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## Upcoming Trade Shows

- Satellite 2007**  
**When:** 19-22 February  
**Where:** Washington, DC  
**URL:** [www.satellite2006.com](http://www.satellite2006.com)
- 
- AFCEA TECHNET Tampa**  
**When:** 13-14 March  
**Where:** Tampa, FL  
**URL:** [www.afcea.org](http://www.afcea.org)
- 
- Aerospace Test Expo-Europe**  
**When:** 27-29 March  
**Where:** Munich, Germany  
**URL:** [www.aerospacetesting-expo.com/europe](http://www.aerospacetesting-expo.com/europe)
- 
- National Space Symposium**  
**When:** 9-12 April  
**Where:** Col. Springs, CO  
**URL:** [www.spacesymposium.org](http://www.spacesymposium.org)

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## President's View

### BURT SMITH REFLECTS ON THE FORMATION OF L-3 TELEMETRY & RF PRODUCTS AND UPCOMING CHALLENGES FACING THE SPACE INDUSTRY

L-3 Communications Telemetry & RF Products is led by Burt Smith, who has been president since 2002. Mr. Smith reflects on the current state and future of the **Space industry**.

**Question:** Why was L-3 Telemetry & RF Products formed?

**Answer:** The synergies were obvious. Both L-3 Telemetry East and Telemetry West serve many of the same markets with similar products and technology. Pooling our resources and sharing technology only makes sense. By better coordinating and utilizing our investments, L-3 Telemetry & RF Products will be able to increase product offering capabilities while expanding the scope of research and development.

**Question:** What changes in the TT&C (Telemetry, Tracking & Control) side of the space industry do you foresee over the next 5 years and how will Telemetry & RF Products respond to them?

**Answer:** We certainly see a continued thrust towards smaller, more cost-effective, operationally responsive systems – with increased capabilities – across the board in the world's military, civil and commercial space markets. L-3 Telemetry & RF Products continues to leverage our internal research & development towards technologies that will bring us closer to these solutions. We are using our packaging expertise to shrink products to meet market demand. We are working with multiple waveforms and standards to ensure that our products are well positioned to compete in the global TT&C market.



**Burt Smith**  
 President  
 L-3 Communications  
 Telemetry & RF Products

**Question:** What are the largest things beyond straight performance a customer should consider when looking for a preferred supplier for space-qualified components and systems?

**Answer:** Heritage, depth of experience, knowledge – this is where the pitfalls and lessons learned are applied. The mission-critical nature of TT&C components requires assurance that command & control will happen when it's required on orbit. At L-3 Telemetry & RF Products, we specialize in high-reliability space products. But we also have the depth of multiple levels of product expertise, including COTS boards & boxes, terrestrial radios, ground station rack mount equipment, airborne communication systems – which all contribute towards a “high-rel” product that can be depended on to perform – while also considering cost effective design and manufacturing techniques.

*Excellence You Can Measure*



## Space Solutions - Product Updates

### L-3 COMMUNICATIONS AWARDED MULTIMILLION-DOLLAR CONTRACT TO SUPPORT THE U.S. AIR FORCE SPACE TELEMETRY, TRACKING AND CONTROL NETWORK

L-3 Telemetry West in conjunction with L-3 Communication Systems East will provide the U.S. Air Force prototypes of the next-generation, crypto-modernization-compliant encryptor and decryptor for satellite telemetry, tracking and control (TT&C). They will include two configurations – an embeddable solution (ES) and a standalone end cryptographic unit (ECU).

The AVE I1 product (an NSA Type 1-certified space flight TT&C COMSEC device) will consist of a hardware solution that can be programmed with different algorithms for command and telemetry applications.



### INCONTROL SOFTWARE

**InControl Software** is the most powerful and flexible satellite ground system solution available today.

#### Comprehensive Functionality

InControl supports the full range of command and control system requirements, including telemetry processing, commanding, data display and analysis, fleet monitor and control, onboard system management, and ground equipment monitor and control.

#### Visionary Architecture

InControl is not just a software product—it is also a comprehensive architecture, specifically crafted to evolve over time without impacting the fundamental system design.

- System wide user interface
- Command Procedure platform
- Dynamic Data Display
- Secure four layers of operations security
- Written to software industry standards
- Multi-satellite & fleet support
- Telemetry & commanding
- System automation
- Easily extensible and customizable
- Platform independent



### CXS-2000

The CXS-2000 is a dualband Flexible Secure Transponder designed for satellite TT&C applications. It is a programmable multi-mode unit for use with various systems, including Space-Ground Link System (SGLS) and Unified S-Band (USB). It operates directly at L- and S-bands as a stand-alone transponder or with separate up/down converters up to Ka-band frequencies. The input/output frequencies are independently synthesized from an internal ultra-stable reference oscillator which may be slaved for coherent operation. The unit includes embedded COMSEC compatibility with multiple encryption/decryption algorithms.

The CXS-2000 is based on both the proven heritage of L-3 Telemetry & RF Products' CXS-610 and CXS-810C and the latest in digital radio (digital signal processing) techniques. The CXS-2000 provides a flexible, high-performance, cost/weight/power/space-saving transponder for high-reliability applications. The unit is also available with an optional triplexer included as an integral part of the transponder. Other optional customer requested custom interface characteristics for command function inputs and telemetry outputs can be provided.



**CXS-2000  
Transponder**

## Recent Launches With Our Products Onboard

**ETS-8 – 18 DECEMBER 2006** <http://spaceflightnow.com/h2a/ets8/>

Japan's largest satellite was launched by the nation's most powerful rocket Monday, December 18, to begin a mission testing technologies to aid the burgeoning mobile communications industry. Liftoff of Japan's eighth Engineering Test Satellite occurred at 0632 GMT (1:32 a.m. EST) from the Yoshinobu launch complex at the Tanegashima space center.



## Space Solutions - Research Update

### SPACE OPTICAL COMMUNICATIONS LINK

In support of improving our competitive advantage by targeting key technologies for investment, L-3 Telemetry & RF Products (T&RF) recently designed and built a free space optical communications link for initial investigations in our laboratories.

Specifically, free space optics (FSO) communications refers to LASER-based optical communications. Within the context of our business domain, this can involve satellite-to-satellite, satellite-to-ground, satellite-to-aircraft, ground-to-aircraft or aircraft-to-aircraft communications.

L-3 T&RF engineers designed and built a free space optical communications link capable of operating at up to 2.48 Gbps using optical components from various manufacturers. Using two optical cables (one for the transmitter and one for the receiver), electronics and optics were mounted and separated by 20 feet in our lab, with the link operating in the near-IR spectrum at a wave length of 1550 nanometers.

Using an optical LASER diode transmitter (with supporting interface electronics) driven from a high data rate bit error rate tester, the output was driven to a fiber optic cable that was coupled to some simple optics consisting of a collimator and steering mirrors, thereby forming the final transmitted IR beam.

On the receiver end, the link consisted of focusing mirrors and optics to concentrate the transmitted IR beam and focus it on the end of another fiber optic cable. The receive fiber optic cable was then interfaced to a LASER detector diode and associated data and clock recovery circuitry. The recovered data and clock were then applied to the BER tester/receiver to complete the communications link.

The goals for the IR&D project were three-fold. The first goal was to gain some practical knowledge in free space optical communications so we can have a basic understanding of the technology and how to apply it. The second goal was to build and test a simple, high data rate (2+ Gbps) free space optical communications link in a lab environment. The third goal was to determine how the optical communication components might be integrated into various optical assemblies (systems) to support long-range communication for air-to-air, air-to-ground and space-to-ground applications.



## L-3 Telemetry & RF Products Gives Back.....

### L-3 TELEMETRY WEST DONATES TO RADY CHILDREN'S HOSPITAL

L-3 Communications Telemetry-West donated \$2,840 to Rady Children's Hospital. The funds were received from the 2006 Holiday Party silent auction and the generous donations of our employees. Rady Children's Hospital is the San Diego region's only designated pediatric trauma center and the only area hospital dedicated solely to pediatric care.

Read more information about Rady Children's Hospital at [www.chsd.org](http://www.chsd.org)

### L-3 TELEMETRY WEST CONTRIBUTES TO VOICES FOR CHILDREN HOLIDAY PARTY

Voices for Children gave a holiday party for more than 400 children on December 9, 2006, providing a personalized gift for each child attending. This is an annual event given for the children and their Court Appointed Special Advocates.

Read more information about Voices For Children at [www.voices4children.com/](http://www.voices4children.com/)



## Telemetry Solutions

### NOW SHIPPING - PMC DECOMMUTATOR / SIMULATOR (50 MBPS)

L-3 Telemetry West is pleased to announce volume shipments of our newest member of the PCI Mezzanine Card (PMC)-based I/O family of Ground Telemetry Systems products.

The 30 Mbps PMC Decommutator / Simulator (DSZ543) and 50 Mbps (DSZ545) modules are multi-format dynamic PCM test instruments designed for the most robust and demanding telemetry applications. The products perform frame-synchronized format switching for up to 16 unique formats and support a large aggregate major frame size to over 4 million words with minor frames to 65,536 words. The Simulator functions test the decommutator and the database defining the PCM data stream. They provide static and dynamic simulation capabilities for virtually all telemetry formats in both open- and closed-loop applications, including multistage events, simulating complex combinations of computer, sensor, and discrete data. The simulators generate a serial data stream in any selected code at rates up to 50 Mbps and can switch formats at minor and major frame boundaries for up to 16 different formats.



**PMC Decommutator/  
Simulator  
Transponder**

Users can select a static and/or dynamic data source for system checkout and calibration requirements, and change data word values, without interrupting the bit stream. Multiple modules can be included in the same system for simulating independent data streams.

### Product Highlight

- Decommutates and simulates a serial PCM data stream from 10 bps to 30 Mbps (DSZ543) or 10 bps to 50 Mbps (DSZ545), DM-S, DM-M

### L-3 TELEMETRY EAST CONTINUES TO SUPPORT THE SM-3 PROGRAM

In a partnership support role with the Boeing Company, L-3 Telemetry East (L-3 TE) continues to support the success behind Raytheon's Standard Missile-3 (SM-3) program.

L-3 TE has been awarded a follow-on contract award in support of SM-3. L-3 TE delivers the Encryption and Transmitter portions of the product's Telemetry system, which makes up the core critical elements of the weapon's Kill Vehicle. L-3 TE has successfully delivered hardware requirements for past SM-3 efforts.

**March 8th, 2006** – successful test shot where a Standard Missile-3 (SM-3) was launched from the USS Lake Erie (CG 70) in a Missile Defense Agency and Japan Defense Agency joint test in the Pacific. The cooperative test demonstrated the SM-3's capabilities with a Japan-designed advanced nosecone.

**November 17th, 2005** – testing successfully demonstrated the SM-3's ability to engage a "separating" target, where the target warhead separated from its booster rocket, requiring the interceptor to distinguish between the body of the missile and the actual warhead.

**February 24th, 2005** – the Aegis BMD System and Standard Missile-3 (SM-3) destroyed a ballistic missile outside the earth's atmosphere during an Aegis BMD Program flight test over the Pacific Ocean.

**Between January 2002 and late 2004** – the Aegis Ballistic Missile Defense (BMD) system successfully intercepted targets in space four times with the SM-3 system. In all flight tests, the SM-3 was successfully launched from a U.S. Navy cruiser under increasingly realistic and operational conditions.



**SM-3 Launch**

## Telemetry & RF Products Assist Their Customers

L-3 Communications Telemetry & RF Products continues to supply Raytheon with quality products. Harry Schulte, Strike Weapons vice president at Raytheon Missile Systems in Tucson, states in the article below that five years of JSOW on-time delivery could not be accomplished without complete supply chain performance, including suppliers.

The suite of products supplied by L-3 Telemetry & RF Products to JSOW are shown below.



**FTR-915A1**



**CTS-905**



**VCS-700**



**PCM-600**

### RAYTHEON DELIVERS JOINT STANDOFF WEAPON ON SCHEDULE FOR FIVE CONSECUTIVE YEARS

(TUCSON, Ariz., Oct. 9, 2006) – Raytheon Company has achieved five consecutive years of meeting or exceeding contract schedule deliveries of the Joint Standoff Weapon (JSOW). JSOW provides warfighters a long-range, precision-guided, air-to-ground weapon that allows them to stay out of harm's way.

JSOW-A and JSOW-C variants shipped to the U.S. Navy in September marked 60 straight months of on-time or ahead-of-schedule deliveries. Raytheon is currently delivering the weapons four weeks ahead of contract schedule. More than 2,500 have been delivered to date. Raytheon is under contract with the Naval Air Systems Command to provide JSOW to the Navy, Marine Corps and Air Force.

Raytheon's JSOW program won the 2005 U.S. Department of Defense David Packard Award for Excellence in Acquisition for JSOW Block II cost reduction initiatives resulting in a 25 percent reduction in unit cost.

"Five years of on time production that provides our warfighters with a critically needed weapon is a remarkable accomplishment," said Harry Schulte, Strike Weapons vice president at Raytheon Missile Systems in Tucson. "This five-year milestone represents a lot of hard work, careful planning and attention to detail by all members of the JSOW team including suppliers, contractor and the government."

JSOW production will transition to Block II in 2007, which significantly lowers the unit price. Raytheon and the Navy have begun development of a Block III variant of the weapon, which will add moving target capability by including a weapons data link and other improvements. "We will give the fleet the capability to engage moving land and sea targets at range using a network-capable weapon," said Cmdr. Eric Holmberg, the Navy's deputy JSOW program manager. "JSOW Block III will enable our Navy and Marine Corps warfighters to attack moving enemy targets at long range through bad weather."

JSOW is a joint Navy and Air Force program. It is a family of low-cost, air-to-ground weapons that employ an integrated global positioning system-inertial navigation system that guides the weapon to the target. It uses a common and modular weapon body capable of carrying various payloads. Its long standoff range, greater than 70 nautical miles, allows delivery from well outside the lethal range of most enemy air defenses. The weapon's low radar cross section and infrared signature are key stealth features and ensure a high probability of survival en route to highly defended targets.

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*"Five years of on-time production that provides our warfighters with a critically needed weapon is a remarkable accomplishment."*

Harry Schulte  
Strike Weapons Vice  
President at Raytheon  
Missile Systems in Tucson

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**communications**  
Telemetry & RF Products

Today, Telemetry & RF Products serves commercial, military, and civilian customers worldwide, with a product offering that includes TT&C satellite transponders, high data rate satellite transmitters, high-power amplifiers, high-reliability receivers/transmitters, encryption/decryption units, video compression/decompression units, tactical intelligence radios, tactical HF/SSB and microwave radios, telemetry ground system components and solutions, and specialized telemetry and surveillance products.

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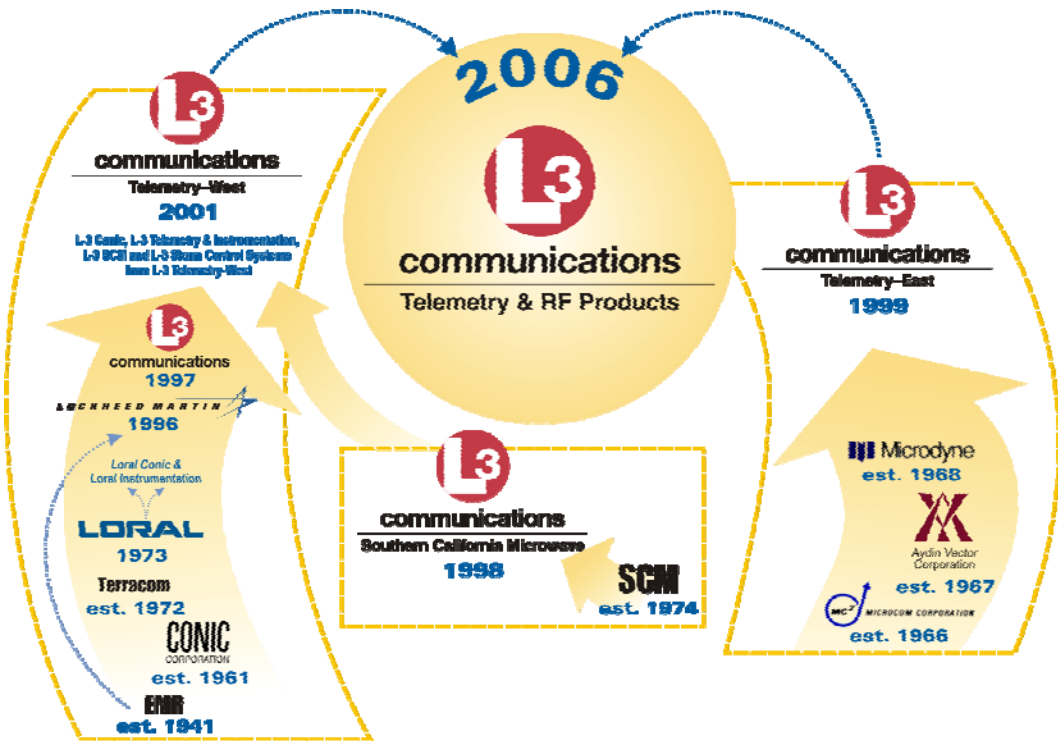


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## L-3 Telemetry & RF Products Heritage



L-3 Telemetry & RF Products has over 65 years of heritage, bringing performance and value to virtually every major defense and aerospace organization in the world. We're joined in that legacy by over ninety L-3 divisions, each a leader in its area of expertise - from microwave components, antennas and telemetry instrumentation to satellite communications and secure communications systems.

Our breadth of capability continues to grow with full spectrum solutions, including integrated ground-based and airborne telemetry components and systems as well as complete systems engineering and integration services.

**How do we measure up? (<http://www.l-3com.com/TW/VOC/index.htm>)**