

RAPID DEPLOYMENT MINIATURE DATA ACQUISITION UNITS

Flexibility is key when testing attritable platforms

// KAREN DANIELS



Every application and test has specific parameters and constraints. This can make finding the ideal data acquisition unit (DAU) a challenge. “Aerospace testing solutions are as varied as the applications – one size does not fit all,” says Huy Nguyen, aerospace and defense manager at DTS. “Especially with today’s accelerated development cycles, these new platforms rely on tons of critical data to keep programs on track. Customers need fast, flexible, and cost-effective tools they can customize.”

One primary goal of flight testing is to understand the physical effects on the unit under test. Knowing what’s happening with the electronics and avionics at these high altitudes and speeds is critical. That means collecting lots of temperature, pressure, acceleration, strain, and vibration data.

“DTS approaches the challenge from three angles: Miniature, rugged and COTS,” says Nguyen.

SLICE6 AIR, DTS’ flagship product for aerospace testing is SWaP-C optimized for size, weight, power, and cost. “DTS is a

pioneer in miniaturized data acquisition for dynamic testing. We are known for crash, blast and rugged testing solutions – the kind of testing you have one chance to get it right.”

UAS/UAV

Growing technical capabilities in unmanned aerial systems are contributing to innovative defense systems such as the Future Tactical Unmanned Aircraft Systems and Air Launched Effects (ALE).

1 // A key requirement for hypersonic testing is a quick installation DAU (Photo: Sandia Labs)

2// SLICE6 AIR is suitable for temperature, pressure, acceleration, strain and vibration measurements

3 // Test articles like pods or munitions can be instrumented off site and added to the aircraft just before takeoff (Photo: USAF)



ALE enable a defensive response to a range of threats. In August 2020, the Army’s Combat Capabilities Development Command released a request for information with an aim of creating semi-autonomous drones, from less than 50 lbs up to approximately 250 lbs. The size constraints and much shorter development cycles than with manned aircraft, mean testing is also fast-tracked and requires data acquisition equipment as small as possible.

“Adding modules to locations that couldn’t be accessed before is our specialty,” explains Nguyen. “SLICE6 AIR units provide the flexibility of quick customization and installation.”

Single 6-channel units can be part of a distributed system or added in remote locations, such as a wing. The new DS4 docking station offers a centralized option for up to 4 SLICE6 AIR units (24 channels). Plus it’s all commercial off-the-shelf (COTS) with lead time of six to eight weeks.

STORES AND WEAPONS TESTING

Compatibility, integration, and separation testing is required to ensure that any new or modified aircraft stores don’t negatively affect the main platform. Introducing hardware such as missiles, ISR (intelligence, surveillance, and reconnaissance) pods, drones, or field tanks, can affect the performance of the craft and be potentially hazardous.

“When you want to add a missile or pod, traditionally you’d need the aircraft available for instrumentation,” explains Nguyen. “We understand that access to the main craft is often unfeasible, or last minute. This creates scheduling challenges for everyone. But even more critical is the manpower, time and money it takes to tear an aircraft apart and run all the FTI and sensor wires.

The test article can be instrumented off-site and ahead of time with SLICE6 AIR. Measurement channels can be added faster and in different locations without the need to run long sensor cables.

Another developing area of interest is hypersonic vehicles. Traveling at speeds up to Mach 8 creates intense vibrations, wide

temperature swings, and tremendous forces at initial launch. Testing these craft creates specific challenges, but it's critical for understanding how to design these systems to survive such forces.

Nguyen adds, "The SLICE6 AIR units offer numerous advantages in hypersonic testing. It's rugged enough to withstand the extreme stressors produced in hypersonic testing, the system can be distributed so there's no need to run central cabling, and units can be installed near sensors, saving cost and development time."

COMMERCIAL LAUNCH VEHICLES

Commercial launch vehicles offer customers a method for transporting equipment, such as satellites, into space at a much lower cost than traditional launch methods. Launching spacecraft requires rapid acceleration of roughly 25,000mph (40,000km/h), and transit through, and beyond, our atmosphere can push launch systems to maximum performance limits.

Since the primary goal in commercial launches is to carry as much cargo as possible, any payloads on the vehicle must be kept to a minimum. "The SLICE6 AIR weighs only 50g," says Nguyen. "This



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means you can trade instrumentation mass for payload mass.

"Since these units don't have to be centralized and can be installed quicker, there's lower cost in time and money. There is nothing else as small and flexible as SLICE6 AIR on the market today," concludes Nguyen.

DTS is opening new possibilities in aerospace testing and is proud their equipment has been used in a variety of aerospace projects, including NASA missions and in SpaceX's Ripley Mannequin, which rode aboard Crew Dragon. \

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4 // The small size and low mass of SLICE6 AIR makes it suitable for use in commercial launch vehicle testing (Photo: Blue Origin)



SLICE6 AIR Data Acquisition Unit
Distributed FTI Solution

FLIGHT TESTING
FLEXIBILITY
at your fingertips

TEMPERATURE | PRESSURE | ACCELERATION | STRAIN | VIBRATION



SLICE6 AIR Docking Station
Centralized FTI Solution

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