



Aerospace and Defense

SOLUTIONS BROCHURE

Validate Mission Superiority: Technologies Advancing Aerospace Defense

Modern aerospace defense systems must evolve at an increasingly rapid pace to achieve mission success. As missions shift toward integrated, multi-domain operations, engineers face mounting pressure to ensure that systems can share data seamlessly, adapt to unpredictable threats, and remain resilient in contested electromagnetic (EM) environments. Across the electronic warfare (EW), radar, space and satellite, spectrum management, and secure communications domains, the convergence of commercial and defense technologies heightens that pressure. Examples range from artificial intelligence (AI) to the integration of fifth and sixth generation (5G and 6G) cellular technologies, cloud-based simulation, and modular open architectures. System and test engineers must evolve systems to prevail over challenges ranging from complexity to adversity.

Success depends on design, validation, and emulation from design through deployment. Engineers must characterize and validate systems before prototypes exist, which requires high-fidelity modeling, precise signal generation, and advanced analysis capabilities. To evaluate survivability, engineers need lab environments that can emulate seemingly countless dynamic scenarios with high repeatability. With increased reliance on software, the ability to model, simulate, and verify system performance under realistic conditions is now a critical engineering requirement.

With robust design, test, and simulation **solutions**, engineers increase confidence in system reliability, interoperability, and resilience across **electromagnetic spectrum operations** (EMSO), **radar**, **spectrum management**, **space and satellite**, and **secure communications** operations.



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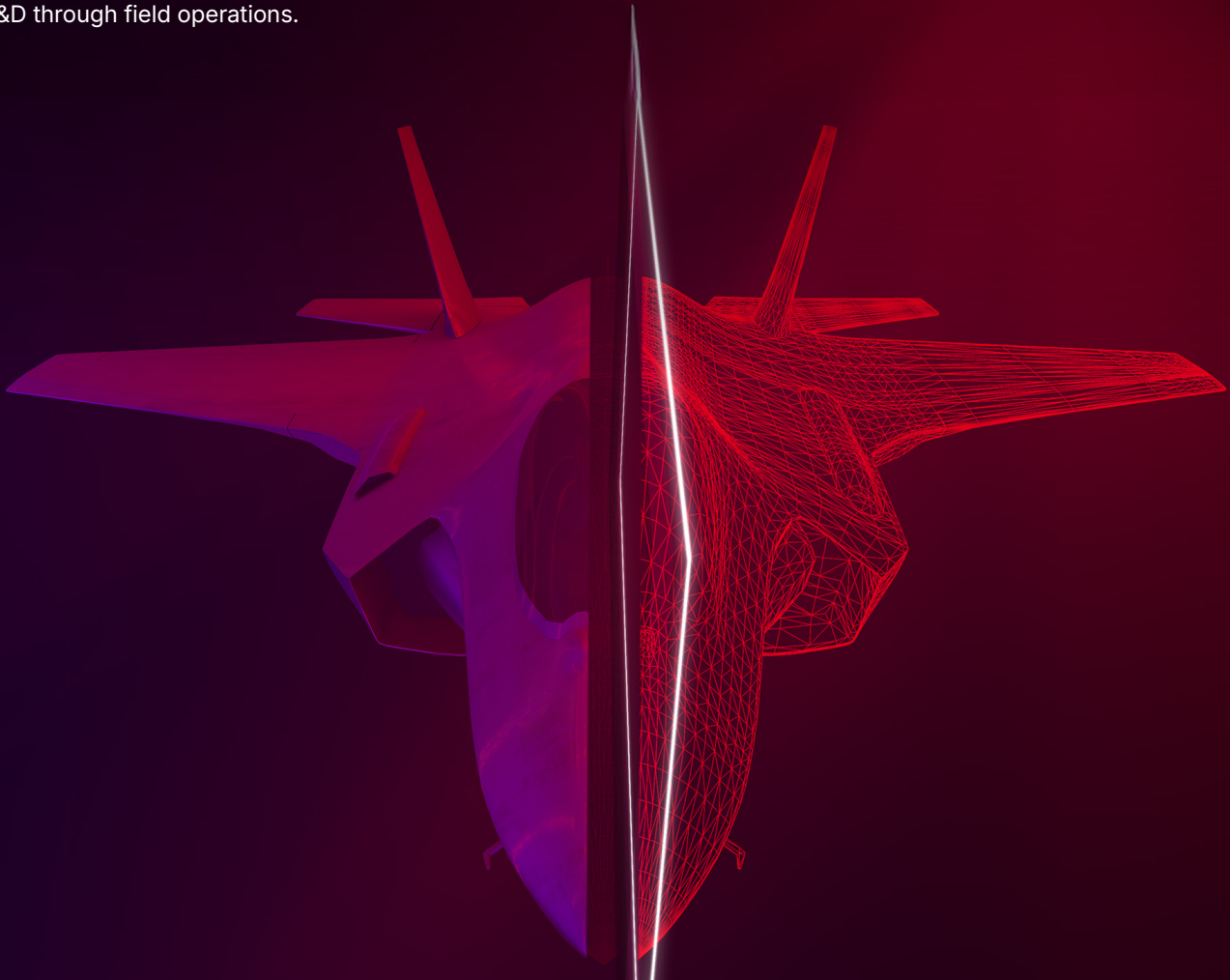
EM SPECTRUM OPERATIONS

Enable Mission Superiority in the Invisible Battlespace

Controlling the electromagnetic spectrum is now mission critical. Modern missions demand the ability to sense, protect, and defeat across congested, contested RF environments, where systems must detect, identify, and locate RF emitters with speed and precision.

The Keysight Electronic Warfare Advanced Simulation Platform (EWASP) delivers flexible, scalable threat simulation and analysis that drives realistic, mission-relevant testing. By aligning solutions like EWASP with Keysight's broader EMSO capabilities, programs gain higher realism, tighter interoperability, and greater confidence to detect, classify, defend, and defeat in the electromagnetic battlespace.

Keysight's **EMSO** solutions help programs prevail across the spectrum. We bring together electronic warfare, radar, signal intelligence, and spectrum management test disciplines so engineers can validate performance from benchtop R&D through field operations.



Scale Threat Simulation for Modern EW Test

The **Electronic Warfare Advanced Simulation Platform (EWASP)** delivers a scalable, software-driven environment for creating mission-representative threat scenarios. By combining Keysight's signal generation hardware, SimulationView software, and modular plug-ins, EWASP enables defense organizations to design, emulate, and validate complex RF environments with unmatched realism.

From benchtop development to high-density, open-air range systems, EWASP provides a flexible architecture that adapts to your mission needs; reducing risk, increasing confidence, and accelerating system readiness.

Key features for EW Simulation:

- **Seamless integration:** Leverage Keysight's commercial off the shelf (COTS) signal generators, analysis tools, and software in one cohesive platform
- **Instantaneous bandwidth:** Gain up to 2.5 GHz of instantaneous bandwidth per channel for wideband jamming, noise generation, and dense emitter modeling
- **Threat model requirements:** Gain real-time scenario control with SimulationView and plug-ins for phased arrays, mission data file verification (MDFV), and Event Beam plugin for creation of modern threat model requirements
- **Configurable architecture:** Span the entire workflow including R&D labs, anechoic chamber, reprogramming, open-air range use cases, and beyond
- **Mission data support:** Create, play back, and validate mission data files across multiple platforms

Measurement capabilities:

- simulate advanced signal threats including radar, chirp, Doppler, and swept CW waveforms
- use VXG-C and UXG signal generation hardware in hybrid configurations for extended frequency range and increased emitter density
- perform scenario-based testing for radar warning receivers, jammers, and EW support systems
- generate synchronized, multi-channel environments for precise angle-of-arrival (AoA) and time-difference-of-arrival (TDOA) simulation
- integrate real-time feedback and control for closed-loop EW system evaluation

EWASP combines Keysight's proven signal generation hardware and advanced simulation software into a cohesive platform that delivers reliable, repeatable results for electronic warfare testing. Its scalable architecture, real-time control, and high-fidelity signal emulation help defense organizations accelerate development cycles, strengthen validation processes, and ensure mission-ready performance across laboratory, chamber, and open-air environments.



Scale Threat Simulation for Modern EW Test

Test and Evaluate EW Systems with Modular, High-Fidelity Platforms

Keysight's EW Threat Simulation Systems provide a complete, scalable solution for emulating modern electromagnetic threat environments. Designed to integrate seamlessly with EWASP components, these modular **platforms** enable synchronized, high-density signal generation across multiple channels, ideal for validating radar warning receivers, electronic support measures, and more.

Built on a flexible, modular architecture, each system can be configured to meet a range of mission-specific test needs, from simple emitter emulation to complex multi-port, multi-threat scenarios.

Key features for Scaling EW Simulation:

- modular, scalable design adaptable to evolving mission needs
- multi-port angle-of-arrival (AoA) simulation with synchronized phase and timing
- dense, multi-emitter environments with overlapping pulse-on-pulse generation
- hardware-in-the-loop (HIL) integration for real-time signal injection into the system under test
- seamless interoperability with EWASP software and VXG-C and UXG signal generators
- proven reliability across laboratory, chamber, and range environments

Measurement capabilities:

- high-density, synchronized channel generation for precision threat replication
- expandable configurations supporting advanced emitter modeling
- dynamic waveform control and repeatable test automation

- integration with advanced analysis tools for closed-loop test execution
- realistic emulation of multi-domain signal environments for operational validation

Every custom EW Threat Simulation System is engineered to the unique specifications of the individual mission and testing environment. From channel density and signal complexity to timing synchronization and calibration workflows, these systems are designed, assembled, and validated to meet the precise operational and technical requirements of modern defense programs. The result is a fully integrated, high-fidelity platform that delivers unmatched realism, repeatability, and confidence, helping customers accelerate development, reduce risk, and ensure mission readiness.



Custom EWASP Systems



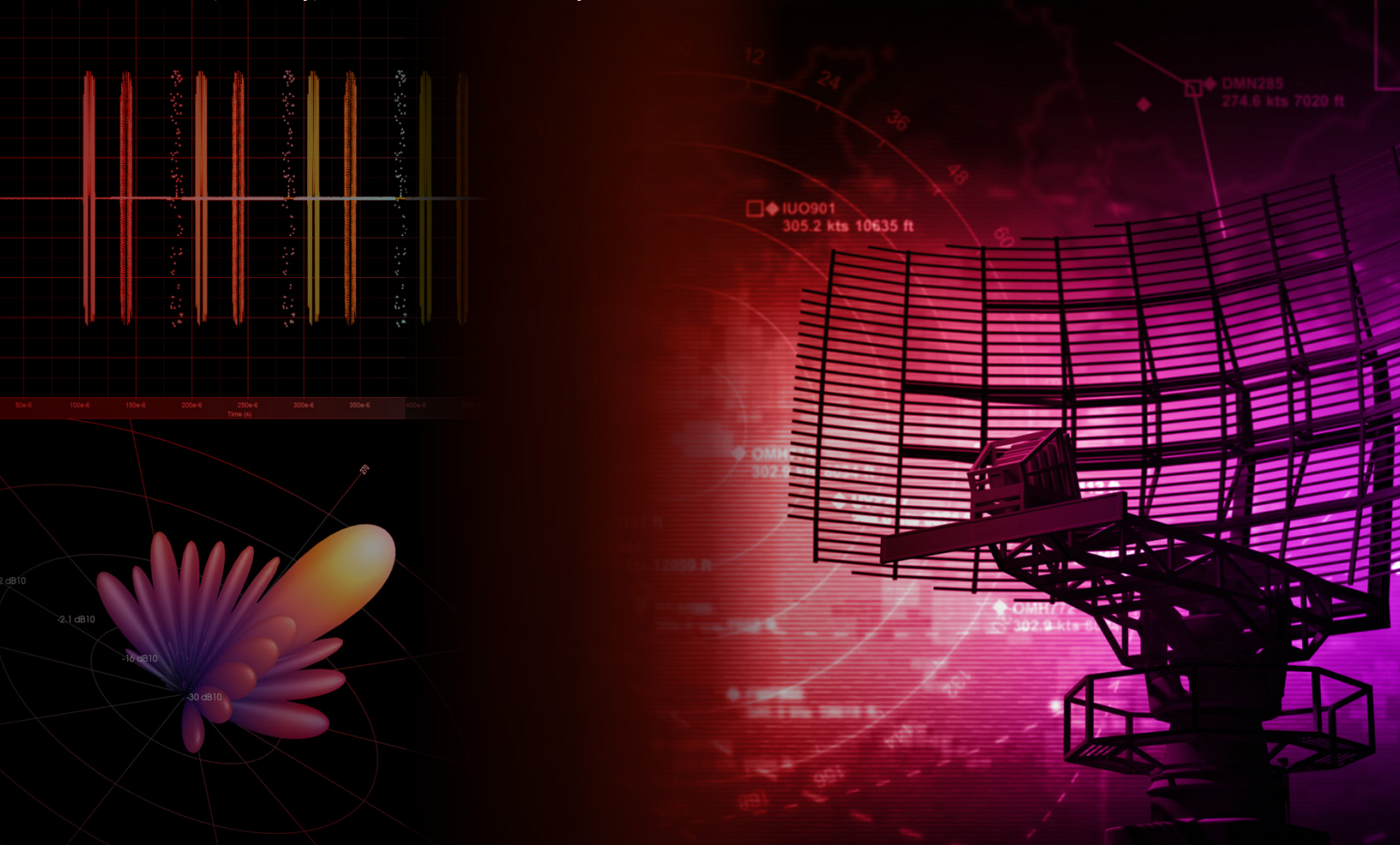
RADAR

Enhance Situational Awareness Through Precision and Power

Modern radar systems serve as the eyes of every mission; providing the awareness, tracking, and targeting capability needed to ensure operational dominance. As threats evolve and environments grow more complex, radar performance must be validated across the full spectrum of conditions, from digital design to live mission testing.

Keysight's **radar** solutions integrate high-performance signal generation, phase-coherent analysis, and real-time simulation to accelerate development and verification. Our platforms enable engineers to model, stimulate, and measure radar behavior with precision, reducing risk and ensuring mission-ready performance.

By combining Keysight's advanced RF hardware, system-level simulation tools, and automation software, engineers can characterize radar subsystems faster and with higher fidelity. Whether validating pulse agility, evaluating phased-array timing, or analyzing return-path coherence, Keysight empowers defense and aerospace teams to achieve superior detection, accuracy, and resilience across every radar mission.



Accelerate High-Fidelity Signal Recording and Playback

The Keysight S7961A/S7962A Wideband Streaming Solution provides a complete, high-speed recording and playback platform for capturing and analyzing wideband RF and in-phase and quadrature (I/Q) signals. Built on Keysight's X-Series analyzers and PXIe storage architecture, this solution provides seamless end-to-end workflows for recording, visualization, and analysis, enabling precise characterization of radar, communications, and EW signals across gigahertz-level bandwidths.

Designed for mission-critical applications, the **S7961A/S7962A** ensures reliable, lossless data streaming and comprehensive post-capture insight, supporting both laboratory and field test environments. The SpectrumView Express **software** introduces high-speed, FPGA-accelerated processing that dramatically shortens analysis cycles for ultra-large I/Q datasets.

Key features for Ultra Wideband Recording:

- **Scalable wideband recording:** Capture fully corrected I/Q data with bandwidths up to 2 GHz using N9042B or N9032B X-Series analyzers
- **ODI-based streaming architecture:** Leverage high-speed Open Data Interface (ODI) links for continuous, gapless 14-bit I/Q data transfer
- **PXIe RAID storage integration:** Combine controller and storage cards (15.2 TB each) for extended multi-hour recordings with stripe-based throughput scaling
- **Record and Playback Manager (RPM):** Configure, control, and monitor real-time recording sessions through an intuitive, workflow-based interface
- **VSA Software integration:** Perform in-depth spectral and pulse analysis directly from recorded I/Q data using Keysight's 89600 VSA platform
- **Immediate file review:** Manage and view captured data with metadata, signal descriptions, and real-time visualization tools
- **Flexible deployment:** Support direct-coupled and open-air recording setups for radar, communications, and EW use cases

Recording capabilities:

- record, stream, and replay up to 2 GHz of fully corrected, gapless I/Q data
- capture long-duration, high-dynamic-range RF signals with phase and amplitude precision
- visualize full-bandwidth spectrum activity in real time during capture
- analyze pulse and radar transmitter characteristics using 89600-BHQ Pulse Analysis
- synchronize multiple recording channels for coherent, multi-domain event capture

Whether validating advanced radar systems, characterizing electronic threats, or supporting real-time signal intelligence operations, the S7961A/S7962A Wideband Streaming Solution provides the fidelity and reliability engineers need to capture every bit of mission-critical data.



S7961A Ultra Wideband Recording Solution



SPECTRUM MANAGEMENT

Turn Signal Complexity into Operational Advantage

Detecting, identifying, and locating interference signals is increasingly challenging. By monitoring and logging spectrum use over extended periods, engineers can build knowledge of band and channel activity on a daily or even minute-to-minute basis. Whether your mission is to intercept, detect, monitor, or trend and analyze, Keysight's spectrum monitoring and signal analysis solutions and deep familiarity with wireless communications give you an edge.

Keysight's **Spectrum Management** capability empowers defense and government organizations to achieve clarity, awareness, and control across the electromagnetic spectrum. Our solutions provide advanced RF analysis, automation, AI, and measurement technologies to support dynamic spectrum operations and real-time situational awareness.

Wideband signal monitoring, interference detection, and real-time spectrum visualization deliver actionable intelligence across fixed, mobile, and distributed environments. At the core of these efforts is Keysight's SpectrumView software, a powerful platform enabling users to detect, classify, and manage signal activity with precision and efficiency.

Backed by a broad portfolio of interoperable solutions and engineering expertise, Keysight's Spectrum Management solutions transform complex RF data into mission-relevant insight, helping engineers make informed decisions, mitigate interference, and optimize spectrum utilization worldwide.



Gain Real-Time Awareness Across the RF Spectrum

As spectrum environments grow more congested and contested, situational awareness across wide bandwidths has become critical for defense, regulatory, and wireless operators alike. Keysight's **Spectrum Monitoring Software (KSMS)** provides a scalable, network-aware platform for continuous spectrum surveillance, signal analysis, and emitter geolocation.

Built to integrate seamlessly with Keysight's real-time spectrum analyzers (RTSAs) and distributed receiver networks, KSMS enables users to detect, classify, and locate transient or unauthorized signals with unmatched speed and precision. From handheld interference hunting to nationwide monitoring networks, KSMS offers unified visibility across the electromagnetic spectrum.

SpectrumView Express introduces high-speed, FPGA-accelerated processing to KSMS, dramatically shortening analysis cycles for ultra-large I/Q.

Key features for Spectrum Monitoring:

- **Increased intercept probability:** Wide instantaneous bandwidth and gap-free capture ensure detection of short-duration or frequency hopping signals
- **Faster analysis and decision-making:** Automated detection, classification, and geolocation reduce manual processing time and accelerate response to interference or threats
- **Enhanced spectrum planning:** Long-term data logging enables trend visualization and under-utilized band analysis, supporting spectrum-management and policy decisions
- **Portable field capability:** Deployable analyzers extend monitoring to remote or last-mile locations, complementing fixed-site sensors for comprehensive coverage
- **Reduced risk of service degradation:** Early interference detection helps maintain quality of service (QoS), operational readiness, and regulatory compliance

Spectrum monitoring capabilities:

- real-time streaming and recording up to 2 GHz bandwidth
- signal detection, modulation recognition, and classification
- emitter geolocation using TDOA and received signal strength (RSS) methods
- networked sensor management and synchronized data fusion
- spectrum occupancy and trend analytics with automated reports
- remote control and API support for integration with third-party tools

KSMS transforms real-time spectrum data into actionable intelligence. By combining broadband capture, automated analytics, and scalable network integration, KSMS empowers organizations to detect, classify, and localize signals faster, ensuring operational awareness, efficient spectrum utilization, and mission success in today's dynamic RF environment.



Advance Signal Detection, Classification, and Analysis

SpectrumView delivers intelligent AI-driven insight from massive I/Q datasets, transforming complex spectrum environments into actionable information. Using advanced algorithms and machine learning (ML) based analytics, **SpectrumView** enables engineers to detect, classify, and manage diverse signal environments faster and more efficiently than ever before.

The SpectrumView programmable application programming interface (API) connects SpectrumView's analysis engine to Keysight and third-party environments, enabling automated workflows and large-scale data management. SpectrumView Express introduces high-speed, FPGA-accelerated processing that dramatically shortens analysis cycles for ultra-large I/Q datasets.

Key features for Signal Insights:

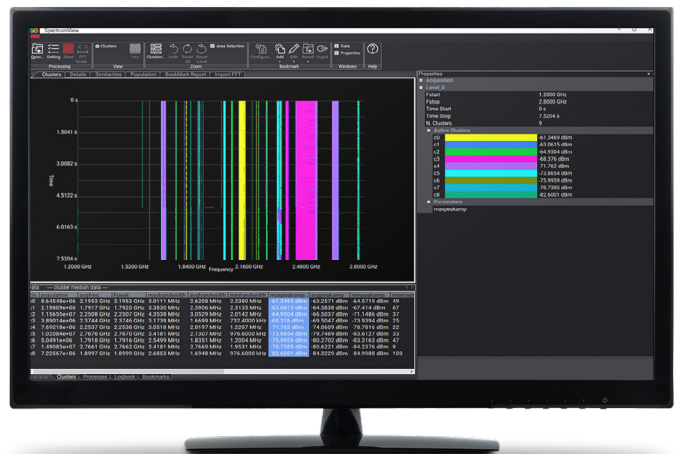
- **Unsupervised signal detection and classification:** Automatically identifies and categorizes signals without prior user input, allowing engineers to uncover unknown or emerging emitters within dense spectrum environments
- **ML-based cluster analysis:** Applies ML clustering to recognize signal families, behavior patterns, and anomalies, accelerating the understanding of dynamic and adaptive signal activity
- **Data compression and I/Q snippet downloading:** Efficiently compresses large I/Q datasets while enabling targeted snippet downloads for focused analysis, minimizing storage requirements and improving workflow efficiency

Signal measurement capabilities:

- I/Q snippet export to KSMS/VSA for signal identification
- streamlined workflow through automation and intelligent data indexing, significantly reducing manual review effort

- intuitive signal tables summarizing thousands of signals across terabytes of I/Q data for quick situational awareness
- automatic compilation of key signal metrics into exportable CSV reports for easy sharing and documentation
- extended analysis capabilities with external AI frameworks and Keysight software ecosystems for automated classification and identification
- removal of >100 TB of raw I/Q data after overview analysis while maintaining permanent access to databases and stored snippets for traceability

SpectrumView transforms data overload into decision advantage. By fusing advanced machine learning, automated workflows, and seamless integration with Keysight's test ecosystem, SpectrumView enables engineers to achieve real-time awareness of the electromagnetic spectrum. The result is faster detection, deeper classification, and smarter operational readiness across complex and evolving signal environments.



N6890A SpectrumView Software



SPACE AND SATELLITE

Accelerate Mission Success Beyond Earth's Boundaries

As the NewSpace era expands, mission success depends on precision, resilience, and performance that extends from the ground to orbit and beyond. From LEO constellations and high-throughput satellite (HTS) payloads to deep-space communication links, the ability to design, simulate, and validate every element of the mission is critical.

Keysight's Space and Satellite **solutions** connect digital engineering, channel emulation, and RF test expertise to help organizations accelerate innovation across the entire mission lifecycle. Our solutions bridge design, verification, and operations; ensuring payloads, antennas, and ground systems perform flawlessly under real-world conditions.

By combining software-driven workflows, hardware-in-the-loop testing, and mission-assurance services, Keysight empowers customers to reduce risk, shorten development cycles, and gain confidence in orbit. Whether validating next-generation payload architectures, optimizing phased-array antennas, or emulating inter-satellite links, Keysight provides the tools to keep missions connected, reliable, and ready for launch.



Calibrate and Characterize Phased Array Antennas

Keysight's F9650A **Compact Antenna Test Range (CATR)** delivers a turnkey, over-the-air (OTA) solution for the control, calibration, and performance verification of phased array antennas. Built on trusted PNA-X network analysis measurement science, it enables engineers to achieve rapid, repeatable, and highly accurate measurements across the entire RF-to-IF signal chain, from early prototyping through production.

By making the array part of the instrument, Keysight's CATR solution dramatically accelerates beamformer calibration and system-level testing while maintaining precision across parameters such as effective isotropic radiated power (EIRP), gain-to-noise temperature ratio (G/T), 1-dB compression point (P1dB), and error vector magnitude (EVM).

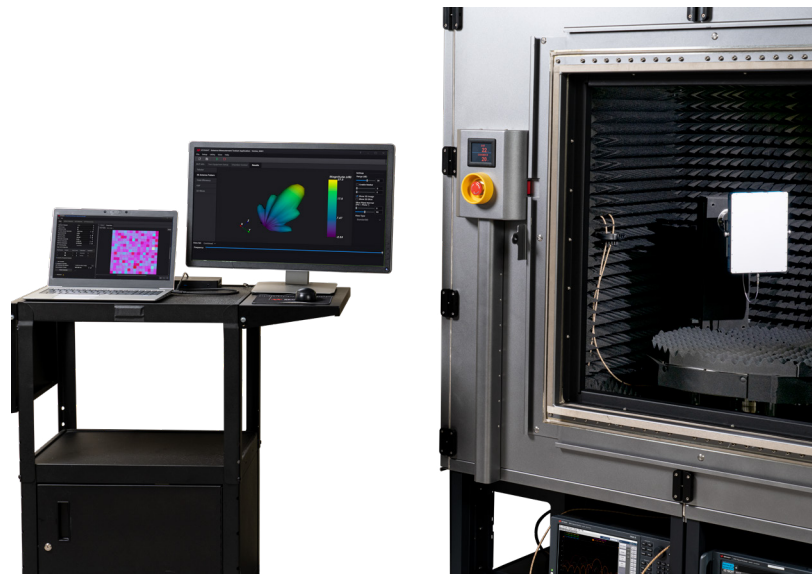
Key features for Phased Array Control and Calibration:

- **Fast calibration:** Calibrate active phased array antennas with 256 or more elements in less than a minute, reducing multi-hour workflow to mere minutes
- **Real-time system-level measurements:** Perform over-the-air characterization including radiation patterns, beamforming accuracy, and modulation distortion (EVM) directly within the quiet zone
- **Compact, scalable test environment:** Support both R&D and manufacturing environments with 60 cm and 80 cm quiet zones
- **Integrated control and analysis software:** Use S7601A Antenna Measurement Toolset and F9629A Chamber Control Software for synchronized chamber, positioner, and measurement automation
- **Free-space S-parameter calibration:** Extend the PNA-X ecosystem for gain compression, noise figure, swept intermodulation distortion (IMD), and G/T measurements in free space

Measurement capabilities:

- amplitude and phase error correction per array element
- EIRP and G/T performance analysis
- beam pattern and leakage suppression visualization
- gain and phase stability over temperature
- automated report generation and 3D pattern plots (phi cuts, heatmaps, and polar displays)

Keysight's F9650A CATR solution transforms phased array testing by combining speed, precision, and scalability in one integrated platform. From design validation to production test, it enables defense and satellite innovators to deliver reliable, high-performance phased array antennas.



F9650A Compact Antenna Test Range (CATR)

Characterize Modern Digital-RF Architectures

Keysight's wideband **Digital Transmit Receive Module (DTRM)** solution provides a fully integrated platform for evaluating advanced transceivers merging digital baseband processing with RF front ends. By unifying high-performance measurement instruments and software, DTRM enables seamless validation across both the digital and RF domains, without the complexity of fragmented setups or massive data handling.

By combining synchronized sampling, vector analysis, and proprietary measurement automation, the DTRM platform gives engineers the insight needed to optimize performance, accelerate development, and ensure compliance with next-generation RF system requirements.

Key features for characterizing Digital to RF Devices:

- **Integrated Test Architecture:** Combine a vector network analyzer (VNA), vector signal generator (VSG), and advanced software suite, including Device Measurement eXpert and Digital Wideband Transceiver Analysis, for cohesive, automated test control
- **Cross-Domain Stimulus-Response:** Use synchronized sampling and spectral correlation to measure frequency and power response, distortion, and linearity across digital and analog paths
- **Customizable DUT Interface:** Support proprietary device control, waveform generation, and automated test sequencing for both transmit and receive chains
- **Scalable Multi-Channel Analysis:** Enable concurrent measurement across multiple channels, ideal for phased-array, massive MIMO, and high-density digital-RF systems
- **Software-Defined Flexibility:** Adapt to unique DUT architectures and protocols through turnkey integration options and user-defined configurations

Measurement capabilities:

- reveal gain flatness, delay deviation, EVM, noise figure, and IMD across wide bandwidths and high frequencies (up to 67 GHz)
- eliminate manual data analysis and complex calibration steps for faster time to market
- scale for multi-channel systems with support for phased-array antennas and massive MIMO with simultaneous multi-channel measurements
- adapt to unique DUT specifications with Turnkey Integration Options

The DTRM platform supports a broad range of applications across defense, aerospace, and telecommunications domains. From secure communications, phased-array radar, and RF sensing to 5G/6G systems, non-terrestrial networks (NTN), and satellite links, DTRM delivers the precision and flexibility needed to validate performance in any environment. Engineers can ensure compliance with stringent SWaP+C requirements, optimize channel-to-channel alignment in advanced phased-array designs, and streamline high-throughput production testing for complex multi-channel RF modules. By bridging the gap between digital and RF validation, DTRM accelerates development cycles and empowers confident deployment of next-generation transceiver systems.



Emulate Power for Space and Photovoltaic Testing

Keysight's **Solar Array Simulator (SAS)** Systems provide a modular, high-fidelity power-emulation environment for spacecraft, satellite, and renewable-energy applications. These systems accurately reproduce the I-V characteristics of solar arrays and photovoltaic (PV) strings under diverse environmental and operational conditions, enabling realistic testing of power converters, satellite power systems, and energy-harvesting electronics.

From benchtop R&D to full-scale HIL test setups, Keysight's SAS platforms deliver fast curve switching, high power density, and precision measurement accuracy to ensure reliable validation before launch or field deployment. The systems also help to reduce footprint and infrastructure cost through compact, modular 2-U design.

Key features for Solar Array testing:

- **Emulation of solar-array/PV I-V curves:** Simulate realistic current-voltage behavior under varying illumination, temperature, and load conditions
- **Fast I-V curve change and recovery:** Rapidly switch between simulated profiles to mimic dynamic on-orbit or terrestrial conditions
- **Modular, high-power architecture:** Support up to six modules in a 2-U chassis with the MP4300A simulator system for excellent power density
- **Two-quadrant operation:** Gain source and sink capability for regenerative testing and closed-loop power-system validation
- **High-voltage scalability:** Achieve up to ~2000 V output for large-string inverter or satellite bus simulation with PV8900 series
- **Multi-channel support:** Configure isolated outputs for testing segmented or redundant array architectures
- **System integration:** Leverage LAN/LXI, USB, and optional GPIB interfaces for seamless ATE and automation integration

Measurement capabilities:

- expanded test flexibility with programmable I-V curves covering multiple environmental and mission scenarios
- accelerated throughput via fast curve reconfiguration and automated switching
- improved accuracy and reliability by closely replicating real-world solar array performance
- scalable power levels up to megawatt-class through parallel operation

Keysight's Solar Array Simulator Systems combine precision power electronics with modular scalability to create mission-representative energy sources for space, defense, and renewable applications. Whether validating spacecraft power conditioning units, satellite bus converters, or next-generation inverter systems, Keysight's SAS platform ensures confidence from design to deployment, reducing risk, increasing efficiency, and accelerating innovation in power-system testing.



MP4300A and PV8900 Series Solar Array Simulators

Emulate Real-World Channels for Aerospace, Satellite, and NTN Systems

Keysight's PROPSIM Satellite and Aerospace **Channel Emulation Solution** delivers high-fidelity, repeatable testing for spaceborne and airborne communication systems. Powered by the PROPSIM F64 and Aerospace Channel Emulation Engine (ACE), this toolset recreates complex radio environments in the lab, allowing engineers to validate performance under realistic Doppler, delay, and multipath conditions without costly field trials.

By combining advanced propagation modeling with synchronized multi-channel coherence, PROPSIM enables true end-to-end testing of next-generation satellite, aerospace, and non-terrestrial network (NTN) systems, accelerating development, reducing risk, and ensuring mission readiness.

Key features for GNSS and CRPA testing:

- **Integrated toolset:** Combine the PROPSIM F64 channel emulator with Aerospace Channel Emulation Engine (ACE) for cohesive, real-time emulation across all test cases
- **Realistic propagation modeling:** Accurately reproduce Doppler shifts, long delay spreads, range rates, multipath, and phase noise for moving aircraft and orbital platforms
- **Scenario creation:** Support dynamic multipath, AWGN/CW interference, and custom orbital or flight routes through the Aerospace Model Editor and integration with ANSYS STK toolkit

- **High fidelity:** Maintain phase coherence and precise delay/Doppler tracking across multiple RF channels, enabling robust MIMO and CRPA testing
- **Troubleshooting integration:** Seamlessly integrate with WaveJudge Wireless Analyzer for synchronized protocol and RF correlation, supporting fast diagnosis of NTN signaling and RF impairments

Measurement capabilities:

- multi-link channel emulation up to 64 RF channels and 1,200 MHz bandwidth
- long-delay modeling up to 1,000 ms for satellite and deep-space testing
- dynamic Doppler, fading, and interference scenario replay
- correlated I/Q and RF analysis with the WaveJudge wireless analyzer for root-cause isolation
- real-time performance verification for MIMO and phased-array links

From tactical data links, secure SATCOM, and LEO/MEO/GEO constellation testing to NTN validation and satellite-terrestrial convergence, PROPSIM delivers unmatched realism and scalability. Engineers can verify interoperability between ground and orbital networks, assess system robustness under interference and motion, and debug Doppler-related timing or protocol issues using combined PROPSIM + WaveJudge workflows.



WaveJudge Wireless Analyzer and PROPSIM Satellite and Aerospace Channel Emulators

Automate High-Performance Validation for Satellite RF Payloads

Satellite payloads must meet stringent RF performance requirements before launch, with no margin for error once in orbit. Keysight's **Payload Test System (PTS)** provides a fully integrated, modular, and automated environment for validating complex RF payloads from UHF through Q-band. Built for satellite OEMs, integrators, and dedicated test houses, PTS enables end-to-end payload characterization with accuracy, fast throughput, and low lifetime test cost.

PTS combines Keysight instrumentation, signal-conditioning hardware, calibration assemblies, and CodeOne™ automation software into a unified test architecture. This approach eliminates manual recalibration steps, reduces risk, and ensures repeatable, mission-assured measurement performance across the entire test program.

Key features for Payload System testing:

- **Complete, unified set of RF instrumentation:** Leverage signal-conditioning calibration hardware, and control software optimized for satellite payload testing
- **Modular switch-matrix platform:** CalPod Assembly Modules enable in-line calibration of uplink and downlink paths without disconnecting the DUT
- **Flexible, upgradeable construction:** System evolves with changing payload requirements

Software automation and repeatability:

- **Powered by Keysight CodeOne™:** PTS interfaces directly with payload system controllers to automate measurement sequences for high accuracy and repeatability
- **Software-movable calibration plane:** Eliminate interruptions for periodic recalibrations
- **Reduce human error:** Ensure consistent test execution across operators and shifts

Measurement capabilities:

- uplink and downlink RF performance testing (UHF through Q-band) for comprehensive uplink and downlink validation
- gain, noise figure, linearity, and conversion-gain analysis
- power-measurement capability with 96 dB dynamic range, up to 50,000 readings per second, and time-selective average power analysis
- in-line calibration using CalPod assemblies
- high-speed data acquisition (50,000 readings/s)

Keysight's Payload Test System delivers the modularity, automation, and accuracy required for high-performance satellite payloads. By combining in-line calibration, scalable architecture, and automated CodeOne™ workflows, PTS ensures repeatable, mission-ready validation, reducing cost, accelerating test cycles, and providing the confidence needed to launch with assurance.



Keysight's Payload Test System



SECURE COMMUNICATIONS

Innovate Communications to Enhance Security and Situational Awareness

Modern missions rely on communication links that perform flawlessly, no matter the environment, distance, or threat. From secure tactical networks and public-safety systems to aerospace and defense applications, the ability to transmit, receive, and interpret information without compromise defines operational success.

Keysight's **Critical Communications** group empowers organizations to design, validate, and sustain the devices and networks that enable coordination, command, and control under the most demanding conditions. Our solutions combine advanced RF analysis, signal emulation, and digital protocol validation to ensure reliable, interference-free connectivity across air, land, sea, and space.

By integrating real-world channel emulation, system-level simulation, and high-performance measurement hardware, Keysight helps engineers test mission-critical communications as they would perform in the field, before deployment begins. Whether assessing Land Mobile Radio (LMR) interoperability, evaluating satellite-to-ground links, or securing next-generation network infrastructure, Keysight delivers the precision, realism, and confidence needed to maintain uninterrupted communication when it matters most.



Test Hardware and Software Security

As connected devices proliferate across defense, automotive, and IoT ecosystems, hardware-level security has become a mission-critical concern. Keysight's **Riscure Device Security Solution** provides a unified hardware and software testing environment designed to identify, quantify, and mitigate vulnerabilities in chips, modules, and embedded systems.

The platform integrates side-channel analysis (SCA) and fault-injection (FI) capabilities into a modular, scalable lab environment, enabling both pre-silicon and post-silicon security validation. Security flaws are detected early, long before devices reach production or field deployment.

Key features for Hardware/Software Security testing:

- **Side-channel analysis:** Measure power consumption, electromagnetic emissions, and contactless interfaces to detect confidential information leakage. Support both first- and higher-order attacks using dedicated software and hardware modules
- **Fault-injection testing:** Introduce controlled faults via laser, voltage glitching, or EM disturbance to assess the resilience of cryptographic operations, authentication processes, and secure element behavior
- **Pre- and post-silicon validation:** Enable early-stage testing during the design phase, allowing teams to assess chip and system security before hardware fabrication
- **Integration with design-to-test workflows:** Seamlessly integrate into existing validation and certification processes to accelerate time-to-compliance for standards like ISO 21434, UNECE R155/R156, and Common Criteria
- **Scalable and configurable tooling:** Modular instrumentation supports a wide range of targets, from smart cards and payment terminals to automotive ECUs and IoT edge devices
- **Lab-ready environment:** Available as a turnkey security lab solution with calibrated instrumentation, data acquisition, and analysis software, all optimized for repeatable, high-fidelity testing

Measurement capabilities:

- power, electromagnetic, and optical emission analysis for side-channel leakage detection
- fault injection using voltage, EM, or laser-based methods
- timing, jitter, and clock manipulation for resilience testing
- correlation and differential analysis for key extraction
- automated test routines for attack vector reproducibility
- integration with third-party verification or certification tools

Keysight's Riscure Device Security Solution combines the rigor of accredited security testing with Keysight's precision measurement expertise, creating a unified platform for validating device resilience against physical and logical attacks. Whether used as a standalone testbed or integrated into a broader verification flow, it empowers developers, security researchers, and certification labs to ensure reliable performance from design to deployment.



Riscure Device Security Solution

Accelerate Network Interoperability and Cyber Resilience Testing

The Keysight EXata **Network Modeling Platform** delivers a high-fidelity, real-time digital twin environment for testing, training, and validating complex communication networks. Built for both development and operational use, EXata enables users to replicate and interact with real or virtual network components, providing insight into performance, resilience, and mission readiness before deployment.

Designed for defense, aerospace, and enterprise applications, EXata seamlessly bridges the gap between simulation and live operation, allowing users to connect real hardware, emulate radio behavior, and test cyber scenarios in a controlled, repeatable environment.

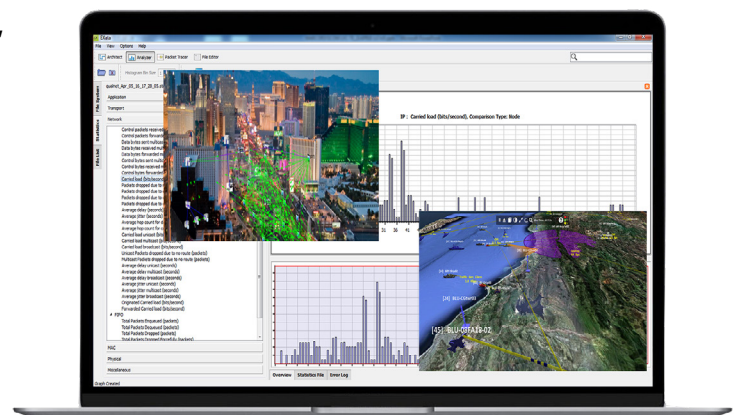
Key features for Network Modeling:

- **Network digital twin creation:** Build virtual replicas of tactical and enterprise networks, integrating real radios, applications, and nodes for high-fidelity modeling
- **Hardware-in-the-loop integration:** Connect simulation environments to live systems, servers, and devices for realistic, interactive testing
- **Cyber attack and defense simulation:** Conduct red-blue team exercises with live cyber events to assess network resilience and response strategies
- **Scalable architecture:** Support thousands of nodes and multiple protocol layers while maintaining real-time execution and accuracy
- **Comprehensive visualization tools:** Monitor topology, traffic flow, latency, and performance metrics in real time for rapid analysis
- **PathWave and EWASP integration:** Interface with Keysight's broader test ecosystem for end-to-end network and EMSO environment validation

Measurement capabilities:

- model and emulate full network topologies across wired, wireless, and hybrid architectures
- measure end-to-end latency, throughput, jitter, and packet-loss across virtual and live nodes
- assess application performance for voice, video, and data services under dynamic conditions
- evaluate protocol interoperability and link behavior under jamming or interference
- conduct repeatable cyber-attack simulations and analyze recovery and mitigation performance
- automate configuration and testing workflows for faster, repeatable validation cycles
- perform full demodulation and bit error rate testing for APCO P25, DMR, TETRA, and custom waveform formats

The EXata Network Modeling Platform gives engineers, analysts, and operators a unified environment for designing, testing, and validating mission-critical networks. Whether assessing cyber resilience, optimizing communications performance, or supporting Live, Virtual, and Constructive (LVC) training environments, EXata enables confident decisions before systems go live.



SN100EXBA EXata Network Modeling Solution

Speed RF Communications Test for Mission Networks

The Keysight M8920B **PXIe Radio Test Set** delivers an integrated, modular platform for testing analog and digital radios across a wide range of communications standards. Designed for both laboratory and production environments, the M8920B provides unmatched speed, flexibility, and precision, enabling engineers to validate mission-critical transceivers from design through deployment.

Built on a scalable PXIe architecture, it combines powerful signal generation and analysis capabilities to support AM, FM, PM, SSB, and digital land mobile radio (LMR) formats such as APCO P25, DMR, TETRA, and dPMR. With its advanced measurement applications and automation-ready interface, the M8920B simplifies complex workflows while maintaining the repeatability and accuracy required for aerospace, defense, and public safety communications.

Key features for Radio Test:

- **All-in-one analog and digital radio testing:** Generate, demodulate, and analyze both analog (AM/FM/PM/SSB) and digital (P25, DMR, TETRA, dPMR) signals from a single PXIe platform
- **Modular PXIe architecture:** Compact and scalable system supports frequency coverage from 100 kHz to 6 GHz and analysis bandwidths up to 160 MHz
- **Fast multi-touch interface:** Intuitive quad-display UI enables simultaneous control of signal generation, analysis, and real-time spectrum visualization
- **Comprehensive modulation support:** Evaluate modulation quality with advanced metrics including EVM, SINAD, phase error, deviation, and SNR
- **Test automation integration:** Automate test sequences using Keysight's TAP software with ready-to-use analog, digital, and tracking generator plug-ins, no programming required

Measurement capabilities:

- measure AM, FM, PM, and SSB parameters with high precision, including deviation, SINAD, modulation rate, and distortion
- visualize baseband waveforms and AF spectra directly for intuitive signal quality evaluation
- apply post-demodulation filtering to isolate desired signals and minimize noise or harmonic distortion
- perform full demodulation and BER testing for APCO P25, DMR, TETRA, and custom waveform formats

The M8920B PXIe Radio Test Set combines Keysight's measurement expertise with modular PXIe performance to deliver a complete, future-ready communications test platform. Its seamless blend of analog and digital radio testing, advanced automation, and precision signal analysis ensures dependable results from early design through high-volume production.

Whether verifying mission radios, securing avionics links, or modernizing legacy systems, the M8920B empowers engineers to achieve faster validation, greater insight, and superior confidence in every communication channel.



M8920B PXIe Radio Test Set Solution



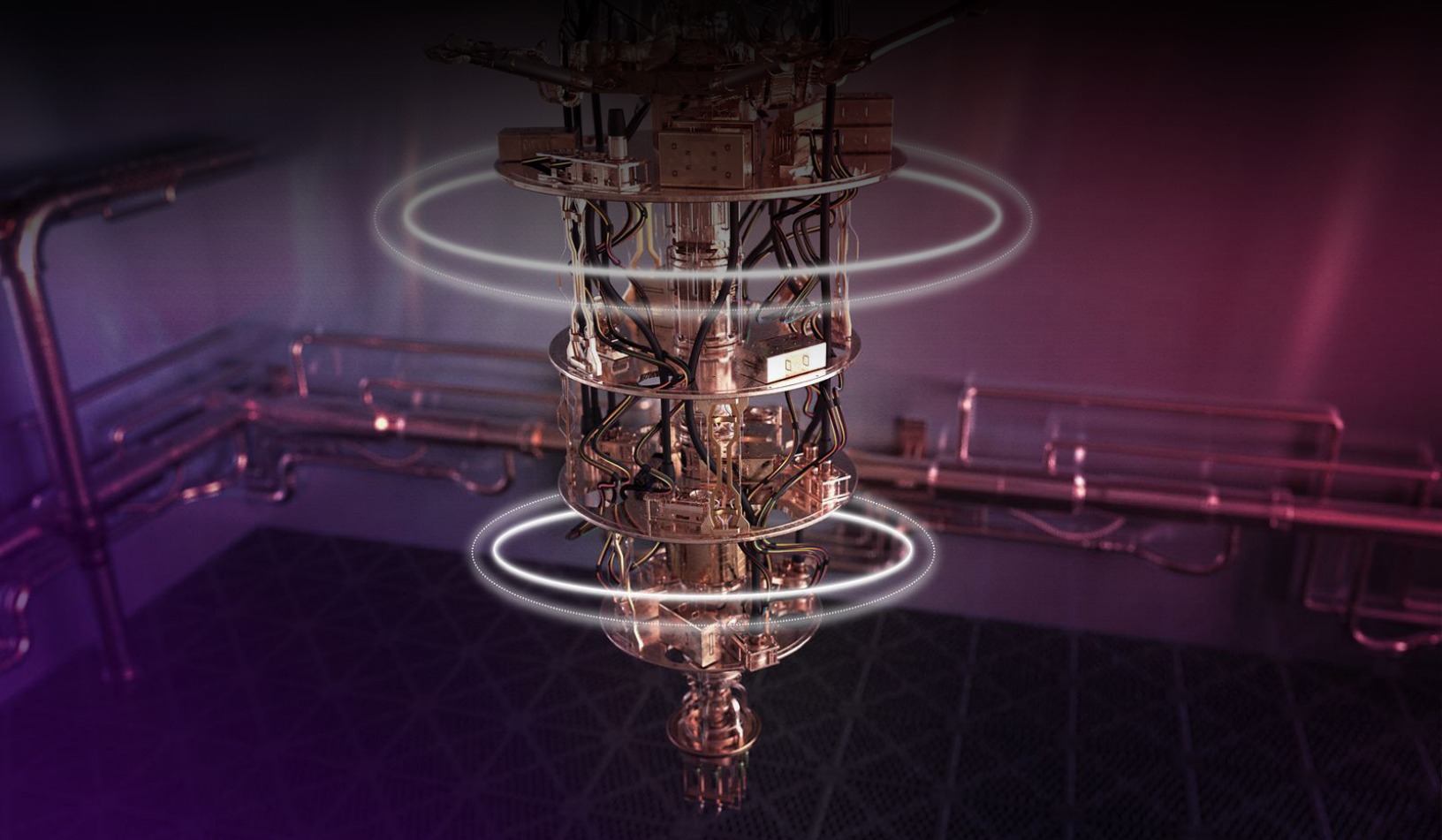
EMERGING TECHNOLOGIES

Pioneer Innovations to Accelerate Technology Readiness

Modern defense and aerospace missions are defined by rapid technological evolution, where advances in **AI**, **quantum** systems, autonomy, and digital engineering reshape how programs are conceived, tested, and sustained. Keysight's Emerging Technologies initiatives bridge the gap between cutting-edge research and mission-ready application, ensuring innovation moves from concept to capability with speed and confidence.

Keysight partners with research agencies, integrators, and defense innovators to validate new architectures and mission frameworks early in development. Through advanced modeling, digital twin environments, and scalable hardware-in-the-loop testbeds, Keysight helps customers assess performance, interoperability, and resilience before deployment, accelerating technology readiness across domains.

From quantum sensing and resilient positioning, navigation, and timing (PNT) to next-generation radar, **6G** communications, and AI-driven signal intelligence, Keysight provides the tools, measurement science, and expertise to help organizations explore the frontier of possibility, and operationalize it for real-world advantage.





CONCLUSION

Ensure Mission Readiness Across Every Domain

Keysight's Aerospace Defense Government Solutions (ADGS) group works alongside defense and government teams, bringing technologies, expertise, and insight to advance mission superiority.

From design and validation to deployment and sustainment, Keysight's **aerospace and defense** solutions provide the measurement science and test systems needed to accelerate innovation, reduce risk, and ensure operational confidence in the most demanding environments.

Our portfolio spans the full mission lifecycle, uniting simulation, emulation, and measurement across radar, electronic warfare, spectrum management, communications, and space domains. By integrating hardware, software, and digital twin technologies, Keysight helps customers bridge the gap between concept and combat readiness.

Driven by deep collaboration with our customers and partners worldwide, ADGS solutions enable defense and aerospace programs to test with realism, analyze with precision, and perform with assurance.



Additional Resources

[Keysight Electronic Warfare Advanced Simulation Platform](#)

[Keysight Spectrum Management Software \(KSMS\)](#)

[Keysight SpectrumView Software](#)

[Keysight Wideband Record and Playback Solutions](#)

[Keysight Antenna Measurement Toolset](#)

[Keysight Digital Wideband Transceiver Solution](#)

[Keysight CRPA-Enabled GNSS Receiver Test Solution](#)

[Keysight Photovoltaic Array Simulator Series](#)

[Keysight Modular Solar Array Simulator Series](#)

[Keysight Satellite and Aerospace Channel Emulation Toolset](#)

[Keysight Satellite Payload Test System](#)

[Keysight Device Security Solution](#)

[Keysight EXata Network Modeling Solution](#)

[Keysight PXle Radio Test Set](#)



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.