National Aeronautics and Space Administration

THE ARMSTRONG X-PRESS

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X-56B begins new flight series

The X-56B remotely piloted aircraft prepares for a landing following the first of a new flight series. The flight was April 19 at NASA Armstrong with partner Northrop Grum man. See story, page 6.

AFRC2021-0052-18

NASA/Lauren Hughes

www.nasa.gov/

Aviation safety's best

NASA Armstrong named best in government

By Jay Levine
X-Press editor

It matters how safety is approached every day, but even more so when conditions are dynamic, the requirements are challenging and it's uncertain what's coming next.

It is under those conditions that NASA Armstrong won the 2020 Federal Aviation Safety Award for Premier Federal Aviation Programs.

The center was honored in the large category for organizations supporting operations for more than 20 aircraft. NASA Armstrong operates a diverse fleet of 24 airplanes made up of 13 types of aircraft with 111 primary and secondary flight crewmembers who operate them.

The award recognizes the center as the safest, most efficient and effective, in all aspects of a flight program. Included are aviation management, administration, operations, maintenance, training, and safety, among 16 different federal government agencies who are members of the Interagency Committee for Aviation Policy.

Troy Asher, NASA Armstrong director of Flight Operations, submitted the application on behalf of the center. For more than a decade NASA Armstrong has continued to improve each year, culminating in the 2020 win.

"In a year where there were so many different challenges because of the pandemic, we were able to put procedures and rules in place to allow the most critical work to continue and keep our people safe," Asher said. "The award was a validation of all the great work our organization and the center accomplished."

NASA

A G-III from NASA Armstrong was in the right place at the right time to transport NASA astronauts Doug Hurley and Bob Behnken back to NASA's Johnson Space Center just hours after splashdown from the first crewed flight of a commercial vehicle to the International Space Station and back. The Jet also was the unplanned background for the press conference after the astronauts returned to NASA Johnson.

AFRC2016-0002-21 Steven Lee

NASA/Carla Thomas

NASA Armstrong pilot Troy Asher flew Oct. 9, 2020, with photographer Jim Ross in the F/A-18 at the Edwards Air Force Base Hybrid Aerospace Valley Air Show. At right is the 2020 Federal Aviation Safety Award.

A winning approach

The accomplishments were substantial. NASA Armstrong had zero National Transportation Safety Board reportable accidents in fiscal year 2020 and an accident rate of zero.

"The center's mishap rate has remained less than 0.2 mishaps per 1,000 flight hours

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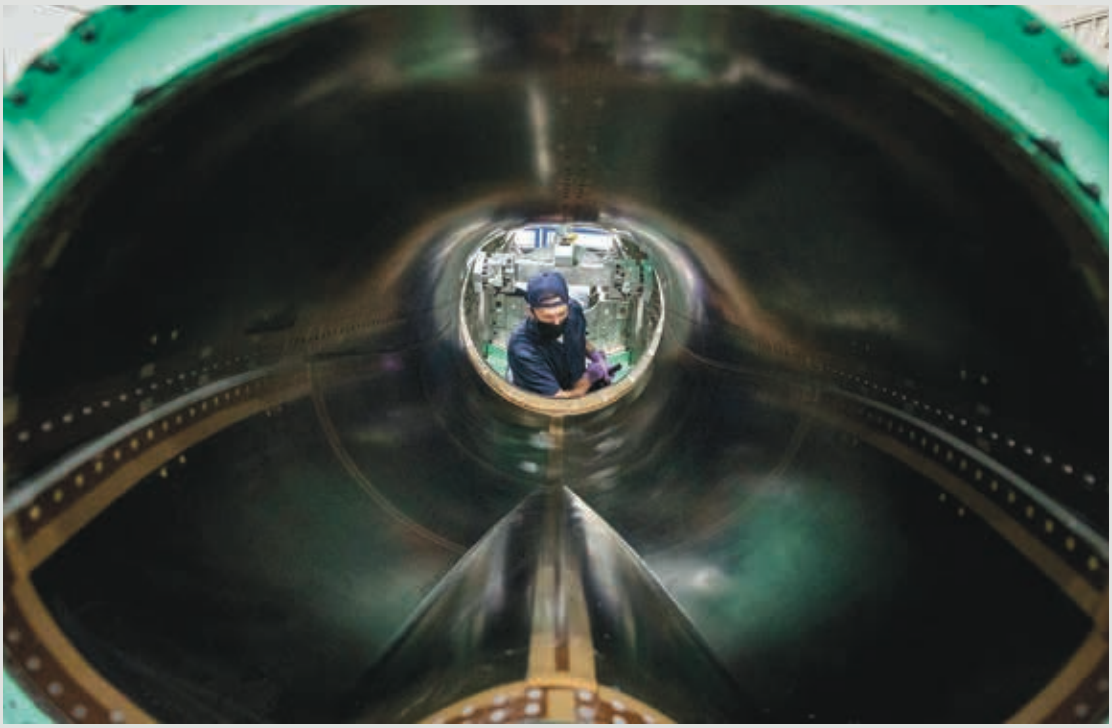

Lockheed Martin

X-59 engine inlet view shared

By Kristen Hatfield
NASA's Langley Research Center

NASA's X-59 requires the use of creative and strategic supersonic technologies to control and soften the jarring sound that hits the ground as the aircraft flies faster than the speed of sound above. One of these creative technologies is the placement of the X-59 engine inlet.

This visual is a closeup looking downstream inside of the X-59's engine inlet where, later in the assembly process, the 13-foot GE F414 engine will be placed behind. The main purpose of the engine inlet is to condition or smooth out and slow down the air before it actually gets to the engine. Before the X-59 engine is installed, there will be pressure measurement sensors mounted to the inlet walls to help the team monitor the inlet air flow and flight test data for the X-59 aircraft.

Most of the time, the engine is placed on the bottom of an aircraft, but on the X-59, this section of the inlet and engine are mounted to the top of the plane. The reason for this is so the supersonic shock waves from the inlet and engine are shielded by the wing — one of the many ways that NASA reduces the sonic boom to a sonic thump. With the engine's unique location on the plane in mind, the team conducts high-speed wind tunnel testing to increase confidence that the inlet will work as designed.

After proving the aircraft works as designed and can fly safely in the national airspace, NASA will fly the X-59 over several participating communities across the U.S. to understand their response to the X-59's sonic thump. NASA will provide this data to federal and international regulators to enable them to consider setting new guidelines for the possibility of future supersonic commercial travel over land.

Environmental review underway

NASA and the Air Force are conducting the third, Five-Year Review for the NASA Armstrong Superfund site.

In 2006, a remedy consisting of land use controls, groundwater monitoring and chemical oxidation treatment was selected to address groundwater below the center impacted primarily by chlorinated solvents. The Five-Year Review is conducted to verify that the remedy continues to protect people and the environment.

As part of the review, interviews will be conducted with members of the NASA Armstrong community. The review is scheduled for completion in September 2021.

Please contact Angelica Jackson, the center's environmental manager, at 661-276-3195, or angelica.c.jackson @nasa.gov for additional information or to participate in the interview process.

News at NASA

New flight planned for Mars copter

Plans are underway for NASA's Ingenuity Mars Helicopter to make its sixth flight on the Red Planet in the next week. The flight is the first during the helicopter's operations demonstration phase and includes scouting multiple surface features from the air and landing at a different airfield. In this new phase, data and images from the flight will be returned to Earth in the days following the flight. The Perseverance rover will not record images of the helicopter in flight, as it is preparing for the start of the mission's science operations.

Ingenuity's flight plan begins with the helicopter ascending to 33 feet (10 meters), then heading southwest for about 492 feet (150 meters). When it achieves that distance, the rotorcraft will begin acquiring color imagery of an area of interest as it travels south about 50-66 feet (15-20 meters). Stereo imagery of the sand ripples and outcrops of bright rocks at the site will help demonstrate the value of an aerial perspective for future missions. After completing its image collection, Ingenuity will fly about 164 feet (50 meters) northeast where it will touch down at its new base of operations (known as Field C).

The top groundspeed Ingenuity is expected to achieve on this flight is 9 mph (4 meters per second) and the time aloft will be around 140 seconds.

Maintaining safety

By Jay Levine
X-Press editor

Teamwork was the theme of NASA Armstrong's Safety Day, as it has been for successfully navigating the COVID-19 pandemic and continuing to accomplish the center's work.

Through creative thinking and working together the center staff achieved a number of safety milestones, culminating in capturing the 2020 Federal Aviation Safety Award for Premier Federal Aviation Programs (see related story).

There was improvement across the board in safety in 2020 and if an item didn't look right to employees, many times it was reported and caught before it become a mishap, said Glenn Graham, director of Safety and Mission Assurance.

While the news was generally good, he said staff cannot become complacent. He noted 12 mishaps and close calls have been reported so far this fiscal year, compared to eight for all of fiscal year 2020.

"We want you safe and your families need you at home," he said.

NASA/Kirstin Sharrer

Teamwork also permitted a continuation of key work and projects. One component of that success was how the telework environment is leveraged with the limited number of staff permitted on center, said David McBride, NASA Armstrong center director.

"Thank you for your productivity and for permitting us to accomplish milestones and maintain flight operations, crew competency and maintenance," he said. "People are making the center work from information technology and range, to facilities maintenance keeping the center safe and clean."

When more and more people are permitted to return to the center, vigilance will be required to remain safe.

"Risk is still out there," McBride said. "When you have opportunity, please take the vaccine. In addition, a lot of our staff have been away an entire year and we have new employees who have never been to the center."

Safety Day speakers included:

• Eric Raynor, NASA Headquarters NASA Safety Reporting System program manager, explained how to report safety and health concerns.

• Dr. Lawrence Stock and Jonathon Truong presented a snap shot on the current status of COVID-19 and the variants that emerged in different areas of the United States.

• NASA Armstrong's Derek Abramson, Tom Jones and Kevin Reilly discussed personnel experiences in aviation and the lessons learned from the situations.

• Corey Taylor, NASA's Marshall Space Center in Huntsville, Alabama, mishap manager, shared a look at Occupational Safety and Health Administration case studies.

• Marcus Manella shared a look at Amelia Earhart's around the world record attempt through the lens of modern day flight test risk management best practices.

• California Highway Patrol officer Aaron Mauer, a public affairs officer from the CHP Mojave station, examined driving impaired, driving in adverse weather conditions, driving in construction zones, distracted driving, speeding and parking lot safety.

• Jerry Dobbins, Armstrong Stratospheric Observatory for Infrared Astronomy crew chief since 2014 and currently serving a detail as the deputy branch chief for Aircraft Maintenance, presented on general mishap response and radio frequency fundamentals.

Everyone has responsibility for safety

By Jay Levine
X-Press editor

Integrity, competence, collaboration and character are some of the key ingredients of a successful safety culture. It is in such a culture that people feel empowered to speak up when something isn't right.

That was part of Rogers Smith's NASA Armstrong Safety Day presentation. Smith, a former center chief pilot and director of Flight Operations, shared some lessons learned, the responsibility of everyone in the organization to flag challenges and the importance of not only creating a safety culture, but maintaining it.

During Smith's 19-year career here, he worked on the reverse swept wing X-29, the Advanced Fighter Technology Integration F-16 and F-111 aircraft and the highly maneuverable X-31. He also was part of the F-15 Advanced Control Technology for Integrated Vehicles, the F/A-18 and the SR-71. He currently is an aerospace consultant in the areas of flight test and safety, as well as international speaker on leadership and safety.

Integrity is when people find something is not working and tell managers there's a problem, Smith said. The challenge is to effectively

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Women turn pain into help for others

By Jay Levine
X-Press editor

Two women have taken unimaginable loss and channeled that into the creation of a foundation to help others manage loss, depression and loneliness.

Tania Owen and Vickie Speed shared stories about the loss of their husbands, who worked for the Los Angeles County Sheriff's Department, during the recent NASA Armstrong Safety Day.

Sgt. Steve Owen was killed in a single moment when he was shot multiple times responding to a burglary. Detective Mitch Speed had a 26-month battle with prostate cancer caused by workplace exposure. Mitch Speed introduced Vickie and Tonia at an event the two couples attended 10 days before Steve Owen was murdered and the two women have been friends ever since.

Tania Owen was employed by the Los Angeles County Sheriff's Department and her career assignments included patrol, detective and bomb squad K-9 handler. She is now the CEO of the Owen-Speed Foundation, an organization aimed at supporting law enforcement spouses, families and survivors with financial assistance and support to reduce the financial burdens and allow families to process, connect and grieve. Speed joined Owen at the foundation as the CFO and had previously worked for 30 years in construction accounting and project management.

NASA

Tania Owen and Vickie Speed started a foundation to provide assistance to law enforcement spouses, families and survivors.

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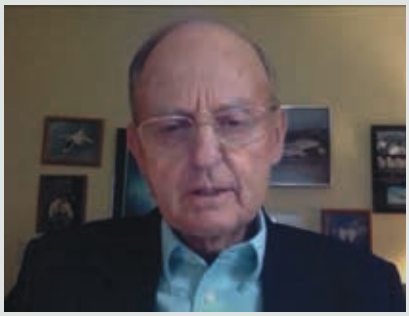
Rogers Smith... from page 4

communicate. What can make that prospect more complex is that there are often two departments in many organizations.

"The department of wishful thinking that is occupied by directors and marketing," Smith explained. "The other is the department of reality, where most of us live."

Communicating the bad news to managers is difficult, especially when trying to balance between the two departments. Good communication is how that balance is achieved.



Rogers Smith

"Voices need to be heard in the wishful thinking department," Smith said. "Ask questions and take a seat at table to manage risk. Own the safety culture and be accountable, learn from the past and if you think safety is expensive, try an accident."

Some lessons learned he cited were:

• A 1974 YF-16 1974 taxi became a flight. A sensitive side stick cause massive pilot induced oscillation, where the pilot tries to overcorrect for a challenge. Smith identified the lateral control system was a problem, as identified through simulation.

The official disagreed with Smith and blamed the pilot, who was reassigned. Another pilot later saved the project when he controlled the aircraft through four bounces on takeoff. After that the system's sensitivity was improved by factor of four. Organizational hubris almost lost the program.

• The highly maneuverable X-31 flew in November 1995 in a situation where there was icing below the clouds – rare for the Mojave Desert. The pilot ejected and the aircraft crashed outside the Edwards Air Force Base north gate.

"We did not have auto safety pilot that could have avoided an accident," Smith said. "We now have auto safety pilots and we need to use them."

• AF-447 (A330) crashed into the Atlantic Ocean on a flight from Rio de Janeiro to Paris. It was a dark night and bad weather. The flight controls reacted to an airspeed problem with a multiple changes that resulted the aircraft crashing with 250 people on board.

"It was a poor controls design," Rogers said.

• The X-22 crashed from 100 feet into the mud because of a lack of communication on aircraft maintenance.

• Changes were made to the B 737 when the B 737 came out. No specific training, or simulator requirements were added for pilots with a lot of new elements on the aircraft. A defective sensor was the key cause in two B 737 Max crashes.

Capt. "Sully" Sullenberger testified to congress in 2019 that the system of design and certification had failed in the case of the B 737 Max.

With enlightened leadership, the truth can be heard, Smith said. Development remains a discovery process, which requires independence, self-sufficient autonomy, humility, discipline and teamwork.

Smith was asked if he ever had to make a knock it off call and how it was resolved.

"When the X-29 almost departed because no one in the control room wanted to tell the chief pilot the test point was not set up properly because he would get really upset. I called a knock it off. It takes discipline to do what you need to do. I don't care if someone was mad."

A challenge for the future will be to balance automation and training.

"I am a believer in technology and automation, but that should not be used to relieve you from proper testing," Smith said. "Marry the two and do it right because balance is the key."

AFRC2021-0052-4 NASA/Lauren Hughes

Justin Hall and Red Jensen prepare the X-56B remotely piloted aircraft for flight.

AFRC2021-0052-7 NASA/Lauren Hughes

The X-56B remotely piloted aircraft is prepared to begin a new flight series by James Smith and Red Jensen.

X-56B begins new flight series

At right, the X-56B remotely piloted aircraft flies the first flight of a new series.

Below, the X-56B remotely piloted aircraft lands following the first of a new flight series.

AFRC2021-0052-17 NASA/Lauren Hughes

AFRC2021-0052-22 NASA/Lauren Hughes

By Jay Levine
X-Press editor

The X-56B remotely piloted aircraft began a new flight series. The flight was April 19 at NASA Armstrong, with partner Northrop Grumman.

The X-56B uses the same centerbody as the earlier X-56A, which concluded testing in 2019. The X-56A suppressed a potentially destructive vibration called flutter. Flutter suppression permitted research of the aircraft's lightweight, flexible wings.

X-56A team also facilitated the development of tools and technologies and acquired data to validate modeling techniques. The U.S. Air Force Research Laboratories in Ohio is a partner on X-56B and also was a partner on the X-56A.

Aviation Safety... from page 2

over the last 10 years," Asher said. "We have also achieved a decrease in the rate of total incidents, easily meeting a 10% decreasing incident rate goal, year over year. I think our safety culture has been steadily improving and folks think about the safety implications of their actions before they take them."

On average, NASA Armstrong flies about 1,000 missions and 3,000 flight hours per year. In fiscal year 2020 despite the global pandemic, the center flew 571 research missions and a total of 1,589 flight hours.

"My hat is off to the maintainers, the pilots, the operators, engineers and everyone who had a role in it because that was really the recognition we received with this award: the input of every single person in the process had," Asher said. "This was a team effort across all of Armstrong."

In fiscal year 2020, NASA Armstrong aircraft, pilots, maintainers, engineers, project managers and other support personnel were leveraged for 72 different NASA customers. Included in that total: 39 projects for NASA's Aeronautics Research Mission Directorate, six projects for NASA's Science Mission Directorate, six projects for NASA's Human Exploration and Operations Mission Directorate, four projects for NASA's Space Technology Mission Directorate and 17 projects for U.S. Department of Defense and commercial partnerships, all successful.

It was a challenge.

"The deliverables didn't happen the way we originally planned because of the pandemic, but we made progress," Asher said. "We proved we could still serve our customers and meet contractual obligations in a telework environment along with deliberate trips to Armstrong."

> "The launch window for the Mars 2020 mission was very narrow and if it was missed, a 24-month delay would have cost nearly $1 billion."
>
> **Troy Asher**
> NASA Armstrong director of Flight Operations

The flight operations area had more people on site because "You have to go onsite to fly an airplane or work on one," Asher said. "It is not lost on me that we needed all the people working behind the scenes in order for us to fly airplanes."

Finding a way

From about St. Patrick's Day to early June the center and most of the country was locked down. NASA was at Stage 4, which permitted only mission essential projects and people.

However, an agency transportation need arose that the center was uniquely qualified to assist. Waivers were approved for the Mars 2020 rover mission because it was an agency level requirement that was second only to the International Space Station.

To assist in transportation challenges, Airborne Science aircraft were modified to meet the need. The effort required waivers from agency and center officials for the modifications and coordination in a telework environment with as few people on site as necessary for the work to happen safely, Asher said.

"NASA Armstrong's Gulfstream-III No. 808 in particular was not configured for passenger transport because it was in modification status and it was a big effort to re-configure it," he explained. "We did that without a single COVID-19 case."

As a result, the aircraft based at Armstrong was able to transport critical scientists and engineers from the Jet Propulsion Laboratory to Kennedy Space Center to support the Mars 2020 mission.

"The launch window for the Mars 2020 mission was very narrow and if it was missed, a 24-month delay would have cost nearly $1 billion," Asher added.

NASA Armstrong aircraft were used to safely transport personnel for four months, flying 82 flights and 283 hours in support of this mission, successfully meeting the launch date. Also, the center took on additional missions moving U.S. astronauts between the SpaceX Corporation facility in Los Angeles to NASA's Kennedy Space Center in Houston to support the SpaceX DM-2, the first launch of American astronauts from American soil on American Rockets in more than seven years.

Thomas Zurbuchen, associate administrator of the Science Mission Directorate, said with regard to the center's contingency transport efforts: "One of the best demonstrations of 'One NASA' I've seen in a while is playing out right now with our Perseverance rover. Together we are persevering."

Measuring improvement

NASA Armstrong uses 18 different performance measures and metrics to gauge the success of its flight operations. These measures are designed to evaluate the effectiveness of the center's research operation from end-to-end including aircraft generation ability (maintenance), logistics, scheduling, and actual flight rates. Some examples include pilot hours required and flown, aircraft availability by various tail numbers, categories and mission types, and mission cancelation rate.

"It's not so much about the metric and having something to look at, it's all about what you're trying to do," Asher explained. "It's about your goal and improving. If you have a particular goal, you've broken down the process by which you will make that goal, then you can find areas of that process to improve. We can always improve."

The greatest effort is placed on areas that need improvement.

"That which is measured improves," he said. "If you don't measure it, how are you ever going to get better? You can put something in place to improve that process and you can watch that metric go up."

One area Asher said the center is working to approve is ensuring F-15D aircraft are available to support X-59 flights.

"We are looking at our support aircraft and know the F-15D is the platform we need to measure the shockwave on the X-59," he said. "To do that, we are working on ensuring we have the right staff, maintenance knowledge, replacement parts, and logistics improvements."

How the aircraft fleet is used is also evolving. For example, the F-18s are undergoing upgrades and the focus is on phase inspections to improve availability and reliability and possibly transfer some projects form F-15Ds to the F-18s.

"With a team like this, with a common goal and everyone focusing on the same thing, there's no limit to what you can do," Asher said.

Foundation... from page 5

Sgt. Owen was a 29-year law enforcement veteran who earned five medals for his work including the Meritorious Medal of Valor. That made it all the more shocking when Tonia Owen received a phone call that her husband had been shot.

"The morning started like any other," she recalled. "We were getting ready for work, had a cup of coffee and talked about the kids. We embraced and said we loved each other and would see each other that night. Little did I know that was the last time I would see my husband."

She was unaware that there was a bullet at the base of his brain and when she arrived, he was receiving cardio pulmonary resuscitation. Within a minute he was gone.

"My experience was traumatic and I endured an incredible loss," Tania Owen said. "It was completely unexpected."

Detective Mitch Speed, a 16-year veteran of the Los Angeles County Sherriff's Department, was assigned to the Lancaster office, a job he dreamed of and worked to achieve at 36 years old.

"He didn't feel right and he didn't look well," Vickie Speed recalled.

Soon after the couple went to the City of Hope. Weeks later Mitch Speed learned that he had Stage 4 cancer. He battled for more than two years, but lost his fight on July 7, 2018.

"With cancer, it really is a roller coaster," Speed said. "Towards the end we were running out of treatment options and he had to go to hospice. He passed within three weeks. It was difficult to watch and that is the reality."

Owen and Speed have endured great pain. However, they draw strength from their friendship and the foundation they have created that honors their husbands. It also helps a number of law enforcement spouses, families and survivors in need to recover from complicated and difficult challenges.

Vincent Tolomeo, former NASA Armstrong employee, dies at 75

Vincent "Vinny" Tolomeo, a former NASA Armstrong aerospace engineer, died April 7. He was 75.

He worked at the center for more than 20 years from the mid 1970s to the mid 1990s. Tolomeo worked in the NASA Armstrong Flight Loads Lab and the Dryden Aeronautical Test Range where he maintained the computers and associated systems.

People who knew him considered him on of the center's unsung heroes.

Howard Trent, former avionics technician and specialist, dies at 72

Howard Trent, a longtime NASA Armstrong employee, died March 21. He was 72.

Trent was an avionics technician and quality inspection and assurance specialist at the center from 1985 to 2014. During his career, he designed, installed, and maintained flight test video and camera systems for numerous NASA Armstrong research and support aircraft, some of which are still in use.

Projects Trent supported included the NB-52B Testbed, the F-104 and F-15 space shuttle thermal protection system tests and the X-29 forward swept wing program. He also was involved in the X-38 Crew Research Vehicle, the F-18 High Alpha Research Vehicle, the CV-990 Shuttle Landing Systems research aircraft and several space shuttle landings at Rogers Dry Lake near NASA Armstrong and preparation for return at the center.

From 2005 -2014 he provided quality inspection and assurance support for NASA Armstrong's F-15 and Global Hawk aircraft as well as the U.S. Forestry Service Air Tanker program. Trent retired from civil service in 2013 and then supported the Global Hawk deployment to NASA's Wallop's facility as a contractor in 2014. He received numerous individual and team awards during his career, including a NASA Spaceflight Award in 2003.

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**Address: P.O. Box 273,
Building 4800, MS 1422
Edwards, California, 93523-0273
Phone: 661-276-3449
FAX: 661-276-3167**

**Editor: Jay Levine,
Logical Innovations, ext. 3459**

Managing Editor: Steve Lighthill, NASA

**Chief, Strategic Communications:
Kevin Rohrer, NASA**

National Aeronautics and
Space Administration

**NASA Armstrong Flight
Research Center**
P.O. Box 273
Edwards, California, 93523-0273

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