

## GPS Modernization



Dear Subscriber,

Welcome! With last week's successful launch of a Block IIR-M satellite carrying an experimental L5 demonstration payload, now is the perfect time to discuss the latest developments in GPS modernization in all 3 segments: space, control, and user.

Spirent has always been the test and simulation leader in user modernization technology, and we are committed to remain at the forefront to keep you there!

Sincerely,  
The Spirent Federal Team

## Helpful Overviews

[GPS Modernization Fact Sheet](#) by the US Air Force

[Overview of the GPS Wing](#) by Col. David Madden, GPS Wing commander

[Interview with Col. David Madden](#) on GPS modernization paradigm

## Space Segment

GPS space-segment modernization consists of new civilian and military signals and the new block satellite programs: Block IIR-M, Block IIF, and Block III.

**L2C** The L2 civil signal joined the legacy signals with the launch of the IIR-M space vehicles and is currently being transmitted by the 7 IIR-M satellites in orbit (including last week's newly-launched IIR-(20)M). The L2C signal will make GPS a more robust navigation service by further mitigating RF interference and reducing errors due to the ionosphere. Read a detailed [analysis of the L2C signal](#).

Because fully operational capability is not scheduled until 2016, L2C-enabled GPS receivers must currently be tested with satellite signal simulators. **Spirent Federal has supported L2C for many years, and the L2C signal is provided on the GSS8000 multi-frequency Spirent simulator.**

**L5** To meet an August 2009 International Telecommunications Union (ITU) deadline for frequency allocation, on Tuesday, 24 March 2009, the USAF launched IIR-(20)M, which will temporarily transmit a L5 signal. L5 will support safety-of-life, aviation and other applications and, at full-constellation strength, will mitigate most ionospheric refraction effects. L5 signals will be 4 times stronger than L2C, increasing performance in degraded conditions. Block IIF and Block III satellites will incorporate L5 signals; the first IIF satellite is scheduled for a late 2009 launch.

The modernization schedule does not call for fully operation capability of L5 until 2018. **Spirent Federal provides L5 capability TODAY in a stand-alone simulator or combined with GPS L1 and L2, GLONASS and Galileo simulation systems.**

**M-code** On 25 September 2005, the US Air Force launched GPS satellite IIR-(14)M into orbit, carrying a modernized navigation payload with additional military and civil signals. For authorized military users, M-code will improve immunity to interference and enhanced security. M-code will be the primary signal used by the US military once the full constellation is operational. Read about the [M-code signal design](#).

**Spirent Federal is the first company to offer M-code Simulator Data Sets (SDS) approved by the GPS Wing, and we offer a variety of M-code test capabilities for authorized users: [M-noise](#), [AES M-code](#), and [M-code SDS](#).**



(photo from United Launch Alliance)

[Watch IIR-\(20\)M launch.](#)

## Control Segment

In November 2007, Northrup Grumman and Raytheon were [awarded the first phases](#) of modernized Operational Control Segment (OCX) contracts. OCX is scheduled to replace the current OCS system in the 2012-2013 time span.

[OCX improvements](#) include increased user situational awareness with updated datasets, heightened coordination ability with other GNSS and SBAS, and continuous access to next-generation GPS III satellites.



(GPS World image)  
Read [GPS Control Segment](#) by the commander of the GPS Control Segment Group USAF.

## User Segment

[Two major Modernized User Equipment \(MUE\) contracts](#) have recently been awarded for the development of modernized GPS receivers. Col. David Madden, commander of the GPS Wing, has stated that prototype receivers are [scheduled for testing by 2010](#).

**Spirent Federal is proud to be the first company to obtain security approval from the GPS Wing for a simulator that meets all the requirements for MUE.**

**In September 2007, we delivered the first SDS M-code simulation system to Raytheon and Rockwell Collins in support of their MUE Receiver Card Development contracts. [Read more.](#)**



Read [Military GPS User Equipment \(MGUE\)](#) mission within the USAF to complete M-code capability.

## Upcoming Events



Come see Spirent Federal in booth #23 at the 2009 JSDE/ION [Joint Navigation Conference](#), 1-4 June.

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