OCEAN INNOVATION & PARTNERSHIPS: *SUPPORTING REAL-TIME SATELLITE AIS*

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NON-Export Controlled Information

Oceans'16
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The sea's the limit!

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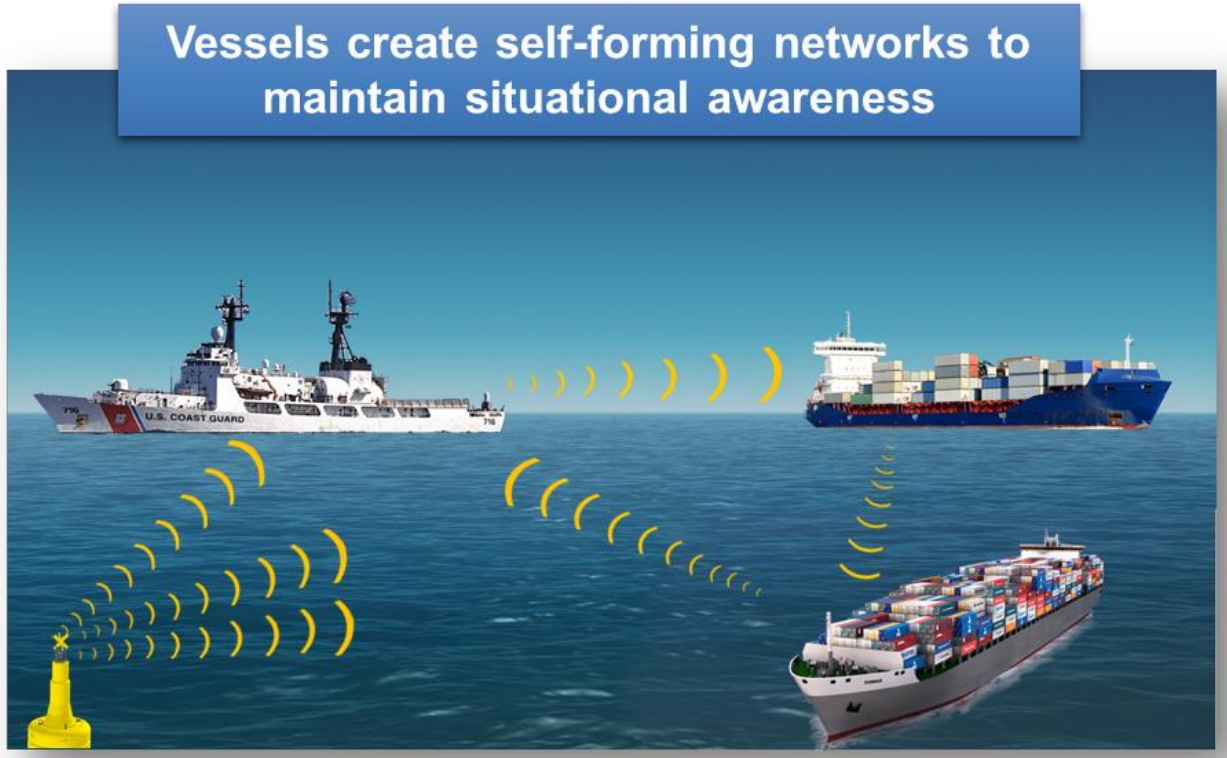
HARRIS® TECHNOLOGY TO CONNECT, INFORM AND PROTECT™

This presentation discusses a future capability currently in development. Any performance data metrics are based on our current analysis and will be validated through testing and on-orbit performance metrics.

Automatic Identification System (AIS) Overview

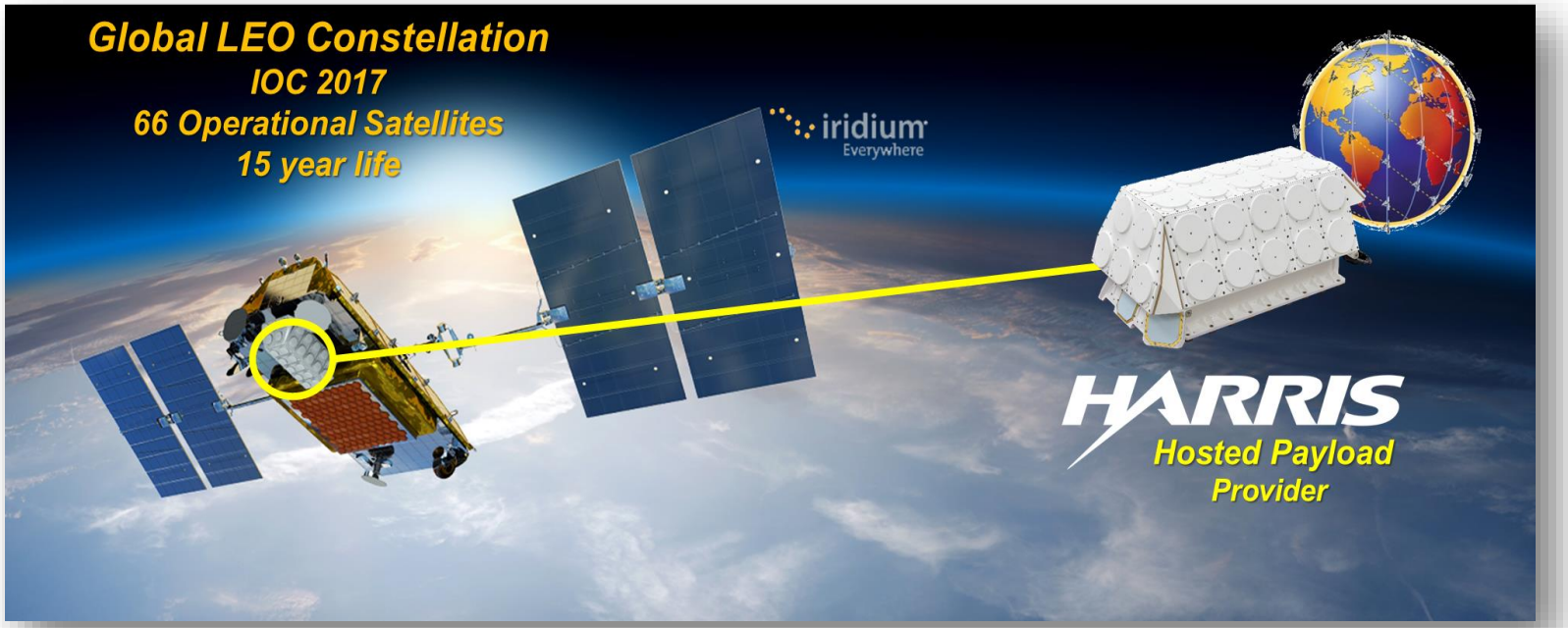
Vessels Communicate AIS Messages within the VHF Maritime Band

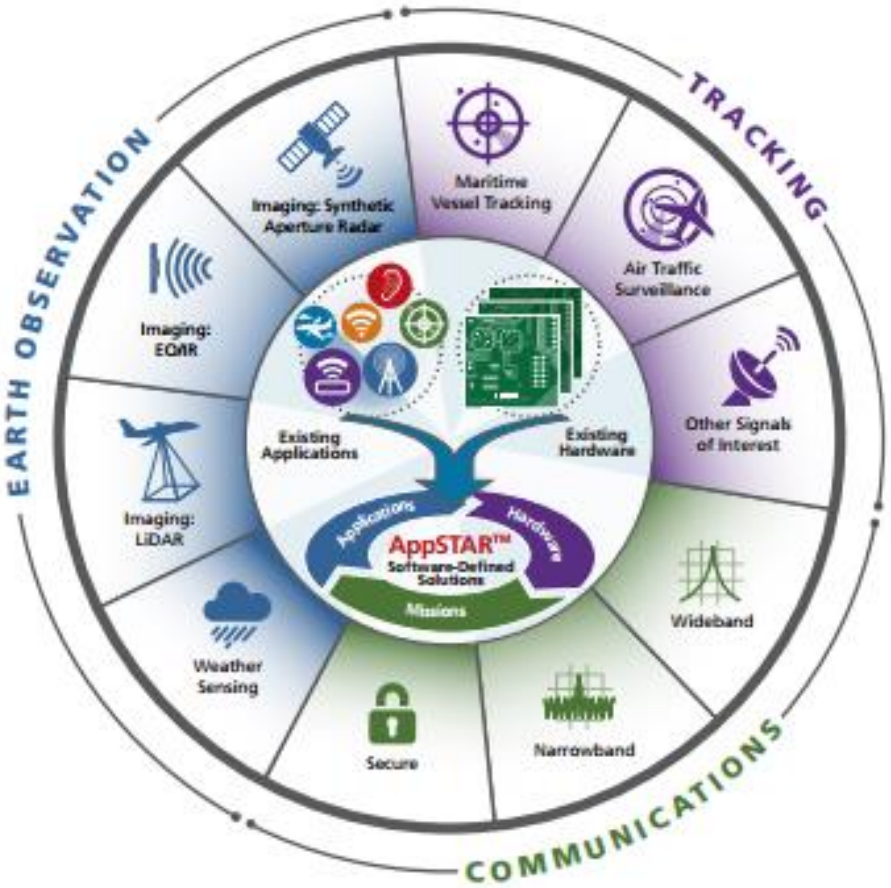
Location, Destination, Draught, and more are broadcast



- Ship-based & Terrestrial AIS developed in the 1990's
- Satellite-based receivers commercially available in 2008

Innovative Technology: AppSTAR™





- Reconfigurable payload
  - Software-defined architecture
  - Leverages proven hardware design and software modules
  - Supports simultaneous diverse payload missions
- Technology base for over 220 hosted payloads on Iridium NEXT Constellation

Reprogrammable VHF Constellation

Key Partnership

HARRIS

Has Joined forces with market leader

exactEarth

To Bring the Next Generation of
Real-time Satellite AIS Systems to the world

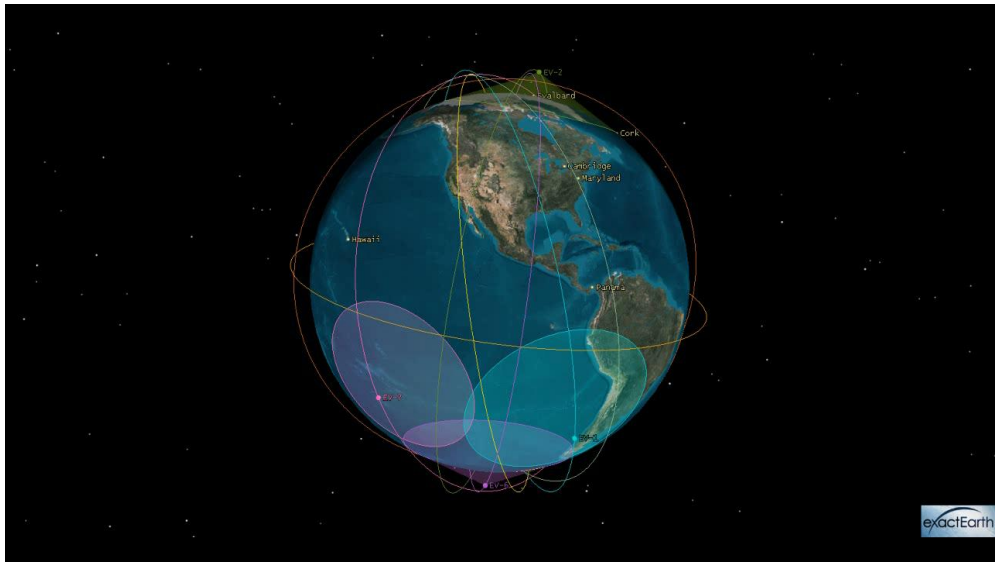
exactView™ RT

Powered By Harris Corporation

Premier Satellite AIS and Maritime Awareness Services

What We See Today vs. Tomorrow …

9 Satellites In Orbit Now



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6.5 million
AIS position reports daily

<30
Minute Avg. global latency

53,000+
Unique vessels detected in space daily

98%
Globe under persistent coverage

< 1
Minute Avg. global latency

3X-4X
Unique vessels detected in space daily

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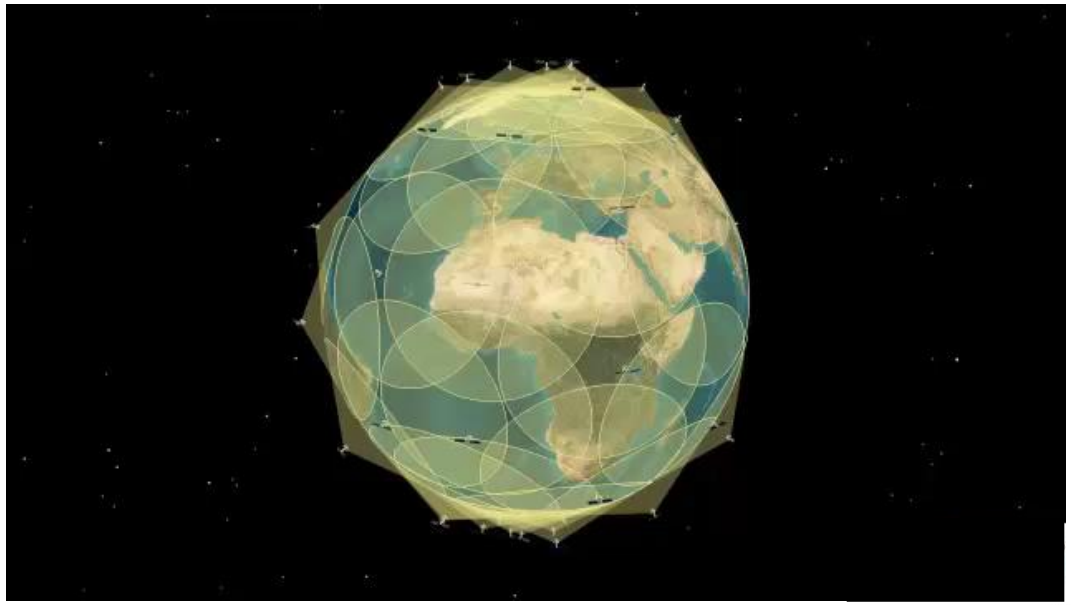
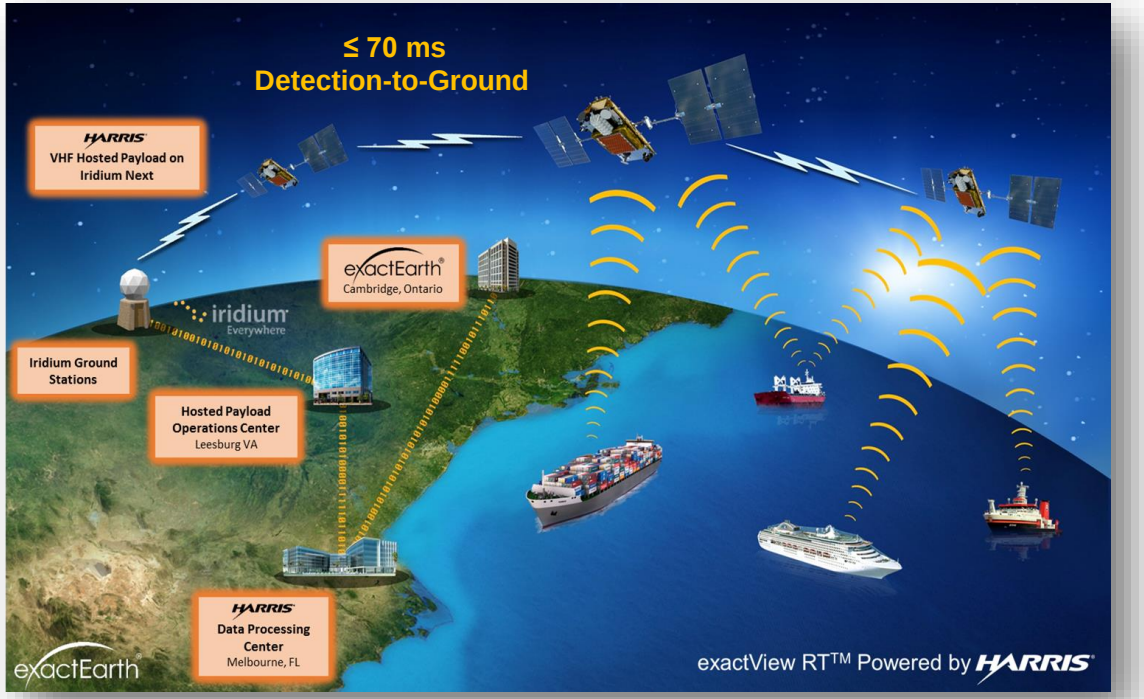
LAUNCHING SOON



58+ AIS Receivers

Key to Success: Business Model



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Commercial Investment

$3+ billion

Design, develop, launch of the Iridium next constellation. Additionally the development of the Harris AppStar SDR and hosted payloads

- Global Persistent Coverage
- Cross Linked Constellation Real-Time Downlink
- Reconfigurable Software Defined Radio's

Cost Prohibited to Achieve This Performance Otherwise

Using RT to Defeat AIS Manipulation Practices

Top Five AIS Manipulation Practices

New research by Windward identifies the top AIS manipulation tactics:

- *Identity Fraud*
- *Obscuring Destinations*
- *'Going Dark'*
- *GPS Manipulation*
- *AIS Spoofing*

Source: October 2013 – 2014 "AIS Data on the High Seas: An Analysis of the Magnitude and Implications of Growing Data Manipulation at Sea",

	Manipulation Practice	The "RT" Solution
1.	1% of all ships use fake identification information over the past year, resulting in several hundred vessels "in disguise" at any given time	**"Voyage of Life"™** is the cataloging of ships metadata and changes throughout the of life of a vessel. (Position, IMO#, Owner, Flag, MMSI, …). We validate and track against our 6 years historical AIS data and other sources
2.	Obfuscation, with on average, vessels report their next port of call only 41% of the time	**Real-time AIS** tracks, high-density historical data, sea-state and weather fusion enable more accurate predictions
3.	Over ¼ of the vessels worldwide turn off their AIS at least 10% of the time	**Real-time change detection** of AIS status including the moment it is turned on/off
4.	From mid-2013 to mid-2014 there has been a 59% increase in the use of GPS manipulation	**Position Validation** via 58+ LEO payloads allows accurate geo-location beyond the self-reported position
5.	AIS can be "spoofed" and inserted into the data stream allowing people to create "ghost ships" where none exist	**Coincident/Correlated collect** with other geospatial and real-time assets

Value of Real-Time Satellite Tracking & Monitoring

AIS + Data = Improved Maritime Awareness

One Ship, Many Questions

Environmental Regulations
Emissions, Travel through protected waters?

Maritime Security
Unusual / Illegal Behavior?

Insurer
Unnecessary risks or unplanned route?

Search and Rescue
State of Emergency, Conditions near emergency location?

Environmental Monitoring
MET and ocean conditions, Oil spill / pollution detection?

Port Authority
Arrival Time, Logistics, Keel clearance?

Commodities Trader
Source and value of cargo?

Customs
Tracking containers, Unusual cargo or behaviors?

Navigation Safety
Charts up-to-date, Bathymetry, Weather /Ice conditions, Sea state?

CONTACT INFORMATION