National Aeronautics and Space Administration

THE NEIL A. ARMSTRONG FLIGHT RESEARCH CENTER

X-PRESS

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70th Anniversary

NASA Armstrong Flight Research Center 1946-2016

www.nasa.gov/

NASA Consolidates Center Operations

NASA is consolidating its Dryden Flight Research Center under Ames Research Center management and its Wallops Flight Center management.

Under the consolidations Dryden becomes an operational element of Ames, and Wallops becomes an operational element of Goddard. The Dryden and Wallops Centers will retain their identities but will be under the overall management and direction of Ames and Goddard, respectively.

Dr. Alan M. Lovelace, NASA Acting Administrator, said the consolidation will focus the resources of each of the installations on what it can do best.

"The close relationship between Ames and Dryden's efforts in aeronautical programs and Wallops' and Goddard's efforts in suborbital programs, as well as the unique facility capabilities and the physical proximity of the installations provides an opportunity to improve overall program effectiveness through these consolidations," Lovelace said.

Flight research operations for Ames will be carried out primarily at Dryden and sounding rocket development and operations for Goddard will be carried out primarily at Wallops.

The consolidations are expected to be completed by October 1, 1981.

Further details of the consolidation and anticipated changes in operations will be provided when received from Headquarters.

* * *

NASA DRYDEN DIRECTOR Isaac Gillam, recently received a 1981 alumni award from Howard University, Washington, D.C. The award, presented March 1 to Gillam by Howard University President James E. Cheek, was for his postgraduate achievement in the fields of Space and Science Engineering.

Amateur Radio Club Participates in First Shuttle Landing

The Antelope Valley Amateur Radio Club participated in the first orbital mission of the Space Shuttle Columbia by operating a special event amateur radio station at the landing site, NASA Dryden.

Transmitting as K6OX (the club's call sign), a total of 3350 radio contacts were made around the United States from the 10th through the 14th of April, on the 80, 40, 20, 15, 10, and 2 meter amateur radio bands by 16 individual operators.

Station equipment consisted of a 200 watt HF and 10 watt VHF transmitters and associated receivers, directional antennas elevated 80-feet, and a personal computer for logging stations contacted.

Stations contacting K6OX during the special event operation will receive on request a unique QSL card which is a certificate confirming the amateur radio contact.

BEGGS...Continued

1969.

Mark will replace Dr. Alan M. Lovelace, who resigned December 29 and is presently acting as Associate Administrator/General Manager.

THE ANTELOPE VALLEY Amateur Radio Club recently participated in the first landing of the Space Shuttle by contacting approximately 3350 separate radio operators located around the United States.

The X-PRESS is a bi-weekly publication for the employees of the NASA Dryden Flight Research Center. Contributions are due the Friday before payday. Published by the Public Affairs Office, Extension 221. Photography by staff photographers.

May 1, 1981
Volume 24 Issue 2

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National Aeronautics and Space Administration
High-L Dryden Flight Research Center
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NASA Armstrong Flight Research Center had a number of names. In fact, for more than a decade it was consolidated from a center to a facility under NASA's Ames Research Center. The consolidation is on the last page of the May 1, 1981, X-Press issue, above. The facility became a center again and it was reported in the February 1994 issue, below. Nancy Lovato of public affairs had an interview with Center Director Ken Szalai about the changes in the X-Press March 1994, at right.

X-PRESS
DRYDEN FLIGHT RESEARCH CENTER

Volume 36 Issue 3 March 1994

Up front with Dryden Director Ken Szalai

"NASA Administrator Dan Goldin talks about "centers of excellence," and I think we are certainly that for flight research."

Background: Dryden was restored to full NASA center status March 1. Ken Szalai was designated center director, he has been facility director since December 1990.

X-Press: Now that the initial round of congratulations are over, what does being a center again mean for Dryden?

KJS: I believe it says NASA intends to retain a strong flight research program. NASA Administrator Dan Goldin talks about "centers of excellence," and I think we are certainly that for flight research. It has removed a layer of management, which goes along with reinventing government. It creates a clear sense of mission and delegates authority and responsibility, as Vice President Gore's National Performance Review (NPR) recommends. We can work directly with our customers: the other centers, DOD, industry, universities. It certainly has meant an increase in pride. I have seen it in employees and people external to Dryden. It also means we have to be able to carry out all the functions of a center, many of which Ames has provided. It will be more work, but it will be "faster, better, cheaper."

X-Press: Will there be any increases in funding or personnel in the near-term?

KJS: The transition team has identified some additional resource requirements and we're discussing them with NASA Headquarters. I do not see any changes at present. Any new slots must be justified as critical. We are looking at securing services from other centers. The agency direction is to consolidate functions and we will not duplicate services. Our funding and staff are directly related to our programs and we need to advocate a strong flight research program.

X-Press: There have been cuts in our support service contracts. Will these cuts continue or do you see any changes?

KJS: Again, the size of our workforce, both civil service and contractor, is directly related to the flight research program. Part of reinventing government is to cut unnecessary spending. Administrator Goldin has given clear direction to do our mission "faster, better, cheaper." We have reduced the size of the support service contractor staff by about ten percent over the past year. I would expect to see more reductions in both civil service and contractor staff throughout NASA the rest of the decade as the government downsizes to do its mission more efficiently. However, I think the contractor workforce at Dryden is essential. I do not foresee Dryden without a contractor staff.

X-Press: Can you talk about new programs Dryden is advocating?

KJS: We are targeting our flight research to contribute more directly to the civil sector. We are advocating a sonic boom program geared towards improving predictions and reducing sonic boom strength. Another proposed program would look at ways to improve the aerodynamics and propulsion performance of subsonic and supersonic civil transports. Another area is an expanded program to develop unpiloted aircraft that would conduct atmospheric experiments. Perseus is a precursor. We are continuing the advocacy of high speed experiments on the SR-71 — I believe that the SR-71 will be an important testbed for the rest of the decade. We are also working with other centers and DOD to develop hypersonic experiments. In the human resources area, we are developing new student programs with several schools to encourage diverse pools of talent for all levels of the workforce. Our efforts to achieve diversity in the workforce will be enhanced by center status.

X-Press: Do you plan any changes in the present organizational structure?

KJS: I expect to see changes. Continual improvement strategy demands optimizing. NPR directions are to reduce management overhead and supervisory ratios government-wide. There won't be any major changes on March 1, except those made for legal reasons such as naming a comptroller and a chief counsel. I do want to reduce overhead and be better able to deal with our customers in a timely way. The agency has reduced a layer [of management] for us and we should do likewise locally. I would expect organizational changes after Oct. 1.

X-Press: Dryden's 50th anniversary is in 1996. How do you see the center functioning then?

KJS: I see us with research projects in every flight regime: subsonic to hypersonic. I see employees at all levels fully embracing continual improvement and empowered to make changes. We will be operating at a reduced cost per flight - that's mandatory. I see a resurgence of interest in X [experimental] aircraft. We will be completing the seismic upgrade on bldg. 4800. I expect to see more employees focused on civil programs than high performance. I expect to see all key positions filled permanently. I also expect, and this is very important, to see the richness of America's diverse population reflected at all levels at Dryden.

X-Press: You've been with NASA, at Dryden, since 1964. How does all this affect you personally? Do you feel that you are at the pinnacle of your career?

KJS: Each year has been a pinnacle, based on Dryden staff successes. I have always been so impressed with the can-do attitude here. When I was a working engineer, what was most important to me was to have the tools and freedom to do my job, without management interference. I have to remember that. I believe that freedom leads to innovation. Being named center director is a humbling experience. There are so many top-notch people leading the other centers. The ability to regularly deal with the other center directors makes me realize the enormous strength of the agency. There will be many more responsibilities, more trips to Washington. The strength of the Dryden staff gives me confidence we will succeed together.

❑ *Nancy Lovato*

National Aeronautics and Space Administration
Dryden Flight Research Center

Director Ken Szalai addresses employees at the ceremony marking Dryden's restoration to Center status.

Dryden Flight Research Center

Former Dryden directors assist current director Ken Szalai at the unveiling of Dryden's new Center sign.

THE X-PRESS
AMES RESEARCH CENTER | DRYDEN FLIGHT RESEARCH FACILITY

Mirror system tested on F-104

Dryden charts own course once again

Cover photo by Ken Ulbrich
AFRC2016-0265-01

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X-Press continues proud traditions

For all but eight of the center's 70-year history the X-Press, our internal newspaper, has been and continues to be a record of our success, a celebration of our accomplishments and a look at the high-caliber people responsible for making the seemingly impossible a reality.

My favorite X-Press issues are those that feature Armstrong people who bring diverse and unique perspectives to their work regardless of the mission. Armstrong's workforce is helping to integrate Unmanned Aircraft Systems, or UAS, into the National Airspace System, aiding in the return of supersonic passenger air travel and working to reduce emissions and noise with greater fuel economy and less impact to the environment. We are also assisting with elements of the mission to Mars.

People are the most important element of our Armstrong Strategic Plan as we leverage our atmospheric flight expertise to advance technology and science for the benefit of NASA and the nation. That's what we continue to do and that is what the X-Press reflects.

The center will be researching the X-57 electric propulsion aircraft and the preliminary design review for the Quiet Supersonic Transport is underway. The QueSST is envisioned as a human-piloted X-plane that creates softer sounds when it pierces the sonic barrier. These are but two examples of how NASA will be with people when they fly in the future.

Forward-looking concepts like the hybrid wing, joined wing and double bubble aircraft are designs that could lead to big improvements in commercial transport. The Aeronautics Research Mission Directorate's 10-year New Horizons initiative includes these aircraft. Expect to see Armstrong contributions in future X-Press issues when details solidify.

In addition, Armstrong staff helps the astrophysics mission by maintaining and flying the Stratospheric Observatory for Infrared Astronomy, or SOFIA, NASA 747SP. This science platform has a growing number of certified instruments to permit investigators to study the stars in ways never before possible. It is chronicled in the pages of the X-Press.

Armstrong also supports Earth science missions around the world. The C-20A and the ER-2 went to Africa this year to examine atmospheric chemistry and changes in our planet's climate. The DC-8 continues to fly science missions in support of IceBridge. NASA is on it when collecting data about how our planet is changing. The X-Press covers those missions.

The X-Press also reports on center and agency initiatives. NASA's ongoing Convergent Aeronautics Solutions project examines aviation-related technologies as part of the Transformative Aeronautics Concepts Program. Researchers are studying a number of concepts that have the potential to solve some of the biggest challenges in aviation – critical because technology drives exploration.

Armstrong's move to Critical Chain Project Management, or CCPM, is another example of how the X-Press helps communicate center initiatives. Better communication, a 25 percent increase in the number of projects completed on an accelerated time schedule and a database that makes it possible to see the center's progress at a glance are some results of CCPM.

In addition to programs, projects and technology development reported in the X-Press, it also reflects the times. For example, the men sported white shirts and thin, black ties and some women had beehive hair styles during the late 1950s and 1960s. The 1970s offered trends such as bell-bottom clothing, mutton-chop sideburns and more recently jeans.

I have enjoyed the special color editions that focused on some of our key projects and the teams that make them happen. I also like to catch up on what's going on in the regular black and white issues. Coverage of the Exchange Scholarship winner, the chili cook off and holiday Exchange Council events help us to manage the work and life balance. It also is rewarding to see the best of us receiving NASA and center awards and recognition each year.

Regardless of the new missions, aircraft and trends, the X-Press will report it.

David McBride
Neil A. Armstrong Flight Research Center director

Armstrong celebrates 70 years

The X-15 rocket-powered aircraft begins its climb after launch at the NASA Flight Research Center (now Armstrong).

EC65-884 NASA

Photo courtesy U.S. Air Force

The X-15 makes one of that program's 199 flights. The rocket plane posted an official speed and an unofficial altitude record. In addition, the X-15 program tested technologies and collected physiological data critical for preparations for the manned space program.

By Jay Levine
X-Press editor

The National Advisory Committee for Aeronautics sent 13 engineers and support staff to California's Mojave Desert in September 1946 to assist in the quest for supersonic flight.

The X-1 aircraft represented the first U.S. Air Force designated "X" or experimental vehicle. It officially exceeded Mach 1 Oct. 14, 1947. Mach is measured from 650 to 750 mph depending on a number of factors such as atmospheric conditions and altitude. The NACA had its first supersonic flight, also with an X-1 aircraft, March 4, 1948.

The small contingent of the NACA staff were expected to complete the single project and wrap up operations at the desert outpost. Now 70 years later, NASA Armstrong continues to test the latest aviation marvels through flight.

A number of X-planes followed, designed to find answers related to speed, temperature, structure, control and human physiology, work that continued as the agency morphed from the NACA to NASA in 1958. One such aircraft was the X-15 rocket plane that posted a then record 199 flights, including binders of research, and an official record of speed at Mach 6.7, or more than 4,500 mph, and an unofficial altitude record at the edge of space at 67 miles, or 354,200 feet.

The center's initial focus was aeronautics, but the X-15 bridged the worlds of high speed aircraft with the research needed to reach

NACA

The X-1B reaction control system thrusters are tested in 1958 and later proven on the X-15 as a way to control a vehicle in the absence of dynamic pressure.

beyond Earth's atmosphere. The development of reaction control systems for the legendary X-15 was critical for spaceflight, as it provided a way to control a vehicle in the absence of dynamic pressure as is encountered in space.

The Lunar Landing Research Vehicle also was tested here. The aircraft simulated flight in the one-sixth gravity of Earth that astronauts would face on the moon. The research contributed to construction of Lunar Landing Training Vehicles that were built and sent to NASA Johnson Space Center (then the Manned Spaceflight Center) in Houston. Apollo astronauts used the spindly aircraft to train for landing on the moon. The practice was helpful when Neil Armstrong piloted the Lunar Module manually to the lunar surface to take the first steps.

Lifting body aircraft were designed to validate the shape of a space return vehicle that could land like an aircraft instead of descending under a parachute and landing in the ocean.

When the Sierra Nevada Corporation's Dream Chaser spacecraft returns for additional approach and landing tests at Armstrong in 2017, it will continue the center's historic role with lifting body shaped vehicles.

Space Shuttle Enterprise's approach and landing tests marked another contribution to space-related technology. A large steel gantry called the Mate Demate Device slowly lifted the shuttle onto the back of a specially modified NASA 747 Shuttle Carrier Aircraft. Enterprise was then launched from the back of the large aircraft to confirm shuttles could safely land unpowered.

The center retained a role with the space shuttles during the 30-year program, often hosting landings. Most early landings and first flights of new orbiters or return to flight operations took place at the center. The shuttles concluded 54 space missions with a landing at Edwards and a return trip on the NASA 747 to Kennedy Space Center in Florida.

ED12-0317-60 **NASA/Jim Ross**

Space Shuttle Endeavour is affixed atop NASA's 747 Shuttle Carrier Aircraft as it prepares for a landing at Los Angeles International Airport to conclude a final flight on Sept. 21, 2012.

NASA/JSC2010-E-068745

The undamaged Pad Abort-1 flight test crew module rested in the desert after a successful Pad Abort-1 flight test May 6, 2010, at the White Sands Missile Range in New Mexico.

ED13-0389-03 **NASA/Carla Thomas**

A NASA Armstrong F/A-18 aircraft validated NASA Marshall's adaptive augmenting controller software for the Space Launch System rocket.

Also of consequence of the space program, Armstrong was involved in testing the pad launch abort test capsule for NASA's Orion spacecraft, which is intended to eventually take astronauts on a journey to Mars. The capsule's instrumentation and wiring took place at the center, as did its weight and balance, center of gravity and combined systems testing. The center also led the construction of the launch site at White Sands Missile Range in New Mexico where the capsule successfully launched May 6, 2010.

Software for the agency's Space Launch System rocket, which will launch Orion into deep space, was tested onboard Armstrong's F-18 aircraft that flew nearly vertical to simulate a rocket flight path. An Armstrong F-18 was also used to test a radar system that helped land the Mars Curiosity rover on the surface of the planet in 2012.

In fact, Armstrong manages the Space Technology Mission Directorate's Flight Opportunities program, which seeks to mature space technology development through flights on commercial suborbital launch vehicles. The program funds the flights in space-like environments of new technologies of interest to NASA's space exploration goals. Among other successes, the program has matured a 3-D printer now on the International Space Station that can print parts and tools.

Speed isn't only the regime of space vehicles. Armstrong researchers explored the realm of hypersonic speed with the first integrated hypersonic scramjet engine that was a component of the X-43A. The air-breathing engines propelled the vehicle to speeds of Mach 7, about 4,500 mph, and Mach 10, or roughly 6,500 mph, during separate flights in 2004.

A defining feature of all supersonic aircraft is a loud sonic boom created when an aircraft exceeds the speed of sound. Over the years NASA researchers have worked to mitigate or soften these booms, modifying aircraft to test theories and new technologies.

Seven decades after helping to create the first sonic boom, NASA is designing a new X-plane to demonstrate quiet boom capabilities, which could lead to supersonic flight without startling people on the ground, a key hurdle to amending rules that currently prohibit overland supersonic operations. The preliminary design review for the Quiet Supersonic Transport human-piloted X-plane is currently underway.

Unmanned Aircraft Systems, or UASs, are another major area that the center has researched with experimental vehicles since the 1960s. Engineers have continued to investigate this area of aeronautics including shapes and subsystems.

Armstrong and other NASA centers remain involved in the technology development of UAS to help in the eventual integration of Unmanned Aircraft Systems into the National Airspace System.

In the early 1990s Armstrong managed the Environmental Research Aircraft and Sensor Technology program with industry partners. The idea was to develop emerging environmentally friendly aircraft, sensors and technologies needed to fly the emerging class of aircraft safely and conduct science missions. The solar-powered Helios reached an altitude of 96,863 feet during the program. Prototypes of the Predator-B aircraft later led to the NASA science platform named Ikhana, which is now used for science and aeronautical missions.

Sometimes technology advancements lead to revolutions in the way challenges are approached. For example, a specially-modified F-8 aircraft flown at Armstrong validated digital fly-by-wire control technology that replaced hydraulic systems. Military and commercial aviation companies subsequently integrated the systems into their aircraft. More recently, cars, motorcycles and boats are using systems with origins based in that research.

ED01-0230-3 **NASA/Carla Thomas**

The solar-powered Helios Prototype aircraft, which featured a wing as long as that of a Boeing 747-400, flew to an altitude of nearly 100,000 feet.

ED13-0220-127 **NASA/Carla Thomas**

A rainbow frames the Stratospheric Observatory for Infrared Astronomy 747SP during its first Southern Hemisphere deployment in Christchurch, New Zealand, in mid-July 2013.

NASA Langley/Advanced Concepts Lab, AMA Inc.

An artist's concept of NASA's X-57 Maxwell aircraft shows the plane's specially designed wing and electric motors. The X-57 is intended to demonstrate that electric propulsion can make planes quieter and more efficient and environmentally friendly.

With an eye toward making aircraft technologies transferrable to commercial uses, the NASA Aeronautics Mission Directorate is planning to make it common for future aircraft to be more fuel efficient, quieter and produce fewer emissions. An example is the all-electric X-57 Maxwell X-plane intended to be high efficiency, while reducing noise and emissions.

The center doesn't fly airplanes only for aeronautics research. Specially modified aircraft based at Armstrong support NASA's Airborne Science program, flying scientists and specialized instruments around the world to study Earth and its changing environment. They include a DC-8 flying laboratory, a C-20A aircraft, two ER-2 high-altitude aircraft and two Global Hawks.

Armstrong also operates and maintains the Stratospheric Observatory for Infrared Astronomy, or SOFIA. The NASA 747SP has the world's largest airborne infrared telescope. The airborne observatory flies above most of the atmosphere's water vapor, which limits Earth-bound telescope observations. The result is clearer images of the universe and the ability to use the latest science instruments to capture extraordinary astronomical data about the solar system and far beyond.

It's hard to predict how future aviation and space vehicles and their systems will evolve. However, it is certain that NASA Armstrong will build on its 70 years of success to validate the technologies that will drive exploration for a better tomorrow.

Leslie Williams, Christian Gelzer, Matt Kamlet and Mike Agnew contributed to this report.

X-Press tales

Separating the real from the imagined

By Jay Levine
X-Press editor

The modern day X-Press wasn't called that when it debuted Feb. 25, 1955. It was called the National Advisory Committee for Aeronautics High Speed Flight Station – News.

The three-page publication, printed on one side and held together with a single staple in the top left corner, featured a lead story on a pay raise for government aeronautical researcher interns and scientists. Also on the front page was a mention of obeying the base speed limit, a note from the safety committee and a raffle notice.

A handful of people began the publication including managing editor Helen Foley, editor Carmelita Southern (later Holleman), and typist Stella Doyle. Harry White was in charge of the art and the publication was reproduced by Walter Melver and Jack Corbin. This team developed the newsletter and requested ideas on naming the publication on the last page under the headline "You Name It."

The second issue printed March11, 1955, sported the winning name on the cover, the X-Press. Richard Musick of instrument repairs suggested the name that was one of 100 suggestions. To put that in perspective that was one-third of the approximately 300 people working at the facility (not yet a center). His prize – $5. To put the prize in perspective, gasoline was 23 cents a gallon, milk was 43 cents for a half gallon, cookies were 39 cents and a fast-food hamburger was 15 cents.

The front page of the second issue featured stories on the selected name, the 40th Anniversary of the NACA, a list of visitors and a credit union notice. None of the early issues had photography as the X-Press was essentially a small community newsletter with announcements of activities, facility sports team standings, new

NACA
HSFS-NEWS

The center's first-ever newsletter was distributed on Feb. 25, 1955, and called the NACA High-Speed Flight Station - News. About a third of the staff submitted ideas for what to call the publications, encouraged by a cash prize. The March 11, 1955, issue sported the new name, the X-Press. More than 62 years later, the styles and content have changed, but the name remains the same.

faces, deaths, service pins, meeting announcements and awards.

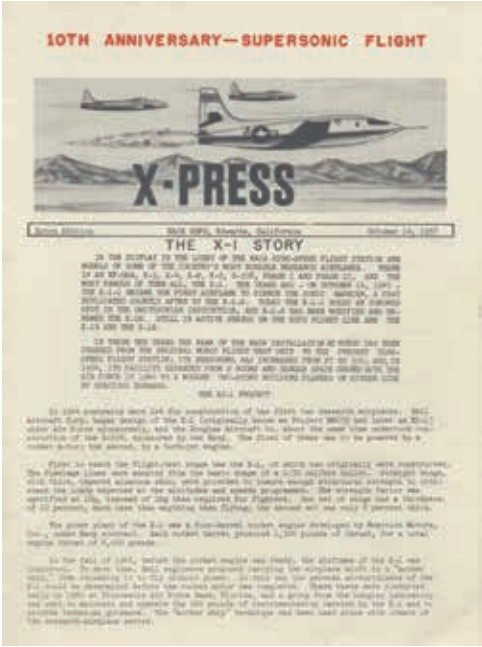
By 1956 the newsletter was beginning to evolve. The July 27, 1956, issue featured the first graphic, a map to the annual picnic, and the first photo, an image of the X-3 that accompanied an article on the experimental aircraft's retirement. In 1957, the content remained similar and the main changes to the publication were the addition of a new masthead that included an X-1, a chase plane and the publication's name.

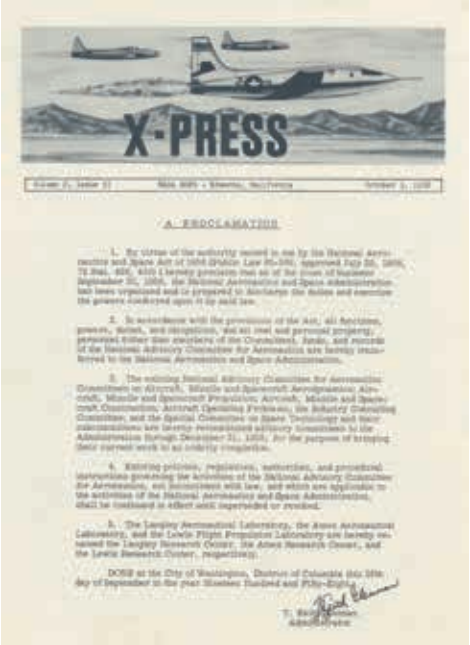
Major changes came in 1958 and were reflected in the pages of the X-Press. The Aug. 8, 1958, X-Press lead article was about President Dwight D. Eisenhower signing the law that created the National Aeronautics and Space Administration. That law passed Congress without a dissenting vote.

On Oct. 17, 1958, the North American Aviation X-15 rocket plane premiered at the Inglewood, California, plant. The first time the X-15 was carried in flight on a pylon under the wing of the NB-52B was reported in the March 20, 1959, edition and the first glide flight of the X-15 in the June 12, 1959, issue.

The space race also had an impact on facility personnel as Walter C. Williams, then station chief, was named an associate director of Project Mercury. He was replaced by Paul F. Bikle, who had a distinguished career in flight test with the U.S. Air Force prior to becoming the station's director and about a month later director of the new NASA center. The Oct. 2, 1959, X-Press lead article reported that NASA Headquarters had decided most flight test operations would occur at the station, which was renamed NASA Flight Research Center.

X-Press, page 12





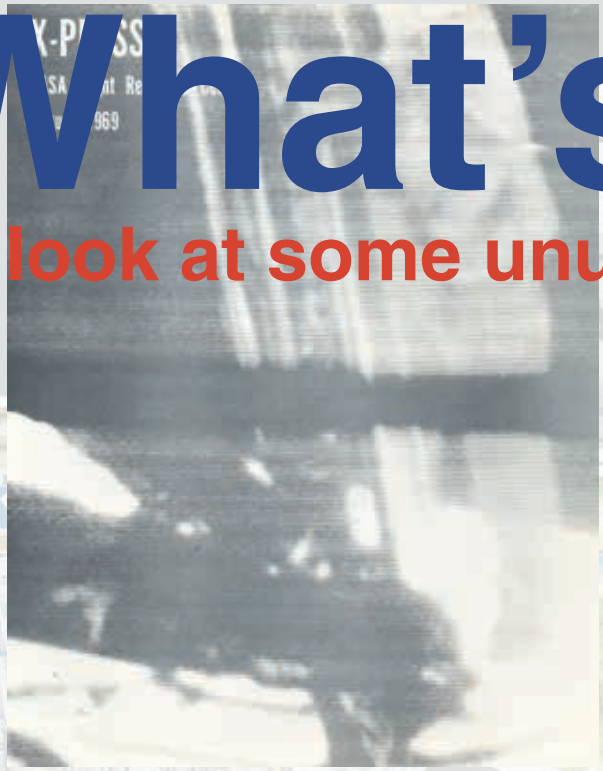
***Top left**, is the 1957 X-Press celebrating the 10th anniversary of supersonic flight. It also was the first X-Press to use spot color.*

***Top right**, the 1958 X-Press ran a proclamation that was a result of the National Aeronautics and Space Act approved unanimously in the U.S. Congress, changing the agency's name from the NACA to NASA.*

***At left**, the first – and only – X-Press Extra edition announced major news about two center icons.*

What's that?

A look at some unusual X-Press covers



The August 1969 X-Press ran an image of Neil Armstrong about to take his first steps on the moon. It has an abstract look of the man who was an X-15 pilot here at the center that now shares his name.

The X-tra was a special X-Press edition featuring a single topic, in this case the loads laboratory. A component of the X-37 is undergoing a thermal test on the cover of the January 2006 issue.

The propeller-driven Mini Sniffer was envisioned as a remotely piloted vehicle to collect atmospheric samples in the upper atmosphere. A later hydrazine-powered engine was intended to gather samples of rock and data from Mars after being dropped by a spacecraft. This was the cover of the Jan. 13, 1978, X-Press.

The HL-10 lifting body aircraft was chosen among the many options for this vehicle category because it is mounted on a display stand at the front of the center and is one of the first aircraft visitors see. This cover appeared on Jan. 19, 1968.

X-PRESS

NASA FLIGHT RESEARCH CENTER

PARAGLIDER

FRC Recruits

NEW WAGE STRUCTURE

The paraglider research vehicle built by center engineers and technicians looked at challenges of the recovery of spacecraft and booster rockets. The cover appeared Feb. 16, 1962.

X-PRESS

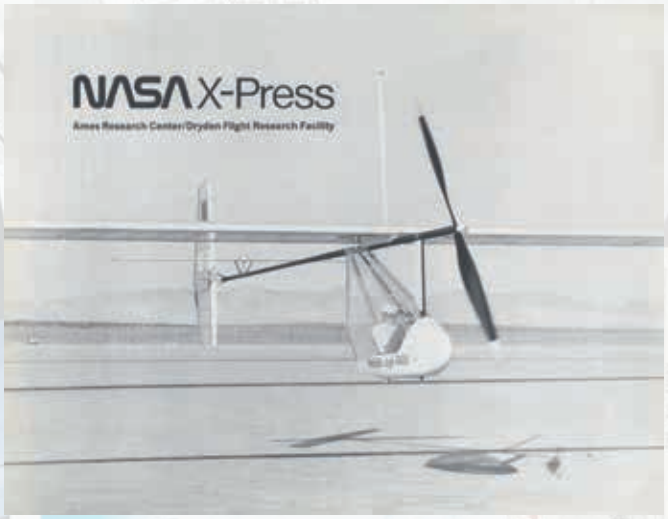
LLRV EDITION

LLRV Program Personnel Honored; Six Employees Receive Plaques

PROJECT PILOT JOE WALKER EARES THE LLRV BACK TO THE RAMP AREA IN PREPARATION FOR LANDING.

This special edition X-Press dated Feb. 19, 1965, looked at the Lunar Landing Research Vehicle tested here. The LLRV later was modified into the Lunar Landing Training Vehicle that astronauts used to train for the moon landing.

Resembling a flying yardstick, the solar-powered Helios Prototype posted a altitude record for its class of aircraft at 96,863 feet. The X-Press from May 8, 2002, shows the aircraft, which had a wingspan of 247 feet and larger than that of a 747-400, gaining altitude during a checkout flight. The record was a goal of the Armstrong (then Dryden) managed Environmental Research Aircraft and Sensor Technology program.



The Michelob Light Eagle was a human (pedal) powered aircraft that had an eight-minute flight on Jan. 2, 1981, and appeared in the Jan. 16, 1987, edition. The team from the Massachusetts Institute of Technology later formed the Aurora Flight Sciences Company.

X-PRESS

CEREMONY MARKS ROLL-OUT OF X-15

X-PRESS

X-15 MAKES FIRST CAPTIVE FLIGHT

X-PRESS

X-Press... from page 9

The 1960s marked the beginning of the X-15 flying program as pilot Joe Walker made the first flight of the government research program March 25, 1960. Scott Crossfield, a former NACA pilot, made the first flights of the aircraft for North American Aviation before the rocket's official transfer to the government. The Aug. 19, 1960, X-Press reported during an eight-day span in August 1960, X-15 pilots recorded unofficial records for speed (Joe Walker) and altitude (Maj. Bob White). Neil Armstrong would beat both records during a single flight of the X-15, No. 3 vehicle Dec. 20, 1961. April 20, 1962, Armstrong's flight reached 207,000 feet and 3,818 mph, the X-Press reported.

The Nov. 23, 1962, X-Press reported that pilot Jack McKay was seriously injured when the aircraft's engine did not reach full power and was turned off as the aircraft was intended to glide to a landing at Mud Lake, near Tonopah, Nevada. The left landing gear collapsed causing the aircraft to skid to the left and resulted in the collapse of the nose gear. The right wingtip then dug into the lake bed and McKay jettisoned the canopy and the aircraft rolled over onto its back. The aircraft would be restored and fly additional test flights.

A contract was awarded to Bell Aerospace Corp. of Buffalo, New York, for the design and construction of two manned lunar landing research vehicles to support Project Apollo, according to the Feb.1, 1963, X-Press. Research from those vehicles was incorporated to later Lunar Landing Training vehicles used to prepare astronauts to land the Grumman Aircraft Lunar Module on the surface of the moon. In

X-Press, page 15

X-PRESS

NASA FLIGHT RESEARCH CENTER

Volume 3 Edwards, California April 1, 1960 Issue No. 20

J.WALKER MAKES 1st GOV'T X-15 FLT

X-15 Program Progresses Here

X-15 Pilot Walker

X-PRESS

NASA FLIGHT RESEARCH CENTER

Edwards, California Aug. 19, 1960

X-15 SETS SPEED, ALTITUDE MARKS

the fastest...

and the highest

X-PRESS

NASA FLIGHT RESEARCH CENTER

Edwards, Calif. August 5, 1962

ALL THREE X-15s FLY IN ONE WEEK

X-PRESS NASA Flight Research Center

April 1969

X-PRESS
NASA FLIGHT RESEARCH CENTER

Exchange Council Plans Annual Spring Dance

Lifting Body Contract Awarded

X-PRESS
NASA FLIGHT RESEARCH CENTER

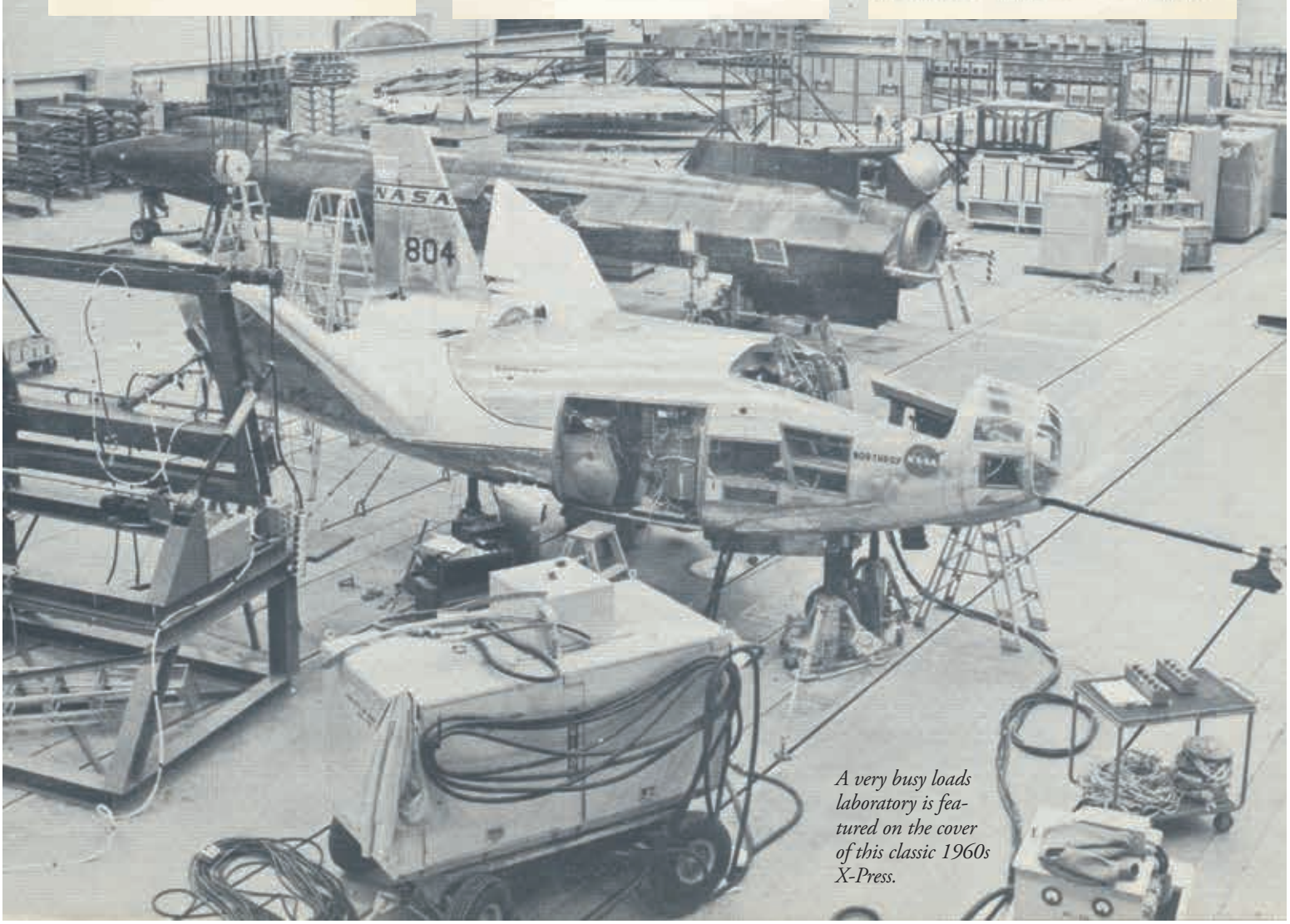
U.S. Government Leaders Praise United Fund Campaign Work

M-2 Begins Flight Test Program; 7 Successful Flights Completed

X-PRESS
NASA FLIGHT RESEARCH CENTER

High Range Contract Awarded To Unitec

Center Receives First Lunar Landing Research Vehicle



A very busy loads laboratory is featured on the cover of this classic 1960s X-Press.

X-PRESS
NASA FLIGHT RESEARCH CENTER

President Johnson To Visit Edwards; LLRV, M-2, X-15 To Be Displayed

X-PRESS
NASA FLIGHT RESEARCH CENTER

M2-F1 Makes High-Speed Taxi Tests; Captive Flight Soon

Ex-Center Pilot To Command Gemini 8

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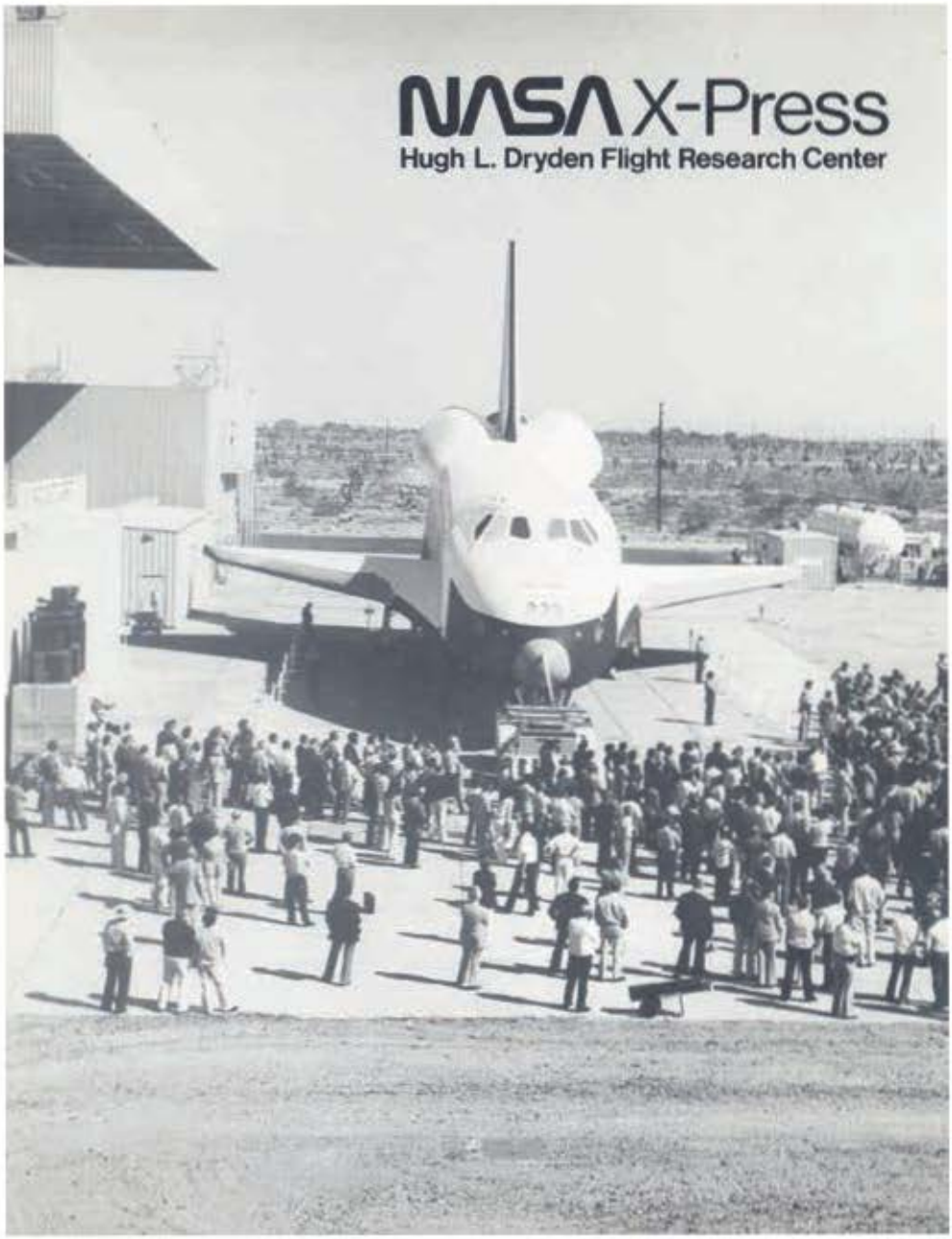
Bikle, Beeler Included In 1966 'Who's Who'

Haise, Engle Selected As Apollo Astronauts

X-PRESS
NASA FLIGHT RESEARCH CENTER

Aviation Great Dr. Hugh L. Dryden Dies

The May 1971 X-Press honored Paul F. Bikle's retirement after serving 12 years as center director.



The Sept. 24, 1976, X-Press featured the rollout of the Space Shuttle Enterprise prototype.

The March 25, 1977, X-Press featured the F-8 Digital Fly-By-Wire aircraft.

The Feb. 25, 1977, X-Press displayed an image of the first captive carry of Enterprise.

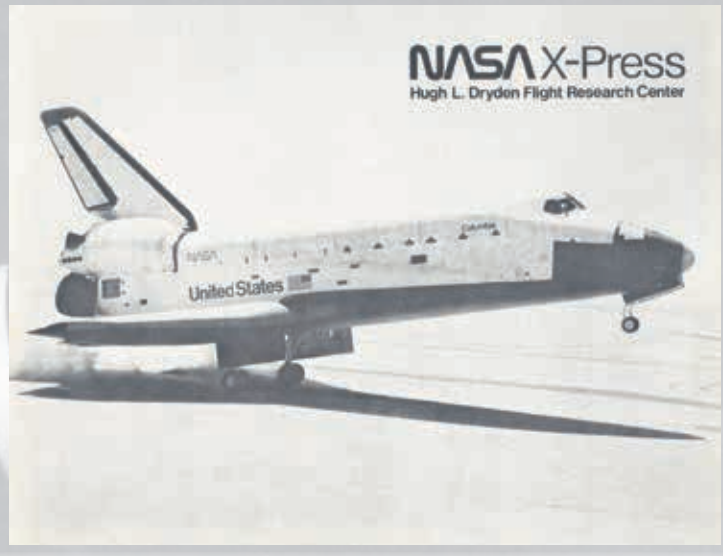
The Feb. 7, 1986, X-Press honored the Space Shuttle Challenger loss.

X-Press... from page 12

April 1964 the center received the first of the LLRV aircraft. The end result of flying the LLRV and LLTV was commemorated in the August 1969 X-Press, with a cover photo of the moon landing by former center test pilot Neil Armstrong (see X-Press cover in What's that? feature on page 10).

Flight research success continued with seven successful flights recorded on the first day of testing the M-2 lifting body aircraft, as reported in the Sept. 13, 1963, X-Press. The 1970s saw flights of the Enterprise space shuttle prototype from the back of a NASA 747 Shuttle Carrier Aircraft, the F-8 Supercritical Wing, the F-8 Digital Fly-By-Wire aircraft, the SR-71 and additional lifting body aircraft. The center was renamed the NASA Dryden Flight Research Center in honor of Hugh L. Dryden, who was a key figure in aeronautics

X-Press, page 17



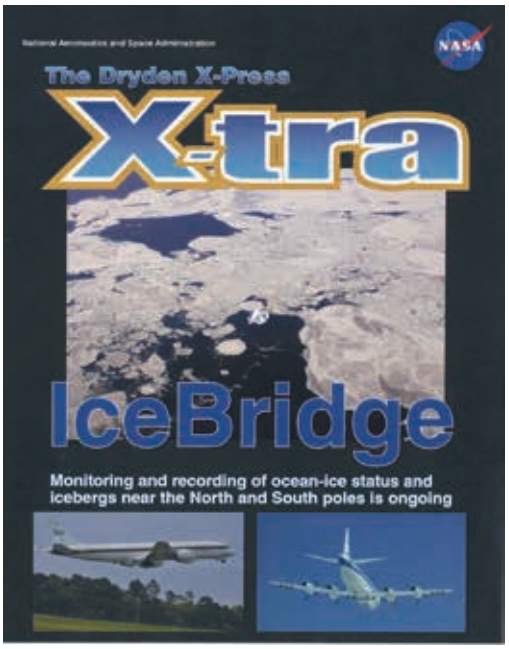
The May 1, 1981, X-Press cover featured the first-ever landing of a shuttle from space. Columbia landed at Edwards Air Force Base and so did most of the early shuttle missions. **In the background** *is Hugh L. Dryden. The X-Press cover from Jan. 16, 1976, marks the renaming of the center that was called Dryden from 1976 to 2014.*

Hugh L. Dryden Flight Research Center

At right *is the X-Press published following the loss of Space Shuttle Columbia and the orbiter's seven-member crew on Feb. 1, 2013.*

The Sept. 29, 1989, X-Press featured a cover of the F/A-18 High Alpha Research Vehicle conducting flow visualization studies with smoke. A second phase of HARV research included engine nozzles that could direct thrust for control in flight regimes that ordinary aircraft could not travel.

At right *a special edition X-Press celebrated the successful Space Shuttle Discovery mission that marked the spacecraft's return to flight.*



X-Press... from page 15

history, a director of the National Advisory Committee for Aeronautics and NASA's first deputy director.

Dryden was consolidated with the Ames Research Center Oct. 1, 1981. It became the NASA Ames Research Center, NASA Dryden Flight Research Facility, as reported in the Oct. 16, 1981, X-Press. The facility would regain center status again in 1994 (see page 2 for a look at those classic X-Press covers).

Regardless of what the center was called, the focus on flight research continued. Two X-29 Forward Swept Wing aircraft flew for a decade beginning in the 1980s and the F/A-18 High Alpha Research Vehicle took aeronautics to new flight regimes where previous generations of high-performance jets could not dare to go.

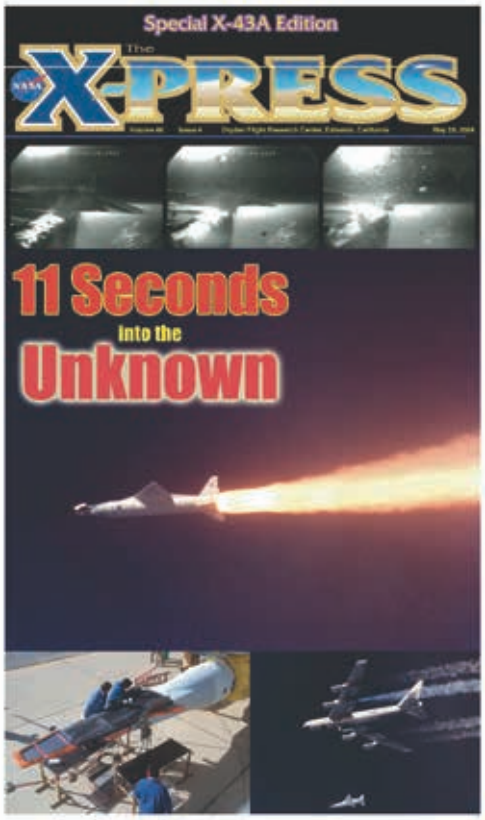
The Environmental Research Aircraft and Sensor Technology program was managed here and led to maturing aircraft and systems needed for science missions and to begin work for integration into the National Airspace System that continues today.

Although the center assisted with fewer shuttle landings when NASA's Kennedy Space Center in Florida was named the primary landing site, the center completed flight research on the orbiter's tires and braking systems with a CV-990. Thermal protection shuttle systems also were studied on center testbeds.

When Columbia was lost returning from a space mission Feb. 1, 2003, center representatives helped with a number of activities leading to the return of the space shuttle program. Discovery safely returned from space with a landing at Edwards Aug. 9, 2005.

Please see the other articles in this issue for more on the modern era of center research.

Here's to 70 more



By Jay Levine
X-Press editor

As NASA Armstrong celebrates its 70th anniversary, looking through the lens of the X-Press coverage is a unique way to peer back at how our NASA center has changed and how the X-Press has been there to report it.

Formats, editors, technologies, frequency and eras have changed and the X-Press has evolved. Some things haven't changed – the editor's commitment to providing the best publication possible and recognizing that every item that appears on these pages is important.

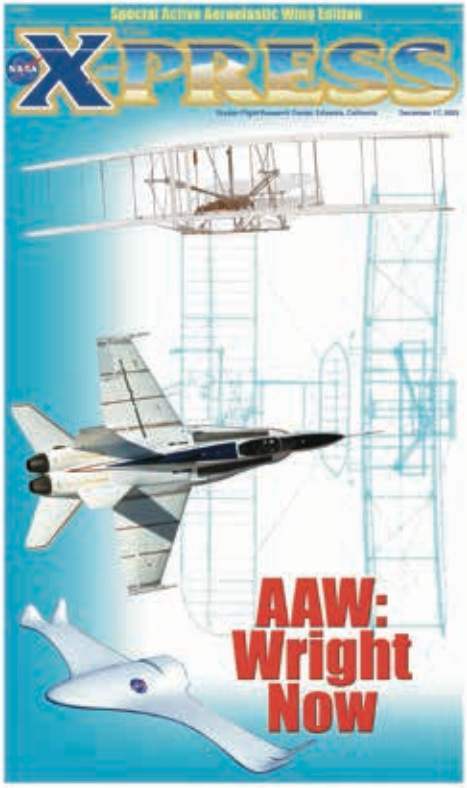
I began as X-Press editor in 1998 and I still feel as I did then – constantly in awe of how such a small center accomplishes so much. Also, how the center continually attracts high-quality individuals, many of whom sacrifice for the greater good of teams accomplishing what others have said is impossible.

I had been a reporter in New Mexico and California before accepting a position as the Antelope Valley Press aerospace reporter in 1995. It was there that I learned about the history of the center and the amazing area that surrounds it. I always enjoyed going to Armstrong (then Dryden) because I knew I'd see the latest innovations and meet people passionate about what they do. That's still true.

Now in my 19th year, my enthusiasm is always rekindled by the pride people have in their work. All you have to do is ask, and most people will tell you with excitement about what they do. They do it for Armstrong, for NASA and for the nation.

My time as a reporter was an excellent transition to working at Armstrong. For example, I began writing about the Environmental Research Aircraft and Sensor Technology program as a reporter and then as the X-Press editor. That program had some spectacular milestones with the Pathfinder, Pathfinder Plus and Helios solar-powered aircraft. They all resembled ever-longer yardsticks as each flew higher, although very slowly, to new heights of nearly 100,000 feet altitude.

From the very slow to the superfast, I also wrote about the X-43A hypersonic



vehicles. The first of three X-43A vehicles had a rough flight and was unable to reach flight conditions for the test as it completed its indented flight into the Pacific Ocean. As is the history of Armstrong, the team determined what went wrong and returned with two spectacular flights in March and November 2004 when the second and third vehicles reached speeds of Mach 7, or about 4,500 mph, and Mach 10, roughly 6,500 mph, respectively, and landed in the Guinness Book of World Records.

The March X-43A flight was especially memorable, as I had barbecued my leg weeks before in a grilling accident that made it tough to get around. A number of people came to my rescue to help me get around and arrive at the right places at the right times to report on the amazing accomplishments.

Watching the Stratospheric Observatory for Infrared Astronomy program unfold also was captivating. A special X-Press in 2007 looked at the history of the Boeing 747SP and the challenges of integrating a German-built telescope and its systems into the aircraft. First flights, opening and closing the door covering the telescope, integrating new instruments and making new discoveries were amazing and recorded in the X-Press and its special publications.

Then there was the space shuttle work that I supported. It was the space shuttle program that inspired me in high school. However, I honestly never saw myself working for NASA. Imagine my surprise when a reporting job in Arizona turned into an aerospace reporting position at the Antelope Valley Press and then, after the birth of my first son Levi, an opportunity to come to NASA Armstrong to report on the latest aerospace innovations and technology – and the space shuttles.

Assisting families of dignitaries during landings, seeing the orbiter prepared for return to Kennedy Space Center in Florida and getting to write about it clearly is a highlight of my life.

Now I'm writing about the groundbreaking work underway with the Prandtl-D remotely piloted glider. The Prandtl-D validated in flight tests a bell-shaped wing with a twist, which has the potential to prove the technologies that could one day lead to new aircraft designs that are at least 30 percent more fuel efficient.

Jay Levine

NASA and Armstrong team members are well into planning for the first human-piloted NASA X-plane in decades with the X-57 electric propulsion aircraft. A planned supersonic aircraft that promises to reduce the sound of aircraft as they pierce the sound barrier is in preliminary design review. It is an exciting time in aeronautics.

Supersonic flight reminds me of seeing the SR-71's final four flights in 1999. Nothing before or since (except the shuttles, of course) has made such an impact on me. The sound, the smell of JP-7 jet fuel and the roar of the engine that is felt all the way through one's body are unforgettable.

I have been able to see and do things that few people experience. I am privileged to follow in the footsteps of generations of editors that came before me. I work every day to live up to the legacy they left for all of us. I won't let them, or the Armstrong workforce, down.

Thank you to the previous editors of the X-Press. The Public Affairs chief was named as editor some years, so if I miss any of the former editors, let me know. Meanwhile, thank you to my predecessors, listed alphabetically, Cheryl Agin, Linda Faulhaber, Reneé Fisher, Allison Gatlin, Carmelita Holleman (Southern), Ralph Jackson, Karen Kingsley, Cei Kratz, Nancy Lovato, Robin McMaken, Lynn Manley, Stan Miller, Don Nolan, Les Reinertson and Trudy Tiedemann.

The Nov. 17, 2000, X-Press was the first full-color issue. It featured a mission on smog in Africa.

The Dec. 31, 2004, X-Press recognized the final NB-52 flight. The aircraft was used for 50 years.

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