T&E Challenges for Beyond Line of Sight

The 27th Annual
Test Instrumentation Workshop

May 14 - 16, 2024
The Tuscany Hotel & Conference Center
Las Vegas, NV

ABOUT ITEA

The premier professional association of the international test and evaluation community.

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SCHEDULE-AT-A-GLANCE

EVENTS	DAY/TIME
Pre-workshop Tutorials	• Tuesday, May 14 8:00 a.m. – 5:00 p.m.

Exhibit Hours	• Wednesday, May 15
	  9:00 a.m. - 5:00 p.m.
	• Thursday, May 16
	  9:00 a.m. - 5:00 p.m.

Hands-on-Lab	• Tuesday, May 14
	  1:00 p.m. – 5:00 p.m.
	• Wednesday, May 15
	  1:30 p.m. – 3:30 p.m.
	• Thursday, May 16
	  10:30 a.m. – 3:30 p.m.

Technical Sessions	• Wednesday, May 15
	  10:30 a.m. - 12:30 p.m.
	  1:30 p.m. – 3:30 p.m.
	• Thursday, May 16
	  1:00 p.m. – 3:00 p.m.

Opening Ceremony & Keynote	• Wednesday, May 15 8:00 a.m. - 10:00 a.m.
Panel: Digital Engineering through the Lens of T&E	• Wednesday, May 15 3:45 p.m. – 5:15 p.m.
Panel: Plant 42 - Nothing Happens Here	• Thursday, May 16 10:30 a.m. – 12:00 p.m.
Reception in Exhibit Hall	• Wednesday, May 15 5:15 p.m. – 6:45 p.m.

Featured Speakers	• Thursday, May 16
	  8:10 a.m. – 10:00 a.m.
	  3:30 p.m. - 5:00 p.m.

Bios

UPCOMING EVENTS

Submit an Abstract | Volunteer
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Multi-Domain Operations Workshop

The MDO Continuum: Testing, Experimentation, and Training

July 16 – 18 | Alexandria, VA

Cybersecurity Workshop

Exploring Cyber Test Ranges: Past, Present, and Future Perspectives

September 17 – 19 | Orlando, FL

Annual International Test & Evaluation Symposium

T&E Challenges of Evolving Digital Ecosystems

November 4 – 7 | Huntsville, AL

HANDS-ON-LAB

An End-to-End Flight Test Telemetry Educational Experience

Take a journey through the entire flight test telemetry data process. HOL represents seven different phases of flight test. Each of the seven phases is supported by a government Subject Matter Expert (SME) and partnering industry vendors. The SME provides an educational overview and the partnering industry vendors share a Hands-on experience with technical insight related to the specific phase they are representing.

📍 **Florentine E/F**

Tuesday	1:00 p.m. - 5:00 p.m.
Wednesday	1:30 p.m. - 3:30 p.m.
Thursday	10:30 a.m. - 3:30 p.m.

Test Article

PHASE 1
› Sensor Data Generation

PHASE 2
› Data Acquisition
› Data Multiplexing
› Onboard Data Recording

PHASE 3
› Airborne Transmission

Receiver Station

PHASE 4
› Data Receiving

PHASE 5
› Data Transport

Mission Control

PHASE 6
› Data Decom
› Real-Time Processing & Display
› Data Recording

Post-Test

PHASE 7
› Post-Flight Processing & Analysis

AGENDA
Wednesday, May 15

8:00 a.m. - 8:10 a.m. ⦿ Florentine A/B	**Opening Ceremony** National Anthem performed by **Kerry O'Malley** (video)
8:10 a.m. - 8:20 a.m.	**Welcome** **Mark Phillips,** ITEA Chairman
8:20 a.m. - 8:30 a.m.	**Dr. Jean Paul "JP" Santos** TIW Program Chair, NAWC-WD Point Mugu, Airborne Instrumentation Systems Department
8:30 a.m. - 9:15 a.m.	**Keynote Speaker** **Dan Osburn**, Chairman, EXCOM Range Commanders Council and Executive Director, 412th TW (Edwards AFB)
9:15 a.m. - 10:00 a.m.	**Keynote Speaker** **George Rumford (SES)**, Director, Test Resource Management Center
10:00 a.m. - 10:05 a.m.	**Scott Kujiraoka**, TIW Technical Program Chair, GBL Systems (NAWC-WD, Point Mugu)
10:00 a.m. - 10:30 a.m.	**BREAK WITH EXHIBITORS** ⦿ Florentine C/D
10:30 a.m. - 12:30 p.m.	**Technical Tracks**

TRACK 1: Telemetry and Relay
⦿ Florentine A

Lead: **Mike VanMeter**, NAVAIR Ranges SRF Lead, NAVAIR Ranges (PAX River)

Start Time:	10:30 a.m.
Presenter(s):	Patrick Freemyers, NSWC Dahlgren BOA DCS Lead and Chris Patscheck, Raven Defense
Presentation:	*BOA DCS - Supporting Beyond Line-of- Sight Data Collection*
Start Time:	11:00 a.m.
Presenter(s):	Jason Countryman, US Navy
Presentation:	*BLOS Capabilities for Flight Test*
Start Time:	11:30 a.m.
Presenter(s):	Kamal Bhakta, US Navy
Presentation:	*STAR Self-Interference Cancellation for TM*
Start Time:	12:00 p.m.
Presenter(s):	Robert Ziegler, Peraton Labs
Presentation:	*5G Cellular Telemetry Developments*

TRACK 2: Interoperability of Ranges
⦿ Florentine G

Lead: **Doug Nelson**, Sr. Combat Systems Engineer, Teknicare

Start Time:	10:30 a.m.
Presenter(s):	Kevin Percey, Redstone Test Center
Presentation:	*MOSAIC Amphibious Test Range Overview*
Start Time:	11:00 a.m.
Presenter(s):	Sunil Samtani, Altio Labs
Presentation:	*Federated Resources & Analytics Mission Environment (FRAME) for the "Range of the Future"*
Start Time:	11:30 a.m.
Presenter(s):	Benjamin Tomlinson, NASA
Presentation:	*Technology Maturation Projects – Flight Research Return on Investment (ROI)*
Start Time:	12:00 p.m.
Presenter(s):	Bruce Lipe, NASA
Presentation:	*X-59 Telemetry Data Processing at NASA AFRC*

TRACK 3: Tracking Radar & TSPI Systems
⦿ Tuscany

Lead: **Alvia Sandberg**, Telemetry Engineer, Redstone Test Center

Start Time:	10:30 a.m.
Presenter(s):	Steve Meyer, NAWC-WD China Lake, Gary Glazner, Alvia Sanberg, Scott Kujiraoka, GBL Systems
Presentation:	*Hybrid Tracking System for GPS Denied Environments (HYTS) Overview*
Start Time:	11:00 a.m.
Presenter(s):	Benjamin Kupferschmidt, Curtiss-Wright
Presentation:	*High Accuracy TSPI Field Test Results*
Start Time:	11:30 a.m.
Presenter(s):	Achilles Kogiantis, Altio Labs
Presentation:	*5G based Positioning and Sensing for T&E Environments*
Start Time:	12:00 p.m.
Presenter(s):	Frederick Howard, PEO Spectrum
Presentation:	*Spectrum Sensors Use in a Shared Environment*

TRACK 4: Flight Termination
📍 Firenze

Lead: **Russ Fielder**, Sr. System Engineer, SATECH (NAWCWD-China Lake)

Start Time:	10:30 a.m.
Presenter(s):	Sid Jones, Naval Air Warfare Center Aircraft Instrumentation Division
Presentation:	*Water-proofed Microphone Flight Test Results*

Start Time:	11:00 a.m.
Presenter(s):	Jonathan Wright, Redstone Test Center/Army Test and Evaluation Command
Presentation:	*Application of Li-Ion Batteries, LDPC, and Distributed Design Capabilities in Flight Termination*

Start Time:	11:30 a.m.
Presenter(s):	Hon Chan, NASA Armstrong Flight Research Center
Presentation:	*Flight Test Demonstration and Sensors Validation of Fiber Optics Sensing System (FOSS) on USAF T-38C*

Start Time:	12:00 p.m.
Presenter(s):	Brian Hetsko, CAES Mission Systems
Presentation:	*Evolution of Autonomous Flight Termination into Tactical Platforms*

TRACK 5: Spectrum Usage I
📍 Siena

Lead: **Bruce Johnson**, Chief Engineer, NAWCAD-Pax River

Start Time:	10:30 a.m.
Presenter(s):	William Keane, Duane Morris LLP
Presentation:	*Spectrum Policy Report*

Start Time:	11:00 a.m.
Presenter(s):	Charles (Ed) Coyle, Defense Information Systems Agency, PEO Spectrum
Presentation:	*AWS-3 2025-2110 MHz Sharing Lessons Learned*

Start Time:	11:30 a.m.
Presenter(s):	Mark Wigent, Laulima Systems
Presentation:	*Spectrum Utilization Metrics System (SUMS)*

Start Time:	12:00 p.m.
Presenter(s):	Bruce Johnson, Chief Engineer, NAWCAD-Pax River
Presentation:	*ATR's Use of Commercial Services for Airborne Telemetry Re-Radiation*

12:30 p.m. - 1:30 p.m.	LUNCH	📍	Florentine C/D
1:30 p.m. - 3:30 p.m.	Hands-on-Lab	📍	Florentine E/F
1:30 p.m. - 3:30 p.m.	Technical Tracks		

TRACK 6: Spectrum Usage II
📍 Florentine G

Lead: **Tim Chalfant**, Engineering Consultant, GMRE, Inc.

Start Time:	1:30 p.m.
Presenter(s):	Phiroz Madon, Peraton Labs
Presentation:	*Spectrum Usage Measurement and Deconfliction*

Start Time:	2:00 p.m.
Presenter(s):	Andrew Portune, Peraton Labs
Presentation:	*Orchestrator and Distributed Integrator (ORDER) – Leveraging Open Architectures for AI/ML Adaptive Orchestration in Dynamic Spectrum Environments*

Start Time:	2:30 p.m.
Presenter(s):	Anthony Triolo, Altio Labs
Presentation:	*Spectrum Data Analytics*

Start Time:	3:00 p.m.
Presenter(s):	Ricardo Barreto, US Navy
Presentation:	*Weaver Architecture*

TRACK 7: Constrained RF Environment
📍 Tuscany

Lead: **Max Apalboym**, Chief Engineer, NAWCWD-Point Mugu

Start Time:	1:30 p.m.
Presenter(s):	Sean Chen, UCLA
Presentation:	*Parametric Devices in Front-end Communications Systems*

Start Time:	2:00 p.m.
Presenter(s):	Steven Warner, NAWCWD
Presentation:	*Using Filters to Help Mitigate Near Term Radio Frequency Interference (RFI)*

Start Time:	2:30 p.m.
Presenter(s):	Evan Mouchard, Airborne Instrumentation Division, Point Mugu NAWCWD
Presentation:	*Mitigating RF Blackout with Mu-Negative Metamaterial*

Start Time:	3:00 p.m.
Presenter(s):	Mike VanMeter, NAVAIR Ranges SRF Lead
Presentation:	*Citizens Broadband Radio Service (CBRS) Spectrum Usage*

TRACK 8: Development of Future BLOS Skillset
📍 Firenze

Lead: **Athen Pham**, RF Engineer, NAWC WD-Point Mugu

Start Time:	1:30 p.m.
Presenter(s):	Bruce Johnson, Aircraft Instrumentation Division Prototyping, Instrumentation and Experimentation Dept. NAWCAD
Presentation:	*Telemetry Receive/Record & Re-Radiation Pod*

Start Time:	2:00 p.m.
Presenter(s):	Dr. Jean Paul "JP" Santos, NAWC-WD – Airborne Instrumentation Systems Dept.
Presentation:	*Designing for Beyond Line of Sight in RF Systems*

Start Time:	2:30 p.m.
Presenter(s):	Scott Kujiraoka, GBL Systems
Presentation:	*Lessons Learned in the Development of BLOS TM Systems*

Start Time:	3:00 p.m.
Presenter(s):	Prof. Yuanxun Ethan Wang, UCLA
Presentation:	*Noise Figure Testing of Active Directly Matched HF/VHF Antenna Receiver*

TRACK 9: Cybersecurity
📍 Sienna

Lead: **Jason Schalow**, 412th Communications Squadron; Edwards, AFB Mugu

Start Time:	1:30 p.m.
Presenter(s):	Jeff Kalibjian, Peraton Labs
Presentation:	*Spanning the Gap: Overcoming Cybersecurity Challenges with Managing Testing Data in the Cloud*

Start Time:	2:00 p.m.
Presenter(s):	Jason Schalow
Presentation:	*Defensive AI: Leveraging Artificial Intelligence to Combat Cybersecurity Threats*

Start Time:	2:30 p.m.
Presenter(s):	Payton Rudnick, 412th Communications Squadron, Edwards AFB
Presentation:	*Time Series Anomaly Detection for Network Security*

Start Time:	3:00 p.m.
Presenter(s):	Speaker
Presentation:	*To Be Announced*

| 3:30 p.m. - 3:45 p.m. | **STRETCH WITH EXHIBITORS** |
| | 📍 Florentine C/D |

| 3:45 p.m. - 5:15 p.m. | **PANEL 1: Digital Engineering through the Lens of T&E** |
| 📍 Florentine A/B | Moderator: **Will Harrell**, Digital Engineer Lead, TRMC |

Panel Members:
Brian Kelly, Chief Data and Analytics Officer Army Test & Evaluation Command, ATEC

Kevin Percey, Program Manager, MOSAIC, Redstone Test Center,

Amber Willet, Branch Head, Naval Test Wing Atlantic, Test & Evaluation Data Division

Kyle Snow, Digital Engineering Lead, 96th Test Wing, Eglin AFB

Jeff Tolleson, Vice President, Peopletec

| 5:15 p.m. - 6:45 p.m. | **RECEPTION HOSTED BY** |
| 📍 Florentine C/D | |

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AGENDA
Thursday, May 16

8:00 a.m. - 8:10 a.m. 📍 Florentine A/B	**Reconvene** **Dr. Jean Paul "JP" Santos,** TIW Program Chair, NAWC-WD
8:10 a.m. - 8:45 a.m.	**Featured Speaker** **Thomas C. Dowd (SES),** Director, Ranges/Targets Operations
8:45 a.m. - 9:25 a.m.	**Featured Speaker** **COL Joel Babbitt,** USA (Ret), Vice President Army Programs, Viasat *"Back Yard Testing, Front Yard Testing, a PM's Perspective on Test"*
9:25 a.m. - 10:00 a.m.	**Featured Speaker** **Vincent M. Liddiard (SES)**, Executive Director, White Sands Missile Range
10:00 a.m. - 10:30 a.m.	**BREAK WITH EXHIBITORS** 📍 Florentine C/D
10:30 a.m. - 3:30 p.m.	**Hands-on-Lab** 📍 Florentine E/F
10:30 a.m. - 12:00 p.m. 📍 Florentine A/B	**PANEL 2: "Plant 42, Nothing Happens Here"** Moderator: **Dr. David G. Smith**, Director, Air Force Production and Flight Test Facility, Plant 42 Mission briefing, the AF Industrial Mission; Background Support Delivering B-21 to Test; Essential Communication Capabilities Supporting HALE Programs; and Taking care of people, taking care of mission.
12:00 p.m. - 1:00 p.m.	**LUNCH** 📍 Florentine C/D
1:00 p.m. - 3:00 p.m.	**Technical Tracks**

Abstracts

TRACK 10: Long Range Fires
📍 Florentine G

Lead: **Ben Johnson**, Chief Engineer, NAWCWD-China Lake

Start Time:	1:00 p.m.
Presenter(s):	Richard Burr, Director, Point Mugu Sea Range
Presentation:	*Pacific Hypersonic Testing*
Start Time:	1:30 p.m.
Presenter(s):	Daniel Crump, Curtiss-Wright
Presentation:	*Empirical Measurement of Flight Test Video Encoding Quality*
Start Time:	2:00 p.m.
Presenter(s):	John Rudy and Mark Hagiwara, NASA
Presentation:	*Developing Wireless Sensing Technology aboard NASA Experimental Aircrafts*
Start Time:	2:30 p.m.
Presenter(s):	Benjamin Baird, 896th Test Support Squadron, Eglin AFB
Presentation:	*Wireless Airborne Instrumentation*

TRACK 11: AI / ML Data Analytics
📍 Tuscany

Lead: **Thomas Grace**, Electrical Engineer, NAWCAD PAX River

Start Time:	1:00 p.m.
Presenter(s):	John Blackadar, Department of Homeland Security, CWMD SSD
Presentation:	*Evaluating Radiation Portal Monitor System Performance Using Modeling and Simulation*
Start Time:	1:30 p.m.
Presenter(s):	Scott Wolfson, U.S. Army Redstone Test Center
Presentation:	*How to Instantiate a Neural Network on an FPGA – Methodology and Results*
Start Time:	2:00 p.m.
Presenter(s):	Blaine Perry, US Army Redstone Test Center
Presentation:	*Harnessing the Power of T&E: Pioneering High-Quality Data for AI/ML within the DoD*
Start Time:	2:30 p.m.
Presenter(s):	Speaker
Presentation:	*To be Announced*

TRACK 12: Live Virtual Constructive
📍 Firenze

Lead: **Shannon Wigent**, President, Laulima Systems

Start Time:	1:00 p.m.
Presenter(s):	Ben Kupferschmidt, Curtiss-Wright
Presentation:	*The MDL Metadata Language*

Start Time:	1:30 p.m.
Presenter(s):	Matthew Goldsbury and Paul D'Urbano, CTI
Presentation:	*Electronic Warfare M&S in support of T&E, and a case for AI/ML for Predicting and Evaluating Non-Kinetic Effects*

Start Time:	2:00 p.m.
Presenter(s):	Richard Burr, Director, Point Mugu Sea Range
Presentation:	*Point Mugu Sea Range LVC Efforts*

Start Time:	2:30 p.m.
Presenter(s):	Speaker
Presentation:	*To be Announced*

TRACK 13: Phased Array Antenna Special Session (CUI)*
📍 Siena

Lead: **Tom Young**, Engineering Consultant, TRMC

Start Time:	1:00 p.m.
Presenter(s):	Tyler P. Neale, TRMC High Speed Systems Test, AEDC/TDH
Presentation:	*SkyRange Overview*

Start Time:	1:30 p.m.
Presenter(s):	Anand Kelkar, CDSI
Presentation:	*PATAS / To Be Announced*

Start Time:	2:00 p.m.
Presenter(s):	Satya Ponnaluri, Blue Halo
Presentation:	*Advances in a Phased-array Antenna's for Telemetry*

Start Time:	2:30 p.m.
Presenter(s):	Chris Patscheck, Raven Defense
Presentation:	*Raven Advanced Phased-array Telemetry Resource (RAPTR)*

3:00 p.m. - 3:30 p.m.	BREAK WITH EXHIBITORS
	📍 Florentine C/D

3:30 p.m. - 5:00 p.m.	Featured Speaker
	Ryan Norman, Chief Data Officer and Executive Manager, Joint Mission Environments, TRMC
	Modernization and Extension of Test Ranges and a Summary of the Technical Sessions

5:00 p.m.	PROGRAM CONCLUDES

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2024 EXHIBITORS

Apogee Labs — Corporate Member

North Wales, PA | www.apogeelabs.com

Founded in 1993, Apogee Labs, Inc. is a leading supplier of data acquisition, data transport/distribution, testing, and specialty engineering solutions to the telemetry and communications communities. Our products include airborne and ground-based multiplexers, TMoIP I/O nodes, BERTs, digital switches, ruggedized tactical encoders, interface conversion equipment, and custom solutions.

Astro Haven — Corporate Member

Lake Havasu City, AZ | www.astrohaven.com

AHE is the company in this space that is pushing the envelop and continuously improving. We can only do this by listening to the customer and be willing to step up to their needs. New products usually make a quantum jump in process and functionality but frequently incorporate the specific size or design requirements of the launch customer. Our most recent products expand the use of Vacuum Infusion Process in our product line but are designed for even better environmental protection and simplified installation.

Avionics - Teradyne — Corporate Member

Omaha, NE | www.aviftech.com

Avionics Interface Technologies (AIT) is a leading designer and manufacturer of high-performance flight modules, test and simulation modules, embedded solutions, databus analyzers, and support systems for both the commercial aerospace and defense industries. Our field-proven modules support MIL-STD-1553A/B, MIL-STD-1760E, ARINC 429, ARINC 615A, Combination MIL-STD-1553/ARINC 429, ARINC 664, and Fibre Channel.

Curtiss-Wright — Corporate Member

Ashburn, VA | www.curtisswright.com

Curtiss-Wright's Aerospace Instrumentation team consists of TTC, ACRA, and IADS, who combined are the undisputed leaders in designing and manufacturing COTS FTI products. Our modular product approach enables the rapid delivery of complete system solutions. Total system solutions help eliminate integration issues and reduce total program cost and schedule.

Dell Technologies / Epoch Concepts — Corporate Member

Round Rock, TX | www.dell.com/en-us

Transform on your terms with Dell Technologies. Whether you're optimizing an existing infrastructure or exploring emerging technologies — 5G, AI/ML, data management — in the cloud or at the edge, we have the technology expertise. Create a secure IT foundation that allows you to adapt to change, deliver consistent experiences and confidently lead you well into the future.

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Delta Information Systems — Corporate Member

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DEWESoft — Corporate Member

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Geeks and Nerds (GaN) — Corporate Member

Huntsville, AL | www.geeksandnerds.com

Geeks and Nerds (GaN) is an innovative solution developer. Our motto, Innovate with Purpose™, succinctly defines our commitment to provide solutions and services that positively impact our community and national security. Our innovation encompasses the entire spectrum of engineering and science including research, development, testing, evaluation, and training.

Georgia Tech Research Institute (GTRI)   Corporate Member

Atlanta, GA | www.gtri.gatech.edu

Georgia Tech Research Institute (GTRI) is the applied research organization of the Georgia Institute of Technology. At GTRI, we develop advanced technology solutions and large-scale system prototypes to address the most difficult problems in national security, economic development, and the overall human condition.

JT4   Corporate Member

Las Vegas, NV | www.jt4llc.com

JT4 provides engineering and technical support to multiple western test ranges for the U.S. Air Force, Space Force and Navy under the Joint Range Technical Services Contract (J-Tech II). Along with several teammates, we prepare our nation's warfighting aircraft, weapons systems, and aircrews for today's missions and tomorrow's global challenges.

Lumistar   Corporate Member

Carlsbad, CA | www.lumi-star.com

Lumistar has maintained a laser focus on providing Ground Station Solutions for the Aeronautical Flight Test community since 2000. Our product offerings include individual components, customized sub-systems, and complete end-to-end telemetry ground systems.

NASA Neil A. Armstrong Flight Research Center

Edwards AFB, CA | www.nasa.gov/armstrong

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Nomad GCS   Corporate Member

Columbia Falls, MT | www.nomadgcs.com

Nomad GCS designs and manufactures Connected Mobile Operations Centers (CMOCs) for the world's most critical missions. Nomad is a first-choice partner for customers who need uncompromising safety, security, reliability, and fast, actionable data on the test range. End users include White Sands Missile Range, Edwards AFB, Nellis AFB, and more.

Orca Techologies

San Clemente, CA | www.orcatechnologies.com

ORCA Technologies manufactures custom high-precision GNSS time and frequency products and is managed by a team with over 30 years of product design, management, and application experience. Stop by our booth to see our newest offerings including our TimeTraveler Battery Operated Clock and Trestles GNSS based products.

Parraid, LLC   Corporate Member

Hollywood, MD | www.parraid.com

Parraid is a highly regarded, U.S. based technology and engineering company specializing in product solutions for aerospace & ground tactical applications. Our products include telemetry data systems (TDS), deployable tactical systems, and net-centric everything over IP products. Our mission-critical solutions enable our customers to transform, evolve, and modernize.

Photo-Sonics   Corporate Member

Chatsworth, CA | www.photosonics.com

Photo-Sonics, Inc. has been in business for 99 years and has been a trusted supplier to the U.S. Government of precision optical systems since 1939. Today, we design and manufacture advanced optical tracking systems and custom gimbals. We produce Time-Space-Position-Information (TSPI) systems for use by Test Ranges around the world.

Raven Defense Corporation   Corporate Member

Albuquerque, NM | www.ravendefense.com

Raven Defense Defense provides high quality engineering services, expert program consultation, and highly specialized technical equipment to meet our customer's demanding requirements in satellite communications and ground stations, deployable sensors, and cutting-edge research, development, test and evaluation systems. Our team has decades of experience working across the US DoD and other government agencies to provide mission critical technology solutions and support.

Safran Data Systems, Inc.   Corporate Member

Norcross, VA | www.safrandatasystemsus.com

Safran Data Systems, Inc. is a Cleared Defense Contractor based in Georgia. We offer high-technology equipment and solutions for Airborne & Ground Flight Test Telemetry, Airborne Mission Data Management equipment and a wide range of products and services for Space Communications and Space Situational Awareness.

SEMCO   Corporate Member

Vista, CA | www.semco.com

SEMCO designs, manufactures, and deploys sophisticated RF telemetry equipment used by the DoD in support of weapon systems flight testing and launch provider access to space. Its product portfolio ranges from airborne TM transmitter to ground TM receivers, simulators, multi-couplers as well as tracking antenna and turnkey TM stations. Along with other members of The Consortium, SEMCO is bringing innovative solutions to revolutionize test ranges with the delivery of digitally-savvy telemetry products and the Telemetry Collection as a service.

Spectra Aerospace & Defense / CALCULEX

Alpharetta, GA **I** www.spectra-aerodef.com

Spectra Aerospace & Defense is a trusted group of leading designers & manufacturers of rugged, highly-engineered avionics, electronics products, and systems that support military operations in all modern battlespace domains.

CALCULEX's highly skilled team of engineers applies the latest technologies within a well-established framework of industry and open standards, leading to products that consistently meet and exceed customer expectations. CALCULEX has developed and implemented a Quality Assurance System that is certified to AS9100D and ISO9001 standards. CALCULEX has been part of Spectra Aerospace & Defense since February 2021.

Telspan Data   Corporate Member

Centennial, CO **I** www.telspandata.com

Telspan Data is a leader in telemetry technologies. Our Multi-Disciplined product architecture leverages open standards and the latest SoC, data transmission and processing technologies. These products give Instrumentation & Test Engineers unparalleled flexibility and capability. Products include recorders, switches, gateways & TAPs along with telemetry ground systems & "data fusion" software.

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EXHIBIT HALL & EXHIBITORS

Exhibit Hall Hours

Wednesday, May 15	**9:00 a.m. - 5:00 p.m.**
• Break in the Exhibit Hall	10:00 a.m.
• Reception in the Exhibit Hall	5:00 p.m.

Thursday, May 16	**9:00 p.m. - 5:00 p.m.**
• Break in the Exhibit Hall	10:00 a.m.
• Break in the Exhibit Hall	3:30 p.m.

Exhibitors

Apogee Labs
Astro Haven
Avionics-Teradyne
Curtiss-Wright
Delta Information Systems
DEWESoft
Dell Technologies / Epoch Concepts
Geeks and Nerds (GaN)
Georgia Tech Research Institute (GTRI)
JT4
Lumistar
NASA Neil A. Armstrong Flight Research Center
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