The National Aeronautics and
Space Administration

THE ARMSTRONG X-PRESS

Volume 62 EP Number 8 September 2020

COVID-19

NASA Teams up with Antelope Valley Task Force

Story page 3

Table of Contents

COVID-19

NASA Assists in Developing Solutions

NASA has joined forces with a task force in Antelope Valley, in northern Los Angeles County, California, to build medical devices to help patients with coronavirus (COVID-19).

NASA's Armstrong Flight Research Center partnered with Antelope Valley Hospital, the City of Lancaster, Virgin Galactic, The Spaceship Company (TSC), and Antelope Valley College to come up with innovative ideas to solve possible shortages of critical medical equipment.

"NASA is more than scientists, engineers and explorers. We are neighbors and members of communities across the country," said NASA Administrator Jim Bridenstine. "In a time like this, it's critical that we contribute the vast expertise of our workforce to do all we can to help our neighbors, our communities, and the nation."

This task force is working closely with medical professionals at the hospital to provide alternative solutions to needed equipment that is not available for a large-scale emergency.

One of their first efforts was to build a prototype oxygen hood that has now proven to work for the doctors at the hospital. The production of 500 will begin next week at TSC's Faith Facility in Mojave.

"I've been inspired by the teamwork shown by the Antelope Valley task force in response to the challenge of COVID-19. Now more than ever, it is crucial that we share knowledge, skills and collaborate," said Virgin Galactic CEO George Whitesides. "By producing several innovative health solutions for regional hospitals over a few weeks, we are protecting health care workers

on the front lines while improving patient care. It is truly showing the best of American public-private cooperation."

The device, developed by NASA engineer Mike Buttigieg, is an oxygen hood for COVID-19 patients exhibiting minor symptoms and will minimize the need for these patients to use ventilators. The device functions like a continuous positive airway pressure (CPAP) machine to force oxygen into a patient's low-functioning lungs.

"We looked across our center's expertise in innovation, engineering, design, and fabrication of unique systems, to bring NASA knowledge and people together to collaborate on solving the needs and challenges brought about by the COVID-19 situation," said Armstrong Chief

COVID-19 from page 3

Technologist David Voracek.

NASA engineer Allen Parker and this team at Armstrong designed a canopy that protects health care workers by safely covering COVID-19 patients while still allowing health care providers access to the patients to provide care.

“The patient will be located inside this canopy where aerosol viral contaminants will be vacuumed out through a viral filter located within the canopy. In doing so, the health provider can freely work around the patient outside the canopy with minimal risk,” Parker said.

The ingenuity and teamwork displayed by NASA employees, along with their task force partners while in quarantine, may help us prepare for the future emergencies that affect the nation. Learn more about NASA’s efforts to aid in the national response to COVID-19 at https://www.nasa.gov/coronavirus.

View Full Story Here

Click to Watch the assembly video with Mike Buttigieg

X-59 QueSST

More Than the Sum of its Parts

A time-honored tradition employed by the aerospace community for decades is continuing with the assembly of NASA's X-59 Quiet SuperSonic Technology aircraft at the Lockheed Martin Skunk Works® factory in California.

Perfectly acceptable components from other aircraft – some major, some minor – are finding new life as parts installed on the X-59, an experimental airplane whose mission is to help open a new era of commercial supersonic air travel over land.

Landing gear from an Air Force F-16 fighter, a cockpit canopy from a NASA T-38 trainer, a propulsion system part from a U-2 spy plane and a control stick from an F-117 stealth fighter are among the repurposed parts to be used on NASA's newest airplane. It's all about saving time and money.

"The X-59 is designed so that, as it flies faster than sound, any sonic booms that reach the ground are so quiet they can barely be heard – if at all. That's what's new here," said Craig Nickol, NASA's X-59 project manager.

"So, while we're pushing technology in terms of the X-59's overall shape and configuration, at the same time we can take advantage of using reliable systems from aircraft we know or have experience with and install those," Nickol said.

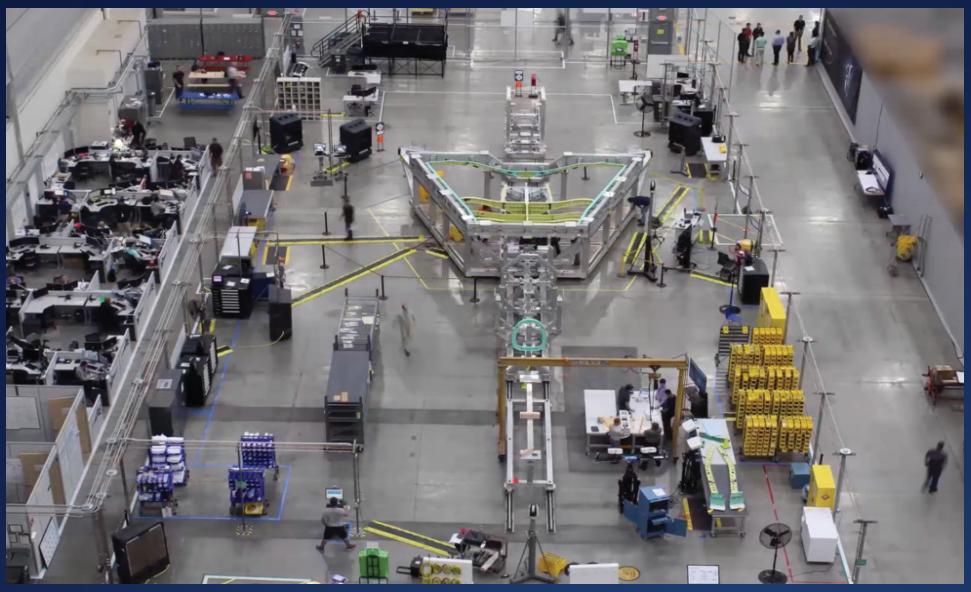
The alternative – designing those same types of parts from scratch – would come with a big downside. Additional years and

millions of dollars – no one is sure exactly how much – would be needed to build, test and certify these components and systems as being safe for flight.

And while integrating the repurposed parts so they all safely work together is still a challenging task, going that route is definitely appreciated by the Lockheed Martin team who was responsible for the original design of the X-59 and then earned the $247.5 million contract to build the airplane.

"Development of those systems would be complex and potentially add risk to the

X-59 QueSST from page 5



Click to Watch the Timelapse!

program. With the availability of these components we didn't need to take on that risk to be successful with the X-59," said Peter Iosifidis, Lockheed Martin's X-59 program manager.

Another factor in favor of using existing components from other aircraft is the fact the X-59 is a one-of-a-kind-airplane. Only one will be built. There are no plans to build and operate a fleet of airplanes like the X-59.

"That's not our job at NASA and that's not the purpose of this research aircraft. As a result, it's much more efficient to leverage existing components because we're not going into a large production run," Nickol said.

This practice of building a new experimental aircraft like the X-59 with parts large and small from other vehicles is not new, either for aeronautics research or for space exploration.

View Full Story Here

Range Operations

DATR Supports Space Communication Research Flights

As the number of flights increase to the International Space Station from commercial spaceships delivering U.S. astronauts and supplies and Russian Soyuz flights continue, NASA's Armstrong Flight Research Center in California is enhancing its abilities to be ready to help.

The center's Dryden Aeronautical Test Range (DATR) has for decades provided backup communications for the space station and the Russian Soyuz spacecraft that currently takes U.S. astronauts to and from the space station, said Tracy Ackeret, chief of range operations.

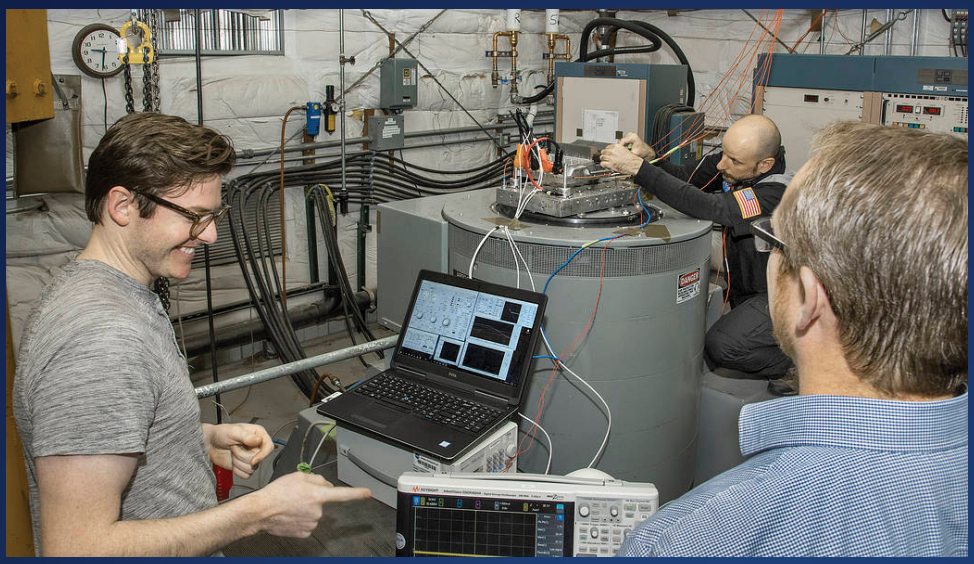
NASA's Commercial Crew Development program, which aims to transport U.S. and international astronauts and supplies to space by privately owned crew vehicles, periodically asks for DATR assistance in radar tracking spacecraft to confirm location. If DATR is requested, the range also is able to provide radar tracking support for landings. In addition to supporting the space station and spacecraft scheduled to visit there, the range is involved in every flight from Armstrong. That responsibility has led to enhancements to the DATR's infrastructure to prepare for the next generation of experimental aircraft, such as the anticipated X-59 Quiet SuperSonic Technology (QueSST) aircraft.

Click to Watch A Behind the Scenes Video!

View Full Story Here

X-57 Maxwell

First All Electric X-plane



Click to Watch A New Concept Video of the X-57!

NASA is making progress on the road to first flight for the agency's first all-electric X-plane, and first piloted X-plane in two decades, the X-57 Maxwell.

Above, NASA engineer Jacob Terry, left, and Operations Manager Matthew Shemenski of Empirical Systems Aerospace (ESAero), right, prepare an X-57 cruise motor controller for vibration testing – part of a series of structural ground tests in support of the X-plane – at NASA's Armstrong Flight Research Center in Edwards, California.

Currently in its first configuration as an all-electric aircraft, called Mod II, X-57 underwent a series of structural ground tests, giving engineers a look at the vehicle's predicted characteristics during flight. In addition to testing the X-57's cruise motor controllers, which are critical for providing power to the aircraft's electric motors, similar ground vibration testing took place on the wing and fuselage. These tests are helping NASA examine the integrity of the component for flight conditions.

With growing interest in electric aircraft, a goal of X-57 is to help the Federal Aviation Administration set certification standards for these emerging electric aircraft markets. NASA will share X-57's electric-propulsion-focused design and airworthiness process with regulators, as well as the industry, to help advance certification approaches.

Visit the X-57 photo gallery

View Full Story Here

UAS in the NAS

NASA Partners Work with FAA to Develop UAS Road Map

NASA and its industry partners are taking unmanned aircraft systems closer to operating in harmony with other aircraft in the national airspace.

The technology and procedures developed during a nearly decade-long program has been assisting the Federal Aviation Administration (FAA), develop the rules for certification of unmanned aircraft to safely coexist with other air traffic. The goal is to enable new commercial and public service opportunities, such as real-time surveillance of fires, infrastructure inspections for pipelines and medical transportation in the future.

NASA began its Unmanned Aircraft Systems (UAS) Integration in the National Airspace System (NAS) Project in 2011. Work since then has included multiple simulation efforts and six specific flight tests series that focused on validating these simulations and supporting the development of minimum operational performance standards (MOPS) for Detect and Avoid (DAA) systems.

The project selected the TigerShark XP, a Navmar Applied Sciences Corporation (NASC) UAS with a wingspan of 21.3 feet for Flight Test Series Six (FT6). The aircraft was modified with a nose structure to integrate Honeywell's Digital Active Phased Array, or DAPA-Lite, an early, developmental, low size, weight and power (SWaP), air-to-air

UAS in the NAS from page 9

radar system. The radar system underwent initial limited flight testing on a Honeywell helicopter test bed during Flight Test Series Five.

FT6 was focused on informing revisions to the DAA related MOPS addressing Group 3 UAS and expanded operations in the NAS.

The TigerShark performed scripted encounters and full mission flights at Armstrong. The scripted encounters involved an “intruder,” manned aircraft, flying pre-planned paths in the vicinity of the TigerShark to trigger the DAA alerting and guidance. All encounters maintained a safety buffer, a vertical clearance, to ensure test effectiveness of the DAA alerting and guidance system, while maintaining a safe operation.

View Full Story Here

Click to View the Tigershark during Flight Test Six!