II. International Developments

The Artemis Program, A Global Science Driver, Has Unexpected Support

by Ned Rosinsky, MD

Jan. 23—With the new Biden administration already slashing several of the development policies initiated by the Trump presidency, such as the Keystone XL Pipeline, on his first day in office, and Biden promoting the anti-growth, de-industrialization insanity of the Green New Deal by committing the U.S. to rejoining the Paris carbon limitation treaty, the question remains regarding what will happen to Trump's Artemis space exploration initiative.

The Artemis Moon-Mars exploration program, which has set a deadline for bringing astronauts back to the Moon by 2024, is the most important science driver since JFK's declared intention, in a 1961 joint session of Congress, that "This nation should commit itself to achieving the goal, before the decade is out, of landing a man on the Moon and returning him safely to Earth."

Enormous science projects invigorate the economy by creating new technologies and new scientific discoveries. But more importantly, they invigorate the culture as a whole, by challenging and inspiring our youth to participate in these scientific and technological developments, an effect that was dramatically evident during the Kennedy administration.

NASA

An artist's depiction of the Constellation mission, cancelled during the Obama administration in 2010. The Artemis program takes up again the task of sending human beings to the Moon, Mars, and beyond.

We have recently witnessed the results of just such a crash scientific effort, with the development of Covid-19 vaccines just 12 months after the target part of the virus, the spike protein, was identified and characterized. This crash effort, spearheaded by support from the Trump administration's Operation Warp Speed, involved tens of thousands of researchers and lab technicians around the world, and tens of billions of dollars of investment.

The result is not just a vaccine, but the development of techniques that can be rapidly applied for producing vaccines against new infectious diseases, as well as for treatments of a huge variety of other diseases that involve abnormal proteins or abnormal genes. Since most of the major causes of death in the U.S. have at least a partial inheritable pattern, such as cancer, heart disease and stroke, the techniques of protein and gene therapies have the potential to radically improve treatments and preventions for these chronic diseases. (See "Science Driver Medicine: RNA Vaccine Technology Expands Into Broader Disease Treatment," Ned Rosinsky, *EIR*, August 14, 2020.)

This scientific crash program must be defended from the anti-science mob, since the issues of treatment and prevention of major diseases are fundamental to the needs of the population.

Unexpected Support for Artemis

In this context, it is most interesting, and important, that several British Intelligence-associated U.S. establishment think tanks, including the Council on Foreign Relations (CFR) and the Center for Strategic and Inter-

national Studies (CSIS), have recently come out publicly urging the new administration to continue the Artemis program commitment to space research and exploration.

The CFR issued a report on November 18, 2020, titled "Space Exploration and U.S. Competitiveness," an update of a report by Steven Markovich originally published in 2013. Markovich, a Contributing Editor at CFR, notes that the Obama administration killed the Constellation human space exploration program developed under the prior Bush administration, which was intended to replace the aging Shuttle program. This left the U.S. with no rocket transport ability, and therefore required any travel to the International Space Station to be done using a Russian transport rocket.

Trump reversed this policy in 2017 with his Presidential Directive to NASA to plan a human Moon landing, followed by human flights to Mars. No specific date for this mission was initially indicated in the Presidential Directive. In 2018 the Chinese announced their timetable for a human Moon landing in 2028, at the annual meeting of the international Committee on Space Research. The following year, 2019, Trump revised the NASA time schedule to plan for a human landing on the Moon by 2024. Clearly there is a competition in these timetables.

DoD/Lisa Ferdinando

A vial of COVID-19 vaccine, produced in just 12 months under the crash effort of Operation Warp Speed, initiated by President Donald Trump.

This competition appears to be the reason for the timing of this CFR report. The U.S. establishment is going through a Sputnik-type response, but in this case in regard to China, with the result being parallel to what happened after 1957, when the U.S. establishment launched a crash science driver to catch up with the Soviet space program.

We are therefore in a period in which there are two huge science drivers that must be defended against the kinds of attack we saw after the Kennedy Apollo Moon mission and after the LaRouche-Reagan SDI initiative in 1983.

Intrinsic Benefits of Artemis

The cited CFR report, in addition to referencing the Chinese program, goes further, pointing out some of the intrinsic benefits of Artemis. First, regarding the cost, the article notes that President Trump requested $25 billion for the coming year, but Congress appropriated only $22.6 billion, which would short the funding required for the Moon landing module component. The report notes that this total funding amount is only half of one percent of the Federal budget.

NASA

White House

Two science driver announcements: President John F. Kennedy (left) announced on May 25, 1961, the mission to send an American safely to the Moon before the end of the decade; and President Ronald Reagan announced the Strategic Defense Initiative in addressing the nation on March 23, 1983.

The CFR article then points out two major benefits of the Artemis program: the launching of careers in science, technology, engineering, and math (STEM), and spinoffs. Regarding STEM, the article states:

> The space race of the 1960s and 1970s captured the American public's imagination like few other endeavors. A 2009 study in the journal *Nature* found that the Apollo program had inspired half of the scientists surveyed, and almost 90 percent believed that manned space exploration inspired younger generations to study science. Some evidence supports this. According to the National Science Foundation, the percentage of graduates holding bachelor's degrees in science and engineering fields peaked in the late 1960s, around the time of the Moon landing, but then declined slowly for several decades before recent administrations began to reemphasize the importance of funding science, technology, engineering, and mathematics (STEM) education.

NASA

Large science projects invigorate a culture and challenge and inspire its youth to participate in them. Shown here: youth attending NASA's ASTRO CAMP Community Partners Program.

Regarding the issue of spinoffs, the CFR report states:

> Since 1976, technologies originally developed for space exploration have led to more than two thousand spinoffs when they were transferred to the private sector. Some are obvious, such as communications satellites, but other transfers are less well known. Many medical advances are derived from space technologies, such as refinements in artificial hearts, improved mammograms, and laser eye surgery. Space exploration drove the development of new materials and industrial techniques, including thermoelectric coolers for microchips; high temperature lubricants; and a means for mass producing carbon nanotubes, a material with significant engineering potential. Household products such as memory-foam mattresses, Bluetooth headphones, programmable ovens, vacuums, and ski apparel all trace their origins to NASA.

cc/Ed g2s

pixabay

Two spin-offs from technologies originally developed for space exploration: a typical Bluetooth mobile phone headset, and laser eye surgery.

Most importantly, the report states:

> Space can also inspire international cooperation. In 1963, during what would be his final speech before the United Nations,

President Kennedy asked, "Why should the United States and the Soviet Union, in preparing for such expeditions, become involved in immense duplications of research, construction, and expenditure?"…. In May 2020, NASA announced the framework for the Artemis Accords, a series of bilateral agreements with other space agencies that want to participate in the Artemis program, based on the Outer Space Treaty of 1967. CFR's David P. Fidler praised the accords, writing that they "embrace rules and principles developed through multilateralism rather than a scofflaw version of American unilateralism."

cc/Roscosmos

Dmitry Rogozin, head of Russia's space agency, Roscosmos: "The most important thing would be to base [the Artemis] program on the principles of international cooperation."

It is noted that the Artemis Accords pledge to use space for peaceful purposes only.

Despite the emphasis on peaceful cooperation, there are some doubts about this from the Russians. According to an article from October 19, 2020 in *Universe Today*, titled "NASA and Seven Countries Sign the Artemis Accords for the Exploration of the Moon. Russia Declined to Participate":

> Dmitry Rogozin, the head of Russia's space program Roscosmos, called the Accords too "U.S.-centric" while speaking at a forum sponsored by the International Astronautical Congress [in October 2020]. "The most important thing here would be to base this program on the principles of international cooperation that we've all used" regarding the ISS, Rogozin said. "If we could get back to considering making these principles as the foundation of the program, then Roscosmos could also consider its participation."

So far, the Artemis Accords have been signed by the following nations: Australia, Canada, Italy, Japan, Luxembourg, The United Arab Emirates, United Kingdom, and United States.

CSIS—Artemis and the Wolf Amendment

Regarding the Center for Strategic and International Studies, a CSIS project called "Defense 360" issued a report on December 11, 2020 titled, "Bad Idea: Halting or Reversing Trump-Era NASA Programs in a New Administration," by Makena Young, a research associate with the Aerospace Security Project at CSIS. The report reviews Trump's Space Policy Directive-1, which began the Artemis program, and concludes by stating, "With international momentum building, it would be foolish to decrease commitment of funding to this program integral to the future of space exploration."

Another CSIS report titled, "Bad Idea: The Wolf Amendment (Limiting Collaboration with China in Space)," dated December 4, 2019, is also written by Makena Young. The Wolf Amendment, introduced in Congress by Representative Frank Wolf in 2011, was added as an amendment to the annual CJS (Commerce, Justice, and Science) appropriations bill. As summarized in the CSIS report:

> The Wolf Amendment says that no government funding for NASA, the White House Office of Science and Technology Policy (OSTP), or the National Space Council can be used to collaborate with, host, or coordinate bilaterally with China or Chinese-owned companies without certification from the Federal Bureau of Investigation (FBI). The FBI must certify that there is no risk of information sharing and that none of the Chinese officials involved have been determined by the United States to have direct involvement with violations of human rights.

This Amendment has been added to the CJS appropriations bill each year since 2011.

The CSIS report argues that this restriction on collaboration with China has been detrimental to the U.S. space effort:

> Being left out of U.S.-led international missions has not deterred China in space, but instead has pushed China to develop parallel capabilities on its own. Without a way to contribute to the International Space Station (ISS), China began development and testing its own modular space station. China launched the Tiangong-1 and Tiangong-2 space laboratories in 2011 and 2016, respectively, as testbeds for a permanent space station. The China National Space Administration (CNSA) has announced that the permanent Chinese Space Station (CSS) should be fully operational by the year 2022.
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> With the ISS slated for retirement in 2024, other countries that want a long-term human presence in low Earth orbit may be lured into partnering with China on the CSS…. Closing China off from these projects could be a strategic mistake.

The Biden Administration

Several of Biden's science advisors on his transition team have advised him to engage in collaboration with China in space science. The Washington journal Politico published on December 20 an article titled "Biden Space Advisors Urge Cooperation with China." The article states:

> The debate gained more urgency recently after China became just the third nation to retrieve samples from the moon, the latest in a series of major achievements for its ambitious space program.
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> "Trying to exclude them I think is a failing strategy," Pam Melroy, a former astronaut who is serving on Biden's NASA transition team and is among those being considered to lead the space agency, told POLITICO before the election. "It's very important that we engage."
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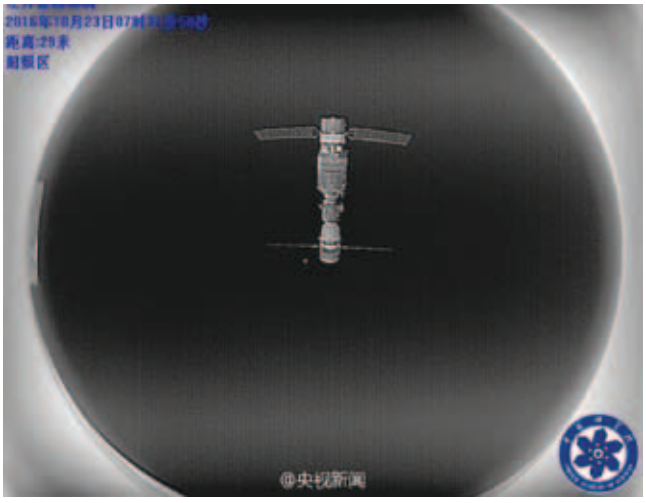
> One of the top priorities for the Biden administration should be modifying the Wolf amendment to allow for "limited space engagement" with China in areas such as scientific research and robotic space exploration, according to a recommendation by the nonprofit Secure World Foundation.



CAS

China has not been deterred by being denied a part in U.S.-led space missions. Shown: China's Shenzhou-11 crewed vehicle docked with the Tiangong-2 space laboratory, as imaged from the Banxing-2 satellite, October 2016.

The Space Force

A related issue that undercuts international cooperation in space was the creation in 2019 of the Space Force as the sixth branch of the U.S. Armed Forces. The Space Force was initially made part of the Air Force, but the law that created it specifies that after one year it is given its own representative on the Joint Chiefs of Staff, similar to the Marine Corps, which is part of the Department of the Navy. Initially the Space Force will be consolidating space missions from the other departments, particularly those involving information gathering and transferring.

It is hoped that as the Artemis program develops, alongside parallel programs of non-participating nations, that a spirit of cooperation and collaboration will develop, mirroring the 1975 outer space handshake between American Brigadier General Thomas Stafford and Russian cosmonaut Alexei Leonov. The Chinese have repeatedly asked the U.S. to join in their Belt and Road program of worldwide infrastructure development, but so far, the U.S. has not agreed to do so. A peace based on cooperation in economic and scientific development, a peace that benefits all parties, is a stable peace. A peace based on military force is inherently unstable, and increasingly dangerous as weapons of mass destruction proliferate. Biden's space advisors are urging cooperation. He would be wise to follow their advice.