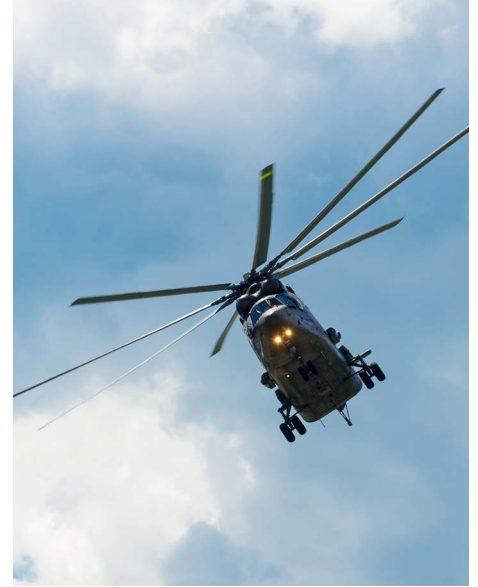




Aerospace Instrumentation

Space, Fixed Wing, Rotorcraft, and Unmanned



Curtiss-Wright Defense Solutions

Curtiss-Wright Corporation (NYSE:CW) is a global integrated business that provides highly engineered products, solutions and services mainly to Aerospace & Defense markets, as well as critical technologies in demanding Commercial Power, Process and Industrial markets. Headquartered in Davidson, North Carolina, the company leverages a workforce of approximately 8,600 highly skilled employees who develop, design and build what we believe are the best engineered solutions to the markets we serve. Building on the heritage of Glenn Curtiss and the Wright brothers, Curtiss-Wright has a long tradition of providing innovative solutions through trusted customer relationships.

The Defense Solutions Advantage

Modern aerospace instrumentation systems can be highly complex, with changing requirements that can cause significant delays. Reliably capturing data is essential to avoid expensive additional flights or losing months of program data. Curtiss-Wright is the industry leader and lowers these risks by providing a comprehensive range of flexible commercial off-the-shelf (COTS) systems, with the capability to customize offerings when required. These allow for rapid reconfiguration when requirements change.

Working with the industry's most experienced partner helps to ensure system integration issues are minimized and data is delivered reliably, flight after flight. When customers use our systems, they gain an expert partner with decades of experience that extends the capability of their system architect/design team to deliver a future-proof total solution. The result is less risk of losing data and suffering schedule delays and financial costs. Industry-leading support is there when the inevitable unknown issues arise.

Total System Solutions

Today's instrumentation systems are large and complex, and each new program may need new technologies. Curtiss-Wright's range of products allows our customers to build a solution from one supplier to meet their needs. Our modular approach means rapid deployment using COTS building blocks, with scope for custom alterations where necessary to complete our customer's unique requirements. By driving the latest innovations in size, power, and breadth of hardware and software, along with expert advice and support, the result is a compact and flexible system that is easy to set up and manage.



Data Acquisition

- Wide range of advanced data acquisition platforms
- Support virtually all sensors & interfaces
- Reliability proven over hundreds of programs



Telemetry

- Multi-band transmitters, receivers, and transponders
- TmNS IP transceivers
- Flight termination receivers



Network Switches

- Deterministic and reliable
- Highly rugged with rapid boot-up
- IEEE-1588 V1/2 PTP support and Grandmaster
- Automated flow control



Imaging

- Rugged HD, IP, and high-speed cameras
- Supports large networks of synchronized cameras
- Camera controllers and managers simplify operation
- Weapon separation video systems



Ground Stations

- Industry-leading real-time & post-test analysis
- Servers, IP transceivers, receivers, and decom/bit sync
- IRIG, TmNS, and network packet processing compliant



Recorders

- Stand-alone and DAU-integrated
- High-speed and capacity
- Comprehensive data acquisition options
- Various encrypted storage options
- File servers (NFS, CIFS, FTP, HTTP)



Software

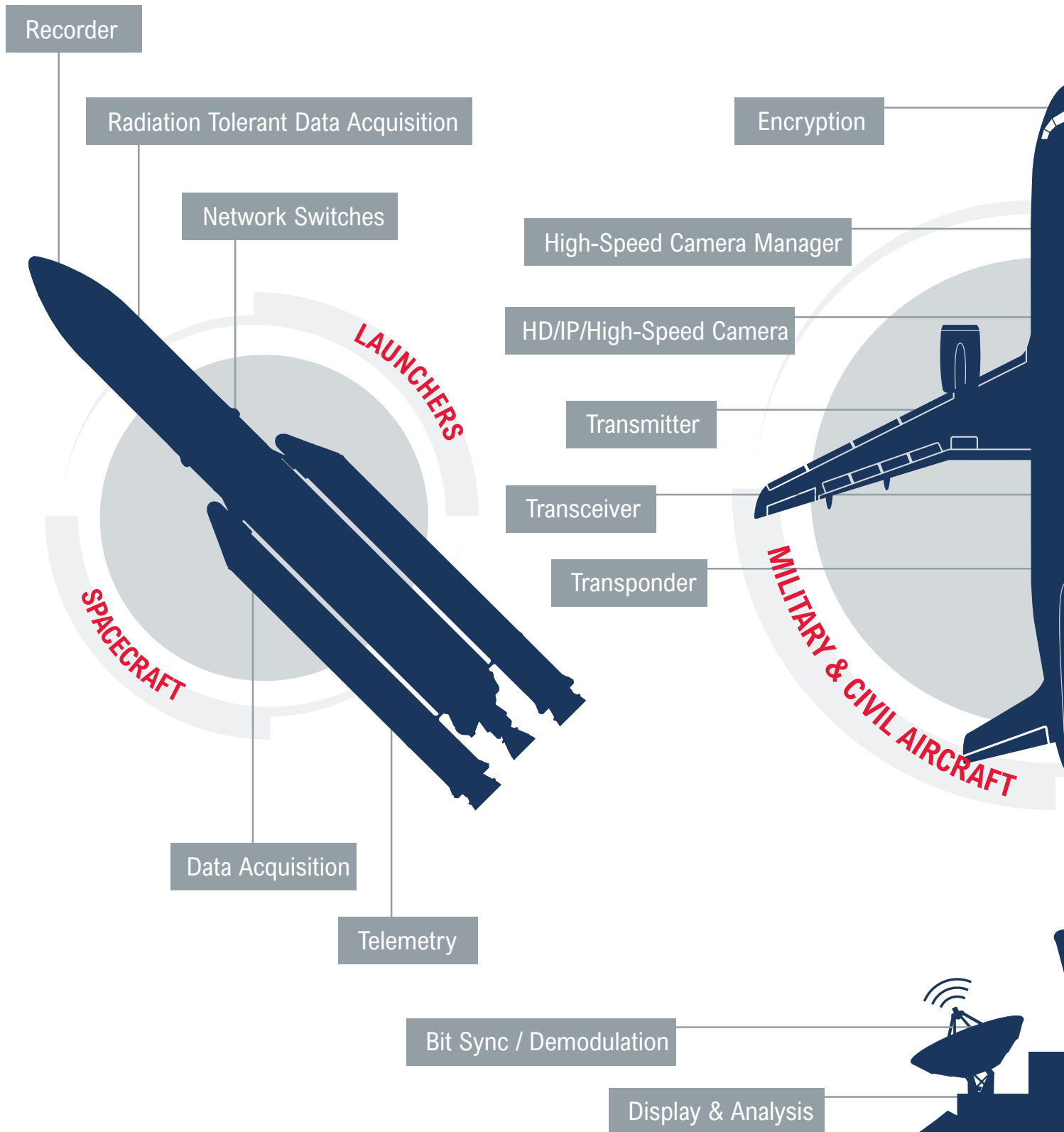
- Real-time and post-test display, analysis & reporting
- Simple, powerful setup and management
- Simplified integration of 3rd party hardware



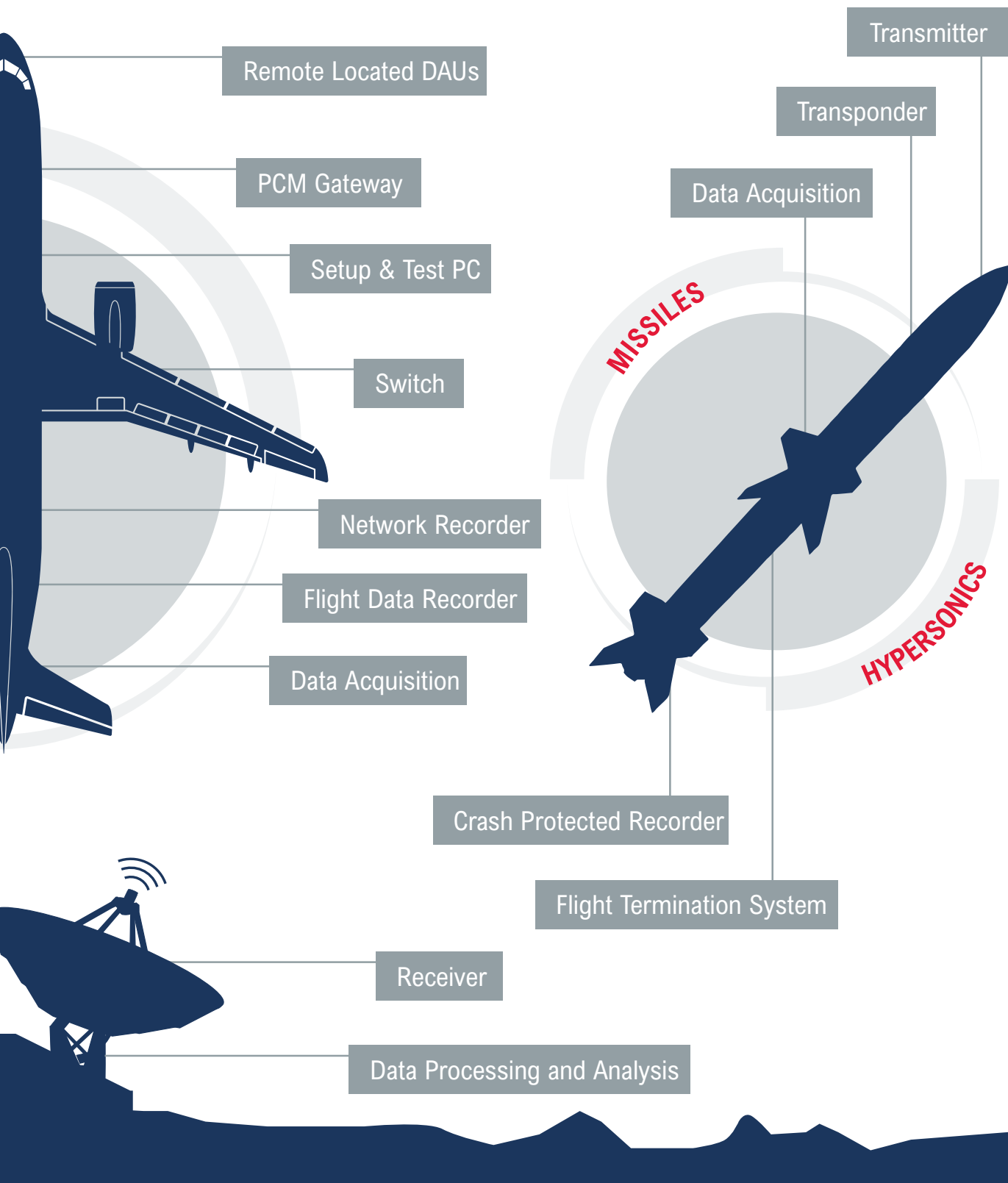
FTI Power Systems

- Aircraft power converters
- Instrumentation power back up systems
- Small rotor-mounted battery packs

Engineering Comprehensive, Flexible, and Reliable Solutions

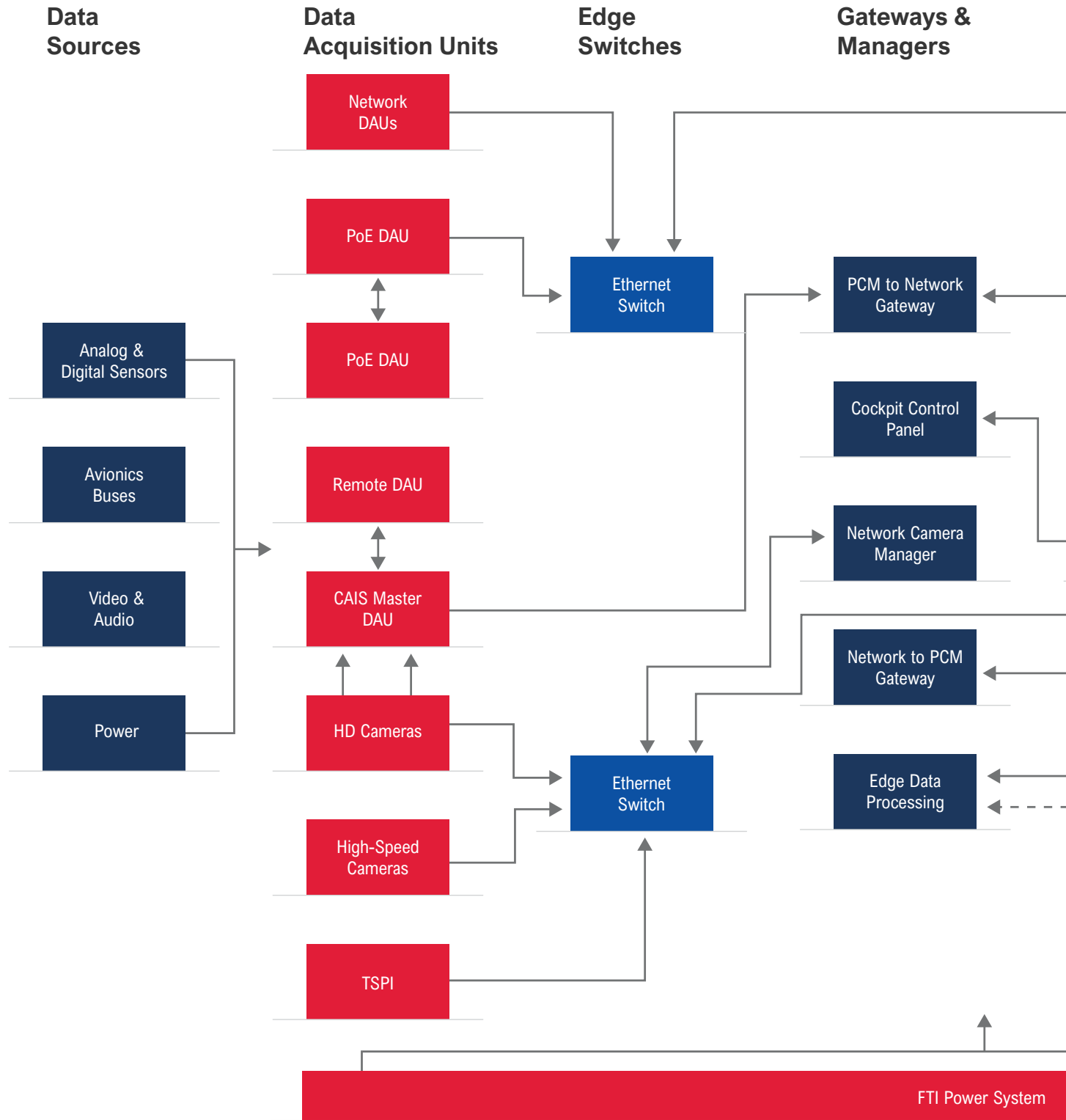


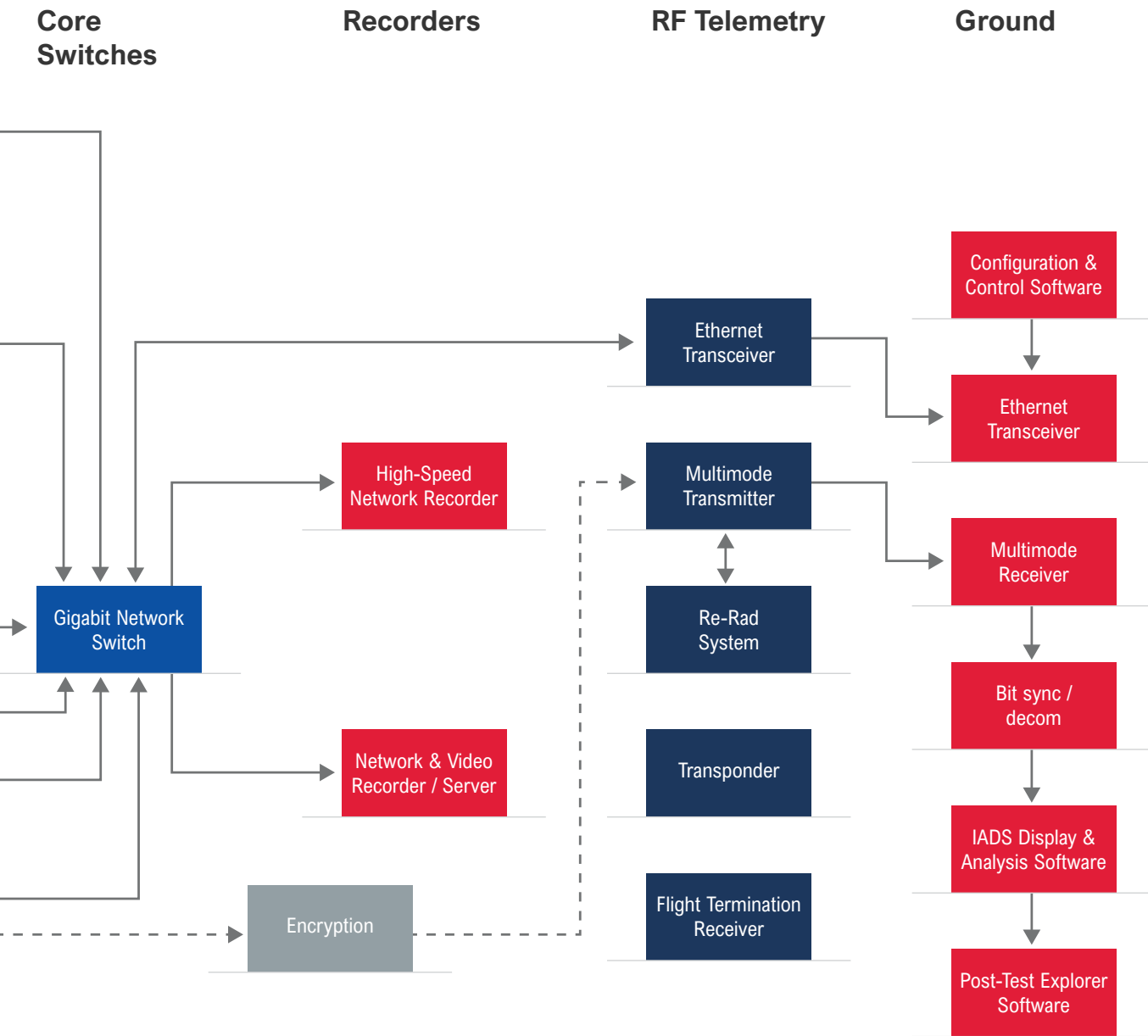
Your Trusted Partner Supporting FTI Solutions for 30+ Years



Comprehensive FTI systems

Curtiss-Wright provides a comprehensive range of easily integrateable products that are trusted to work flawlessly in all environments. These include data acquisition units, network hardware, recorders, TSPI systems, cameras, telemetry subsystems, power systems, and display, analysis and post-test reporting software.





AEROSPACE INSTRUMENTATION

Aerospace applications need good data, and operators need to know they can trust the systems that acquire, process, and deliver it. All applications, in particular flight tests, cannot afford to waste any time getting a system operational and cannot afford a failure that results in repeated flights. A foundation of every data gathering system are the data acquisition units (DAU). Curtiss-Wright is the largest aerospace DAU provider in the world, with decades of proven experience. We are trusted globally by aircraft manufacturers, ranges, test agencies, and operators to deliver solutions that reduce the risk of having to repeat a flight or compromise a maintenance program's integrity.

- Comprehensive, rugged signal conditioning, data acquisition, data multiplexing, Ethernet, and PCM encoder systems for underwater to terrestrial to space environments
- Utilize the latest technology to combine high performance with SWaP-optimized operation
- Scalable from a single DAU to massive systems using the same building blocks
- Deterministic systems for mission-critical reliability
- Support for multiple industry standards, including Ethernet, TmNS, IRIG-106 Chapter 4, 7, 8 & 10, DARv3, IENA, and iNET-X
- Bulk and selected data capture from avionics buses
- High-speed units and miniature models for remote mounting



Data Acquisition Chassis

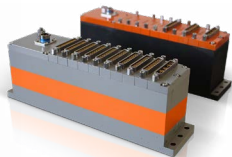
Curtiss-Wright offers various chassis to meet our customer's size, bandwidth, and infrastructure needs. Each chassis type uses different modules – further details can be found on our website.

Product	Modules	Dimensions (W x H x L)*	Mass	Throughput	Software support
Acra KAM-500	3-13	3.2 x 3.9 x 5.5-11.0" 80 x 99 x 140-280 mm	1.8 – 6 lb 0.80 – 2.7 kg	64 Mbps	DAS Studio
Axon ADAU	1-16	2.2 x 3.0 x 5.7-13.1" 55 x 76 x 145-334 mm	0.5 – 4.3 lb 0.2 – 1.95 kg	380 Mbps	TTCWare
Axon AXN	1-16	2.2 x 3.0 x 5.7-13.1" 55 x 76 x 145-334 mm	0.5 – 4.3 lb 0.2 – 1.95 kg	380 Mbps	DAS Studio
Axon Pico	1	2.6 x 0.7 x 2.2 " 67 x 19 x 57 mm	0.3 lb, 0.13 kg	60 Mbps	DAS Studio
TTC nDAU	4-16	5.0 x 5.4 x 5.4-14.0" 127 x 137 x 137-356 mm	4.6 – 8.2 lb 2.09 – 3.72 kg	20 Mbps	TTCWare
TTC MnACQ	1-31	2.5 x 2.6 x 6.0-18.0" 63 x 67 x 152-457 mm	1.0 – 4.0 lb 0.45 – 1.82 kg	40 Mbps	TTCWare
TTC MnHSD	1-16	2.5 x 2.6 x 6.0-12.0" 63 x 67 x 152-305 mm	1.0 – 3.0 lb 0.45 – 1.4 kg	50 Mbps	TTCWare
TTC MDW-2020	1-14	5.5 x 2.6 x 3.8" 140 x 66 x 97 mm	1.0 – 2.38 lb 0.45 – 1.08 kg	20 Mbps	TTCWare

*Custom chassis available where required.



MnACQ-2700



Axon/ADAU



Pico



MDW-2020



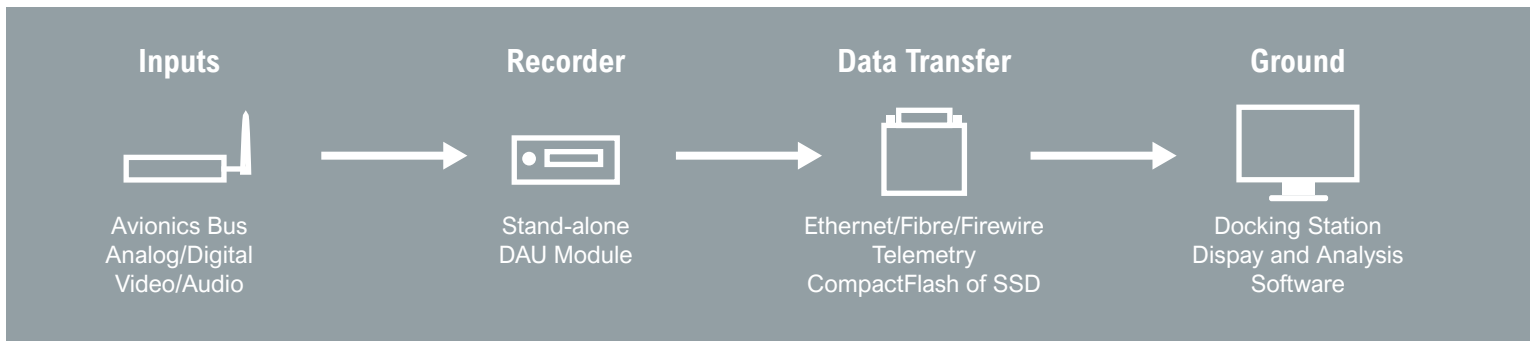
MnHSD



KAM-500



KAM-500



Ethernet Switches

Curtiss-Wright’s rugged Ethernet switches are designed to meet harsh aerospace environments and deliver high-speed real-time data reliably. They are deterministic and compact with a wide temperature operation from -40 to 85°C. Rapid boot-up minimizes data loss from power outages, while flexible forwarding and filtering configurations can send required data to multiple destinations for real-time monitoring, recording, and transmission.

They support IEEE-1588 PTP, some with embedded v1 and v2 Grandmaster support and translation, and GPS and digital IRIG-B input and output. Additional hardware can translate between PCM/CAIS and Ethernet to help protect existing hardware investment. Curtiss-Wright has participated in the TmNS program by developing leading-edge technology and has a range of hardware and tools, including wireless transceivers, for complete network monitoring and control to bring TmNS into programs today.

- Stand-alone or DAU-integrated models
- Rugged and reliable with rapid boot-up
- IEEE-1588 V1 and V2 PTP support and Grandmaster
- GPS input, digital IRIG-B input, and output
- Support for 10 GbE speeds
- Gateways for PCM/CAIS
- TmNS-ready hardware and tools available

Switch	Ports	Type	Speed Mbps	Dimensions (W x H x L)	Mass
MNSW-503	3	TTC DAU Module	10/100	2.6 x 0.4 x 2.5" 66 x 10 x 64 mm	0.1 lb 0.05 kg
KAD/SWI/108	4	KAM-500 Module	10/100	3.1 x 3.1 x 0.4" 80 x 80 x 10 mm	0.09 kg 0.2 lb
NSW-5GT-TGE	5	Stand-alone	100/1000	5.39" x 1.25" x 4.45" 137 x 32 x 113 mm	1.7 lb 0.8 kg
NET/SWI/101	8	Stand-alone	100/1000	4.9 x 1.8 x 10.6" 124 x 46 x 269 mm	3.8 lb 1.8 kg
NSW-8GT	8	Stand-alone	100/1000	6.0 x 1.7 x 4.5" 152 x 43 x 113 mm	2.0 lb 0.9 kg
NSW-12GT	12	Stand-alone	100/1000	7.0" x 2.4" x 5.5" 178 x 61 x 140 mm	3.9 lb 1.8 kg
NSW-16GT	16	Stand-alone	4 x 1000/10000 12 x 100/1000	10.75" x 2.5" x 7.0" 273 x 64 x 178 mm	6.7 lb 3.0 kg



Recorders

Curtiss-Wright manufactures various recorders to best suit specific user needs. High-speed and capacity units are perfect for capturing high-speed busses and camera data, while flexible data acquisition-enabled recorders are ideal for smaller systems. They are all rugged for harsh environmental conditions and store data on solid-state media with options for remote downloading in various formats. Our recorders integrate easily with our other product lines using IRIG-B (digital) and IEEE-1588 v1/v2 PTP for time synchronization. Control is via a front panel or remote-control function, depending on the model selected.

- High capacity, 10 GbE line-rate recorders available
- Rugged stand-alone or DAU-integrated options
- Chapter 10 and PCAP formats supported
- IRIG-B (Digital), IEEE-1588 v1/v2 PTP time synchronization



ADSR-4003F



nREC-7000



MSSR-2010-SA



ADSR-40003Z



SSR-CHS and Modules

Product	Rate (Mbps)	Capacity (max GB)	I/O	Format	Drive	Dimensions (W x H x L)	Mass
nREC-7000	18,000	24,000	2 x GbE Ethernet, 2 x 10GbE Ethernet	DARv3, CH10/11, PCAP, TmNS	SSD	5.0 x 3.75 x 6.91" 127 x 95 x 176 mm	10.0 lb 4.5 kg
ADSR-4003	1,200	3,000	2 x GbE Ethernet, 4 optional I/O cards for video, audio or avionics bus data	PCAP, CH10/11, DARv3, TmNS	3 x SSD	6.0 x 3.2 x 8.0" 152 x 82 x 203 mm	7.6 lb 3.5 kg
AIM-2005R	400	128	Chapter 10, 5 optional I/O cards	CH10/11	SSD	6.3 x 6.0 x 9.3" 160 x 152 x 236 mm	15.0 lb 6.8 kg
NET/REC/002	85	256	Ethernet	PCAP	SSD	4.9 x 2.8 x 6.4" 127 x 71 x 163 mm	2.4 lb 1.1 kg
MSSR-2010	48	128	Chapter 10, 8 optional I/O cards	CH10/11	CF	2.6 x 3.8 x 3.2" 67 x 96 x 80 mm	1.4 lb 0.6 kg
NET/REC/001	48	64	Ethernet	PCAP	CF	2.8 x 4.9 x 2.2" 127 x 57 x 70 mm	1.5 lb 0.7 kg
SSR/CHS/001	40	64	Ethernet, 4 optional I/O cards	PCAP	CF	4.9 x 3.3 x 5.7" 127 x 85 x 144 mm	4.2 lb 1.9 kg
SSR/REC/001	20	64	PCM	PCAP	CF	4.6 x 1.5 x 2.8" 116 x 38 x 70 mm	1.1 lb 0.5 kg

RF and Flight Safety

Curtiss-Wright's telemetry systems are high-performance, dependable, and economical solutions that work seamlessly with our air and ground station product lines. Our products are easy to use and have many unique features. Our state-of-the-art facility provides an in-house RF design laboratory, a fully capable screen room, and an EMI test capability to ensure quality.

Products include:

- Compact single and multimode transmitters with superior bandwidth efficiency
- Flight safety products developed in close consultation with the RCC range safety community
- Transponders with the highest efficiency in the industry
- TmNS transceivers for point-to-point Ethernet links
- Flight-proven re-radiation systems for stealth applications
- Exportable encryption solution that encodes streaming telemetry data using AES-256
- Compact, flexible telemetry instrumentation kits (TIK)

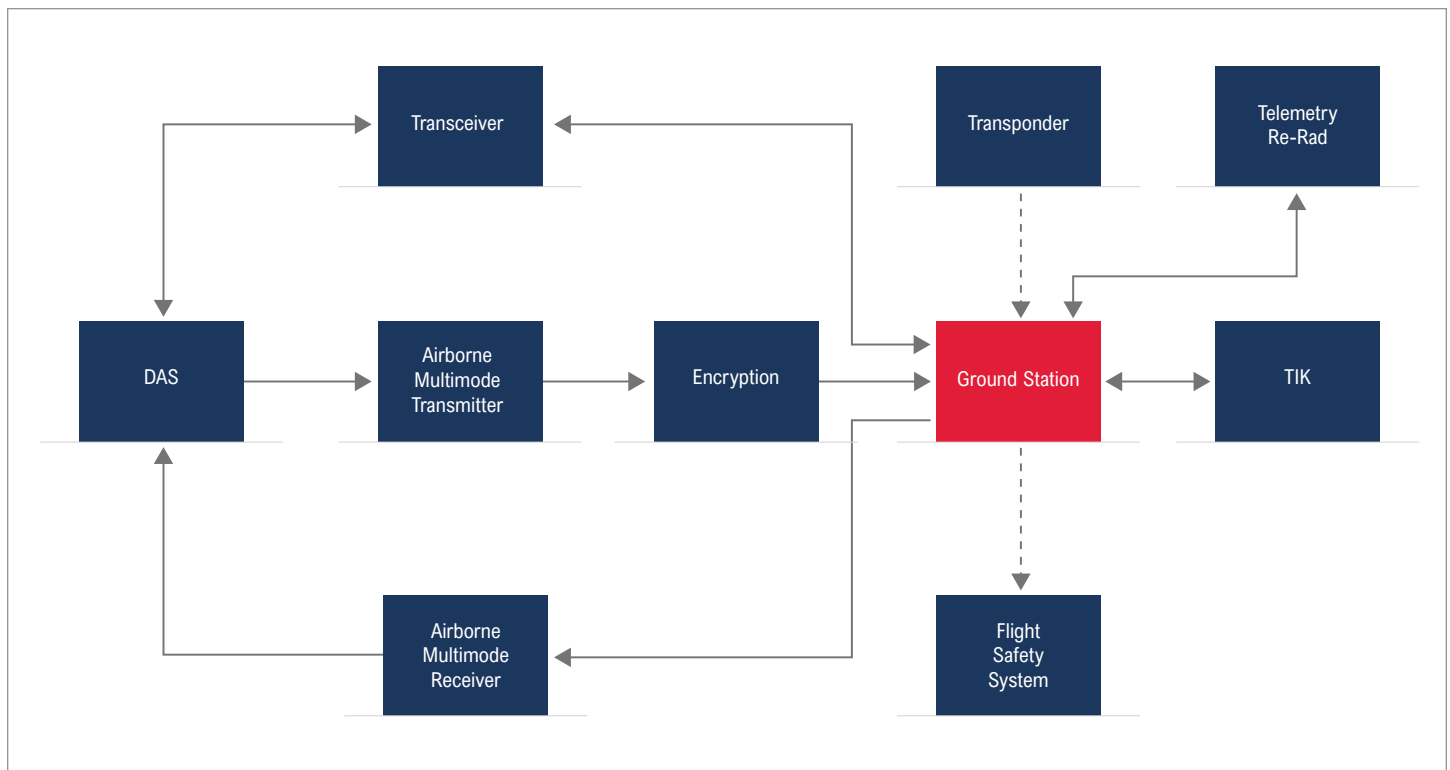


Image caption

Transmitters

Curtiss-Wright has a wide range of single and multimode transmitters with a bandwidth efficiency improvement of two to one compared to many competitors. Depending on the model, features include state-of-the-art modulation, forward error correction, and space time processing compatibility to IRIG-106-15, with user programmability options for serial and parallel interfaces with a high-efficiency power amplifier chain.

Airborne Receivers

Curtiss-Wright's airborne receivers offer a standard PCM/FM or modulation-efficient SOQPSK demodulator and provide recovered data and clock up to 20 Mbps.

Flight Safety/ Flight Termination Systems

Our flight safety products, developed in close consultation with the RCC range safety community, are miniature solutions for flight termination system applications that utilize tone-based command messaging. They provide a highly-sensitive superheterodyne RF receiver whose center frequency is programmable.

Transponders

Curtiss-Wright provides RF transponders with the highest efficiency in the industry that meet or exceed the RCC-262-02 requirements and are available with outputs of 20, 50, and 400 W versions.

Transceivers

Our wireless C-band network transceivers are designed for air-to-ground and ground-to-air wireless TmNS-based communications. The transceivers work together to perform wireless router functions, transparently connecting two or more radios in a point-to-point or multipoint configuration.

Telemetry Encryption Systems

Our exportable encryption solution encodes streaming telemetry data using AES-256 and is ideal for use in missile telemetry and test, flight test, and aircraft monitoring applications. The module set provides a PCM encoder interface, ARTM transmitter interface and an optional cryptographic key management software package.

Telemetry Instrumentation Kit (TIK)

Curtiss-Wright provides all the components to create custom and flexible telemeter solutions, whether distributed or tightly integrated into a single, compact unit. Combined with an auxiliary system, it forms the basis for a TIK.

Telemetry Re-rad

Re-radiates the range safety flight termination signal (FTS) into a closed weapons bay to be received by the weapon telemetry. It allows the test pilot to keep the weapons bay door closed while the Range Safety Officer can verify the FTS prior to a missile shot.



FTI Power Systems

Flight tests often need to be performed on vehicles where 28 VDC power is not available. Curtiss-Wright offers a variety of products to address power needs during flight test including battery powered flight test instrumentation and power conversion.



Power Converters

Curtiss-Wright offers several options for rugged, airborne power conversion from 270 VDC to 28 VDC. These solutions support the ability to provide up to 2.4 kW of power for the FTI sub-system.



FTI Batteries

Battery products address use cases where vehicle power is unavailable to power the FTI system. Curtiss-Wright's battery power for flight test instrumentation includes an option for a whole DAU battery power solution. We also offer batteries for maintaining the real-time clock in our time code modules between test flights.

Time Space Position Information (TSPI) System

Curtiss-Wright's MiTSPI range provides user defined TSPI information for both real-time telemetry via Ethernet and/or Chapter 4 PCM (Clock and Data), as well as simultaneous recording for data retrieval post flight.

This miniature solution can be used as a stand-alone device or integrated into a DAU or MATS system to add high quality position and orientation data.



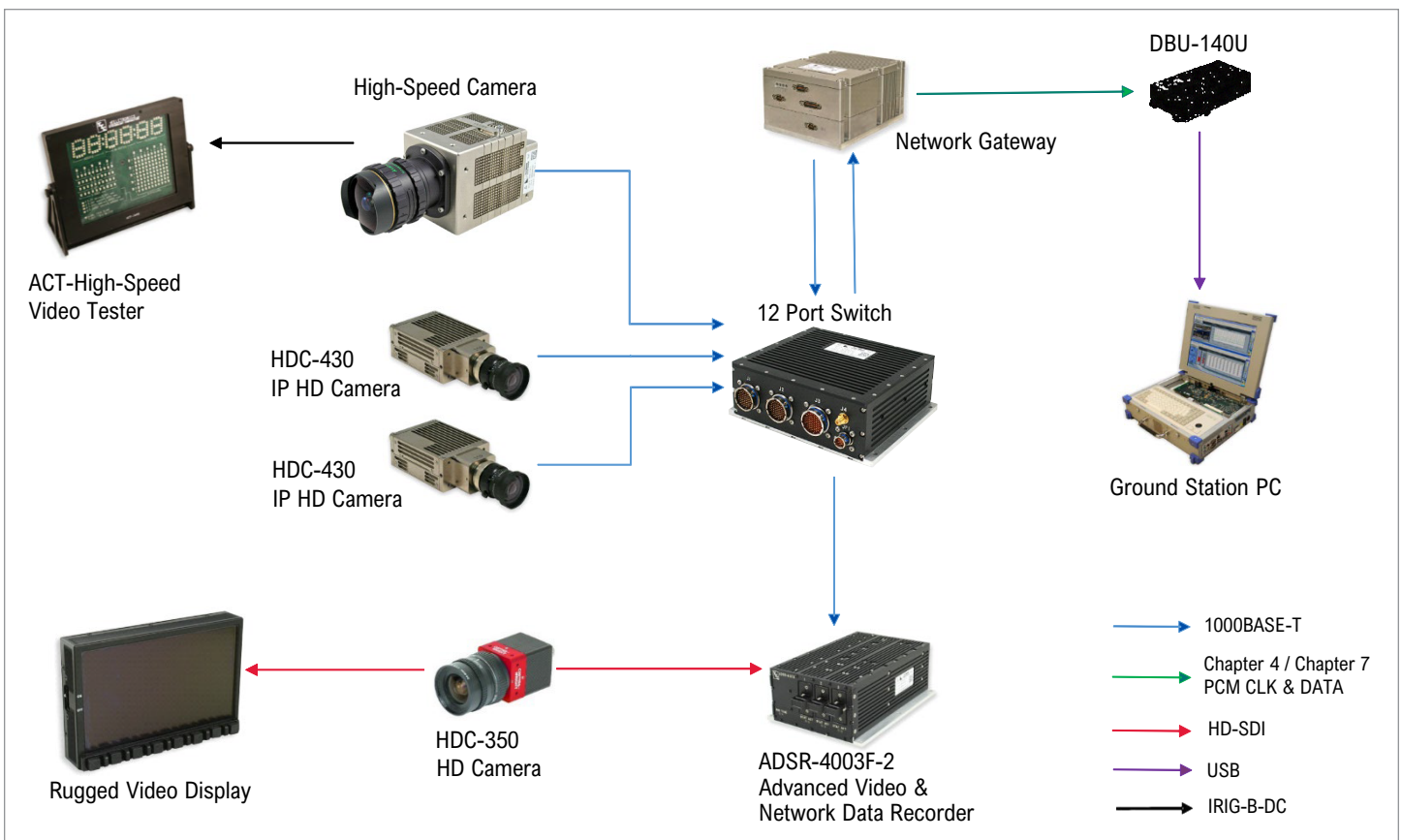
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Imaging

There is an increasing demand for camera solutions for airborne separation, aviation, aerospace, missile and range ground testing, and industrial applications. It can be challenging to find rugged systems for these harsh environments that can easily integrate into more extensive video and data acquisition systems for simplified transmission, storage, and viewing.

Curtiss-Wright provides rugged camera and video acquisition products to capture, convert, route, transmit, record, view, and test imagery. These can be combined into a fully integrated and synchronized system from one to dozens of video sources.

- Suitable for aerospace, airborne separation, missile, and range ground testing, and industrial applications
- System can capture, convert, route, transmit, record, and view imagery
- High-speed, HD, and IP cameras are available
- Fully combinable into a fully integrated and synchronized system from one to dozens of video sources
- All cameras are ruggedized for harsh aerospace environments
- FPGA-based DSP surpasses standard video cameras for image quality, light sensitivity, and high-dynamic range imaging



Ground Station Systems

Curtiss-Wright telemetry ground station solutions are tailored to work with our aerospace instrumentation products to offer an end-to-end solution from sensor to processed data.

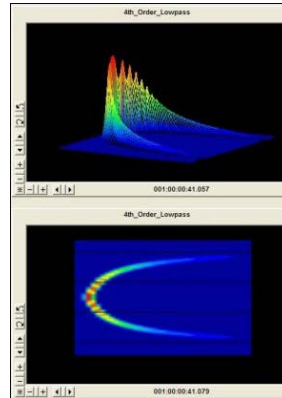
Our range of ground station hardware includes IP transceivers, PCM receivers, demodulators, and bit synchronizers. Our setup software helps speed data acquisition system setup and management, while our advanced real-time, post-processing analysis and post-test reporting software completes the solution with a host of time-saving features.

IADS Server/ Client Software System

IADS is a suite of display and analysis tools for creating displays, parameter definitions, analysis options, and test setups in seconds that can scale from large multi-discipline test rooms to single-user systems. IADS toolset includes high-fidelity strip charts with threshold checking, frequency response plots with predicted data overlays, TA test point system that allows the user to mark events and automate batch processing easily, and much more.

All displays can instantly recall any portion of the test data for display and analysis without affecting real-time data performance. Derived equations can be added or modified on the fly for use throughout the system. All supporting data can be input using a familiar spreadsheet interface. This flexibility allows displays, data, and analysis techniques to be built, tested, and saved with little effort at any time during the mission or at the engineer's desktop.

IADS's ease of use, depth of display capability, and powerful analysis techniques save time and effort on any test program.



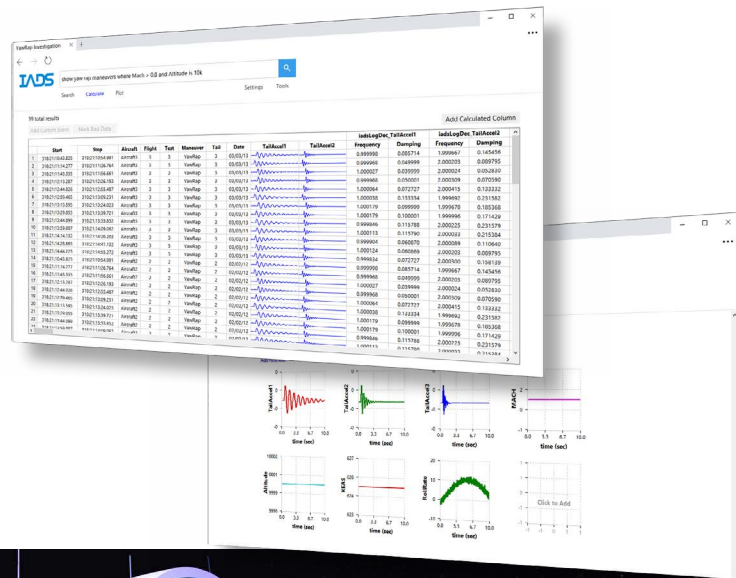
“We are breaking ground here. I am unaware of any program that has obtained stability margins and compared them with predictions as quickly as we are currently doing. Our testing is well ahead of schedule.”

– Flight Test Engineer, Boeing

IADS Post Test Explorer

Traditionally, post-test analysis is a fragmented and largely project-specific endeavor. It is common for flight test engineers to spend an enormous amount of time developing post-test systems that only meet the specific needs of one project.

IADS Post Test Explorer provides a unified post-test system that benefits the flight test community across numerous groups, disciplines, and aircraft. It contains many features, including natural language search queries for gathering data from multiple tests, a framework for developing custom data analysis functions using the Python programming language, and exploits the power of IADS to create plots and charts for use in reports.



Setup and Management Software

Curtiss-Wright setup and management software is used to configure our data acquisition, network, recording, RF, imaging, and ground station products. It has been developed using feedback from decades of support experience in the data acquisition community to make it intuitive, fast, and efficient to use. It saves time when entering, reviewing, and validating setup information. User interfaces are simple to learn with data-rich tables and a consistent look that cuts through the complexity of configuring a data acquisition system.

- Optimized for rapid system setup with an intuitive user interface
- Built-in wizards and tools speed up time-consuming tasks
- Tools for viewing data and network information in real-time
- Validates software configuration against hardware to catch errors early
- Supports open XML formats
- Library function to re-use proven configurations



Support and Company Facilities

Curtiss-Wright's Aerospace Instrumentation group is known for providing the highest level of technical and program support from pre-sales to the completion of your project. Every program will run into challenges, be they unknown unknowns, integration issues, or changes to requirements.

To better support our customers, we have leveraged our broad experience and deep domain expertise, which we have acquired over hundreds of programs to provide our customers with the following:

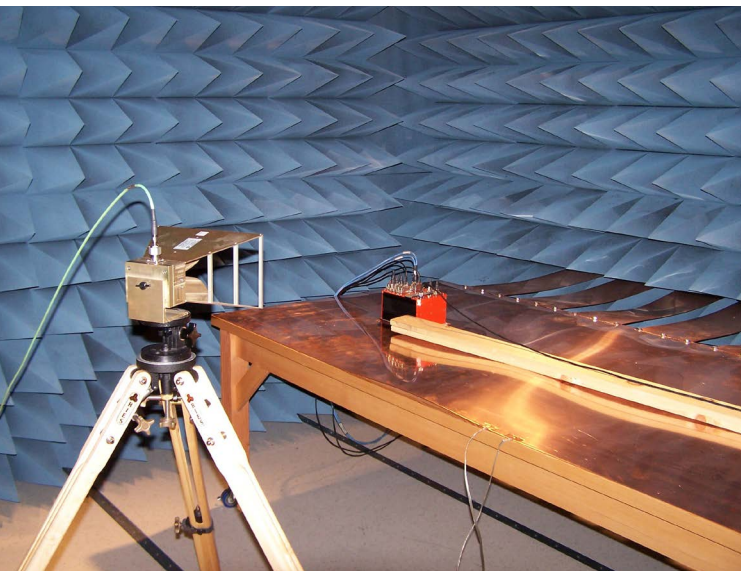
- Year-round, 24/7 support through all the program phases
- Proven reliable delivery and product performance that lowers lost time and program costs
- Unrivaled training, both in-country and virtual, where needed

The Aerospace Instrumentation group comprises various state-of-the-art production facilities for commercial, defense, and aerospace products. These allow us to develop, test, and validate our products to the highest standards.

Our facilities include:

- Specialized acceptance test procedure (ATP) rooms
- Advanced manufacturing and test machinery
- Dedicated training rooms
- RF screen rooms
- Environmental testing equipment

Certifications	Description
AS9100D	Quality management for aviation, space, and defense industries
ISO 9001:2015	Quality management
J-STD-001F/J-STD-001FS	Soldering certification/space addendum
IPC-A-610F, IPC-6012C	Workmanship and production certification
ANSI/ESD S.20-20-2014	ESD control certification
MIL-STD-810F / 461E and GOST-R	Product certification



Aerospace Instrumentation Solutions



 defense-solutions.curtisswright.com/contact

 ds@curtisswright.com

 defense-solutions.curtisswright.com

Dublin, Ireland

+353.1.295.12649

dub_customersupport@curtisswright.com

Newtown, PA

+1.267.352.2000

NTW-Support@curtisswright.com

Palmdale, CA

+1.661.273.7003

iads-support@curtisswright.com