stated, "with the issue of habitability in the bag, we can undertake a more systematic search for a brighter carbon signal."

But the scientists also cautioned that, even if no organics are found, it does not mean that life was never resident on Mars. Complicated compounds, such as organics, degrade over time, it was pointed out, especially under the constant bombardment of radiation on the Martian surface. It is possible that life, and organics, were present in Mars' past, but have been erased, at least from the surface, over time.

Grotzinger also stated that even if organic compounds are not found during this mission because they were not there in the past, the Gale Crater site could still have supported life, because inorganic carbon can be used as food by a microbe. "What we have learned in the last 20 years of modern microbiology," Grotziner said, "is that very primitive organisms … can derive energy just by feeding on rocks."

Following a month of conjunction throughout April, where the relative position of the Sun between the Earth and Mars prevents robust communications between the two planets, Curiosity is slated to start its multimonth trek to Mount Sharp. The 3-mile-high mountain was created when a meteorite struck the planet, excavating Gale Crater and throwing subsurface material up in to the center.

From orbit, and now, from stunning photos taken by Curiosity, it is clear that Mount Sharp has a story to tell. The base of the mountain will contain the oldest excavated material in the crater, and its sedementary layers, laid down through successive periods of flowing water, should reveal more of the chemical, geologic, hydrologic, and atmospheric history there. If Curiosity is able to climb up the side of Mount Sharp, eons of time of Mars' history will be revealed.

Alex Alishevskikh, cc-by-sa-2.0

The meteor strike at Chelyabinsk, Feb 15, 2013.

The Strategic Defense of Earth: Unanswered Questions

The following is an open letter to the US Congress, prepared in response to the two Congressional Hearings on planetary defense held in March:

- *"Threats from Space: A Review of U.S. Government Efforts to Track and Mitigate Asteroids and Meteors, Part 1"—March 19, House of Representatives Committee on Science, Space, and Technology*
- *"Assessing the Risks, Impacts, and Solutions for Space Threats"—March 20, Senate Committee on Commerce, Science and Transportation—Subcommittee on Science and Space*

This letter was prepared by:

- *Kesha Rogers, 2010 and 2012 Democratic nominee for the House of Representatives in the 22nd District of Texas. Ms. Rogers ran her campaigns on a platform of full funding for NASA and the impeachment of President Obama, achieving solid victories in the primaries.*
- *Jason Ross, 21st Century Science and Technology Editor in Chief.*
- *Benjamin Deniston, 21st Century Science and Technology Staff Writer, specializing in planetary defense.*

March 29, 2013

Distinguished Members of the United States Congress,

In March, the House of Representatives and the Senate held independent hearings inspired by the February 15, 2013 surprise impact of the Chelyabinsk meteor and the close flyby of asteroid 2012 DA14, featuring relevant witnesses from the government, military, academia, and industry. It was good to see that this issue is being addressed by the federal government. However, while some useful discussion was generated, clarifying what the United States has done on this issue and what has yet to be done, we were shocked by what was missing from the discussion.

The subject at hand is the continued existence of human civilization. Can we honestly say that the United States is measuring up to this challenge? The decisions now being made, or not made, will affect all hu-

manity, future and past. The Chelyabinsk meteor impact delivered a clear warning: *we can no longer delay and stall our expansion into space, as we have increasingly done over the past decades*. Defending the Earth from threats from space will not be accomplished with a few specific telescopes or missions, but raises more fundamental questions. What type of future are we going to create over the next two decades? Over the next two generations? And what are we doing right now, *today*, to make that future a reality? The simple fact is that we are already far behind where we could have been, and where we must be. Currently mankind sits blind, unprotected, and vulnerable to extinction, a situation we must do everything in our power to change as rapidly as possible.

The following six critical points were either completely missed or misrepresented during the March 19 and 20 hearings, and must be addressed to ensure a comprehensive defense of Earth.

Courtesy of Kesha Rogers

Kesha Rogers outside the Johnson Space Center, launching her 2010 campaign for Congress. Campaigning on a platform of full funding for NASA and impeachment of President Obama, she won the Democratic nomination for the House of Representatives in the 22nd District of Texas in 2010 and 2012.

1.) Cooperation with Russia on a Strategic Defense of Earth

At the March congressional hearings, there was no mention of the Russian offers for strategic cooperation with the United States on planetary defense. This is very strange. These offers have been repeated since the fall of 2011, starting with Dmitry Rogozin, who is currently the Russian Deputy Prime Minister in charge of defense and space industry, and is heading up the creation of the Russian Foundation for Advanced Research Projects in the Defense Industry (Russia's equivalent of DARPA). In 2011, Rogozin proposed that the United States and Russia openly cooperate on both missile defense systems and planetary defense systems. Calling this the "Strategic Defense of Earth," he said this is an important opportunity to collaborate in addressing challenges that are larger than any one nation. It was reported at the time that then-president Dmitry Medvedev showed interest in the proposal.

In 2012 the Russian Security Council Secretary, Nikolai Patrushev, placed asteroid defense on the agenda of the June 2012 Global Security Summit in St. Petersburg, and since the Chelyabinsk meteor impact on February 15, 2013, Rogozin, Patrushev, and an array of other top Russian officials have repeated this offer, including the head of the Russian Parliament's Foreign Affairs Committee, Alexei Pushkov, who said, "Instead of fighting on Earth, people should be creating a joint system of asteroid defense… Instead of creating a [military] European space defense system, the United States should join us and China in creating the AADS—the Anti-Asteroid Defense System."

With the Cold War long over, and the United States facing extreme financial and economic crises, which prevent us from addressing this challenge alone, it is perplexing that this offer is not being discussed or pursued by the U.S. Congress. We should also note that this concept of U.S.-Russian strategic cooperation on planetary defense goes back to the work of Dr. Edward Teller, who in the 1990s worked with other veterans of the LaRouche-Teller-Reagan SDI in promoting open strategic cooperation with Russia on planetary defense.

The most recent calls from Russia came on March 12, when the upper house of the Russian parliament (the Federation Council) held a high-level round table discussion on the subject of planetary defense, featuring top Russian representatives from Roscosmos, the Russian Academy of Sciences, the Ministry of Emergency Situations, the Ministry of Foreign Affairs, the Ministry of Defense, Rosatom, Energia, the Center for Planetary Defense, and more. A repeated theme of the Russian parliamentary discussion was the need for close collaboration with the United States and other nations. Strangely, there has been no coverage of this extremely important

discussion in the western media, and it was not even mentioned at the March 19 and 20 U.S. congressional hearings.

2.) The Constitutional Implications of Planetary Defense

The supreme law of the United States government, our Constitution, opens with a simple and clear declaration of purpose:

> We the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defense, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

Protecting the territory and interests of the our nation from asteroids, comets, and meteoroids falls under the federal government's obligation to "provide for the common defense," and the failure to pursue the adequate means to do so would mean the government is neglecting its primary responsibility. NASA Administrator Bolden's statement during the House hearing, that currently our only response to certain scenarios of a threatening asteroid impact, would be to "pray," is not encouraging. It must be emphasized that the scenario he was responding to is among the most likely scenarios for the next asteroid impact.

Presently NASA is not being provided the means to meet its 2005 mandate to find 90% of near-Earth objects down to 140 meters in diameter by 2020. The 2010 National Research Council report, *Defending Planet Earth: Near-Earth Object Surveys and Hazard Mitigation Strategies*, stated:

> Finding: Congress has mandated that NASA discover 90 percent of all near-Earth objects 140 meters in diameter or greater by 2020. The administration has not requested and Congress has not appropriated new funds to meet this objective. Only limited facilities are currently involved in this survey/discovery effort, funded by NASA's existing budget.

While we are failing to support even this modest effort, presently there is *no* government-directed mission to find asteroids down to the size of 30 meters in diameter and provide enough warning time to prevent the impact from occurring. According to NASA's most recent estimates, we presently know of less than 1% of the total expected population of the asteroids ranging from 30 to 100 meters in diameter, a size large enough to destroy an entire metropolitan area and kill millions of people, if one were to strike a major city.

The efforts of certain private initiatives and foundations, such as the B612 Foundation's Sentinel Mission, are certainly commendable. However, even these efforts will not find all the potentially threatening asteroids that could do serious damage to the Earth, and, *more importantly, such efforts do not alleviate the obligation of the federal government to lead this effort*. Again, it is the government's job to provide for the common defense.

Is the present policy of the United States government to leave the defense of Earth to philanthropists?

3.) Long-Period Comets

Neither of the March hearings addressed the challenge of long-period comets (those with periods longer than 200 years). While it is clear that long-period comets strike less frequently than near-Earth asteroids, they are harder to see and deflect, and must be discussed. Because of their long periods, they spend the vast majority of their time in the outer depths of the Solar System, where they are undetectable by our current observation systems. By the time we do detect them, they are generally only a few months to a few years away, providing a very short warning time. This short warning time, coupled with the fact that they are generally significantly larger than near-Earth asteroids and can travel much faster, make deflection missions to stop a long-period comet impact extremely difficult, if not impossible with current capabilities.

For more information, see the 2010 National Research Council report, *Defending Planet Earth: Near-Earth Object Surveys and Hazard Mitigation Strategies*, pages 22, 80-83; and the 2009 IAA report, *Dealing with the Threat to the Earth from Asteroids and Comets*, pages 45-47, 111-113, 119.

4.) Statistics vs Knowledge

Unfortunately, much of the discussion of planetary defense quickly falls to statistics. Statements claiming that we don't have to worry about future impacts because the "chances are so low," are irresponsible at best.

We can all recall the havoc that Hurricane Katrina created in New Orleans in 2005, and the tragic results of not preparing for the "100-year storm" because it was believed that it was unlikely to hit any time soon. With the threats from even smaller asteroids, down to 30 meters in diameter (of which we have discovered less than 1%), the consequences could be much worse than a Category 5 hurricane, and we could lose an entire city. A single long-period comet could eliminate all human civilization. It would be negligence to replace or delay a much-need policy of serious space expansion and planetary defense with statistical arguments.

It must be emphasized that statistics do not represent real knowledge. Specifically, statistics do not provide an understanding of the underlying dy-

namic nature of the Solar System. For example, from 1840 to 1880 there was an anomalous increase in the number of large meteor sitings around the world, as recorded independently in both China and Europe (see *Meteorite Falls in China and Some Related Human Casualty Events*, by Kevin Yau, et al., Meteoritical Society, 1994). While these particular meteors were not large enough to cause severe damage, the periodic global increase indicates that asteroid impacts do not necessarily follow a random statistical distribution, and we must look for a larger dynamic we don't yet understand.

The only truly competent basis for policy is real knowledge. Until we have an adequate understanding of the entire asteroid population, and a comprehensive means to defend the Earth from these asteroids and comets, downplaying the danger by use of statistical estimations borders on potential criminality.

5.) Reverse Obama's Impeachable Takedown of NASA

Operating under the governing principle of the Preamble to the Federal Constitution, to "provide for the common defense" and to "promote the general Welfare," the systematic takedown of NASA's capabilities by President Obama amounts to an impeachable offense. Following his attacks on the manned space program, the recent sequestration cuts and the just announced additional cuts on top of sequestration, threaten NASA's in-depth capabilities, which in turn, threatens all mankind.

To defend all human civilization, past and future, from the threats of asteroids and comets, the best chance we have is to unleash NASA, providing all the funding necessary for NASA to again excel in its role in leading the United States into space and increase cooperation with other leading nations, especially Russia and China.

The challenge of defending the Earth requires mankind have dominion over the entire inner Solar System as a territory. This means expanding our knowledge of the inner Solar System and expanding our ability to act quickly and efficiently throughout this entire territory. In addition to specific efforts, including those discussed in the hearing, this requires the general expansion of NASA and our space-faring capabilities. This includes the accelerated development of the broad-based space infrastructure required to provide mankind quick and efficient access to the Solar System, most emphatically the development of industrialized basing operations on the Moon, the development of outposts on Mars, and the development of advanced propulsion systems utilizing the high energy-flux densities of thermonuclear fusion reactions (while working towards breakthroughs in harnessing the power of matter-antimatter reactions). These are medium- to long-term missions, but are fundamental for mankind's future survival in the Solar System. They have already been delayed for decades, and absolutely require our immediate attention now.

6.) The Financial Reforms to Make All of This Possible

The supreme principle of the preamble of the Constitution, including providing for defense and promoting the general welfare, overrides any speculative financial obligations. If we are told we cannot afford to invest in these needed space efforts, but we can continue to pour money into a program to "bail out" (or "bail in") bankrupt investment banks, then something is fundamentally wrong, or potentially treasonous, with our national policy decisions. For example, the looting of the population of Cyprus is only the latest scheme in the past five years of bailouts, and, unless this process is stopped, such schemes will come here to United States. We can no longer place the speculative debt of the trans-Atlantic financial system above the interests of our population and our posterity.

The reinstatement of the Glass-Steagall financial regulations of Franklin Roosevelt is absolutely necessary to stabilize the finances of the United States. Only by freeing the economy and the government from the obligation to maintain the value of hyperinflationary speculative assets, can we issue new credit, under the auspices of a Hamiltonian national bank, for real investment to improve the conditions of the nation.

The role of NASA, in both exploration and defense, as part of an international Strategic Defense of Earth effort, is among the most important investments we can make as a nation.

In conclusion, we must rise to the challenges placed before all mankind by the events of February 15, 2013, and respond with what some might call "outside the box thinking." However, "outside the box" in this case is simply outside the Earth, and this is nothing more than meeting the basic challenges facing mankind. The entire territory of the inner Solar System must now be seen as our domain, as a wild frontier in desperate need of the organizing hand of man. Properly understood, planetary defense is nothing less than the natural progress of mankind, progress that has already been long delayed, and progress that is absolutely necessary for the continued existence of mankind.

With the defense of the humanity at stake, we must respond with boldness and appropriately reinterpret the most ancient of directives from the standpoint of the challenges now facing mankind:

… Be fruitful and multiply, replenish the inner Solar System, and subdue it; and have dominion over all that moveth therein …


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