CASE STUDY

HOW TSC ADAPTED MATCHSTIQ™ Z3U FOR AN RF-INTEGRATED MOD PAYLOAD

With the Modular Payload (Mod Payload) specification* now serving as the United States Special Operations Command (USSOCOM) standard for tactical unmanned system payloads, TSC decided to create a Mod Payload form factor device that featured a fully integrated software-defined radio (SDR) for deploying advanced SIGINT, EW and A-PNT applications.

The Mod Payload Program was developed to promote modularity in the DoD arsenal of Group 2 Unmanned Aerial Systems (UAS). It has since been expanded to support Groups 1 and 3 UAS. The Modular Payload Expanded Capability (MPx), developed under the Joint Threat Warning System (JTWS) program, further expanded the MP Standard to support both manned aircraft and maritime platforms. This standard aims to define the common interfaces and attributes for both EW / SIGINT / Communications payloads and also the platforms into which such payloads will be integrated. Specifically, the primary objectives of the Mod payload program are as follows:

→ Reduce government costs for new payload integrations.
→ Reduce time and complexity for the crew to swap capabilities down range.

The goal of High West—TSC's Mod Payload form factor device—is to provide an end user with the capabilities of an Epiq radio in a modular form factor that has become the SOCOM standard for payloads among unmanned assets including UAVs, UGVs, and UUVs.

TESTIMONIAL

TSC's family of multi-domain, multi-function electronic warfare modular payloads have a critical role in current and future DoD mission solutions. Many of TSC's technologies leverage Epiq's mature SDR technologies and streamlined integration options, making Epiq Solutions a key contributor to TSC's successful delivery of critical mission solutions and quality products.

– Brandon Wolfson, CEO, TSC

*apps.dtic.mil/sti/citations/AD1167779

THE ASK

To accomplish this, TSC needed a field-proven, well-supported SDR that would simplify application software and hardware development. Due to the high level of developmental support that Epiq provides, along with broad API compatibility with COTS/GOTS applications and open-source SDR suites like GNU Radio and SoapySDR, TSC chose the Matchstiq™ Z3u as the SDR to go “inside” their 1U Mod Payload form factor SDR product.

Limited Budget and Time Frame

To meet the demands of their customer in both pricing and timing, TSC needed to test and deploy this new standard quickly—and do so as efficiently as possible.

Low SWaP

TSC wanted an SDR they could integrate, not one they had to build from scratch. As such, their ideal SDR would already include all the necessary components: including drivers, RFIC, and development resources.

Mission and Platform Adaptability

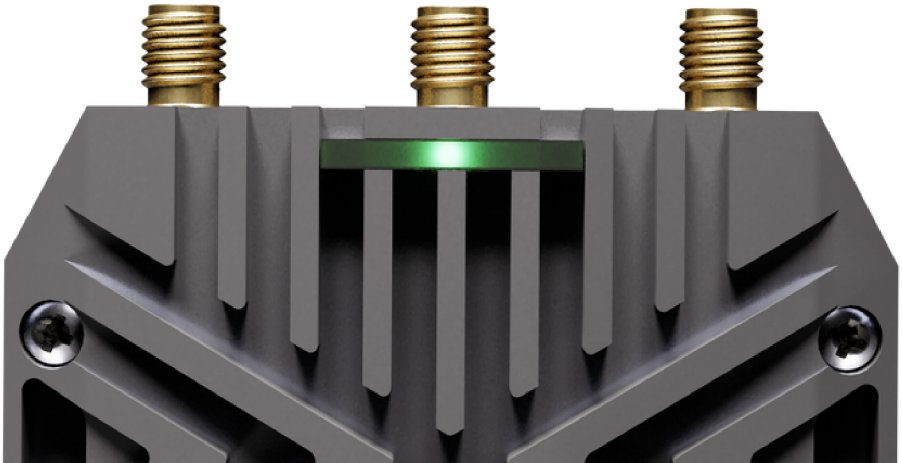
In developing a product for use in tactical unmanned systems, TSC needed a solution that met Mod Payload standards to enable easy integration with a wide variety of unmanned assets—but that could also be customized to meet the varying requirements of SIGINT, EW, and A-PNT applications.

Proven, Ready-to-Deploy Solution

TSC needed to minimize time iterating on the design. The ability to use a field-proven SDR with all the components and features needed–including drivers, RFIC, and development resources—would significantly cut down on the time and cost of the project upfront.

Dedicated Support

In developing new technology, iteration does happen. TSC needed dedicated and responsive support that would allow them to move through integration decisions and challenges quickly: bringing them to a reliable product with greater agility and speed. With Epiq, there were no debugging or interface issues which allowed TSC to focus on its mission.



SOLUTION

Knowing this project would present unique challenges, TSC found that Epiq's Matchstiq™ Z3u fit uniquely with the requirements of this advanced form factor. They then integrated Epiq's radio into the Mod Payload form factor via their own custom carrier card and custom RF frontend.

Using Epiq's radio instead of designing their own saved TSC hundreds of hours of engineering design work and testing and allowed them to meet the aggressive schedule of their customer. In addition to reducing development time, the Matchstiq™ Z3u, coupled with Epiq's white glove support, helped minimize risks that may have complicated the delivery of their new product, High West.

RESULTS

THE MOD PAYLOAD PROMISE: FULFILLED

TSC recently demonstrated the ability of High West to support both active and passive RF tasking on unmanned platforms in airborne and maritime scenarios. Using Epiq's Matchstiq™ Z3u to characterize the RF environment and decode critical signals of interest, TSC then distributed that data to multiple operators of unmanned systems, providing key situational awareness that would have otherwise gone unrealized.

TACTICAL EDGE IN LAND, AIR, AND SEA

High West is currently being operated across multiple frequency bands— including VHF, UHF, and S-Band—in land, air, and maritime environments. Providing all the capabilities of an Epiq radio in the form factor that's become the USSOCOM standard for unmanned tactical vehicle payloads and with a proven COTS SDR capability, High West serves many USSOCOM and non-USSOCOM users alike.

CONCLUSION

As mission requirements rapidly evolve, Epiq is dedicated to making its customers successful by enabling them with cutting-edge SDR technology. In line with the goal of Mod Payload to reduce the cost of new payload integrations and shorten the time to switch mission packages, High West—featuring Epiq's Matchstiq™ Z3u—brings TSC's end users a greater degree of control over their RF environments at a reduced cost and a fraction of the usual development time.

It also positions TSC at the forefront of RF and UxS innovation and makes future RF and UxS integrations possible: supporting more efficient, strategic missions for USSOCOM branches of the Army, Marine Corps, Navy, and Air Force. Combining an Epiq radio with a Mod Payload form factor, High West sets the stage for further innovations in how radio frequency capabilities are integrated with unmanned systems.

ABOUT EPIQ

Epiq Solutions develops state-of-the-art tools that provide situational awareness and detailed insight into RF environments. With more than a decade serving government-focused industries, we understand how important speed, cost, and performance are for critical applications. Our state-of-the-art SDR transceiver modules and turnkey RF sensing tools lead the way in size, weight, and low power consumption.

ABOUT TSC

TSC is an employee-owned, high-technology company primarily engaged in providing engineering services and specialized products to the U.S. Government. For over 50 years, we have developed and manufactured technologies that detect, defend, and defeat threats to personnel and strategic resources. With strong technical knowledge and experience, we develop and implement advanced technical solutions in key disciplines such as systems engineering, sensor technology, C4ISR, logistics, and information systems.

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