Mars Negative

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1NC – Inherency Takeouts

NASA already committed to Mars Mission

VeronicaForeman 11**,** CNN, "NASA announces next Mars rover's landing site", 7/22, CNN, <http://articles.cnn.com/2011-07-22/us/nasa.mars.rover_1_mars-rover-martian-surface-nasa-s-mars-exploration-program?_s=PM:US>

Could there have been life on Mars? That's the mission NASA is setting out to answer with Curiosity, the next-generation Mars rover whose landing site was announced Friday at the National Air and Space Museum's annual Mars Day.

Michael Meyer, lead scientist for NASA's Mars Exploration Program, told reporters the mission is bound for the base of a layered mountain in Gale Crater that is 5 kilometers tall, calling it a "worthy challenge" for the new rover. "The site holds a diversity of features," he said, "some of which could inform a broader understanding of the habitability on ancient Mars."

NASA is funding the one-way mission already

Williamson, Topnews, 10 (Jamie, Topnews.com, 10-28-11, “NASA’s ‘Hundred Years Starship’ ‘to take you to Mars but never return’, http://www.topnews.in/usa/nasa-s-hundred-years-starship-take-you-mars-never-return-25693, accessed 6-2-11, JG)

Washington: NASA is planning a one-way mission to Mars in a program called ‘Hundred Years Starship’ in which, a manned spacecraft will take astronauts to Mars and leave them there forever. NASA Ames Director Pete Worden revealed that one of NASA’s main research centres, Ames Research Centre, has received 1million dollars funding to start work on the project. Washington State University researchers had said that while technically feasible, a manned mission to Mars and back is unlikely to lift off anytime soon and so, a manned one-way mission to Mars would not only cut the costs by several fold, but also mark the beginning of long-term human colonization of the planet.

The European Space Agency and NASA restarted a joint mars exploration effort

Selding, Space News Writer, 11 (Peter B., Space News, 5-27-11, “ESA Cleared To Restart Work on 2016 Mars Mission”, <http://www.spacenews.com/civil/110527-esa-cleared-restart-work-mars.html>, accessed 5-31-11, JG)

The European Space Agency(ESA) on May 26 **gave a** sufficiently strong endorsement of a redesigned Mars exploration program with NASA to permit contract payments to restart in July, ESA officials said, adding that the new schedule leaves enough time — but just barely — to meet the program’s launch dates. Meeting in Utrecht, Netherlands, May 26-27, ESA’s Human Spaceflight and Operations directorate agreed to the general outlines of an ESA-NASA cooperative effort that includes launches in 2016 and 2018. The two-launch program was destabilized in March when NASA said it could no longer afford to build its own rover for the 2018 mission to be launched alongside a European rover. Instead, NASA proposed a joint rover for the 2018 mission. With the rover mission facing a major review, ESA in early April issued a stop-work order on not only the 2018 rover work, but also on a 2016 mission with NASA to launch a Mars orbiter and an entry, descent and landing technology package. The payment freeze was necessary because ESA governments approved the 2016 and 2018 missions as a single program called ExoMars. In addition to coping with the rover issue, ESA’s ExoMars project was struggling to fit its industrial contract package into a budget of 1 billion euros ($1.4 billion). That figure includes only ESA’s work, and does not account for some 400 million euros in ExoMars experiments that will be provided by individual ESA member states. ESA officials had planned to ask the agency’s check-writing body, the Industrial Policy Committee, for authority to resume payments for the 2016 mission while waiting for the rover issues to be settled. That would have permitted a restart of work in mid May. ESA Director-General Jean-Jacques Dordain said he scrapped that idea because it would have required approval of the 2016 financing pending a resolution of the wider ExoMars budget issues and the NASA rover cooperation. Instead, he elected to seek prior approval by the Human Spaceflight and Operations panel. In a May 26 interview, Dordain said that having now obtained that approval, the agency can present a complete package to the Industrial Policy Committee for financial approval on June 29-30. “This allows us to restart work on July 1, which our industrial contractors have told us gives them enough time to meet the 2016 launch schedule,” Dordain said. Alvaro Gimenez, ESA’s director of science and robotic exploration, said negotiations with the ExoMars industrial team in recent weeks have come close to the target price for ExoMars.

1NC – STEM Frontline

**Obama’s educate to innovate program with NASA solves STEM jobs in the status quo**

White House 10’ The White House, Office of the Press Secretary, January 06, 2010, <http://www.whitehouse.gov/the-press-office/president-obama-expands-educate-innovate-campaign-excellence-science-technology-eng> “President Obama Expands “Educate to Innovate” Campaign for Excellence in Science, Technology, Engineering, and Mathematics (STEM) Education”

Public-private investments of more than $250 million will help prepare over 10,000 new math and science teachers and train over 100,000 existing teachers Today at the White House, as part of his “Educate to Innovate” campaign to lift American students to the top of the pack in science and math achievement over the next decade, President Obama will announce several new and innovative partnerships involving major companies, universities, foundations, non-profit organizations and government agencies designed to attract, develop, reward and retain outstanding educators in science, technology, engineering, and mathematics (STEM). These partnerships will build upon initiatives already announced by the President in November at the launch of the “Educate to Innovate” campaign to motivate and inspire students to excel in STEM subjects. Also today, the President will honor more than 100 outstanding math and science educators—the latest winners of Presidential awards for excellence in STEM teaching and mentoring. The President will announce: Five new public-private partnerships that will use proven models to prepare more than 10,000 new math and science teachers over the next five years and will support the professional development of more than 100,000 current teachers in STEM fields. These partnerships – Intel’s Science and Math Teachers Initiative, Expansion of the National Math and Science Initiative’s UTeach Program, a Commitment of Public University Presidents to Train 10,000 Math and Science Teachers Annually by 2015, the PBS Innovative Educators Challenge and Woodrow Wilson Teaching Fellowships in Math and Science – represent a combined commitment of more than $250 million in financial and in-kind support, adding to the more than $260 million in support announced in November at the launch of the “Educate to Innovate” campaign. Building on the President’s call to action to all scientists and engineers last May, a challenge to the 200,000 scientists and engineers working for the federal government to engage in high-impact volunteering alongside STEM educators. As part of this Presidential challenge, NASA will organize a multi-year “Summer of Innovation” enrichment program in which NASA scientists and engineers will work with thousands of teachers and students to work on cutting-edge STEM learning opportunities. “The quality of math and science teachers is the most important single factor influencing whether students will succeed or fail in science, technology, engineering and math,” President Obama said. “Passionate educators with issue expertise can make all the difference, enabling hands-on learning that truly engages students—including girls and underrepresented minorities—and preparing them to tackle the grand challenges of the 21st century such as increasing energy independence, improving people’s health, protecting the environment, and strengthening national security.”

The “Change the Equation” initiative is dramatically improving education

Imperial Valley News 10’ Written by Imperial Valley News, Thursday, 16 September 2010 <http://imperialvalleynews.com/index.php?option=com_content&task=view&id=7994&Itemid=2> “Educate to Innovate Campaign Expanded”

Washington, DC - Today at the White House, as part of his “Educate to Innovate” campaign to raise American students to the top of the pack in science and math achievement over the next decade, President Obama will announce the launch of Change the Equation, a CEO-led effort to dramatically improve education in science, technology, engineering, and math (STEM). Change the Equation, a new 501(c)3 non-profit organization, is a response by the business community to the President’s “call to action” at the National Academy of Sciences in spring 2009 for all Americans to join the cause of elevating STEM education as a national priority essential to meeting the economic challenges of this century. "Our success as a nation depends on strengthening America’s role as the world’s engine of discovery and innovation," said President Obama. "I applaud Change the Equation for lending their resources, expertise, and their enthusiasm to the task of strengthening America’s leadership in the 21st century by improving education in science, technology, engineering and math." Within a year, Change the Equation will replicate successful privately-funded programs in 100 high-need schools and communities such as efforts to allow more students to engage in robotics competitions, improve professional development for math and science teachers, increase the number of students that take and pass rigorous Advanced Placement (AP) math and science courses, increase the number of teachers who enter the profession with a STEM undergraduate degree and provide new opportunities to traditionally underrepresented students and underserved communities. Change the Equation will also create a state-by-state “scorecard” to highlight areas for state-level improvement, and help companies increase the impact of their own engagement in STEM education. Change the Equation was founded by astronaut Sally Ride, former Intel Chairman Craig Barrett, Xerox CEO Ursula Burns, Time Warner Cable CEO Glenn Britt, and Eastman Kodak CEO Antonio Perez, with support from Bill and Melinda Gates Foundation and Carnegie Corporation of New York. With a membership of 100 CEOs, and funding of $5 million for its first year of operations, Change the Equation is in a unique position to meet its three goals of: Great teaching: Improving STEM teaching at all grade levels; Inspired Learners: Inspiring student appreciation and excitement for STEM, especially among women and under-represented minorities; and, A Committed Nation: Achieving a sustained commitment to improving STEM education. The President will also announce specific public-private partnerships involving Change the Equation members, non-profits and foundations. Such announcements include increased opportunities for student engagement in science museums across the nation, improved teacher professional development in Newark, New Jersey, harnessing the power of electronic games for STEM education, and dramatically expanding the number of skilled volunteers participating in National Lab Day. Also on Thursday, the President’s Council of Advisors in Science and Technology (PCAST) will release a report outlining ambitious new policy proposals for improving STEM education.

2NC – STEM Frontline Extensions

Educate to Innovate key to STEM

White House 11**, "**Educate to Innovate", 7/27, <http://www.whitehouse.gov/issues/education/educate-innovate>

President Obama has launched an “Educate to Innovate” campaign to improve the participation and performance of America’s students in science, technology, engineering, and mathematics (STEM). This campaign will include efforts not only from the Federal Government but also from leading companies, foundations, non-profits, and science and engineering societies to work with young people across America to excel in science and math.

Plan trades off with key educational programs

Arabe 04’ By Katrina C. Arabe, Associate Editor Spotlight Ads, February 17, 2004, <http://news.thomasnet.com/IMT/archives/2004/02/manned_mission.html>

It's too expensive, and it may not even be feasible, many contend. Meanwhile, others say that pursuing this goal could single-handedly stimulate a stagnating profession--engineering: Last month, President Bush outlined an ambitious U.S. space initiative that will include putting a man on the moon—something that hasn't been done since Dec. 1972—and human exploration of Mars—an unprecedented feat. "Mankind is drawn to the heavens for the same reason we were once drawn to unknown lands and across the open sea," the president declared at NASA headquarters. "We choose to explore space because doing so improves our lives and lifts our national spirit. So let us continue the journey." But such a journey to the moon and to Mars—a six- to nine-month flight from Earth—represents an astronomical expense, critics assert. The program will require billions of dollars—money that could be better spent on reducing the deficit, for example, or generating much-needed jobs or expanding educational programs. In fact, some say traveling to Mars will come at the expense of such programs. In a recent TIME editorial entitled "Why We Shouldn't Go to Mars," Gregg Easterbrook, a fellow at the Brookings Institution, writes, "Present systems for getting from Earth's surface to low-Earth orbit are so fantastically expensive that merely launching the 1,000 tons or so spacecraft and equipment a Mars mission would require could be accomplished only by cutting health-care benefits, education spending or other important programs—or by raising taxes." Easterbrook also points out that automated probes could perform the task of analyzing rocks, removing the risk to human safety and the cost of sending people to Mars.

A mission to Mars would tradeoff with education spending like “Educate to Innovate”

Easterbrook 04’ By Gregg Easterbrook (Easterbrook is a fellow at the Brookings Institution and author of the new book The Progress Paradox) Monday, Jan. 26, 2004 [http://www.time.com/time/magazine/article/0,9171,993172,00.html#ixzz1TDvKF0ei](http://www.time.com/time/magazine/article/0%2C9171%2C993172%2C00.html#ixzz1TDvKF0ei) “Why We Shouldn't Go to Mars”

Many times I have stared up at Mars in the evening sky--in the mountains, away from cities, you can almost see the red tint--and wondered what is there, or was there. But the fact that a destination is tantalizing does not mean the journey makes sense, even considering the human calling to explore. And Mars as a destination for people makes absolutely no sense with current technology. Present systems for getting from Earth's surface to low-Earth orbit are so fantastically expensive that merely launching the 1,000 tons or so of spacecraft and equipment a Mars mission would require could be accomplished only by cutting health-care benefits, education spending or other important programs--or by raising taxes. Absent some remarkable discovery, astronauts, geologists and biologists once on Mars could do little more than analyze rocks and feel awestruck beholding the sky of another world.

1NC – Cooperation Frontline

1) Mutual US - Russia Scientific Cooperation Now - solves Aff

The Voice of Russia 2011**,** "US Energy Secretary Chu hails cooperation with Russia", 6/14, <http://english.ruvr.ru/2011/06/14/51697817.html>

U.S. Energy Secretary Steven Chu visited Russia staying in St.Petersburg and Moscow from June 6th to June 11th. According to western mass media, his main idea was to highlight the tremendous potential for mutually beneficial cooperation and shared economic opportunities with Russia in the areas of innovative clean energy technology, safe and reliable civilian nuclear power, best practices in energy efficiency, and nuclear non-proliferation. The visit was to promote continued collaboration between U.S. and Russian scientists, technical experts, and energy sector businesses, paving the way for U.S. investment and clean technology exports to Russia.

2) US - Russia doing ExoMars now

ESA 10, "Enhanced Exomars**",** esamultimedia.esa.int/docs/MinisterialCouncil/MC-EXOMARS\_1811.pdf, 4/17

Attention is returning worldwide to the robotic exploration of Mars. The USA and Russia are implementing their own exploration plans, and will participate in ExoMars. At a time in which Mars canonly be reached via robotic means, ExoMars will establish Europe as a key player in the long-term exploration of the planet.

3) US - Russia Scientific Collaboration High

Russian-American Business 11**,** "Russia is ready for strategic relationships", 5/7, <http://russianamericanbusiness.org/web_CURRENT/articles/769/1/Russia-is-ready-for-strategic-relationships>, magazine

On March 9, 2011, the President of Russia Dmitry Medvedev met with the American Vice President Joseph Biden in Moscow. The Russian head of state said that Russia was ready to create a strategic relationship with the United States. Russian government officials are hopeful that the United States would help Russia join the World Trade Organization in 2011. President Medvedev also asked the American Vice President to work with Congress to graduate Russia from Jackson-Vanik. The Jackson-Vanik amendment, adopted in 1974, precludes Russia from receiving preferred nation status on the basis of the former Soviet Union’s restrictions on Jewish emigration and is now thought to be an undeserved impediment in the U.S.-Russian commercial relationship. Russia’s endeavors to join the World Trade Organization have also taken a long while, as the country has been pursuing multilateral negotiations since 1994. Officials in the Russian government are optimistic that those efforts will at last pay off very soon. The help of the United States in Russia’s accession to the WTO will be instrumental. Meanwhile, Russian-American business and scientific cooperation also saw significant progress as of late. On March 24, 2011, the state-run company Techsnabexport, a division of Rosatom, entered into a USD-2.8-billion contract with the American-based company USEC for enriching uranium. As reported by the CEO of Rosatom Sergei Kiriyenko, the contract will provide for Techsnabexport’s supplying uranium to the U.S. company over a 10-year period commencing in 2013. Techsnabexport will ship to the United States 21 million SWUs (separative work units, a unit of uranium enrichment) of uranium.

2NC – Cooperation Frontline

1) US - Russia doing ExoMars now

ESA 10,"Enhanced Exomars**",** esamultimedia.esa.int/docs/MinisterialCouncil/MC-EXOMARS\_1811.pdf, 4/17

Attention is returning worldwide to the robotic exploration of Mars. The USA and Russia are implementing their own exploration plans, and will participate in ExoMars. At a time in which Mars canonly be reached via robotic means, ExoMars will establish Europe as a key player in the long-term exploration of the planet.

2) ESA and Russia collaborating on Exomars

Avionews 09, "Agreement between ESA and Roscosmos signed at 'MAKS 2009'", 8/20, <http://www.avionews.com/index.php?corpo=see_news_home.php&news_id=1108379&pagina_chiamante=index.php>

Yesterday ESA Director General Jean-Jacques Dordain and Head of Roscosmos (Russian Space Agency) natoly Perminov signed the Implementing Arrangement on activities in support of Certain Space Exploration programmes. This includes using the European ground network during the Russian Phobos Grunt mission, to be launched in October 2009, and cooperation on the ExoMars project.

3) ESA and Russia collaborating now

**RedOrbit 09,** "ESA, Roscosmos Strike Mars Deal", 8/20, <http://www.redorbit.com/news/space/1740298/esa_roscosmos_strike_mars_deal/>

Russia's Interfax news agency reported the European Space Agency (ESA) signed a deal on Wednesday with its Russian counterpart Roscosmos to cooperate on two Mars exploration projects. Roscosmos head Anatoli Perminov and the ESA's Jean-Jacques Dordain inked the deal at the Maks aviation and space show outside Moscow, according to the AFP. The ESA will use Russia's Proton rocket as part of its Exomars project to send a robotic rover to the Mars surface and buy Russian parts for the rover's power supply system, the AFP reported.

4) US ESA cooperation now on Exomars

Universe Today 11**, "**ExoMars", 1/3, http://www.universetoday.com/83061/exomars/

ExoMars is a Mars rover program that is backed by the European Space Agency. The concept has undergone many revisions due to delays and changes in financial backing. However the main purpose of the mission remains the same which is to send a rover to Mars to explore the terrain and gather data on the surface of Mars. To help fund the mission ExoMars has been paired with a module from the Russian space agency. However recent changes now have the mission split up into two phases and the partnership is now with NASA. The main goals of the exomars mission will be the following. First the rover is to look for any signs of life on Mars. This includes not just currently living organisms but remains that might prove the existence of life in the past. The second is to gather data on the distribution of water and geochemicals on the surface of mars. The next objective is to survey the surface for possible hazard to future Mars missions. The next is to study the subsurface and see if it yields information on the history of Mars and its possible habitability. The last step for the specific scientific tasks is to prepare incrementally for a return mission to Mars. The remaining objectives are technical. The first is to send a large payload to Mars and land it safely. The next goal is to exploit solar power on the surface of Mars. The third objective is to explore the subsurface using a drill. The final one is to expand the exploration capabilities of a rover on the surface of Mars. The mission is important because it shows the growing capacity of the European Space Agency to take on increasingly more complicated missions. This is definitely leading towards the capacity to send manned missions to space on its own without the help of other space agencies. At the same time the mission also shows growing cooperation between space agencies in order to achieve large scale projects. This is becoming more necessary as governments trim their space exploration budgets to meet shortfalls in tax revenue. We have written many articles about the ExoMars program for Universe Today. Here’s an article about ExoMars rover’s 2013 launch, and here’s an article about the ExoMars rover.

5) ESA, Europe, and US trilateral cooperation on Exomars now

Space 07**,** "ESA Commits $1.5 Billion To Fund Early ExoMars Work", 12/17, <http://www.space.com/4750-esa-commits-1-5-billion-fund-early-exomars-work.html>

PARIS — European Space Agency (ESA) governments, led by Italy, have agreed to finance early work in 2008 on a $1.5-billion Mars rover mission that likely will feature participation by the United States and Russia but will not be definitively approved by ESA governments until November, according to European government officials. The decision to spend 80 million euros ($117 million) in 2008 on the ExoMars mission will preserve ESA's ability to launch the rover package in 2013 by permitting the purchase of hardware needed now to meet the 2013 launch date, ExoMars project manager Don McCoy said Dec. 14. In an interview, McCoy said the decision is a positive sign for ExoMars, but that the mission still faces key hurdles even before ESA ministers meet in November to approve the entire ExoMars financial package. An industrial team led by Thales Alenia Space Italy has submitted an ExoMars package totaling 1.02 billion euros including the production of a rover, integration of 22 science instruments, plus launch and operating costs. This is the figure that ESA governments will need to approve in November. Not included are the 22 science instruments, most of which will be supplied by the national space agencies of Italy, France, Germany and Britain. Daniel Sacotte, ESA's director of exploration programs, has raised concerns that these national agencies might not be able to furnish their instruments, raising the possibility that ESA ultimately will need to finance one or more of them from its own budget. Taking a page from ESA's science directorate — which has encountered the same problem in its missions — ExoMars managers are preparing an Instrument Multilateral Agreement to be signed by ESA and by the national agencies taking part in the mission. The agreement will not be a contract, but will carry the weight of a commitment on the part of these governments with respect to instrument specifications and delivery dates. McCoy said ESA hopes the document will be signed by all the participating agencies in early 2008 so that instrument work can begin. The document also will be another indicator — as was the ExoMars 2008 funding allocation of 80 million euros — that European governments remain supportive of the mission. A much smaller version of ExoMars was approved by ESA governments in December 2005, with a budget set at 650 million euros. But this version was abandoned quickly when it became clear that its instrument package and rover, designed to be launched by a medium-lift Soyuz rocket, was too small to meet European scientists' expectations. That led to the full program review, the new industrial proposal and the decision to cancel the original ExoMars in favor of the larger-scale project now moving forward. ESA also intends to bring NASA and the Russian space agency, Roskosmos, into ExoMars as part of separate bilateral agreements. McCoy said a draft letter of agreement with NASA has been approved and now is making its way through the U.S. and European space agencies' legal systems. The draft agreement calls for NASA to provide one full instrument on ExoMars and to provide a second instrument in cooperation with ESA. In addition, NASA would provide a telecommunications relay capability for ExoMars through one of the Mars orbiter missions planned by the U.S. agency. The cooperation with Russia is more complicated. ESA is working on a broad cooperation accord that would cover both ExoMars and Russia's Phobos-Grunt mission to Phobos, one of Mars' two moons. Phobos-Grunt tentatively is scheduled for launch in 2009 and is intended to return soil samples from Phobos to Earth. The intergovernmental agreement with Roskosmos also would include a possible launch of ExoMars aboard a Russian Proton rocket, and the purchase by ESA of Russian-built radioisotope heater units, which use plutonium to keep the rover instruments warm. Europe does not have this technology and the United States has long said any U.S.-provided nuclear heaters would not likely be available for export. Roskosmos tentatively has agreed to provide the technology for ExoMars, but ESA officials say they expect to have to pay for the technology even if Russia's Proton and other contributions are part of a no-exchange-of-funds agreement. McCoy said using Russia's Proton rocket for ExoMars would relieve ESA of having to perform safety and security upgrades to Europe's Guiana Space Center spaceport that would be necessary for handling nuclear material.

1NC – Colonization Frontline

Mars Colonization is impossible

Launius 2010, Chief Historian for NASA and author of many books on aerospace history, Roger D., “Can we colonize the solar system? Human Biology and survival in the extreme space environment”, *Science Direct*

Overcoming the technological hurdles encountered during the Mercury, Gemini, and Apollo programs were child’s play in comparison to the threat to human life posed by long duration, deep space missions to such places as Mars. Even the most sophisticated of those, the lunar landings of Project Apollo, were relatively short camping trips on an exceptionally close body in the solar system, and like many camping trips undertaken by Americans the astronauts took with them everything they would need to use while there. This approach will continue to work well until the destination is so far away that resupply from Earth becomes highly problematic if not impossible if the length of time to be gone is so great that resupply proves infeasible. There is no question that the U.S. could return to the Moon in a more dynamic and robust version of Apollo; it could also build a research station there and resupply it from Earth while rotating crews and resupplying from Earth on a regular basis. In this instance, the lunar research station might look something like a more sophisticated and difﬁcult to support version of the Antarctic research stations. A difﬁcult challenge, yes; but certainly it is something that could be accomplished with presently envisioned technologies. The real difﬁculty is that at the point a lunar research station becomes a colony profound changes to the manner in which humans interact with the environment beyond Earth must take place. Countermeasures for core challenges – gravity, radiation, particulates, and ancillary effects – provide serious challenges for humans engaged in space colonization.

Mars Colonization Bad - Laundry List

Discovery 11**,** "How a mission to Mars could kill you", 7/18, <http://news.discovery.com/space/mission-to-mars-health-risks-110718.html> When NASA's 30-year Space Shuttle Program ends on Thursday as Atlantis touches down for the last time, space-watchers will be looking toward our next step into space.

We've already 'done' the moon, but Mars still beckons like some interplanetary Brigadoon; visible through the eyes of clever little rovers and orbiters, but just beyond the reach of human footsteps. Despite several decades of research and development, a long-duration voyage to Mars is still on the drawing board. Putting aside the enormous financial costs of an interplanetary mission, there are still major engineering and physiological hurdles to overcome. Radiation The combined effects of background cosmic rays from extragalactic sources and extreme radiation events from the sun make space travel too hazardous for an estimated six months there and six months return. "The estimate now is you would exceed acceptable levels of fatal cancer," said Francis Cucinotta, chief scientist for NASA's space radiation program at the Johnson Space Center in Houston. "That's just cancer. We also worry about effects of radiation on the heart and the central nervous system." Cucinotta says these estimates do take into account protective shielding around a crew vehicle, probably some form of polyethylene plastic. Lead shields actually create secondary radiation when struck by cosmic rays, while water, perhaps the best form of protection, would have to be several meters thick to get enough protection. ("Houston calling Water Balloon 1, do you copy?") Lead and water, in any case, are very heavy for the quantities that would be required, making them an expensive shielding to launch. Solution: Pick astronauts that have never smoked, never been around smokers, and have a built-in genetic resistance to radiation damage. "We didn't know about this (ability) five or ten years ago, we should have an answer in another ten or 15 years," Cucinotta said. Genetic protection plus a special shielded shelter may do the trick. Bodies Without Gravity Let us count the ways that the human body falls apart without gravity: 1) Bone loss of one percent per month. 2) Fainting spells (women more than men) after re-entering a gravitational field. 3) Cognitive problems including Alzheimer's-like symptoms. 4) Weakness and lack of cardiovascular fitness. 5) Muscle atrophy. All of these medical conditions would make it tough for the crew to build a shelter when they land on the Red Planet, for example. "What happens if they land on Mars and try to lift an object that's fairly or reasonably heavy, they could herniate their discs," said Alan Hargens, an orthopedic surgeon at the University of California San Diego who studies the effects of gravity on astronauts. "One of the main issues is that when they arrive at Mars, there's nobody there to take care of them. If they have some issue due to de-conditioning in that six month period, they'll definitely have a problem." Solution: Lots of time on a treadmill while in microgravity conditions and some kind of artificial gravity may help, but not eliminate the risk. The crew needs either a small unit inside the ship or a vehicle design that rotates around a central pivot point (think 2001: A Space Odyssey). Hargens said a rotating arm of one-kilometer diameter will produce the equivalent of the gravity felt on the Earth at sea-level. Smaller centrifuges have produced nausea among astronauts, according to Hargens, and take up a lot of space inside a cramped vehicle. Another possibility is a special compression suit that forces body fluids into the legs, and helps maintain fitness. Cabin Fever Put six or seven people in a confined space for 18 months, send them to a place nobody's been before, with no way to escape, is likely to produce stress, tension and perhaps even severe psychiatric problems, according to NASA’s 2009 Human Research Program report. Based on studies in Antarctica and other isolated environments underwater, the report cited the risk of "increased human performance errors due to sleep loss, fatigue, work overload, and circadian desynchronization; and, increased errors due to poor team cohesion and performance, inadequate selection/team composition, inadequate training, and poor psychosocial adaptation." Cosmonaut squabbles aboard the Russian Mir space station brought one mission home ahead of time, while NASA has also reported crew disputes among its astronauts. Solution: pick the astronauts very carefully ahead of time. NASA is also looking at special voice and facial movement monitors to diagnose early signs of stress before they turn into a big fight. An on-board counselor (a la Star Trek’s Deanna Troi) may help as well, but who counsels the counselor? Food Only vegetarians will be allowed on a Mars trip, since meat can't be preserved in space. Food provides a natural morale boost for the crew, and proper nutrition wards off oxidative damage to the astronauts' bodies. However, studies show that radiation can damage the vitamins in food supplies, and the loss of even one vitamin in the food chain could cause serious health effects over a long trip. Little is known about the long-term effects of radiation on food supplies, since International Space Station (ISS) crews have been partially sheltered by Earth's magnetosphere. It's expected that the crew will have to grow its own food in some kind of greenhouse, something researchers already do at the South Pole during winter-over. Hardware/Propulsion At closest approach, Mars is about 35 million miles from Earth, but that figure increases six-fold depending on the alignment of the two planets' orbits. Some experts say the answer to all the medical, radiation, food and psychological issues is to get there faster. Former astronaut Franklin Chang-Diaz is developing an electric-nuclear plasma-powered rocket (called the Variable Specific Impulse Magnetoplasma Rocket, or "VASIMR") to cut the trip to 39 days. President Obama mentioned the new propulsion system during a recent trip to Cape Canaveral. But the Mars Society's founder, Robert Zubrin, is highly critical of this plan, saying we already have the rocket technology needed to mount a Mars expedition. Zubrin also went on the record to call VASIMR a "hoax." "The insistence that we need a faster propulsion system just allows politicians to postpone a Mars mission," said Zubrin, author of the recently re-released book "The Case for Mars." Zubrin proposes a three-stage, 18-month round-trip Mars expedition that will send a crew habitat ahead of time, as well as devices to produce fuel for the return trip.

1NC – Solvency Frontline

1) The high risk of mission failure outweighs the benefits

Buff 04’ (Joe Buff is a professional writer on national security and defense preparedness. Two of Joe's non-fiction articles on future submarine technology and tactics, which appeared in The Submarine Review, received literary awards from the Naval Submarine League. Joe is a Life Member of the following organizations: U.S. Naval Institute, the Navy League of the United States, the Fellows of the Naval War College, CEC/Seabees Historical Foundation, and the Naval Submarine League.) February 6, 2004 [http://www.military.com/NewContent/0,13190,Buff\_020604,00.html](http://www.military.com/NewContent/0%2C13190%2CBuff_020604%2C00.html)

Why Mars? I've attempted to craft the discussion so as to lead up to this final question: Why send men to Mars soon, or even within the lifetimes of any adult alive on Earth today? Mars is much too far away (tens of millions of miles) to be of any practical military use. Ah, but you say, what about the scientific value of such an expedition? I answer your question with a question: Yeah, what about it? What can men do on Mars that robotic space probes can't do much more safely and more cheaply? This issue requires a lot of careful and objective study before we jump on the bandwagon of another, possibly misbegotten, space race to get somewhere just for the sake of getting there. Readers should know that a controversy has long raged among academic scientists and NASA planners about the relative merits of manned and robotic space exploration. Different highly qualified professionals take different sides, for what often seem like equally good reasons. Personally, I think the advancement of science and technology is vital on both a practical applications level, and on a visionary-spiritual level, for the benefit of all humankind. But we must distinguish critically between reality and science fiction. The late Gene Roddenberry may have done us a disservice by making space appear much more accessible to people like you and me than it actually is. The title of this essay was chosen on purpose, to frame a closing parable. We can certainly send men "at" Mars -- even if their spacecraft explodes and kills them seconds after liftoff. We can definitely send men "toward" Mars, recognizing that a malfunction might cause them to fail to enter Mars orbit, and go sailing onward off into eternity. We can even send men "to" Mars, in the sense of landing them there to safely walk the ruddy, rocky, alien soil in spacesuits -- but those same men might not survive the trip home. Until we do bring them back to Earth alive, and they can stand before us and say truthfully, "We are men from Mars," the mission has not succeeded. The odds of failure, based on past experience, are high. The non-monetary costs of such a disaster -- in terms of lives lost, prestige squandered, and civilian morale and confidence undermined -- call into substantial doubt whether the entire men-on-Mars effort should even remain high on our list of national (or international) goals for years to come. The advancement of science is important, but so is plain common sense. For another generation at least, let expendable, capable robotic spacecraft and rovers do the work.

2) The requirements and risks for astronauts prevent solvency

Lott 11 (Maxim, January 10, FoxNews.com, “To Boldy Go: What Made 400 People Volunteer for a One-Way Mission to Mars?,” http://www.foxnews.com/scitech/2011/01/10/space-volunteer-way-mission-mars/) KA

But more than spiritual issues will arise, warn psychologists who have worked with NASA. "It's going to be a very long period of isolation and confinement," said Albert Harrison, who has studied astronaut psychology since the 1970s as a professor of psychology at UC Davis. He also warned that life on Mars wouldn't be as romantic as it sounded. "After the excitement of blast-off, and after the initial landing on Mars, it will be very difficult to avoid depression. After all, one is breaking one’s connections with family, friends, and all things familiar," he told FoxNews.com. "Each day will be pretty much like the rest. The environment, once the novelty wears off, is likely to be deadly boring. Despite being well prepared and fully equipped there are certain to be unanticipated problems that cannot be remedied. One by one the crew will get old, sick, and die-off." All communications with Earth would also come with a delay of about 45 minutes. The volunteers said they are aware of the psychological issues, but believe they would be able to handle them. "I've spent an inordinate amount of time with myself and my own thoughts, and am happy to do so till the end of days," Greaves said. Are they qualified? Volunteering is all well and good, but would Greaves or Gregersen have a chance of being selected? NASA spokesman James Hartsfield referred to the astronaut application guidelines posted on the agency's website. Currently, the requirement of a college degree in science, engineering, or math -- followed by years of professional experience -- would probably disqualify most, he said. However, the mission in question is not intended to be sponsored by NASA. Harrison said he was more upbeat about the volunteers. “The people within this group show high interest and would bring varied backgrounds and experiences to the mission,” he said. “Also, there will be spiritual issues to address, and it would not surprise me at all if the mission would benefit from someone who served as a chaplain.” Currently, NASA astronauts must complete at least 4 to 5 years of training before going on long-duration missions. The training includes intense physical tests. “Astronaut Candidates are required to complete military water survival before beginning their flying syllabus, and become SCUBA qualified to prepare them for spacewalk training,” the guidelines read. Harrison said that he was sure good colonists could be found, but that political and regulatory hurdles would be a tougher issue.

3) **The large distance and current technology pose significant barriers to mission success**

Anupam 07’ , Anupam is a software engineer, Mar 14 2007, <http://www.spacescan.org/entry/top-10-risks-in-manned-mission-to-mars/> “Top 10 risks in manned mission to Mars”

Risk 1: Over dependence on current technology:

Journey to Mars is not as easy as a journey between any two places on Earth. It will require each and every bit of technology that we have. Moreover any hardware or software failure could result in disaster as we cannot send a mission to repair the damage done as we did when Hubble encountered a failure. Another concern is that any damage that may occur to the space craft during the initial journey as the astronauts cannot survive in a damaged spacecraft.

Risk2: Large Distance:

The distance between Earth and Mars, when Mars is at the minimum distance from Earth is 33,900,000 miles. This means that reaching Mars takes six months when Mars is at the minimum distance from Earth. The return journey will be even longer as the planets would have changed their relative places in their orbits. Such a long journey also means that we are over-depended on the current technology and the physical conditions of the astronauts should also be considered.

1NC – Spending Link

The plan is the single most expensive undertaking in US history – equivalent to 800 new Hoover Dams

Easterbrook 04’ By Gregg Easterbrook (Easterbrook is a fellow at the Brookings Institution and author of the new book The Progress Paradox) Monday, Jan. 26, 2004 [http://www.time.com/time/magazine/article/0,9171,993172,00.html#ixzz1TDvKF0ei](http://www.time.com/time/magazine/article/0%2C9171%2C993172%2C00.html#ixzz1TDvKF0ei) “Why We Shouldn't Go to Mars”

Two centuries ago, Meriwether Lewis and William Clark left St. Louis to explore the new lands acquired in the Louisiana Purchase," George W. Bush said, announcing his desire for a program to send men and women to Mars. "They made that journey in the spirit of discovery ... America has ventured forth into space for the same reasons." Yet there are vital differences between Lewis and Clark's expedition and a Mars mission. First, Lewis and Clark were headed to a place amenable to life; hundreds of thousands of people were already living there. Second, Lewis and Clark were certain to discover places and things of immediate value to the new nation. Third, the Lewis and Clark venture cost next to nothing by today's standards. In 1989 NASA estimated that a people-to-Mars program would cost $400 billion, which inflates to $600 billion today. The Hoover Dam cost $700 million in today's money, meaning that sending people to Mars might cost as much as building about 800 new Hoover Dams. A Mars mission may be the single most expensive nonwartime undertaking in U.S. history. The thought of travel to Mars is exhilarating. Surely men and women will someday walk upon that planet, and surely they will make wondrous discoveries about geology and the history of the solar system, perhaps even about the very origin of life. Many times I have stared up at Mars in the evening sky--in the mountains, away from cities, you can almost see the red tint--and wondered what is there, or was there. But the fact that a destination is tantalizing does not mean the journey makes sense, even considering the human calling to explore. And Mars as a destination for people makes absolutely no sense with current technology. Present systems for getting from Earth's surface to low-Earth orbit are so fantastically expensive that merely launching the 1,000 tons or so of spacecraft and equipment a Mars mission would require could be accomplished only by cutting health-care benefits, education spending or other important programs--or by raising taxes. Absent some remarkable discovery, astronauts, geologists and biologists once on Mars could do little more than analyze rocks and feel awestruck beholding the sky of another world. Yet rocks can be analyzed by automated probes without risk to human life, and at a tiny fraction of the cost of sending people. It is interesting to note that when President Bush unveiled his proposal, he listed these recent major achievements of space exploration: pictures of the rings of Saturn and the outer planets, evidence of water on Mars and the moons of Jupiter, discovery of more than 100 planets outside our solar system and study of the soil of Mars. All these accomplishments came from automated probes or automated space telescopes. Bush's proposal, which calls for "reprogramming" some of NASA's present budget into the Mars effort, might actually lead to a reduction in such unmanned science--the one aspect of space exploration that's working really well. Rather than spend hundreds of billions of dollars to hurl tons toward Mars using current technology, why not take a decade--or two decades, or however much time is required--researching new launch systems and advanced propulsion? If new launch systems could put weight into orbit affordably, and if advanced propulsion could speed up that long, slow transit to Mars, then the dream of stepping onto the Red Planet might become reality. Mars will still be there when the technology is ready. Space-exploration proponents deride as lack of vision the mention of technical barriers or the insistence that needs on Earth come first. Not so. The former is rationality, the latter the setting of priorities. If Mars proponents want to raise $600 billion privately and stage their own expedition, more power to them; many of the great expeditions of the past were privately mounted. If Mars proponents expect taxpayers to foot their bill, then they must make their case against the many other competing needs for money. And against the needs for health care, education, poverty reduction, reinforcement of the military and reduction of the federal deficit, the case for vast expenditures to go to Mars using current technology is very weak. The drive to explore is part of what makes us human, and exploration of the past has led to unexpected glories. Dreams must be tempered by realism, however. For the moment, going to Mars is hopelessly unrealistic.

2NC – Spending Link Wall

A manned mission to Mars could cost up to 1 trillion dollars

Shaw 09’ Robots Should Go Where Man Hesitates to Tread Great risks were taken to send man to the moon. It is impractical to take those risks today to go to Mars. July 20, 2009 - 11:22 am - by Jazz Shaw (Jazz Shaw is a Northeastern former RINO and regular columnist at The Green Room at Hot Air.) <http://pajamasmedia.com/blog/robots-should-go-where-man-fears-to-tread/>

Two rovers on Mars are still trundling along, dragging disabled wheels and running on low power due to dust covered solar panels, but performing their mission years beyond initial projections. Also, unmanned missions are free of the burden of delivering air, food, water, and all of the other requirements for keeping humans alive. They weigh less, cost less, and can take all the time they need to arrive at their destination. When the Mars Polar Lander entered the Martian atmosphere in 1999, it immediately fell silent and was never heard from again. It is now believed that it crashed into the wall of a canyon, smashing on the rocks far below. It was a terrible loss in terms of technology and discovery, disappointing many, but imagine our reaction if that had been a landing craft with five astronauts on board. Some risks are still best left to our machine surrogates. And finally, what of the cost? The Mars Express plan is conservatively estimated to carry a price tag of more than 100 billion dollars. Many observers feel this is only a down payment, with the eventual bill coming in closer to one trillion. As much as we may yearn for bold adventure and discovery, we are currently watching Congress burn through imaginary cash as if it were the last known fuel source on the planet. Is this really the time to consider incurring such a debt load? Human beings are explorers by nature. It’s built into our genetic code. But we also need to be aware of our practical limits and avoid having our reach exceed our grasp. Future generations may well overcome these obstacles and continue our trek to the stars, but reality needs to have a seat at the table. I can sympathize with Michael Griffin’s lofty, noble vision for the future of American space exploration, but given the costs and risks involved –- both in dollars and human blood -– this may be a time for robots to run where man fears to tread.

Even NASA recognizes that a Mars mission is too expensive

Spillius 09’ By Alex Spillius in Washington 11:58PM BST 09 Sep 2009 <http://www.telegraph.co.uk/science/space/6163901/Nasas-manned-Moon-mission-too-expensive.html> “Nasa's manned Moon mission 'too expensive'”

George W. Bush's pledge to send a manned mission to the Moon by 2020 and then to Mars is in tatters after a White House inquiry into Nasa's spending decided the project was too expensive. The bleak assessment by the panel, which said the US spave programme appeared "on an unsustainable trajectory", left the project floundering and dented one of the legacy-defining wishes the former US president made five years ago. Presenting the White House with another dilemma over spending in a straitened economy, the Augustine Commission, assembled by President Barack Obama when he came into office, said that the space agency would need at least an additional $3 billion (£1.8 billion) a year for the foreseeable future to pay for projects aiming to return Americans to outer space. "Space operations become all the more difficult when means do not match aspirations," the committee wrote in a preliminary report. "The nation is facing important decisions on the future of human spaceflight.

Plan is astronomically expensive – trades off with education and health care

Arabe 04’ By Katrina C. Arabe, Associate Editor Spotlight Ads, February 17, 2004, <http://news.thomasnet.com/IMT/archives/2004/02/manned_mission.html>

It's too expensive, and it may not even be feasible, many contend. Meanwhile, others say that pursuing this goal could single-handedly stimulate a stagnating profession--engineering: Last month, President Bush outlined an ambitious U.S. space initiative that will include putting a man on the moon—something that hasn't been done since Dec. 1972—and human exploration of Mars—an unprecedented feat. "Mankind is drawn to the heavens for the same reason we were once drawn to unknown lands and across the open sea," the president declared at NASA headquarters. "We choose to explore space because doing so improves our lives and lifts our national spirit. So let us continue the journey." But such a journey to the moon and to Mars—a six- to nine-month flight from Earth—represents an astronomical expense, critics assert. The program will require billions of dollars—money that could be better spent on reducing the deficit, for example, or generating much-needed jobs or expanding educational programs. In fact, some say traveling to Mars will come at the expense of such programs. In a recent TIME editorial entitled "Why We Shouldn't Go to Mars," Gregg Easterbrook, a fellow at the Brookings Institution, writes, "Present systems for getting from Earth's surface to low-Earth orbit are so fantastically expensive that merely launching the 1,000 tons or so spacecraft and equipment a Mars mission would require could be accomplished only by cutting health-care benefits, education spending or other important programs—or by raising taxes." Easterbrook also points out that automated probes could perform the task of analyzing rocks, removing the risk to human safety and the cost of sending people to Mars.

Mars mission costs billions and will only get more expensive – even if it is funded, the unexpected costs, delays and waning public support will cause it to be defunded by subsequent administrations

Christianson 11’ by J Scott Christianson, High-tech entrepreneur, trainer and college instructor. Posted on March 11, 2011, <http://thefreerangetechnologist.com/2011/03/manned-mission-to-mars/> “We can’t afford manned mission to Mars”

Now, 28 years after the first space shuttle took off, NASA officials are in the process of retiring the remaining shuttles and replacing them with two more conventionally designed rockets, the Ares I and Ares V. NASA has more ambitious plans for these rockets, however, than just replacing the shuttle’s orbital hauling capabilities. Namely, it plans to return humans to the surface of the moon, establish a base there and then use it to launch a manned mission to Mars — an extremely expensive, dangerous and misguided plan given the challenges currently facing our planet. A manned mission to Mars will cost tens of billions of dollars. According to a recent report, NASA immediately needs an extra $3 billion per year to keep its plans on track. It is almost guaranteed the costs for this project will expand greatly. Costs cannot be correctly estimated for large projects so unique and untried. And a major risk associated with a manned Mars mission is that, after sinking billions into this project, Congress or a future administration will pull the plug because of cost overruns and delays. This is exactly what happened to the superconducting super collider project in Texas, which Congress canceled after its estimated costs at completion ballooned from $4 billion to $12 billion. Political and public support of such large science projects wanes quickly as time and costs increase. By pouring the majority of their efforts into this one mission, NASA is betting on the success — and continued funding — of a manned mission to Mars. The known risks for human space flight on this scale are huge and have to be mitigated with a variety of not-yet-invented technologies. And in any such complex project, all the risks can’t be known. The space shuttles have surely proved that — two of them were destroyed by an “O” ring and a piece of foam. Mars is not days away like the moon; it is months away, with lots of time for things to go horribly wrong. A manned mission to Mars will tie up most of NASA’s intellectual resources for a decade or more as they toil on an incredibly expensive project whose success and scientific value is uncertain.

Stops at the moon, retired experts and non-existent technology make a Mars mission incredibly expensive

NPR 09’ “NASA's New Space Race Needs Life Support” October 24, 2009 <http://www.npr.org/templates/story/story.php?storyId=114135408>

Part of what makes sending a manned mission to Mars so expensive is the stops along the way. We'd have to start with sending humans back to the moon. Chiao says that's because we need to relearn how to land and operate on other planets. "The last Apollo mission was 37 years ago, so all the people who executed that program are long since retired from the industry or moved on," he points out. We'd more or less be starting all over again. Then, we'd need to know how to operate in a deep space habitat for extended periods. "One-hundred-eighty or more days — that's something we've never done," Chiao says. "So those two things we need to build up in order to be able to go and send a human mission to Mars." To build that knowledge, Chiao says, an asteroid flyby might be interesting. "We would learn a lot about the engineering that went into a departure stage, and the operations, the navigation," he says. "All that gets us to the nearest object." "Landing, of course, would have its own set of challenges," Chiao says, "but no question — we would be learning and building infrastructure to go explore farther on to Mars."

The actual cost will exceed expectations by 30% - and trades off with other missions to Mars

Anupam 07’ , Anupam is a software engineer, Mar 14 2007, <http://www.spacescan.org/entry/top-10-risks-in-manned-mission-to-mars/> “Top 10 risks in manned mission to Mars”

Risk 10: Cost Risk:

A human mission to Mars is expected to cost around $100 billion. This mission has already been described as ‘crazy’ by some White House advisors. Moreover this money will come at the cost of some unmanned missions that are more urgent than this mission to Mars. If an estimate from traditional NASA contractors is made, the actual costs will probably exceed that by at least 30%.

New Generation Mars Rovers will cost 2.5 Billion

India Times 11, "Cost of next generation Mars rover soars to $2.5 bn", 2/2, <http://articles.economictimes.indiatimes.com/2011-02-02/news/28424954_1_mars-science-laboratory-rover-nasa-advisory-council>

LOS ANGELES: NASA's next-generation rover to the surface of Mars will be quite the behemoth \_ with a price tag to match. Nine months before its scheduled launch, the space agency said the flagship mission has burned through its reserves and needs an extra $82 million to complete testing before liftoff. It's the latest cost overrun to plague the Mars Science Laboratory, a nuclear-powered rover the size of a small sports utility vehicle that will study whether the planet was or is still habitable. Technical snags during development coupled with ballooning costs forced NASA to delay the launch by two years. Curiosity, as the rover is known, is now slated to lift off in late November from Cape Canaveral, Florida. The latest price tag? $2.5 billion, making it the most expensive mission yet to Mars. NASA broke the bad news last week to members of the planetary science subcommittee of the NASA Advisory Council, which provides input to the space agency. It blamed the latest budget woes on issues that cropped up during testing involving the rover's avionics, landing radar and drill that took more time and money than expected to fix. Arizona State University planetary scientist Ronald Greeley, who chairs the panel, was disappointed about the latest cost increase, but still supports the mega-rover. ``We want that mission to fly,'' Greeley said. The problem could have been worse, some scientists say. The amount needed to usher Curiosity to the launch pad is relatively small compared to what's already been spent, said Arizona State University astronomer Jim Bell, who works on the long-running twin Mars rovers mission. Still, researchers are bracing for possible cuts to their projects to cover the latest cost growth. ``It's unavoidable that there will be some pain,'' Bell said. Just how much pain remains to be seen. NASA said the extra cash will come from its planetary science division, which funds everything from technology development to Mars missions to projects to the outer solar system. Jim Green, who heads the division, said in a statement it's too soon to know what missions will be affected. He noted that ``no other projects are being cancelled or delayed to provide funding'' for Curiosity. Since 2008, the project cost has skyrocketed by than $660 million, mainly because of technological and engineering hurdles, according to a report last year by the Government Accountability Office. NASA has never landed such an advanced spacecraft on the Martian surface before. Curiosity proved to be a challenge from the outset because of its size and capability. It can drive farther than golf cart-size twin rovers Spirit and Opportunity and will carry a sophisticated suite of instruments including a rock-zapping laser.

1NC – Politics Link

The plan is so unpopular that they have banned manned missions to Mars

Jones 09’By Naven Jones, freelance investigative journalist, 4/22/2009 <http://www.uncoveror.com/nomars.htm> “CONGRESS BARS NASA FROM MARS MISSIONS”

The US Congress does not want NASA to consider any manned mission to Mars. They are writing this ban into HR 3093, an appropriations bill that includes NASA's 2008 budget. The bill states that NASA may not pursue "development or demonstration activity related exclusively to Human Exploration of Mars." The language of the bill goes on to say why... "NASA has too much on its plate already, and the President is welcome to include adequate funding for the Human Mars Initiative in a budget amendment or subsequent year funding requests." So, all President Bush has to do is fund Mars missions separately? Is that really the whole story? I suspected not. Congressman Barney Frank (D MA) has pushed to add anti-Mars language to appropriations bills in 2005 and 2006. In 2005, he wrote "I agree about what was said about aeronautics; it is so important. I agree with space experimentation, primarily unmanned. But sending human beings to Mars, which this bill unfortunately endorses, is an extravagance…". In 2006 he moved to add the language, "None of the funds made available by this Act may be used for a manned space mission to Mars." So, it would seem that Congressman Frank wants NASA to be frugal with taxpayers' money, and views any manned Mars mission as a boondoggle.

2NC – Politics Link Wall

**Congress believes that a Mars mission is an unneeded extravagance**

Huang 07’ by Michael Huang, General Engineer at Department of the Air Force, Monday, December 3, 2007, <http://www.thespacereview.com/article/1012/1>

For NASA and Mars, it’s no humans allowed. As reported by the Mars Society and other space enthusiasts, Congress is finally clamping down on the menace of human life on Mars (see [“Why ‘Save Mars’ is worth the effort”](http://www.thespacereview.com/article/998/1), The Space Review, November 12, 2007). The House of Representatives version of [HR 3093](http://thomas.loc.gov/cgi-bin/query/z?c110:h.r.3093:), the bill that determines NASA’s funding for 2008, effectively bans the study of an entire planet: Provided, That none of the funds under this heading shall be used for any research, development, or demonstration activities related exclusively to the human exploration of Mars. The House committee report mentions the proposed prohibition: Finally, bill language is included prohibiting funding of any research, development, or demonstration activities related exclusively to the human exploration of Mars. In 2006, there was an attempt to implement a Mars ban by Rep. Barney Frank (D-MA): None of the funds made available by this Act may be used for a manned space mission to Mars. Frank was also arguing against humans and Mars back in 2005: I agree about what was said about aeronautics; it is so important. I agree with space experimentation, primarily unmanned. But sending human beings to Mars, which this bill unfortunately endorses, is an extravagance… The chief motivation behind the ban is the old, predictable anti-human-spaceflight routine. Robots are better for science, therefore we should have a robot-only space policy.

A Mars mission would encounter tremendous public and political opposition

Lott 11 (Maxim, January 10, FoxNews.com, “To Boldy Go: What Made 400 People Volunteer for a One-Way Mission to Mars?,” http://www.foxnews.com/scitech/2011/01/10/space-volunteer-way-mission-mars/) KA

"There will be tremendous public and political opposition from many members of the public to a mission which can only end in death ... There are people who can do the job, but the question is, will the public let them do it? I think to sell the missions, there has to be at least some chance of the astronauts returning." The journey home Harrison's comments raise an important issue: Why must this be a one-way mission? Why couldn't the brave few come back home? “We prefer the one-way mission as it would drastically reduce costs,” said Dirk Schulze-Makuch, a professor at Washington State University who contributed to the Journal. His plan involves sending supplies to Mars as necessary, but not a return vehicle. "The astronauts would be re-supplied on a periodic basis from Earth with basic necessities, but otherwise would be expected to become increasingly proficient at harvesting and utilizing resources available on Mars. Eventually the outpost would reach self-sufficiency, and then it could serve as a hub for a greatly expanded colonization program."

No one is interested in a manned mission to Mars – many reasons

CUMBRIAN SKY 09’ Mars beckons..? July 21, 2009 http://cumbriansky.wordpress.com/2009/07/21/mars-beckons/

Whoah there, Silver! I’m as keen as anyone to send people off to Barsoom, but let’s all just take a deep breath shall we? How likely is a manned mission to Mars by the 60th anniversary of Apollo 11’s historic landing on the Moon? Well, let’s face facts and stop kidding ourselves: countries aren’t queuing up to go to Mars. China, whatever it says, isn’t going to Mars anytime soon. Europe hasn’t got the technology, the money or the experience to go either. The only nation that could possibly go it alone and send a manned expedition to Mars is the US, and that’s just not going to happen anytime soon. It’s becoming painfully clear that President Obama – whose pre-election support for NASA seems to be evaporating faster than a comet that’s flown too near the Sun – is not going to be the visionary supporter of space exploration we all hoped. It’s not his fault, really; the US economy is a mangled, smoking train wreck that’s been hit by a crashing plane, and it’s going to take a helluva lot of fixing, if it even can be fixed. Obama’s review of NASA is either a) a genuine attempt to get NASA back on track, or b) a cunningly-disguised way of cutting NASA’s budget and ambitious plans without being open about it. Either way, if you’re expectantly watching Twitter for news of a “We choose Mars!” speech from Obama you’re in for a long, long wait. Check your wall planners and calendars for the day hell freezes over – it’ll be a week after that. What about an international mission then? Well – Sorry, I was distracted then. A pig flew past the window. No, come on, get real. That’s a pipe dream. NASA and ESA have just agreed to work together on the unmanned exploration of Mars, and that’s a generation’s worth of budget-balancing work right there, so any joint manned Mars expedition is way, way beyond that. But the real reason why we’re not going to Mars anytime soon has nothing to do with money, and it’s about time we accepted it. It’s the classic “elephant in the room” – a huge, looming, unpalatable truth that no-one in the space advocate or space enthusiast communities wants to acknowledge. THE PUBLIC AREN’T INTERESTED IN SENDING PEOPLE TO MARS. There. I’ve said it. We were all thinking it, but no-one was saying it. Time to face facts. There is, at present, NO public demand – or even support – for a manned mission to Mars. They think it would be a huge amount of money spent for absolutely bugger all practical use. And until space enthusiasts and the space community, and, yes, NASA itself, can give the public a damned good reason for sending people to Mars and not just more rovers, WE ARE NOT GOING TO MARS.

A majority of the public is opposed to a manned mission to Mars

Rasmussen Reports 09’ 51% Oppose U.S. Manned Mission to Mars, Tuesday, July 21, 2009(Rasmussen Reports is an electronic media company specializing in the collection, publication and distribution of public opinion polling information. We poll on a variety of topics in the fields of politics, business and lifestyle, updating our site’s content on a news cycle throughout the day, everyday.) <http://www.rasmussenreports.com/public_content/lifestyle/general_lifestyle/july_2009/51_oppose_u_s_manned_mission_to_mars>

Buzz Aldrin, one of the three U.S. astronauts who first walked on the moon in 1969, says America’s next goal should be sending a manned mission to Mars, but just 29% of Americans agree. Fifty-one percent (51%) of adults are opposed to sending someone to Mars as one of the current goals of the U.S. space program, according to a new Rasmussen Reports national telephone survey. Twenty-one percent (21%) are not sure. Women strongly oppose sending a manned mission to Mars while men are almost evenly divided. (Want a free daily e-mail update? Sign up now. If it's in the news, it's in our polls.) Rasmussen Reports updates also available on Twitter. As the nation celebrates the 40th anniversary of landing men on the moon, 44% of all Americans also believe the United States should cut back on space exploration because of the state of the economy. Thirty-four percent (34%) oppose cuts in space exploration, and 22% are undecided.

1NC – STEM CP

Counterplan Text: The United States federal government should set uniform proficiency standards in science, technology, engineering, and mathematics career and technical education under Title I.

National standards are key to STEM

Libby **Quaid**, Staff writer at the Washington Times, 2-20-200**9**, “Academic standards vary by state, U.S. study finds,” <http://www.washingtontimes.com/news/2009/feb/20/academic-standards-vary-by-state-us-study-finds/>

Some schools deemed to be failing in one state would get passing grades in another under the No Child Left Behind law, a national study found. The study underscores wide variation in academic standards from state to state. It was issued Thursday by the Thomas B. Fordham Institute, which conducted the study with the Kingsbury Center at the Northwest Evaluation Association. The study comes as the Obama administration indicates it will encourage states to adopt common standards, an often controversial issue on which previous presidents have trod lightly. “I know that talking about standards can make people nervous,” Education Secretary Arne Duncan said recently. “But the notion that we have 50 different goal posts doesn’t make sense,” he said. “A high school diploma needs to mean something, no matter where it’s from.” Every state, he said, needs standards that make children college- and career-ready and are benchmarked against international standards. The Fordham study measured test scores of 36 elementary and middle schools against accountability rules in 28 states. It found the schools failed to meet yearly progress goals in states with more rigorous standards, such as Massachusetts. But they met yearly progress goals in states with lower standards, such as Arizona and Wisconsin. Under No Child Left Behind, states have a patchwork of rules that vary from state to state, the study found. No Child Left Behind is misleading, said Chester E. Finn Jr., president of the nonprofit Fordham Foundation. “It misleads people into thinking that we have a semblance of a national accountability system for public schools, and we actually don’t,” he said. “And it’s produced results I would call unfair from one state to the next.”

2NC – STEM Solvency

STEM key to aerospace

**Michaela** Platzer**, Former VP of Research at American Electronics Association, December** 2009**, “U.S. Aerospace Manufacturing: Industry Overview and Prospects,” http://www.fas.org/sgp/crs/misc/R40967.pdf**

The aerospace industry confronts a considerable workforce challenge, which is part of an overall problem in the U.S. science and technology workforce. The industry claims that the United States is not producing enough qualified workers to meet the needs of aerospace companies, and not enough students are opting for science and engineering careers. The number of students receiving engineering bachelor’s degrees dropped by 11% between 1986 and 2006, but more recent data indicate a change in this trend, with engineering degrees conferred to undergraduates up 14% since 2000.46 In addition, the current aerospace industry workforce is aging, with an increase in retirements projected in coming years. According to Aviation Week’s 2009 Workforce Study, the average age of the broad U.S. aerospace and defense industry workforce is 45, with an average age of 43 among engineers.47 Boeing reports the average age of today’s aerospace engineer at 54 years, which is even older.48 A 2008 report by the American Institute of Aeronautics and Astronautics found that 26% of aerospace professionals will be eligible to retire this year, and potential additional retirements of “baby-boom” personnel will create a virtual “silver tsunami” of skilled workforce reduction.49 As a consequence, there is concern among aerospace companies that they are rapidly losing their institutional knowledge base. At the same time, the industry is finding it difficult to replenish its workforce with a younger engineering base. Significant competition for the small pool of technically trained aerospace talent comes from other industries, such as information technology and financial services, and increasingly other countries.

Solves science diplomacy

**Lord and Turekian, 7** (Kristin and Vaughan, respectively. Elliott School of International Affairs, The George Washington University, Washington, DC 20052, USA.; Chief international officer, AAAS, Washington, DC 20005, USA. “Time for a New Era of Science Diplomacy.” <http://www.scienceonline.org/cgi/content/full/315/5813/769#AFF1>)

If we understand public diplomacy in these terms, the role of S&T is pivotal. Scientific education creates citizens with the critical thinking skills necessary for successful participatory governance and competition in the global economy. S&T are linked strongly with economic development (7). Zogby public opinion polls in several Middle Eastern nations, where the United States is particularly unpopular, indicate that S&T are the single most respected elements of American society (8). Social science research indicates that collaboration to solve common problems is one of the best ways to foster positive relations between groups (9).

 STEM is key to power projection

**Gorrell 7** [Ken Gorrell for a New Hampshire-based defense contractor “U.S. Math Woes Add Up to Big Trouble,” Apr 8 <http://www.massachusetts.edu/stem/stem_math_woes.html>]

There is a war raging all around us, a war the United States cannot afford to lose. No one has died in this war, and no one is likely to. But there are casualties. The injuries are mental rather than physical, but the suffering is lifelong. I'm not referring to the global war on terror or the war on drugs. I'm talking about the mathematics war. While the United States is the world's only superpower militarily, mathematically we are a second-rate power, and losing ground every year. In the math war, the superpowers are Singapore, Korea, Japan, Taiwan, Hong Kong and Belgium. In assessment after assessment, those countries prove that their weapons - fourth, eighth and 12th graders - are more accurate and advanced than our own. Their strategies are more focused. Their national resolve is stronger. The debate in this country about mathematics education and curricula has been termed the math wars, but it is in reality a generally civil disagreement. There are two distinct sides in the debate, which for simplicity's sake I'll label "reformers" and "traditionalists." Because I subscribe to the BLUF principle - Bottom Line Up Front - I'll tell you now that I side with the traditionalists. In this forum, I can't possibly present all the relevant information necessary for you to make an informed decision on this issue. My goal is to pique your interest so that you will want to become better informed, will want to take a stand. Why? Because the issue is critical to our nation's ability to remain an economically advanced world power. Let's face it: Math whizzes in Taiwan or Belgium will get good jobs in the global economy, but they are not going to grow up to become taxpaying supporters of the American baby-boomers' social safety net. Only American math whizzes can be counted on to do that. We need to grow our own. A bit of context is important. The reformers, representing the education establishment, believe learning "process" is more important than memorizing core knowledge. They see self-discovery as more important than getting the right answer. For them it's the journey, not the destination. Traditionalists, consisting mainly of parent groups and mathematicians, advocate teaching the traditional algorithms. They advocate clear, concrete standards based on actually solving math problems. The destination - getting the right answer - is important to traditionalists

1NC – Robots CP

The United States Federal Government should substantially increase the remotely piloted exploration of Mars.

Robots are the best way to explore Mars – they’re faster, cheaper and safer

Beste 01’ By Steven Den Beste (Steven Den Beste a software engineer, nearly always doing embedded work. I've been in many industries, but deep down it was all the same: microprocessors controlling custom hardware working in real time. I've worked on test and measurement equipment, factory automation systems, medical equipment, wide area networks, and now on cellular equipment.) 2001/07/26. <http://www.denbeste.nu/essays/mars.shtml>

We should not plan a manned mission to Mars For the foreseeable future, anything we could do with a manned mission can be done faster, cheaper and much safer with robots. There are just too many unknowns in the technology which would be required to send humans. Such a mission must necessarily take at least two years, for orbital reasons. We do not know how to build such a craft which won't break down in that interval. Worse, we do not have the capability of reasonably building a craft which could carry with it to Mars enough fuel to get back. All the current proposals involve manufacturing the fuel for the return flight on Mars before the return trip begins. This is extremely scary; if it doesn't work, there's no return. And it means that the craft carrying the people must land almost exactly on top of the system which has manufactured the fuel; if they miss by twenty miles, they're dead. No matter how it's done, it would be grossly expensive. Humans are large and fragile and consume enormous amounts of resources. Because of this, it's only possible for us to mount a single mission, with a landing at one place. We'd learn a lot about that one place (a radius of at most twenty kilometers around the landing site), but Mars is large and varied. It has the surface area of North and South America combined. Turn it around and assume we were Martians attempting to explore the earth. If our one and only landing happened in the Yukon, how much would we learn about the Mojave Desert, or the Amazon rain forest, or the Mississippi delta? Robots are better. Robots are smaller, and while it's uncomfortable if we lose one, it's not a tragedy. Robots are current technology; they already work and we've already succeeded with them. They take a one-way trip, and they require no life-sustaining resources while they travel between the planets, except for a small amount of renewable electricity from photocells. They can sustain dozens of gravities during reentry, making reentry far easier to engineer. (And even at that, we've had trouble with that kind of thing.) Because we can build and send many robots for the cost of a single manned mission, we can land them all over Mars, thus getting a better idea of the entire sphere, instead of a very concentrated look at one microscopic piece of it.

2NC – Robots Solvency

Robots would maximize the benefits and minimize the risks

Christianson 11’ by J Scott Christianson, High-tech entrepreneur, trainer and college instructor. Posted on March 11, 2011, <http://thefreerangetechnologist.com/2011/03/manned-mission-to-mars/> “We can’t afford manned mission to Mars”

The American public should have a better chance of receiving a decent return on its investment in NASA. Perhaps the most compelling argument for not proceeding with a manned mission to Mars is NASA’s great success with unmanned missions to Mars and other planets. These “smaller, cheaper, faster” space probes have been extremely useful and cost-effective and have proved themselves capable of performing real science or, at the very least, capable of being the on-the-ground technicians for scientists safely located on Earth. A better use of NASA’s budget for exploration and planetary science would be to fund several smaller unmanned missions to explore Mars and other planets, thus spreading out both the risks and the rewards. While some of these are bound to fail, most of these little probes would be successful, and several would be successful beyond their original design. The Spirit and Opportunity probes continue to operate on Mars some five years past their original mission of 90 days. Even Voyager 1, launched in 1977, is still operating some 30 years later. Investing in several smaller missions with clear scientific goals offers much more reward for the risk.

Robots can do better scientific research without risking lives

Beste 01’ By Steven Den Beste (Steven Den Beste a software engineer, nearly always doing embedded work. I've been in many industries, but deep down it was all the same: microprocessors controlling custom hardware working in real time. I've worked on test and measurement equipment, factory automation systems, medical equipment, wide area networks, and now on cellular equipment.) 2001/07/26. <http://www.denbeste.nu/essays/mars.shtml>

It's been argued that the advantage of humans is versatility, and that if human explorers find something unexpected they have the ability to adapt and investigate it. This argument doesn't wash, because robots can do the same thing. It just takes longer. If a robot spots something unusual, we can send another robot four or six years later designed specifically to check it out. The result is the same, and I'm not in a hurry. For the same monetary investment, we can get far more and far better science done with robots than with a manned mission, because we won't be spending vast sums to transport oxygen, food and water to keep fragile humans alive during a long voyage. And it will be better science, because it will be spread all over the globe. It will be less glamorous, less spectacular. But those are dreadful reasons for risking the lives of precious humans. And if we send humans, everything has to work perfectly the first time.

Robonauts are less expensive, more effective, and save lives

Rahls 5 (Chuck, science writer @ Physorg.com, “Manned vs. Unmanned Space Exploration (Part 1)”, 11/23/5, http://www.physorg.com/news8442.html) JPG

Robotic space exploration has become the heavy lifter for serious space science. While shuttle launches and the International Space Station get all the media coverage, these small, relatively inexpensive unmanned missions are doing important science in the background. Most scientists agree: both the shuttle (STS – Space Transport System) and the International Space Station are expensive and unproductive means to do space science. NASA has long touted the space station as the perfect platform to study space and the shuttle a perfect vehicle to build it. However, as early as 1990, 13 different science groups rejected the space station citing huge expenses for small gains. Shuttle disasters, first the Challenger followed by Columbia’s catastrophic reentry in February, 2003, have forced NASA to keep mum about crewed space exploration and the International Space Station is on hold. The last important media event promoting manned flight was Senator John Glenn’s ride in 1998 – ostensibly to do research on the effects of spaceflight on the human body, but widely seen by scientists as nothing but a publicity stunt. Since each obiter launch cost $420 million dollars in 1998, it was the world’s most expensive publicity campaign to date. Proponents say the publicity is needed to support space program funding. Scientific groups assert the same money could have paid for two unmanned missions that do new science - not repeat similar experiments already performed by earlier missions. Indeed, why do tests on the effects of zero gravity on humans anyway when they can sit comfortably behind consoles directing robotic probes from Earth? Space is a hostile place for humans. All their needs must be met by bringing a hospitable environment up from a steep gravity well, the cost of which is enormous. The missions must be planned to avoid stressing our fragile organisms. We need food, water and air requiring complicated and heavy equipment. All this machinery needs to be monitored, reducing an astronaut’s available time to carry out experiments. Its shear weight alone reduces substantially the useful payload. The space shuttle is a hopelessly limited vehicle. It’s only capable of reaching low earth orbit. Worse, the space station it services is placed in the same orbit – one that is not ideal for any type of space science. Being so close to the Earth, gravity constantly tugs at the station making it unstable for fabrication of large crystals – part of NASA’s original plans but later nixed by the American Crystallographic Association. To date, more than 20 scientific organizations worldwide have come out against the space station and are recommending the funds be used for more important unmanned missions. NASA has gone so far as to create myths about economic spin-offs from manned spaceflight - the general idea being the enormous expense later results in useful technology that improves our lives. Items like Velcro, Tang and Teflon – popularly believed to have come from the space program or invented by NASA. There is only one problem: they did not. Shuttle launches are expensive: very expensive. Francis Slakey, a PhD physicist who writes for Scientific American about space said, “The shuttle’s cargo bay can carry 23,000 kilos (51,000 lbs) of payload and can return 14,500 kilos back to earth. Suppose that NASA loaded the Shuttle’s cargo bay with confetti to be launched into space. If every kilo of confetti miraculously turned into gold during the return trip, the mission would still lose $270 million.” This was written in 1999 when a shuttle flight cost $420 million. Currently, it’s estimated that just the shuttle program average cost per flight has been about $1.3 billion over lifetime and about $750 million per launch over its most recent five years of operations. This total includes development costs and numerous safety modifications. That means each shuttle launch could pay for 2 to 3 unmanned missions. While recent failures have more than quadrupled success rates for unmanned missions, they still have managed to keep space programs alive – not just for the US, but Russia, Japan and China as well. Mars Pathfinder and Mar Exploration Rovers have succeeded beyond the expectations of their designers and continue to deliver important data to earthbound scientists. When the successful Deep Impact mission smashed into comet Temple 1 in July, 2005 it released a cloud of debris that may help understand comet formation and composition. Future robotic missions promise to deliver even more crucial data to widely divergent fields. TRW is now building Hubble’s successor, the Jack Web Space Telescope (formally the Next Generation Space Telescope). Slated for launch in 2010, it will be placed in L2 orbit – a much better position to study the stars. At L2, or Lagrange Point 2, it needs only one simple shield instead of the complicated cooling system required by Hubble because of its nearness to earth. It will also be out of range of the space shuttle should anything go wrong as did on the Hubble mission. As computers become more capable and reliable, robots of greater complexity will be built to handle even the most challenging assignments. The time for humans to explore space may have come…. And, indeed, may have gone forever.

1NC – NASA Cred Net Benefit

**1) NASA’s credibility is low now because of failed shuttle attempts and misplaced goals, putting funding for key programs at risk – another failed mission risks cuts to vital NASA programs**

David 06’ Space Shuttle: NASA’s Risky, High-Stakes Gamble by Leonard David, Senior Space Writer Date: 28 June 2006 Time: 07:11 AM ET. <http://www.space.com/2527-space-shuttle-nasas-risky-high-stakes-gamble.html>

**NASA credibility and space funding** "In truth, the problems that NASA continues to experience with its shuttle and the International Space Station program--really the only reason the shuttle is still flying--goes back at least to the [Challenger disaster](http://www.space.com/1990-remembering-challenger-shuttle-disaster-refocus-nasa.html) in 1986," Pelton said. Two major national space commissions back then--one looking into the Challenger accident, the other delving into the future of the American space program--noted that the shuttle was indeed becoming "obsolescent" and that it had to be replaced by another vehicle within at least 15 years, or 2001, Pelton noted. "Instead of developing alternative plans for the launch of International Space Station components in smaller and more modular parts at that time," Pelton said, "NASA pushed ahead without developing a new vehicle, nor developing a back-up plan. Now, not only is NASA's credibility and space funding at risk, Pelton continued, but also at risk are the agency's international partners that are engaged in the $100 billion station program. "The now 'tar baby-like tandem' of the ISS and the space shuttle has done great harm to space programs around the world." NASA has over-invested in both the shuttle and station initiatives, Pelton said, taking away money from programs that truly matter to the United States and indeed the world.

2) Accidents empirically kill NASA’s credibility

Kauffman 2000 James Kauffman is an associate professor of communication studies at Indiana University Southeast. Adding fuel to the fire: NASA’s crisis communications regarding Apollo 1 James KauffmanCorresponding Author Contact Information, a Department of Communication Studies, Indiana University Southeast, 4102 Grante Line Road, New Albany, IN 47150 USA Available online 2 February 2000.

In January 1967, NASA faced its first major crisis when a flash fire killed the three-man crew of Apollo 1 during a routine, preflight test. Unprepared for a fire on the ground and desperate to manage its image, the space agency responded poorly to the crisis: it waited 2 h to report the deaths; it communicated inaccurate, contradictory, and purposefully misleading information to Congress and the media; it lied, and refused to release information, to congressional committees investigating the fire; and it stacked the official board investigating the fire with its own personnel and people who had close ties to the agency. NASA’s poor crisis communications exacerbated the tragedy, tarnishing its image, hurting its credibility, and prolonging the crisis. This study provides an example of an unsuccessful response to a crisis and demonstrates how much damage can occur when an organization fails to communicate openly and honestly.

3) A Mars mission is riddled with risks – probability of astronaut death is near certain

Carey 05’ by Bjorn Carey, Staff Writer Senior Associate Editor at Popular Science educated at New York University and Bowdoin University , Date: 01 November 2005 Time: 06:27 AM ET <http://www.space.com/1732-martian-dust-major-risk-manned-mission.html> “Martian Dust Major Risk to Manned Mission”

This past weekend, Mars swung closer to Earth than it will for the next decade, and coincidentally a dust storm kicked up and gave skywatchers something special to view. While the red planet looks close enough to grab through a telescope, NASA doesn’t plan to send people there until after 2020, and even that far-off date could be pushed back by something as seemingly insignificant as dust. According to a NASA report that evaluates the risks of sending a manned mission to Mars, Martian dust poses as one of the biggest potential problems. Compared to here, dust on Mars is thought to be larger and rougher, like the dust that covers the Moon. When Apollo astronauts landed there, they were covered in just a few minutes. Within hours, rough lunar dust had scratched up lenses and degraded seals. While the lunar stays were short, if astronauts make the six-month journey to Mars, they’ll likely be expected to stay a while. That would give potentially hazardous dust plenty of time to accumulate in equipment, cause airlock malfunctions, or even infiltrate astronauts’ lungs. “Martian dust is a number one risk,” says Jim Garvin, NASA chief scientist at the Goddard Space Flight Center. “We need to understand the dust in designing power systems, space suits and filtration systems. We need to mitigate it, keep it out, figure out how to live with it.” Perfect dust storm Dust on Mars doesn’t just sit on the ground – it gets furiously swept about in dust devils and massive dust storms. This past weekend skywatchers could easily spot an 800-mile-wide dust storm as it spun across Mars at 35 mph. Every once and a while, Mars experiences the “perfect dust storm,” where powerful winds kick dust up into the atmosphere where it is spread around until it eventually clouds the entire planet. One of these rare storms would obviously make it difficult for a spacecraft to land or take off from the planet’s surface, but even smaller storms like the one this past weekend are a substantial mission risk, making atmospheric wind forces the number two mission risk, according to the report. While dust and wind are two major mission risks, the team of scientists that contributed to NASA’s Mars Exploration Program Analysis Group report believe that future orbiters and robotic missions could help us better understand the planet and reduce these risks. “We could observe Martian wind speeds at different altitudes, which is vital both for targeting accuracy when a mission lands, and for reaching the right orbit when the mission departs,” said David Beaty, Mars Program Science Manager and the report’s lead author. Lively dust? Although signs of life haven’t been discovered on Mars, that might be a different story in 25 years. The possibility that microbial organisms, or their remains, could exist in Martian soil is ranked as the number three mission risk. Having never been exposed to these forms of alien life, they could stand as a substantial health risk to astronauts. The biggest concern to scientists, though, is that these life forms might hitch a ride back to Earth, where they could replicate, prosper, and do unknown damage. Scientists say they need more robotic missions and soil sample return to truly evaluate this risk. Even a couple pounds of Martian dirt would be of tremendous value, Beaty said. Bodily harm? Once on Mars, exposure to radiation is a relatively low risk, even for a long mission, according to the report. This evaluation is supported by data from the Mars Odyssey spacecraft. However, during the year spent traveling between planets, astronauts will not be protected by a planet’s atmosphere and will be exposed to a greater dose of radiation. NASA says this amount falls within the lifetime safety limits, and protective spacesuits and ships are in the works. Not mentioned in the report, however, are the physiological effects to bone and muscle from time spent in reduced gravity environments. Astronauts returning from long missions on the International Space Station have suffered massive muscle and bone loss. These losses would be slowed by Mars’s gravity, which is 3/8 of Earth’s, but it could be disastrous if a crewmember broke their leg during the mission. Scientists are currently exploring methods of slowing muscle and bone deterioration, including an exercise device that creates its own gravity. Useable water? The roundtrip journey to the red planet and back will take about a year. The mission spacecraft can carry only so much water. Every gallon takes up space that could be used for other supplies or equipment and raises the total mission cost. However, reducing the water load on the spacecraft could force the astronauts into a situation where they would run out of water before they returned to Earth, especially if their stay on Mars is longer than anticipated. For a long mission, potable water in some form that’s accessible near the landing site could address this risk, scientists write in the report. Future orbiter and robotic missions could help identify a region on Mars where water might be available to astronauts, which could reduce the risk of astronauts running out of water. Water is also a source of breathable oxygen, which, for a yearlong stay on the planet, would be expensive to transport.

**4) Trades Off threaten satellites that track Natural Disasters and Global Warming**

WEST ’06(Larry; “Budget Cuts and Mismanagement Place Environmental Satellites at Risk,” http://environment.about.com/b/2006/03/06/budget-cuts-and-mismanagement-place-environmental-satellites-at-risk.htm, 3/5, SO)

Budget cuts and cost overruns are threatening the current integrity and future existence of a network of U.S. environmental satellites that help scientists forecast hurricanes, droughts and floods, and predict global warming, according to a news story by the Associated Press. "The system of environmental satellites is at risk of collapse," said Richard A. Anthes, president of the University Corporation for Atmospheric Research and chairman of a National Academy of Sciences committee that advises the federal government on developing and operating environmental satellites, in an interview with the Associated Press. "Every year that goes by without the system being addressed is a problem." Satellites Give Warning Before Disasters Strike Scientists say that neglecting the environmental satellites orbiting the Earth could have severe human consequences. If the environmental satellites aren’t there to provide up-to-date information about approaching natural disasters and threats from other severe climate and weather conditions, then scientists will be unable to warn the people most likely to be harmed and the public safety officials who must try to protect them. Yet, at a time when the United States is still recovering from the worst hurricane season on record, when Africa and South America are experiencing devastating droughts, and when regions worldwide are feeling the first effects of global warming, NASA is managing its budget as though extreme weather and natural disasters were passé. In an effort to save money, NASA has canceled plans for at least three earth-observing satellites, and cost overruns have delayed a new generation of weather satellites until 2010 or 2012. The Government Accounting Office has called the entire U.S. environmental satellite effort “a program in crisis.” Balancing Budgets and Priorities NASA Administrator Michael Griffin has the difficult job of trying to stretch his shrinking budget to cover the cost of operating the space shuttle and the space station as well as space exploration and programs such as the environmental satellites. NASA’s proposed budget for 2007 includes $6.2 billion for space shuttle and space station operations, and $4 billion for planning future missions to the moon and Mars, but only $2.2 billion for satellites that help scientists observe the Earth and the sun. "We simply cannot afford all of the missions that our scientific constituencies would like us to sponsor," Griffin told members of Congress when he testified before the House Science Committee on Feb. 16, 2006. Perhaps not, but it seems as though humanity’s critical need for the information that environmental satellites provide should place them higher on NASA’s list of priorities.

5) Natural disasters will cause extinction.

SID AHMED ‘05 (Mohamed, Managing Editor for Al-Ahali, “The post-earthquake world”, Issue #724, <http://weekly.ahram.org.eg/2005/724/op3.htm>)

The human species has never been exposed to a natural upheaval of this magnitude within living memory. What happened in South Asia is the ecological equivalent of 9/11. Ecological problems like global warming and climatic disturbances in general threaten to make our natural habitat unfit for human life. The extinction of the species has become a very real possibility,whether by our own hand or as a result of natural disasters of a much greater magnitude than the Indian Ocean earthquake and the killer waves it spawned. Human civilisation has developed in the hope that Man will be able to reach welfare and prosperity on earth for everybody. But now things seem to be moving in the opposite direction, exposing planet Earth to the end of its role as a nurturing place for human life. Today, human conflicts have become less of a threat than the confrontation between Man and Nature. At least they are less likely to bring about the end of the human species. The reactions of Nature as a result of its exposure to the onslaughts of human societies have become more important in determining the fate of the human species than any harm it can inflict on itself. Until recently, the threat Nature represented was perceived as likely to arise only in the long run, related for instance to how global warming would affect life on our planet. Such a threat could take decades, even centuries, to reach a critical level. This perception has changed following the devastating earthquake and tsunamis that hit the coastal regions of South Asia and, less violently, of East Africa, on 26 December. This cataclysmic event has underscored the vulnerability of our world before the wrath of Nature and shaken the sanguine belief that the end of the world is a long way away. Gone are the days when we could comfort ourselves with the notion that the extinction of the human race will not occur before a long-term future that will only materialise after millions of years and not affect us directly in any way. We are now forced to live with the possibility of an imminent demise of humankind.

2NC – Link Extensions

Empirically when NASA fails it hurts its credibility with the public

NASA in crisis: The space agency's public relations efforts regarding the hubble space telescope **James** Kauffman James Kauffman is a member of the faculty of the Department of Speech Communication at Indiana University Southeast, in New Albany, IN, USA Available online 4 April 2002.

This study examines NASA's public relations efforts regarding the Hubble Space Telescope in 1990. It proposes that NASA's poor public relations exacerbated the problems caused by the telescope's spherical aberration. To a great extent, NASA brought the crisis on itself. It oversold the telescope before it was deployed; it failed to developed a clear plan for dealing with first-light images and early release of photographs; it provided misleading flight reports; and it reported prematurely and incorrectly that the Hubble could not produce photographs. NASA's poor handling of the Hubble, coupled with its poor handling of the Challenger explosion, suggests the agency must improve its crisis communications if it hopes to maintain the trust and support of Congress and the American people into the twenty-first century.

NASA faces budget cuts that threaten the earth sciences necessary to protect life on the planet

House Science Committee 2006 "How Severe Budget Cuts May Threaten the Vitality of NASA Earth SciencePrograms"

The House Science Committee initiated what may be a series of hearings that question NASA's plans to cancel or delay a number of Earth Science satellite missions. For Fiscal Year (FY) 2006, NASA has proposed to spend $1.37 billion for Earth Science research, a cut n 8% from FY 2005 levels, and a 24% cut in real dollars from FY 2004, according to Science Committee ranking member Bart Gordon. A day before the hearing, the National Research Council (NRC) released a report, which found that tight budgets at NASA and other agencies are threatening the value and preeminence of U.S. earth observing systems. Concerned with these findings, committee members called on senior U.S. scientists to offer testimony regarding NASA's role in meeting future scientific priorities. Committee Chairman Sherwood Boehlert, Representative Gordon, and other members of Congress have been concerned that cuts to Earth observing missions are due to NASA's strategic reorientation around the President's "Vision for Space Exploration." In his opening remarks, Chairman Boehlert challenged the apparent shift in priorities. "The planet that has to matter most to us is the one we live on," he said. "You'd think that would go without saying." Gordon added that under the proposal, Earth Science and Aeronautic Programs would absorb 75% of the overall cuts that NASA must sustain to meet tight budget demands. In comparison, exploration programs would only account for 10% of the overall cuts.

**2NC – Internal Link Extensions**

There are massive risks associated with a Mars mission – laundry list

Anupam 07’ , Anupam is a software engineer, Mar 14 2007, <http://www.spacescan.org/entry/top-10-risks-in-manned-mission-to-mars/> “Top 10 risks in manned mission to Mars”

Risk 3: Solar Radiation:

Such inter-planet travel missions mean that humans and the spacecraft will be continuously subjected to solar radiation. The two cosmic sources of radiation that could impact a mission outside the Earth’s magnetic field are solar particle events (SPE) and galactic cosmic rays (GCR). These radiations can cause a number of health-related problems, but the primary concern is related to the increased risk of cancer induction in astronauts.

Risk 4: Lack of Real-time transmission from Mission Control

Considering the distance between Mars and Earth it takes 20 minutes for a signal to travel from Mars to Earth. Astronauts will have to wait for 40 minutes to get a reply of their query from Mission Control. This means that the astronauts will have to cater to any instant damage or problem in the space craft or the Mars Lander or they will have to wait for 40 minutes for a solution from Mission Control. 40 minutes can be fine for a normal problem but if there is some severe problem that needs immediate attention then the crew is at risk.

Risk 5: Fear of collision with an asteroid:

NASA has already commented that the space agency is lacking funds to protect Earth from ‘Killer Asteroids’. We have not been able to track all the near-Earth asteroids that could be on a collision course with Earth. Tracking the asteroids that will be on the collision course with the spacecraft is a dream till now. A collision with an asteroid which is as small as a golf ball could end the mission instantly.

Risk 6: Effects of Low-gravity:

Astronauts will have to remain in Zero-gravity environment till they reach Mars and on reaching Mars they will be subjected to low gravity conditions. Low-gravity presents challenges such as near total damage of the human musculature and the immune system. After returning from such a long mission astronauts will have to cope up to the gravity of Earth which could prove to be fatal.

Risk 7: Effects of continuous stay in low temperature:

The temperature on Mars ranges from -129° C to 0° C. Living in such low temperatures could have a disastrous effect on blood circulation and can even cause hypothermia.

Risk 8: Risk from Martian Dust:

Unlike the dust on Earth, the dust on Mars is thought to be larger and rougher similar to the dust on Moon. If astronauts make a long trip to Mars they are expected to stay there for some months. This would give potentially hazardous dust plenty of time to accumulate in equipment, cause airlock malfunctions and even infiltrate astronaut’s lungs. Moreover dust on Mars doesn’t just sit on the ground; it gets furiously swept about in massive dust storms. Such massive dust storms can make the conditions even worse.

Risk 9: Physiological effects on Humans:

Humans can have adverse mental effects of the long journey and the stay on Mars. The loneliness, tensions with crewmates and a daily battle to maintain fitness can start playing on the minds of astronauts. We cannot depend on trips to Moon to determine human behavior in adverse conditions as on Mars because the trips to moon are comparatively shorter than the trips to Mars. Astronauts will not be able to talk to the family members as they do in ISS because they will have to wait for 45 minutes to pass on their conversation and wait for another 45 minutes to get the reply. All this can show its effects on humans who can start acting in an abnormal way.

Astronauts would face a plethora of health risks

Niiler 11’ By Eric Niiler, Award-winning journalist and newsroom manager has delivered high-quality radio, print and online reports from Capitol Hill to Baja California to Fallujah. Now reporting Washington-based stories for Discovery News, The Washington Post and PRI/BBC's "The World" public radio program. Executive Editor at Capitol News Connection ,Mon Jul 18, 2011 07:00 AM ET <http://news.discovery.com/space/mission-to-mars-health-risks-110718.html>

When NASA's 30-year Space Shuttle Program ends on Thursday as Atlantis touches down for the last time, space-watchers will be looking toward our next step into space. We've already 'done' the moon, but Mars still beckons like some interplanetary Brigadoon; visible through the eyes of clever little rovers and orbiters, but just beyond the reach of human footsteps. Despite several decades of research and development, a long-duration voyage to Mars is still on the drawing board. Putting aside the enormous financial costs of an interplanetary mission, there are still major engineering and physiological hurdles to overcome. WIDE ANGLE: Exploiting Mars Radiation The combined effects of background cosmic rays from extragalactic sources and extreme radiation events from the sun make space travel too hazardous for an estimated six months there and six months return. "The estimate now is you would exceed acceptable levels of fatal cancer," said Francis Cucinotta, chief scientist for NASA's space radiation program at the Johnson Space Center in Houston. "That's just cancer. We also worry about effects of radiation on the heart and the central nervous system." Cucinotta says these estimates do take into account protective shielding around a crew vehicle, probably some form of polyethylene plastic. Lead shields actually create secondary radiation when struck by cosmic rays, while water, perhaps the best form of protection, would have to be several meters thick to get enough protection. ("Houston calling Water Balloon 1, do you copy?") Lead and water, in any case, are very heavy for the quantities that would be required, making them an expensive shielding to launch. Solution: Pick astronauts that have never smoked, never been around smokers, and have a built-in genetic resistance to radiation damage. "We didn't know about this (ability) five or ten years ago, we should have an answer in another ten or 15 years," Cucinotta said. Genetic protection plus a special shielded shelter may do the trick. SEE ALSO: The (Space) Drugs Don't Work Tumbleweed WATCH VIDEO: New concepts for Mars-probing rovers would use Martian wind to move around the planet. Bodies Without Gravity Let us count the ways that the human body falls apart without gravity: 1) Bone loss of one percent per month. 2) Fainting spells (women more than men) after re-entering a gravitational field. 3) Cognitive problems including Alzheimer's-like symptoms. 4) Weakness and lack of cardiovascular fitness. 5) Muscle atrophy. All of these medical conditions would make it tough for the crew to build a shelter when they land on the Red Planet, for example. "What happens if they land on Mars and try to lift an object that's fairly or reasonably heavy, they could herniate their discs," said Alan Hargens, an orthopedic surgeon at the University of California San Diego who studies the effects of gravity on astronauts. "One of the main issues is that when they arrive at Mars, there's nobody there to take care of them. If they have some issue due to de-conditioning in that six month period, they'll definitely have a problem." SEE ALSO: Mars Voyage Could Leave Crew Dangerously Weak Solution: Lots of time on a treadmill while in microgravity conditions and some kind of artificial gravity may help, but not eliminate the risk. The crew needs either a small unit inside the ship or a vehicle design that rotates around a central pivot point (think 2001: A Space Odyssey). Hargens said a rotating arm of one-kilometer diameter will produce the equivalent of the gravity felt on the Earth at sea-level. Smaller centrifuges have produced nausea among astronauts, according to Hargens, and take up a lot of space inside a cramped vehicle. Another possibility is a special compression suit that forces body fluids into the legs, and helps maintain fitness. Cabin Fever Put six or seven people in a confined space for 18 months, send them to a place nobody's been before, with no way to escape, is likely to produce stress, tension and perhaps even severe psychiatric problems, according to NASA’s 2009 Human Research Program report. Based on studies in Antarctica and other isolated environments underwater, the report cited the risk of "increased human performance errors due to sleep loss, fatigue, work overload, and circadian desynchronization; and, increased errors due to poor team cohesion and performance, inadequate selection/team composition, inadequate training, and poor psychosocial adaptation." Cosmonaut squabbles aboard the Russian Mir space station brought one mission home ahead of time, while NASA has also reported crew disputes among its astronauts. Solution: pick the astronauts very carefully ahead of time. NASA is also looking at special voice and facial movement monitors to diagnose early signs of stress before they turn into a big fight. An on-board counselor (a la Star Trek’s Deanna Troi) may help as well, but who counsels the counselor? SEE ALSO: 'Mars Mission' Crew to Spend 520 Days in Isolation Food Only vegetarians will be allowed on a Mars trip, since meat can't be preserved in space. Food provides a natural morale boost for the crew, and proper nutrition wards off oxidative damage to the astronauts' bodies. However, studies show that radiation can damage the vitamins in food supplies, and the loss of even one vitamin in the food chain could cause serious health effects over a long trip. Little is known about the long-term effects of radiation on food supplies, since International Space Station (ISS) crews have been partially sheltered by Earth's magnetosphere. It's expected that the crew will have to grow its own food in some kind of greenhouse, something researchers already do at the South Pole during winter-over. Hardware/Propulsion At closest approach, Mars is about 35 million miles from Earth, but that figure increases six-fold depending on the alignment of the two planets' orbits.

2NC – Impact Extensions

Funding is key to the economy and preventing conflicts over dwindling food and water

COLLETON 4/20 (Nancy; “Budget Cuts Put ‘Environmental Intelligence’ at Risk,” Space News, 2011, <http://spacenews.com/commentaries/110418-cuts-environmental-intelligence-risk.html>, JA)

U.S. scientific agencies are bracing for big budget cuts, and America’s environmental information supply chain is in grave danger as a result. The timing of this potential dumbing down of “environmental intelligence” couldn’t be worse in light of the upward trend in natural disasters, like the recent catastrophic earthquake and tsunami in Japan and last year’s deadly Russian heat wave. The United States alone experienced a record 247 natural disaster events in 2010, according to Munich Re. Meanwhile, international competition is increasing as China has announced a plan to launch 13 weather satellites in the coming decade. And, report after report cautions about the destabilizing impacts of increasingly insufficient water resources, given the linkages between drought, wheat production, the world food crisis and civil unrest. There’s no doubt that tough choices must be made in tough economic times. These choices, however, must not compromise our nation’s ability to collect and deliver accurate and timely information about our world that enables governments, communities, companies and individuals to make sound decisions that save lives, protect and grow the economy, strengthen national security and improve our quality of life. Environmental intelligence is the result of a critical but fragile supply chain that begins with science and observations — ground sensors, ocean buoys, stream gauges, satellites, etc. — and ends with actionable information that allows decision-makers to better respond and adapt to a changing planet. That supply chain is threatened, however, by broad cuts to the nation’s Earth-observing programs. Most of us benefit from the environmental information supply chain almost every day in the form of that cherished weather report we consult before going to work or sending the kids off to school. The weather information supply chain begins with NASA research and development, which leads to technology that is transitioned to the National Oceanic and Atmospheric Administration (NOAA) for operational purposes. NOAA satellites and other instruments collect and store environmental data that are fed into complex computer models. That model output fuels forecasts provided by NOAA’s National Weather Service and the $1.7 billion private-sector weather services industry, which in turn delivers value-added weather information and alerts to media outlets, farmers and agricultural companies, transportation authorities, and even directly to your smartphone. What many people do not realize is that the supply chain process that produces that much-valued weather report is years to decades in the making and is threatened by looming gaps in critical data due in large part to funding deficits combined with satellites operating beyond their planned lifetimes, with replacements either not ready or not planned. These same gaps also threaten a similar supply chain process — sometimes involving different players such as the National Science Foundation and the U.S. Geological Survey — that produces a variety of vital information products related to oceans, drought, volcanoes, earthquakes, tsunamis, forests, polar ice, climate and more. Therefore, each time Earth science investment is reduced, the nation’s ability to monitor and forecast tornadoes and tsunamis, for example, or provide data for the emerging wind energy market is threatened. And it’s not just the satellites and other instruments that monitor the planet that are jeopardized by slash-and-burn budget cuts, but also critical improvements in computing capabilities, efforts to integrate data sets across numerous federal agencies whose formats are incompatible with one another, and the mechanisms by which the public and private sectors deliver data to users and decision-makers in a timely manner. Significant sacrifices are an unfortunate reality in the face of hard economic challenges. But the proposed U.S. budget cuts lack a nuanced approach that recognizes potential long-term impacts and costs that would far outweigh the benefit of any short-term savings. They also illuminate another important issue: No long-term national vision exists for these vital programs that enable us to see how the planet is changing — to capture and deliver information needed by energy companies to better manage resources, emergency workers to respond to a hurricane or earthquake, military planners to prepare for friction caused by drought-induced food shortages, or government officials to respond to disasters such as the Deepwater Horizon oil spill. Perhaps the question shouldn’t be what can we cut, but rather how do we better invest to better protect our citizens and grow the economy? In a time of national budget woes, it’s fantasy to think that any one agency or program is immune to cuts. We must beware, however, that cutting too deep or without care or a plan will almost certainly lead to inadequacies in the information needed to make sound decisions related to our environment, which impacts every sector of the U.S. economy, today and for many years and decades to come.