NETWORK-CENTRIC FLIGHT TEST ARCHITECTURES

The easier management and control of large amounts of data can be achieved with the modern Ethernet over IP and the right software

The integration of various high-speed sensors and 10Gb plus Ethernet backbones within the flight test instrumentation (FTI) community has vastly increased data rates, onboard processing requirements, pure network architecture and cybersecurity requirements. These latest high-speed systems often need to record traditional low-speed data such as PCM, 1553, video, analog and discrete signals. Conventional hardware-based CH10 recorders are too slow for new programs, have too much latency and limited processing power. The new requirements for recording high- and low-speed signals in a usable and protected format has moved the industry toward new FTI technology.

Ampex Data Systems produces airborne solid-state recorders and, like GDP Space Systems and Acroamatics, is within the Delta Information Systems portfolio of companies. Ampex is the only avionics company to offer a complete, high-speed NextGen FTI solution designed to combine conventional data and the latest network requirements in a future-proofed system with onboard machine-learning-based data management and cybersecurity options.

In addition to NextGen FTI, Ampex's sister division, Delta Digital Video, is delivering the next generation of video encoders. Delta's new 7800 Series H.265 video encoders provide far greater compression efficiency (~50%) than H.264 solutions. Implementation of H.265 provides better video quality or twice as many channels over existing TM links. Required storage capacity can also be reduced when recording video that is compressed using H.265.

Today's telemetry ground stations are migrating from traditional serial pulse-code modulation (PCM) data distribution to telemetry over IP architectures.

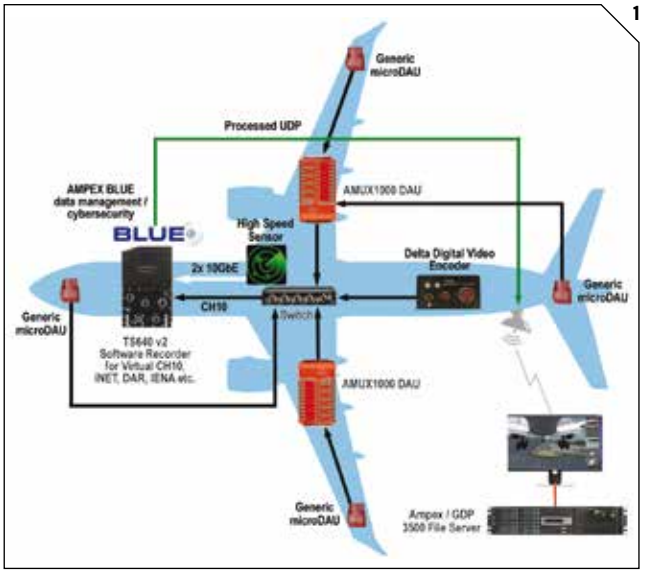
GDP Space Systems and Acroamatics Telemetry Systems kickstarted the migration to telemetry over IP by pioneering Bit Synchronizers with Ethernet data output capabilities at the International Telemetry Conference (ITC) more than 15 years ago.

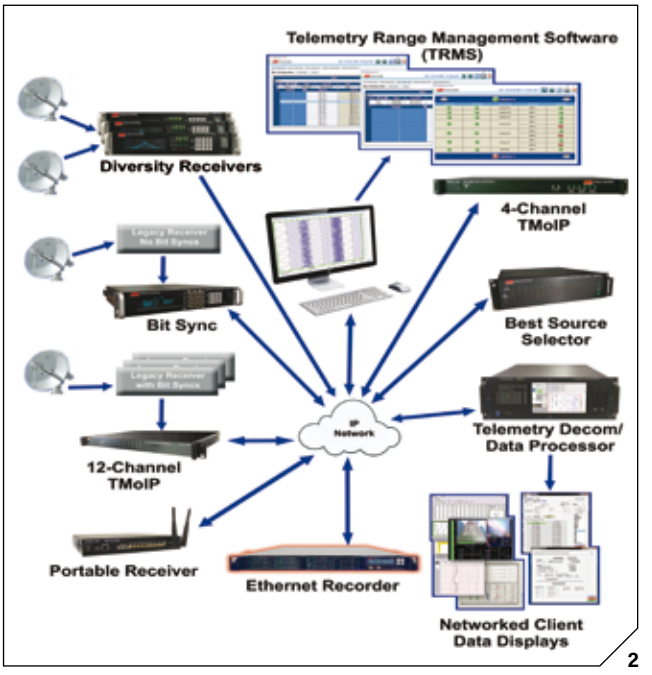
Today, these two companies are continuing to develop innovative technology solutions that support Ethernet data and control interfaces. GDP Space Systems' network-centric products include telemetry receivers, bit synchronizers, telemetry gateways, best source selectors, ethernet recorders, and telemetry data processing and display systems.

Ethernet transport can be used as a modern matrix switch, meaning data streams can be easily electronically routed between acquisition, distribution, and processing and display devices. This method is far superior to previous methods of routing data through legacy matrix switches via coax cables, distribution amplifiers and patch panels.

Ethernet transport is essential in today's systems, as data rates have increased to a level that legacy infrastructures can no longer support. Ethernet allows many hundreds of megabits of data to be sent over a single link, distributing them to an unlimited number of devices on the network through commercial switches and routers. Additionally, it provides secure, lossless data distribution between geographically dispersed assets.

GDP Space Systems and Acroamatics Telemetry Systems Telemetry Range Management Software (TRMS) application has been developed to enable easy operator access and management of the routing of data between devices across a network. Control and status of GDP Space Systems, Acroamatics Telemetry Systems and other third-party devices are supported by TRMS. The software also includes debug and status tools that enable the operator to know when data is flowing and to effortlessly test, pinpoint and resolve problems. \\





1 // A typical network setup for flight test

2 // A selection of telemetry solutions delivered over an IP Network