F15s and F16s Flying Over Beautiful Destin, FL Equipped with the URITS System.

High Power S Band SSPA Enhances the URITS Air Combat Training System

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A new high power S Band SSPA has been developed by Aethercomm, Inc., of San Marcos, California for use in demanding applications in extreme environments. One such application is the URITS air combat training system produced by Metric Systems Corporation of Fort Walton Beach, Florida. The URITS system consists of a suite of instrumentation pods and a debriefing station. The pods are carried externally by fighter aircraft to track and record all airborne maneuvers and weapon system events. The debriefing station provides high-fidelity post-mission visualization of air combat training events and weapon employment scenarios using data recorded by the pod in flight.

A key component of the URITS airborne instrumentation pod is the Random Access Pod Interactive Data-Link (RAPID). This data-link provides direct pod-to-pod data communications and supports 99% message reliability at ranges up to 75 nautical miles at S-band. The URITS system also supports alternative data link systems at L-band (100 nm) and UHF (175 nm).

RAPID provides both autonomous, direct pod-to-pod communications, and an optional capability to monitor aircraft training activities in real time. The system ensures high message reliability at extreme data link ranges employing a combination of processing techniques including forward error correction, 24-bit cyclic redundancy check, and Viterbi decoding.

The URITS system contains an Intelligent Flash Solid State Recorder (IFSSR) to reliably record digital data in the harsh external store environment of high performance fighter aircraft. The IFSSR also provides the means to upload pre-mission data to configure the URITS Airborne Pod to support a variety of training and test mission requirements. Pod data may be transferred in DOS compatible file format on a Data Transfer Device (DTD) consisting of a Type III PC card enclosed in a protective metal cartridge. The DTD capacity of 175 Megabytes is sufficient to record all data from every participant in a 24 player exercise.

Metric Systems Corporation was awarded a contract to supply US Air Force in Europe the URITS system. Eight systems were delivered to squadrons in 1999, providing air combat training for all F-15, F-16, and A-10 squadrons in Europe. This success resulted in an additional contract for URITS systems deployed to Prince Sultan Air Base in Saudi Arabia, which became operational in January 2000. URITS now supports continuing training for pilots rotating through the region, flying training missions one day and flying peacekeeping missions over Iraq the next. So far, sortie effectiveness rates are better than 97%, far exceeding the specified 85% success rate.

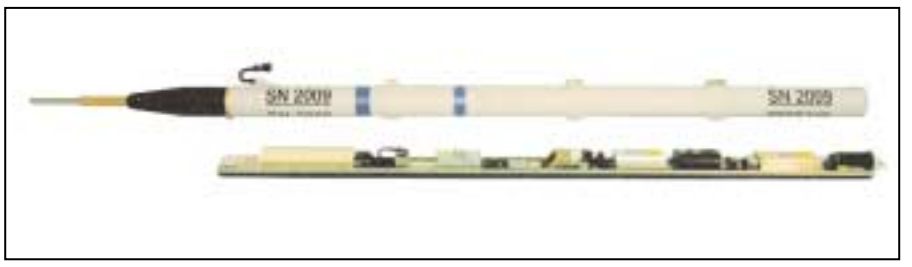
The URITS airborne pod's tracking solution is provided by a 10 channel, all in view, differentially correctable P(Y) code receiver using Wide Area GPS Enhancement (WAGE) to reduce the two most predominant P(Y) code error sources-satellite ephemeris errors and satellite clock bias errors. The GPS receiver is tightly coupled with a 1 degree/hour Fiber Optic Gyro (FOG) inertial sensor via a 24 state Kalman filter providing accurate full state-vector tracking through the full range of dynamics of modern tactical aircraft. An integral Air Data Sensor also provides parametric tracking data.

The URITS systems is a highly reliable, extremely accurate training system, used in very extreme environments found at the external stores stations on fighter aircraft. The Aethercomm SSPA 10007-001 is a key component in the URITS RAPID system, used to transmit training data between pods. The 10007-001 is located in each of the URITS training pods, and is used to provide the final signal amplification required to complete the data link. The URITS training pods may either be air or ground based.

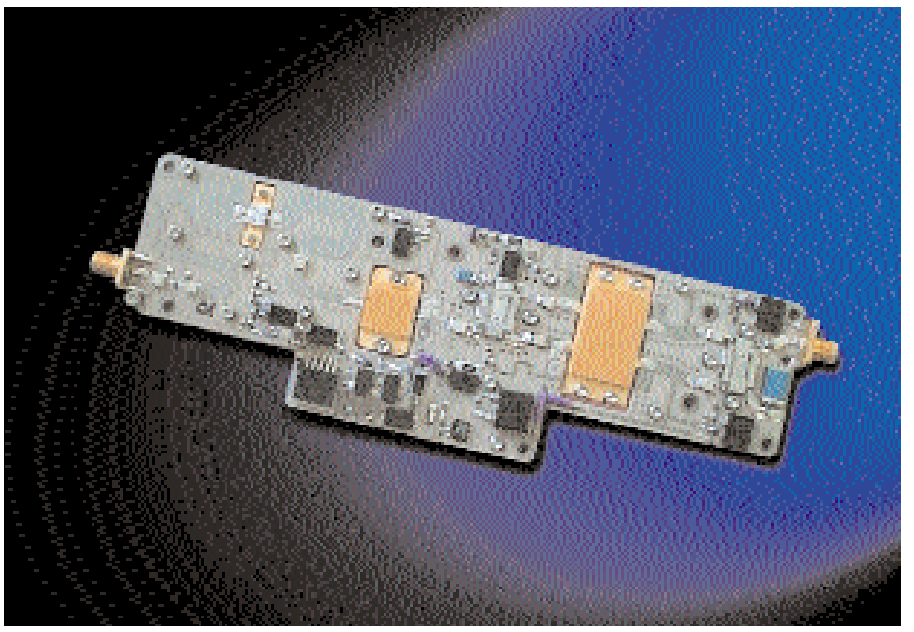
The 10007-001 offers the following typical operation performance: The amplifier provides a 1 dB compression power (P_{1dB}) of 50 dBm (100 Watts) between 2200 and 2600 MHz, with the amplifier power gain at this output level better than 30 dB. Typical operational power added efficiencies run about 35%, at ambient temperatures. Gain flatness is better than ±1dB within the full 400 MHz bandwidth. All of these are typical values measured at room temperature (25°C).

The 10007-001 performs well in extreme environments as well as under ambient conditions. The SSPA has been tested from –50°C to +81°C, and performed well under each of those conditions. The SSPA provided better than 90 watts at the hot temperature extreme, and 120 watts at the cold extreme, as well as the 100 watts at ambient conditions previously mentioned.

The 10007-001 comes housed in an approximate 2.5" x 7.5" package, and weighs less than 1 lb. The amplifier may be operated either in continuous wave (CW) or pulsed mode however, heat sinking will be required if operated in the continuous wave mode. The input DC voltage to the amplifier is 12 volts. The amplifier typically consumes in the neighborhood of 20 amps of current in CW mode, but this may be reduced by placing the amplifier in a deeper class AB mode. The input and output return losses are typically better than 1.5 : 1.



Metric Systems Corporation URITS Pod



Aethercomm's 100 Watt S Band Solid State Power Amplifier

Aethercomm, Inc. provides both custom and off the shelf solutions for RF, microwave and millimeter wave applications in commercial, military and satellite communication systems. We are expert in the design and manufacture of Solid State Power Amplifiers (SSPA), Low Noise Amplifiers (LNA), linearized power amplifiers, transmitters, receivers, synthesizers, and frequency converters. Aethercomm can custom design any of the above mentioned systems, or will modify any of its existing designs to tailor the products performance to the customer's own specifications.

The Aethercomm design staff brings extensive experience to bear on the most difficult designs, resulting in first pass success and quick turn around times. Aethercomm has technical expertise ranging in frequency from a few Megahertz to 40 Gigahertz. Some examples of previous Aethercomm work include: Satcom and Military SSPAs (L,S,C,X, Ku and Ka), Satcom, Military and commercial High IIP3 LNAs, Linearized Power Amplifiers, LMDS links (27 GHz), and 40 GHz point to point radios. Once designed, Aethercomm controls both the expertise and facilities to manufacture and test all of its designs, in both small and large quantities as required. Aethercomm possesses an outstanding technical staff available to fulfill the customer's RF needs, whether you need a paper design, prototype hardware or production RF equipment.

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