Budget Uncertainty Alters NASA's Commercial Procurement Strategy

DAN LEONE, WASHINGTON

Budget woes have prompted NASA to modify its plans for funding development of commercial crew taxis. The agency announced Dec. 15 that it will continue using flexible Space Act Agreements instead of shifting to more-traditional fixed-price contracts.

NASA had planned to release a request for proposals Dec. 19 for the Commercial Crew Integrated Design Contract, a 21-month effort intended to get at least two competing spacecraft designs ready to enter production.

NASA's human spaceflight chief, William Gerstenmaier, told reporters during a Dec. 15 teleconference that budget concerns drove the agency to keep using funded Space Act Agreements — which impose fewer administrative burdens on the contractor and limit government oversight — to pursue the same goal: taking two or more competing concepts through critical design review by mid-2014.

But even with Space Act Agreements, which commercial space advocates say can deliver faster results for less money, Gerstenmaier said he does not expect a new U.S. crew vehicle to enter service before 2017. That is about a year later than NASA projected during the summer when Congress was still considering a budget request that included $850 million for the Commercial Crew Program for 2012.

Gerstenmaier said that the $406 million Congress ultimately approved as part of a broader $17.8 billion NASA budget will go further if it is spent on flexible, milestone-driven Space Act Agreements rather than more traditional contracts subject to the Federal Acquisition Regulation (FAR).

"We think with the Space Act we can carry more providers through this period," Gerstenmaier told reporters.

NASA Administrator Charles Bolden said in a Dec. 15 announcement that changing procurement tactics "will allow us to preserve competition as we maintain our momentum to provide a U.S.-based commercial crew launch capability at the earliest possible time."

NASA is counting on the Commercial Crew Program to end the United States' dependence on Russia for ferrying astronauts to and from the international space station at some $63 million a seat. NASA's current contract with the Russian Federal Space Agency runs through June 2016.

NASA Commercial Crew

SEE COMMERCIAL PAGE 16
Raytheon congratulates NASA and NOAA on the successful launch of the NPOESS Preparatory Project (NPP) satellite. With advanced Raytheon technology in orbit and on the ground, the satellite will improve weather forecasting accuracy by as much as 75%, delivering intelligence that saves lives.
U.S. Congress Finalizes Defense Authorization

Congress sent U.S. President Barack Obama a defense authorization bill Dec. 15 that tightens oversight of the Pentagon’s primary satellite launching program and limits the discretion of U.S. satellite telecom regulators to license systems that might interfere with GPS signals.

A provision included in the final conference version of the Defense Authorization Act for 2012 directs the Air Force to spell out its compliance with a U.S. Government Accountability Office report that called the service’s rocket acquisition strategy into question. To the extent that the Air Force does not intend to comply, it must specify its rationale in its 2013 budget request, to be submitted to Congress in February.

A related provision would subject the so-called Evolved Expendable Launch Vehicle program to stricter reporting requirements by changing its designation from a sustainment to an acquisition program.

The legislation also stipulates that the Federal Communications Commission (FCC) cannot approve any commercial broadcast system until the U.S. Defense Department is satisfied that the system does not interfere with GPS satellite navigation services. That provision appears to be aimed at LightSquared, which received conditional FCC approval to move ahead with its satellite terrestrial broadcast network despite GPS interference concerns.

House Completes Action On Milspace Spending

The U.S. House of Representatives passed a finalized 2012 spending bill Dec. 16 that provides $125 million for a “follow-on” military weather satellite system while adding $326 million to the Pentagon’s $468.7 million request for its primary satellite communications system.

The 2012 Final Consolidated Appropriations Bill, which at press time was awaiting Senate approval, provides $1 trillion for various agencies including for the Defense Department for the remainder of fiscal year 2012. Most of the federal government has been operating since the fiscal year began Oct. 1 under stopgap funding measures.

The U.S. Air Force requested $445 million in 2012 for the Defense Weather Satellite System (DWSS), which followed U.S. President Barack Obama’s 2010 cancellation of a military system intended to provide global coverage from polar orbit. In May, the Air Force announced Northrop Grumman Aerospace Systems, which was prime contractor on the canceled program, a DWSS contract worth $900 million.

That contract appears to be in jeopardy. In September, Senate appropriators recommended terminating DWSS and holding a new competition for weather satellites, providing $150 million and $290 million for those purposes, respectively.

The final bill, which does not mention DWSS by name, appears to track with the Senate recommendation but provides only half the money. The legislation also provides $43 million for what it referred to as the National Polar-orbiting Operational Environmental Satellite System, the civilian program that was canceled.

The finalized bill followed the House’s recommendation in boosting funding for the Air Force’s Wideband Global SATCOM communications system. The increased funding will go toward the ninth satellite in the series.

Thaicom, AsiaSat To Share New Satellite

Satellite fleet operator Thaicom of Thailand has agreed to pay competitor AsiaSat of Hong Kong $171 million over 15 years for the use of one-half of an AsiaSat satellite to be placed in a Thai orbital position in an arrangement that will permit Thailand to preserve its rights to the slot, the companies announced Dec. 15.

Under the agreement, the AsiaSat 6 satellite, which AsiaSat ordered in November from manufacturer Space Systems/Loral of Palo Alto, Calif., will be launched in 2014 and operated at 120 degrees east longitude. Thaicom will have access to up half of the satellite’s 28 C-band transponders and will pay AsiaSat $170 million in installments in the satellite’s 15-year life. Thaicom said in a document filed with the Stock Exchange of Thailand, the AsiaSat satellite is on track to enter service in 2013.

The final bill would rename AsiaSat 6/Thaicom 7, the two companies said in a joint statement. Before its launch, AsiaSat and Thaicom will place an interim satellite at 120 degrees to retain Thailand’s regulatory rights to the slot.

International regulations oblige satellite operators to establish a presence at a reserved orbital slot within a certain number of years or risk having the position, and its associated broadcast frequencies, returned to the general pool and made available to other governments, and other satellite operators.

“We are pleased to establish this new partnership with AsiaSat to cooperate on a satellite project that will preserve the orbital slot for Thailand at 120 degrees east, and fulfill the fast growing demand for quality satellite capacity from customers in our country and across the region,” Thaicom Chief Executive Suphajee Suthumpun said in a Dec. 15 statement.

AsiaSat Chief Executive William Wade said the strategic partnership with Thaicom will permit AsiaSat to “expand our inventory and meet the growing demands from our customers in the region.”

In its stock-exchange filing, Thaicom said the investment, totaling about $171 million, “includes the satellite, its launch insurance, and ground system and project administrative cost.”

Europe’s ISS Chief Endorses China Invite

The international space station partners in the long run should invite China to join the program as a partner, Europe’s space station director said.

Thomas Reiter, director of human spaceflight and operations at the 19-nation European Space Agency (ESA), said China’s obvious ambition in manned missions makes it a natural addition to the current space station partnership of the United States, Russia, Europe, Japan and Canada.

Speaking Dec. 13 in Bremen, Germany, after signing a contract for commercial operations of Europe’s section of the station, Reiter said China’s recent success in preparing its own space station and launching astronauts into space leave little doubt as to its willingness to invest.

“Cooperation with China offers great potential and there are great perspectives for us,” Reiter said.

“We could imagine joint activities at the ISS [the international space station], with China participating with ESA, or ESA participating in the Chinese space station.”

AEHF-1 Operations On Track for March Start

The U.S. Air Force’s first Advanced Extremely High Frequency (AEHF) secure communications satellite is on track to enter operations in March, the service announced Dec. 15.

Dave Madden, director of theMilstar Systems Directorate at the Air Force Space and Missile Systems Center in Los Angeles, told reporters that on-orbit testing is proceeding well, with the satellite so far having completed 39 of 76 tests and 225 of 374 of objectives. Many of the remaining tests involve demonstrating connectivity between AEHF and the legacy Milstar secure communications satellites and AEHF’s interoperability with ground terminals.

“We always run into a few things that surprise us a little bit,” Madden said. “But this testing has gone extremely clean, and anything that comes across is going exceptionally well.”

Madden also said a recent $312 million modification to Lockheed Martin’s AEHF contract is unrelated to a propulsion glitch that delayed the arrival of the first satellite at its operating location for more than a month.

In a Dec. 15 written response to questions, the Air Force said the contract modification is a standard, planned extension of Lockheed Martin’s support role for delivered AEHF satellites and ground systems. “This on-orbit anomaly occurred after AEHF satellites and ground systems were delivered,” the Air Force said.

The international space station is on track to enter operations in March, the service announced Dec. 15.

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French military officials on Dec. 16 said the four-satellite electronic-intelligence (elint) system they plan to operate beginning in early 2012 will be the last of France’s in-orbit elint demonstration projects and will be succeeded by an operational system at the end of the decade.

In a briefing here the day before the launch of the four Elisa satellites, the officials said after 15 years and four different elint satellite demonstrator projects — all judged to have been successful — France is ready to proceed with an operational system with or without European partners.

Caroline Laurent, head of space and information systems at France’s arms procurement agency, DGA, said the Elisa system, which was scheduled for launch late Dec. 16 from Europe’s Guiana Space Center spaceport here, will identify ground-based radars and other telecommunications sources in higher frequencies than its predecessor, Essaim.

The four Essaim satellites were launched in 2004 and were operated, flying in close formation in low Earth orbit, for five years before being de-orbited in 2009. Essaim followed two one-satellite elint demonstrators, the Cerise and Clementine satellites, launched respectively in 1995 and 1999.

DGA has been occasionally criticized in French military ranks for being an expert at demonstration missions that do not usher in operational programs. In addition to the four elint missions in the past 15 years, DGA has also launched two Spirale satellites that tested missile warning technologies. Spirale, too, was a demonstrator that, to date, has no follow-on program.

DGA officials have acknowledged the criticism, and responded that France had hoped that by now one or more European partners would join in an elint or missile warning system.

That has not happened. French President Nicolas Sarkozy has said since arriving in office in 2007 that he wanted Cerise to proceed as a fully operational elint program. Budget pressures have prevented that from happening on schedule.

Laurent said that Cerise design studies, which have already begun under a minimal budget, would accelerate in 2013 and that a contract for the construction of a three- or four-satellite Cerise system would begin in time for a launch by 2019. She said France is determined to build Cerises with or without partner nations joining the program.

French Air Force Gen. Yves Arnaud, who heads the French Joint Staff’s space office, said here that French expertise in optical satellite Earth observation gained from the Helios series of reconnaissance satellites since 1995 has given France a piece of an intelligence, surveillance and reconnaissance system. Elint, he said, is another piece.

The goal of the Cerise elint program, Arnaud said, is to provide French Rafale fighter jets with up-to-date maps of ground-to-air radars. These radars would be part of a catalog assembled by Ceres and then updated by both Ceres and Helios data.

What we would like is to give our Rafale pilots a library of data on ground-to-air radars that would be assembled by Ceres and Helios,” Arnaud said. “Ceres and Helios would work together. Helios would identify the location of a radar, and Ceres would then fly over it to determine if it was still active and to learn more about it. Similarly, if Ceres identifies a previously unknown source of radar emissions, optical reconnaissance will be able to tell us more about it.”

This kind of mapmaking capability depends on more than just satellites in any event, but the satellite component is indispensable, and cannot be provided by Elisa, Arnaud said.

The four-satellite Elisa program cost DGA about 115 million euros ($155 million). The Elisa system was built by a team led by Astrium Satellites and Thales Airborne Systems. The satellites, each weighing about 120 kilograms at launch, are using the Myriade platform, or skeletal structure, developed by the French space agency, CNES, and now commercialized by Astrium. Fifteen Myriade platforms have been built.

The Elisa constellation will operate in a polar low Earth orbit 694 kilometers in altitude. To save their limited fuel, the satellites will be slowly drifted to their final positions after launch and are expected to be operational by late March, Laurent said.

Comments: pdeselding@gmail.com
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**Contract Challenges Astrium To Reduce Station Operations Costs**

**PETER B. de SELDING, BREMEN, Germany**

Astrium Space Transportation will manage operations of Europe’s share of the international space station under a two-year contract signed Dec. 13 with the European Space Agency (ESA). The contract, worth 235 million euros ($310 million), is in addition to the costs of operating the Automated Transfer Vehicle (ATV) unmanned supply ship.

The contract includes a provision that Astrium and ESA will agree on regular cost reductions so that, by 2012, the current presumed end date for the station’s operational life — annual operations cost 30 percent less than today.

“While there are not just efficiency cuts,” said Michael Menking, Astrium’s director of operations and systems and space exploration, “there are regular, real reductions, and process changes.”

The 235 million euro contract covers 2011 through 2012. An authorization to proceed under the contract was sealed in early 2011 following a meeting of ESA’s ruling council, permitting Astrium to continue its provision of support for the station’s operations.

Thomas Reiter, ESA’s director of human spaceflight and operations, said the contract’s allocation for 2012 includes the first slice of price reductions that are expected to reach 30 percent by 2020.

In a press briefing here, Reiter managed the station from the ground. Menking estimated that, combining national station-user facilities, there are perhaps 50 people involved in the station’s operations and maintenance in Europe.

Control of European spaceflight (satellites that are operated by the German Aerospace Center in Oberpfaffen-hofen. But it is Astrium’s job to reduce the station’s operations to sustain its operations without the ATV.

Menking said some of the operating-cost savings expected in the coming years will be the result of investments made in new hardware. It is one reason, he said, that Astrium is pushing ESA to sign a contract for as long a period as possible.

“Further, the longer the better,” Menking said. “If we need to invest now to reap savings in the future, we need to know the contract’s terms. Obviously we do not make changes in operating systems without the approval of ESA.”

In addition to the costs of developing, installing, and operating its experiments and its astronaut corps, ESA has an 8 percent stake in the station’s ownership that requires an annual contribution to pay the station’s common operating costs.

ESA and NASA have agreed to pay NASA in a form that has not yet been decided. ESA officials have opened discussions with NASA on possible EU contributions to NASA’s space exploration effort that could be used to offset the launch of founding. ESA has proposed that the ATV’s propulsion module, and perhaps a variant of the ATV vehicle, could be used by NASA for space exploration.

“Beyond providing fuel, food, water and other supplies, the ATV is called on to push the station into a higher orbit. Resource expenditure on the station’s operating altitude of about 400 kilometers causes the station to the complex to descend in altitude.”

ATVs are scheduled to continue their cost-offset function through 2017. That leaves three years, or about 150 million euros, of station expenses that ESA will pay to NASA in a form that has not yet been decided. ESA officials have opened discussions with NASA on possible European contributions to the ATV’s propulsion module, and perhaps a variant of the ATV vehicle, could be used by NASA for space exploration.

“Beyond providing fuel, food, water and other supplies, the ATV is called on to push the station into a higher orbit. Resource expenditure on the station’s operating altitude of about 400 kilometers causes the station to descend in altitude.”
Paul Allen Teams with Burt Rutan, SpaceX on Air-launched Rocket

DAN LEONE, WASHINGTON

Microsoft co-founder Paul Allen announced Dec. 13 the formation of Stratolaunch Systems, a Huntsville, Ala.-based company that aims to build an air-launched orbital launch system comprising a SpaceX-built booster and carrier aircraft developed by Scaled Composites. Designed to carry up to 6,100 kilograms of payload to orbit, the Stratolaunch system would offer similar performance to the Delta 2, a medium-lift workhorse rocket widely used by NASA until the U.S. Air Force shifted its launch traffic and financial support to the Atlas 5 and Delta 4 Evolved Expendable Launch Vehicles.

The company will be led by a former NASA chief engineer, Gary Weitz, and will be overseen by a board of directors that includes former NASA Administrator Mike Griffin — now a professor at the University of Alabama, Huntsville — and David King, who was director of Marshall Space Flight Center under Griffin and now serves as executive vice president of Dynetics. Also based in Huntsville, Dynetics will build a mating and integration system for the Stratolaunch Systems carrier aircraft.

Hawthorne, Calif.-based Space Exploration Technologies (SpaceX) is represented on the Stratolaunch board of directors by SpaceX President Gwynne Shotwell. The new venture, which reunites Allen with his X Prize-winning SpaceShipOne collaborator and Scaled Composites founder Burt Rutan, aims to conduct its first flight within five years.

"Work has already started on our project at the Mojave spaceport," Allen said during the project's Dec. 13 unveiling at the Seattle headquarters of his investment company, Vulcan Inc.

For now, Allen will provide all the funding for the project, which he expects to cost "at least an order of magnitude more" than SpaceShipOne, the Rutan-designed, air-launched suborbital spaceplane that won the $10 million X Prize in 2004 by reaching 100 kilometers in altitude twice in a two-week period.

Allen, who was worth an estimated $15 billion in 2011, has said he invested $28 million in SpaceShipOne’s development, which was led by Scaled Composites. The Mojave, Calif.-based company is currently building and testing Virgin Galactic’s WhiteKnightTwo carrier craft and the air-launched SpaceShipTwo suborbital spaceplane.

Allen said Scaled Composites, Dynetics and SpaceX will act as Stratolaunch subcontractors and will not be investing money of their own.

The Stratolaunch Systems mother ship will be capable of launching a booster that weighs up to 222,000 kilograms. The carrier aircraft will operate from a large airport or spaceport, such as Kennedy Space Center, and be able to fly up to 2,400 kilometers to the payload’s launch point and boost up to 6,100 kilograms of payload to low Earth orbit.

Griffin said Stratolaunch "would make a very effective launcher" for small- and medium-class communications satellites, a market he described as "thriving."

While Stratolaunch is being designed with an eye toward one day carrying both people and payloads into orbit, Griffin said initial business with NASA would be focused on "unmanned payloads that are not cargo to the space station."

SpaceX’s contribution to the project is a downsized version of the Hawthorne, Calif.-based company’s ground-launched Falcon 9 rocket.

"It will either be along the lines of a Falcon 4 or Falcon 5,” said Adam Harris, SpaceX vice president of business development, referring to the number of kerosene-fueled Merlin engines the booster will use. "It will be shorter than the existing Falcon 9 vehicle, and we’re currently running trades to determine what kind of wings or fins it may actually need to make the turn from the drop” off of the carrier ship.
French Gyroscopes Picked For U.S. Weather Satellite

Astrium Satellites and its partner, iXSpace of France, will provide fiber-optic gyroscopes for attitude control aboard the U.S. Joint Polar Satellite System (JPSS)-1 satellite to be launched in 2016. Astrium said it is the first time it will be delivering key internal measurement units for a U.S. government satellite program and is an example of Astrium’s recently redoubled efforts to promote itself as a component provider to other prime contractors in addition to building satellites on its own.

Under the contract announced Dec. 14, Astrium will deliver fiber-optic gyroscopes marketed by iXSpace under the Astrix name to Ball Aerospace & Technologies of Boulder, Colo., which is building the JPSS-1 satellite for NASA.

JPSS-1 is designed to be the first of three JPSS polar-orbiting meteorological satellites to be operated by the U.S. National Oceanic and Atmospheric Administration (NOAA).

NOAA and Europe’s 26-nation Envisat meteorological satellite organization, along with the U.S. Department of Defense, coordinate their separate polar-orbiting satellite systems to provide maximum global weather monitoring.

iXSpace said it has produced more than 50 Astrix fiber-optic gyroscopes for satellite missions including Europe’s Planck science satellite, launched in 2009; South Korea’s COMS weather and telecommunications satellite; the two French Pleiades optical Earth observation satellites; and the two European Galileo navigation satellites launched in October.

The gyroscopes permit the satellite to maintain its precise attitude in orbit, and to point its instruments.

NASA Adds Another Year to Lockheed’s Johnson DFOC

Lockheed Martin Information Systems and Global Services of Gaithersburg, Md., was awarded a $165 million contract extension to continue supporting NASA Johnson Space Center’s Mission Operations Directorate.

Under the contract NASA announced Dec. 12, Lockheed Martin and its Houston-based subcontractors Cinamoront Software Services Inc. and United Space Alliance will support hardware, software, and data and display systems used to train for and execute NASA human spaceflight missions.

The majority of the work will be performed in Houston.

Lockheed Martin won the $755 million Facilities Development and Operations Contract (FDOC) in November 2008. The one-year extension exercises the first of two potential options and increases the total value of the contract through September 2013 to $919.5 million.

Two Sentinel Satellites To Launch Atop Vega Rockets

Europe’s Arianespace launch consortium on Dec. 14 said it will launch two European Sentinel Earth observation satellites between 2014 and 2016 in the first two commercial contracts signed for the new Vega small-satellite launcher, which is still in development.

Vega is expected to make its first launch in the first quarter of 2012, joining the European version of Russia’s Soyuz rocket alongside Europe’s heavy-lift Ariane 5 vehicle in operations from Europe’s Guiana Space Center in French Guiana.

Under the contracts, Arianespace will use Vega to launch a Sentinel 2 multispectral land-imaging satellite and the Sentinel 3 radar observation spacecraft in separate launches. Each satellite is expected to weigh around 1,200 kilograms at launch and to operate in an 800-kilometer near-polar low Earth orbit.

Astrium Satellites is prime contractor for Sentinel 2, Thales Alenia Space is building Sentinel 3. Both companies have contracts to manufacture three copies of each satellite as part of Europe’s Global Monitoring for Environment and Security (GMES) project, managed by the European Space Agency (ESA) and the European Commission.

The first Sentinels are scheduled for launch in 2013 pending a resolution of a dispute between ESA and the commission over funding for GMES operations beyond 2013.

ESA’s ruling council on Oct. 27 informed the commission in writing that it would instruct ESA not to launch the first Sentinel satellites if the commission has not committed, by the end of 2012, to funding GMES operations over the long term.

The two Vega contracts could be used for any of the Sentinel 2 or Sentinel 3 satellites ready for launch between 2014 and 2016, but under the current Sentinel planning the launches would be of the Sentinel 2b and Sentinel 3b spacecraft.

SIERRA TO WIND-TUNNEL TEST DREAM CHASER AT MARSHALL


Louisville, Colo.-based Sierra Nevada is developing the winged Dream Chaser Soft-

ware vehicle with financial assistance from NASA’s Commercial Crew Development program, which aims to foster development of privately owned spacecraft capable of ferrying astronauts to the international space station.

Under the agreement, Marshall will perform wind-tunnel tests that simulate speeds ranging from Mach 0.2, or about 244 kilometers per hour at sea level, to March 5, or about 6,133 kilometers per hour at hour level. The tests will be conducted in Marshall’s 1.3-square-meter wind tunnel, which is capable of conducting tests at subsonic, transonic and supersonic speeds.

NASA said in a press release that the agreement could lead to joint development, testing and operations of advanced space systems.

AIA Forecasts a Small Drop In U.S. Space Sales in 2012

U.S. space sales rose 2.4 percent to $46.4 billion in 2011 despite the retirement of NASA’s space shuttle fleet but are expected to dip slightly in 2012, Aerospace Industry Association (AIA) President Marion Blakely said Dec. 14. AIA predicts that the U.S. space industry will ring up $45.1 billion in sales in 2012, or about $1.3 billion less than 2011 and $200 million less than 2010.

Two European Sentinel satellites will be launched by Vega (inset).
Japan Launches IGS Radar Reconnaissance Satellite

Japan successfully launched its latest Information Gathering Satellite (IGS) radar satellite Dec. 12 on an H-2A rocket at 10:21 a.m. local time from the Tanegashima Space Center in southwestern Japan.

The satellite, which carries radar for all-weather and nighttime observation, successfully separated from the H-2A as planned about 20 minutes after liftoff, and is so far functioning normally, an official at the Cabinet Satellite Intelligence Center, which is in charge of the IGS program, told Space News. Japan started the IGS program in response to North Korea’s 1998 test firing of a Taepodong 1 ballistic missile that flew over Japanese territory. The first IGS satellite launched in 2003.

The IGS system is designed to function as a constellation of four low Earth orbiting satellites consisting of two satellites with optical sensors and two with radar to monitor North Korea and East Asia.

Several IGS radar satellites have failed prematurely, reducing the IGS fleet to three operational optical satellites. A fourth optical satellite, launched in September 2010, has yet to enter service.

“There is nothing wrong with the optical satellite, it is just finishing its on-orbit checkout,” the official said. If all goes well, the radar satellite will come into operation in two to three months, the official said.

The official also said that another radar satellite launch is planned for sometime during Japan’s 2012 budget year, which begins in April.

Dec. 12 launch was the 14th consecutive successful flight for the H-2A since a November 2003 failure destroyed two IGS satellites.

The next H-2A mission is scheduled for March, when it will launch South Korea’s multipurpose ArianSat 3 satellite, the rocket’s first and only commercial contract to date.

Orbital Picks ‘Antares’ As New Name for Taurus 2

Dulles, Va.-based Orbital Sciences Corp. announced Dec. 12 that it has picked “Antares” as the new moniker for its Taurus 2 rocket, a medium-class booster slated to launch the firm’s unmanned Cygnus spacecraft on space stations as early as 2013.

Orbital officials said the new name will reflect the company’s Taurus XL rocket, which is a direct replacement for the retired Taurus rocket that carried some university payloads.

“Antares is one of the brightest stars in the night sky and the brightest star in the constellation Scorpius.”

Orbital officials explain on the company’s Antares website, “Orbital selected the name of keeping with the retro constellation naming tradition of using Greek-derived celestial names for launch vehicles.”

This is not the first time the name Antares has been used by Orbital Sciences in space launch contracts.

In 1971, NASA’s Apollo 14 mission to the Moon carried a lunar lander dubbed Antares. NASA astronauts Alan Shepard and Edgar Mitchell rode the Antares lander to the lunar surface and spent 53 hours and 51 minutes on the Moon before returning to their command module in orbit.

Proton Rocket Puts Israeli, Russian Satellites in Orbit

A Russian Proton rocket placed an Israeli commercial telecommunications satellite and a Russian military data relay spacecraft into geostationary orbit Dec. 12, with both satellites reported healthy after separation.

The Proton’s Breeze-M upper stage.

Both satellites are based on Russian prime contractor ISS Reshetnev’s Express-1000 spacecraft structure, with payload contributions by Thales Alenia Space of France and Italy.

Seven years after a U.S.-based Reshetnev won the Amos 5 contract with Israeli satellite fleet operator Spacecom in 2008 with a bid valued at $157 million, including the satellite’s construction and launch. It represented one of the first non-Russian contract wins for Reshetnev, which has teamed with Thales Alenia Space on numerous satellites for Russia’s domestic satellite communications market.

Tel Aviv-based Spacecom will operate the Amos 5 satellite at 17 degrees east in geostationary orbit. It will add to its commercial business, especially with a C-band beam covering a wide swath of Africa.

Amos 5, which carries 18 C-band transponders — 14 broadcasting at 72 megahertz and four at 36 megahertz — and 18 and 72-megahertz Ku-band transponders, Spacecom, whose Amos 2 and Amos 3 satellites operate at 4 degrees west, said the Amos 5’s capacity was more than 55 percent sold before launch.

In a Dec. 12 statement, Spacecom Chief Executive David Polk said the addition of Amos 5 “further transforms Spacecom into a leading multi-regional satellite operator … as we prepare to bring our reliable high-quality services to Africa. The satellite will offer excellent coverage and ready capacity to a rapidly growing region.”

Spacecom had leased the former AsiaSat 2 satellite, owned by AsiaSat of Hong Kong, and moved it to the 17-degree east in early 2010 to pair it with the company’s market. Amos 5 AsiaSat 2 was near retirement.

Orbital Sciences currently plans to launch the first two Antares rockets in the first half of 2012. The company currently has a $1.9 billion contract with NASA to provide eight cargo delivery flights to the space station using the Antares rocket and the Cygnus spacecraft.

NOAA Administrator Warns of Greater Disruption from Solar Maxima in 2012

Increased solar activity anticipated in 2012 is not likely to be markedly different from previous solar maxima, but this one has the potential to cause more disruption because businesses and individuals rely heavily on the electric grid, GPS, satellite communications and other technologies that may be affected by solar storms, the leader of the U.S. National Oceanic and Atmospheric Administration (NOAA) said Dec. 7.

“There is concern that extreme solar events might have devastating impact on the U.S.” NOAA Administrator Jane Lubchenco said.

NASA’s Advanced Composition Explorer (ACE) mission launched in 1997 to monitor solar wind remains in excellent health with enough fuel to operate “until at least 2020,” said Adam Szabo, ACE program scientist at NASA’s Goddard Space Flight Center in Greenbelt, Md. Nevertheless, NOAA is planning ACE’s replacement because the spacecraft is “well past its expiration date,” Lubchenco said during an American Geophysical Union conference in San Francisco.

ACE was designed to gather data for five years. “While there is no evidence that ACE has any imminent failures, we are prudent to start planning for its eventual replacement,” Szabo said in a Dec. 7 email.

The administration of President Barack Obama requested funding in its 2011 and 2012 budget requests for an operational space weather satellite, the Deep Space Climate Observatory (DSCOVR). No money was provided in 2011. In 2012, however, Congress appropriated $30 million of the $47 million the agency requested to fund the project. That money will allow NOAA to move ahead, Lubchenco said. A DSCOVR launch is anticipated in 2014.

In the near term, NASA’s Solar Terrestrial Relations Observatory — Stereo, for short — also is aiding scientists in monitoring solar activity, Barbara Giles, NASA Heliophysics Division director, said. Data drawn from Stereo, a mission launched in 2006, can help scientists plan future operational space weather monitoring capabilities, Giles added Dec. 6 at the American Geophysical Union meeting. “We intend to make our data and models available to NOAA and any other agency that needs it, so they can work on prototyping and demonstrating such a capability,” she added.
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B

etween EchoStar's $2 billion purchase of broadband provider Hughes, the space shuttle's retirement after three decades of operation and the first launch of a Russian rocket from European soil, the space industry continued to demonstrate during 2011 that it is as diverse and dynamic as any global industry.

Much of the news has been less than positive, fueled by the financial crises facing the United States and much of Europe. But for every failed company or failed mission there have been spectacular successes including the U.S. National Reconnaissance Office's multi-launch campaign that helped narrow looming gaps in intelligence-gathering capabilities and China's first on-orbit docking. The commercial satellite communications industry, meanwhile, continues to prosper, oblivious to the stubborn global economic downturn.

What follows are brief recaps of just some of the events that helped shape and define the global space industry in 2011, and whose influence will continue to be felt in the years ahead.

— The Editor

**JANUARY**

**NASA** hands Congress a preliminary de-

sign for the heavy-lift Space Launch System featuring technology from the space shuttle and Constellation programs. NASA says the vehicle is likely to cost more and take longer to field than mandated by Congress.

Boeing Space and Intelligence Systems wins a $2 billion order from the Mexican government for the three-satellite Mexsat program. Boeing will build two large I-

band satellites and has hired Orbital Sci-

tics Corp. to build a smaller C- and Ku-

band satellite.

U.S. President Barack Obama signs a de-

fense policy bill that supports missile de-

fense programs but bars the Pentagon from spending money in 2011 on a Euro-

pean missile shield until certain require-

ments are met, including agreements by countries to host the necessary assets.

Interest of London secures $666 million in loans from the U.S. Export-Import Bank to finance the three-satellite Global Express all-up-rate network, which is being built by Boeing Space and Intelligence Systems.

The European Space Agency (ESA) selects Astrium Services as prime contractor and operator of the European Data Relay Sys-

tem, to feature two femtosatellites in geosta-

tionary orbit. Astrium is investing in system development in return for exclu-

sive rights to develop the data-relay serv-

cice into a business.

NASA’s Planetary Science Division Director James Green announces that the $2.5 bil-

lion Mars Science Laboratory will send a 308-mission cash infusion in order to launch in 2011. The mission had already missed its 2009 launch window.

ESA’s 2011 budget rises by 7 percent com-

pared with 2010, to nearly 6 billion euros ($7.8 billion), but agency officials say they will keep cash withdrawals to a minimum.

An analysis by the Aerospace Corp. con-

cludes that the current Indian satellite constella-

tion is low Earth orbit and will remain operational until 2011. The analysis was re-

quested by the French export credit agency, Cofinor, and commercial banks fin-

ancing India’s second-generation India-

sat constellation.

Europe and China remain apart in nego-

tiations to resolve frequency overlaps in their planned satellite navigation sys-

tems, the European Commission con-

cludes in a report. The overlap concerns the encrypted PNS service on Europe’s planned Galileo system, which is equiva-

lent to the military code under the U.S. GPS constellation.

With the shuttle program winding down, NASA unveils a facility, leasing plan de-

signed to avoid mothballing shuttle infra-

structure at the Kennedy Space Center, Fla. Among the buildings up for lease is the iconic Vehicle Assembly Building.

The U.S. Air Force’s recently launched Space Based Space Surveillance satellite is on track to enter operations after com-

pleting its initial checkout phase. The satellite is expected to increase the num-

ber of objects the Air Force can track in space by a factor of 10.

Intelsat concludes that the failure that allowed its Galaxy 5 satellite to drift across the geostationary arc for several months while remaining electrically active was caused by an electrostatic discharge and had nothing to do with solar activity.

Construction starts on the main sensor for the next generation of geostationary weather satellites, and the program passes an early design review. The SmallSat Operational Environmental Satellite program is targeted for a first launch in October 2015.

The U.S. National Reconnaissance Office’s (NRO) former chief warrant officer, Christopher Ross, himself a former Space Shuttle commander, is confirmed as the first civilian in space, with a NASA astronaut Mark Kelly, is shot and gravely wounded by a deranged gunman outside a grocery store in his district.

Europe’s second Automated Transfer Vehicle unmanned cargo carrier docks automatically to the international space station to deliver food, fuel and supplies, and to put the station into a higher orbit.

EchoStar Corporation purchases broadcast serv-

ice and hardware provider Hughes Com-

munications for about $2 billion including assumptions of Hughes’ debt.

The U.S. Defense Department says it will not contribute to the Medium Extended Air Defense System, being developed jointly with Germany and Italy, by 2033.

NASA asks Congress for big funding in-

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**FEBRUARY**

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— The Editor

**MARCH**

The French government agrees to spend

$500 million (€410 million) in a state bond issue on space technologies, including preliminary work on a next-
generation rocket to succeed the heavily Ariane 5, and satellite proj-

ts including the Surfact Water Ocean Topography mission with NASA.

Mitsubishi Electric Corp. of Japan, in its largest commercial satellite award, has won the hotly contested contract to build two telecommunications satellites for the United Arab Emirates.

The National Research Council officially rolls out its roadmap for NASA planetary exploration for the next 10 years, putting a Mars sample-collection mission at the top of its list of fabled farthest priorities. NASA concludes that it cannot afford to carry out the mission as designed.

The U.S. Air Force’s first Space Based In-

frared System (SBIRS) satellite, GEO-1, arrives at Vandenberg Air Force Base, Calif., in preparation for a May launch on an Atlas V rocket. Once in geosynchronous orbit, the long-delayed missile warning satellite will join two DBRS payloads hosted on classified satellites in high elliptical orbits.

A board of inquiry concludes that a mi-

saligned propellant tank connected to a

satellite rocket caused the failure of the Eutelsat W3B satellite shortly after launch. The satellite’s highly elliptical transfer orbit, in which it is likely to remain as space de-
bris for 20 years or more.

 Venture firm XCOR Aerospace and United Launch Alliance announce their collaboration on a new cryogenic upper-

stage rocket engine that could one day replace Pratt & Whitney’s RL-10 super-

stage engine used on the Atlas 5 and Delta 4 rockets.

Following back-to-back flight test fail-

ures of its primary strategic missile

systems, the U.S. Missile Defense Agency defers plans to buy long-range targets and reduces by 20 percent the total num-

ber of tests planned to conduct during the next few years.

Intelsat agrees to be the anchor customer for Boeing’s satellite in orbit-boosting service, called Space Infrastructure Ser-

vices, agreeing to spend $260 million for several of its satellites to be rebuffed by Intelsat and Intelsat agree to share the search for a government customer.

Two low Earth orbiting demonstration satellites built by Northrop Grumman Aerospace detect and track a ballistic missile through all phases of flight. Sci-

called death.truth tracking of a ballistic missile launch had never been done before from space.

An Orbital Sciences-built Taurus XL rocket fails to fully release its payload faking, doomed NASA’s Glory satellite two years after a similar failure on the same rocket deployed NASA’s Orbital Carbon Observatory.

Mobile satellite services provider In-

marsat acquires maritime communications specialists Ship (Cape of Norway) for $91.5 million as it prepares for its next-
generation Ka-band Global Express service, aimed primarily at the maritime market.

**APRIL**

NASA spreads $269 million over four companies in the second round of the agency’s Commercial Crew Develop-

ing program. Boeing, Sierra Nevada Space Systems, SpaceX and Blue Origin will each receive seed money to develop crew-carrying vehicles.

India’s Resourcesat-2 Earth observation satellite is successfully launched aboard an Indian PSLV rocket. The satellite’s im-

ages will be useful for Indian government projects and will also be sold on the com-

mercial market.

The U.S. Air Force, NASA and the U.S.

National Reconnaissance Office (NRO) agree to take steps to permit emerging rocket builders to launch government satel-

sites, in competition with United Launch Alliance.

NASA Administrator Charles Bolden says the James Webb Space Telescope, al-

ready billions of dollars over budget and years behind schedule, probably will not launch until 2017.

Boeing Phantom Works wins a $5 million contract from the U.S. Air Force to develop two experimental cubesats that will carry space weather payloads under the Service’s Experimental Nanosatellite Experiment program.

The U.S. Trade Representative’s annual report again points to China and India as industries that maintain barriers to foreign satellite services providers to protect their domestic and government-owned satellite fleet operators.

SpaceX says it is targeting a 2013 test launch of its highly elliptical transfer orbit, where it is likely to remain as space de-
bris for 20 years or more.

Venture firm XCOR Aerospace and United Launch Alliance announce their collaboration on a new cryogenic upper-

stage rocket engine that could one day replace Pratt & Whitney’s RL-10 super-

stage engine used on the Atlas 5 and Delta 4 rockets.

Following back-to-back flight test fail-

ures of its primary strategic missile

systems as the head of Roscosmos, the Russian space agency.

The U.S. National Reconnaissance Office caps an eight-month, air-launch campaign with the launch of the NROL-38 satellite from Vandenberg Air Force Base. Cali. NRO Director Sean O’Keefe says one satellite, launched in January, will become a pro-

tected target in a key intelligence-gathering capability from nine months to 35 days.

The Russian Space Mission Agency awards three contracts totaling $2.3 billion to design a Next Generation Aegis, or Stan-

dard Missile 3 Block 1B, interceptor. Lockheed Martin received $473 million, Raytheon won $467 million, and Boeing, $461 million.

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December 19, 2011

SPACE NEWS

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NASA’s Inspector General says the Mars Science Laboratory will interfere to a wide variety of GPS applications, including military. A U.S. House defense oversight panel’s recommendation not to fund a proposed Naval BASE tracking satellite system draws fire from one prominent member, who nonetheless endorses the broader measure that contains the provision. SSTL Technology Co. Ltd., for a three-satellite constellation of optical observation satellites with a ground resolution of 1 meter. SSTL has a capacity of about 30,000 per second. The U.S. House passes a defense authorization bill that approves Air Force plans to buy two more secure communications satellites, adds $310 million to the Pentagon’s Operational Responsive Space budget and authorizes $50 million for a study on space-based missile interceptors. White House science advisor John Holdren says the administration of President Barack Obama is interested in a dialogue with Congress to begin laying the groundwork for future partnerships in space exploration. The comment draws the ire of Rep. Frank Wolf (R-Va.). The U.S. Air Force successfully launches its first dedicated Space Based Infrared System (SBIRS) ground-based missile warning satellite aboard an Atlas 5 rocket from Cape Canaveral Air Force Station, Fla. The U.S. House approves a $25 million contract to United Launch Alliance to loft the Navy’s second Mobile User Objective System satellite, the Air Force’s sixth Wideband GlobalSAT satellite, and the NRO-65 mission for the National Reconnaissance Office. The Senate Commerce, Science and Transportation Committee subpoenas the company’s Atlas V rocket to Florida’s Cape Canaveral Air Force Station aboard a Delta IV rocket, bringing an end to the Development program aimed at fostering development of privately run astronaut transport services. The U.S. House Appropriations Committee approves a spending bill that would provide $901.3 million in 2012 for a cash-starved polar weather satellite program. The U.S. House Appropriations Committee passes a defense spending bill that would provide $910.3 million in 2012 for a cash-starved polar weather satellite program. The U.S. House Appropriations Committee approves a spending bill that would provide $910.3 million in 2012 for a cash-starved polar weather satellite program. The U.S. Senate Commerce, Science and Transportation Committee subpoenas NASA documents related to the agency’s progress on the heavy-lift Space Launch System.
2011: THE YEAR IN REVIEW

SEPTEMBER

Commercial launch services provider Sea Launch AG, now of Bern, Switzerland, restructures to save up to 25% in cost avoidance involving a Chapter 11 bankruptcy process that removed its debt.

Satellite operator SES of Luxembourg and Russia’s Eutelsat系统的 partnership marks an exciting relationship between Eutelsat of Paris and Russian Satellite Communications Co. of Moscow.

The U.S. Air Force awards Boeing Space and Defense Systems $1.3 billion contract to build a seventh WebSat Global Broadcast satellite and to start building parts for eight more. The first-hand price contract modification includes an option for a ninth spacecraft.

NASA commits to building the Space Launch System and announces the rocket’s first two missions: sending the Multi-Purpose Crew Vehicle around the Moon and back. The first flight is slated for 2017 and will be unmanned. A crew-carrying mission will follow in 2021.

Intelsat purchases two large satellites from Space Systems/Loral and will lease most of their capacity to DirecTV Latin America in a transaction that will add up to $3.7 billion to the company’s backlog.

Robert Braun, NASA’s first chief technologist in a decade, resigns after less than two years on the job, citing a desire to return to academia.

Locked Hartle Space Systems says it has completed thermal vacuum testing of the U.S. Navy’s first Mobile User Objective System satellite, putting the 10-bay schedule spacecraft on pace to launch during the first quarter of 2012.

A European Ariane 5 heavy-lift rocket launches an SES telecommunications satellite carrying a hosted payload for the U.S. Air Force. The first time the service has agreed to such an arrangement with a commercial satellite operator. Development of the Commercially Hosted Instrument Program — Hosted Instrument (CHIP) — is expected to be funded by the host payload operators.

ATV AquaSat completes a prototype of the shuttle-like cargo module housed in a satellite. The module is intended to be a part of the Space Launch System.

U.S. Senate appropriators propose canceling development of a missile interceptor that the Pentagon has shelved for a key role in the future defense of Europe. The Standard Missile-3 Block 2B interceptor is a subject of a competition between Boeing, Lockheed Martin and Raytheon.

The inaugural flight of the Europeanized version of Russia’s Soyuz rocket places two Eutelsat Galileo navigation satellites into medium Earth orbit. The first Chinese launch of a Western commercial satellite takes place.

The U.S. Department of Defense says it is moving ahead with planned block buys of satellite launches despite a Government Accountability Office recommendation to reassess that strategy.

High Frequency 1 spacecraft arrives in geostationary orbit 14 months after being launched with a deficit in its propulsion system that forced contractors to use its smaller backup motors to raise it to final position.

Russia’s Glonass positioning, navigation and timing satellite constellation is restored to full 24-satellite strength following the launch of a Glonass M spacecraft. Glonass and the U.S. GPS constellation are the only two global navigation systems in service.

Orbital Sciences Corp. and SpaceX must complete before they can start routine cargo runs to the international space station.

Japan launches a pair of Theater High Altitude Area Defense satellites into low Earth orbit.

U.S. Defense Secretary Leon Panetta warns of devastating cuts to the Pentagon, including military space programs, if a congressional supercommittee fails to agree on a deficit reduction plan, triggering an automatic $1.2 trillion reduction in defense spending over the next decade.

NASA’s Gravity Recovery and Interior Laboratory launches from Cape Canaveral Air Force Station in Florida. The mission’s two orbiters will study the Moon’s interior.

LightSquared Chairman and Chief Executive Sanjiv Agar discloses on Capitol Hill “indecisive” allegations that the company, which is planning a satellite-terrestrial mobile broadband network serving North America, received favorable treatment from U.S. telecommunications regulators because of its political connections.

Intelsat’s Norway-based Recovery and Interior Laboratory launches from Cape Canaveral Air Force Station on Florida. The mission’s two orbiters will study the Moon’s interior.

NOVEMBER

China’s Shenzhou-9 spacecraft returns to Earth after performing China’s first in orbit docking, a key capability as China designs its own space station.

Russia’s Proton-MiG spacecraft, which was to return a sample of a martian moon to Earth, gets stranded in Earth orbit after launch. The Russian space agency repeatedly tries to communicate with the craft but fails.

France-Russia satellite builder Thales Alenia Space signs an agreement on future strategic cooperation with Russia’s biggest satellite builder, ISRO, in a deal that in recent years has been more active in the commercial market.

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NASA’s Gravity Recovery and Interior Laboratory launches from Cape Canaveral Air Force Station.

The U.S. National Oceanic and Atmospheric Administration (NOAA) advises its European counterpart, Eumetsat, that it will not be able to finance payloads that had been planned for Europe’s second-generation polar orbit meteorological satellite system. NOAA is also having trouble funding a new mission needed to launch the U.S. European Union’s 3-meter satellite.

NASA proposes a 2014 test flight of its Ohio Multi-Purpose Crew Vehicle. The capsule’s intended career rocket, the Space Launch System, will not be ready then, so the craft will fly on a Delta 4 rocket at a cost of $579 million.

A NATO procurement official warns of “out-of-bounds” unless the 20 nations agrees on satellite launch costs that will allow all nations to participate.

Japan launches a pair of Theater High Altitude Area Defense satellites into low Earth orbit.

Orbital Sciences Corp. renames its Taurus 2 rocket the “Antares.”

The U.S. Air Force awards $150 million to United Launch Alliance for launch of the fifth Medium-Global Satellites military communications satellite.

A team that includes Microsoft co-founder and billionaire Paul Allen, aerospace design wizard Burt Rutan and former NASA Administrator Mike Griffin unveils plans for an air-launched rocket capable of placing medium-sized satellites into low Earth orbit.

Japan tests an L-band radar satellite as part of its Information Gathering Satellite system and as a precursor to launching U.S. national security satellites.

Japan agrees to provide two radar Earth observation satellites to Vietnam as part of a broader development assistance agreement between the two nations. The deal illustrates Japan’s new focus on satellite applications and is Japan’s first export of an Earth observation satellite.

PPP, the next-generation U.S. civil polar-orbiting weather satellite, is delayed from Vandenberg Air Force Base, Calif. The NASA-led mission was conceived as an instrument test-bed for a descent, civil-military weather satellite system but was thrust into an operational role when the parent project was downsized in 2010.

The European Space Agency selects Solar Orbiter, to be built with NASA, and the European Space Agency to investigate the mission’s expanding role in support of the agency’s next Medium-class space mission, for launch in 2017 and 2020.

Orbital Sciences Corp. renamed its Taurus 2 rocket “Antares.”

Citing tight budgets, NASA shifts gears on its Multi-Purpose Crew Vehicle development program, announcing that the next round of funding will be dispersed under Space Act Agreements rather than traditional contracts subject to Federal Acquisition Regulations.

Intelsat, currently held by private equity investors, seeks regulatory approval to transfer ownership of its satellite fleet, the world’s largest, following its long anticipated public stock offering.

DECEMBER

A team that includes Microsoft co-founder and billionaire Paul Allen, aerospace design wizard Burt Rutan and former NASA Administrator Mike Griffin unveils plans for an air-launched rocket capable of placing medium-sized satellites into low Earth orbit.

Japan launches the latest radar satellite as part of its Information Gathering Satellite surveillance system aboard an Arian couple rocket.

The U.S. Congress passes a National Defense Authorization Act for 2012 that includes provisions designed to increase scrutiny of the Pentagon’s main satellite launch system and to protect GPS against ICBM interference from commercial systems.

NASA gives conditional approval for SpaceX to combine two demonstration cargo flights to the international space station and announces a Feb. 7 launch date.

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Lockheed Martin Readies Production Lines for GPS 3

DEBRA WERNER, SAN FRANCISCO

Lockheed Martin Space Systems is gearing up to produce the U.S. Air Force’s next-generation Global Positioning System (GPS) navigation satellite in a roughly 4,000-square-meter production facility that has more in common with advanced aircraft assembly lines than low-volume satellite production lines.

During the last three years, Lockheed Martin gutted the former Atlas and Centaur rocket assembly plant in Littleton, Colo., and built a production line large enough to accommodate six or seven satellites at a time. The facility includes dedicated thermal vacuum and anechoic chambers as well as a 2,800-square-meter high bay with room for four spacecraft.

“There is enough volume to put together a true production line, which makes the spacecraft more affordable,” said Keoki Jackson, GPS 3 program manager for Denver-based Lockheed Martin Space Systems.

Lockheed Martin is using the new factory for final assembly, testing and integration of the GPS 3 Non-flight Satellite Testbed (GNST), a prototype of the GPS 3 satellite the company is building to validate the spacecraft’s design and perform final testing before being shipped to Stennis Space Center in Mississippi to undergo environmental procedures.

That satellite is scheduled for launch in May 2014, Lockheed Martin spokesman Michael Friedman said.

Lockheed Martin officials plan to spend nearly a year completing GNST assembly and testing. The prototype spacecraft will be fitted with its primary navigation payload featuring additional capability.

GPS 3 at Lockheed Martin facility

The entire GPS 3 acquisition strategy is designed to help the Air Force avoid some of the costly problems associated with previous satellite development programs. That back-to-basics approach is characterized by extensive, up-front systems engineering work to uncover problems long before construction begins on flight hardware.

The new strategy already is paying dividends, Jackson said. Lockheed Martin engineers working on the GNST have identified hardware and software integration issues. Those issues “were reasonably easy to resolve at this stage of the game,” Jackson said, adding that it would have been far more expensive and time-consuming to fix the problems if they were discovered when the first flight vehicle was being assembled.

“Lockheed Martin employees who assembled GNST subsystems and now are building subsystems for the first flight unit also are noticing significant reductions in the number of defects encountered and lower labor costs,” Jackson said. The core structure for the first flight vehicle is being mated with propulsion subsystems at Tenneco in Mississippi before traveling to Littleton in the summer of 2012, Jackson said. That satellite is scheduled for launch in May 2014, Lockheed Martin spokesman Michael Friedman said.

Lockheed Martin officials plan to spend nearly a year completing GNST assembly and testing. The prototype spacecraft will be fitted with its primary navigation payload featuring additional capability.

The prototype is then scheduled to undergo extensive testing before being shipped in late 2012 to Cape Canaveral Air Force Station in Florida, where it will be used to verify launch processing procedures.

In an effort to reduce the overall cost of the GPS 3 program, Lockheed Martin is proposing launching two satellites at a time on United Launch Alliance Atlas 5 rockets. Company representatives briefed senior Air Force officials in early December on the results of a study showing that the dual launch approach would be feasible and would provide “a significant reduction in the cost to orbit,” Jackson said.

In 2008, the Air Force awarded Lockheed Martin a $1.5 billion contract to build GNST and the first two GPS 3 flight vehicles. Since then, the service has directed Lockheed Martin to procure longlead items for the third and fourth flight vehicles. In all, the Air Force has spent approximately $1.7 billion on the GPS 3 research and development program, according to a report released Oct. 28 by the Congressional Budget Office, “The Global Positioning System for Military Users: Current Modernization Plans and Alternatives.”

Lockheed Martin officials said they anticipate a contract for production of the third and fourth GPS 3 flight vehicles by the end of 2011. The Air Force is expected to buy as many as 32 GPS 3 satellites in three successive blocks, each featuring additional capability.

Overall, GPS 3 satellites are designed to offer significantly more accuracy than the current constellation of GPS spacecraft, allowing users to determine their position to within one meter, compared with slightly more than three meters with the existing signals. In addition, the new spacecraft will produce higher-power signals for military customers and a new civilian signal interoperable with other satellite navigation constellations, including Europe’s Galileo, Jackson said.

Even before the GNST arrived in Littleton, Lockheed Martin engineers tested manufacturing procedures for the new spacecraft in the company’s Collaborative Human Immersive Laboratory, a virtual reality facility that opened Dec. 14 in Denver.

Lockheed Martin workers used head-mounted displays to practice assembly and testing procedures in the virtual environment. That activity helped program managers eliminate redundant operations and streamline tasks, Jackson said.

Comments: dpmower@qual.com

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Program officials plan to hold a webcast briefing the week of Dec. 19 to provide more details about the revised commercial crew flight vehicle acquisition strategy. Gerstenmaier said NASA intends to award multiple Space Act Agreements next summer, which is the same timeframe as agency officials had targeted for awarding one or more fixed-price Commercial Crew Integrated Design contracts.

"In the current budget environment … it’s really tough to lock into a firm-fixed-price contract with a number of providers that can keep us moving forward," Gerstenmaier said. "We decided that to help with that uncertainty, we could do a Space Act activity which has individual milestones, and each one of those milestones can be incrementally approved so it gives us some flexibility from a budget standpoint."

NASA’s announcement coincided with the release of a Government Accountability Office (GAO) report praising NASA’s use of firm-fixed-price, performance-based contracts for Commercial Crew but questioning whether NASA could afford to fund more than one contractor under the budget Congress approved in November. The GAO advised NASA to reassess its procurement approach in light of the agency’s budget challenges.

NASA is heading into 2012 with a budget $648 million smaller than 2011 and nearly $1 billion below what it requested. Although NASA’s 2013 budget request is embargoed until February, U.S. aerospace industry officials are bracing for further cuts.

NASA in April awarded Space Act Agreements totaling $270 million — since increased to $315.5 million — to Blue Origin, Boeing, Sierra Nevada Space Systems and Space Exploration Technologies (SpaceX) to refine their commercial crew concepts and test key technologies in preparation for a more intensive design phase.

In July, NASA Commercial Crew Program officials said Space Act Agreements were ill-suited for the upcoming integrated design phase and that they would be switching to fixed-price, FAR-type contracts. NASA’s about-face, then and now, drew a mixed reaction.

"This announcement was one small step for commercial crew, and one giant leap for common sense," said Michael Gold, director of operations for Bigelow Aerospace, the North Las Vegas, Nev.-based company developing inflatable space habitats.

SpaceX President Gwynne Shotwell also praised NASA's decision. “Given budget realities, NASA and domestic space companies need to innovate more than ever,” she said in a Dec. 15 statement. "We applauded NASA's decision to use Space Act Agreements for the next round of commercial crew and look forward to the competition.”

Rep. Ralph Hall (R-Texas), chairman of the House Science, Space and Technology Committee, questioned the implications of NASA’s decision.

"The disadvantage of using Space Act Agreements is that NASA cannot impose its safety requirements as would be possible under a normal acquisition," Hall said in a Dec. 15 statement. Gerstenmaier acknowledged this limitation. "[Although we can’t specify the exact requirements … we still get a lot of insight into what they’re doing. We can see how their designs are progressing, but we just can’t formally interact with them," he said.

Hall also said he is concerned about NASA's ability to afford funding multiple, competing efforts. "Time is of the essence. We need to be able to fully utilize our Space Station until the end of this decade, and we also need to end our reliance on other countries to ferry our astronauts," Hall said. "In order to reduce risk and cost, and to minimize further schedule slips, it would be my hope that two commercial companies would team together to jointly develop a cost-effective and safe launch system."

Boeing spokeswoman Susan Wells said NASA’s procurement strategy is less important than “ensuring the aggressive implementation of a safe, reliable and cost-effective capability.”

“Our hope is that NASA balances the desire to maintain a large number of partners with the urgency to adequately support the International Space Station with a domestic transportation capability by 2015,” Wells wrote Dec. 15 in an email to Space News.

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Reflectors Would Support Secondary GPS 3 Applications

RACHEL BERNSTEIN, WASHINGTON

Several U.S. government agencies are awaiting U.S. Air Force approval for a plan to include laser reflectors on the service’s next generation of GPS navigation and timing satellites, a $200 million investment advocates say would support a variety of scientific and mapping applications.

NASA has agreed to fund the project, entailing the installation of laser retro-reflectors on the second block of GPS 3 satellites. The reflectors would be used to determine more precisely the orbital location of the satellites, data that, when combined with GPS position-location and timing information, would improve the quality of various secondary GPS applications, according to U.S. government officials.

Among the agencies advocating for the installation of retro-reflectors are the U.S. National Geospatial-Intelligence Agency (NGA), the National Oceanic and Atmospheric Administration and the U.S. Geological Survey. NASA is taking the lead because it has experience with the technology and because the reflectors would support agency efforts to model the Earth’s gravity field and improve its understanding of the Earth’s shape and distribution of mass, NASA spokeswoman Stephanie Schierholz said in an emailed response to questions.

The request to include the retro-reflectors on the GPS 3 satellites was submitted in 2005, which was too late to integrate the hardware on the first block of satellites, Air Force Space Command spokeswoman Christina J. Sukach said in an emailed response to questions. The request is under review in an interagency forum to determine whether it meets policy guidelines for secondary payloads aboard the GPS 3 satellites, the statement said. Assuming that condition is met, the retro-reflectors will be added to the GPS 3 requirements documents for further evaluation, the statement said.

According to NASA, the laser retro-reflectors would cost $500,000 each, plus ongoing support for tracking and analysis. The total cost would be $200 million through the lifetime of the GPS 3 constellation, Schierholz said.

NASA Administrator Charles Bolden informed the Air Force in June 2010 that the agency would provide equipment for the project and related tracking and analysis data to NGA.

NASA would tap the Jet Propulsion Laboratory in Pasadena, Calif., and the Goddard Space Flight Center in Greenbelt, Md., to develop the reflectors. Those centers have expertise in developing GPS receivers and laser ranging instrumentation for scientific research applications.

The retro-reflectors would reflect laser signals beamed from the ground back to their sources, revealing the satellites’ precise orbital location based on the time it takes for the light to make the round trip. Satellites tend to drift from their prescribed orbits over time, and this drift reduces the accuracy of certain high-precision GPS applications such as measuring the movement of the Earth’s tectonic plates. With better orbital location data, scientists can correct for the satellites’ drift.

The concept of combining GPS data with laser retro-reflector measurements is not new. Two GPS 2 satellites were equipped with reflectors in 1994, and similar hardware is either being included or planned for inclusion in the Russian Glonass and European Galileo satellite navigation systems, according to U.S. government officials.

The addition of retro-reflectors is part of a “commitment … to keep GPS the gold standard of [global navigation satellite systems] worldwide,” Col. Harold Martin, head of Positioning, Navigation and Timing (PNT) Command at Air Force Space Command, said here during a recent meeting of the government’s PNT advisory board.
Today, the requirements of satellite customers are more challenging than ever. And day after day, launch after launch, Boeing is meeting those challenges across the spectrum—with solutions that deliver total performance and superior capability to end users. No matter what the requirements, the commitment remains the same: performance as promised.
Comtech Reaffirms 2012 Forecast Despite Mounting Budget Pressure

PETER B. de SELDING, PARIS

Satellite ground communications manufacturer Comtech Telecommunications is sticking with its earlier revenue and gross-profit forecasts for 2012 despite what it says are signs that pressure on U.S. government spending, its primary source of revenue, is increasing on all fronts.

In particular, the company told investors, its biggest microsatellite contract, with the U.S. Naval Research Laboratory, now appears under threat of cancellation.

McVille, N.Y.-based Comtech’s AeroAstro division is building a satellite platform, or skeletal structure, for a star-mapping satellite called Joint Milli-Arcsecond Pathfinder Survey, or JMAPS, under two contracts with a combined value of $45.4 million. The satellite was to have been launched in 2015.

Comtech had hoped that this contract would pave the way for future work for its microsatellite division. Company Chief Executive Fred Kornberg, in a Dec. 9 conference call with investors, said that although it is still hopeful that a tight budget environment will cause U.S. government agencies to seek out smaller, less expensive satellites such as those that AeroAstro can build.

But JMAPS is in trouble. “As a result of the extreme pressures on our U.S. government customers to reduce in spending,” the company’s Chief Financial Officer Michael D. Porcelain said in a Dec. 8 filing with the U.S. Securities and Exchange Commission (SEC), “and the threat that additional bookings for our large microsatellite contract have become less certain,” Comtech said in a Dec. 9 conference call with investors, “we believe it is still hopeful that a tight budget environment will cause U.S. government agencies to seek out smaller, less expensive satellites such as those that AeroAstro can build.

But JMAPS is in trouble. “As a result of the extreme pressures on our U.S. government customers to reduce in spending,” the company’s Chief Financial Officer Michael D. Porcelain said in a Dec. 8 filing with the U.S. Securities and Exchange Commission (SEC), “and the threat that additional bookings for our large microsatellite contract have become less certain,” Comtech said in a Dec. 9 conference call with investors, “we believe it is still hopeful that a tight budget environment will cause U.S. government agencies to seek out smaller, less expensive satellites such as those that AeroAstro can build.

Kornberg said Comtech is already certain of receiving the expected JMAPS revenue in 2012 and early 2013. Further work is uncertain, but he said he remains confident that “the customer will eventually find the funds to complete it. It was just a matter of time.”

The microsatellite work was to have been a growth relay as Comtech transitions its business following the loss of two of its two largest contracts, the Movement Tracking System (MTS) and the Blue Force Tracking (BFT)-1 work that together have been central to Comtech’s financial performance for the past decade.

The U.S. Army selected ViaSat Corp. of Carlsbad, Calif., for the second-generation BFT work, called BFT-2, and is gradually winding down its work with Comtech. Still undetermined is how fast the wind-down will occur, and how much “sustainment” work on MTS and BFT-1 the Army will request Comtech to perform in the coming three to five years.

In the conference call, Kornberg said Comtech is still negotiating with the Army on the kind and amount of MTS and BFT-1 work Comtech will do. Comtech has said that, depending on what the Army decides, the company may inaugurate a new pricing system for Comtech-owned intellectual property used in MTS and BFT-1. This would compensate the company for the possible loss of the contract to provide the Army with commercial satellite capacity as part of the hardware delivery contract.

The company’s overall performance in some of Comtech’s other markets, makes it difficult to predict how the coming months will develop.

For now, Comtech is sticking with its earlier forecast that total revenue will be between $490 million and $490 million, with EBITDA, or earnings before interest, taxes, depreciation and amortization, at about 17.5 percent of revenue.

A bright spot, Kornberg said, is the company’s 500-watt Ka-band tube amplifier for high-throughput broadband satellites. Satellites of this type are just now entering the commercial market in Europe and North America, and represent a high-growth area in an otherwise static overall satellite manufacturing market.

BOEING RECEIVES TRACKING AND DATA RELAY (TDRS) M CONTRACT NOVEMBER 30, 2011

NASA has exercised an option to add TDRS M Satellite to the existing TDRS fleet. Three Boeing-built TDRS satellites are currently providing critical services to NASA, with two more on schedule for future delivery.
EARTH SCIENCE and Climate Monitoring

DEBRA WERNER, SAN FRANCISCO

Columbia University’s International Research Institute for Climate and Society (IRI) is using data drawn from space-based sensors to help public health officials around the world learn when climate conditions increase the risk of epidemics.

The researchers have created free, Internet-based tools designed to provide local officials with timely information on the climate conditions that contribute to diseases. For example, people who use the IRI website can map areas where drought occurred, heavy rainfall, warm air temperatures, lush vegetation and the presence of standing water are likely to contribute to growth in local mosquito populations, and the spread of malaria and dengue fever.

IRI researchers are working with public health officials in Kenya, Ethiopia, Madagascar and Eritrea to assess where and when malaria epidemics are most likely to strike. They also are helping local officials identify the conditions that propel the spread of dengue fever in Brazil and Colombia. “We study places where environmental factors are driving the epidemics,” said Pietro Cecatto, a research scientist at Palisades, N.Y.-based IRI, which is part of Columbia University’s Earth Institute.

In 2004, Columbia University scientists began analyzing the relationship between environmental factors and malaria epidemics. Specifically, the researchers looked for correlations in regions where outbreaks did not occur every year to test their ability to predict and confirm local outbreaks of the disease. Those tests led to development of specific tools related to public health in the Elna Lamont-Doherty Earth Observatory Climate Data Library, which offers users interactive maps and tools to monitor current climate conditions and view forecasts.

The climate reports and forecasts presented in the data library feature hundreds of data sets drawn from ground-based rain gauges as well as sensors onboard geostationary and polar-orbiting satellites. That information is then used to create simple, self-service tools, such as maps that users can click on to see changing rainfall patterns in a particular district or local area.

The goal is to make the tools so user-friendly that government health officials who have never used remote sensing data can obtain information easily through the website, Cecatto said. IRI also invites public health officials to visit its facility in New York for two-week training sessions to teach them how to analyze the relationship between climate conditions and various diseases.

In addition to malaria and dengue fever, the Climate Data Library can help users study the conditions that heighten the risk in many parts of the world of diseases spread by miasma and are aggravated by locust infestations.

While IRI researchers have access to the space-based data used in their current research, they would like to obtain more detailed information on bodies of water. The Moderate Imaging Spectral Radiometer, which flies on NASA’s Terra and Aqua Earth observation satellites, provides imagery with a resolution of 250 meters. Higher-resolution imagery would enable researchers to assess water quality, for example, where turbid water in unused swimming pools is serving as a breeding ground for the mosquitoes that carry dengue fever, Cecatto said. IRI officials have discussed the characteristics they would like to see in future space-based instruments with scientists and engineers at the Jet Propulsion Laboratory in Pasadena, Calif.

In addition to sharing their models and maps with public health officials worldwide, IRI officials are working with the World Health Organization to assess the efficacy of campaigns designed to halt the spread of malaria with nets and pesticides. Instead of simply comparing the number of cases of malaria with those of previous years, IRI is using climate models to determine how frequently malaria epidemics would have been likely to occur without government intervention.

IRI is one of many organizations around the world using satellite data to develop surveillance and early warning tools to inform the public when changing environmental factors create conditions that could aggravate pulmonary diseases such as asthma or encourage the spread of diseases carried by insects or contaminated water. The NASA Earth Science Applications Program is providing funding for many of those initiatives, said Steven Kempler, manager of the Distributed Archive Data Center at NASA’s Goddard Earth Sciences Data and Information Services Center (GES DISC) in Greenbelt, Md.

NASA officials also are developing Web-based tools to help students and researchers maximize use of the data. Information gathered by space agency sensors is distributed through 12 NASA Earth science data centers. Researchers and educators obtain data related to public health through GES DISC and the Socioeconomic Data and Applications Center (SEDAC), also located at Columbia University.

“SEDAC offers several interactive, data-visualization tools,” Kempler said in a Dec. 14 email. GES DISC developed Giovanni, a tool that enables researchers to display and download NASA satellite data without having to spend hours identifying the most pertinent information and downloading it. Through Giovanni, data can be accessed, viewed and downloaded with a few clicks of a computer mouse, Kempler said.

GLOBAL SNAPSHOT

Location: Alberta, British Columbia
Data gathered by: U.S. Landsat satellites
Instrument used: Enhanced Thematic Mapper Plus
Source: NASA’s Earth Observatory website

Balancing Energy, Environmental Needs in Canadian Forest

Buried under Canada’s boreal forest is one of the world’s largest reserves of oil. Bitumen — a very thick and heavy form of oil (also called asphalt) — coats grains of sand and other minerals in a deposit that covers about 142,200 square kilometers of northwest Alberta. According to a 2003 estimate, the Athabasca oil sands mines have the capacity to produce 2.5 million barrels of oil per day for 186 years.

Only 20 percent of the oil sands lie near the surface where they can easily be mined. The rest of the oil sands are buried more than 75 meters below ground and are extracted by injecting hot water into a well that liquefies the oil for pumping. In 2010, surface mines produced 356 million barrels of raw bitumen, while in situ production (the hot water wells) yielded 189.41 million barrels of oil.

The Landsat satellite images show the growth of oil sands mines from 1984 (top right) to 2011 (bottom right). The Athabasca River runs through the center of the scene, separating two major operations. To extract the oil, producers remove the sand in big, open-pit mines, which are tan and irregularly shaped in the photos. The sand is rinsed with hot water to separate the oil, and the waste sand and wastewater are stored in “tailings ponds,” which have smooth tan or green surfaces.

Oil sand mining has a large impact on the environment. Forests must be cleared for both open-pit and in situ mining. Pit mines can grow to more than 80 meters deep, as massive trucks move up to 720,000 tons of sand every day. As of September 2011, roughly 663 square kilometers of land had been disturbed for oil sand mining.

Some groups have labeled the oil sands an environmental menace, but the mines also offer a stable source of energy and economic growth. The Athabasca oil sands are the largest segment of the economy in Alberta, making up just over 30 percent of the gross domestic product. In 2009 and 2010, the Alberta government received more than 3 billion Canadian dollars in royalties from oil companies.
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**Magnetic Patterns Could Provide Evidence of Mars Life**

MIKE WALL, SAN FRANCISCO

If life ever existed on Mars, it may have betrayed its presence with a distinctive magnetic signature that a future rover could detect, a new study suggests.

A mission to hunt for life on the red planet could look for deposits of magnetite or other iron-bearing minerals in martian sedimentary mounds that smearing of magnetite grains throughout such mounds would be strong evidence of long-ago capture by sticky microbial “biofilms,” the idea goes.

This magnetic method holds promise as a definitive test for martian life, researchers said. Scientists have been searching for such a black-and-white metric for decades, but most options offer many shades of gray.

“We’re trying to get rid of the gray area,” said lead author Victoria Petryshyn of the University of Southern California, who presented the study here Dec. 9 at the annual winter meeting of the American Geophysical Union.

On Earth, communities of microorganisms commonly build large sedimentary mounds called microbialites. The microbes clump together in slimy mats or films, which grow like layer by layer as the microbes reproduce, creating microbialites.

The most famous of these mounds are stromatolites, which form in shallow water and preserve a fossil record of life on Earth that stretches back 3.5 billion years.

If a rover stumbled across a stromatolite-like mound on the surface of Mars, scientists would doubtless get very excited. But that discovery would not in itself be definitive evidence of past or present martian life, since similar mounds can also form without the assistance of living organisms.

Further, microbes do not fossilize well, so the rover might not find anything in a sample even if the mound was once crawling with red-planet bacteria.

But biofilms are sticky; microbialites generally contain a lot of magnetite. This magnetic method holds promise as a definitive test for martian life, researchers said.

Scientists want to add an instrument to a future Mars rover (Opportunity rover, above, is currently exploring Mars) to detect a distinctive magnetic signature that would suggest past life on the red planet.

The team used the mat samples swapped out for a carbonate control (microbialites generally contain a lot of carbonate minerals).

They did the same thing with the mat samples swapped out for a carbonate control (microbialites generally contain a lot of carbonate minerals).

The team found that the mat samples trapped much more magnetite than the control. In the control sample, magnetite peaked at about 10 percent of the bottom, as dictated by the laws of gravity. But the mat grabbed lots of the magnetite on the surface, showing just how sticky biofilms are. Even vertically tilted mat samples snagged a lot of magnetite, while the slab right off tilted control samples.

Sampling mounds on Mars?

The team’s experiments suggest that a future rover mission could search martian stromatolite-like mounds for magnetite or other iron-bearing minerals, researchers said. Any mounds that exhibit lots of these minerals throughout their structure — not just at the surface — were likely built by microbes.

To do the job, a rover would just need a small drill and an in-vehicle magnetic field, a flight-ready version of the table-top device the researchers used for their study.

That should not be too tough, Petryshyn said, pointing out that robot explorers have been outfitted with more sophisticated gear in the past. For example, NASA’s Curiosity rover, which launched to search the red planet in November, carries a suite of 10 instruments, including a mass spectrometer.

“If you can put a mass spec on a rover, you can put this on a rover,” Petryshyn said.

Of course, the method Petryshyn was proposing would be useful only if rovers spot any suspicious-looking magnetic features on the martian surface. That has not happened yet. But if it does, researchers would probably want a good way to investigate and not for it was biologic in origin.

“We found a stromatolite-like structure on Mars; then the fight would begin,” Petryshyn said.

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**Familial Roadblocks Ahead for Obama Administration’s Export Control Reform**

KATE BRANNEN, WASHINGTON

The White House’s effort to reform the government’s export control regime is coming to a crunch as Congress begins to tally the costs of its unilateral power. The effort faces the same roadblocks that slowed it down and ultimately stopped past efforts.

Where this has crashed and burned every time before has been when Congress says, “We don’t like what you’re doing,” a former State Department export control official said.

For those who want on Capitol Hill, it is not quite that simple.

“It is a situation in which you have foreign policy prerogatives, which are the (Obama) administration’s, and you have constitutional powers to regulate foreign commerce, which are the Commerce Department’s, and so you have a gray area of a shared power, if you will, over arms sales,” a senior congressional staffer said.

This clash is the heart of the effort to shut down progress on the effort before November’s election.

“The Obama administration has decided to bite this off despite the fact that they know that it’s hard and they deserve points for that,” the former State Department official said.

The administration’s effort is based on creating what it calls “four singularities.” Of these, the easier ones to accomplish are creating a single-enforcement coordinating agency and implementing a single information technology system.

Very difficult but technically doable is creating a single list of controlled goods by merging the existing U.S. Munitions List (USML) and the Commerce Control List (CCL). The fourth singularity is creating a single licensing agency, which is practically a political nonstarter.

The bulk of the effort is now in rewriting the USML and CCL lists, which means migrating thousands of items from the State Department’s jurisdiction over to the Commerce Department.

The Obama administration says the goal of reform is to make sure the system is protecting the items that really need protection and to be able to deliver needed equipment to allies faster.

“We seek to facilitate exports to allies and partners by eliminating approximately 5,000 dual-use licenses and tens of thousands of licenses for munitions parts and components annually,” Andrew Shapiro, the State Department’s assistant secretary for political-military affairs, said Nov. 9 during a meeting of the Defense Trade Advisory Group.

Items on the USML are controlled under the stricter International Traffic in Arms Regulation (ITAR) regime, while the Commerce Department’s CCL is governed by the Export Administration Regulations and includes items that have both military and commercial use.

While the USML can be revised through regulatory changes alone, under section 38(f) of the Arms Export Control Act, the executive branch must notify Congress at least 30 days before moving items off the USML and onto the CCL and provide a description of the new controls that will be used.

So far, the State Department has published proposed rule changes for a handful of USML categories, but has yet to officially notify Congress of any final changes.

This is where things get interesting, and it is the piece of the puzzle that poses the biggest hurdle for the administration’s reform effort.

The congressional staffer said the administration made a “pretty big tactical error” this summer, shifting its approach with Congress.

Before the summer, the staffer said, there was an understanding that they were going to send up a test case for USML Category 7 (vehicles) that satisfied the criteria, what was being proposed for removal.

Instead, he said, the administration changed its strategy and decided to show Congress what would remain on the USML, but deemed it too time-consuming and difficult to show what had come off the list.

While executive branch officials continue to negotiate with Congress to discuss category changes, this decision could prove to be a “fundamental misstep,” the senior staffer said.

So far, the administration has published proposed changes for three categories.

Each time the State Department publishes a revised category, the Commerce Department publishes its corresponding category to public gaps or overlaps between the lists.

The majority of items that would move from Category 5 to Category 6 are commercial satellites, unmanned aerial vehicles, commercial aircraft, and auxiliary surface vessels, Shapiro said, adding that this shift will require legislation.

Since July, the administration has published proposed changes to Category 8, which covers aircraft, and a revised version of Category 7. More recently, proposed changes for Category 19, which describes gas turbine engines and associated equipment, has also been published, with the public comment period open until Jan. 20.

Shapiro said new rules for Categories 6 through 9 (the USML and special naval equipment) and 20 (Submersible Vessels, Oceanographic and Associated Equipment) will be released soon.

These changes come as a change in share based on public feedback, the former State Department official said. “They’re working that is really hard, but they’ve still got a lot to do.”

While the worker bees continue to hammer out the details, the next step politically is less certain.

“I would really hate — because I think there are things we’re willing to change — for this to turn into ‘the movie we’ve seen before,’” the congressional staffer said.
DEBRA WERNER, SAN FRANCISCO

There is growing recognition within the U.S. Federal Aviation Administration, Federal Emergency Management Agency and Department of Homeland Security of the importance of studying, predicting and monitoring solar activity. That does not mean, however, that heliophysics researchers can anticipate increased funding for their activities, according to Barbara Giles, Heliophysics Division director in NASA's Science Mission Directorate.

“We should expect budgets for coming years to reflect the fiscal environment,” Giles said Dec. 6 during the Space Physics and Aeronomy town hall meeting at the American Geophysical Union conference here. “These will be challenging years.”

The U.S. Congress passed budgets for NASA's Heliophysics Division of $589.4 million in 2011 and $622 million in 2012. Division leaders anticipate funding of $632.4 million in 2013 and $650.6 million in 2014. Overall, budgets are expected to rise enough to account for inflation, Giles said.

With that money, the Heliophysics Division will conduct research and missions designed to improve understanding of the sun and its interactions with Earth and the solar system. In September 2012, NASA plans to launch the Radiation Belt Storm Probes, a mission that includes twin satellites to gather data on charged particles around Earth that pose a danger to spacecraft electronics. Engineers at the Johns Hopkins University Applied Physics Laboratory in Laurel, Md., completed construction of the spacecraft and began environmental tests of instruments in early December. Those tests are scheduled to be completed in March.

The division also is gearing for two ambitious flagship missions: the Magnetospheric Multiscale (MMS) mission to improve understanding of the physics of the electron diffusion region and reconnection, and Solar Probe Plus, a campaign to study the sun’s outer atmosphere.

NASA officials will begin integration and testing of MMS flight units in 2012, a process that is expected to pose challenges because the mission includes four spacecraft featuring identical instruments to study magnetic reconnection, which occurs when tangled magnetic fields cross, merge and break apart, releasing energy, Giles said. The MMS mission, led by the Southwest Research Institute of San Antonio, is scheduled to be ready to launch in August 2013 but lift off no later than March 2015, she added.

Solar Probe Plus, which features five instruments on a spacecraft built by the Applied Physics Laboratory, is designed to fly closer to the sun than previous satellites. That mission poses significant cost, schedule and technical challenges, Giles said. NASA officials will evaluate the Solar Probe Plus design at space agency headquarters in January, she said. The mission is slated to launch in 2018.

NASA also is working with the European Space Agency on the Solar Orbiter, scheduled to fly in 2017. Europe's space science decision-making body, the Science Program Committee, approved plans for the Solar Orbiter in October. According to a memorandum signed by mission partners, ESA will provide the spacecraft, ground segment and most instruments while NASA will contribute additional instruments and the launch vehicle. Rising launch costs, however, are forcing mission partners to cut in half the number of instruments the spacecraft will carry. “Due to a significant increase in launch costs, we had to descope two of the four instruments,” Giles said. “Some European states are seeking to support those instruments through other means.”

NASA's Heliophysics Division is preparing for a 2013 launch of the Interface Region Imaging Spectrograph (IRIS), a NASA Small Explorer mission to send a solar telescope and spectrophotograph to study the solar chromospheres and transition region. NASA officials will conduct an IRIS launch readiness review in late 2012 and the mission is scheduled to fly no later than June 2013, Giles said.

In March or April, the National Research Council is scheduled to release a space and solar physics decadal survey, Giles said. That document will help NASA's heliophysics leaders plan future missions including the next solar terrestrial probes, she added.

Upcoming NASA Heliophysics Missions

- Radiation Belt Storm Probes: Launch September 2012
- Interface Region Imaging Spectrograph: Launch no later than June 2013
- Magnetospheric Multiscale mission: Ready to launch by August 2013, lift off by March 2015
- Solar Probe Plus: 2018 launch (under review)
New York’s Intrepid Museum Takes Ownership of Enterprise

ROBERT Z. PEARLMAN, HOUSTON

NASA’s space shuttle prototype, Enterprise, now belongs to the Intrepid Sea, Air & Space Museum in New York City. Space agency leaders and local elected officials marked the shuttle’s transfer of ownership, which took place last month, during a ceremony Dec. 11 onboard the aircraft carrier-turned-museum.

“Let there be no bones about it, the Intrepid now officially owns a space shuttle and that’s going to stay for a very long time to come,” U.S. Sen. Charles Schumer (D-NY) said during the event.

NASA officially turned over the atmospheric test shuttle to the Intrepid Museum Nov. 22 when Lynn Cline, outgoing deputy associate administrator for human exploration and operations, signed the title contract. The Dec. 11 ceremony saw NASA Deputy Administrator Lori Garver sign an enlargement of the “Assignment of Title” as well as other ceremonial documents. Enterprise’s Pride of America and Marenoff-Zausner also signed, together with guest witnesses Schumer, New York State Assemblyman Daniel O’Hare, and museum co-chairman Charles de Gunzburg.

“It’s NASA’s pleasure to transfer to Intrepid the title to the space shuttle Enterprise,” Garver said. “With the last flight of the space shuttle program in July, the shuttle era came to an end, but that won’t stop these marvelous spacecraft from inspiring millions of people from around the world who will visit them in the geographically diverse areas that will house them.”

NASA announced in April that the Intrepid was one of four institutions nationwide to receive a shuttle. The agency’s three space-flown orbiters will be displayed at museums in California, Florida and Virginia. Enterprise, which was used for approach and landing tests in the late 1970s, will move from its current exhibit at the Smithsonian National Air and Space Museum’s Steven F. Udvar-Hazy Center in Chantilly, Va., to New York next April. The shuttle will be flown on NASA’s modified Boeing 747 shuttle carrier aircraft.

Enterprise will then be transported during the summer of 2012 by barge to the Intrepid museum complex located at Pier 86 of Hudson River Park, and placed on the aircraft carrier’s flight deck under a protective covering. The public will have the opportunity to see the shuttle while visiting the museum.

“Enterprise’s flight deck display, however, is intended to be temporary. The Intrepid is planning to build an $85 million new museum facility located across the street from the pier in what is now an empty lot owned by the state. Intrepid is Enterprise’s third owner.”

DENISE CHOW, NEW YORK

NASA has lost or misplaced more than 500 of the Moon rocks its Apollo astronauts collected and brought back to Earth, according to a new report from the U.S. space agency’s internal watchdog. In an audit released Dec. 8, NASA’s Office of the Inspector General states that the agency “lacks sufficient controls over its loans of moon rocks and other astro-materials, which increases the risk that these unique resources may be lost.”

The report stresses the importance of maintaining stricter guidelines for the release of lunar materials to researchers, and more meticulous inventory procedures for their storage and return.

“NASA has been experiencing loss of astromaterials since lunar samples were first returned by Apollo missions.”

Paul K. Martin

And while the agency reported the 517 missing Moon rock samples, even more of these precious materials may have gone astray, according to the report. Martin’s office audited 59 researchers who had received samples from NASA, and found that 11 of them, or 19 percent, could not locate all of the borrowed materials.

The report also found that the Astromaterials Acquisition and Curation Office at the Johnson Space Center in Houston had records of hundreds of samples that no longer exist, and loans to 12 researchers who had died, retired or relocated, sometimes without the office’s knowledge and without beforehand returning the samples.

“Curation Office did not ensure that these loaned research samples were efficiently used and promptly returned to NASA,” Martin wrote. “For example, we learned of one researcher who still had lunar samples he had borrowed 35 years ago on which he had never conducted research.”

In response to the inspector general report, the agency is looking into modifying its loan agreements and procedures. “NASA is committed to the protection of our nation’s space-related artifacts, and sharing these treasures with outside researchers and the general public,” NASA spokesman Dewey Brown said in a statement.

“NASA has been experiencing loss of astromaterials since lunar samples were first returned by Apollo missions.”

Paul K. Martin

NASA has lost hundreds of Moon rocks, Inspector General report says.
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United States Must Begin Walking the Walk

The U.S. government is flirting with a reputation as an unreliable partner in international space projects. That’s not the message Washington wants to be sending, especially at a time when budgetary pressures are making it increasingly difficult to go it alone on space projects.

The U.S. government is flirting with a reputation as an unreliable partner in international space projects. That’s not the message Washington wants to be sending, especially at a time when budgetary pressures are making it increasingly difficult to go it alone on space projects. In a letter to Space News, Ms. Kicza captured that very point: “As we face tough budgetary realities on both sides of the Atlantic, our partnership with Eumetsat will become more important, not less.”

Europe’s budget woes are at least as serious as those of the United States, and ESA and Eumetsat have seen their share of ups and downs on funding. As multinational agencies, they’ve had to work through these kinds of issues, which perhaps is why they are showing considerable patience with their U.S. counterparts.

It’s high time the U.S. government demonstrate that it values international cooperation as more than kindling for feel-good rhetoric, and it can do that by taking concrete steps to shore up its reputation as a partner.
Save the Mars Missions

<ROBERT ZUBRIN>

America’s planetary exploration program is one of the great chapters in the history of science, of civilization and of our country. Its abandonment would represent nothing else than an embrace of American decline.

NASA Needs To Wake Up to Reality

<CHRISTOPHER CRAFT>

Building a great big rocket is not a necessary expenditure at this time. In fact, the budget that will be consumed by this big rocket will prevent NASA from any meaningful human exploration for at least the next decade and probably beyond.

Canada, Japan, India and others who want to participate would be very supportive of this idea and have in recent months been trying to influence the U.S. to utilize the ISS blueprint that has been so successful.

The U.S. and the world already have a large set of space assets — both human and machines — that can be immediately utilized. NASA engineers and scientists need to exploit this nearby satellite. A set of outward-looking instruments to study the universe from the backside of the Moon would begin to uncover secrets of the universe not viewable by either means. The possibilities of generating electrical power on the Moon and transporting that power back to Earth are promising. The water recently discovered on the Moon portends a capability to produce many substances that have a large number of uses, including supporting the humans to mine these assets. The material resources may indeed supplement those needed on Earth. The future uses of the Moon and its vicinity as a launching pad to further explore the planets and the universe beyond are boundless.

So come on NASA, wake up! Take the lid off and turn loose the human resources you already have in place. Most of these bright people came to NASA excited about the future, about going back to the Moon to stay and becoming a part of what could be another renaissance in space.

Building a great big rocket is not a necessary expenditure at this time. In fact, the budget that will be consumed by this big rocket will prevent NASA from any meaningful human exploration for at least the next decade and probably beyond.

T

he White House Office of Management and Budget (OMB) has withdrawn a U.S. commitment to joint Mars missions with the Europeans in 2016 and 2018. This poses a grave crisis for all of us hoping for a human future in space.

NASA’s Mars exploration program has been brilliantly successful because, since 1994, it has been approached as a campaign, with probes launched every biennial opportunity, alternating between orbiters and landers. As a result, combined operations have been possible, with orbiters providing communication links and reconnaissance guidance for surface rovers, which in turn can conduct ground-truth investigations of orbital observations. Thus, the great treks of the rovers Spirit and Opportunity, launched in 2004, were supported from above by Mars Global Surveyor (MGS, launched in 1996), Mars Odyssey (launched in 2001) and Mars Reconnaissance Orbiter (MRO, launched in 2005). But after serving 10 years on orbit, MGS is now lost, and if we wait until the 2020s to resume Mars exploration, the rest of the orbiters will be gone as well. Moreover, so will be the experienced teams that created them. Effectively, the whole program will be completely wrecked, and we will have to start again from scratch.

In any case, cost is not the issue. With the Europeans putting up their share, a matching $1 billion contribution from NASA to either of the next six years would be sufficient to fund both the 2016 and 2018 missions at a level of $1 billion each. This would require less than 1 percent of NASA’s current budget. There is no excuse for not doing this. The Mars program would not be terminated to make funds available for future projects at other places. In fact, there would be no money in the OMB plan to fund any of them, either.

America’s planetary exploration program is one of the great chapters in the history of science, of civilization and of our country. Its abandonment would represent nothing else than an embrace of American decline. This is unacceptable. Mars is key to humanity’s future in space. It is the closest planet that has all the resources needed to support life and technological civilization. Its complexity uniquely demands the skills of human explorers, who will pave the way for human settlers. It is, therefore, the proper goal for NASA’s human spaceflight program, and the proper priority for its robotic scouts. The human spaceflight program may be in disarray, but the scouts have been making progress, and are set to make more, if only we continue with them.

If we allow the OMB to shut down the Mars exploration effort, NASA will lose its most effective endeavor, one of the few that delivers the goods that justify the entire space program as a national enterprise; the nation will lose one of its crown jewels; the scientists will lose their chance to find life beyond Earth; and humanity will lose the one significant effort that is making real and visible progress toward opening the frontier on another world. We can’t let that happen.

Here is where we need to make a stand. There is no excuse for wrecking the Mars program. The nation can afford it, and walking away from it is walking away from success, from our allies from science, from greatness, from the pioneer spirit, and from our future. Everyone needs to mobilize now to save the 2016 and 2018 Mars missions.

This is a fight we can and must win. It’s time to speak up.

SEES PARIS AND LUXEMBOURG FOR FUTURE RENEWED AND GROWTH MARKETS AND INTRODUCES FOUR GLOBAL SALES REGIONS WITH DEDICATED MANAGEMENT LEADERS

The Americas will be headed by ELIAS ZACCACK, Europe by FREDERICK ZELLESKY, Africa by BRIDHARIN GUINBA-SADO and Asia Pacific and Mid-East by DEEPAK MAHUR.

All four executives report to FERDINAND KAYSER, the chief commercial officer. SCOTT SPAEGI, until now senior vice president of global sales, has decided to leave SES.

Zaccack has worked for SES for more than 12 years and headed different positions in sales and business development in Asia as well as in the United States. He was previously vice president of global sales and marketing for Asia Pacific. He will be based in Washington and will work closely with STEVE BURNE and DOLORES MARTOS, who continue to lead the sales forces in North America and Latin America, respectively.

Zaccack leads the European sales force, which includes the Western and Central European key markets as well as the Nordic and Baltic, Eastern and Southern Europe, as well as Russia, Ukraine and Turkey.

Guinba-Sado is joining SES from Intelsat, where he was senior vice key account director and held sales and marketing as well as systems operations roles for more than 15 years. His roles included the responsibility for Intelsat’s representation in Africa. In his new role, he will be based in Johannesburg.

Maahir has successfully developed the activities in SES in Asia and Africa for the past 10 years. He remains based in Singapore and will continue to report to ZACCACK, the chief executive officer, who continues to be responsible for the Asia-Pacific region for SES.

Universal Space Network, Inc. (USN), Horsham, Pa., selects JOHN E. WILLIAMS as its new president and chief executive. He will be responsible for the management and growth of USN’s mission critical services to government and commercial customers worldwide.

Williams joins USN with 32 years of aerospace and defense experience gained through extensive management, leadership and industry careers. In addition, he currently serves as the eastern region vice president for the National Defense Industrial Association’s Space Division and is a member of the association’s science technology engineering and math-matics workforce division.

In the private sector, Williams most recently served a two-year term with ATK Aerospace Systems as director of business development for the spacecraft systems and services division.

Williams is a retired U.S. Air Force officer, having served 21 years in a variety of national security space-related roles, such as commander of the Air Force Satellite Control Network.

The El Segundo, Calif.-based Aerospace Corp. announced changes to its board of trustees.

David M. Bicarl and Tina W. Jonas were elected to the corporation’s board, and RUFUS A. FULTON has retired from the board.

D'Carlo has more than 36 years of experience in national space systems. He recently retired from Northrop Grumman as vice president and general manager of the space systems division in the aerospace systems sector.

Jonas is executive vice president of operations at PASSUR Aerospace. Prior to joining PASSUR, she was director of operations planning and analysis at Sikorsky Aircraft Corp.

Fulton is the former chairman and chief executive of Fulton Financial Corp. and a former director of the Federal Reserve Bank of Philadelphia. He was elected to the board in 2006, and during his tenure served as chairman of the facilities subcommittee and as a member of the audit committee.

Washington-based Women in Aerospace (WIA) announces the election of its 2012 board of directors and officers. The 2012 WIA board leaders are: board chairwoman, LILLIAN RYALS, the MITRE Corp.; and vice chairwoman, DIANNE USA, ATK.

The newly elected board members are: ROBERT BURKE, Northrop Grumman Corp.; TAMMY CAMERON, the Boeing Co.; DANIEL CHACON, ORATIONAL TECHNOLOGY; GEORGE DOLPHIN, NASA; and JUDY SMITH, ITT EXELIS.

Outside North America

China, Germany, Indonesia, Israel, Korea, Malaysia, Russia, Taiwan, Singapore, Austria, Denmark, Finland, India, Netherlands, Belgium, Luxembourg, Norway, South Africa, Sweden, Switzerland, United Kingdom

Outsiders will be based in Beijing, Singapore, and London, respectively.

SES-Global

September 15 - 17, 2012

AIAA Space Forum

San Diego, California

Newcomers to the board are: board chairwoman, LILLIAN RYALS, the MITRE Corp.; and vice chairwoman, DIANNE USA, ATK.

The newly elected board members are: ROBERT BURKE, Northrop Grumman Corp.; TAMMY CAMERON, the Boeing Co.; DANIEL CHACON, ORATIONAL TECHNOLOGY; GEORGE DOLPHIN, NASA; and JUDY SMITH, ITT EXELIS.

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SES-Global
Now that MSL is on its way to Mars, how many people are coming off of the program?

There were about 600 people for development. For the operation we are going to need about 300 people or about 250.

Are the same people who built MSL doing the operations?

A fair number of them, because you need people who understand the systems, and so on. So you have about 200, 250. And we’re already down to 350 now.

What about the others?

We found positions for the other people. And we have the Soil Moisture Active-Passive satellite — it’s an Earth-orbiting mission, but it’s being built in house.

The point is we have a proof of concept that we can get to it. I’m confident that we can do that because we’re capitalizing a lot on the MSL engineering designs, so the idea would be to use a similar, as a matter of fact almost identical, descent module. The rover would be different, because it’s doing different things, and the payload would be different. But it basically would be the same descent system.

The sky crane seems risky. Was it the really the best mechanism you could come up with?

If you want to land a ton-sized vehicle, you cannot use airbags. We looked at the airbags. But MSL is seven times the size of the Spirit and Opportunity rovers. It’s like 900 kilograms, roughly, versus 200 kilograms or 180 kilograms. After doing a lot of engineering analysis, the smartest engineers who have worked on landings said the sky crane is the best way to do it. Airbags, they become huge. There was now you’ve avoided the radiation because you are just zooming by Europa and not in synch with Europa. So every time you orbit, you fly by Europa. So you can do 80, 90 orbits and you can fly by Europa 80, 90 times. So now you’ve avoided the radiation because you are just zooming by Europa and not in orbit around it. Another mission we are looking at is taking all of the instruments that absolutely have to be in Europa orbit and put those on a smaller probe; we’ll orbit Jupiter and then we’ll orbit Europa. A third element is to do landers, to basically drop landers.

What sort of Europe exploration schemes have you been looking at with NASA having concluded that it cannot afford the $4.7 billion concept that was being studied?

We have been looking at missions which are below $2 billion. Now, they will not do all the science that the big Europa mission will do, but we are looking at three different options.

One is to go in orbit around Jupiter but be in synch with Europa. So every time you orbit, you fly by Europa. So you can do 80, 90 orbits and you can fly by Europa 80, 90 times. So now you’ve avoided the radiation because you are just zooming by Europa and not in orbit around it. Another mission we are looking at is taking all of the instruments that absolutely have to be in Europa orbit and put those on a smaller probe; we’ll orbit Jupiter and then we’ll orbit Europa. A third element is to do landers, to basically drop landers.

The point is we have a proof of concept that we can do some major missions to Europa and have a significant amount of the science — not all of the science — for $1.5 billion to $2 billion.

Do you consider $2 billion to be the cost threshold for designation as a flagship-class mission?

What would the Cassini Saturn orbiter mission cost in today’s dollars?

It would be close to $3 billion. Voyager wouldn’t be very much. If you look at Spirit and Opportunity, it would be about $1.5 billion in today’s dollars. I’m talking everything here: launching them, operating them, the whole thing.

How can flagship missions be justified in the current budgetary environment?

Flagship missions, you do major science with one launch. Smaller missions, you need multiple launches, and the launch is becoming a large cost. I’m concerned both about the selection and the costs of launch. The more money you spend on the launch vehicle, the less money that goes on the missions. That’s what I’m worried about; that’s what lots of people at NASA are worried about.

Somebody at JPL did the calculation recently on how much money goes to the science, percentage-wise, relative to the total cost of the mission. And the flagship missions came way above smaller missions like Discovery- and New Horizon-class missions. If you take a fixed amount of money, flagship missions give you more science than the equivalent amount of smaller missions because of the launch costs. We looked not only at the cost, but how much publication, per dollar, missions generate. It turns out Cassini, Voyager, Hubble are well above the equivalent of the smaller missions.

All NASA science programs are being asked to contribute to fund the overbudget James Webb Space Telescope, on which JPL has a relatively small role. What kind of effect do you expect to feel at JPL?

We have to wait and see what’s in the ‘13 budget and beyond. For ‘12, the impact was very large. As you know, there was an increase in the Science Mission Directorate budget that covered a significant part of it. Fundamentally, I support it. Sometimes I have to look at, “What’s the benefit for JPL?” But sometimes, I really ask, “What’s the right thing for the nation?”

Charles Elachi

DIRECTOR, JET PROPULSION LABORATORY

Golden Age of Exploration

The Nov. 26 launch of NASA’s most ambitious Mars mission to date was yet another milestone for the Jet Propulsion Laboratory (JPL), which over the decades has distinguished itself for carrying out planetary missions beyond the capabilities of any other institution anywhere.

With the Mars Science Laboratory (MSL), a nuclear-powered, car-sized rover, now on its way to the red planet, the question is what’s next for the legendary JPL, which currently has no large, funded planetary missions on its plate. NASA’s Osiris-Rex asteroid sample-return mission, for example, is led by the agency’s Goddard Space Flight Center in Greenbelt, Md., which in recent years has garnered a larger share of planetary projects.

Ever the optimist, Charles Elachi notes that JPL, which is co-located with and managed by the California Institute of Technology in Pasadena, is building an Earth science satellite and working on designs for an affordable mission to Jupiter’s icy moon Europa. He also is hopeful that NASA will be able to commit to a 2018 mission to Mars with the European Space Agency per a 2009 agreement that is being revisited due to the U.S. funding limitations.

Elachi worries that JPL’s unique capability to land probes on distant planets will be lost should NASA not take a role in the 2018 mission, which would utilize the same entry, descent and landing system that will debut on MSL. He concedes he will get little sleep on the eve of MSL’s scheduled Aug. 6 landing, in which a so-called sky crane system is to lower the rover to the planet’s surface by cable from a hovering spacecraft.

Elachi, who says NASA is enjoying a golden age of planetary exploration, spoke recently with members of the Space News editorial staff.
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Ariane 5 is the undisputed heavyweight champion when it comes to lifting ever-larger spacecraft into orbit. Arianespace holds the records for the largest commercial satellite ever launched and the heaviest cargo resupply mission ever flown to the ISS. With the ability to launch two satellites weighing a combined 9.5 metric tons to GTO, we provide unparalleled heavy-lift performance for our customers.
Ready to Power the Next Generation of Human Space Exploration

ATK applauds NASA’s decision to move forward with a Space Launch System for human deep space exploration.

As NASA stated it so well, “SLS will take the agency’s astronauts farther into space than ever before, and provide the cornerstone for America’s future human space exploration efforts.”

We stand ready to support that vision with flight-proven, affordable systems that are ready now.

September 8, 2011 test of the solid rocket boosters that were chosen for the initial SLS flights. They are the world’s most powerful.

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