

By Ashish Uttarwar

Engineering Contributions Report

ARAV Systems was initially brought on board to help supplement development and testing efforts of the engineering staff and meet some urgent deadlines. Over the course of the year that we subsequently worked alongside them, we aided them in LabVIEW and TestStand code development and testing and helped provide additional support when it came to testing fixtures and optimizing software processes and workflows. A detailed breakdown of the areas we worked on follows:

LabVIEW Development

Framework Implementation for Final Chamber Testing

Collaborated with test engineering staff to implement a LabVIEW framework architected specifically for the Final Chamber test environment. This framework established a structured foundation for the test system, ensuring consistent behavior across test runs and providing a scalable base for future development. The implementation involved translating the architectural design into working LabVIEW code while maintaining alignment with the broader test system requirements.

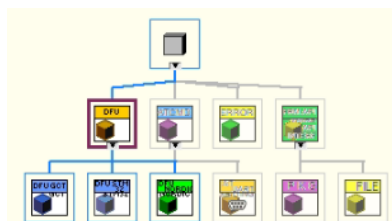
New Diagnostics Methodology

Developed and introduced a new diagnostics methodology that significantly improves the development and validation workflow. The key innovation allows test system (TS) core logic to be exercised directly within the LabVIEW environment, eliminating the need to run full end-to-end test sequences during development iterations. This approach yields two major benefits:

- Core logic can be tested in isolation within LabVIEW, making defects easier to identify and reproduce without the overhead of a full test run.
- Iteration cycles are meaningfully faster, accelerating both debugging and feature validation.

DFU Logic - Built from Scratch

Designed and implemented the Device Firmware Update (DFU) logic in LabVIEW entirely from the ground up. This included establishing the communication protocol handling, state management, error detection, and retry logic required to reliably perform firmware updates on the device under test. Building this component from scratch required close attention to device behavior and edge cases to ensure robust operation under real test conditions.



Class hierarchy for the DFU project, with new classes and code reused from other modules

Industry
Satellite/GPS

ARAV Systems provides software consultancy and development services using NI and third-party hardware and software products.

Testimonial

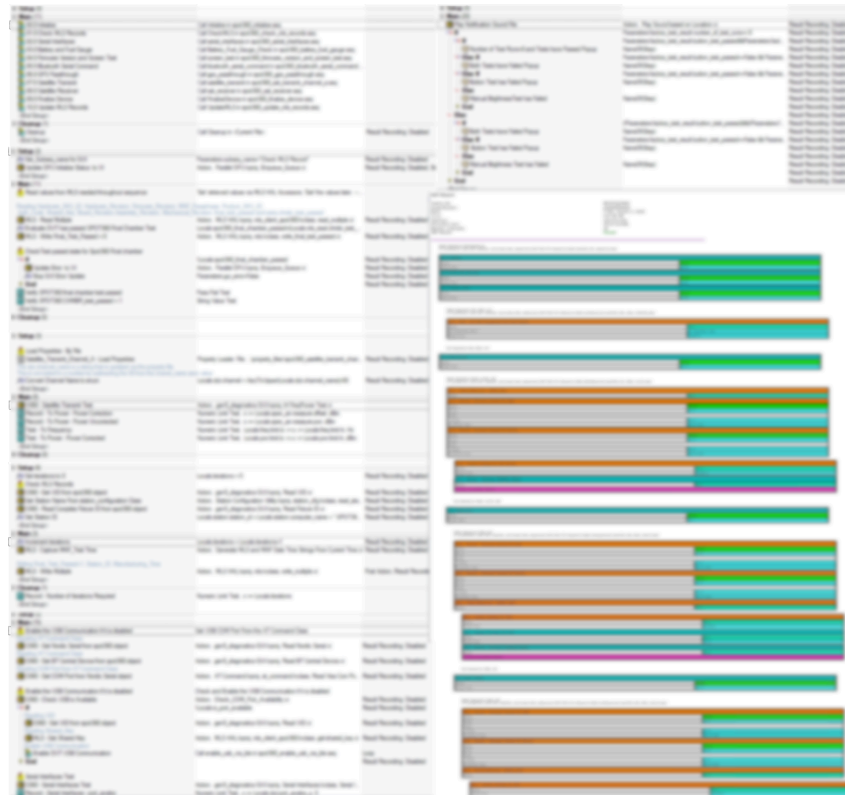
"We brought ARAV Tech onto a complex test software project with a tight timeline and a lot of moving parts. The team was technically capable, responsive to feedback, and willing to dig into problems that weren't always well-defined on our end. They navigated ambiguity professionally and delivered working software under real production pressure. Thank you to the team for their hard work!"

- A leading company in the satellite communication industry
<Name withheld upon request>

TestStand Development

Final Chamber Test Implementation

Implemented the complete Final Chamber Test sequence in TestStand, translating requirements and LabVIEW logic into a structured, production-ready test sequence. This involved configuring test steps, managing data flow between steps, setting pass/fail limits, and integrating with the underlying LabVIEW instruments and diagnostics modules. The resulting sequence serves as the primary automated test used to qualify devices before shipment.



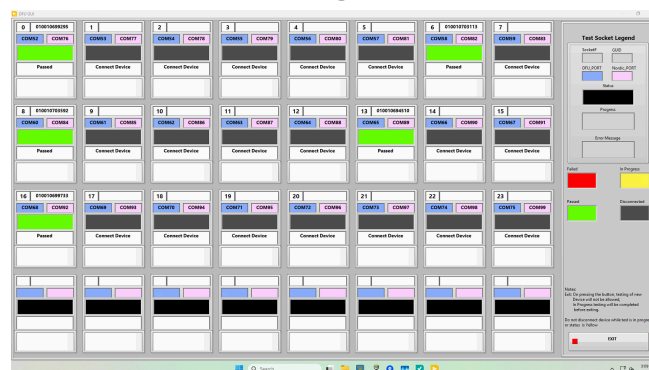
A sampling of the many sequences and subsequences developed and the generated reports

DFU Sequence — Built from Scratch

Authored the DFU sequence in TestStand from scratch, mirroring the LabVIEW DFU logic within the test executive framework. This sequence orchestrates the full firmware update flow as an integrated step within the broader test sequence, handling sequencing, error propagation, and result reporting in a manner consistent with the rest of the test architecture.

Parallelization of the DFU Sequence

Optimized the DFU sequence by restructuring it to run in parallel where the test architecture permits. By identifying steps that are independent of one another and executing them concurrently, the total time required to complete firmware updates during testing is reduced. This is particularly impactful in multi-device or multi-site test configurations where sequential DFU execution would otherwise create a significant bottleneck.



Custom GUI developed in LabVIEW to reflect the DFU state of multiple devices while the parallel sequence runs in the background

Overall Improvements

Faster Test Speed

The combined effect of the new diagnostics methodology, the parallelized DFU sequence, and the structured framework implementation has resulted in a measurable improvement in overall test execution speed. Faster test cycles directly support higher throughput on the production floor and reduce the feedback loop during test development, enabling quicker identification and resolution of issues. These gains contribute to both engineering efficiency and manufacturing scalability.

Other Development and Test Activities Undertaken

Improvement of git based workflows

ARAV Systems team actively helped improve and streamline the client's git branching strategies and workflows to speed up development and minimize the time spent resolving conflicts. This was done by introducing ephemeral feature branches that are merged back into the main trunk as soon as possible and other similar concepts. This helped both the ARAV Systems developers and the client work smoothly with minimal to no conflicts.

Upgrading of LabVIEW and TestStand code

The client code had been developed in legacy versions of LabVIEW and TestStand that were a decade out of date. It needed to continue being maintained in that version, but the client also wished to have the option to upgrade to the latest versions of LabVIEW and TestStand. The code was upgraded to these latest versions and thoroughly tested. This was done while active code development and modifications continue to be done in the older versions of the software. A workflow was set in place to continue to develop in the older versions of the software and easily and rapidly convert the code to the latest versions to test and validate migration to the new versions of the software by introducing scripting code that automates this upgrade in the shortest time possible.

Our Company Profile

- NI Engineering Impact Award (India) winners in 2014 and 2015
- We provide software development services for Test & Measurement, Process Automation and System Integration projects

