

**PSPE Philadelphia Chapter** (page 1 of 2)  
**Outstanding Engineering Achievement Award Nomination Form 2009/2010**

**Name of Project:** Global Positioning System GPSIIR / GPSIIR-M Satellites  
**Location of Project:** Designed in E. Windsor NJ  
additional spacecraft design & fabrication in King of Prussia PA  
Current program office: Newtown PA

**Description of the Project:**

The Global Positioning System (GPS) is a U.S.-owned utility that provides users with positioning, navigation, and timing (PNT) services. This system consists of three segments: the space segment, the control segment, and the user segment. The U.S. Air Force develops, maintains, and operates the space and control. Lockheed Martin was awarded the contract to design and build 21 Block IIR spacecraft in 1989. The design phase was performed in East Windsor (Mercer County NJ) and construction in King of Prussia PA.

GPS Block IIR satellites began replacing the older GPS Block II/IIA satellites in 1997. The GPS Block IIR satellites boast dramatic improvement over the previous blocks with reprogrammable satellite processors to enable fixes and upgrades in flight.

Subsequently, 8 IIR vehicles were modernized with addition navigation signals. GPS Block IIR-M satellite improvements include a new military signal (M-Code) on both the L1 and L2 channels, and a more robust civil signal (L2C) on the L2 channel. On Aug. 17, 2009, the U.S. Air Force successfully launched GPS IIR-21(M), the last in the series of eight modernized GPS IIR satellites carried aboard the last of the Air Force procured Delta II Rocket from Cape Canaveral Air Force Station, Fla.

GPS Block IIF satellites (built by Boeing ) are the follow-up the the GPSIIR-M space vehicles. The first GPS Block IIF satellite is scheduled to launch in 2010.

In May 2008, Lockheed Martin was awarded the contract to design and build the next generation GPS Block III satellites. Design and construction is planned at the Newton PA facility. The GPS IIIA will transmit a new civilian signal (L1C), which is designed to be highly interoperable with the European Galileo satellite navigation system signal and intended to be fully compatible and interoperable with those signals planned for broadcast on Japan's Quazi-Zenith Satellite System (QZSS). For military users, GPS IIIA satellites will provide further increases in the anti-jam capability of the M-Code signals. The GPS III satellites will be developed in three increments with each increment including more capabilities based on technical maturity. GPS IIIA is projected to be available for launch in 2014.

**Completion Date:** August 17, 2009 (final launch of GPSIIR-M)

**Primary engineering Disciplines represented by the Project (check those that apply):**

Mechanical  
Electrical

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**Organizations/Firms that contributed to the Project and are responsible for the Achievement:**

**Names:** Spacecraft Integrator: Lockheed Martin Space Systems Company  
Navigation Payload: ITT Aerospace (Clifton NJ)  
**Address:** 100 Campus Drive, Newtown PA 18940  
**Contact Person:** Karen Gauthier  
**Phone:** 215-497-4424

**Owner:**

**Names:** Space and Missile Systems Center (SMC),  
**Address:** 483 N. Aviation Blvd, El Segundo CA 90245  
**Contact Person:** SMC Public Affairs  
**Phone:** (310) 653-1131

**Submitted by:**

**Names:** Lockheed Martin Space Systems Company  
**Address:** 100 Campus Drive, Newtown PA 18940  
**Contact Person:** Will Schartel  
**Phone:** 215-497-4454

**To be presented on December 3<sup>rd</sup> by:**

**Name:** Will Schartel (GPSIIR Mission Operations Lead)  
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