TOUGH STUMP TECHNOLOGIES | BREAKING BARRIERS

TOUGH STUMP RODEO | JUNE 3-5, 2025

EXECUTIVE SUMMARY

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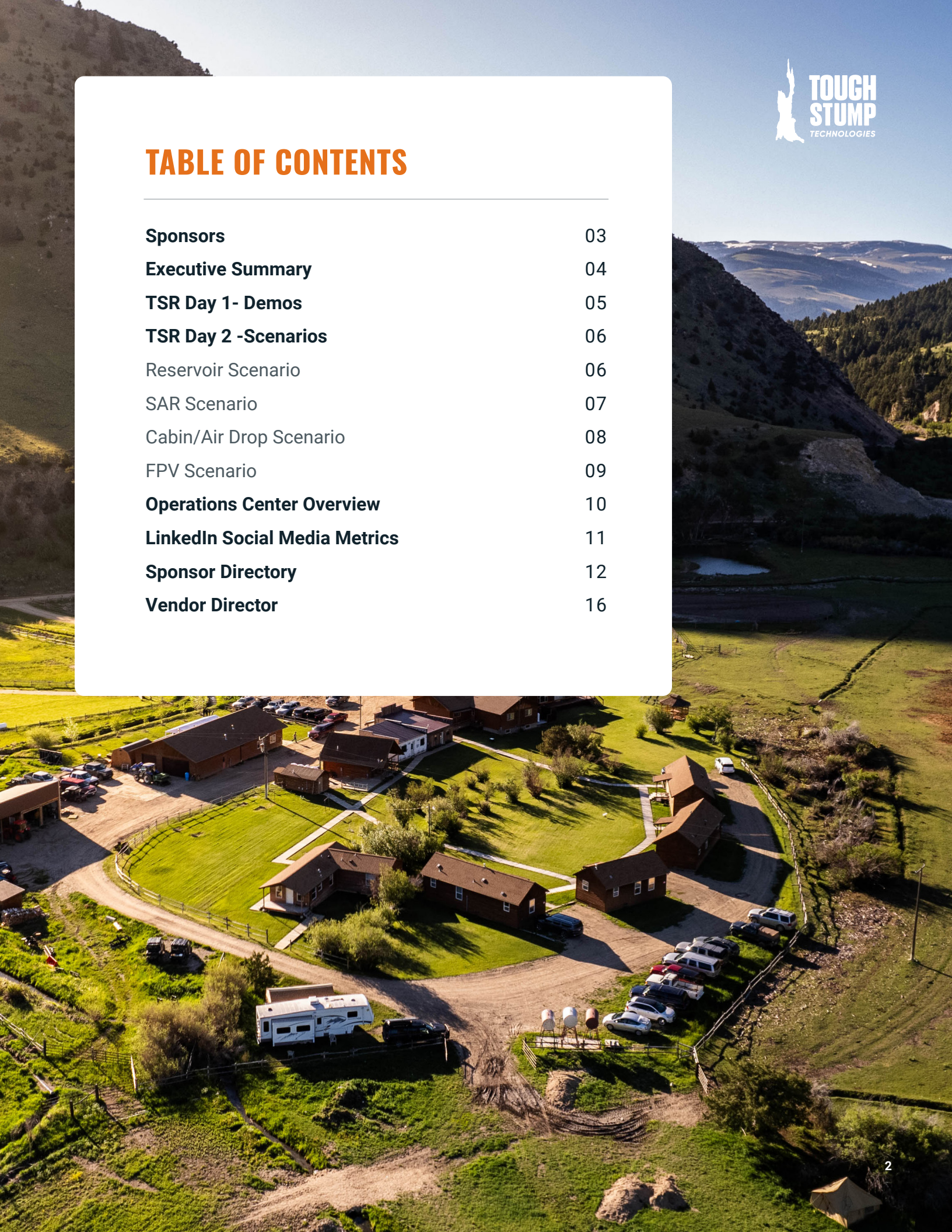

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TSR25 Best Vendor: Primordial Labs

OVERVIEW

Tough Stump Rodeo 2025 (TSR25) was a rigorous, real-world technology demonstration focused on collaborative problem-solving at the tactical edge. The event brought together a range of vendors to operate in challenging, signal-denied environments and demonstrate the interoperability and operational effectiveness of their technologies in mission-relevant scenarios.

By simulating field conditions and placing emphasis on solutions that support the individual at the "X," TSR25 highlighted how advanced technologies can work in tandem to enable situational awareness, communication, and command and control. What sets this event apart is its unwavering focus on solving complex problems through unified efforts - not isolated wins. It's about collaboration, capability, and delivering results that matter in the field.

TSR25 DESCRIPTION DAY 1

Participating vendors seamlessly integrated their technologies to support mission success, demonstrating practical, end-user solutions tailored for high-risk operational environments. Set across a sprawling 425-square-mile operational area, the demonstrations challenged both technology and teams under authentic, stress-tested conditions.

The event prioritized real-world problem solving through collaboration, reflecting the joint efforts required in actual mission scenarios.

For the first time in TSR history, the rodeo was broadcast live via YouTube - still generating views - and streamed through TAK to 14 countries and 31 states. With over 23 TAK servers federated, we reached more than 1,000 active viewers in real time.

Day 1 Demonstrations - Upper Canyon Outfitters:
The first day of Tough Stump Rodeo 2025 kicked off at Upper Canyon Outfitters, where vendors were given the opportunity to showcase their individual and integrated technologies across four distinct demonstration areas.

Demo Areas 1 & 2:
Dedicated to demonstrations involving small unmanned aircraft systems (sUAS), allowing participants to highlight aerial capabilities and integrations.

Demo Area 3:
Supporting vendors whose technologies do not require drone integration, offering a platform to showcase ground-based systems and other capabilities.

The Nett Warrior Demo Area:
A rare opportunity for vendors to test and integrate directly with ACI and the Nett Warrior Integrated Tactical Network, validating interoperability and performance in a mission-relevant ecosystem. This structured, scenario-based approach allowed for tailored demonstrations while promoting cross-vendor collaboration and real-world application.

SCENARIOS

RESERVOIR SCENARIO

In the first scenario, ROV teams searched for sensitive items underwater in a reservoir, streaming live video, sensor data, sUAS footage, ATAK/ATOS GPS tags, and/or PLI in real time. This data was transmitted through a MANET/ADHOC radio network, supported by an airborne communications platform when needed, and relayed to the operations center. The Incident Commander (IC) used the initial intelligence and sensor feeds to guide
recovery dive teams to precise locations. All ATOS GPS tags, ATAK devices, and GoTenna data were also transmitted over the same radio network, providing the Operations Center with a comprehensive and synchronized view of the operational environment.

DOMO Tactical Communications (DTC) - Mobile ad-hoc network (MANET) radios that relay voice, data & video traffic

Private Tier Solutions - Live ISR Video Bridging: Real-time video from a Strategic Robotic Systems (SRS)

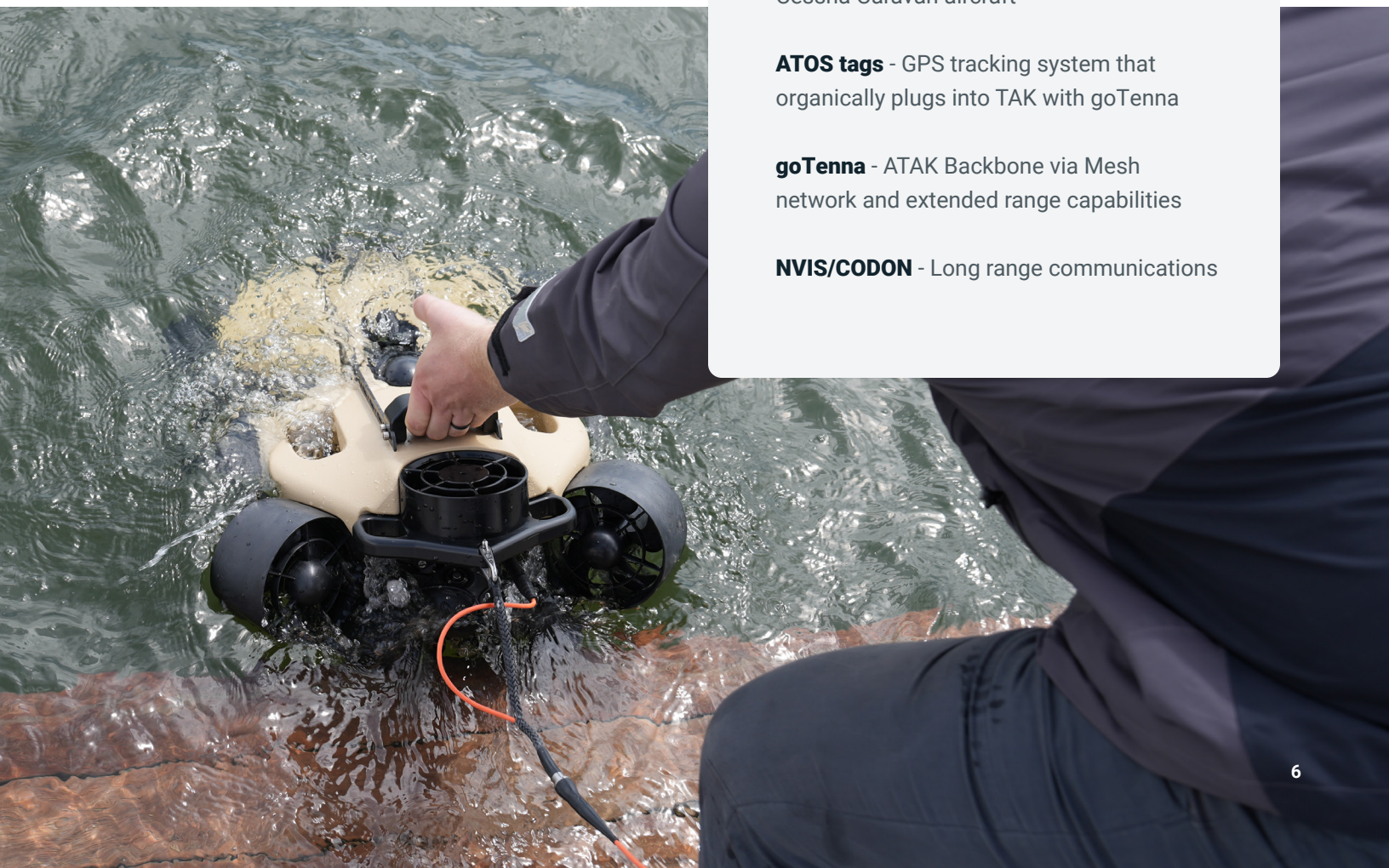
Strategic Robotic System – Seamless Underwater Data Flow: We successfully integrated the SRS FUSION UUV into the TAK network, proving we can achieve robust data transmission even in challenging aquatic environments

Textron Aviation - Airborne comms node/ relay sharing PLI and live video via manned Cessna Caravan aircraft

ATOS tags - GPS tracking system that organically plugs into TAK with goTenna

goTenna - ATAK Backbone via Mesh network and extended range capabilities

NVIS/CODON - Long range communications



SCENARIOS

SAR SCENARIO

The second scenario simulated a Search and Rescue (SAR) mission involving two lost and injured hikers with suspected broken legs. SAR teams deployed sUAS to locate the individuals and, once identified, drones capable of carrying up to 10 pounds were used to deliver critical medical and life-sustaining supplies.

The objective was to pinpoint patient locations and transmit comprehensive situational data—including thermal imaging, electro-optical/infrared (EO/IR) feeds, photographs, and live video streams from the sUAS—along with medical data, ATOS GPS tags, and/or Personal Location Information (PLI). This information was transmitted across more than 30 miles using an ADHOC MANET/MESH radio network. The operations center received, tracked, and analyzed the incoming data using ATAK, enabling real-time coordination, operational oversight, and informed decision-making throughout the SAR mission.

Trellisware – Mobile ad-hoc network (MANET) radios that relay voice, data & video traffic

Skydio drones – Autonomous, high-resolution drones with AI capabilities

PDW drones – Drone capable of delivering up to 10LBs of cargo

LifeLens – Medical Biometrics & pioneering innovative devices for personal health monitoring

Rain Technology – Advanced medical sensors that not only track vital signs but also pinpoint the exact location of a gunshot wound

Everywhere – Iridium burst communications

Somewear Labs – Iridium burst communications

ATOS tags – GPS tracking system that organically plugs into TAK with

goTenna – ATAK Backbone via Mesh network and extended range capabilities

SCENARIOS

CABIN/AIR DROP SCENARIO

The third scenario featured a reconnaissance team conducting a static-line parachute insertion to deploy a Boston Dynamics robotic dog outfitted with long-range sensors and an integrated MANET radio system. Once on the ground, the team remotely operated the robotic platform to gather intelligence on a High Value Target (HVT) located at a remote cabin.

This ISR mission set the conditions for follow-on actions by Air Force elements staged at the operations center. All collected data - including thermal imagery, LiDAR, EO/IR footage, still photos, live-streamed sUAS video, ATAK/ATOS GPS tags, and PLI - was transmitted back to the operations center via a MANET/ADHOC data radio network.

Persistent Systems – Mobile ad-hoc network (MANET) radios that relay voice, data,. & video traffic

Boston Dynamic Robotics – Agile and durable all-weather ground drone for use in a broad range of unstructured urban and natural environments

Skydio drones – Autonomous, high-resolution drones with AI capabilities

MS. Montana – C47 WWII airplane as the drop platform

ATOS tags – GPS tracking system that organically plugs into TAK with goTenna

goTenna – ATAK Backbone via Mesh network and extended range capabilities

SCENARIOS

FPV SCENARIO

The fourth scenario simulated an enemy convoy being located and tracked using a combination of fixed-wing sUAS and quad drones. Targeting data was relayed to the Assault Force's FPV explosive team, who launched simulated explosive FPV drones to neutralize as many vehicles and enemy personnel as possible. Following the strike, a Boston Dynamics robotic dog equipped with long-range EO/IR sensors and specialized attachments was deployed to conduct battle damage assessment. The robot live-streamed video back to the Operations Center via the MANET/ADHOC data radio network. Additional sensor feeds, drone footage, and ATAK/ATOS-tagged information from the team were also transmitted to support real-time situational awareness.

Persistent Systems – Mobile ad-hoc network (MANET) radios that relay voice, data & video traffic

Red Cat - showcased a powerhouse lineup at TSR25, featuring the long-range Sky Wave fixed-wing drone for endurance missions, the stealthy Black Widow for agile ISR operations, the battle-tested Teal drone for tactical deployments, and the high-performance Roto Riot drones for unmatched FPV precision and control. Together, these platforms demonstrated versatility, reliability, and mission-ready capability in the rugged Montana terrain

Boston Dynamics - Boston dynamics Spot was delivered in it's transportation case (testing post dropped was successful with power up and mobility tests). A secondary Spot was staged IVO the drop target and was activated after the drop.

ATOS tags - GPS tracking system that organically plugs into TAK with goTenna

goTenna - ATAK Backbone via Mesh network and extended range capabilities

OPERATIONS CENTER OVERVIEW

The Operations Center was purpose-built to manage TAK server connections and provide real-time situational awareness at scale. During the event, it served as the central hub for data integration and distribution, enabling seamless coordination across multiple networks and systems.

Leveraging BAH's SITx and RTX BBN servers, the center supported over 1,000 online viewers across 31 U.S. states and 14 countries. A total of 23 TAK servers were federated, pushing live mission data to two Combatant Commands and directly into their MAVEN smart systems for enhanced operational visibility.

Data feeds included Cursor on Target (CoT) messages, ATOS-generated GPS tags (BFT), and Full Motion Video (FMV), all streamed directly from the Tough Stump Rodeo in Montana. The Operations Center enabled both in-person and remote participants to monitor, coordinate, and respond in real time - showcasing the power of integrated tactical networks and live mission data flow across a globally distributed environment.

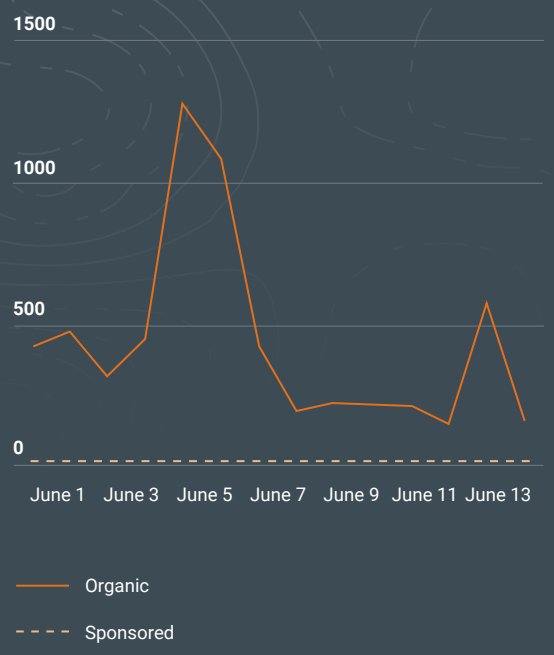
- Ditto Live (cross bands wave form)
- BAH (SITx Video server hosting/setup and Unmanned systems support)
- Samsung (ATAK Tactical Edition End User Devices)
- Darley (Integrator)
- Bryodyn (BLOS aggregation of Data & Starlink)
- RTX BBN Technologies (GOTs server connections/setup)
- RedCom (Cross Banding wave forms)
- ACI (Net Warrior PR & Integrator)
- RevealTech (Edge FMV map processing)
- Sherpa 6 (Tech Integrator)
- Dejero (Resilient Connectivity Comms)
- Glen Air (Cables/connectors & Pwr HUBs)
- Juggernaut (ATAK EUD's cases/mounts)
- Serastar (on the edge secure mesh video/ data compression)
- RMX used to be (Reticulate) (Edge Video/ data compression/streaming)
- Galvion (Batt. Pwr supply)
- Onyxaero (Gear carrier)
- Eli Technology (Non-GPS location utilizing WIFI)
- Noble (Integrator)
- CRGcorp (Batteries/Fuel Cell inventors)
- Hoverfly (Tethered drones)
- Squarehead (Cuas passive detect/Audio)
- Primordial Labs (Voice to machine tasking/ AI) BEST VENDOR WINNER
- Entropy robotics (AI learning, targeting, autoFPV flight)

LINKEDIN SOCIAL MEDIA METRICS

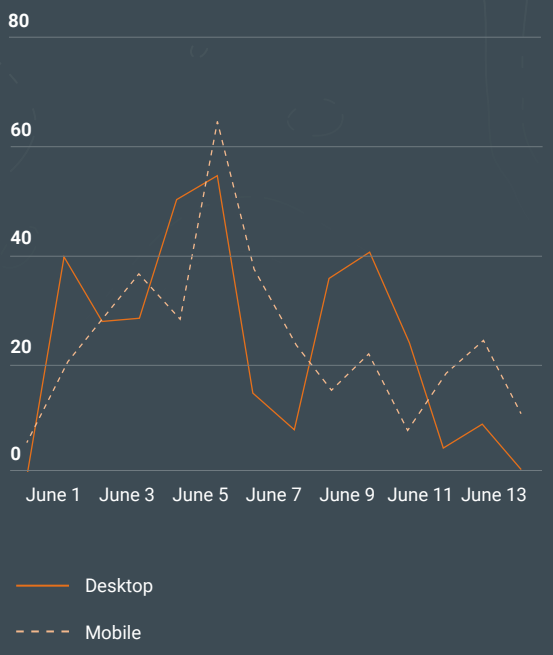
During and immediately following the Tough Stump Rodeo 2025, social media activity generated the following results:

104	6,196	674	100%
			Organic
New Followers	**Impressions**	**Page Views**	**Promotion Type**
	Including **296** unique visitors		No sponsored or boosted content

IMPRESSIONS



VISITOR METRICS



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SKYDIO: PRESENTING SPONSOR

Website: skydio.com
Sales / BD Contact: Anthony Morlino
Email: Anthony.Morlino@skydio.com
Products Summary: When it comes to autonomy, Skydio continues to lead the way. As our Presenting Sponsor at TSR25, they brought cutting-edge capabilities and unmatched flight performance to the mountains of Montana. Their drones didn't just fly — they thought. Huge thanks to the Skydio team for making this event smarter, safer, and more autonomous than ever.

Skydio participated in Tough Stump Rodeo 2025 (TSR25), a premier field technology integration and demonstration event hosted by Tough Stump Technologies in Ruby Valley, Montana, from June 2–6, 2025. The event brought together over 300 participants including DoD, federal/state agencies, public safety teams, and leading technology vendors for a series of real-world scenarios designed to stress-test emerging communications, robotics, and drone capabilities in complex, austere terrain.

Skydio fielded a large cross-functional team to engage in technical demonstrations, customer support, and live scenario operations across multiple mission lanes including Search and Rescue (SAR), Cabin Recon, FPV Assault, NettWarrior integration, and Underwater Search. Our presence included showcasing the latest enhancements to the X10D platform—including ISR nav/comms improvements, real-time KLV streaming, and ATAK integrations—while partnering closely with Reveal, Quaze, Primordial, PDW, and others to drive multi-vendor interoperability. Notable successes included:

- A highly effective SAR lane operation with live CoT, FMV, and KLV streaming via Starlink and MANET networks;
- Airdrops of GPS-enabled ATOS tags in live scenarios;
- NettWarrior integration using Trellisware and Persistent Systems ITN radios;
- First-time X10D compatibility with Primordial's natural language interface;
- Successful real-time Reveal 3D modeling;
- Support and resolution for US Customs and Border Protection ATAK integrations.

Skydio provided 3 X10 Systems for this lane to locate and then provide overwatch continually, as well as deliver an initial small payload to the Injured Hikers. All three systems were providing CoT through the provided TAK Server, and Video and KLV through the provided BBN Video Server.

The three X10s were employed, each uniquely, to showcase the capabilities of pushing the required data during the event. The following is a breakdown of each system and its connectivity configuration during the SAR lane.

- **Skydio SAR 1:** Controller connected via Trellisware Radio and Reticulate Micro Compression Processor. Owing to technical difficulties on the Reticulate and TW sides of the connection, it did take a while before the Video was pushed back to the UTC, but after that, the video seemed to be stable.
- **Skydio SAR 2:** This aircraft employed Skydio Cloud Live Streaming through a QR Ready Link, transmitting video via a Starlink connection at the Launch and Recovery site. The QR code was supplied to the UCO for streaming purposes during the event.
- **Skydio SAR 3:** This aircraft utilized a Wi-Fi-enabled X10D Controller connected to the on-site Starlink and transmitted video through the BBN RTSP server, delivering exceptional real-time video and data during the operation. This aircraft successfully deployed the ATOS tag and Garmin InReach Mini2 Tracker within 6 feet of the hikers from an altitude of several hundred feet above the team.

PDW delivered the Raintech Solution Payload shortly after, while Skydio provided overwatch.

All in all, this mission was a success. What made all this possible and, frankly, very easy is the Incredible X10 UAS system; the onboard autonomy makes piloting effortless, allowing the pilot to focus fully on the situation at hand. The native video we provide is exceptionally clear, providing valuable intel within a COP. TS Rodeo is something we all look forward to, as it involves real-world tests and integrations. We look forward to next year!

BOOZ ALLEN HAMILTON: PLATINUM SPONSOR

Website: boozallen.com
Sales / BD Contact: Verne LaClair
Email: LaClair_Verne@bah.com
Products Summary: Booz Allen brought big brains and even bigger impact to TSR25. Their team continues to shape the future of mission-driven innovation, and we're proud to have had their expertise in the field this year.

Events Overview
The Tough Stump Technologies Rodeo 2025, held from June 2 to 6, 2025, at Upper Canyon Outfitters in the rugged wilderness of Alder, Montana, marked the fifth iteration of this premier hands-on technology demonstration event. Designed to push the boundaries of tactical communications and operational collaboration in disconnected, austere environments, the rodeo brought together vendors, evaluators, and observers from DoD and Public Safety backgrounds to test and integrate cutting edge solutions under real world conditions. The event's core purpose centered on fostering interoperability among diverse technologies, with a strong emphasis on integration via the Android Team Awareness Kit (ATAK) ecosystem. Participants navigated harsh landscapes, unpredictable weather, and limited connectivity, compelling vendors to break down barriers and collaborate on solving unique and complex problem sets, such as real time data transmission over vast distances and mission critical communications, such as full motion video feeds, in zero cell coverage zones. Highlights included innovative demonstrations like parachuting a robotic dog from an aircraft, showcasing advanced unmanned systems in action, while pushing the live video feed through ATAK. The event was deemed a resounding success, achieving significant advancements in bandwidth and data sharing, enabling the backhaul of data, UAV video feeds, and position location information over 35 to 40 miles of rugged terrain.

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Booz Allen Hamilton's Role and Contributions
As representatives from Booz Allen Hamilton, our team played a pivotal role in orchestrating the event's Operations Center, leveraging our Sit(x) TAK Server solution to create a unified common operating picture for all vendors and participants. The Sit(X) server was also federated with an on-premise GOTS TAK server hosted by RTX BBN Technologies. This integration ensured seamless connectivity and data distribution, including live camera feeds, drone feeds, and outputs from other unmanned systems, which were disseminated across multiple Combatant Commands, notably NORTHCOM and EUCOM, and into their MAVEN Smart Systems platforms. Our Unmanned Systems Team, responsible for maintaining and developing the UAS Tool Plugin, collaborated closely with multiple drone vendors to achieve ATAK compatibility. This enabled the re broadcast of feeds across diverse communication networks into the Sit(x) TAK Server environment, allowing remote observers to access real time data from over 25 U.S. states and 11 countries.

The event underscored the value of ATAK as the foundational platform for interoperability, forcing vendors to overcome silos and innovate collectively in Montana's beautiful yet challenging terrain. Collaborations, such as those enhancing connectivity for critical operations, highlighted the practical impact of these integrations, with Booz Allen's efforts contributing to enhanced mission effectiveness and personnel safety. By bridging disparate systems and ensuring fluid data flow, our teams demonstrated how integrated solutions can transform complex challenges into actionable advantages, all while maintaining reliability in the most demanding settings.

Team Focus and Values
At the heart of our participation is the Sit(x) and Unmanned Systems Team, composed of multiple Special Operations Veterans who prioritize end user needs and mission success above all. We take immense pride in our unwavering availability to support those who rely on us, whether they are soldiers in the field or public safety officers securing large scale events or disaster areas, ensuring TAK based solutions help keep them and their teams safe in high stakes environments. This unparalleled commitment drives every aspect of our work, from rapid problem solving during the rodeo to ongoing development that anticipates real world demands. Our veterans' firsthand experience informs a deep understanding of operational and tactical realities, allowing us to deliver tools that not only integrate seamlessly but also empower users to focus on their objectives with confidence.

Summary and Recommendations
The 2025 rodeo showcased not only the robustness of ATAK integrated systems but also demonstrated the power of cross vendor collaboration in austere settings, which yielded actionable insights for future deployments. Our two teams recommend continued involvement in such events to accelerate innovation, interoperability, and relationship building. For further details or follow up discussions, please contact Verne LaClair, Senior Product Manager.

SAMSUNG: PLATINUM SPONSOR
Website: samsung.com/us/business/solutions/industries/government/
Sales / BD Contact: Todd Maxwell
Email: t.maxwell@sea.samsung.com
Products Summary: TSR25 was tough, but Samsung's Tactical Edition devices were tougher. Their team showed up with mission-grade gear and unmatched support, and we were proud to have them powering comms in the wild.

Samsung Galaxy Connected Ecosystem:
Samsung Smartphones & Wearables - S24, XCover 6 Pro, S23 Tactical Edition, Galaxy Watch: From special operations to coordinate multiagency responses, Samsung's innovative devices feature highly accurate GPS chipsets to support ATAK's real-time mapping of operational areas, personnel and assets involved in the mission. The open and secure Samsung platform and Android OS allow for seamless and secure file sharing and communication of mission data through ATAK using LTE, LMRs, Tactical Radio Networks and satellites. Samsung has a lengthy heritage in the ATAK development community supporting plug-in development for drones, wearables and other sensors and feature enhancements to our end points. Samsung offers end point options to support your mission from our flagship S24 with best in class processors and GPS chipsets to our rugged XCover6 Pro smartphone to Galaxy Watch wearables with ATAK plug-ins. In addition, the Samsung Tactical Edition portfolio of devices provides the durability, functionality, processing power and security required for precision military operations with our S23 and XCover6 Pro editions.

Samsung Tablets - Galaxy Tab Active5 and Tab Active4 Pro: Give your frontline team a tablet that's more than up for the job with Galaxy Tab Active's. These Tablets help your crew do more with less while staying productive on-site or in the truck — perfect for field workers and industries like delivery services, warehouses, and law enforcement. A durable and water-resistant design withstands drops, spills and tough heat and cold. The responsive touchscreen makes it easy to knock out tasks — it even works if you're wearing gloves or with water on it. Keep the workflow going with a long-lasting battery that's also replaceable — simply swap it for a fresh battery.

Drone Control: Samsung has been trusted as the drone controller end point for the most used UAS systems because of industry leading features, TAA compliant options and custom software configurations options.

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Command & Control - Government agencies are increasingly adding video walls and high-resolution monitors to their command and control centers, the information hubs of emergency response teams. Where safety and security are paramount, lifelike color and heightened clarity aren't just nice to have; they can improve rescue and response times in a crisis. Control rooms rely on accurate and uninterrupted visuals to monitor crisis situations, dispatch response teams and coordinate those teams' efforts. These hubs also organize critical ongoing activities such as air traffic and manufacturing. In applications like military and homeland security, command centers enable tactical operations and threat assessment. Law enforcement and public safety agencies also frequently use command and control centers for security and surveillance. Having high-functioning, efficient control rooms is critical to their operations' success and the safety of the population at large —and that's where Samsung displays, can make a world of difference.

GLENAIR: PLATINUM SPONSOR

Website: glenair.com
Sales / BD Contact: Justin Fuchs
Email: jfuchs@glenair.com
Products Summary: When it comes to making secure connections, Glenair doesn't miss. From battlefield wiring to tactical comms, their rugged hardware helped keep our networks tight and tactical at TSR25.

Glenair supported other vendors during the demo day as well as FPV lane with hubs and adapters to accomplish their mission. Multiple vendors came to us with a problem set they were having trying to connect multiple devices to push power and data and Glenair was able to solve all of them and introduce new technology into their space.

The pilots at the FPV lane all had Glenair STAR-PAN hubs which increased battery life and situational awareness. Redcat was able to have s successful test flight of their new Black Widow drone utilizing a STAR-PAN hub. With STAR-PAN NG (Next Generation) hubs we were able to host TAK servers on the hubs and federate through STARLINK. NG hubs are able to forward video over radio networks as well as multicast bridging of two radio networks.

Glenair also had their RZR at the event equipped with Trellisware, MPU-5 and Silvus radios connected to their 10 port HUB (STAR-PAN X) also running a TAK server. For us this was our second time at the rodeo and found ourselves more involved. We would however like to somehow tie the link to the other vendors for demos as well as support Tough Stump at the MSS and/or Ops Center with our equipment.

RED CAT HOLDINGS: PLATINUM SPONSOR

Website: redcat.red
Sales / BD Contact: Mike Paulson
Email: mike.paulson@redcat.red
Products Summary: Red Cat brought the heat — and the hardware. Their integration of edge technology and drone systems turned heads and proved why they're leaders in ISR innovation.

Red Cat Holdings successfully demonstrated the Black Widow R1.5 UAS at the 2025 Tough Stump Rodeo in Montana's austere terrain, validating its capabilities in flight endurance, high-altitude operations, and real-time ISR in a complex, multi-technology environment.

A Key highlight was the 8km FPV Strike Lane, where Black Widow provided overwatch for the FANG FPV attack while conducting ISR from 200 ft AGL, 8000ft MSL. Despite mid-flight MAVlink loss, the AV completed the ISR orbit and returned safely, demonstrating robust recovery protocols, EO/IR switching, and 45+ minute endurance flights. Red Cat operated in multiple live demo areas around the UCO, integrating alongside technology partners and receiving direct feedback from DoD users and first responders. This collaborative setting enabled real-time evaluation of interoperability across systems.

Red Cat showcased key integration efforts:

- Primordial Labs' Anura voice-command interface enabled the Black Widow to respond to natural-language flight and ISR commands, winning "Best Vendor" at TSR.
- Hoverfly's NEXUS tether system, paired with Doodle Labs MANET radios, extended comms range while enabling flexible control through WEB or GCS.
- REVEAL's Farsight 3D mapping tools enhanced BDA and planning visualization in complex terrain.
- Recharging "Lily" pads were featured for potential forward sustainment in distributed ops.
- TSR reinforced the Black Widow's readiness for expeditionary ISR and its adaptability to partner tech stacks, setting the stage for continued integration and warfighter-driven refinement.

DEJERO: GOLD SPONSOR

Website: dejero.com
Sales / BD Contact: Rory McCabe
Email: rory.mccabe@dejero.com
Products Summary: TSR25's mountainous terrain didn't stop Dejero. Their blended connectivity solutions kept the signals flowing and the data streaming. Resilient networks made real.

Day 1 focused on shaping a coordinated plan with BAH and Sherpa 6 to partner across Soldier Borne Mission Command (SBMC), Human Machine Integrated Formations (HMIF), Transformation in Contact unit product fielding, and Next Generation Command and Control (NGC2). This coordination enables partner representation of Reveal Farsight as the mission command platform alongside Anduril and Palantir. Integration opportunities with Redcat were explored to include streaming workflow and Farsight mapping excursions with the Black Widow Short Range Recon Tranche 2. Access was obtained to event TAK Server and data products, and an after-action review with BAH on UAS Tool utilization of Maxar georegistered baselines for Digital Call For Fires was held.

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Day 2 involved provisioning Reveal EUDs, syncing with Skydio on photogrammetry threads with successful Farsight tests from X10D, and repeating the thread with Black Widow, encountering video feed issues due to interference. Brief syncs were held with GoTenna and Nett Warrior on integration, and a Farsight mission with a DJI Matrice was completed. A potential solution for the Next Vision gimbal via adding telemetry into video rebroadcast from UAS Tool was identified.

Day 3 included demonstrations of Maxar models to BAH, demos of Farsight and Identifi to JSOC representatives, discussion with Reticulate Micro (RMX) on video compression and KLV preservation via Vast product, and a follow-up with GoTenna regarding roadmap and integration possibilities. GoTenna showed potential for sharing Farsight insights over their mesh and supporting assured C2 backhaul. Other activities included validation of Farsight on a Samsung Tab Active 5 Tactical Edition, conversations on joint BG Denomy demo with Sherpa6, Glenaire Starpan hub demo, and a Farsight fielding sync with the Nett Warrior Software Integration Lab 3rd Party Lead.

PATH FORWARD: Action items include follow-ups on Skydio exploration of joint business opportunities, RMX NDA, GoTenna technical roadmapping, Glenair Starpan Bailment for Farsight Accelerator, lessons learned backbriefs for engineering teams, and follow-up integrations with Redcat and Performance Drone Works. A lab based risk reduction and industry partner whiteboard is in planning for a BAH, Sherpa 6, and Reveal technical exchange scoped for Army modernization priorities, date TBD July.

Dejero Smart Blending Technology™ delivers mission-critical connectivity by seamlessly combining multiple IP networks—including LTE, 5G, and satellite—into a resilient, high-bandwidth virtual network. At Tough Stump Rodeo 2025, Dejero solutions powered the Operations Center with robust, real-time connectivity in an environment with no cellular coverage.

Dejero's GateWay 211 and M6E6 devices, paired with Kymeta and Starlink antennas and deployed in partnership with IP Access International, enabled reliable data transmission for LiDAR, UAV video, and position location information across 35–40 miles. Guest connectivity, a previous pain point, was also fully supported. The team's ability to rapidly restore systems during live operations demonstrated the real-world reliability and agility of the Dejero platform.

Dejero proved not only technically capable but operationally essential, transforming limited infrastructure into a mission-ready communications backbone and enabling true operational resilience in disconnected environments.

RAIN TECHNOLOGY SOLUTIONS: GOLD SPONSOR

Website: raintechsolutions.com
Sales / BD Contact: Eric Jones
Email: eric@raintechsolutions.com
Products Summary: Rain Technology Solutions delivers advanced medical sensors that not only capture vital signs but can also pinpoint the exact location of injuries, giving teams life-saving insight when seconds matter.

Rain Tech is a full-stack SW dev company specializing in TAK. Our flagship product is HAIL (Health Awareness, Intelligence, and Logistics), a TAK-native platform supporting medical intelligence at the edge, including real-time team health status, digitized casualty care, and digitally-aided CASEVAC (DACASEVAC). While at the Rodeo, we confirmed HAIL is Nett Warrior compliant, completed an initial integration with goTenna, and participated in the SAR Lane, successfully pushing real-time vitals and digital DD1380's for 2 injured hikers over Trellisware and goTenna radio networks over a distance of 25 miles back to the ops center.

–HAIL was used during a real emergency–
After the Rodeo was over, someone on the goTenna team had a terrible ATV accident while retrieving one of their relays. This person used their Garmin InReach to call an SOS, alerting the team. When they arrived, his upper body was badly injured, and they did not know if he was internally bleeding or able to take in air. Someone on scene had been using HAIL with his personal Garmin during the Rodeo. He put his watch on his injured colleague to see his heart rate, respiration rate, and SpO2 readings directly on TAK while pushing that info to others on the network. They monitored his condition and called out his vitals to medics with whom they were communicating en route to critical care. HAIL was used in a real operation to reduce risk and give the team confidence they had time to safely transport their colleague. He is now post-surgery and is expected to fully recover.

PRIVATE TIER SOLUTIONS: GOLD SPONSOR

Website: privatetier.solutions
Sales / BD Contact: Paul Butcher
Email: paul@privatetier.solutions
Products Summary: Quiet professionals with elite tech — Private Tier Solutions brought advanced networking and cybersecurity chops to the front lines of TSR25.

Live ISR Video Bridging: Real-time video from a Strategic Robotic Systems (SRS) ROV was transmitted from the Ruby River Reservoir to ATAK and the CTP via HDMI through a Domo Tactical Communications (DTC) H2 radio LAN. The feed was then routed through a PLEO Starlink WAN to the main COC located 14.8 miles away at Upper Canyon Outfitters.

Multi-Platform Video Integration: In parallel, live video from a Textron Cessna Caravan ISR platform was pushed to the same LAN using a Silvus 4200 node and relayed to a Silvus 4400 node at Ruby River Reservoir. Both feeds were integrated into the CTP and delivered via PLEO Starlink uplink.

WAN Integration and Network Bridging: At the Ruby River Reservoir node, all LAN feeds were pushed in real time into the WAN. Using a Bryodyn TIG device, Private Tier Solutions securely bridged the isolated networks over VPN into the CTP, providing synchronized situational awareness across geographically dispersed command nodes.

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Backhaul from Upper Canyon Outfitters: The main COC at Upper Canyon Outfitters served as the control and monitoring node for mission execution. UCO connected to the PLEO WAN via Starlink terminal, ensuring bi-directional communication and real-time data visualization from remote sensor and platform nodes.

AUGUSTINE CONSULTING INC: SILVER SPONSOR

Website: aciedge.com
Sales / BD Contact: Marshall Healy
Email: mhealy@aciedge.com
Products Summary: A trusted partner from the planning table to the last mile — ACI's deep technical insight and relentless support helped drive mission success at TSR25.

ACI is a software developer and systems integrator, we work in a variety of fields from National Labs to the Army' Nett Warrior system for dismounted Soldiers. We work to provide end user driven customer focused products with our in house full stack development teams, integration lab and experienced test and evaluation team. Or integration and production teams handle processing of customer requested integration services form GOTs or COTs, and prepared and deliverers already installed and validated system to the customer

GALVION: SILVER SPONSOR

Website: www.galvion.com
Sales / BD Contact: Chris Barb
Email: chris.barb@galvion-usa.com
Products Summary: From headgear to power management, Galvion outfitted this year's Rodeo with tech that's built for real-world operations. Smart gear for the sharpest operators.

In June 2025, Galvion participated in the Tough Stump Rodeo near Alder, Montana, alongside our technology partner Quaze Technologies, to showcase our full suite of Power and Data Systems (PDS) and advanced wireless power transfer capabilities. The event brought together leaders in unmanned systems, communications, and tactical operations, providing an ideal environment to demonstrate the breadth and adaptability of Galvion's energy solutions.

Galvion's on-site demonstrations included:

- Squad Power Manager (SPM) for multi-source power management
- Wearable Power and Data Hubs for soldier integration
- Max-8 Bulk Charger, charging multiple tactical battery types simultaneously
- The full suite of Batl Chrg wireless power transfer technologies

We successfully demonstrated our ability to harvest, manage, and sustain power across diverse tactical platforms, supporting edge devices and mission-critical equipment in austere conditions. Notably, Batl Chrg integrated seamlessly with unmanned systems from leading UxS companies, including Boston Dynamics, PDW, Teal, Skydio, and Vidaar.

Key outcomes included:

- Wireless charging of aerial and ground UxS platforms
- Power delivery to unattended systems in the field
- Remote drone reboot capability, using integrated Batl Chrg and Somewhere Labs radio, overcoming traditional line-of-sight limitations
- First-time on-site integration with FPVs, highlighting the system's plug-and-play adaptability for COTS platforms

This event further validated Galvion and Quaze's position at the forefront of dismounted energy and wireless power innovation, showcasing how our technologies enable agile, sustained operations across dynamic and distributed tactical environments.

JUGGERNAUT CASE: SILVER SPONSOR

Website: juggernautcase.com
Sales / BD Contact: Chris Stalzer
Email: cstalzer@juggcase.com
Products Summary: Drop-tested, field-proven, and ATAK-ready — Juggernaut brought durability to the fight. Their cases and mounts were seen across the field, protecting what matters.

Juggernaut.Case worked closely with Samsung to provide rugged solutions for the mobile devices utilized at the TSR25. By providing 15 S23TE VELOX Kits, 15 Xcover6 Pro TE OPRTR Cases and 5 Tab Active 5TE OPRTR Cases and corresponding Armor.Mounts/Vehicle.Mounts, we were able to Protect - Mount - Connect all of the Samsung devices for the week. We also provided VELOX Data-Charge Docks to several vendors (Sherpa 6, Booz Allen, etc.) for provisioning and charging the ATAK devices. The Tough Stump Rodeo provided a real-world test event for our kit and also a method for us to gain invaluable insight into how the products performed in this environment.

DARLEY DEFENSE: SILVER SPONSOR

Website: darley.com
Sales / BD Contact: Randy Roy
Email: randyroy@darley.com
Products Summary: A name known for service and support — Darley showed up with solutions and logistics that kept the wheels turning and the tech deployed.

Darley was a Silver Sponsor to the best show in the country! Darley is a Prime Vendor for the DLA TLS Contract, meaning, every vendor that was present, Darley can provide their solutions to the war fighters through the contract vehicle. We were very impressed with the organization of the rodeo. Jimbo is very instrumental in the outcome of the event. It all started early on with briefings and follow up meetings that made sure all were aligned with intent and expectations.

The round-robin demo day at UCO with added time is a sustain for the future. The venue is un-matchable, and I hope you continue building on the scenario-based problem sets.

Thanks very much and we look forward to TST Rodeo '26.

VENDOR DIRECTORY
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MP ANTENNA: SILVER SPONSOR
Website: mpantenna.com
Sales / BD Contact: Ben Baranek
Email: bbaranek@mpantenna.com
Products Summary: Challenging terrain, meet multi-polarized performance. MP Antenna helped power the connectivity that TSR25 demanded, no matter the conditions.

The MP Antenna Field/Sales Team were very excited to attend this event. Because the area of RF antennas is very bland, many end users to not tend to care about good antennas until what they are currently using does not work or the end user simply does not believe anything better can be found.

After working for MP Antenna for over 6 years now, it has been my experience that seeing is believing when it comes to what MP Antenna offers. Utilizing an event like the Tough Stump Rodeo that allows end users to test various things, in real life scenarios, it a perfect set up to have end users see why our antennas make a difference. Three examples of our antennas making a difference that happened at tough stump were:

- Boston Dynamics SPOT utilizing a C Band link from an MPU5 was unable to navigate behind obstructions (cars/buildings). By switching to our antennas, there were no longer comms issues.
- UAV Pilot unable to get video reception from any distance longer than 1600'. Switched to our antennas (that were not even tuned to the proper frequency) and were able to receive video at 3000'.
- A drone operator could not get usable range beyond 5.5km. We took off their stock, and embedded antennas and zip tied / electrical taped our antennas onto the UAV. Their range went to 8km.

TSC: SILVER SPONSOR
Website: tsc.com
Sales / BD Contact: Brian Nelsen
Email: brian.nelsen@tsc.com
Products Summary: Mission-driven tech with a legacy of excellence — TSC showed up ready to support real-time, real-world tactical integration.

During the recent Tough Stump Rodeo exercise, TSC successfully demonstrated the operational capabilities of the FASTRAK™ system in a dynamic, real-world search and rescue scenario.

Despite operating in mountainous, heavily wooded terrain, FASTRAK detected and decoded WiFi and Bluetooth signals at distances exceeding 3 miles while en route to the event—showcasing its effectiveness in complex RF environments.

For this mission, FASTRAK was installed in a vehicle platform, but the system's modular design allows it to be employed across a variety of platforms including drones, boats, vehicles, and as a man-packed solution—offering unmatched flexibility for mission-specific requirements.

On-site, TSC SIGINT/EW subject matter experts used FASTRAK to detect and geolocate a known signal emitter left behind by simulated missing hikers at the trailhead. This information, along with other geolocated emitters associated with the hikers and rescue equipment, was shared in real-time over a MANET (Mobile Ad Hoc Network) using the ATAK (Android Team Awareness Kit) platform. This enabled a common operating picture across the entire network—including ISR assets, ground teams, and command elements—accelerating coordination and response.

The fusion of precision SIGINT geolocation, robust terrain performance, real-time situational awareness through ATAK, and integration with ISR assets underscores FASTRAK's value in time-sensitive, multi-domain operations. The successful demonstration reinforced FASTRAK's role as a mission-critical capability for search and rescue in complex operational environments.

SHERPA 6, INC.: SILVER SPONSOR
Website: sherpa6.com
Sales / BD Contact: Clay Usie
Email: cusie@sherpa6.com
Products Summary: The Sherpa 6 team didn't just bring technology — they brought a mission mindset. From the lab to the field, their support was next level.

Sherpa 6 demonstrated Watchtower, a government off-the-shelf mobile device management solution designed for large-scale tactical device orchestration in challenging environments. The demonstration included configuring kits and provisioning devices over Wi-Fi using Knox QR enrollment. Sherpa 6 also presented TRAKR, a beacon-agnostic logistics tool that supports operational tracking and provides a common operating picture (COP). TRAKR features a scalable WinTAK and ATAK application, supporting complex operations such as infil, exfil, resupply, and convoy movement.

SOMEWEAR LABS: SILVER SPONSOR
Website: somewearlabs.com
Sales / BD Contact: Kevin Wijas
Email: kevin@somewearlabs.com
Products Summary: TSR25 was remote, but never out of reach — thanks to Somewear Labs. Their SATCOM and mobile mesh solutions were everywhere we needed to be.

During the TSR25 Demo Day, Somewear Labs showcased the flexibility of our integrated mesh and satcom device, Node, and the power of the Grid network to enable multiple CONOPs focused on our core mission of saving lives by enabling critical communications for the world's most important organizations.

MANET RESILIENCE
Using Node & Somewear's ATAK plugin, we rapidly connected comms from 3 disparate tactical radio networks - Silvus, Doodle Labs, and TrellisWare - forming a single software-defined network for essential data like PLI and messages. Each member had built-in resilience from Node's satcom, ensuring continuous data flow, even when MANET links break, thanks to Somewear's automatic SmartRouting and SmartBackhaul.

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UAV FLIGHT
Our UxS-agnostic solution for LOS and BLOS control via Node enabled transmitting flight controls to a UAS and demonstrated its MOSA through plug-and-play interoperability with the Nett Warrior Mission Planner. Using this solution will ensure continuous situational awareness and enable pilots to maintain dynamic control even when mission parameters demand breaking the line-of-sight link.

QUAZE INTEGRATION
Working together with Quaze and autonomous systems including Boston Dynamics' "Spot" quadruped robot and Skydio's X10 UAS, we demonstrated the ability to bring autonomy beyond the range of a single battery. Quaze collected real-time data and controlled their portable wireless charging stations using Somewear's low SWaP-C Node and lightweight integration agent, Beam - showing the ability to deliver unattended recharging in austere conditions for UxS. SIT(x)

SERVER INTEGRATION
Somewear's software-defined network served as the backbone for these operations, seamlessly aggregating and routing data into a centralized Sit(x) server. This provides real-time information sharing and maximizes situational awareness from the tactical edge to command, even as operators move through their PACE plan, connectivity to C2 remained a constant.

Somewear rapidly transformed a drone into an aerial mesh relay and delivered communication kits with Node and an ATAK device to lost hikers via air drop from 350'. These capabilities enabled the hikers to stay connected to nearby rescuers operating with a Somewear Deployment Kit in a vehicle, as well as remote oversight over both satcom and mesh.

Somewear's Grid network ensured continuous tracking of the drone and bi-directional connectivity for tracking data & messaging to hikers while feeding all data to the Sit(x) server used as the common operational picture in the ops center over satellite.

ELI TECHNOLOGY: FRIENDS OF TOUGH STUMP

Website: eli.build
Sales / BD Contact: Robert Salmon
Email: robert.salmon@eli-technology.com
Products Summary: Eli Tech continues to push the envelope on mobile mesh and mission-ready networking. Their support helped make TSR25 a truly connected event.

In June 2025, ELI Technology participated in the Tough Stump Rodeo, a field event bringing together military, law enforcement, and tech teams to evaluate tools in real-world scenarios. The event served as a proving ground for our ATLS-TAK Plugin, showcasing live indoor tracking capabilities across multi-domain operations.

The Challenge:
While TAK provides strong outdoor situational awareness, its performance degrades indoors due to GPS limitations. This creates critical gaps during building-based operations like search and rescue, crisis response, or tactical missions in urban environments.
Our Solution: ATLS-TAK Plugin ATLS enhances TAK with accurate indoor tracking and real-time team visibility.

Key capabilities include:

- Seamless outdoor-to-indoor transitions
- Sub-3-meter accuracy using Wi-Fi, GPS, and Bluetooth
- Floor and room-level tracking across teams
- Integrated indoor floor plans viewable in TAK
- Compatibility with TAK tools: geo-fencing, alerts, range/bearing, CoT
- The plugin requires no new infrastructure, making deployment simple and scalable.
- Demonstration Highlights ELI Technology mapped an on-site building and demonstrated real-time indoor tracking within TAK.

Observers saw:

- Live location tracking indoors and across floors
- Smooth transition from outdoor to indoor positioning
- Room-level updates within the TAK interface
- The scenario highlighted how ATLS strengthens decision-making, coordination, and safety when GPS alone is unreliable.

Conclusion:
The Tough Stump Rodeo confirmed the ATLS-TAK Plugin's value in operational settings. By enabling accurate indoor awareness, it improves planning, navigation, and response across a range of high-risk missions.

As we move forward, the relationships and endorsements facilitated by the Tough Stump Rodeo reinforce the critical role our technology and services play in modernizing public safety and emergency response, setting the stage for broader adoption and deeper partnerships.

EVERYWHERE COMMUNICATIONS: FRIENDS OF TOUGH STUMP

Website: everywherecomms.com
Sales / BD Contact: Mike Gibbs
Email: mike.gibbs@everywherecomms.com
Products Summary: Everywhere Communications lives up to their name. From remote comms to situational awareness, their contribution ensured no one was out of the loop.

The Everywhere Platform enables the Garmin inReach Mini 2 hardware to be securely tracked and perform bidirectional messaging between users and the Everywhere Hub. The Everywhere solution remains a dual use technology and enables AES 256 encryption to meet government requirements. Everywhere also removes the Garmin inReach devices from the Garmin servers and places them on Everywhere US only servers for messaging and tracking. The Mission Connect software is separate and works in parallel to the Hub by establishing a two-way connection between the Garmin inReach, from either EMSS or Commercial gateways, to TAK Servers or any Common Operating Pictures (COP's).

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The Everywhere Garmin inReach Mini 2 battery life, at a 10 minute track rate, will continue to function between 10 to 14 days. Through partnership with goTenna and Tough Stump Technologies, Everywhere will also transport both mesh networks and ATOS tag data.

The unique size and weight of the Everywhere Garmin (3.5 oz with no phone required) enabled it to be dropped from a Skydio X10 drone. Since a Phone (EUD) is not required, this enables search and rescue drones of nearly all sizes to deliver a payload to isolated personnel. The SOS function can be sent to the FT-MMC/JPRA, any phone number, email address, or other notification channels. The inReach can be placed in the same hierarchy of other inReaches for peer-to-peer texting.

Once the hikers were located, the Skydio X10 launched with a Secure Everywhere Garmin inReach Mini 2 and an ATOS tag. The Everywhere Garmin dropped from 350 – 400 feet above the ground, and the hikers immediately activated the SOS. Mission Connect enabled four separate TAK Server to initiate a 911 Alert when the SOS was activated. The SOS location was also sent via SMS with Link to the SAR leader and to the Operations Center via the Everywhere Hub. This multi-notification capability provides a data PACE plan to ensure that the correct personnel are notified by multiple means.

GOTENNA: FRIENDS OF TOUGH STUMP

Website: gotenna.com
Sales / BD Contact: Tim Miller
Email: timmiller@gotenna.com
Products Summary: In GPS-denied terrain, goTenna kept the lines open. Their mesh network gear was a reliable lifeline throughout the Montana backcountry.

We worked with Rain Technology Solutions, EVERYWHERE Communications, Skydio, and a number of other awesome tech companies to simulate a remote Search And Rescue mission of two lost hikers in one of Montana's most remote canyons.

Together, we were able to locate the lost hikers, communicate over satellite and local mesh, and even push real-time biometrics via ATAK over 25 miles through the canyon without Cellular, Satellite, or WiFi service - over the goTenna mesh network.

We first met the EVERYWHERE team in person at last year's TS Rodeo and over the past year developed a Beyond Line Of Sight (BLOS) mesh integration that allows teams to provide and have situational awareness anywhere in the world - with or without cellular or WiFi connection.

As of this year, the Everywhere Plugin and goTenna plugins are live and approved on the Army's NettWarrior builds.

We began working with RAIN technologies a few months before this year's rodeo, and integrated goTenna as a transport layer for biometrics data from wearables through ATAK. This transport layer also sent casualty cards through the canyon where no other technology was able to get two way comms. This was our first test in the field with RAIN's HAIL app and it functioned exceptionally well.

We also installed an aerial relay utilizing a goTenna ProX2m for a portion of the demo inside TEXTRON Aviation's small manned airplane, and utilized RedResearchGroup's Aptara antenna.

TSR25 BEST VENDOR WINNER

PRIMORDIAL LABS: FRIENDS OF TOUGH STUMP

Website: primordial-labs.com
Sales / BD Contact: Chris Kirk
Email: chris.kirk@primordial-labs.com
Products Summary: AI in the field is no longer science fiction — thanks to innovators like Primordial Labs. Their decision support tools helped fuse data into clarity.

Primordial Labs demonstrated our NLC2 product, Anura, which allows operators to task unmanned systems just like they would a human teammate, using verbal, intent-based commands in a natural and expressive way. No keywords or memorization required. Anura distills the intent of the spoken command, accounts for any constraints, and translates the intent to physical action. Anura empowers an operator to command UxS individually or as teams. The natural interface dramatically reduces soldier burdens resulting in increased lethality of human-machine teams.

MERRITT GROUP: MEDIA SPONSOR

Website: merrittgrp.com
Sales / BD Contact: Jayson Schkloven
Email: Schkloven@merrittgrp.com
Products Summary: Merritt Group helped bring TSR25 to the world — capturing the grit, the gear, and the innovation that made this year's Rodeo one for the books. Thanks for telling the story with clarity and style.

Merritt Group is a nationally recognized strategic communications agency that provides marketing, public relations and digital strategy and services to organizations ranging from venture-funded startups to global Fortune 500 companies.

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BOSTON DYNAMICS

Website: bostondynamics.com
Sales / BD Contact: Shaun Ray
Email: sray@bostondynamics.com
Products Summary: Yes, that robot dog. Boston Dynamics brought Spot to TSR25 — and it worked like a champ. Whether navigating rough terrain or carrying payloads, Spot made more than a few jaws drop.

Boston Dynamics partnered with Tough Stump Technologies, Persistent Systems, and Serastar Technologies to complete the Cabin Air Drop scenario . The Spot Robot was deployed out of Miss Montana, a C-47 plane, as a bundle in which landed near a cabin of interest. Once on the ground, Spot traversed rugged terrain to gain situational awareness of the cabin being controlled a few clicks away using the Persistent Systems Manet Radios. Using the Rear Spot CAM+IR, the operator was able to investigate the house using the 30x zoom camera along with its thermal camera.

Spots Controller was also integrated with Serastars hardware to encode and push real-time live streaming of Spots cameras worldwide over an AES 256-bit encrypted 5G network. With extremely limited 5G connection, off-grid in Montana, Serastar's hardware was able to push video with less than a second of latency.

In addition we utilized Quaze Technologies wireless charging mat to charge Spot while on the remote mission. This allowed the Spot operator to keep a fully charged battery before the mission in order to effectively utilize all 90 minutes of run time with the robot when traversing to the X.

TB2 Aerospace built a prototype magnet release mechanism which launched the Teal Drone off the back of Spot. With a single click the magnet can be engaged and disengaged to either launch the drone or securely fasten it to the back of Spot.

We also engaged with MP Antennas to use their S-Band RP-TNC Antennas on the MPU5

Cabin/Airdrop Mission:
This lane was depicted at POI with personnel being observed with SkyDio X10D. A request for another overwatch asset was requested for cargo drop. The Boston dynamics Spot was delivered in it's transportation case (testing post dropped was successful with power up and mobility tests). A secondary Spot was staged IVO the drop target and was activated after the drop. SkyDio provided 2 X drone with pilots for the scenario: One following the airdrop / the other following the walking spot.

Coordination with Miss Montana (WWII DC-3) was with Bryan Douglas. Crew arrived at Ennis/ Big Sky airport the morning of the airdrop. Drop prep was immediately started with air crew and JM (Mark McBride). TST provided 1 X camera person for inside the aircraft)Christina Westbrook).

Future Development:
Boston Robotics has expressed interest in developing any/ all methods to delivering Spot. Discussions with Airborne units has begun with required paperwork for collaboration as well.

BRYONDYN TECHNOLOGIES

Website: bryodyn.com
Sales / BD Contact: Chad Hayes
Email: chad.hayes@bryodyn.com
Products Summary: Bryodyn brought the behind-the-scenes backbone — resilient, secure networking for the toughest environments. A quiet powerhouse with big capability.

During the 2025 Tough Stump Technologies Rodeo, Bryodyn Technologies partnered with its network of technology providers to deploy a scalable tactical network solution. This deployment successfully supported multiple streams of diverse data originating from remote locations and routed them back to an operations center and the Common Tactical Picture (CTP).

Bryodyn's core contribution was the deployment of its Tactical Internet Gateway (TIG), a network aggregation and bridging device that enables seamless integration across disparate networks using advanced Virtual Private Network (VPN) technology. The TIG enabled Intelligent-PACE communications with true hot-failover capabilities across all active Wide Area Network (WAN) links, maintaining constant connectivity even under dynamic conditions.

The TIG bridged multiple Mobile Ad Hoc Networks (MANETs)—each using unique waveforms and IP addressing schemes—from different manufacturers, including Codan-DTC, TrellisWare, and Silvus Technologies. Bryodyn's VPN solution preserved critical multicast and broadcast traffic across these networks, which was essential for real-time applications at the CTP, such as Team Awareness Kit (TAK) and Booz Allen Hamilton's Sit(x)® situational awareness platform.

The TIG's dynamic link bonding and bandwidth aggregation features enabled real-time prioritization across all available transport links, including multiple Beyond-Line-of-Sight (BLOS) satellite communication (SATCOM) connections. This capability ensured uninterrupted communication across the entire network.

- **Highlights from the demonstration included:**
  Remote video streaming from a Strategic Robotic Systems (SRS) remotely operated vehicle (ROV) located at the Ruby River Reservoir. The stream was transmitted via a Codan-DTC MANET deployed by Private Tier Solutions and routed to the Booz Allen Sit(x)® TAK server.
- A Starlink-to-Starlink WAN connection enabled network bridging from the Codan-DTC MANET into the TIG, which further integrated with TrellisWare and Silvus networks.
- Live airborne video was received from a Cessna Caravan equipped with a tactical camera and a Silvus 4200 radio. The video stream was transmitted Line-of-Sight (LOS) to the ground network and then bridged across all connected MANETs via the TIG.
- Sensor integration from SquareHead's Counter-Unmanned Aircraft System (CUAS) solution was also successfully aggregated across the MANET networks, with data delivered into TAK for shared situational awareness.

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VENDORS

This demonstration proved a successful deployment of a resilient, multi-domain tactical communications architecture. The network enabled real-time situational awareness and decision-making through seamless data integration, even in highly mobile and austere operational environments.

About Bryodyn Technologies
Bryodyn Technologies is a Veteran-Owned Small Business (VOSB) headquartered in Northern Virginia. The company specializes in tactical systems integration and the rapid development of new, innovative capabilities for defense, public safety, and expeditionary operations. Core competencies include Tactical Networking, Tactical Communications, Situational Awareness, Mobile Security, Design and Engineering, and Support Services.

CORNERSTONE RESEARCH GROUP

Website: crgdefense.com
Sales / BD Contact: Shea Martin
Email: shea.martin@crgrp.com
Products Summary: Innovators at the edge — CRG's advanced materials and R&D mindset helped turn science fiction into field-deployable solutions.

This year marked CRG Defense's inaugural participation at the rodeo, where we partnered with Cyntony to deliver high-definition mesh video streaming from our live fire demonstration at the range to Upper Canyon Outfitters. This collaboration enabled real-time, secure, and high-quality video transmission, highlighting the advanced networking capabilities of both organizations.

During the event, CRG Defense prominently showcased its proprietary Li-Ion Safe Cell technology. Through a series of controlled ballistics tests, we fired .308 rounds into both standard and Safe Cell lithium batteries, clearly demonstrating the enhanced safety and reliability of our Safe Cell technology. These tests underscored the significant risk reduction and operational safety benefits for end-users in high-threat environments.

In addition to our battery safety demonstrations, CRG Defense also presented its FPV (First-Person View) UAS (Unmanned Aerial System) batteries in live flight operations, illustrating their performance, endurance, and suitability for demanding applications. Furthermore, we exhibited our advanced Chemical Exposure Monitoring Systems, which provide real-time environmental hazard detection to protect personnel in the field.

Overall, CRG Defense's debut at the rodeo not only highlighted our commitment to innovation and safety but also demonstrated the practical value of our technologies to operators and industry partners

CYNTONY CORPORATION

Website: cyntony.com
Sales / BD Contact: David Moschella
Email: dmoschella@cyntony.com
Products Summary: Comms, meet cutting-edge. Cyntony's RF expertise brought new signals — and new possibilities — to this year's Rodeo.

Cyntony collaborated with Cornerstone Research Group (CRG) and Reticulate Micro (RMX Government) by standing up a great demonstration of all our technology. Cyntony provided wireless Layer 1-2 using the new XTND Base Stations with Doodle Labs Mesh Rider Radios, RMX spanned Layers 3-7 with their super-efficient VAST video streaming technology that enabled CRG to do a remote viewing of their gunshot-safe AgilePower battery technology coming under fire from a .308 at a firing range a couple km from the TSR Ops Center. Live video was fed to the TRS25 Ops Center, proving Chinese batteries go boom, while AgilePower batteries take the shot and become inert.

Cyntony also took advantage of wide open spaces in Montana to benchmark the XTND-DIRECT Base Station's communication performance. Results were excellent! At 2 miles range operating at 2412 MHz with a 3 MHz channel, we got 5 Mbps UDP with 2% packet loss and 4 Mbps TCP transfer; at 3.82 miles range we got 500 kbps UDP with 0% packet loss, still good enough for streaming compressed 1080p video. Operating at 926 MHz with a 3 MHz channel yielded similar results: at 3.82 miles, UDP stream of 500 kbps with 0% packet loss, and TCP transfers at 500 kbps.

DITTO LIVE

Website: Ditto.com
Sales / BD Contact: Michael Herman
Email: mike@ditto.live
Products Summary: Edge sync without internet? Ditto Live proved it's possible. Seamless data sharing in disconnected environments made them a crowd favorite.

The Ditto Edge Sync ATAK plugin enhances situational awareness and communication for tactical teams by enabling automatic peer-to-peer data synchronization across various transports such as Bluetooth Low Energy, Wi-Fi Aware, MANET, and SATCOM, without relying on a central server. It ensures a consistent Common Operating Picture (CoP) in challenging connectivity environments by enabling long-distance multihop sync, store and forward, and auto PACE features. The plugin is platform-agnostic, fully encrypted, and seamlessly integrates with ATAK, allowing for flexible and reliable data sharing at the edge.

Executive Summary
In previous years at the Rodeo, Ditto successfully demonstrated its ATAK plugin offline functionality as well as the ability to bridge waveforms from multiple radio vendors including, DTC, Trellisware, Silvus, and Persistent Systems. This year, Ditto pushed its capabilities even further by taking on new challenges and expanding its technical limits: GoTenna Integration Validated

Ditto successfully demonstrated peer-to-peer message transfer across devices using GoTenna radios and the Ditto plugin. The system worked across multiple hops and confirmed compatibility with ATAK deployments.

Field Test with SOCOM
Ditto was validated in a multi-hop test over Trellisware radios in a DDIL environment, confirming stable message sync and device presence visibility across a 300m range.

Push-to-Talk Milestone Achieved
Ditto's Push-to-Talk (PTT) capability was successfully tested in field and subterranean environments.

DOMO TACTICAL COMMUNICATIONS

Website: dtccodan.com
Sales / BD Contact: Tarry Bailey
Email: tarry.bailey@domotactical.com
Products Summary: When it came to resilient, encrypted video and data, DTC showed up big. Their radios and mesh systems were a reliable backbone in the toughest spots.

Tough Stump Technologies hosted the annual Tough Stump Rodeo, serving as a real-world testbed for tactical technologies including the Android Team Awareness Kit (ATAK), mesh radio systems, and autonomous platforms. In addition to the Rodeo, the company provides training and certification programs such as TAK U™ (ATAK-focused instruction), scheduled by request.

Operational Mission:
Demonstrate and validate the integration of ATAK-compatible technologies and tactical networks in complex terrain to enhance situational awareness and command/control for military and public safety operations.

Mission:
Establish a robust and resilient DTC Mesh communications infrastructure to support multi-domain operations including underwater inspections, aerial reconnaissance, and tactical command and control. The system was to enable real-time data transmission, live video streaming, and TAK ecosystem integration across terrestrial, maritime, and airborne assets.

Execution:
- BluSDR-90 mounted on a 40 ft telescopic mast at the NVIS Communications Command Trailer.
- Netnode 2x2W-5RM placed at elevated terrain 2.5 miles away to extend coverage.
- SDR 2x1WP units deployed on both submerged (UUV) and airborne platforms (Cessna 208).
- SDR-H2 paired with airborne payloads to provide reliable uplink for live-streaming and telemetry.
- Video feeds and ping diagnostics captured from both underwater and aerial platforms.
- All radios operated in Mesh Ultra mode under a unified IP schema (192.268.1.X).

Transmission Layer: DTC Mesh

Mission Success – Unified Achievements Enabled by DTC Mesh:
The DTC Mesh Network served as the foundational transport layer that enabled the successful integration, interoperability, and performance of all mission components and partners. Key accomplishments included:

Underwater Domain (Strategic Robotic Systems + Private Tier Solutions):
- Real-time 4K video, Side Scan Sonar, Forward Looking Sonar (FLS), and Position Location Information (PLI) from the FUSION HUV streamed through DTC Mesh to UCO HQ and cloud infrastructure.
- First successful TAK integration with the FUSION system, enabling rebroadcast to a global network.

Aerial Domain (Textron Aviation):
- Reliable uplink and downlink between airborne platforms and ground nodes up to 8 km away at 10,000 ft MSL.
- Stable video transmission achieved using SDR radios onboard the Cessna Caravan, including live monitoring and signal optimization testing at various altitudes.

Command & Control / TOC (Private Tier Solutions):
- Full C2 data aggregation, video encoding/decoding, and rebroadcasting operations supported in-field with mobile TOC and Starlink redundancy.
- Successfully passed encrypted video over a Layer-2 VPN from the reservoir to UCO (~21 km), then globally via cloud services.

Long-Range Communications (NVIS/CODAN):
- Deployed HF systems (CODAN 6120BM, Envoy X2) as reliable backhaul for mesh-to-HQ redundancy.
- Provided additional communication layers for continuous TAK support even in degraded environments.
- Conducted experimental integration of micro video compression over HF links.

Mesh-Centric Integration (All Partners):
- Seamless real-time interoperability across submerged, surface, and airborne assets.
- Demonstrated distributed situational awareness through the ATAK ecosystem powered by DTC Mesh.
- Enabled distributed command nodes to collaborate across domains with zero data loss and minimal latency.

Summary:
DTC Mesh served as the operational backbone for the entire mission architecture, enabling real-time multi-domain collaboration, data dissemination, and tactical decision-making. It validated its reliability, extensibility, and mission-critical value in austere, terrain-challenged environments supporting integrated UUV, aerial, HF, and C2 operations.

ENTROPY ROBOTICS

Website: entropyrobotics.ai
Sales / BD Contact: Chris Lemuel
Phone: 845-558-8487
Products Summary: With flexible platforms and adaptable payloads, Entropy Robotics brought new meaning to modular robotics. A true disruptor in the tactical UxV space.

Entropy Robotics Demonstrated fully autonomous drone capabilities to include automated object identification and dispatch for secondary drones. Additionally, ER provided a demonstration of "man in the middle" control prior to dispatch of a secondary drone.

All connectivity was demo'd via Starlink based communications protocol with real time RTSP feeds streamed to a connected application-based ground station.

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FOTOKITE
Website: fotokite.com
Sales / BD Contact: Mark Jetton
Email: mark.jetton@fotokite.com
Products Summary: FotoKite took ISR vertical — and persistent. Their tethered aerial system delivered stable eyes in the sky without the flight dram.

This was our first time at the event but have heard great things. It was a good thing we were there. As we are looking at more military use cases for our technology it was great to be around industry experts trying to coordinate interoperability with different technology. It took a team of several vendor but we finally were able to integrate ATAK radios with our livestream.

Also, relaying the information that a Part 107 license is not required with our ATUAS was a benefit to several agencies. Everyone was helpful, there was no competition barriers that sometimes you get at a conference or tradeshow. This was a team from all across the board trying to find solutions to make it easier for our First Responders/Military Personnel to do their jobs safely and effectively. Thank you for the opportunity to join the Rodeo!

HOVERFLY TECH
Website: hoverflytech.com
Sales / BD Contact: John Amick
Email: john.amick@hoverflytech.com
Products Summary: Hoverfly's tethered UAVs stayed on station while others went home for batteries. Constant coverage, constant connection. Hoverfly Technologies Inc. is the industry leader in tethered UAS (TeUAS) technology. We design and manufacture state-of-the-art tethered drones for the top leaders in federal law enforcement, defense, public safety and security industries, revolutionizing long-duration aerial surveillance and secure long-range communications. Hoverfly helped incept modern tethered drones into the defense-technology ecosystem over a decade ago. Now, we are the #1 TeUAS choice for the US Army and the blueprint for advancing TeUAS requirements for the US Military.

During Tough Stump Rodeo 2025 we demonstrated NEXUS. Network Extension of Unmanned Systems by pairing the Hoverfly Spectre with the RED Cat Teal Black Widow through a Doodle radio. By leveraging the strengths of the Hoverfly tethered UAS and other unmanned systems, this innovative technological ecosystem revolutionizes the tactical network. NEXUS™ offers unprecedented endurance, extended range, enhanced concealment and unmatched operational efficiency.

This year's rodeo demonstrations in the Nett Warrior paddock allowed Hoverfly to collaborate and demonstrate to dozens of current and future customers. Follow on efforts to hone the TAK UAS tool have taken place and vehicle integration is underway. NEXUS is fast becoming a core strength to Hoverfly Spectre and Sentry systems.

LIFELENS TECHNOLOGY
Website: lifelenstech.com
Sales / BD Contact: Kevin Carpenter
Email: kcarpenter@lifelenstech.com
Products Summary: TSR25 pushed bodies to the limit — and LifeLens helped monitor every beat. Their biometric tracking was a leap forward for operator wellness and performance.

Tough Stump Rodeo 2025: LifeLens Technologies used Ascent Platform during SAR scenario to showcase durability, ease of use, and Realtime connectivity in comms degraded environments. LifeLens Devices were used in conjunction with UAS industries as a delivered care package to remote and stranded survivors in need of medical attention. The devices were dropped from 300 feet for demonstration and then again at 450 for event SAR scenario! Devices had no signs of external damage nor internal! All components and systems worked appropriately after being airdropped from drones.

Communications with EUD mesh connectivity was functional with all worn system user on location 4 x patients to include 1 SAR event patient. Thank you for the great time!

Loved the Ranch and Family who owns it!

NOBLE SUPPLY AND LOGISTICS
Website: noble.com
Sales / BD Contact: Orin Brown
Phone: 423-740-0631
Products Summary: NOBLE IS YOUR TRUSTED PARTNER IN READINESS

You need it? Noble has it. From last-mile delivery to full-on sustainment, they made sure TSR25 had what it needed, when it needed it.

NOBLE provides global sustainment and operations support for the U.S. Military and civilian government agencies with an unparalleled range of mission-critical products and services.

Our supply chain contains over 13,000 suppliers and millions of products. We offer top brands and cutting-edge technologies to assist with your equipment's total life-cycle sustainment. Noble has integrated 150 contract vehicles and over 13,000 suppliers to offer a single-source procurement solution for government. Our process ensures compliance, saves time and money, and quickly gets products to end users to support their mission.

NVIS COMMUNICATIONS
Website: nviscom.com
Sales / BD Contact: John Roscia
Email: john@nviscom.com
Products Summary: Clear, encrypted, and operational — NVIS Comms brought their best-in-class radio systems to the high-altitude testbed of TSR25.

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Long-Range Communications (NVIS/CODAN):

- Deployed HF systems (CODAN 6120BM, Envoy X2) as reliable backhaul for mesh-to-HQ redundancy.
- Provided additional communication layers for continuous TAK support even in degraded environments.
- Conducted experimental integration of micro video compression over HF links.

Reservoir Mission Equipment:

- CODAN 6120BM & Envoy X2 HF SDR
- VHF P25 Systems
- EMP-shielded mobile comms trailer (AC, DC, and solar-powered)
- Mission:
  Provide HF backhaul communications support for UUV inspection and TAK infrastructure.

Execution Highlights:

- Dual 3G ALE HF circuits active (protocol 4538)
- STARLINK uplink for TAK connectivity
- HF tested for Reticulate Micro Video Compression (experimental phase)
- Mesh redundancy established with BluSDR-90

Transmission: DTC Mesh + HF Backhaul + STARLINK

ONYX AEROSPACE

Website: onyxaero.com
Sales / BD Contact: William Roberts
Email: william.roberts@onyxaero.com
Products Summary: Onyx brought more than aerospace — they brought agility. Their modular platforms offered flexibility for missions that don't go by the book.

Advanced Tactical Solutions Demonstration

Our team successfully demonstrated two breakthrough technologies that directly address critical operational gaps in contested environments and mission-adaptable equipment systems.

Brevity Mobile Application - Deployed a lightweight, server-independent situational awareness platform designed for disconnected/contested operations. Key achievements:

Demonstrated four operational modes (Normal, Sequence, Count, Blackout) enabling covert communications

- Proved sub-60-second deployment capability from cold start to mission-ready
- Successfully integrated with ATAK systems while maintaining zero persistent identity for OPSEC
- Validated offline peer-to-peer functionality and rugged external keyboard operation for silent/gloved use
- Showcased multilingual QR provisioning for rapid large-scale deployment

Modular Gear Carrier System - Advanced 3D-printed tactical equipment using composite materials:

- Fabricated interchangeable panels using Onyx (4.2 GPa tensile modulus) and S-TPU materials
- Demonstrated rapid customization through parametric CAD and additive manufacturing
- Produced field-repairable modular architecture with standardized interfaces
- Achieved dual-material compatibility (rigid + elastic) with ESD-safe, flame-retardant options
- Validated compatibility with tactical vests, drone payloads, and emergency response configurations

Both solutions address immediate operational needs: survivable communications in denied environments and rapidly customizable load-bearing equipment. Technologies are deployment-ready and scalable across DoD, federal, and allied partnerships.

Impact: These innovations provide tactical edge capabilities where traditional systems fail - enabling mission success in contested, disconnected, and resource-constrained environments.

PDW

Website: pdw.ai
Sales / BD Contact: Mike Rucki
Email: mrucki@pdw.ai
Products Summary: PDW stood tall with mission-first gear that's rugged, intuitive, and purpose-built for the field. Tactical design meets real-world deployment.

This SAR-focused integration event tested PDW's C100 drone in mountainous terrain (>6,000 ft elevation). The C100 delivered a 4.5 lb SAR payload to stranded hikers ~2 km from launch, integrating TAK and multiple technologies for real-time support and tracking.

This event proved the C100's SAR mission effectiveness and demonstrated how cross-vendor integration can enhance situational awareness in austere environments. Continued collaboration between PDW, Tough Stump, and partners advances capabilities for real-world response missions

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PERSISTENT SYSTEMS
Website: persistentsystems.com
Sales / BD Contact: Derek Clayton
Email: dclayton@persistentsystems.com
Products Summary: Wave Relay mesh just works — and it showed at TSR25. Persistent kept the network humming from hilltop to valley floor.

During the Tough Stump Rodeo 2025, Persistent Systems, utilizing Wave Relay MANET technology, employed high data rate backhaul at a distanceover 30 miles through the rugged Montana terrain.

This backhaul was optimized using the MPU5, Integrated Sector Antenna, and our highly directional Panel Antenna. This network operated in both S and C bands, allowing varying drone companies, UGV companies, and other tech industry partners to pass critical data back to a centralized Common Operational Picture (COP) for utilization.

Throughout the exercise, Persistent Systems integrated with a variety of companies focusing on both the ground and air domains. Within the ground domain, Persistent Systems integrated with Boston Dynamics, bringing back video feeds from their SPOT. In the air, Persistent Systems used their high-speed backhaul to pull down multiple feeds and PLI data from Skidio's X10 and Teal's Black Widow.

REDCOM
Website: www.redcom.com
Sales / BD Contact: Jason Ragan
Email: Jason.Ragan@redcom.com
Products Summary: Secure voice comms across every echelon — REDCOM showed up with C2 solutions that never blinked, even in denied or degraded environments.

REDCOM Laboratories, Inc. is a U.S. company that specializes in the development of advanced strategic, operational, and tactical command and control communication solutions with a focus on interoperability, flexibility, and ease of use.

REDCOM has a long history of successful deployments at the highest levels of government and in leading Department of Defense (DoD) communications programs for all branches of the military. REDCOM's Sigma software is currently the C2 platform of choice for multiple programs within the U.S. Army and Air Force.

During the Tough Stump Rodeo, REDCOM Sigma Software through our XRI-400 hardware platform was able to provide C2 communications enabling VoIP, Video, Chat, & RoIP capabilities all controlled through our single pane of glass C2 Console User Interface. The C2 Console enabled the operator to dynamically patch disparate endpoints, regardless of frequency, waveform, or radio type.
Additionally, REDCOM was able to bring our communications capabilities to the ATAK platform through our ATAK Plugin. REDCOM Sigma Client for ATAK brings adaptable and highly interoperable communications to the hands of every warfighter. With Sigma Client for ATAK, an Android smartphone or tablet becomes a robust PTT client, converging data and communications into a single pane of glass.

RMX VAST [USED TO BE RETICULATE]
Website: www.rmx.io
Sales / BD Contact: John Dames
Email: j.dames@rmx.io
Products Summary: Tiny, tactical, and powerful — Reticulate's chip-scale tech impressed with size-defying capability. Small form, huge punch.

RMX (Reticulate Micro) attended Tough Stump Rodeo 2025 in Alder Montana, June 2-6, 2025. Tough Stump Rodeo is a proving ground for tactical communications, challenging technology vendors to demonstrate their products and technologies in remote, austere environments that simulate real-world tactical scenarios. RMX's goal was to demonstrate its VAST video compression technology to support multiple scenarios for ISR, UAS, AI, C2 and MANET radio integrated applications.

Objectives and Accomplishments

RMX had the following objectives:

- Increase the number of FMV streams (UAS, ISR, Recce) to 5 concurrent HD streams over a single L-BAND Manet network (SUCCESS)
- Live FMV Video streams over disadvantaged, extended range (30 mile +), multi-hop, BLOS MANET Radio Networks (SUCCESS)
- Ultra-low Bandwidth live FMV video streams via serial over High Frequency (HF) Radio Networks (IDENTIFIED ISSUES)
- Provided video reachback for several unplanned remote scenarios where Starlink wasn't an option (SUCCESS)

VAST Overview

VAST (Video Adaptive Systems Technology), is a cutting-edge video encoder and solution for compressing and streaming high-quality video over disadvantaged, low bandwidth (DDIL) networks. The VAST Video Platform is capable of running on almost any hardware and streaming highly compressed video on almost any IP network regardless of bandwidth, making video possible across a wide variety of scenarios where it simply wasn't viable or even possible before.

- VAST delivers ultrafast, real-time, software-based video compression
- The standards-based encoder streams using the AV1 video codec
- It is hardware agnostic and works across low SWaP-C x86 and ARM architecture (ie. a 5w, USB power Raspberry Pi)
- CPU only software-based encoder, requires no GPU or specialized hardware
- Proven performance with Government and security customers - Successfully demonstrated UDP multicast or RTSP streaming over every tactical band, including first ever video streaming over HF (3G ALE, Wideband), SINCGARS, MUOS, UHF TACSAT, LTAC and others.

UAS ISR Target Scenario

Objective: Enable 4 or more concurrent FMV streams over a single MANET network from multiple live sources (UAS, Recce, Helmet).

During this scenario, RMX demonstrated the ability of VAST to support multiple FMV video streams from deployed UAS aircraft across a bandwidth constrained and congested MANET radio network to remote TAK users on the ground. RMX effectively demonstrated five (5) concurrent video streams and further showed enough airtime for additional streams. Each HD stream was effectively broadcast between 350-500 kbps, instead of the usual 1-2 mbps bandwidth required in legacy video streaming solutions.

In the scenario, VAST was employed at the UAS ground control station and transcoded streaming video from 3 UAS platforms (Teal), significantly freeing up airtime for additional video from other sources. These sources included an additional UAS (Skydio) and a stationary Recce camera source (4k source).

Video was viewed by operators on tactical EUDs (Samsung S23 TE) and laptops via the VAST video player, but was also viewed in TAK using the VAST player's transcode to H264 with TAK video announcements. The use case was successful and thanks to the presence of TAK engineers and Government customer, work started immediately to support VAST's open standard playback (AV1 RTP) in the TAK baseline player which is currently available in TAK v5.5.

Search-and-Rescue (SAR) Scenario

Objective: To assist in UAS search for 'lost hikers' in a search-and-rescue scenario and support live FMV video to remote Ops Center over a BLOS narrowband MANET radio network.

In this multi-drone response scenario, VAST was leveraged at the base station of a single Skydio UAS (one of several deployed search drones). The exercise required multiple drones to assist the search with real-time multi-spectral video for both the ground teams and the Ops Center. Local ground teams were equipped with MANET radios, while the Ops Center was connected over several different networks including multi-hop MANET as well as Starlink.

The ground control station was configured in a typical UDP multicast stream scenario so that nothing changed for the operator, but the stream was consumed and transcoded in VAST for long haul transmission back to the Ops Center. VAST successfully streamed live FMV over a narrow-channel (1.2mhz), multi-hop Trellisware MANET network over 30 km. In the exercise, VAST streaming over a 30+ mile 1.2 MHZ Trellisware link was the only radio-based FMV to successfully reach the Ops Center for use in real-time operations.

Ultra-low Bandwidth FMV over High Frequency (HF) Radio Networks

Objective: To showcase VAST video compression technology in enabling live FMV video streams over 3rd Generation Automatic Link Establishment (3G ALE) narrow-band (NB) radio links and 4th Generation ALE (4G ALE) Wideband (WB) HF radio links.

Successful FMV video streaming using VAST had already been conducted between NAVWAR's test facility in Fort Huachuca AZ and at Naval Information Warfare Center (NIWC) Pacific San Diego CA. This was the first ever practical demonstration of video-over-HF in field conditions. Testing effectively validated the effective deployment and use of video streaming over 3rd Generation Automatic Link Establishment (3G ALE) narrow-band (NB) radio links and 4th Generation ALE (4G ALE) Wideband (WB) HF radio links. For these purposes, narrowband constituted a 3-KHz bandwidth and Wideband up to 48-KHz bandwidth.

While this test was not able to be conducted live at Tough Stump, critical requirements were identified to pursue this capability over the Codan Sentry HF radio system. We found that the Sentry HF system lacks built in IP to serial conversion capabilities, and integration efforts during Tough Stump Rodeo successfully established the interface requirements for serial-to-IP interoperability and scope to extend the VAST video streaming capability to complex Global HF and serial data networks.

REVEAL TECH

Website: www.revealtech.ai
Sales / BD Contact: Jimmy Di Gioia
Email: Jimmy@Revealtech.ai
Products Summary: Real-time 3D mapping and AI-driven situational awareness — Reveal Tech turned terrain into tactical advantage in record time.

Reveal Technology at TSR Day 1: focused on shaping a coordinated plan with BAH and Sherpa 6 to partner across Soldier Borne Mission Command (SBMC), Human Machine Integrated Formations (HMIF), Transformation in Contact unit product fielding, and Next Generation Command and Control (NGC2). This coordination enables partner representation of Reveal Farsight as the mission command platform alongside Anduril and Palantir. Integration opportunities with Redcat were explored to include streaming workflow and Farsight mapping excursions with the Black Widow Short Range Recon Tranche 2. Access was obtained to event TAK Server and data products, and an after-action review with BAH on UAS Tool utilization of Maxar georegistered baselines for Digital Call For Fires was held.
TSR: involved provisioning Reveal EUDs, syncing with Skydio on photogrammetry threads with successful Farsight tests from X10D, and repeating the thread with Black Widow, encountering video feed issues due to interference. Brief syncs were held with GoTenna and Nett Warrior on integration, and a Farsight mission with a DJI Matrice was completed. A potential solution for the Next Vision gimbal via adding telemetry into video rebroadcast from UAS Tool was identified. Day 3 included demonstrations of Maxar models to BAH, demos of Farsight and Identifi to JSOC representatives, discussion with Reticulate Micro (RMX) on video compression and KLV preservation via Vast product, and a follow-up with GoTenna regarding roadmap and integration possibilities. GoTenna showed potential for sharing Farsight insights over their mesh and supporting assured C2 backhaul.

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Other activities included validation of Farsight on a Samsung Tab Active5 Tactical Edition, conversations on joint BG Denomy demo with Sherpa6, Glenair Starpan hub demo, and a Farsight fielding sync with the Nett Warrior Software Integration Lab 3rd Party Lead. PATH FORWARD: Action items include follow-ups on Skydio exploration of joint business opportunities, RMX NDA, GoTenna technical roadmapping, Glenair Starpan Bailment for Farsight Accelerator, lessons learned backbriefs for engineering teams, and follow-up integrations with Redcat and Performance Drone Works. A lab based risk reduction and industry partner whiteboard is in planning for a BAH, Sherpa 6, and Reveal technical exchange scoped for Army modernization priorities.

RTX BBN TECHNOLOGIES

Website: rtx.com
Sales / BD Contact: Nate Soule
Email: nathaniel.soule@rtx.com
Products Summary: BBN brought the brains to the battlefield. From cognitive radio to multi-domain solutions, their legacy of innovation was felt across the range.

RTX BBN Technologies provided Government Off The Shelf (GOTS) TAK Servers for connectivity at the rodeo. We hosted two TAK Servers, one on-premise at the UCO and one in AWS GovCloud. These servers were federated with each other and several other servers, including BAH's Sit(x) server and multiple on-premise TAK Servers, via a TAK Federation Hub running in the cloud. Through these servers and federations data was made available from clients connecting via tactical radio bridges, and over WiFi which provided access to an aggregated SATCOM link. Dozens of directly connected TAK clients were able to quickly get up and running via a variety of connection mechanisms, including auto-configuration data packages, username and password via TAK Server's Certificate Enrollment capability, and via QR code using the TAK Registration plugin. This allowed the various vendors and observers to connect in the way that was easiest and most compatible for them - as connected clients ranged from standard Android and iOS phones, to laptops, to UAS handheld controllers.

SERASTAR OPERATIONS

Website: serastar.com
Sales / BD Contact: Dana Cardenas
Email: dcardenas@serastar.com
Products Summary: Satcom that just works — even where nothing else does. Serastar proved themselves as a go-to for staying connected beyond the grid.

ASRS & Robotic Systems Integration
Serastar's NOMADIC systems are the connective tissue that bridges these platforms with mission control.

Serastar's NOMADIC systems are engineered to support integration with any ASRS (Autonomous Systems and Robotic Solutions) asset, including advanced platforms such as Boston Dynamics' Spot robot. Our systems deliver encrypted, near real-time video and sensor data via LTE, satellite, and MANET networks, even in extremely austere, disconnected, intermittent, or limited (DDIL) environments.

Features

- Real-Time Live Streaming from Mobile Robotics
- AES 256-bit Encryption for Secure Comms
- No Proprietary Software/Hardware Required to view the stream
- MIL-STD-810G Certified, DoD-Tested Security
- Supports Edge Computing & Analytics
- Fully Compatible with C2/C4ISR Systems
- Integration-ready with any ASRS platform (ground, aerial, or maritime)
- Video compression enabled for near real-time performance (1.5-second global latency)
- Proven streaming success with Spot robot and other ASRS assets under operational test conditions
- Operational On-The-Move (OTM) in tactical environments and at base command centers with full connectivity

Demonstrated Success – Tough Stump Tech Demo | Montana

Serastar partnered with Boston Dynamics as well as Persistent Systems and Samsung in Montana, where our systems successfully enabled real-time live streaming from the Spot robot in rugged, off-grid terrain. The test validated Serastar's ability to support live telemetry, autonomous navigation data, and video analytics.

Why Serastar Technologies:

- Rapid Deployment | Plug-and-play system setup
- Scalable Architecture | From individual units to enterprise-level ops
- Built for Harsh Conditions | MIL-certified, field-tested durability
- Unmatched Interoperability | Connects with federal, state & local systems

SQUAREHEAD TECHNOLOGY

Website: www.sqhead.com
Sales / BD Contact: Knut Moe
Email: knut@sqhead.com
Products Summary: Squarehead's acoustic sensors picked up what the rest of us missed. Their tech provided a whole new dimension to situational awareness.

Squarehead arrived on 6/2/2025 for setup at the Upper Canyon Outfitters. We initially found a spot near the big tent but we quickly realized that is where the generators were going to be. We then moved clear across the field to the south. We setup two sensors facing west to detect any drones flying by. This setup worked quite well for us throughout the event.

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After some walking around and conversations we found Bryodyne, a data integration company. We were quickly able to get CoT data over to Bryodyne to be pushed over to ATAK for display in the main tent. After a day or two Bryodyne was able to get our data to ATAK for display.

Initially, due to our location, certain groups were unaware we were there. Once the TS team found out about this, they quickly started funneling people over to our setup for a brief. Towards the end of the week Trey was approached for a brief on a Youtube live which seemed to get good traction.

We also met up with Jim and Matt from Frontline. We ended up going to Great Falls, MT to Malstrom AF Base at the end of the week with Frontline to brief a team on TS, Frontline, and Squarehead.

STRATEGIC ROBOTIC SYSTEMS, INC

Website: srsfusion.com
Sales / BD Contact: Weston Bartkoski
Email: weston.bartkoski@srsfusion.com
SRS brought multi-mission robotic solutions that do more with less. Precision-built platforms are designed for dirty, denied, and dangerous environments.

Products Summary: SRS brought multi-mission robotic solutions that do more with less. Precision-built platforms are designed for dirty, denied, and dangerous environments.

1. Seamless Underwater Data Flow: We successfully integrated the SRS FUSION UUV into the TAK network, proving we can achieve robust data transmission even in challenging aquatic environments. We saw firsthand how it utilized radio relays and mesh networking devices to overcome the limitations of situational awareness underwater.

2. Real-Time Situational Awareness: A critical outcome was the continuous stream of information. The UUV pushed a live RTSP stream (video) and accurate position location information (PLI) directly into the TAK network. This allowed us to maintain real-time situational awareness of the underwater domain. Crucially, the video stream provided us with the operator's view of the vehicle, offering invaluable insight into the sonar data, 4K streaming video from the UUV itself, and a dynamic side scan sonar mosaic. This comprehensive visual and data feed is an absolute game-changer for mission planning and execution.

3. Effective Autonomous Operations: On Day 1, we observed the UUV conducting a precise dam inspection from a boat, demonstrating its capability for targeted, operator-controlled missions. Then, on Day 2, it performed an autonomous survey mission launched directly from the shore. This showcased its significant autonomous navigation and mission execution capabilities, minimizing direct human intervention while still providing crucial data.

4. Comprehensive Tactical Integration: The most impactful takeaway was the UUV's ability to seamlessly contribute to our overarching tactical picture. By getting its data into the TAK network, we demonstrated how underwater assets can be fully integrated with our broader land and air forces, enhancing our overall operational intelligence in austere conditions.

Reservoir Mission:
Perform reservoir floor inspection from 0–19m depth. Stream live data via TAK-integrated mesh communications.

Capabilities Demonstrated:

- Real-time 4K video
- Forward Looking Sonar (FLS)
- Side Scan Sonar (SSS)
- Position Location Information (PLI)
- Autonomous and manual inspection of dam infrastructure
- Successful TAK integration (via Private Tier Solutions) for global rebroadcast

Transmission: DTC Mesh (SDR 2x1WP)

TEXTRON AVIATION

Website: specialmissions.txtav.com
Sales / BD Contact: Eric Thomas
Email: ethomas02@txtav.com
Products Summary: Aviation support at the tactical edge — Textron showed how ISR, utility, and strike platforms can integrate into tomorrow's missions, today.

Textron Aviation Special Missions manufactures a wide range of commercial and defense fixed wing aircraft, including the Cessna and Beechcraft family of products. As the aircraft OEM, we develop and deliver mission provisions to enable our aircraft to serve as multi-mission platforms, from transport to CASEVAC to ISR and beyond. Customers include law enforcement agencies, federal agencies, COCO operators, and militaries worldwide.

Reservoir Mission
Assets:

- Aircraft: Cessna Caravan 208
- Radios: SDR-H2, SDR 2x1WP
- IP camera (aerial payload)

Mission:
Establish and maintain airborne mesh network extension over Ruby Reservoir.

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Execution:

- Maintained ground link at up to 8 km range from 10,000 ft MSL
- Conducted flight orbits with stable video transmission
- IP camera relayed steady video during 11-minute test flight
- Lowered to 8,000 ft for improved signal fidelity; noted degradation beyond 5 km range

Transmission: DTC Mesh (SDR-H2 / SDR 2x1WP) + STARLINK

TRELLISWARE TECHNOLOGIES

Website: txtav.com
Sales / BD Contact: Brett Carlson
Email: bcarlson@txtav.com
Products Summary: Reliable, low-latency comms in a tough RF environment? Trellisware made it look easy. A crucial link in the TSR25 mesh chain.

Trellisware Technologies collaborated with, Skydio, PDW, Reticulate Micro, TSC, Life lens, Rain Technology solutions, Somewear Labs for a Successful Search and Rescue scenario. Video and sensor point of interest data was relayed from the Skydio and PDW platforms utilizing the TSM network. Reticulate Micro optimized video from the SAR site for the TSM network allowing quality video to be passed to UCO and then to the PAR video server. PLI and COT Traffic from the TSM network was passed to a Local TAK server that was federated to the PAR Cloud TAK Server.

Architecture allowed users on both the Tactical RF network and Cloud users to communicate and share situational awareness data. Biometric and patient vital information was collected by Rain Tech units relayed over the TSM network and viewed by Cloud connected End Users utilizing their ATAK plugin. TSC provided their MTS Tracking antenna at UCO (Which provided simultaneous support to Trellisware and Persistent Systems) and their FASTRAK Electronic Warfare unit which aided in the SAR scenario. Trellisware also worked with Somewear labs to send PLI data over their Iridium network. This collaboration provided beyond line of site situational awareness for users. Finally Trellisware provided Textron with a radio that allowed the platform to be visible in the TSM network for RF and Cloud Users.

VIDARR INC

Website: www.vidarrinc.com
Sales / BD Contact: Cliff Byrd
Email: cliff@vidarrinc.com
Products Summary: VidaRR's AI-driven recognition tools made finding the signal in the noise faster than ever. When time matters, they deliver speed and clarity.

TOUGH STUMP RODEO

ESTABLISHED 2021

TOUGH STUMP TECHNOLOGIES

TO LEARN MORE ABOUT THE TOUGH STUMP RODEO
OR SIGN UP FOR TSR26, VISIT WWW.TOUGHSTUMP.COM.