



## Iridium NEXT SensorPODs: Global Access For Your Scientific Payloads

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# Focusing on the Future

## Iridium NEXT

- Comprehensive plan to replenish the Iridium constellation
- New 81 satellites with launches expected beginning 2015
  - 66 operational satellites to replace current constellation
  - 6 in-orbit spare satellites, 9 ground spares
- Compatible with current constellation to simplify network transition and continuity
- Ground architecture upgrade plan in progress
- Designed for hosting payloads - in discussion with potential candidates
- Will maintain Iridium's unique architecture and its advantages

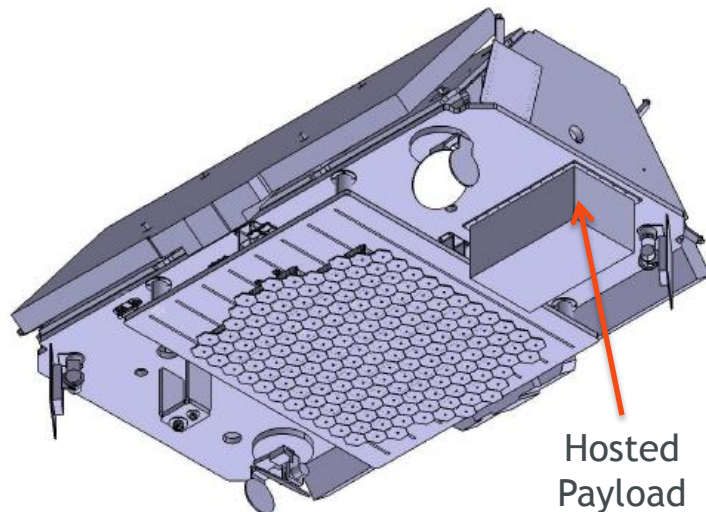


Iridium NEXT Specifications

Constellation	66 satellites in 6 orbital planes
Orbits	Near Polar
Altitude	780 km
Inclination	86.4°
Orbital period	100 minutes
Expected Launch Window	2015-2017
Risk mitigation	Multiple in-orbit spares, redundant backup Earth station

# Iridium NEXT Hosted Payloads

- Opportunity to host third party payloads on Iridium NEXT
- Hosted payload shares infrastructure of the Iridium NEXT satellite and the global networked communications architecture
- Flexible capability designed into every Iridium NEXT satellite. Interface control definition (ICD) between the SV and hosted payload defined
- The ICD to be become final at the PDR in Q1, 2012

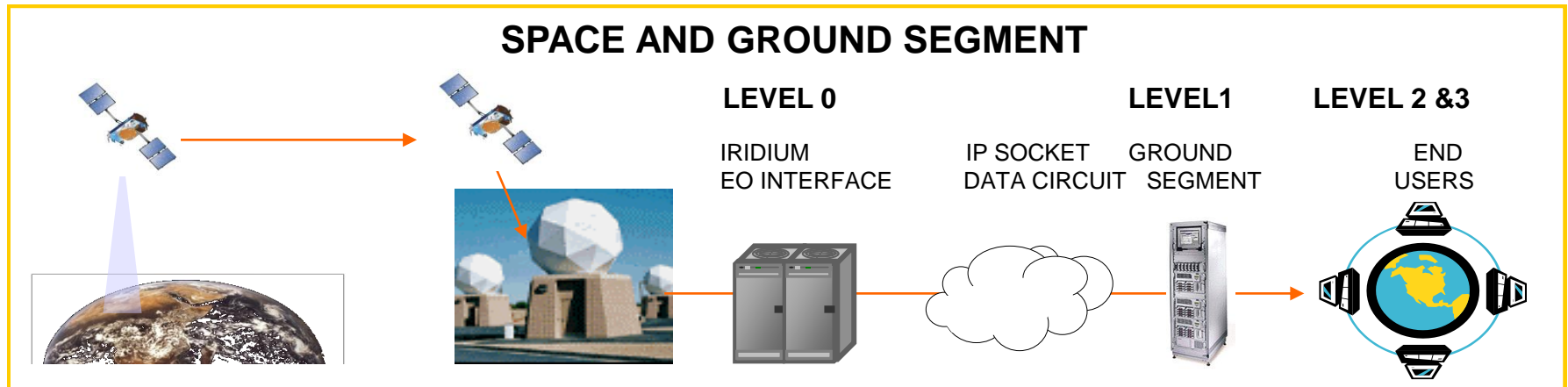


## Iridium NEXT Hosted Payload Specifications

Weight	50 kg
Payload Dimensions	30 x 40 x 70 cm
Payload Power	50 W average (200 W peak)
Payload Data Rate	<1 Mbps, Orbit average ~100Kbps

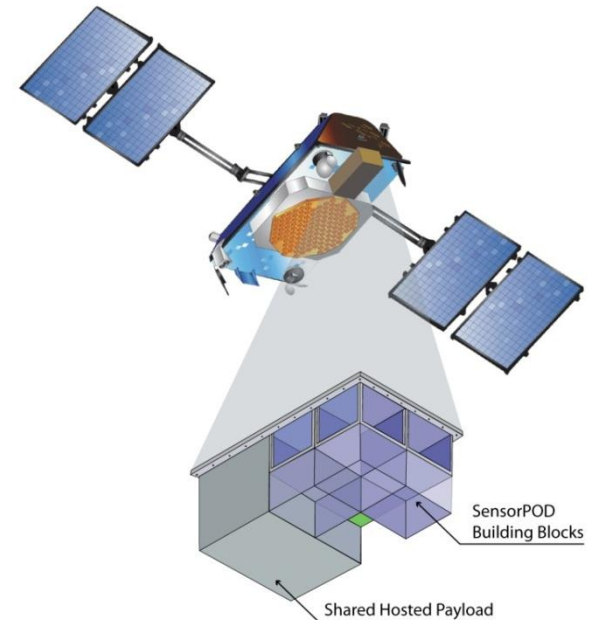
# Ground Segment and Validation

- **Level 0:** Data from the sensors fed through the Ka-band cross-links network to Iridium ground stations
- **Level 1:** Initial data processing, calibration, quality control, converted to a standard format
- **Level 2:** Calibrated data passed to the primary users
- **Level 3:** Value added data, products may be sold commercially
- **Validation:** Validate sensor data in real-time by using remote platforms on the Earth's surface and in the atmosphere for in situ calibration



# SensorPOD

- A new hosting concept called **SensorPOD** on Iridium NEXT constellation for cubesat class payloads:
  - Some hosted payloads on Iridium NEXT do not require full size, weight and power (SWaP)
  - Leverages multiples of 10 x 10 x 10 cm (1U) cubesat such as 2U - 4U type payloads, packaged as a SensorPOD in available SWaP
  - Iridium provides a three-axis stabilized platform, providing power and data communication
  - Entire SensorPOD volume and mass dedicated to the scientific payload
  - Flexible architecture - If a satellite does not carry a primary hosted payload, several SensorPODs could be hosted



Mass	4 - 5 Kg
Dimensions	Up to 20 x 20 x 14 cm
Power	Up to 5 W average, 10 W peak
Data rate	Up to 10 Kbps avg., 100 Kbps peak
Field-of-view	RAM & nadir viewing

# SensorPOD Unique Value Proposition

- Unprecedented global measurements from 66 Iridium NEXT satellites carrying SensorPODs
- Answers to pressing Earth and space science questions with critical scientific impact
- Enable new discoveries in climate, atmosphere, oceans and space weather
- Real-time global data for policy and decision makers
- A platform for developing new innovation from the next generation of scientists and engineers

# SensorPOD vs. Cubesat

## High-value, Low-risk Proposition

Item	SensorPOD	3U Cubesat
Payload Mass	4 - 5 Kg	< 1Kg
Constellation Formation	Built in capability for 66	Cost Prohibitive
Data Delivery	Real Time	Hours
Access to Space	Driven primarily by Iridium business, multiple launches starting in 2015	Undetermined, Opportunity driven,
Ground Infrastructure	Included	Must be built
Altitude	780 Km	Low to ensure de-orbit
Coverage	Global using multiple orbits	Single Orbit
Mission Life	Up to 12.5 years	6 months to 1 year
Power, communication, attitude control	Provided by host	All systems needed inside
Payload Life cycle Cost	< \$150 K per Kg/Year	\$250 K – 300 K per Kg/Year



# GEOScan: An Opportunity for Revolutionary Geoscience using Iridium NEXT SensorPOD

## What is GEOScan?

- GEOScan is a grass-roots scientific effort to place a suite of geoscience sensors on Iridium NEXT
- Proposing as a NSF Major Research Equipment Facilities Construction (MREFC)

## Why GEOScan?

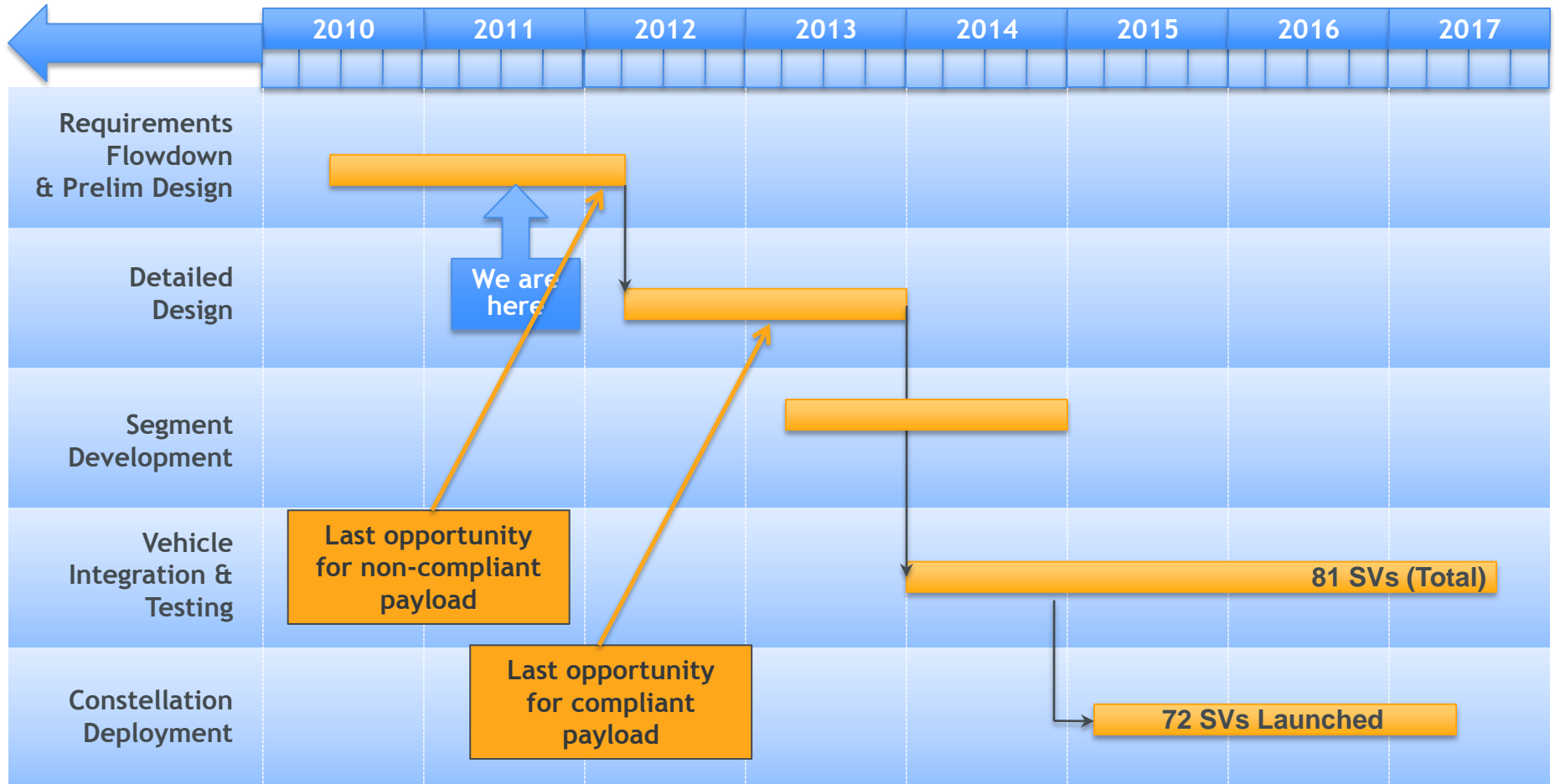
- A once in a lifetime opportunity to solve pressing societal and scientific questions using Iridium NEXT
- March 2011 workshop-120 registered attendees
- Goal: select most compelling yet feasible science goals and instrumentation



- Global scale observations
- Global Science- Climate, Albedo, Gravity-Hydrology, Space Weather
- Improved hurricane and weather prediction, volcanic ash, disaster recovery, space situational awareness
- Exceed many existing NRC measurement priorities at a fraction of the previous cost



# Iridium NEXT Development Schedule



Compliant Payload meets all SWaP and ICD specs  
 Non-Compliant Payload requires modifications to the bus

# Summary

- Iridium is a unique, time-tested, and operationally-proven interlinked LEO satellite system
- Development of the next generation Iridium NEXT constellation underway to provide business continuity and enable enhanced MSS services
- Offering a unique capability to host scientific payloads on Iridium NEXT to enable global observations
- Creates an all new paradigm for launching hosted payloads into space at a very low cost

**Time is running short on capitalizing on this unique opportunity for global Earth observations at a very small cost**