



ITT

GPS Navigation Payloads

Mission Success is Our #1 Priority We Deliver with Reliable, High Performance Systems.

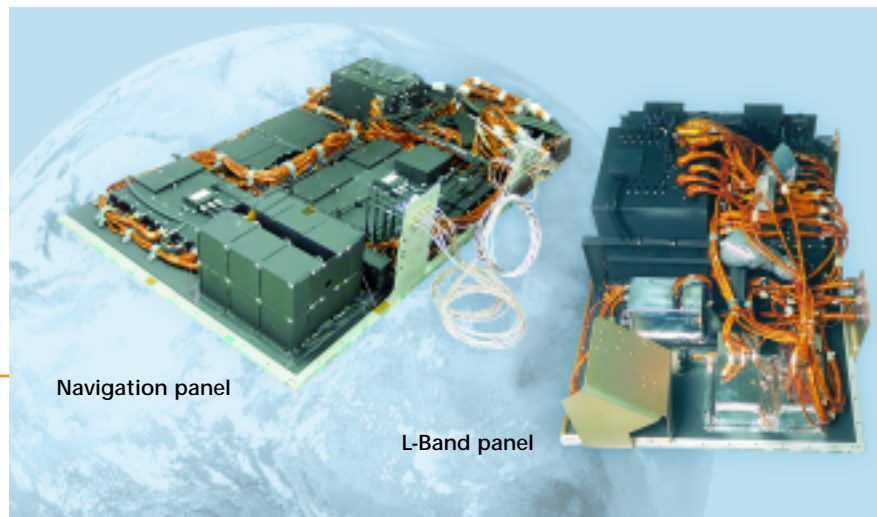
At ITT, your success is our priority. Since 1974, ITT has been designing, developing, manufacturing, and integrating Navigation Payloads for the highly successful United States Air Force NAVSTAR Global Positioning System (GPS), the world's most accurate and reliable position-location system. In fact, our payloads have been on every U.S. GPS satellite ever launched and have accumulated nearly 500 years of orbit life without a single mission-related failure. Today, leveraging this proven technology, ITT has delivered Block IIR-M payloads, and is designing and developing the payloads for GPS Block III.

Latest Payload Technology – Block IIR-M

The GPS Block IIR-M payloads are designed to meet the rigors of space and operate in a high radiation environment. ITT's Block IIR-M Total Navigation Payload represents a significant step forward in added security and capabilities for the warfighter over the Block IIR.

The IIR-M payload provides the same precise three-dimensional position, navigation, and time information on a 24/7, worldwide basis as the predecessor IIR.

In addition, the IIR-M payloads provide the new military M-Code signal and the new civilian L2C signal to provide even better location accuracy to GPS users. The IIR-M payloads also broadcast higher overall power, and provide adjustable power levels among the codes on L1 and L2 to enable improved anti-jam performance for the military.



The Navigation and L-Band panels comprise of ITT's integrated GPS Total Navigation Payload. After testing end-to-end, including environmental tests, the payload is ready for integration into satellites.

GPS Navigation Payloads

Key Features

NAVSTAR GPS Block IIR-M

L-Band Flexible Power Subsystem

ITT's Flexible Power L-Band Subsystem provides the military and civilian user navigation signals at the L1 and L2 frequencies. Generating higher power levels than our IIR predecessors, our IIR-M transmitters allow for adjustment of the power level between the various codes at each frequency. This allows higher GPS signals in areas of military operations to improve the anti-jam performance of the constellation.

Timekeeping System (TKS)

ITT's patented TKS takes maximum advantage of the excellent short-term stability of state-of-the-art voltage controlled oscillators (VCXO) and the unparalleled long-term stability of Rubidium Atomic Frequency Standards (AFS). This subsystem provides the precision timing reference for synchronization of all of the GPS navigation signals.

Mission Data Unit (MDU)

The MDU, which is unique to the IIR/IIR-M satellite, performs all of the navigation processing including message processing and encoding, code generation, timekeeping, crypto processing, telemetry, self-navigation (Autonav), and overall payload housekeeping. It uses a 1750A space-qualified processor programmed in ADA in a redundant, RAD-Hard, upset-proof design, and can be totally reprogrammed from the ground.

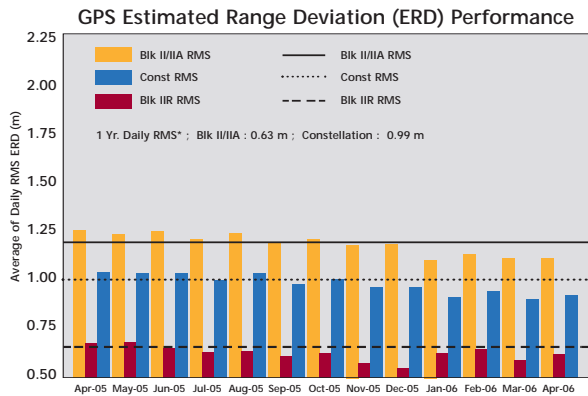
Crosslink Transponder and Data Unit (CTDU)

The CTDU is a state-of-the-art UHF/IIR-M transponder that uses frequency-hopped time division multiplex (TDMA) communications for inter-satellites data transfer. A precision inter-satellite ranging mode is also provided,

allowing autonomous self-navigtion of the GPS constellation. Self navigation (Autonav), a new capability that only exists on the IIR satellites, will also enhance GPS timing performance.

Waveform Generator Modulator Intermediate power amplifier Converter (WGMIC)

The WGMIC is one of three new boxes developed and qualified by ITT to bring the IIR payload up to Block IIR-M status. The highly flexible digital waveform generator is the heart of the IIR-M's ability to generate the M-code signal.



ITT's highly successful Total Navigation Payloads have significantly reduced the Estimated Range Deviation (ERD) performance for GPS. This effort has enabled the high performance GPS constellation that serves the world today.

ITT provides a full range of remote sensing solutions. Learn more at www.ssd.itt.com

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