

# Small Launcher Development Flight Instrumentation Avionics Using Space COTS

**CURTISS-  
WRIGHT**

## Challenge

- Collect credible data using certified instrumentation and at a competitive cost
- Flight conditions require extremely rugged electronics
- Each test flight is very expensive and vehicle data is unrecoverable

## Solution

- Certified data acquisition system with high accuracy
- Cost effective space COTS approach
- Highly reliable and proven telemetry system

## Results

- Modular data acquisition system provided non-bespoke versatile solution
- A cost effective solution helped keep development budget down
- Highly reliable and accurate data collection

## Challenge

Testing any aerospace vehicle is a challenging task with harsh environmental conditions and the requirement for a wide range of data to be gathered. There is also a need to ensure reliable data gathering due to the high expense incurred for every flight. For space launcher development testing, the challenge is amplified with harsher environmental conditions, the need for highly accurate data and the likely destruction of the test article – meaning all data must be captured and transmitted during flight.

A developer of a small launcher sought a data acquisition solution that could meet these challenges while also keeping costs to a minimum. This is critical both because every flight will result in the destruction of the avionics and because the small launcher market is very cost competitive. Customers of their solution will be looking for data to prove their expensive cargo can be delivered into orbit reliably and suffer as minimal harsh conditions as possible (e.g. vibrations) but will also be looking for a cost effective supplier.



## Solution

The space vehicle developer decided to purchase a Curtiss-Wright space COTS solution as such was the best balance between system needs and costs. The space COTS chosen is well proven in harsh conditions and in other space programs so presented a low risk opinion. While other avionics that could withstand the conditions were evaluated, the costs were significantly higher or the systems had not been proven in similar applications.

The system chosen consisted of three thirteen user slot chassis, one for each launcher stage, with various vibration, temperature, acceleration, digital and processing modules. The data from this is fed to a telemetry subsystem for transmission of data to the ground. A subset of the acquisition system will be used on operational launches to provide ongoing information during the launcher's life.

## Results

The manufacturer has obtained a data acquisition system that will suit the needs for the development flights and further act as a source of data for commercial missions at a price that meets their competitive needs. The modular system provided a non-bespoke versatile solution that met all the data acquisition needs. The resulting data has the credibility to be trusted by their customers to ensure payload comfort and flight performance.

The expense of a more traditional space avionics solution or indeed the expense and risk associated with attempting to develop such in-house was avoided. The time and cost saved with this approach allowed the developer to invest further in structural and propulsion development.

### Increasing Cost and Reliability

