visit the James H. Starnes Laboratory was without heat, and it was not clear when heat for the facility would be restored. As is the case at other NASA centers, DM budgets are confusing and appear to be convoluted. The usual practice in research laboratories is to organize funding for maintenance depending on whether the item or event of interest can be specifically associated with a facility (building) and/or a program, and its priority. In reality, however, it seems to too often depend on multiple sources, where it can be negotiated. This creates an additional burden. Although researchers acknowledge the need to spend some of their time searching for funding that provides equipment and instrumentation, the committee believes that spending 30 to 50 percent of their time in this pursuit is an inefficient use of highly skilled personnel.

[NOTE: DM = Deferred Maintenance]

NASA Fails – AT – Tech/Competitiveness

NASA research doesn’t solve tech lead – lack of coordination with industry and dissemination process prevent US edge

Meade, National Research Council Committee for the Assessment of NASA's Aeronautics Research Program co-chair, 8

[Carl J, Committee for the Assessment of NASA's Aeronautics Research Program National Research Council 5-1-8, CQ Congressional Testimony, “NASA Aeronautic Research and Development Program”) LexisNexis, accessed 6/23/11, LGK]

NASA civil aeronautics research will provide value to its stakeholders if and only if the results are ultimately transferred to industry, to the Federal Aviation Administration, and to the other organizations that manufacture, own, and operate key elements of the air transportation system. A closer connection between the managers of NASA aeronautics research projects and some potential users of NASA research would ensure that the need to transfer research results to users is properly considered in project planning and execution, and it would facilitate the formation of a coordinated set of research goals and milestones that are timed to meet the future needs of the nation. In addition, for technology intended to enhance thecompetitiveness of U.S. industry, U.S. leadership would be enhanced by a technology-transfer process that does not necessarily include the immediate, public dissemination of results to potential foreign competitors, so that the U.S. industrial base has a head start in absorbing the fruits of this research.

**NASA Fails – Capabilities –** Restructuring Key to Space Exploration

NASA restructuring crucial to success of any new exploration initiative

Foust, Aerospace Analyst and Ph. D in Planetary Science MIT 6/21/11

(Jeff, Albrecht’s policy prescription for NASA, <http://www.spacepolitics.com/2011/06/21/albrechts-policy-prescription-for-nasa/>, Access: 6/21/11) AC

In this week’s issue of The Space Review, I reviewed the new book Falling Back to Earth by Mark Albrecht, who was the executive secretary of the National Space Council during the George H.W. Bush administration and, later, president of International Launch Services. Much of the book, as I note in the review, talks about his time on the space council, including development of the Space Exploration Initiative and clashes with NASA regarding implementing SEI. Albrecht is pessimistic about the future of human spaceflight, citing the failures of SEI and the Vision for Space Exploration, saying “it is hard to imagine” another president making a major push in this area. At the end of the book, though, Albrecht does state that “changes are urgently needed at NASA” for there to be any hope of reviving human space exploration, reforms that are not themselves sufficient but “necessary preconditions for success” of any new exploration initiative. At the heart of these proposed changes is a greater reliance on public-private partnerships “that recognize that the center of technical development and manufacturing excellence has shifted to the private sector.” (This approach sounds similar to NASA’s COTS and CCDev efforts, although he doesn’t explicitly mention either.) He also endorses greater participation by international entities “based purely on financial and technical capability” as opposed to policy considerations. Separately, he calls for a radical restructuring of NASA as it relies more on these partnerships. The agency, he argues, should be focused on space science and human space exploration; other efforts, including aeronautics and Earth sciences, should be transferred to other agencies. He advocatesfor closing unneeded NASA centers through a BRAC-like process. Congress should support this by resisting earmarks for local center projects, and also through supporting “permissive statutory contexts for aggressive public-private initiatives.”

NASA Fails – Staffing (1/2)

NASA’s research facilities are understaffed

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.24, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

All five of these facilities are focused on TRL 1-3 research and are primarily funded by the subsonic fixed-wing, supersonic, and hypersonic projects in FAP. They support fundamental research in engine design and testing, emissions and alternative fuels research, and work in flow control. All facilities employ a wide array of diagnostics—particle image velocimetry (PIV) and pulsed laser-induced fluorescence, among others—used for generating validation data for computational fluid dynamics codes. They operate in laboratory-scale environments for fundamental research and in general have adequate equipment for performing TRL 1-3 research, although all of the researchers identified various pieces of equipment that they thought would improve the quality of their research. However, since their work is mostly funded out of FAP, the projects have few resources for significant equipment or instrumentation upgrades. Additionally, technician support for these smaller facilities is essentially nonexistent. The low levels of funding means that many of the researchers must work alone because they cannot afford to keep on full-time technicians.

[NOTE: TRL 1-3 = Technology Readiness Level]

NASA’s research facilities are understaffed

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.26, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

Of greater concern to the management and staff at GRC is the lack of resources for supporting technicians and the purchase of basic equipment. The problem of technician support is more serious, because contract technical personnel do not necessarily have the memory bank that is associated with civil-servant technicians devoted to supporting GRC. This is particularly important for laboratories that are running high-speed machinery, which has special instrumentation and safety issues. Laboratories with one PI do not have the financial resources for technician support, and while purchases at $10,000 to $20,000 can reasonably be supported by the FAP, more expensive equipment is usually out of reach unless paid for by supplemental funds from Congress. Researchers are forced to use older or out-of-date equipment or to scavenge equipment from other laboratories. Finally, both management and staff are concerned that without a greater investment in fundamental research and the associated equipment, recruiting the next generation of researchers to meet NASA’s goals will be difficult.

NASA Fails – Staffing (2/2)

NASA facilities don’t have enough technicians and some don’t even have any

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.26, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

Currently, two-thirds of the technician workforce is contractor-provided, and one-third is from the civil service. LaRC is moving toward an all-contractor technical workforce; its support services would be strengthened if it simultaneously develops a strategy to retain the technical competence within the government workforce. Langley researchers provided several examples pointing to the conclusion that, as a general rule, there is an inadequate technician workforce to fully support all the work in the laboratories and facilities at LaRC, and in some areas there is currently no NASA technician expertise.

NASA Fails – Space Centers – Equipment/Facilities (1/3)

Equipment inadequacies mean unique NASA capabilities are wasted

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.25, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

The vast majority of these laboratories are focused on the development of materials and/or coatings that can be used in engine or power generation applications for high-temperature (less than 3000°F) environments. These laboratories span the gamut of old to new. The equipment also ranges from recent purchases to some that are more than 30 years old. In general, these are laboratories with one PI. The funding support for these facilities is also varied. For example, the NPL is a result of an earlier NASA-wide investment in nanotechnology. However, recent investments have been low, and the equipment is probably not at a level to meet NASA goals. Conversely, the PLDL and the HTMSL are now almost fully funded by outside agencies such as the Air Force Office of Scientific Research and DOE. The PCPL is a unique NASA facility for processing high-temperature composites and nanocomposites. Approximately 60 percent of the work in the laboratory is TRL 1-3 and funded by FAP. The other 40 percent is mid-TRL funded by ESMD. This is an example of a laboratory that has more work than the staff can accommodate. The SBTF is also a rather unusual facility, with only one other facility like it in the world. However, like the PCPL, this laboratory, which has funding from both the SMD and FAP, was reported to be limited more by manpower than by equipment. In general, the equipment associated with these laboratories and facilities appears to range from adequate to deficient in some cases. While the FAP funds most of the activity, a couple of the laboratories are totally dependent on outside funding. The work being performed in these laboratories is focused on GRC’s mission in propulsion and engine technology. While both ARC and LaRC also have materials and structures laboratories, their focus is mostly different from that of GRC. Ames’s focus is on thermal protection systems, and Langley’s is on large structures.

[NOTE: PI = Principal Investigator, NPL = Nanotube Processing Laboratory, PLDL = Pulsed Laser Deposition Laboratory, HTMSL = High-Temperature Mass Spectrometry Laboratory, DOE = Department of Energy, PCPL = Polymer Composite Processing Laboratory, ESMD = Exploration Systems Mission Directorate, SBTF = Structural Benchmark Testing Facility, SMD = Science Mission Directorate, FAP = Fundamental Aeronautics Program, ARC = Ames Research Center, LaRC = Langley Research Center, GRC = Glenn Research Center]

NASA’s missions are disastrous accidents waiting to happen due to inadequate funds and outdated facilities

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.16, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11)

The CRV of individual NASA centers in FY 2008, including both active and total real properties, is shown in Figure 3.3. Within NASA, some 80 percent of the facilities are older than 40 years, and each year many facility repair jobs that are ranked 5 × 5, meaning that the consequences of a failure (that is, the impact of failure on a mission) are very high (5), and the probability of failure (that is, the likelihood that failure will happen) are very high (also 5), will not be implemented due to inadequate funding. The FY 2009 annual NASA-wide budget for institutional facility repairs is approximately $234 million,5 but it was estimated by the director of the NASA Facilities Engineering and Real Property Division that almost double this budget would be required to deal with all of the high and very high facility repair requirements. At the present rate of critical repairs, there are identified serious facility problems with potentially major adverse impact on missions waiting to happen.

[NOTE: CRV = Current Replacement Value]

NASA Fails – Space Centers – Equipment/Facilities (2/3)

NASA’s research centers are outdated and maintenance cost requires more than the current funding

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.2, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

Approximately 20 percent of all NASA facilities are dedicated to research and development: on average, they are not state of the art: they are merely adequate to meet current needs. Nor are they attractive to prospective hires when compared with other national and international laboratory facilities. Over 80 percent of NASA facilities are more than 40 years old and need significant maintenance and upgrades to preserve the safety and continuity of operations for critical missions. A notable exception to this assessment is the new science building commissioned at GSFC. NASA categorizes the overall condition of its facilities, including the research centers, as “fairly good,” but deferred maintenance (DM) over the past 5 years has grown substantially. Every year, NASA is spending about 1.5 percent of the current replacement value (CRV) of its active facilities on maintenance, repairs, and upgrades,1 but the accepted industry guideline is between 2 percent and 4 percent of CRV.2 Deferred maintenance grew from $1.77 billion to $2.46 billion from 2004 to 2009, presenting a staggering repair and maintenance bill for the future. The facilities that house fundamental research activities at NASA are typically old and require more maintenance than current funding will permit. As a result, they are crowded and often lack the modern layouts and utilities that improve operational efficiency. The equipment and facilities of NASA’s fundamental research laboratories are inferior to those witnessed by committee members at comparable laboratories at the U.S. Department of Energy (DOE), at top-tier U.S. universities, and at many corporate research institutions and are comparable to laboratories at the Department of Defense (DOD). If its basic research facilities were equipped to make them state of the art, NASA would be in a better position to maintain U.S. leadership in the space, Earth, and aeronautical sciences and to attract the scientists and engineers needed for the future.

NASA’s facilities require $245 million to fix

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.23, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

The facility assessment findings recommend that more than 800 recapitalization projects be performed over the next 5 years, with a total estimated 5-year cost of approximately $245 million. Approximately 27 percent of the total recommended project costs were considered to be urgent or high priority in that they address high-risk issues that could result in costly failures or injury and place facilities in a nonoperational status within the next 12 months. There were readily identifiable required investment trends in the electrical power, data acquisition, and control system categories across all the NASA centers.

NASA Fails – Space Centers – Equipment/Facilities (3/3)

The majority of NASA’s research is done at college campuses- because NASA’s facilities are increasingly all unusable

**Committee on the Assessment of NASA Laboratory Capabilities 10**

(“Capabilities for the Future An Assessment of NASA Laboratories for Basic Research” Committee on the Assessment of NASA Laboratory Capabilities THE NATIONAL ACADEMIES PRESS Washington, D.C. pg 73 <http://books.nap.edu/openbook.php?record_id=12903&page=73> accessed: 6/25/11 TJL)

Much of the basic research in the science and engineering of space studies relevant to NASA is now performed in the graduate departments of top-tier universities in the United States. These universities are leading the way in strong, multifaceted research programs involving faculty, graduate students, and adequate funding. NASA increasingly depends on academia to define the decadal scientific goals for its most important space science and aeronautics undertakings.

NASA Fails – Safety (1/2)

NASA’s projects are too unsafe, even the assessment afterwards is unusable

Marks, New Scientist, 8

[Paul, 1-12-8, New Scientist, “NASA's flawed aviation survey may yet yield useful results; A costly survey of airline pilots to gauge air safety deemed useless by NASA could be re-analysed, says survey expert”, page 24, LexisNexis, Accessed 6/23/11, LGK]

IF YOU fly, you may have been disappointed on 31 December 2007 when NASA released 16,000 pages' worth of survey data on flight safety. Despite spending $11 million on gathering the data, which involved questioning 500 US commercial pilots every month for four years, NASA administrator Michael Griffin says the results are unusable because the survey's methodology was flawed. Conducted by the Battelle Memorial Institute Enhanced Coverage LinkingBattelle Memorial Institute in Santa Clara, California, the National Aviation Operational Monitoring Service (NAOMS) project interviewed pilots about safety issues such as the frequency of near misses, diversions to other airports due to technical failures, and breaks in communication with air traffic control. While existing accident reporting systems allow ground staff to report safety breaches and analyse data from flight recorders, NAOMS was supposed to flag up problems that only pilots see and that increase the probability of accidents. While existing accident reporting systems allow ground staff to report safety breaches and analyse data from flight recorders, NAOMS was supposed to flag up problems that only pilots see and that increase the probability of accidents. That didn't happen. Battelle's findings ended up , such as those for engine failure: the survey's rate for this was four times that recorded by the Federal Aviation Administration (New Scientist , 10 November 2007, p 5). NASA attributes this problem to Battelle counting some incidents more than once and has deemed the survey "simply not credible" , although it has been obliged to release the raw data under freedom- of-information legislation.

NASA Fails – Safety (2/2)

NASA culture and varying budgets and constraints undermine safety prioritization

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 28-29, opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Space travel is inherently dangerous. Nevertheless, NASA’s policy is that “safety is and will always be our number one priority in everything we do.”124 The Augustine committee described safety as a sine qua non.125 Analysts and policy makers generally agree with this emphasis, but some have concerns about whether it is matched by NASA’s implementation of its safety policies and procedures. The Columbia Accident Investigation Board found in 2003 that “throughout its history, NASA has consistently struggled to achieve viable safety programs and adjust them to the constraints and vagaries of changing budgets.... NASA’s safety system has fallen short of the mark.”126 It concluded that “a broken safety culture,” including a “reliance on past success as a substitute for sound engineering practices,” was an organizational cause of the Columbia disaster.127 It found that one contributing factor was “intense schedule pressure,” which had also been identified as an organizational cause of the space shuttle Challenger disaster in 1986.128 It recommended that NASA establish a technical engineering authority, reporting directly to the NASA Administrator rather than to the space shuttle program, that independently verifies launch readiness and has sole authority to grant waivers for technical standards.129 In response to these findings, NASA has made many changes, including the establishment of an independent NASA Engineering and Safety Center under the auspices of the headquarters Office of Safety and Mission Assurance. Nevertheless, some analysts see signs that potential problems remain. The deadline of 2010 to complete construction of the space station and stop flying the space shuttle created schedule pressure for both programs until NASA converted it from a hard deadline to a flexible goal (now extended to early 2011). In 2006, NASA decided to a proceed with a shuttle mission, even though the Chief Engineer and the head of the Office of Safety and Mission Assurance recommended against the launch because of an issue with the shuttle ice-frost ramps that they characterized as “probable/catastrophic.”130 Some observers saw signs of “reliance on past success” in NASA’s justification for this decision: the NASA Administrator disagreed with the “probable” characterization because “we have 113 flights with this vehicle ... and while we’ve had two loss of vehicle incidents, they’ve not been due to ice-frost ramps.”131 (The two officials who recommended against launch stated that they were comfortable with the decision to overrule them because “the risk was to the vehicle and not the crew.”)132 A member of NASA’s Aerospace Safety Advisory Panel testified in late 2009 that describing safety as a sine qua non “oversimplifies a complex and challenging problem” and that NASA “has given serious consideration only recently” to the establishment of safety requirements for commercial crew transport services.133

In the remaining lifetime of the International Space Station there is a 70% chance of another catastrophic accident – reject NASA’s lunacy

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

With these odds, the probability of losing at least one more shuttle during the life of the ISS (i.e., in 65 flights) is nearly 70%. In other words, NASA is gambling its future, and the lives of astronauts, on a program that has less than one chance in three of avoiding disaster. This is like playing Russian roulette with a revolver in which four out of the six chambers are loaded. Only a suicidal lunatic would accept such a proposition.

\*\*\*NASA Fails – Bureaucracy

NASA Fails – Bureaucracy – Generic (1/2)

NASA is too riddled with bureaucracy to accomplish anything – prefer empirics

Patterson, CNN Staff writer, 6-14-11

(Thom, “NASA insider: Some truth to Gingrich's barb” CNN,

<http://news.blogs.cnn.com/2011/06/14/nasa-insider-some-truth-to-gingrichs-barb/> accessed June 22, 2011, EJONES)

After Newt Gingrich's harsh comments about NASA during Monday's night's debate between GOP presidential hopefuls, you'd guess the outrage from the nation's legendary space agency would be deafening. So far today, all we've heard from Houston and Washington are crickets. For those who missed it, Gingrich accused NASA's bureaucracy of wasting hundreds of billions of dollars that it's spent since the 1969 moon landing. Without such waste, he said, "we would probably today have a permanent station on the moon, three or four permanent stations in space, a new generation of lift vehicles." NASA is "standing in the way" of a "new cycle of opportunities" when it "ought to be getting out of the way and encouraging the private sector," said the former House speaker. The government agency that fulfilled President Kennedy's Cold War challenge to send a man to the moon within a decade chose not to comment. "It is inappropriate for us to comment on election rhetoric," said today's one-line statement from the communications office. Why so quiet? Some NASA officials suspect Gingrich may be letting us know that the emperor has no clothes. Some insiders are wondering if NASA is operating with an outdated management paradigm better suited to the 1960s Apollo era rather than the 21st century. Instead of a bounty of exploration riches, Gingrich said, NASA has produced "failure after failure." The space shuttle, which will lift off a final time next month, was originally designed to fly 50 missions per year at $10 million per flight. That never happened. The International Space Station was first priced at $8 billion to design build and develop. That price tag eventually totaled more than $100 billion. NASA's list of expensive and less-than-successful programs includes the X-33, the Constellation, the X-38, the Ares I, and the Ares V, which were all canceled before they came to fruition. The former House speaker didn't mention the shuttle's well-known successes, including countless research missions, fixing the Hubble Telescope and building the International Space Station. "Most people know that there's a lot of truth to what Newt's been saying," said a NASA executive who asked not to be identified so he might speak more frankly. "But they're doing their best to compose the nation's space agenda in the face of all the constraints of operating within a government bureaucracy." What Gingrich didn't say last night is that he agreed with NASA's 2011 budget - which was approved by President Obama. The "Obama administration's budget for the National Aeronautics and Space Administration deserves strong approval from Republicans," Gingrich wrote in an editorial with former Rep. Robert Walker. NASA has been fostering programs during the past few years aimed at using privately developed rockets and orbiting vehicles for U.S. space missions. Space Exploration Technologies, aka Space X, has been contracted to use its Dragon orbiter - after it's fully developed - to resupply the space station. The stakes for NASA to reconfigure are high, said the NASA executive. "NASA will either undergo a paradigm shift now to figure out how to work with the private sector - or it will probably collapse."

NASA Fails – Bureaucracy – Generic (2/2)

Making organizations more effective with a bureaucracy distorts the role, purpose and value that the organization should have – U.S. government proves.

Milward, University of Arizona public management professor, and Rainey, University of Georgia political science and public administration professor, 1983

(H. Brinton, Hal G., “Don't Blame the Bureaucracy!”, *Journal of Public Policy,* May 1983, Vol. 3 No. 2, p. 152, J-STOR, accessed 6/25/11, EK)

No one opposes efficiency in government, and many business practices should be used more frequently in government, but the call for 'running government more like a business' is often badly misconceived. It overlooks several serious points. One of these points is that heavy emphasis on operating efficiency may distort the role, purpose, and value of government in our society. The United States government, with its sharing of executive power between Congress and the President, was originally designed with less emphasis on simple efficiency than on avoiding concentrated power and centralized administration of the type European monarchies possessed. Indeed the same emphasis exists today. Samuel P. Huntington in American Politics: The Promise of Disharmony (I98I) writes that the American people will not permit government to be what it must be for efficient operation, i.e., to possess some measure of hierarchy, inequality, arbitrary power, secrecy, deception and established patterns of superordination and subordination. These are the attributes which are necessary for efficiency but antithetic to the American ideal. Ironically, the Reagan administration represents that fear and distrust of government at the same time they advocate managerial solutions which will make it more fearsome. This unwieldly character of our government complicates the internal operation of agencies and programs and makes them appear inefficient or actually be that way

NASA Fails – Bureaucracy – Mismanagement (1/2)

NASA has a poor middle management system with incompetent central leaders

**Committee on the Assessment of NASA Laboratory Capabilities 10**

(“Capabilities for the Future An Assessment of NASA Laboratories for Basic Research”, Committee on the Assessment of NASA Laboratory Capabilities THE NATIONAL ACADEMIES PRESS Washington, D.C. pg 68-69 <http://books.nap.edu/openbook.php?record_id=12903&page=68> accessed: 6/25/11 TJL)

Research and science center institutional responsibility at NASA Headquarters moved from OAST (Code R) and the Office of Space Sciences (Code S) to the NASA associate administrator (AA). Until 1992, the AA for OAST had responsibility for both the aeronautics and space technology programs, including the R&T base and the institutional responsibility for ARC, DFRC (once part of ARC), LaRC, and GRC. The OAST center directors reported to the AA for OAST. The AA for space sciences had institutional responsibility for GSFC and JPL, and those center directors reported to the AA for Code S. The Code R and Code S AAs were accountable both for their programs and for maintaining the institutional capabilities of their centers. This often made it easier to resolve issues associated with equipment and support and maintenance, minor facilities issues, and so forth, all of which affect center laboratory capabilities and early TRL research. Under that former structure, center directors used to have a great deal of authority working with AAs to address programmatic and institutional issues. Center management traditionally had the responsibility for creating an environment, which includes facilities, laboratories, and equipment, conducive to high-quality innovation and breakthroughs important to national security and scientific understanding. There are many examples of breakthroughs, such as winglets, supercritical wings, swept wings, the lunar rendezvous approach for the Apollo Moon landing, and communications satellite enhancements. Under the current structure, much of the former budgetary flexibility of the center directors to resolve institutional issues affecting laboratory capabilities has been shifted to Headquarters. Although the current approach limits unnecessary duplication across the centers, center directors have become like base commanders, and their intellectual leadership has been eroded.

And this has destroyed NASA’s flexibility and ability to quickly work on projects – means we always get outpaced by other countries

**Committee on the Assessment of NASA Laboratory Capabilities 10**

(“Capabilities for the Future An Assessment of NASA Laboratories for Basic Research”, Committee on the Assessment of NASA Laboratory Capabilities THE NATIONAL ACADEMIES PRESS Washington, D.C. pg 69

<http://books.nap.edu/openbook.php?record_id=12903&page=69> accessed: 6/25/11 TJL)

In response to congressional concerns about the cost of ISS development, NASA’s accounting and budgeting approach shifted from covering all NASA manpower in a single appropriation line to an approach whereby all costs, including manpower costs, had to be recovered by charges against either specific programs for which a budget existed or by overhead costs accrued. Under the earlier construct, center directors had significant discretion in assigning manpower to activities because that manpower was already paid for. After the change, employees had to be charged to a specific project or to overhead. If center management does not aggressively limit overhead charges, rates rise and the center cannot compete effectively for new projects. The old construct gave center management flexibility to allocate manpower to laboratories where they believed the highest payoffs could be achieved. The committee learned from its discussions at the centers that the change to full-cost budgeting and accounting has reduced the discretion and flexibility of center management in promoting research and technology innovation consistent with NASA’s charter. This impedes quick-start research investigations and the assignment of research support in the form of technicians, equipment, and the like, and it has increased the administrative burden. According to the NASA personnel with whom the committee met at the centers, this has been damaging to the laboratory capabilities of the research centers.

NASA Fails – Bureaucracy – Mismanagement (2/2)

And the laboratories that this mismanagement effects are critical to literally every flight based NASA mission

**Committee on the Assessment of NASA Laboratory Capabilities 10**

(“Capabilities for the Future An Assessment of NASA Laboratories for Basic Research” Committee on the Assessment of NASA Laboratory Capabilities THE NATIONAL ACADEMIES PRESS Washington, D.C. pg 69 <http://books.nap.edu/openbook.php?record_id=12903&page=69> accessed: 6/25/11 TJL)

The institutional capabilities of the NASA centers, including their laboratories, have always been critical to the successful execution of NASA’s flight projects. These capabilities have taken years to develop and depend very strongly on highly competent and experienced personnel and the infrastructure that supports their research. Capabilities that have taken years to develop can be destroyed in a short time if not supported with adequate resources and the authority to selectively hire new people to learn from those who built and nurtured the laboratories. It is flawed reasoning to believe those capabilities, once destroyed, can be reconstituted rapidly at will. The laboratory capabilities that are essential to the formulation and execution of NASA’s future missions must be properly resourced.

And the laboratories are decaying without any new state of the art technology

**Committee on the Assessment of NASA Laboratory Capabilities 10**

(“Capabilities for the Future An Assessment of NASA Laboratories for Basic Research” Committee on the Assessment of NASA Laboratory Capabilities THE NATIONAL ACADEMIES PRESS Washington, D.C. pg 70 <http://books.nap.edu/openbook.php?record_id=12903&page=70> accessed: 6/25/11 TJL)

Sophisticated and more expensive research equipment to achieve state-of-the-art capability is not being procured, with researchers doing their best to maintain older instruments. Repair and maintenance contracts for expensive equipment are almost nonexistent. In some cases, when an expensive instrument fails it must be left unusable and the research suffers.

It is very likely that problems with facilities severely hinder all developing missions and research

**Committee on the Assessment of NASA Laboratory Capabilities 10**

(“Capabilities for the Future An Assessment of NASA Laboratories for Basic Research” Committee on the Assessment of NASA Laboratory Capabilities THE NATIONAL ACADEMIES PRESS Washington, D.C. pg 70 <http://books.nap.edu/openbook.php?record_id=12903&page=70> accessed: 6/25/11 TJL)

The NASA centers are largely responsible for funding the maintenance of their facilities out of the CM&O budgets provided by NASA Headquarters. Major repairs in excess of $1 million are funded by NASA Headquarters, but many projects remain unfunded from year to year. The CM&O budgets are inadequate to fund required maintenance or to do what is necessary to prevent catastrophic failures. As a result, many repair and maintenance jobs that have been categorized by NASA Headquarters as very high in both the consequence-of-failure metric and the probability-of-failure metric remain unfunded every year. There are serious facility problems waiting to happen, with potentially major adverse impact on missions and fundamental research operations.

NASA Fails – Bureaucracy – Privatization Better

NASA bureaucracy prevents solvency, the private sector solves better

De Souza- Columnist for National Post, 6/14/11

(Father Raymond J, Priced out of the solar system, National Post p A19, Lexis accessed: 6/21/11) AC

NASA chose the 20th anniversary of Gagarin's orbit for the launch of the first space shuttle in 1981. The liftoff was early on Sunday morning, and then on Tuesday afternoon all of us gathered at school to watch the shuttle makes its triumphant return in the California desert. In 1981, the lunar missions were fresh in the minds of our parents, and children were excited about the prospect of flying into space. But 30, 40, 50 years on, the thrill is gone; and shuttle flight, even the international space station, makes little news. To mark the 30th anniversary of the first shuttle launch this week, NASA announced the museums to which the shuttles would go once the program is retired this summer. Just before the end of its term, the Bush administration announced that the shuttle program would be succeeded by the Constellation manned space flight program -with a planned return to the moon in 2020 and an eventual mission to Mars. Those plans did not survive long. The Obama administration and Congress, citing the high cost of manned space flight, cancelled Constellation. Until 2020, Americans will hitch a ride on Russian rockets to send their astronauts to the space station, and after that will likely rely on private companies to put astronauts into space -if there is to be human presence in space at all. There is a sadness to all of this, even if the decisions are widely supported. Manned space flight is very expensive, and while keeping the country solvent is not as inspiring a goal as venturing into space, it is rather more urgent. The end of the shuttle program was planned for some years, and 30 years is a very long run for any mission, but its coincidence with America's fiscal catastrophe does suggest something dramatic has changed. Is the United States too poor to have it have its own manned flight program? Another coincidence, too, is striking. The shrinking away from manned space flight at the same time as increasing resources are being put toward fighting climate change suggests a drawing in of the horizon. We seek not so much to break through the sky to the heavens, but to repair the sky that it might better protect us against the heavens. It's easy to make spiritual metaphors out of space travel, as if God truly did live amid the stars, but they don't always apply. Not going into space does not mean losing interest in matters spiritual, but something is noteworthy in the shift from conquering the vast unknown frontier to living in fear of what the frontier may do to us. That the American government is retreating from manned space flight doesn't mean that Americans won't be going into space -the government is not the people. The possibility of private companies taking the lead on exploration, scientific projects, commercial satellites and even space tourism is not to be discounted. Just because government largely monopolizes an activity doesn't mean that only government can do it -think of education and health care. Bureaucracies -and NASA is an enormous one -do not contain costs well, which is one reason why manned space flight is so terribly expensive. It may well be that, as it so many other technological fields, private sector discipline makes space exploration more creative and less expensive. Perhaps. But that is to put the best face on what is clearly a retreat from the grand ambitions that captured Russians and American for the past half century. I was in Houston in 2003 when the shuttle Columbia disintegrated in the Texas sky upon return. Covering that story, I heard many brave words about how America would return to space, even though they had just paid a heavy price in lives lost. Eight years later, there will be no return. The price can no longer be paid.

Bureaucracy Bad – Fails (1/4)

Amidst budget concerns, bureaucracies fail and collapse

Smith, Economic Commentator, 10

(Charles Hugh – The Business Insider, “The Growth and Collapse Of American Bureaucracy”, Lexis) AC

Before we get to the lifecycle of bureaucracy, I want to be clear this is not a slam on people who dutifully work in bureaucracies. Bureaucracies arise to serve a social or political need (or perceived need) in an organized fashion, and systems of management, accounting, oversight and so on are required. But just as bureaucracies arise, they also ossify, devote their energy to self-preservation and then implode. We can see how this works in this chart of the University of California system's count of faculty and administrators. I suspect this phenomenon is universal in state-funded universities: bureaucratic staff that have nothing to do with the classroom, research or teaching grow to dominate the payroll and the budget. Much of this is human nature: if the budget can be expanded to serve my department or agency, then it will be expanded. There are other organizational tropisms as well: ENA, for example: "everyone needs an assistant," including the current assistant. When an economy is growing rapidly, then the waste, fraud, duplication, inefficiency and bloat go unnoticed because tax revenues and the budget are rising even faster than the bloat and inefficiency. The problem arises when tax revenues fall. Then the bureaucratic impulse to never-ending growth is stymied, and the various bureaucracies turn inward as they muster their forces to wage internecine warfare with other protected fiefdoms. (That's straight from the Survival+ critique.) Self-preservation become the paramount concern, and the original purpose of the bureaucracy is buried beneath the urgent priority of saving perquisites, benefits, staffing, and budgets. When cuts are required, the actual service provided is slashed to maintain bureaucratic bloat. Thus the Administration of a university suffers simulacrum cuts (a "hiring freeze," etc.) while the teaching and graduate-student teaching assistant staff levels are slashed and burned. "Tip of the spear" military forces and readiness are left twisting in the wind while the thousands of senior officers in the Pentagon and Services jostle for promotions. At the point of implosion, there are more captains, colonels and generals than actual war-fighters. (There are plenty of barbers, cooks, waiters and assistants, though, to serve the senior officers.) Benefits for the survivors are left basically untouched while new hires are fired to preserve the budget for those with seniority. At some point, the mission of the bureaucracy is completely lost, and the citizens' patience with institutional incompetence and self-aggrandizement finally runs out. Although it seems "impossible" in an era where the Federal Reserve just conjures up $1 trillion and the Federal governments sells $1.3 trillion in bonds every year to fund its ballooning deficit, bureaucracies can and will implode.

Big government bad – wastes money and kills private sector effectiveness

Cloud, Co-founder of the Center for Small Government, No Date

(Michael, “Why Not Big Government? The Five Iron Laws” The Center For Small Government, <http://www.centerforsmallgovernment.com/why-small-government/the-five-iron-laws-of-big-government/>, accessed June 25, 2011, EJONES)

Big Government Programs are funded with hundreds of billions of tax dollars. Taken from productive workers and businesses. Every dollar drained from the private sector is a dollar that the individuals and business who earned it can’t spend, save, invest, or give to effective private organizations and programs that help those less fortunate. Charities, churches, and service organizations strive to assist those in need – and help them become self-sufficient. Because these organizations rely on voluntary donations, they are directly accountable to their supporters. Because they operate on lean budgets, they streamline their operations, eliminate needless overhead, and seek better ways to help those unable to help themselves. They regularly produce good results – at a fraction of the expense of comparable Big Government Programs.

Bureaucracy Bad – Fails (2/4)

Bureaucracies ultimately fail to communicate and end up costing more than we can afford

Western Gazette, 10

(Western Gazette series, It's all catch-22 when you enter the bureaucratic world, pg 12, Lexis) AC

One of the wonders of the internet is the principle known as "packet switching" that underpins it. Information technology students will know that the emails we send and the items we upload or download are broken into a multitude of tiny fragments, injected into the global electronic stream of consciousness and then, almost always, recongregated in the right pattern at the right location. This miracle of technology, repeated millions of times a minute around the world, is a useful analogy when analysing the actions of remote bureaucracies. Under the rules made by governments and parliaments, the bureaucracies make millions of decisions about places and people. And these well-intentioned decisions are meant to link up with one another when they arrive at their destination. There is just one hitch. Unlike the internet, centralised bureaucracies don't tend to have very good technologies for making sure that their decisions fit together to form the intended picture when they reach their destinations. This is evident to any constituency MP in their constituency casework. Often enough, over the years, I have come across people caught in the unintended cross-fire between bureaucracies. You know the kind of thing. Bureaucracy A gives you a grant or an incentive or a rule leading you to do X and Bureaucracy B strictly prohibits you from doing, or makes it well nigh impossible for you to do it. This phenomenon is, of course, recognised in Whitehall. But, alas, for many years, the response was to form cross-departmental committees in order to produce "more joined-up government". Sometimes, this can work. But the conclusion I draw from experience is that, all too often, such committees join up nothing except the members of the committee themselves. The real secret, of course, is to learn from the internet and to recognise that it's a lot easier to join things up properly at the periphery than at the centre. Hand power to people, and they will usually make common sense judgments that match their own circumstances. The scope for doing this in England is vast. We live in just about the most centralised country in the western world and there are literally thousands of powers and decisions that we make at the centre, which in almost any other advanced liberal democracy would be made locally. In one sense, we are lucky that the massive shift to local decision-making is only just beginning because, with any luck, the joined-up common sense it permits will help to offset or, in some cases, even more than offset, the effects of reduced spending-power. When money is plentiful, the Catch-22 absurdities of overlapping and mutually contradictory bureaucracies are a monumental bore. When money is tight, they become an un-luxury we simply cannot afford.

Big government fails – can’t solve what they were created to solve

Cloud, Co-founder of the Center For Small Government, No Date

(Michael, “Why Not Big Government? The Five Iron Laws” The Center For Small Government, <http://www.centerforsmallgovernment.com/why-small-government/the-five-iron-laws-of-big-government/>, accessed June 25, 2011, EJONES)

Big Government Programs don’t solve the problems they were created to solve. They don’t produce the results they were intended to produce. They don’t deliver the benefits they were supposed to. Do Government Welfare Programs get people back on their feet and enable them to become self-supporting individuals? Do Government subsidies of businesses make their recipients stronger and more competitive? Big Government Economic and Social Programs don’t work.

Bureaucracy Bad – Fails (3/4)

Bureaucracy guts solvency – multiple reasons

Edwards, director of tax policy studies at Cato, 7

(Chris, “Federal Bureaucrats: Same Old Story” The Cato Institute, February 12, http://www.cato-at-liberty.org/federal-bureaucrats-same-old-story/ accessed June 25, 2011, EJONES)

The Washington Post reports on a new survey of 221,400 federal workers and their pay and performance. Among the survey findings are that only 22 percent of federal workers agreed with the statement “pay raises depend on how well employees perform their jobs.” Despite eight years of Al Gore’s “reinventing government” and six years of similar efforts under President Bush, the federal bureaucracy is still a very ill-functioning “bureaucracy.” Indeed, that will always be the case. Here are some reasons why: Poorly performing federal agencies do not go bankrupt, and thus there is no built-in mechanism to eliminate failures; Government managers face no profit incentive, giving them little reason to proactively reduce costs. Indeed, without profits to worry about, managers favor budget and staffing increases to boost their power and prestige; Without the profit motive, there is little incentive for government workers to innovate and produce better services; The output of much government work is hard to measure, making it difficult to set performance goals for managers and workers; Even if performance could be measured, federal pay is generally tied to longevity, not performance; Disciplining federal workers is difficult, and they are virtually never fired, resulting in agencies carrying heavy loads of poor performers; To prevent corruption, governments need complex and costly regulations and paperwork to carry out routine functions such as procurement; Because of the frequent turnover of political appointees, many agencies experience continual changes in their missions; Congress imposes extra costs on agencies in carrying out their duties, such as resisting closure of unneeded offices in the districts of important members; Agencies get influenced or “captured” by special interest groups that steer policies toward satisfying narrow goals, rather than broad public interest goals; The large size and overlapping activities of federal agencies makes coordination of related functions very difficult. Sadly, we saw the results of this problem with the failures of U.S. intelligence agencies to effectively communicate with each other prior to 9/11. For these reasons, and many more, the federal government ought to radically downsized with as many functions as possible left to the private sector.

Big government fails – counterproductive and leads to irresponsibility

Cloud, Co-founder of the Center For Small Government, No Date

(Michael, “Why Not Big Government? The Five Iron Laws” The Center For Small Government, <http://www.centerforsmallgovernment.com/why-small-government/the-five-iron-laws-of-big-government/>, accessed June 25, 2011, EJONES)

Big Government decided that too many poor people in America lived in sub-standard dwellings. So it created Urban Renewal Programs — bulldozing and tearing down 4 times as many dwellings as it built. Result? Tens of thousands of families without roofs over their heads. (See The Federal Bulldozer by Martin Anderson.) Big Government created “The Great Society” welfare system to help the needy. Results? A culture of irresponsibility and dependency. A welfare system that entices and rewards people for getting on and staying on the dole. (See Losing Ground by Charles Murray) How many stories have you heard about Big Government Programs that backfire? How many others haven’t you heard about?

Bureaucracy Bad – Fails (4/4)

Big government fails – Medicare and Medicaid prove

Cloud, Co-founder of the Center For Small Government, No Date

(Michael, “Why Not Big Government? The Five Iron Laws” The Center For Small Government, <http://www.centerforsmallgovernment.com/why-small-government/the-five-iron-laws-of-big-government/>, accessed June 25, 2011, EJONES)

The Federal Government created Medicare to help senior citizens and Medicaid to help the poor with medical care. Unintended consequences? Massive government funding for these programs drove up health care costs – for those participating and those not. It made doctors and hospitals accountable to the government — instead of patients. It breeched patient-doctor medical confidentiality. It set in motion the drive toward a Government Monopoly — “Single-Payer” — Health Care System. Toward Socialized Medicine. Social Security? Government Central Planning of Education? Government Disaster Relief? The War on Drugs? Mandatory Minimums? All create new problems. Unintended consequences.

Big government fails – no need for under-runs

Cloud, Co-founder of the Center For Small Government, No Date

(Michael, “Why Not Big Government? The Five Iron Laws” The Center For Small Government, <http://www.centerforsmallgovernment.com/why-small-government/the-five-iron-laws-of-big-government/>, accessed June 25, 2011, EJONES)

Have you ever heard about government cost under-runs? How many times have you read about government projects that come in at 5 or 10 or 20 times the price initially agreed to? Why aren’t Big Government Programs thrifty? Because they don’t have to be. It’s not their money. Every year, the officials running these Big Government programs go back to their local or state or federal legislators for bigger budgets and more tax dollars.

\*\*\*NASA Fails – Particular Programs/Areas

NASA Fails – Skylabs Prove

Skylabs systems, which were supposed to facilitate lunar transportation, are museum relics because of NASA’s inefficiencies

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

The average cost of each flight is a staggering $760 million. After a mission, the time required to prepare a shuttle for the next flight was supposed to be less than two weeks, but in practice tens of thousands of technicians spend three to six months rebuilding each "reusable" shuttle after every flight. Worst of all, the shuttle is a needlessly complex, fragile and dangerous vehicle, which has killed fourteen astronauts so far. In 1973, we had a space station called Skylab, with berths for three astronauts. NASA let it reenter and break up over Western Australia. A second Skylab was built, which could have become the Earth terminal of a lunar transportation system. It is now a tourist attraction at the Air and Space Museum in Washington, and the Saturn V to launch it is nothing more than a monstrous lawn ornament, moldering on its side at Johnson Space Center (JSC).

NASA Fails – Education

NASA won’t prioritize education, undermining coherence and commitment to programs

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 16,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Unlike the Department of Education or the National Science Foundation, NASA does not have a lead role in federal education programs. As a result, some analysts may view NASA’s education activities as secondary to its primary efforts in spaceflight, science, and aeronautics. Congress, however, is typically supportive of NASA education programs and often provides more funding for them than NASA requests. This imbalance between Administration and congressional priorities, the dispersed nature of NASA’s education activities outside the Office of Education, and the tendency for congressional funding increases to be dedicated to specific one-time projects rather than to ongoing programs, may make it difficult for NASA to plan and manage a coherent, unified education program.

NASA Fails – Human Flight Fails (1/2)

Human spaceflight is a waste and will inevitably fail

Lind, New America Foundation Economic Growth Program policy director, 4-12-11

(Michael - Editor of New American Contract and its blog Value Added, and a columnist for Salon magazine, Published author on history economy, politics, and foreign policy, Why we should embrace the end of human spaceflight, Salon.com POLITICS section, 4/12/1 accessed: 6/21/11, Lexis) AC

This week NASA is announcing where the soon-to-be-retired space shuttles will be displayed as museum relics. On April 19 the space shuttle Endeavor will be launched, on the penultimate mission of the program. The end of the space shuttle program will mean that the U.S. will have to rely on Russian rockets to deliver American astronauts to space, pending the development of private commercial spaceflight. It is tempting to say that this is an outrage; that the effective end of the American manned spaceflight program is a national humiliation; that the program's demise is yet another symbol of the gap in mentality between the confident, ambitious Kennedy-Johnson years and today's solipsistic, penny-pinching America. It is tempting to say all that, but the temptation should be resisted. The truth is that the American space program is flourishing. In recent years Mars has been visited by the Phoenix lander and the Mars rovers, Spirit and Opportunity. At the moment the Messenger probe is orbiting Mercury and the New Horizons probe is scheduled to pass Pluto in 2015. With the help of the orbiting Kepler space telescope, more than 500 planets in other solar systems have been identified. We live in the greatest age of cosmic exploration in history, even if the public pays little attention because there are no astronauts to engage in white-knuckle landings or to clown around for the cameras. When the Apollo astronauts landed on the moon, many assumed that this was the first step toward permanent colonization of the moon and journeys by astronauts to other planets. From today's perspective, though, the space race was like the races to the North Pole and the South Pole. Once explorers had reached those destinations, the world lost interest. Another parallel is ocean exploration. Back in the 1960s, visions of colonies on the moon competed with plans for domed cities on the ocean floor that gave a new meaning to the phrase "real estate bubble." Scientific exploration of the ocean depths continues to produce marvelous discoveries, like whole ecosystems that have evolved to take advantage of the heat and emissions of undersea volcanic vents. But the year 2000 came and went and millions of homeowners are "underwater" only in metaphor. The parallel is not complete, of course. The poles and the ocean depths are far more hospitable to human life than near Earth orbit or the moon or Mars. Astronauts have learned that prolonged weightlessness does terrible things to the bones and the circulatory system. If God wanted us to live in outer space, we wouldn't have balancing systems in our inner ears. When and if the science-fiction alternative of providing a simulacrum of gravity by spinning a spaceship or space station is tried, let us hope there will be a plentiful supply of barf bags. The worst enemies of human spaceflight are its proponents. Their arguments are so weak that you keep waiting for the real, knock-down argument, which never comes. The success of robot space probes has discredited the idea that machines are too stupid to do science in space. When that argument for human spaceflight collapses, those that remain are preposterous. One is the assertion that life has always sought out new environments. Just as plants and animals moved from the seas to the land, it is said, so humanity must transcend the boundaries of the Earth. This is just silly. Animals never leave a comfortable habitat for a harsh one, unless they are forced to. That is why we don't see buffalo, raccoons and turtles marching off to Death Valley in great numbers to test their mettle, in a spirit of adventure. Our vertebrate ancestors did not come ashore hundreds of millions of years ago because they decided to boldly go where no fish had gone before. Instead, generations of proto-amphibians in shallow water got stranded in separated ponds. The ones that were accidentally equipped to survive by desperately gulping air survived long enough to breed, and here we and our fellow land animals

**[CARD CONTINUES]**

NASA Fails – Human Flight Fails (2/2)

**[CARD CONTINUED, NO TEXT REMOVED]**

are. No lungfish congress would have voted to colonize dry land. Equally silly is the comparison between the exploration of America by Europeans and the exploration of outer space. The Americas had native people to be enslaved by greedy Europeans, abundant resources and lots of pleasant places to live -- to say nothing of breathable air and drinkable water. That's why the European powers fought to control the Western Hemisphere, while ignoring the continent of Antarctica. What about the argument that part of the human race needs to dwell somewhere other than on Earth, if humanity is to avoid extinction? In 500 million years the gradually warming sun may boil the oceans, and a few billion years later the sun will evolve into a red giant, incinerating or engulfing the Earth. Our descendants, if there are any, might consider relocating. In the half-billion years until then, the chances of war, plague or global warming producing the total extinction of a species as numerous, widespread and versatile as humanity are pretty low. A sufficiently large asteroid or comet impact like the one that caused the extinction of the dinosaurs could do the job. But if a massive bolide threatened the Earth, we would send unmanned spacecraft, not Robert Duvall or Bruce Willis, to steer it away or destroy it. In the event some other natural catastrophe -- a supervolcano, a nearby supernova -- rendered the surface of the Earth temporarily or permanently uninhabitable, it would be cheaper and easier to build and maintain underground bunkers than to use the same technology to do the same thing at vastly greater cost on the moon or other planets or in space stations. By the same token, if humanity had the technology to "terraform" the surface of Mars, it would have the power to make the ruined surface of a dead Earth habitable again, making the colonization of Mars unnecessary. If there is no compelling argument for government-sponsored human spaceflight, there is no convincing rationale for private commercial spaceflight, either. The Robert Heinlein wing of science-fiction fandom has always combined Tea Party-style anti-statism with a love of big rockets. Now that the dead hand of the NASA bureaucracy is out of the way, will visionary billionaires inspired by Ayn Rand inaugurate a new age of commercial space travel for the masses? Don't count on it. There might be a niche market for a few space-planes or rockets to take bored plutocrats into orbit for a joy ride. But investors would be wiser to invest in private bathyscaphes offering tours of the Mariana Trench. After 9/11, can anyone believe that the world's governments are going to foster a regime of laissez-faire toward private space shuttles that could be hijacked for suicide missions from orbit, or that might disintegrate over several time zones? And then there is the problem noted by the late William F. Buckley Jr. Because of security precautions, he joked, the increase of speed with each new mode of transport is neutralized by waiting times. A plane is faster than a train or bus, but you have to get to the airport two hours in advance. A spaceplane might take you across the continent in an hour -- but you would have to arrive at the spaceport the day before. In the next few generations there will probably be more human spaceflight on a small scale. In time there might even be tiny teams of scientists in orbit, on the moon or other planets, like those in Antarctica. But for the foreseeable future space exploration will be undertaken mainly by machines that don't horrify a watching world when they die slowly, with no hope of rescue.

NASA Fails – Extend Shuttle (1/2)

Extending the shuttle won’t solve – massive management and technical hurdles because we’re already transitioning away from shuttle

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 17, opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Space Shuttle Program Since its first launch in April 1981, the space shuttle has been the only U.S. vehicle capable of carrying humans into space. After a few remaining flights during 2010 and early 2011, current plans call for the space shuttle program to end. Although some advocates and policy makers would like to extend the program, technical and management issues are making that ever more difficult as the scheduled termination approaches. Congress’s attention is increasingly on managing the transition of the shuttle workforce and facilities and on addressing the projected multi-year gap in U.S. access to space between the last shuttle flight and the first flight of its successor.

Shuttle obsolete – tech outdated, and too costly to maintain

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 17-8, opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Why the Shuttle Program Is Ending The oldest shuttle is approaching 30 years old; the youngest is approaching 20. Although many shuttle components have been refurbished and upgraded, the shuttles as a whole are aging systems. Most analysts consider the shuttle design to be based, in many respects, on obsolete or obsolescent technology. The original concept of the shuttle program was that a reusable launch vehicle would be more cost-effective than an expendable one, but many of the projected cost savings depended on a flight rate that has never been achieved. Over the years, NASA has attempted repeatedly, but unsuccessfully, to develop a second-generation reusable launch vehicle to replace the shuttle. In 2002, NASA indicated that the shuttle would continue flying until at least 2015 and perhaps until 2020 or beyond. The Columbia disaster in 2003 forced NASA to revise that plan. Within hours of the loss of the space shuttle Columbia and its seven astronauts, NASA established the Columbia Accident Investigation Board to determine the causes of the accident and make recommendations for how to proceed.68 The board concluded that the shuttle “is not inherently unsafe” but that several actions were necessary “to make the vehicle safe enough to operate in the coming years.”69 It recommended 15 specific actions to be taken before returning the shuttle to flight. In addition, it found that because of the risks inherent in the original design of the space shuttle, because the design was based in many aspects on now-obsolete technologies, and because the shuttle is now an aging system but still developmental in character, it is in the nation’s interest to replace the shuttle as soon as possible as the primary means for transporting humans to and from Earth orbit.70 The board recommended that if the shuttle is to be flown past 2010, NASA should “develop and conduct a vehicle recertification at the material, component, subsystem, and system levels” as part of a broader and “essential” Service Life Extension Program.71 The announcement of the Vision for Space Exploration in 2004 created another reason to end the shuttle program: money. Before the shuttle program began to ramp down, it accounted for about 25% of NASA’s budget. Making those funds available for the Vision became a primary motivation for ending the program.

NASA Fails – Extend Shuttle (2/2)

Massive hurdles to extending shuttle – too far along in transition away to easily reverse it – contracts, costs, schedule, and safety issues

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 18-19,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

A decision to extend the program would create challenges relating to cost, schedule, and safety. With the planned termination date approaching, some contracts for shuttle components have already run out, and some contractor personnel have already been let go.73 Reestablishing the capability to operate the program would likely incur costs and delays, and this potential will grow as the planned termination date approaches. The recertification process recommended by the Columbia Accident Investigation Board could be costly and time-consuming, although the board itself gave no estimate of either cost or schedule. At this point, completing a recertification in time to maintain a continuous flight schedule might already be difficult. Congressional policy makers or the Administration could simply decide to continue flying anyway, in parallel with the recertification process—in effect, NASA has already done this to some extent with the decision to allow a few flights to slip into 2011—but policy makers could suffer political repercussions from such a choice if another serious accident occurred.

During the 2009 presidential transition, the GAO identified the pending retirement of the space shuttle in 2010 as one of 13 “urgent issues” facing the incoming Obama Administration.74 The GAO also stated that “according to NASA, reversing current plans and keeping the shuttle flying past 2010 would cost $2.5 billion to $4 billion per year.”75

NASA has created a Space Shuttle program that is expensive and accident prone

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

The average cost of each flight is a staggering $760 million. After a mission, the time required to prepare a shuttle for the next flight was supposed to be less than two weeks, but in practice tens of thousands of technicians spend three to six months rebuilding each "reusable" shuttle after every flight. Worst of all, the shuttle is a needlessly complex, fragile and dangerous vehicle, which has killed fourteen astronauts so far.

**NASA Fails – International Space Station**

NASA has failed at building the useless International Space Station- it has been twenty years and counting

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

Now we are building the International Space Station (ISS), which is still incomplete after twenty years of effort. Its orbital inclination, chosen for political reasons, makes it useless as a base for future missions beyond Earth.In the original design, the ISS had a crew of six or seven, but cost overruns have forced deletion of a habitation module and a lifeboat that could return that crew to Earth in emergency. The shrunken station, called "core complete," will accommodate only three astronauts (who will use a Russian Soyuz as a lifeboat). In normal operations, only one of the crew will be American.

The lack of support for the International Space Station means that even if there is a low risk for multiple accidents the mission won’t be restarted because of a lack of national interest

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

Until the Columbia accident, NASA had expected 4 shuttle flights per year to the ISS, and one more for missions unrelated to the station (e.g., to lower inclination). Now the shuttle may be restricted to orbits in the same plane as the ISS, so that the shuttle can go dock there if it is damaged during launch. In any case, present plans call for operation of the ISS until at least 2016, so there will be at least 65 more shuttle flights (5 per year).Based on experience to date (two shuttles lost in 113 missions), the accident probability is a little less than 2% on each flight. Astronauts may accept this risk because there is no other way to fly in space, but they would of course prefer a safer system. As a matter of public policy, however, only a compelling national interest can justify so hazardous a venture. The ISS presents no such necessity.

NASA Fails – Mars – Bureaucracy (1/2)

NASA can’t make any effective and quick mission to Mars – recent Rover delays prove

AP, 6-8-11

(Associated Press, “NASA's Next Mars Mission Over Budget, Behind Schedule” <http://www.foxnews.com/scitech/2011/06/08/nasas-next-mars-mission-already-overbudget/> accessed June 23, 2011, EJONES)

NASA's next-generation rover to the surface of Mars, which is already overbudget and behind schedule, may need more money to meet its November launch date, the space agency's auditors found. The grim news was outlined in a report released Wednesday by NASA's inspector general. Though project managers have solved most of the problems that caused the mission to be delayed by two years, auditors found significant hurdles remained before liftoff. The mobile Mars Science Laboratory is intended to be the most sophisticated rover sent to the Martian surface. From the outset, the mission managed by the Jet Propulsion Laboratory has been plagued by development woes that have put it behind schedule and driven up costs. The price tag has ballooned to $2.5 billion from $1.6 billion. NASA's internal watchdog faulted project managers for routinely underestimating costs and calculated that an extra $44 million may be needed to avoid another delay or cancellation. The latest price tag "may be insufficient to ensure timely completion of the project in light of the historical pattern of cost increases and the amount of work that remains to be completed," the report said. The size of a Mini Cooper and nicknamed Curiosity, the rover is a souped-up version of the golf cart-size twin rovers Spirit and Opportunity. Essentially a science laboratory on wheels, Curiosity carries a suite of tools to analyze Martian rocks and soil to determine whether environmental conditions were ever favorable to support primitive life. Curiosity was supposed to fly in 2009, but problems during construction forced NASA to push back launch by two years to 2011 when the orbits of Mars and Earth are again closely aligned. Engineers had to redesign the heat shield after it failed safety tests. There were delays in shipping instruments to NASA. It took longer than expected to build and test the gear boxes that enable the mega-rover to drive and flick its robotic wrist. Auditors found 1,200 reports of problems and failures that have not been resolved. During testing of the robotic arm, engineers discovered contamination in sample rocks and soil. NASA has since found a solution to minimize contamination, but auditors said they remained concerned that the fix would not be completed until later this month when Curiosity is scheduled to be shipped from California to Florida to be prepped for launch. Another launch delay would increase costs by at least another $570 million, the report said. NASA has maintained that Curiosity is no cookie-cutter rover and that unforeseen problems are to be expected when building such a complex machine. In a two-page response, Ed Weiler of NASA headquarters said he expected outstanding issues to be fixed by launch. Weiler also said the space agency has set aside $22 million in reserves "to achieve a timely and safe launch." Unlike the previous Mars rovers that bounced to a landing cocooned in airbags, the nuclear-powered Curiosity will use a precision landing system to gently lower itself to the surface -- a tough engineering feat. Curiosity's landing site has yet to be chosen from among four finalists. One thing Curiosity won't be able to do is take pretty pictures of its surroundings with a high-resolution 3-D camera. NASA recently nixed the camera that "Avatar" director James Cameron was helping to design because there wasn't enough time to test it before launch. Instead, the rover's "eyes" will be digital color cameras that are three times more powerful than those aboard previous Martian surface spacecraft.

NASA Fails – Mars – Bureaucracy (2/2)

Management delusions mean we never get to Mars

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 2) TJL

The lack of progress has not been due to insufficient funding or to technological problems, but to a series of blunders by NASA management. NASA engineers did not understand the popular enthusiasm aroused by Apollo. They thought the Giant Leap for Mankind was not the lunar landing itself, but the technological prowess it displayed. This led to the mistaken inference that the way to maintain popular support, and hence generous funding, was to propose megaprojects of great technical complexity, regardless of whether they were intrinsically interesting. They are surprised and disappointed that the public are unimpressed by the shuttle and ISS, despite their technical virtuosity. The Giant Leap delusion persists today, in the form of proposals for a flags-and-footprints mission to Mars.

NASA Fails – Climate

NASA’s Climate Research division is a colossal failure

Borenstein, AP Science Writer 3/4/11

(Seth, NASA research satellite plunges into the sea, Associated Press Financial Newswire, Lexis accessed 6/21/11) AC

WASHINGTON - For the second time in two years, a rocket glitch sent a NASA global-warming satellite to the bottom of the sea Friday, a $424 million debacle that couldn't have come at a worse time for the space agency and its efforts to understand climate change. Years of belt-tightening have left NASA's Earth-watching system in sorry shape, according to many scientists. And any money for new environmental satellites will have to survive budget-cutting, global warming politics and, now, doubts on Capitol Hill about the space agency's competence. The Taurus XL rocket carrying NASA's Glory satellite lifted from Vandenberg Air Force Base in California and plummeted to the southern Pacific several minutes later. The same thing happened to another climate-monitoring probe in 2009 with the same type of rocket, and engineers thought they had fixed the problem. "It's more than embarrassing," said Syracuse University public policy professor Henry Lambright. "Something was missed in the first investigation and the work that went on afterward." Lambright warned that the back-to-back fiascos could have political repercussions, giving Republicans and climate-change skeptics more ammunition to question whether "this is a good way to spend taxpayers' money for rockets to fail and for a purpose they find suspect." NASA's environmental division is getting used to failure, cuts and criticism. In 2007, a National Academies of Science panel said that research and purchasing for NASA Earth sciences had decreased 30 percent in six years and that the climate-monitoring system was at "risk of collapse." Then, last month, the Obama administration canceled two major satellite proposals to save money. Also, the Republican-controlled House has sliced $600 million from NASA in its continuing spending bill, and some GOP members do not believe the evidence of manmade global warming. Thirteen NASA Earth-observing satellites remain up there, and nearly all of them are in their sunset years. "Many of the key observations for climate studies are simply not being made," Harvard Earth sciences professor James Anderson said. "This is the nadir of climate studies since I've been working in this area for 40 years." Scientists are trying to move climate change forecasts from ones that are heavily based on computer models to those that rely on more detailed, real-time satellite-based observations like those that Glory was supposed to make. The satellite's failure makes that harder. Ruth DeFries, the Columbia University professor who co-chaired the 2007 National Academies of Science panel, said in an e-mail that this matters for everyone on Earth. "The nation's weakening Earth-observing system is dimming the headlights needed to guide society in managing our planet in light of climate change and other myriad ways that humans are affecting the land, atmosphere and oceans," DeFries wrote. NASA Earth Sciences chief Michael Freilich said it is not that bad. "We must not lose sight of the fact that we in NASA are flying 13 research missions right now, which are providing the fuel for advancing a lot of our Earth science," Freilich told The Associated Press. He said airplane missions, current satellites and future ones can pick up much of the slack for what Glory was going to do. However, Freilich, at a budget briefing a year ago, described the Earth-watching satellites as "all old," adding that 12 of the 13 "are well beyond their design lifetimes." "We're losing the ability to monitor really key aspects of the climate problem from space," said Jonathan Overpeck, a climate scientist at the University of Arizona. "Just about every climate scientist in the world has got to be sad right now."

NASA Fails – Science & Exploration Directorate Underfunded

One-sixth of the Goddard Space Flight Center’s total budget funds the Science and Exploration Directorate

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.41, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

About one-sixth of GSFC’s total budget of $3.1 billion goes to the SED. The permanent staff includes 525 civil servants, of whom 350 are scientists. At any one time, there are also approximately 350 visiting university faculty, staff, and other visitors, 350 support service contractors, 80 collocated engineers, and about 120 summer students and interns.

[NOTE: GSFC = Goddard Space Flight Center, SED = Science and Exploration Directorate]

The Science and Exploration Directorate is underfunded and can’t sustain facilities, salaries and facilities.

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.42-43, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

In the past, SED’s funding of basic research and associated infrastructure through GSFC funds contributed much to the center’s scientific and technological reputation. However, over the past 4 years the funding for basic research has been reduced, making it increasingly difficult to sustain low-TRL facilities, salaries, and instrumentation. For example, SED’s management told the committee that to remain competitive in ROSES competitions (discussed later), requests for funding for general laboratory enhancement are now omitted from their proposals. Large laboratories supporting multiple users are impacted, especially when no one user can afford the fees to maintain a facility. Moreover, the necessity to bid at a bare minimum level to increase the probability of a win eliminates potential opportunities to benefit a larger community of users. Finally, the committee was told that constrained operations funding under the CM&O budget is impacting daily operations and the SED’s ability to support changing mission requirements. One particularly difficult fact is that CM&O funds are sufficient to cover only 25 percent of SED’s annual technical equipment requirements (for all TRLs). The committee was also told that creating new laboratories to pursue new research areas is a very important need at GSFC. This is a very typical low-TRL activity of great importance to future flight programs and the ability of the center to attract high-quality technical talent. SED management told the committee that most of the ROSES funding opportunities available to the center are small awards ($100,000 to $200,000) that are insufficient for a new laboratory leader’s salary, let alone that of the research team and the necessary procurements, including specialized laboratory equipment.

[NOTE: GSFC = Goddard Space Flight Center, SED = Science and Exploration Directorate, ROSES = Research Opportunities in Space and Earth Sciences, CM&O = Center Management And Operations]

NASA Fails – Research Opportunities in Space and Earth Sciences (ROSES)

NASA researchers find it difficult to get funding from the ROSES program.

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.42-43, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

GSFC researchers told the committee that they had two concerns about ROSES. First, much of the work being funded is related to SMD space and Earth science missions, making it difficult for non-mission-directed, low-TRL researchers to be successful in the competitions. Second, because NASA employees may not compete for other federal funds to support their activities, ROSES, which is open to researchers from all types of institutions, offers too little reward relative to the demand of all NASA centers for significant, non-center salary offsets. Unfortunately, because the data provided by SMD gives no information about the success rate of NASA researchers, it is difficult to determine if the ROSES process inadvertently discriminates against NASA support of low-TRL researchers. GSFC low-TRL researchers also say that it is very difficult to write a successful proposal when that proposal includes requests for equipment, since total cost is one of the factors in the ROSES selection process. Thus, NASA personnel find it difficult to create research units that require new equipment.

[NOTE: GSFC = Goddard Space Flight Center, SMD = Science Mission Directorate, ROSES = Research Opportunities in Space and Earth Sciences, TRL = Technology Readiness Level]

Competition for funds within NASA is ineffective

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.59, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

An example of the environment at NASA locations, especially at ARC, is the challenge that researchers face as they write more and more proposals to fewer and fewer opportunities with smaller and smaller award sizes (given the added burdens that full-cost management have brought). At ARC, scientists said that to their knowledge they were the only civil-servant scientists in the government who had to compete with external researchers for their salaries. Since typical grant values are now $100,000 to $200,000 each, and scientists typically ask for only 20 percent of their salary on each proposal, on average a researcher must win 5 proposals to be fully funded. With a good win rate being 1 in 3, a researcher must write 15 proposals a year. Younger researchers getting established could expect poorer success rates and would have to write even more proposals to support themselves, their laboratories, and their staff. Without institutional funds to support the cost of their organization’s operating expenses, laboratory equipment, laboratory personnel, and students (let alone their own salaries), all of these elements had to be obtained through competed funds. Full-cost management for laboratories performing low-TRL research jeopardizes the availability of these facilities for future development. Similar situations were seen at other NASA locations, Table 5.7 presents allocations of low-TRL research at ARC—ROSES awards, IRAD, and B&P expenditures. The DDF no longer exists. Similar to data presented above from GSFC and JPL, the table shows the significance of the ROSES awards for TRL 1-3 research.

[NOTE: GSFC = Goddard Space Flight Center, IRAD = Independent/Internal Research and Development, B&P = Bid and Proposal, CM&O = Center Management And Operations, TRL = Technology Readiness Level, ROSES = Research Opportunities in Space and Earth Sciences]

NASA Fails – Aeronautics Resources

NASA aeronautics program has too many limitations – budgets and project resources

Meade, National Research Council Committee for the Assessment of NASA's Aeronautics Research Program co-chair, 8

[Carl J, Committee for the Assessment of NASA's Aeronautics Research Program National Research Council 5-1-8, CQ Congressional Testimony, “NASA Aeronautic Research and Development Program”) LexisNexis, accessed 6/23/11, LGK]

In addition to resource limitations, NASA's aeronautics research program faces many other constraints (in terms of the existing set of NASA centers, limitations on the ability to transfer staff positions among centers, and limitations on the ability to compete with the private sector in terms of financial compensation in some critical fields), and attempting to address too many research objectives will severely limit the ability to develop new core competencies and unique capabilities that may be vital to the future of U.S. aeronautics. Recommendation. The NASA Aeronautics Research Mission Directorate should ensure that its research program substantively advances the state of the art and makes a significant difference in a time frame of interest to users of the research results by (1) making a concerted effort to identify the potential users of ongoing research and how that research relates to those needs and (2) prioritizing potential research opportunities according to an accepted set of metrics. In addition, absent a substantial increase in funding and/or a substantial reduction in other constraints that NASA faces in conducting aeronautics research (such as facilities, workforce composition, and federal policies), NASA, in consultation with the aeronautics research community and others as appropriate, should redefine the scope and priorities within the aeronautics research program to be consistent with available resources and the priorities identified in (2), above (even if all 51 highest-priority R&T challenges from the Decadal Survey of Civil Aeronautics are not addressed simultaneously). This would improve the value of the research that the aeronautics program is able to perform, and it would make resources available to facilitate the development of new core competencies and unique capabilities that may be essential to the nation and to the NASA aeronautics program of the future.

NASA Fails – Space Centers – Ames Research Center

The Ames Research Center squanders most of its researching capabilities with outdated and inadequate facilities.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.31, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

On average, the laboratory facilities for low-TRL work at ARC are adequate. Most are accommodated in older buildings that originally housed other activities. In many cases the laboratory equipment is only marginally maintained, mainly because there is not enough funding. Exceptions are the air traffic management laboratory and the TPS materials processing laboratory, both of which have up-to-date equipment. There are also major infrastructural deficiencies at ARC: The high-pressure air system is not certified to the latest seismic standards, and the supercomputer lacks an uninterruptible power supply. ARC researchers spend most of their time doing mission-focused work, to the detriment of their fundamental research activities. On top of that, much of their fundamental research time is spent writing multiple proposals, because each project does not provide adequate funding and then the multiple research projects require satisfying several reporting channels. This is an inefficient use of a researcher’s time. The ARC researchers cannot afford to do research in large facilities because of their high cost and the inadequate research project funding, so they are driven to their own small laboratories. The shortage of technicians at ARC means that researchers often do the work of the technicians. The situation for low-TRL work at ARC in many ways resembles that at other NASA aeronautics centers.

[NOTE: TRL = Technology Readiness Level, TPS = Thermal Protection System]

Researchers at The Ames Research Center are forced to be inefficient.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.31, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

On average, the laboratory facilities for low-TRL work at ARC are adequate. Most are accommodated in older buildings that originally housed other activities. In many cases the laboratory equipment is only marginally maintained, mainly because there is not enough funding. Exceptions are the air traffic management laboratory and the TPS materials processing laboratory, both of which have up-to-date equipment. There are also major infrastructural deficiencies at ARC: The high-pressure air system is not certified to the latest seismic standards, and the supercomputer lacks an uninterruptible power supply. ARC researchers spend most of their time doing mission-focused work, to the detriment of their fundamental research activities. On top of that, much of their fundamental research time is spent writing multiple proposals, because each project does not provide adequate funding and then the multiple research projects require satisfying several reporting channels. This is an inefficient use of a researcher’s time. The ARC researchers cannot afford to do research in large facilities because of their high cost and the inadequate research project funding, so they are driven to their own small laboratories. The shortage of technicians at ARC means that researchers often do the work of the technicians. The situation for low-TRL work at ARC in many ways resembles that at other NASA aeronautics centers.

[NOTE: TRL = Technology Readiness Level, TPS = Thermal Protection System]

NASA Fails – Space Centers – Glenn Research Center

Glenn Research Center is underutilized and wasted – shows how NASA is falling behind current technology

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.66, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

GRC is unable at present to provide adequate and stable funding for the equipment, facilities, and support services required for fundamental science and engineering research. Internal funding and NASA Headquarters funding for research have dropped to low levels, and scientists and engineers are spending inordinate amounts of time seeking funding to maintain basic laboratory capabilities. No dollars are allocated from the GRC budget for IRAD. Strategic equipment purchases are difficult because funding must often be pieced together from multiple sources or even over multiple funding years. Many programs have short-term, project-oriented objectives rather than the long-term strategic objectives that should be required from a fundamental research program. The committee members concluded that many of the laboratories at GRC are not keeping up with state-of-the-art equipment now offered by industry and university laboratories. In many cases it is maintaining existing research facilities but not significantly improving them and not advancing the state-of-the-art in research facilities in its disciplines. In other cases, the difficulty in funding licenses, upgrades, computers, maintenance, and the like is causing equipment and capabilities to deteriorate rapidly. Some equipment is so obsolete that it is not now maintainable (or soon will not be); this ranges from large pieces of equipment to programmable controllers. One laboratory was shut down for a year because there was no money for a computer. It was stated by some GRC staff that they go to neighboring universities to use the equipment. This has both negative and positive aspects: sharing equipment with other researchers who have first claim on its use, but also interacting with peers within a research setting. A few facilities that support ETDP work have been funded at minimal levels to maintain capabilities for specifically identified activities. These facilities have generally conducted lower-TRL work in the past and are capable of supporting that work. However, the facilities are currently underutilized and support only a small amount of funded higher-TRL work. The GRC staff noted numerous impediments that had made it more difficult than in the past to support such research and more difficult to acquire and maintain the equipment, facilities, and support services: in some cases, technicians have been moved out of laboratories, and scientists cannot obtain timely technical support even if funded; electric power is limited in some areas because infrastructure has not been fully improved; administrative systems and paperwork are more time-consuming; office supplies have been rationed; and so on. GRC is not keeping up with the state of the art enjoyed by comparable laboratories.

[NOTE: TRL = Technology Readiness Level]

NASA Fails – Space Centers – Glenn Research Center

The Glenn Research Center is barely funded and has no future plans

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.22, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

The R&T Directorate at GRC comprises 484 civil servants and 280 contractors, plus the laboratories and equipment needed to conduct their research. ARMD provides approximately 60 percent of GRC’s R&T funding. In FY 2009, the ARMD funding was approximately $42.7 million.2 Roughly two-thirds of that funding is focused on TRL 1-3 research and is provided primarily by the ARMD’s Fundamental Aeronautics Program. Some funding for maintaining and upgrading the larger facilities is provided by ATP. In many cases, these facilities are used for work at all TRLs and not just for TRL 1-3. GRC-wide TRL 1-3 funding for aeronautics and space decreased from $75 million in FY 2005 to approximately $66 million in FY 2009. Funding for GRC’s aeronautics activity is shown in Figure 4.1. There is no long-range strategy for GRC’s TRL 1-3 research laboratories as there is for the ATP facilities. They can hardly fund their current needs. The R&T Directorate of GRC would like to have a strategic plan and a funding line for its facilities, as ATP has for its large facilities. Currently, GRC’s CM&O is not funding any IRAD work with the R&T researchers. Individual PIs typically have $10,000 to $20,000 for equipment purchases from their individual projects, which is insufficient for large purchases of equipment.

[NOTE: R&T = Research and Technology, GRC = Glenn Research Center, ARMD = Aeronautics Research Mission Directorate, TRL 1-3 = Technology Readiness Level 1-3]

NASA’s most advanced and unique research center is being underutilized.

Space Studies Board et al. 2010 (Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.18, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/23/11) EK

All four facilities are capable of doing TRL 1-3 level research, although AAPL, IRT, and the 10×10 SWT are larger facilities that are frequently used for higher TRL work as well. In general, NASA’s TRL 1-3 work is funded by FAP. The AAPL is uncommon in its ability to do fundamental fluid dynamics and aeroacoustics research, although comparable production-testing commercial facilities do exist at General Electric and the Boeing Company. The IRT is a very well known, historical NASA Glenn facility that supports fundamental research in icing, including technology development, and both in-house and external……applications. It is a unique national facility, though smaller such facilities do exist in Italy and Canada, and it exemplifies a NASA facility that historically was used primarily for TRL 1-3 research. However, NASA staff estimate that only 15 to 20 percent of the research being conducted in this facility is at TRL 1-3. Upgrades to the control system, the refrigeration systems, the spray bars, and heat exchanger have all been identified as high priorities. The 10×10 SWT is another unique facility that is specifically designed to test supersonic aerodynamic and propulsion components in an integrated fashion.

[NOTE: TRL 1-3 = Technology Readiness Level, AAPL = Aero-Acoustic Propulsion Laboratory, NOTE: IRT = Icing Research Tunnel, NOTE: SWT = Supersonic Wind Tunnel]

NASA Fails – Space Centers – Goddard Space Flight Center

The Goddard Space Flight Center is key to space leadership – severely underfunded

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.50, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

GSFC is a national resource for space research, leading the development and operation of important space experiments and observatories that have had an enormous impact on astrophysics, cosmology, and the Earth and planetary sciences. Yet, support for the center’s basic research capabilities (equipment, travel, salaries, support staff) is clearly under stress, and the current emphasis on space missions and exploration at the expense of basic space-related research will soon impair GSFC’s ability to serve as the foundation for new, high-quality missions and to produce the requisite technologies, instruments, and capabilities. The CM&O funds allocated for acquiring technical equipment are low relative to what GSFC needs for a strong and forward-looking basic research program. The center is aware of this problem and attempts to cope with it by requiring cost sharing with direct-funded projects (missions). The older laboratories visited by the committee generally have instruments on a par with those at some universities, but the relatively small GSFC budgets for technical equipment and the restoration of technical facilities are inconsistent with the center’s role as one of the nation’s leading Earth and space science research organizations and the need for national scientific and technical leadership. Researchers said on several occasions that they depend on access to equipment and facilities developed to support flight projects. Such access is helpful but is no substitute for dedicated facilities and equipment that is tailored specifically to the needs of the researcher. Finally, despite the abundance of information on GSFC’s funding of facilities and equipment, it was difficult to obtain information about the impact of these expenditures on the TRL 1-3 research at GSFC owing to the complexities of the center’s accounting system. Nevertheless, it appears that the basic research facilities there receive less funding than they need to keep up with the instrumentation expected for a national institution. Furthermore, the funds available to the GSFC director for facilities and equipment do not allow the center to embark on the broad range of basic research needed to ensure the center’s long-term ability to support major science missions. Mixing GSFC and mission funds to support basic research activities seems essential in the short term, but in the long term this dependence will degrade the center’s essential capabilities.

[NOTE: GSFC = Goddard Space Flight Center, TRL = Technology Readiness Level]

**NASA Fails – Space Centers – Langley Research Center**

The Langley Research Center’s current workforce is not adequate and it is moving towards an all-contractor technical workforce.

Space Studies Board et al. 10

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.28, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

Currently, two-thirds of the technician workforce is contractor-provided, and one-third is from the civil service. LaRC is moving toward an all-contractor technical workforce; its support services would be strengthened if it simultaneously develops a strategy to retain the technical competence within the government workforce. Langley researchers provided several examples pointing to the conclusion that, as a general rule, there is an inadequate technician workforce to fully support all the work in the laboratories and facilities at LaRC, and in some areas there is currently no NASA technician expertise. Committee members familiar with the LaRC laboratories concurred in this conclusion.

[NOTE: LaRC = Langley Research Center]

NASA Fails – Space Centers – Marshall Space Flight Center

The Marshall Space Flight Center is underutilized and wastes its facilities.

Space Studies Board et al. 2010

(Space Studies Board (SSB), Laboratory Assessments Board (LAB), Aeronautics and Space Engineering Board (ASEB), Engineering and Physical Sciences (DEPS), Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research, 2010, P.63, <http://books.nap.edu/catalog.php?record_id=12903>, accessed 6/24/11) EK

The facilities for TRL 1-3 research are underutilized because the scientists and engineers are being moved to work on technologies for specific programs. The committee heard several times that the chief resource that was lacking for basic research was time. MSFC maintains a set of strategic investment technologies in areas where it can obtain a good return on investment—for instance, it aims to feed into a specific mission need. It appeared to the committee members that basic research at MSFC is secondary to the main thrust, which is operations and exploration, and that most research is funded in a technology-pull rather than a technology-push manner. MSFC’s heritage is in propulsion, yet there are only three laboratories within one building doing any propulsion-related basic research. This same building has many empty laboratories not being used at all. While the MSFC facilities are currently in fairly good shape, the small amount of research funding available limits the ability to make improvements and to maintain state-of-the-art facilities. For example, the propulsion research and development laboratory was built in 2004 and provided with state-of-the-art equipment. However, now that research funding has been mostly cancelled, the data acquisition and control systems are becoming old and obsolete. The basic funding for the NSSTC is also limited, and it is becoming harder to cover salaries let alone laboratory equipment.

[NOTE: NSSTC = National Space Science and Technology Center, TRL = Technology Readiness Level]

\*\*\*NASA Fails – AT – Reforms

NASA Reform Fails – AT – Accident Prevention

NASA cannot be reformed – Columbia disaster proves it is impossible to learn anything from accidents meaning NASA is doomed to repeat the same mistakes

Cowing, astrobiologist and former rocket scientist, 8

(Keith, 12-30-8, Space Ref, “NASA Report: Understanding Columbia's Loss”, <http://www.spaceref.com/news/viewnews.html?id=1314>, accessed 6/25/11, LGK]

Of course, learning lessons from fatal accidents is nothing new. Often times, it is all that can be gleaned from loss of a vehicle and its crew - whether they be at sea, in the air, on the ground or in space. Indeed, sometimes virtually nothing can be learned due to the nature of how the accident occurred. With regard to Columbia, as was the case with the loss of her sister ship and its crew, its loss was eventually attributable to both human and mechanical error albeit with two totally different portions of a Space Shuttle's mission. One happened at the very beginning of a mission, the other at the very end. Accidents are things to be avoided. However, by the very nature of how we currently send humans into space and return them to Earth, there is a substantial amount of risk involved. Much of that risk has been identified and is manageable. But not all of it. Of course, when you hear this discussion, someone inevitably says that the only way to make these things risk free is not to do them. Well, we have decided to do these risky things, now haven't we? Inevitably, when the accidents happen, we need to work our way through them, pause and reflect on what happened, and then press ahead. To be certain there is never a good time for a bad thing to happen. But not to benefit from the information that can arise from studying an accident's cause only serves to remove value from the sacrifice that a crew has made.

NASA Reform Fails – AT – Private Industry Cooperation

NASA is too disorganized to cooperate with the private industry

**House Committee on Science, Space, and Technology Democrats, 11**

(The Committee has exclusive jurisdiction over NASA, 4-30-11, “Subcommittee Democrats Urge Clarity and Realism in NASA's Exploration Plans” <http://www.spaceref.com/news/viewpr.html?pid=33139>, accessed 6/25/11, LGK]

The Director of George Washington University's Space Policy Institute, Dr. Scott Pace, told the Subcommittee that the greatest risks to the aerospace industrial base and workforce associated with the transition from Constellation to the Space Launch System program are those arising from policy instability and the lack of a basis for predictable decision-making by NASA and industry. In his capacity as Chairman of the American Institute of Aeronautics and Astronautics' Corporate Membership Committee, Mr. James Maser said that the aerospace industry, which directly supports more than 800,000 jobs nationwide, is imperiled by the lack of a clear space policy. Mr. Maser, who is also the President of Pratt & Whitney Rocketdyne, explained that the uncertainty that the current space policy imposes on the industrial base creates unique problems for the nation, such as harming the industry's ability to recruit future workers because students who are currently enrolled in science, technology, engineering and math (STEM) programs will be wary of entering an enterprise that lacks a clear direction and mission.

NASA Reform Fails – AT – Reform Happening Now

NASA’s reforms are disorganized and contradictory

Martin, NASA Inspector General, 11

(Paul K, 2/11/11, “NASA OIG Testimony: Major Challenges Facing NASA in 2011” <http://www.spaceref.com/news/viewsr.html?pid=36048>, accessed 6/25/11, LGK]

The most immediate challenge facing NASA's leadership is to manage the Agency's portfolio of space and science missions amid the continuing lack of clarity caused by conflicting legislative directives in the Authorization Act and a holdover provision in NASA's fiscal year (FY) 2010 appropriations law. The latter provision prevents NASA from terminating any aspect of the Constellation Program or from initiating any new program.1 Last month we sent a letter to Congress highlighting this issue. As we explained, due to language in NASA's FY 2010 appropriation carried over in the continuing resolution that currently funds NASA and the rest of the Federal Government, NASA is continuing to spend approximately $200 million each month on Constellation, aspects of which both NASA and Congress have agreed not to build. Without congressional intervention, by the end of February 2011 NASA anticipates spending up to $215 million on Constellation projects that, absent the restrictive appropriations language, it would have considered canceling or significantly scaling back. Moreover, by the end of FY 2011 that figure could grow to more than $575 million if NASA is required to continue operating under the current constraints and is unable to move beyond the planning stages for its new Space Exploration program.

NASA has no clear plans for reform

**House Committee on Science, Space, and Technology Democrats, 11**

(The Committee has exclusive jurisdiction over NASA, 4-30-11, “Subcommittee Democrats Urge Clarity and Realism in NASA's Exploration Plans” <http://www.spaceref.com/news/viewpr.html?pid=33139>, accessed 6/25/11, LGK]

(Washington, DC) -- Today, the House Committee on Science, Space, and Technology's Subcommittee on Space and Aeronautics held a hearing to review NASA's exploration program as it transitions toward the development of the new launch and crew exploration systems directed in the NASA Authorization Act of 2010 [P.L. 111-267]. At the hearing, the head of NASA's Exploration Systems Directorate, a space policy expert, and an industry representative were questioned by Subcommittee Members on the pace of NASA's progress in moving forward with designing a space transportation system within the parameters of the Authorization Act. In his opening remarks, Acting Subcommittee Ranking Member Jerry Costello (D-IL) said, "Through the 111th and 112th Congresses, this Committee has held several hearings to discuss the future of NASA's exploration program as it faced budget challenges and considered serious changes to its mission. Despite these ongoing discussions, we still have not received concrete answers on how NASA plans to transition away from the Constellation Program and achieve the goals outlined by Congress in the 2010 Authorization Act." Mr. Costello identified four areas where clear answers were lacking and in which he hoped to get more information , namely (1) the status of NASA General Counsel's review of how existing Constellation contracts can be modified to carry out work on the crew capsule and heavy lift launch vehicles, (2) an exact timeline and date for when NASA will start work on the new vehicles, (3) evidence that the vehicle programs have a real future at the current funding levels, and (4) concrete goals and benchmarks to measure the program's success.

NASA Reform Fails – AT – Reforms Solve

NASA managers have refused to reform and instead created more internal issues – empirics prove

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 2) TJL

Despite these obvious trends, NASA developed grandiose visions of the post-Apollo program, which culminated in the Space Task Group Report of 1969. (3) The STG proposed three options. The most ambitious called for a reusable Earth-to-orbit shuttle and a small space station by 1975; a reusable orbit-to-orbit tug and a lunar orbit station in 1976; a nuclear-powered tug and a lunar surface base in 1978; a 50-man space base in Earth orbit in 1980; a manned Mars mission in 1981; and expansion of the Earth orbit space base to 100 people by 1985. The other options retained all these objectives, but reduced the cash flow by delaying some of them for up to five years. Figure 1 also shows the funding profiles required by the STG proposals (in 2003 dollars). Richard Nixon responded immediately, making it perfectly clear that the whole STG Report was sheer fantasy, and that NASA should expect less money, not more. Given this fiscal reality, NASA could have adopted an incremental approach to space development. The obvious plan was to launch the second Skylab, with minor modifications to permit a long life on orbit, and to support it initially with a simple ballistic capsule (such as a proposed stretch of the Gemini capsule, called the Big G, which could carry seven to nine people) atop an expendable booster. In time, a small reusable orbiter would replace the capsule, and the booster could eventually become reusable too. Beyond that, the scope of the program would depend on funding, but might include a permanent lunar base. This plan was unacceptable because it had two dreadful defects. First, it involved a series of small, affordable steps, instead of the Giant Leaps that many in NASA thought essential to public support

\*\*\*Streamlining Counterplan

**Streamlining CP – 1NC Shell**

Text:

The United States federal government should devolve responsibilities and resources for space flight from NASA to an independent federal Advisory Committee for Commercial Enterprise in the Solar System. The Advisory Committee should \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

No other reforms will work – only CP solves

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 3) TJL

First of all, we must recognize explicitly that NASA has bungled human spaceflight. There have been many suggestions for reform of the agency, and none of them has worked. The only viable solution is a new Federal organization, one that sees its purpose as helping the private sector rather than flying space missions. For convenience, I refer to it here as the Advisory Committee for Commercial Enterprise in the Solar System (ACCESS).

And The 1AC concedes that it’s a pre-requisite to the Aff – NASA’s infrastructure is too complicated and its resources are too scarce for any mission beyond low Earth orbit without the help of private companies like SpaceX – modeling off of the National Advisory Committee on Aeronautics solves

Simberg, Competitive Enterprise Institute adjunct scholar and aerospace engineer, 2010

(Rand, aerospace engineer and a consultant in space commercialization, space tourism, and Internet security “In Search of a Conservative Space Policy” The New Atlantis Fall 2010 #29 pp 99 <http://www.thenewatlantis.com/publications/in-search-of-a-conservative-space-policy> accessed: 6-21-11) TJL

If we want to make real progress in space, progress beyond sending a few astronauts on short visits to places we have already been at a cost of billions of dollars per ticket, we must adopt an approach aligned with core American ideals. We should prefer robust, redundant commercial capabilities to fragile, expensive, government-designed ones. (Recall that after both the Challenger and Columbia accidents, the shuttle program was shut down for years, leaving the United States with no means of getting Americans into space.) Rather than avoiding technical risk by repeating what we did five decades ago — “Apollo on Steroids” was how NASA’s then-administrator Michael Griffin described the revamped lunar program in 2005 — and thereby starving technology development, we should prefer an agency that is aggressively pursuing technological advances that will increase our reach while reducing costs. As much as we are grateful for NASA’s historic victories in the space race, when it comes to basic access to space we should roll back the agency’s mission to something resembling that of its predecessor, the National Advisory Committee on Aeronautics (NACA). Through its basic and applied research, its dissemination of information, and its strategic grant-making, NACA did much to boost the aviation industry during the first half of the last century. NASA should be reconceived along those lines, to serve primarily as an enabler of, rather than a substitute for, private enterprise. This will in turn allow it to focus its scarce resources on more cutting-edge human missions beyond low-Earth orbit.

CP Competition – AT – Perm Do Both

1. Double Bind:

Either the perm severs out of the immediacy of the plan because they have to reform NASA before they can possibly hope to do the plan-that’s Simberg

Or the plan can’t solve because NASA won’t have sufficient infrastructure in order to actually use the funding the plan gets through fiat

2. Permutation is severance – it severs out of the immediacy of the plan, and it severs out of NASA’s jurisdiction Severance perms are a voter for fairness because they make the aff a moving target without a stable advocacy and kills predictability

3. Permutation has a solvency deficit – NASA will obstruct the Counterplan

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 4) TJL

A reform of this magnitude is possible only by legislative fiat. NASA will of course fight it by every means available, but perhaps the Congress will take the necessary action once it is realized that transfer to the private sector can make human spaceflight a source rather than a sink for tax revenues.

4. The management at NASA is too concerned with political infighting to see the writing on the wall – they will fight to maintain turf

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 2) TJL

The worst mistake made by NASA managers was that they allowed disputes over who would be in charge to influence the direction of the program. Their preoccupation with intercenter turf wars obscured the writing on the wall.

CP Competition – AT – Perm Do the CP

1. They sever out of their mechanism – permutations must include all of the plan – the aff must use NASA to do the plan because that is what normal means is as well as what their evidence claims the plan does – that’s a voter for fairness because severance perms make the aff a moving target without a stable advocacy, and kills predictability and neg ground

2. The CP and the Plan are functionally different

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 4) TJL

I recommend the following specific steps: Ground the remaining three shuttles permanently, as too dangerous and expensive to fly. Mothball the ISS and move it to higher orbit, where it is safe from reentry, citing the lack of shuttles as the excuse. Perhaps somebody will eventually find a real use for it. Set up ACCESS as an agency entirely independent of NASA, perhaps reporting through the Department of Commerce. Remove the line items for the shuttle and ISS from the NASA budget and use the money about $5.5 billion per year (5) to fund ACCESS. Have ACCESS provide immediate financial incentives for private development of human spaceflight, including economical launch vehicles (6) and corporate operations in space. Provide office and lab space for ACCESS at JSC in Houston, and transfer test facilities and selected NASA personnel to the new agency. Eventually, JSC will become a center run entirely by ACCESS. Phase out other human spaceflight activities in NASA over a five year period, and transfer the funding to ACCESS. NASA will be left as a smaller agency, focusing on aeronautical research, unmanned spacecraft and the space sciences.

3. The CP is only possible by using fiat because NASA, the plan’s actor, will fight the CP being done without it - means there is a difference between the plan and the CP, and a disadvantage to the perm

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 4) TJL

A reform of this magnitude is possible only by legislative fiat. NASA will of course fight it by every means available, but perhaps the Congress will take the necessary action once it is realized that transfer to the private sector can make human spaceflight a source rather than a sink for tax revenues.

Net Benefit – Politics

The CP would be popular with Congress because it turns aerospace into a resource, rather than sinkhole, for revenue

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 3) TJL

A reform of this magnitude is possible only by legislative fiat. NASA will of course fight it by every means available, but perhaps the Congress will take the necessary action once it is realized that transfer to the private sector can make human spaceflight a source rather than a sink for tax revenues.

CP Solvency Extensions

Governmental cooperation with private industries solves best – multiple reasons – support, revenue, investment, and rapid innovation

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 3) TJL

Apart from other issues, the purpose of human spaceflight is to open the solar system to all of us, not just to civil servants. The appeal of the program depends on the perception that it is opening a new frontier where people can escape the increasing regulation of life on Earth. A centrally-planned, government-run program is incompatible with that vision. It cannot survive, because it contradicts a principal reason for popular support. There are many other advantages to transferring responsibility for human spaceflight to private enterprise: Commercialization could convert the program from a Federal expense to a source of tax revenues. Corporations can grow exponentially because of positive feedback of profits from investments, a mechanism that is unavailable to NASA. Corporations can make rapid progress because they can take risks that government agencies cannot. A growing commercial program would create the constituency needed to avoid further cuts in Federal funding. Human spaceflight can be a potent demonstration of US leadership, but the current NASA program sends the wrong message to nations struggling with the transition from command economies to democracy and free enterprise.

Devolving responsibilities to specialized agencies solves research and development

Schmitt, former U.S. Senator from New Mexico, 11

(Harrison, 5-25-11, “Former Senator Schmitt Proposes Dismantling of NASA and Creation of a New, National Space Exploration Administration (NSEA),” <http://americasuncommonsense.com/>, accessed 6/25/11, LGK]

The easiest change to make would be to move NASA Space Science activities into the National Science Foundation (NSF), exclusive of lunar and planetary exploration science but including space-based astronomical observatories. At the NSF, those activities can compete for support and funding with other science programs that are in the national interest to pursue. Spacecraft launch services can be procured from commercial, other government agencies, or international sources through case-by-case arrangements. With this transfer, the NSF would assume responsibility for the space science activities of the Goddard Space Flight Center and for the contract with Caltech to run the Jet Propulsion Laboratory. Also, in a similarly logical and straightforward way, NASA’s climate and other earth science research could become part of the National Oceanic and Atmospheric Administration (NOAA). NOAA could make cooperative arrangements with the NSF for use of the facilities and capabilities of the Goddard Space Flight Center related to development and operation of weather and other remote sensing satellites. Next, NASA aeronautical research and technology activities should be placed in a re-creation of NASA’s highly successful precursor, the NACA. Within this new-old agency, the Langley Research Center, Glenn Research Center, and Dryden Flight Research Center could be reconstituted as pure aeronautical research and technology laboratories as they were originally. The sadly, now largely redundant Ames Research Center should be auctioned to the highest domestic bidder as its land and facilities have significant value to nearby commercial enterprises. These actions would force, once again, consideration of aeronautical research and technology development as a critical but independent national objective of great economic and strategic importance.

CP Solvency – Empirical

NASA’s “Apollo on Steroids” program was a complete failure and only damaged American tech leadership – The CP solves best

Simberg, Competitive Enterprise Institute adjunct scholar and aerospace engineer, 2010

(Rand, aerospace engineer and a consultant in space commercialization, space tourism, and Internet security “In Search of a Conservative Space Policy” The New Atlantis Fall 2010 #29 pp 99 <http://www.thenewatlantis.com/publications/in-search-of-a-conservative-space-policy> accessed: 6-21-11) TJL

If we want to make real progress in space, progress beyond sending a few astronauts on short visits to places we have already been at a cost of billions of dollars per ticket, we must adopt an approach aligned with core American ideals. We should prefer robust, redundant commercial capabilities to fragile, expensive, government-designed ones. (Recall that after both the Challenger and Columbia accidents, the shuttle program was shut down for years, leaving the United States with no means of getting Americans into space.) Rather than avoiding technical risk by repeating what we did five decades ago — “Apollo on Steroids” was how NASA’s then-administrator Michael Griffin described the revamped lunar program in 2005 — and thereby starving technology development, we should prefer an agency that is aggressively pursuing technological advances that will increase our reach while reducing costs. As much as we are grateful for NASA’s historic victories in the space race, when it comes to basic access to space we should roll back the agency’s mission to something resembling that of its predecessor, the National Advisory Committee on Aeronautics (NACA). Through its basic and applied research, its dissemination of information, and its strategic grant-making, NACA did much to boost the aviation industry during the first half of the last century. NASA should be reconceived along those lines, to serve primarily as an enabler of, rather than a substitute for, private enterprise. This will in turn allow it to focus its scarce resources on more cutting-edge human missions beyond low-Earth orbit.

The Space Task Group Reports proves that NASA must have substantial cooperation with private companies – otherwise it will fail

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 2) TJL

The real lesson of the STG debacle was that a healthy program was not sustainable if funded only by taxpayers. NASA could retain exclusive control of an insignificant, moribund program, or it could accept a supporting role in a growing program, funded by investors and controlled by entrepreneurs. Given these options, NASA chose the first - but instead of doing the best it could with limited funds, it dissipated its resources in the care and feeding of the white elephants called shuttle and ISS.

CP Solvency – Economy

The National Advisory Committee on Aeronautics could have established an enterprise that would have opened the floodgates to whole new space markets

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

Despite cutbacks, NASA has spent a total of $450 billion since Apollo 11 (adjusted for inflation to 2003 dollars). That very large sum was more than enough to fund the developments that Wernher von Braun predicted for the end of the 20th Century, but we have not even started on any of them. If it had been spent wisely, as seed money to stimulate commercial development, we could have established a growing, self-sustaining extraterrestrial enterprise, offering opportunities for thousands of people to live and work off Earth - but the sad truth is that we have less capability in human spaceflight now than in 1970. In 1969, we landed on the Moon, but now we cannot leave low Earth orbit (LEO). NASA claimed that the shuttle would be fifteen times cheaper to fly (per pound of payload) than the Saturn vehicles used in Apollo, but it is actually three times more expensive. The average cost of each flight is a staggering $760 million. After a mission, the time required to prepare a shuttle for the next flight was supposed to be less than two weeks, but in practice tens of thousands of technicians spend three to six months rebuilding each "reusable" shuttle after every flight. Worst of all, the shuttle is a needlessly complex, fragile and dangerous vehicle, which has killed fourteen astronauts so far.

Private companies would be able to develop a strong tourist/trade based economy-Hawaii proves

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 3) TJL

The extraterrestrial economy will be like that in Hawaii, where tourism and the export of pineapples are important industries, but not the reason most people live there. The gross Hawaiian product depends primarily on trade between residents. Similarly, space entrepreneurs may begin by exporting goods and services to customers on Earth (the most promising candidates are space tourism and electric power from solar power satellites), but the real growth phase will begin when trade between people living and working in space generates a significant fraction of corporate revenues.

CP Solvency – Tech Leadership (1/2)

Solves tech leadership better and doesn’t link to the spending disadvantage

Simberg, Competitive Enterprise Institute adjunct scholar and aerospace engineer, 2010

(Rand, aerospace engineer and a consultant in space commercialization, space tourism, and Internet security “In Search of a Conservative Space Policy” The New Atlantis Fall 2010 #29 pp 95-100 <http://www.thenewatlantis.com/publications/in-search-of-a-conservative-space-policy> accessed: 6-21-11) TJL

If we want to make real progress in space, progress beyond sending a few astronauts on short visits to places we have already been at a cost of billions of dollars per ticket, we must adopt an approach aligned with core American ideals. We should prefer robust, redundant commercial capabilities to fragile, expensive, government-designed ones. (Recall that after both the Challenger and Columbia accidents, the shuttle program was shut down for years, leaving the United States with no means of getting Americans into space.) Rather than avoiding technical risk by repeating what we did five decades ago — “Apollo on Steroids” was how NASA’s then-administrator Michael Griffin described the revamped lunar program in 2005 — and thereby starving technology development, we should prefer an agency that is aggressively pursuing technological advances that will increase our reach while reducing costs. As much as we are grateful for NASA’s historic victories in the space race, when it comes to basic access to space we should roll back the agency’s mission to something resembling that of its predecessor, the National Advisory Committee on Aeronautics (NACA). Through its basic and applied research, its dissemination of information, and its strategic grant-making, NACA did much to boost the aviation industry during the first half of the last century.

NASA should be reconceived along those lines, to serve

primarily as an enabler of, rather than a substitute for, private enterprise. This will in turn allow it to focus its scarce resources on more cutting-edge human missions beyond low-Earth orbit.

CP Solvency – Tech Leadership (2/2)

The National Advisory Committee on Aeronautics could have solved technological leadership – they just needed the ability to work with the multiplicity of agencies that surrounded them

Erickson Lieutenant Colonel, USAF 05

(Mark, “Into the Unknown Together The DOD, NASA, and Early Spaceflight” September 2005 accessed: 6/24/11 http://handle.dtic.mil/100.2/ADA459973 pgs 51-52 [Note: Erickson does quote NACA director Hugh Dryden) TJL

On 21 November 1957, the NACA had established the Special Committee on Space Technology to consider how to best use human capabilities in space exploration and outline how the NACA could develop its resources for space exploration. Although this committee did not issue its formal report until after NASA was created, it did show the NACA’s early concern for evaluating and establishing its own role in US space efforts.94 On 14 January 1958, Dryden released a formalized space R&D plan that he had directed his staff to develop. That plan, titled “A National Research Program for Space Technology,” stated: It is of great urgency and importance to our country both from consideration of our prestige as a nation as well as military necessity that this challenge [Sputnik] be met by an energetic program of research and development for the conquest of space. . . . It is accordingly proposed that the scientific research be the responsibility of a national civilian agency working in close cooperation with the applied research and development groups required for weapon systems development by the military. The pattern to be followed is that already developed by the NACA and the military services. . . . The NACA is capable, by rapid extension and expansion of its effort, of providing leadership in space technology.95 Dryden elaborated on the plan’s proposal for a civilian space agency in a 27 January 1958 speech. He recognized that many scientists feared that “the extremely important nonmilitary aspects of space technology would be submerged or perhaps even lost if included as a mere adjunct to a military program.” His proposed alternative, the NACA, was “old and well-tested,” and its proposal for a space exploration program “can be most rapidly, effectively and efficiently implemented by the cooperative effort” of the NACA, DOD, NSF, NAS, civilian universities, research institutions, and industry.96 The NACA concept called for a multi-institutional space-exploration program in which it would take the lead role, work closely with other interested parties, and not infringe on the DOD’s prerogatives.

CP Solvency – Innovation

The National Advisory Committee on Aeronautics’ cowling proves that tech innovation can occur with this model

**Bilstein, Professor of History Emeritus University of Houston-Clear Lake 1989**

(Roger E., July 1989 “Orders of Magnitude: A History of the NACA and NASA, 1915-1990” <http://history.nasa.gov/SP-4406/chap1.html> accessed 6/24/11) TJL

While significant work on cowled radial engines proceeded elsewhere, particularly in Great Britain, investigations at Langley soon provided a breakthrough. American aerodynamicists at this time had the advantage of a new propeller research tunnel completed at Langley in 1927. With a diameter of 20 feet, it was possible to run tests on a full-sized airplane. Following hundreds of tests, a NACA technical note by Fred E. Weick in November 1928 announced convincing results. At the same time, Langley acquired a Curtiss Hawk AT-5A biplane fighter from the Air Service and fitted a cowling around its blunt radial engine. The results were exhilarating. With little additional weight, the Hawk's speed jumped from 118 to 137 MPH, an increase of 16 percent. The virtues of the NACA cowling received public acclaim the next year, when Frank Hawks, a highly publicized stunt flier and air racer, added the NACA cowling to a Lockheed Air Express monoplane and racked up a new Los Angeles/New York nonstop record of 18 hours and 13 minutes. The cowling had raised the plane's speed from 157 to 177 MPH. After the flight, Lockheed Aircraft sent a telegram to the NACA committee: "Record impossible without new cowling. All credit due NACA for painstaking and accurate research." By using the cowling, the NACA estimated savings to the industry of over $5 million--more than all the money appropriated for NACA from its inception through 1928.

CP Solvency – Colonization

The National Advisory Committee on Aeronautics would have created a self-sustaining enterprise that would have had already established colonies off Earth

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

Despite cutbacks, NASA has spent a total of $450 billion since Apollo 11 (adjusted for inflation to 2003 dollars). That very large sum was more than enough to fund the developments that Wernher von Braun predicted for the end of the 20th Century, but we have not even started on any of them. If it had been spent wisely, as seed money to stimulate commercial development, we could have established a growing, self-sustaining extraterrestrial enterprise, offering opportunities for thousands of people to live and work off Earth - but the sad truth is that we have less capability in human spaceflight now than in 1970. In 1969, we landed on the Moon, but now we cannot leave low Earth orbit (LEO). NASA claimed that the shuttle would be fifteen times cheaper to fly (per pound of payload) than the Saturn vehicles used in Apollo, but it is actually three times more expensive.

CP Solvency – Asteroid Mining

The National Advisory Committee on Aeronautics would have created a self-sustaining enterprise that would have had already established colonies off Earth

Chapman, former astronaut and MIT PhD in Science in Instrumentation, 3

(Phillip K., 5-30-3, “The Failure of NASA: And A Way Out” accessed: 6-27-11 <http://www.spacedaily.com/news/oped-03zn1.html> part 1) TJL

Despite cutbacks, NASA has spent a total of $450 billion since Apollo 11 (adjusted for inflation to 2003 dollars). That very large sum was more than enough to fund the developments that Wernher von Braun predicted for the end of the 20th Century, but we have not even started on any of them. If it had been spent wisely, as seed money to stimulate commercial development, we could have established a growing, self-sustaining extraterrestrial enterprise, offering opportunities for thousands of people to live and work off Earth - but the sad truth is that we have less capability in human spaceflight now than in 1970. In 1969, we landed on the Moon, but now we cannot leave low Earth orbit (LEO). NASA claimed that the shuttle would be fifteen times cheaper to fly (per pound of payload) than the Saturn vehicles used in Apollo, but it is actually three times more expensive.

Colony on Mars would successfully mine asteroids—spurs robotic development and profit.

Holtgrefe Bachelor of Science @ Worcester Polytech 7

(Dennis Holtgrefe, , May 2, 2007, “The Moon or Mars: Expanding Humanity’s Domain, Pp. 47) CJQ

A colony on Mars is in a good position to begin harvesting resources from the asteroid belt. The asteroid belt sits between Mars and Jupiter, marking the boundary between the inner and outer solar system. Even if travel into the main belt is considered too dangerous for mining, Mars has almost ten times as many asteroids that orbit close to the planet than earth does. Getting to and setting up the Mars base in the first place will have already developed the necessary rockets and ships to be able to make it out to the asteroids. (Zubrin, Entering Space.) It is likely that the asteroids would actually be mined by robotic or remote controlled robotic systems. This type of system would dramatically decrease the amount of risk involved in mining materials on an asteroid. These dangers not only include exposure to cosmic rays, but the risk associated with landing on asteroids that may be unstable, or the collision between two asteroids in the main belt. The components for these autonomous systems would likely be developed in the Mars base itself. As mentioned previously, the most important resource on the Martian base is going to be labor and man power. As such, great advances are going to be made in the areas of robotics and automation. The mining of the asteroids would be a fantastic application for new robotic technology. The wealth present in asteroids is much greater than the lay person might suspect. Based on samples from asteroids which have fallen to Earth, reliable estimates place the value of the rare mineral ore contained in a single small 1 km asreroid at about $150 billion (Zubrin, Entering Space). Considering that there are millions of asteroids of this size in the main belt, the Mars based mining operation should have plenty of profits to look forward to. Not only are the minerals present in the asteroids, but the ore is actually more pure than that found on Earth and is easier to extract in a zero gravity environment. Materials from the asteroids could either be put to use right in the Mars base or could be exported to Earth. In either case, the financial benefit of mining the asteroids makes it a near certainty.

CP Solvency – Air Power

The National Advisory Committee on Aeronautics promotes readiness and air power

**Bilstein, Professor of History Emeritus University of Houston-Clear Lake 1989**

(Roger E., July 1989 “Orders of Magnitude: A History of the NACA and NASA, 1915-1990” <http://history.nasa.gov/SP-4406/chap1.html> accessed 6/24/11) TJL

In a wartime environment, the NACA was soon busy. It evaluated aeronautical queries from the Army and conducted experiments at the Navy yard; the Bureau of Standards ran engine tests; Stanford University ran propeller tests. But the NACA's role as mediator in the rancorous and complex dispute between Glenn Curtiss and the Wright-Martin Company represented its greatest wartime success. The controversy involved the technique for lateral control of aircraft in flight. Once settled, the resultant cross-licensing agreement consolidated patent rights and cleared the way for volume production of aircraft during the war as well as during the postwar era.

\*\*\*Human v. Robotic Exploration

Human Exploration Good – AT – Robotic Key

Robotic exploration insufficient to solve – human exploration crucial to symbolic value and flexibility

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 32-3,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Advocates of human missions note that science is not NASA’s only purpose and claim that human exploration is more effective than robotic exploration at such intangible goals as inspiring the public, enhancing national prestige, and satisfying the human urge to explore and discover. They assert that even considering science alone, human missions can be more flexible in the event of an unforeseen scientific opportunity or an unexpected change in plans. As support for this assertion, they often cite the human missions to repair and upgrade the Hubble telescope. On the other hand, the Hubble repairs and upgrades required extensive planning and the development of new equipment. They were not a real-time response to an unexpected event. Moreover, robotic missions can also sometimes be modified to respond to opportunities and mishaps, through software updates and other changes worked out by scientists and engineers back on Earth.

Robotic insufficient – can’t sustain support and funding

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 33,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

A few analysts portray robotic exploration as an alternative to human exploration. For the most part, however, the two alternatives are considered complementary, rather than exclusive. The Augustine committee, for example, found that without both human and robotic missions, “any space program would be hollow.”145 In addition, many analysts consider that in the absence of human missions, support for NASA as a whole would dwindle, and fewer resources would be available for robotic missions as well.

Rollback Link – Human Exploration

Massive cost of human exploration risks triggering rollback in favor of less costly and risky alternatives

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 32,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Alternatives to Human Exploration

Given the costs and risks of human space exploration, Congress could decide to curtail or postpone future human exploration missions and shift the emphasis of the nation’s space program to other endeavors. The cost of human exploration is substantial, and according to the Augustine committee, it is not a continuum: there is an “entry cost” below which a successful program cannot be conducted at all.143 Congress could decide that this minimum cost is not affordable. Similarly, no matter how energetically NASA addresses safety concerns, human spaceflight is an inherently risky endeavor. Congress could decide that the potential benefits are insufficient to justify the safety risks.

AT – Human Exploration Key – Robotic Exploration Is Precursor

Robotic exploration is a precursor to human exploration

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 32,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Several options are available as alternatives to human space exploration. Congress could seek to accomplish some of the same goals through other means, such as through robotic exploration. It could focus on technology development, in the hope of developing new technology that makes human spaceflight safer and more affordable in the future. It could focus on NASA’s other activities, such as Earth science and aeronautics. Given sufficient funding, of course, all these options are also available in conjunction with human exploration rather than as alternatives to it. For example, the Augustine committee acknowledged that robotic exploration is important as a precursor to human exploration.

Robotic exploration sufficient to solve – cost effective and lower risk

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 32,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Robotic Exploration

Advocates of robotic missions assert that robotic exploration can accomplish outstanding science and inspire the public just as effectively as human exploration. The Mars rovers are a familiar example of a successful robotic science mission that has captured considerable public attention. Advocates also claim that robotic missions can accomplish their goals at less cost and with greater safety than human missions. They do not need to incorporate systems for human life support or human radiation protection, they do not usually need to return to Earth, and they pose no risk of death or injury to astronauts. Some analysts assert further that exploring with humans “rules out destinations beyond Mars.”144 Given that current plans include no destinations beyond Mars and treat Mars itself only as a long-term goal, this last limitation may not be important in the near term, even if it is correct.

AT – Robotic or Human Key – Complementary

Combination of robotic and human exploration optimal

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 33,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

A few analysts portray robotic exploration as an alternative to human exploration. For the most part, however, the two alternatives are considered complementary, rather than exclusive. The Augustine committee, for example, found that without both human and robotic missions, “any space program would be hollow.”145 In addition, many analysts consider that in the absence of human missions, support for NASA as a whole would dwindle, and fewer resources would be available for robotic missions as well.

\*\*\*International Space Station

US Key to International Space Station

US support crucial to space station survival – others can’t fill in

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 23, opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Alternatives to service life extension also pose challenges. Some have suggested that the ISS could be operated by the other international partners with little or no U.S. participation. The Augustine committee found that this would be “nearly impossible” within the available budgets of the partner space agencies and because export controls would limit the direct support NASA could provide to foreign space agencies. Another option that has been proposed is to “mothball” the ISS for later use. The Augustine committee found that operating the ISS unoccupied would increase the risk of loss by a factor of five and also increase the risk of uncontrolled reentry into Earth’s atmosphere, which would pose a hazard to people on the ground. Even deorbiting the ISS in a controlled manner is a challenging task. The Augustine committee found that no existing or currently planned vehicle is capable of this task. It projected that the cost of developing one, or of disassembling the ISS on-orbit and deorbiting the major components separately, could be $2 billion or more.103

US support crucial to space station survival – others can’t fill in

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 24, opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Post-Shuttle Access to the ISS The U.S. space shuttle has been the major vehicle taking crews and cargo to and from the ISS. Russian Soyuz spacecraft also carry both crews and cargo. Russian Progress spacecraft carry cargo only, as they are not designed to survive reentry into the Earth’s atmosphere. A Soyuz is always attached to the station as a “lifeboat” in case of an emergency. The “lifeboat” Soyuz must be replaced every six months. Unless the shuttle program is extended, paying Russia for flights on the Soyuz is the only shortterm option for U.S. human access to the ISS. In 2009, in order to permit such payments, Congress extended a waiver of the Iran, North Korea, and Syria Nonproliferation Act (P.L. 106- 178 as amended) until July 1, 2016.104 One element of NASA’s plans for ensuring cargo access to the ISS during the gap is the Commercial Orbital Transportation Services (COTS) program to develop commercial capabilities for cargo spaceflight. Under the COTS program, SpaceX Corporation is developing a vehicle known as Dragon, and Orbital Sciences Corporation is developing a vehicle known as Cygnus. Both would be cargo-only and would have about one-eighth the capacity of the space shuttle.105 Only Dragon would be capable of returning cargo to Earth as well as launching it into space. Neither has yet flown into space. In the NASA Authorization Act of 2008, Congress directed NASA to develop a contingency plan for post-shuttle cargo resupply of the ISS in case commercial cargo services are unavailable.106 This plan was transmitted to Congress in March 2010.107 Noncommercial alternatives for cargo, in addition to the Russian Progress, include the European Automated Transfer Vehicle (ATV) and the Japanese H-II Transfer Vehicle (HTV). The first ATV was launched in March 2008 and carried out docking demonstrations with the ISS the following month. The first HTV was launched in September 2009 and also docked successfully with the ISS. Contracting with Russia for use of the Progress would probably require passing an additional waiver of the Iran, North Korea, and Syria Nonproliferation Act. Like the Dragon and Cygnus, the ATV, HTV, and Progress all have significantly smaller cargo capacity than the space shuttle.108 None of the noncommercial alternatives is capable of returning cargo to Earth.

International Space Station Key to Coop

Failure to extend space station will crush international space partnerships

Morgan, Congressional Research Service specialist in science and technology policy, 7-8-10

[Daniel, Congressional Research Service, “The Future of NASA: Space Policy Issues Facing Congress”, p. 23,

opencrs.com/document/R41016/, accessed 6-20-11, AFB]

Many ISS advocates want to continue utilization past 2015 in order to receive a greater return on the cost and effort that have been invested in ISS construction. The international partners issued a joint statement in July 2008 calling for operations to continue beyond 2015. Russia has stated that, if necessary, it will continue operations on its own. (Some analysts doubt that this would be technically feasible.) The Augustine committee found that extending ISS operations would “significantly enhance” the return on investment to both the United States and its international partners, while a decision not to extend operations would “significantly impair U.S. ability to develop and lead future international spaceflight partnerships.” Three of the five options considered by the Augustine committee include the extension of ISS operations until 2020. Congress has directed NASA to ensure that the ISS remains viable through at least 2020 and to take no steps that would preclude continued U.S. utilization after 2015.101