



“Where it’s Been and Where it’s Going.”

Michael Cruess

March 28, 2012

About GIT

- Woman Owned Small Business Certified by WBENC 1/31/10



- ISO 9001:2008 Registration # 19.4311 2/9/07 – “ Provider of Satellite Communication Products and Services. Design, Development and Manufacturing of Satellite Communications Equipment.”



- Awarded GSA contract (GS-35F-0404U) in 2008



- Department of Defense Mentor Protégé Program participant
 - Sponsored by General Dynamics C4S



- Facility Security Clearance – Secret

- Nominated for SBA Entrepreneur of the Year - 2010

Capabilities & Experience

- Sales and Service
- Project Management
- Satellite Systems Integration
- Specification Development
- Test & Evaluation planning
- Concept & Detailed Design Development
- Computer Modeling and Simulation using:
 - Matlab
 - Rhapsody
 - Simulink
 - Diamond
 - ANSI/ISO C/C++
- Mechanical, Electrical, & Control System Engineering
- Microcontroller (HDW/SW)

The GIT Business Model emphasizes Teaming Agreements with large companies, small companies, and individuals for maximum flexibility.

Custom Products Developed

- HMTc - Iridium Tactical Overlay
 - - Marine Corps Warfighting Lab
 - - Integrated EPLRS and Iridium
 - \$8M project -GIT Sub-contractor
- Aeronautical Transceiver Unit
 - Iridium Backhaul interface module
 - 2 channel voice & data
 - First application: Predator UAV
- Ruggedized 9505 Handset
 - Marine Corps Warfighting Lab





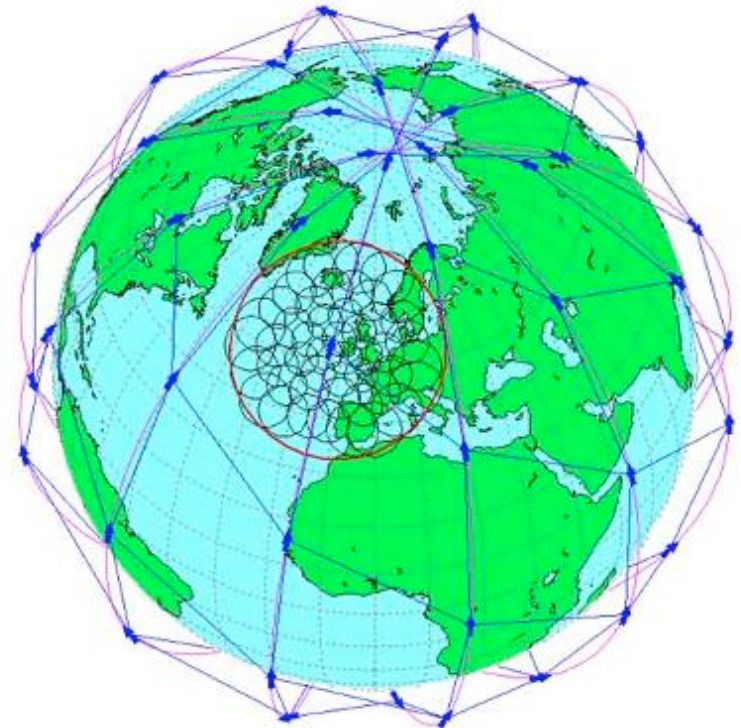
Iridium Background

- Designed in the 1990's
- Satellites launched May 1997 – May 1998
- First call November 1, 1998
- Iridium SSC \$5.5B bankruptcy August 1999
- Assets acquired in 2000 by Iridium Satellite LLC
- Commercial service re-introduced March 2001
- Now operated by Iridium Communications, Inc. trading on NASDAQ as "IRDM"
- Provides voice and data services
- Boeing provides satellite operations and maintenance
- General Dynamics provides product and encryption development
- Iridium Next first launch Q1 2015 – fully funded



Iridium Constellation

- 66 satellites in Low Earth Orbit (LEO)
 - Orbit Altitude: 485 miles (780 kilometers)
 - Orbital Period: 100 minutes, 28 seconds
 - 6 On-orbit spares
- Orbital Inclination 86.4° (near polar)
 - 6 orbital planes, 11 satellites per plane
- Cross-links between orbital planes
 - Each satellite communicates with up to 4 others
- Satellite characteristics
 - 7 Motorola PowerPC 603e processors @ 200 MHz
 - Satellite Weight: 1,500 pounds (689 kilograms)
 - 3 antenna, each with 16 spot beams (48 total)
 - Each spot beam is ~250 miles in diameter
 - Each satellite footprint is ~2800 miles in diameter
 - Each spot beam can handle a maximum of 236 simultaneous active phone calls
 - Each satellite can process approximately 1100 simultaneous active phone calls



Iridium Communication



- Mobile to satellite
 - Line of sight to satellite
 - L-band: 1616 – 1626.5 MHz
 - Transmit power: ~5 watts
 - Multiplexing: TDMA/FDMA



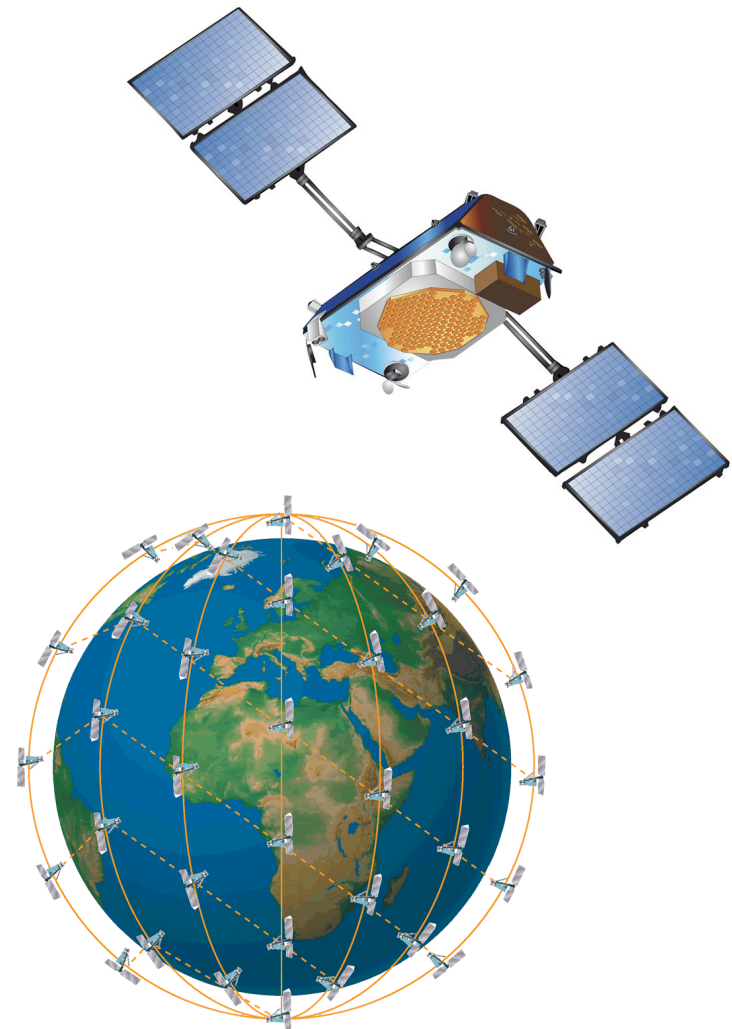
- Satellite to Satellite
 - Each satellite communicates with up to 4 neighbors
 - 10 Mb/sec Ka band links
 - Routes calls/data to another mobile or to a gateway



- Satellite to ground communication
 - Gateways in Arizona & Hawaii
 - Satellite network operations center in Virginia
 - Four telemetry/tracking/control sites

Iridium NEXT

- Next generation pole-to-pole communication
- Same cross-linked LEO architecture
- Higher data speeds
 - L-band up to 1.5 Mbps
 - Ka-band up to 8 Mbps
- Launches begin in 2015
- Fully funded





Added Services Since Launch

- Initially voice & paging
- Circuit switched data (RUDICS) – 2001
- Short Burst Data (SBD) – 2003
- Short messaging service – mobile originated (SMS-MO)
- OpenPort – up 128 Kbps

Smaller Hardware

9500



9505



9555



Phones

2000



2010

LBTs

9522



9601



9602



Iridium 9602 Transceiver

- Small – 41mm x 45mm x 13mm
- Current
 - Idle/rcv current – 45mA (195mA)
 - Transmit – 190mA (1.5A)
- Antenna pass through for GPS
- Serial port/AT Commands – talk to it like it's a a modem

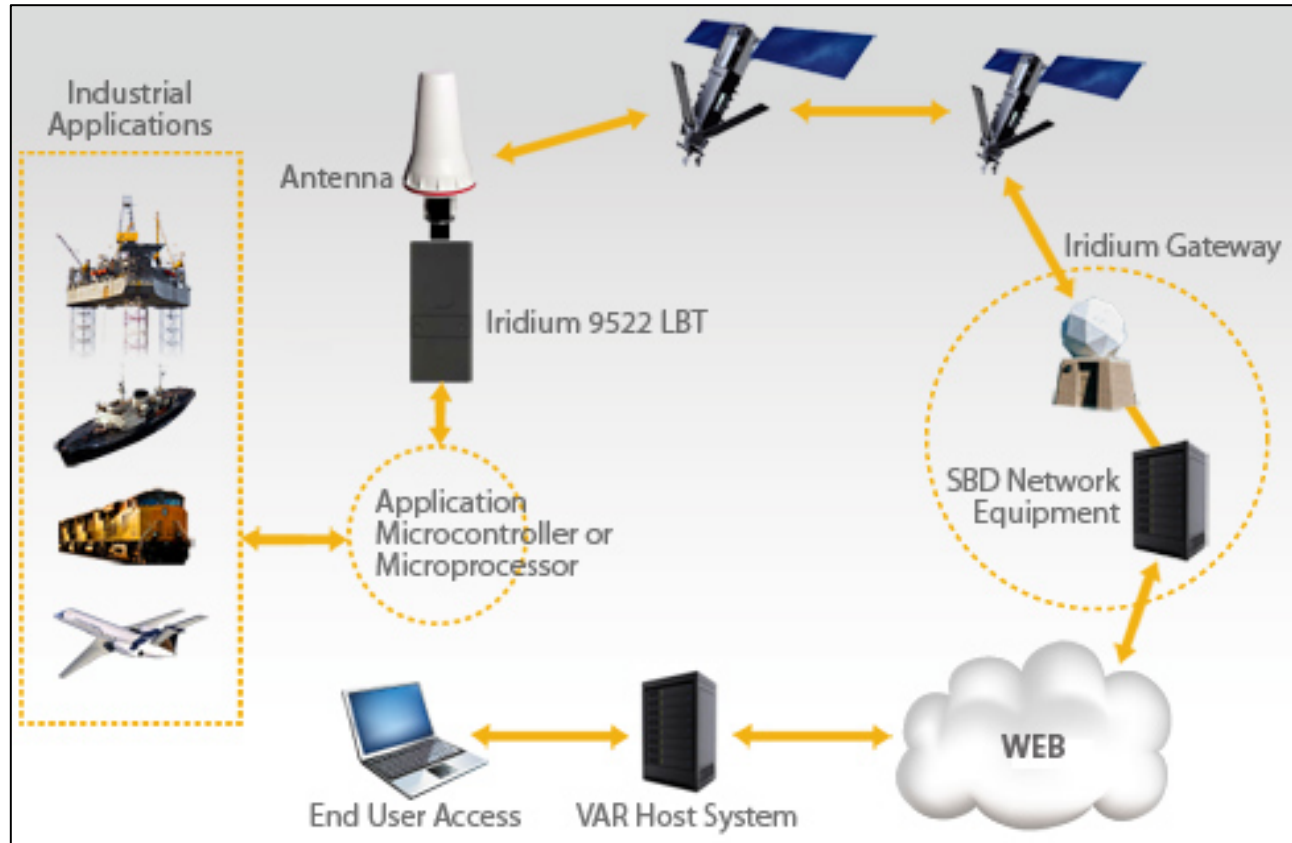


Iridium 9603 Transceiver

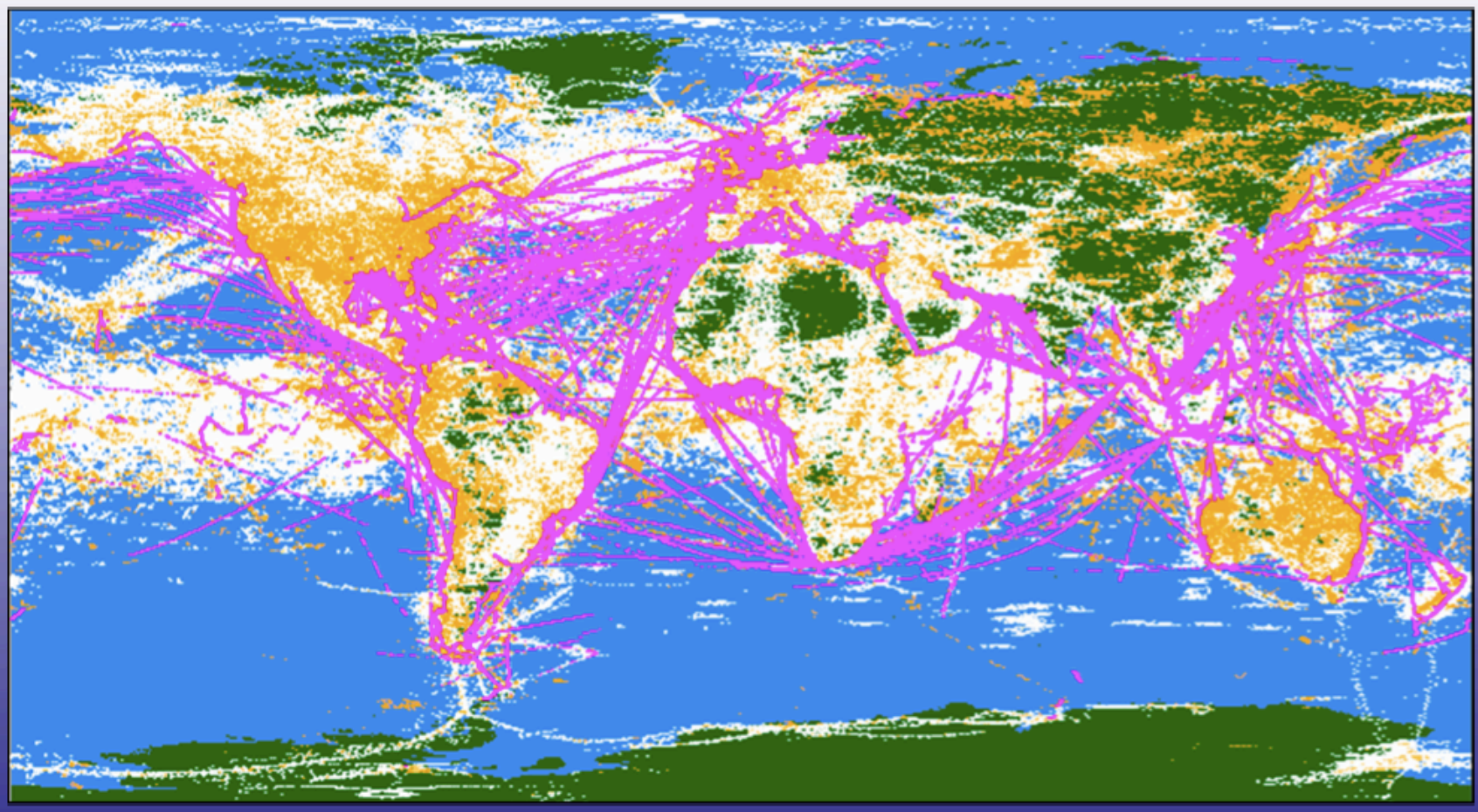
- Next generation
- Size of a postage stamp
- Available 2012



Iridium M2M

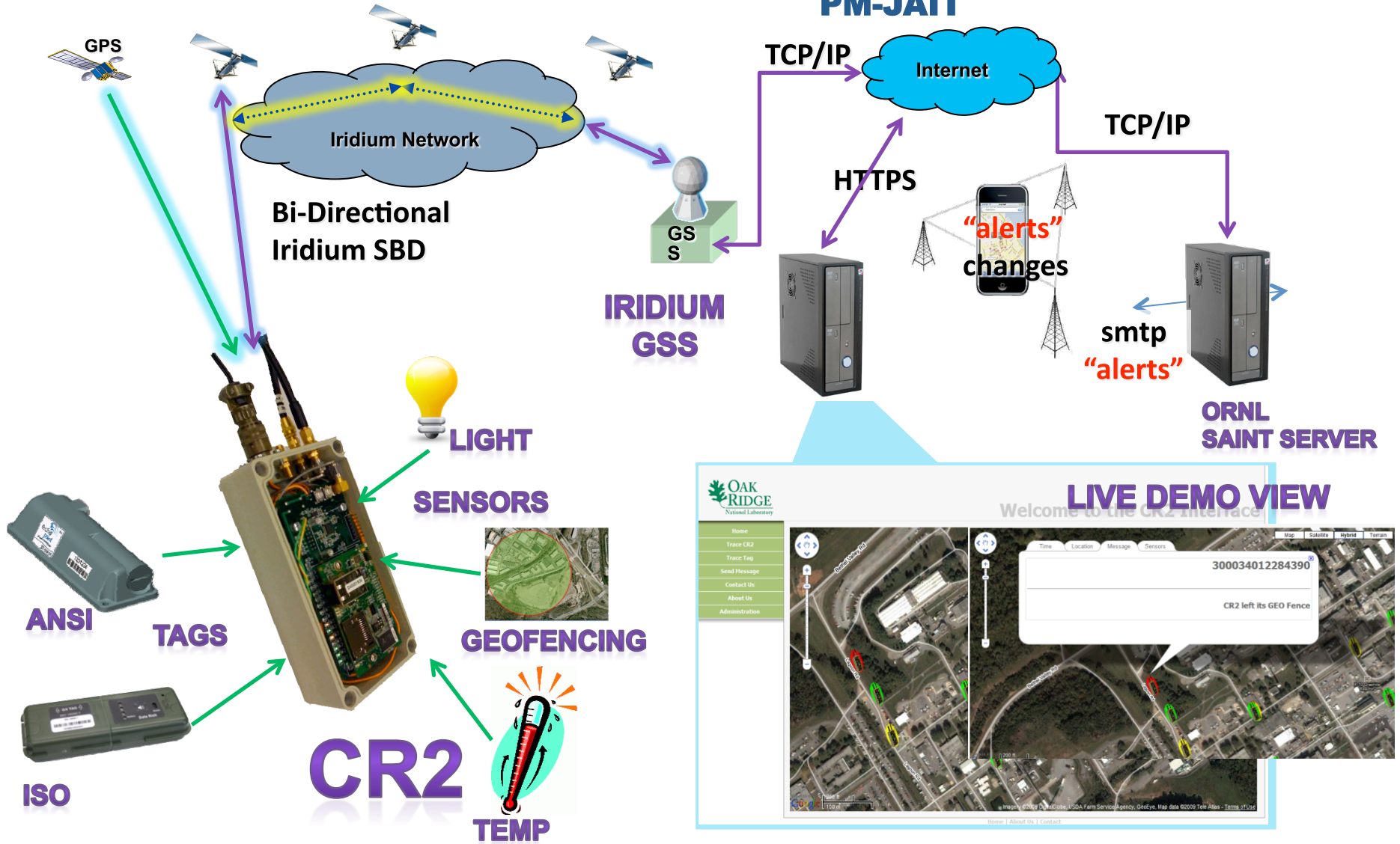


Iridium M2M Traffic



Secure Adaptive Intelligent Tracking (SAINT) Using Cognitive Radio/RFID (CR2)

PM-JAIT

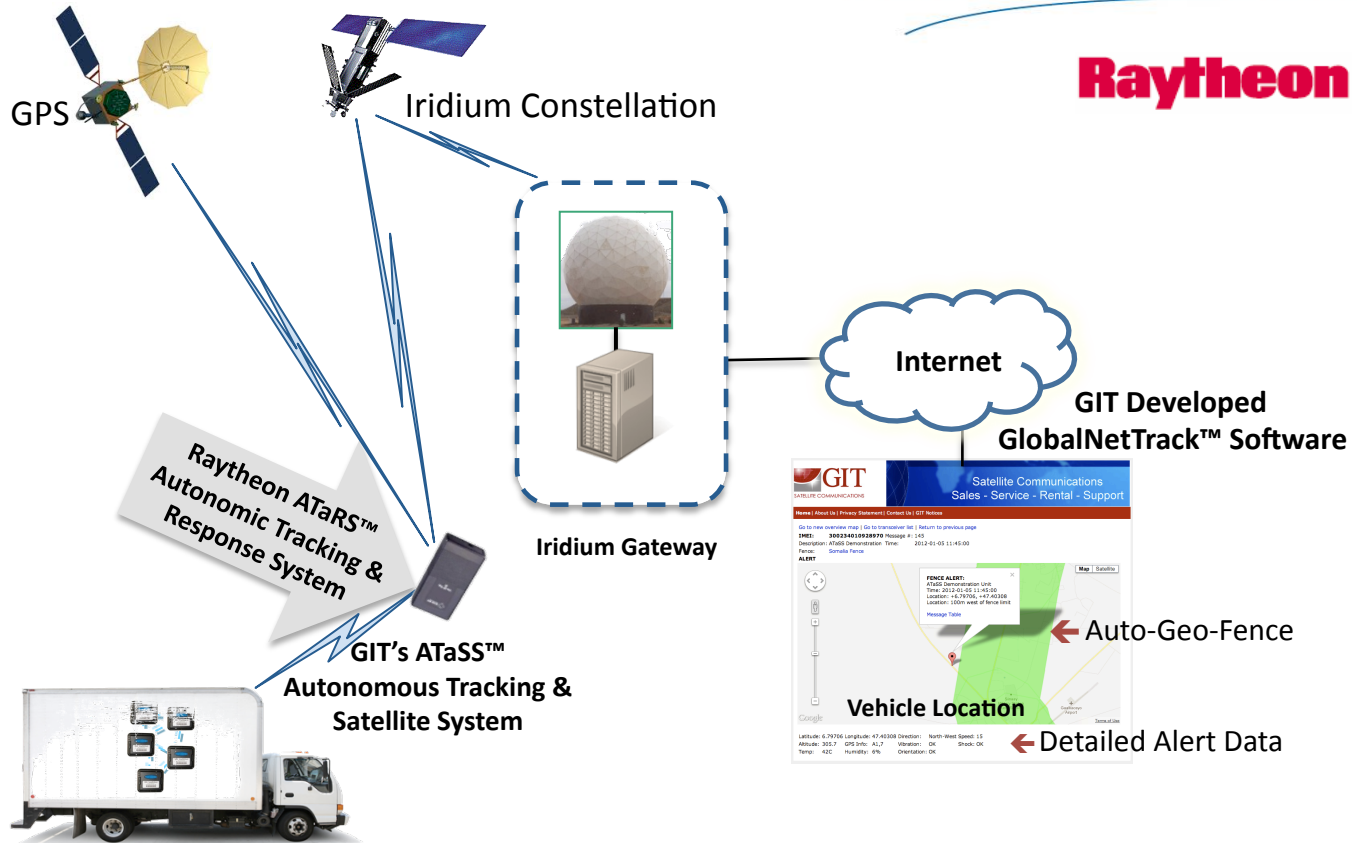




ATaSS™ with ATaRS™ and EMMS™

NORTHROP GRUMMAN

Raytheon



Short Burst Data

- Mobile units can send and receive data
 - 9602 transceiver has 340/270 maximum bytes per transmission
- Mobile can send to gateway (Internet) or to another mobile
- Gateway can receive messages from the Internet and sent to mobile
- Message latency gateway to mobile is seconds

SBD Interface

- Email
 - Mobile originated messages delivered as attachment to an email message
 - Send message to mobile by sending an email to the Iridium gateway server
- DirectIP
 - Mobile originated messages delivered via TCP/IP to a public IP address/port number of your choice
 - Open a TCP/IP connection to the Iridium gateway and write the message header plus data



SBD Messages



sbdservice@sbd.iridium.com


Mar 26 (3 days ago) ☆



to me ▾

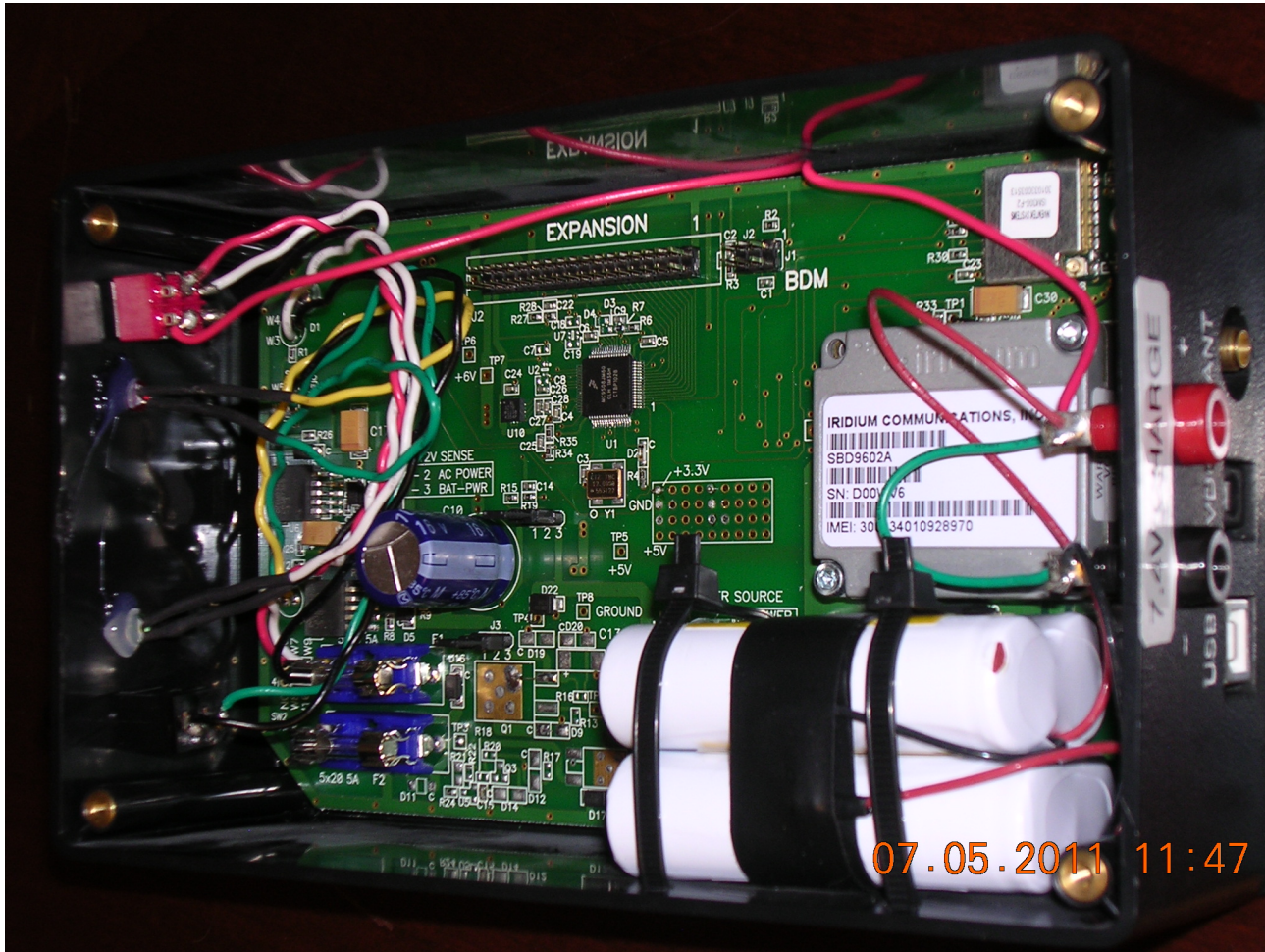
MOMSN: 139
MTMSN: 0
Time of Session (UTC): Mon Mar 26 14:42:24 2012
Session Status: 00 - Transfer OK
Message Size (bytes): 250

Unit Location: Lat = 30.360965 Long = -97.765166
CEPradius = 2

 **300234011708860_000139.sbd**
1K [Download](#)

```
Day:26/03/2012 UTC:14:42:21 Lat:30° 21.3592'N Lon:097° 47.5894 'W  
Alt:179.8 m Dir:208.54 Speed:48.41 k #_GPS_Sat:07 Fix_Mode:A1  
Sen_Vin: 6.47V Sen_5V:4.99V Temp_Sen:0.01V BandGap:1.20V  
Acc_X:1.57V Acc_Y:1.64V Acc_Z:2.04V DieTemp:1.37V s/w rev. G2
```

ATaSS Demonstration Unit



Commercial Applications

[Go to transceiver list](#) | [Go to fence list](#) | [Return to previous page](#)

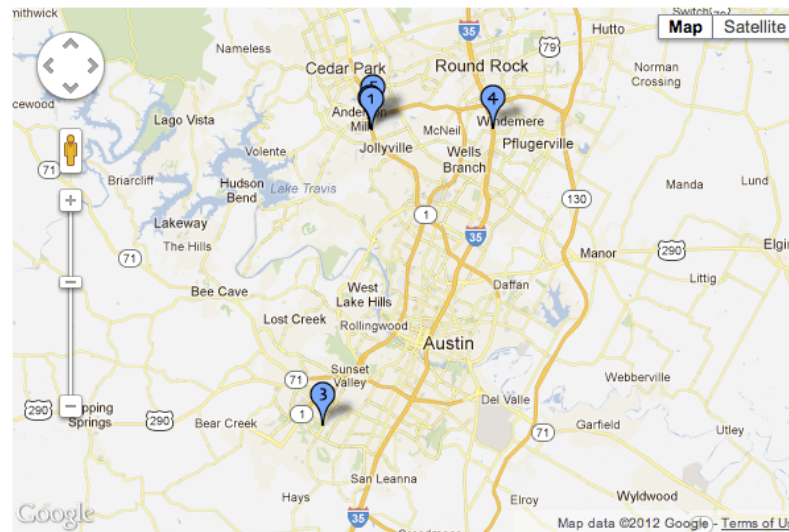
User: **jimsib**

Check to show markers
Click unit name for details

- 1 Out of Service
- 2 Jim's ATASS Test Unit
- 3
- 4 Ghost Rider
- 5 ATaSS Unit 1

[Get Latest Message](#)

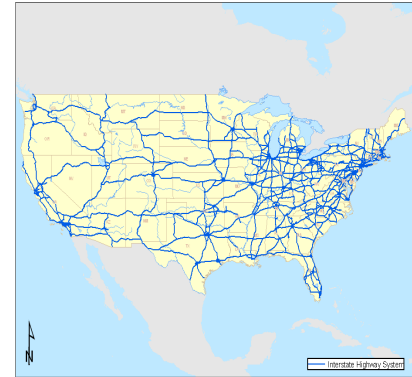
Overview Map



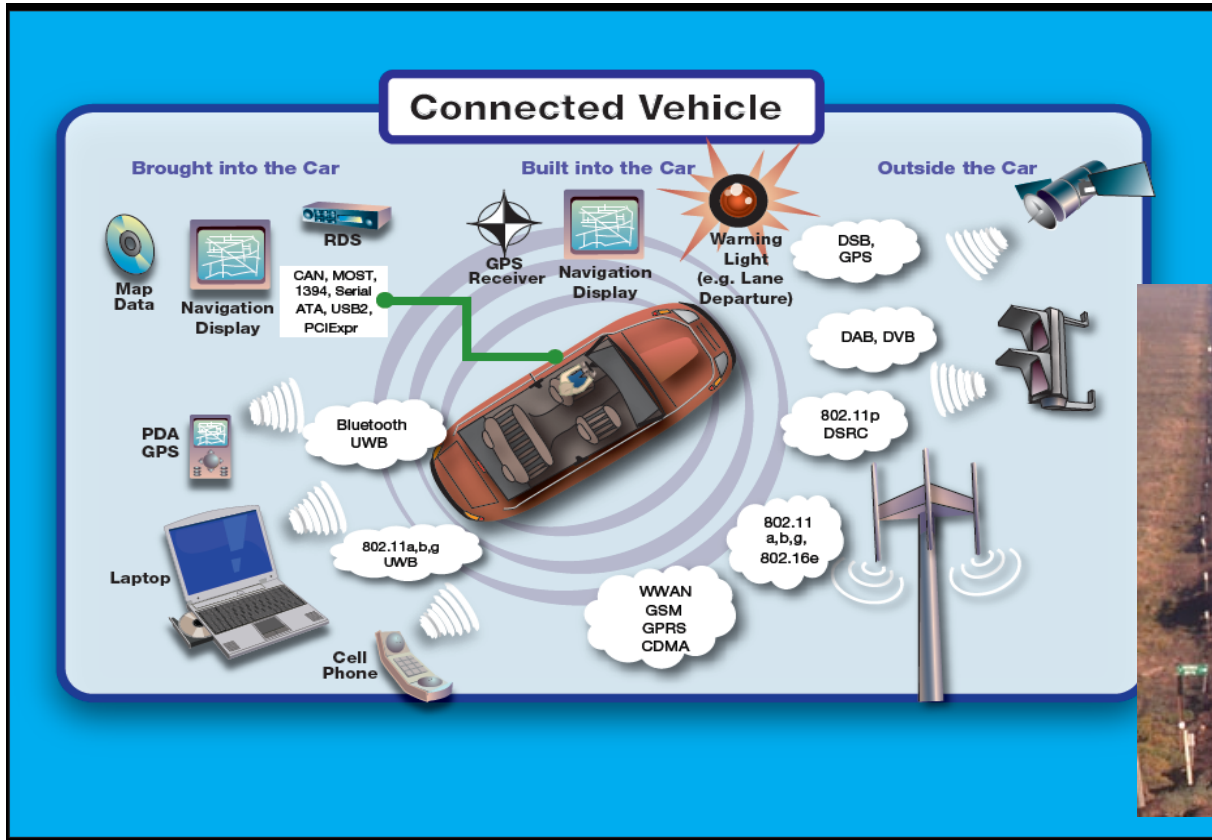
Click a marker for more information

Transportation

COG VEHICLE COMMS

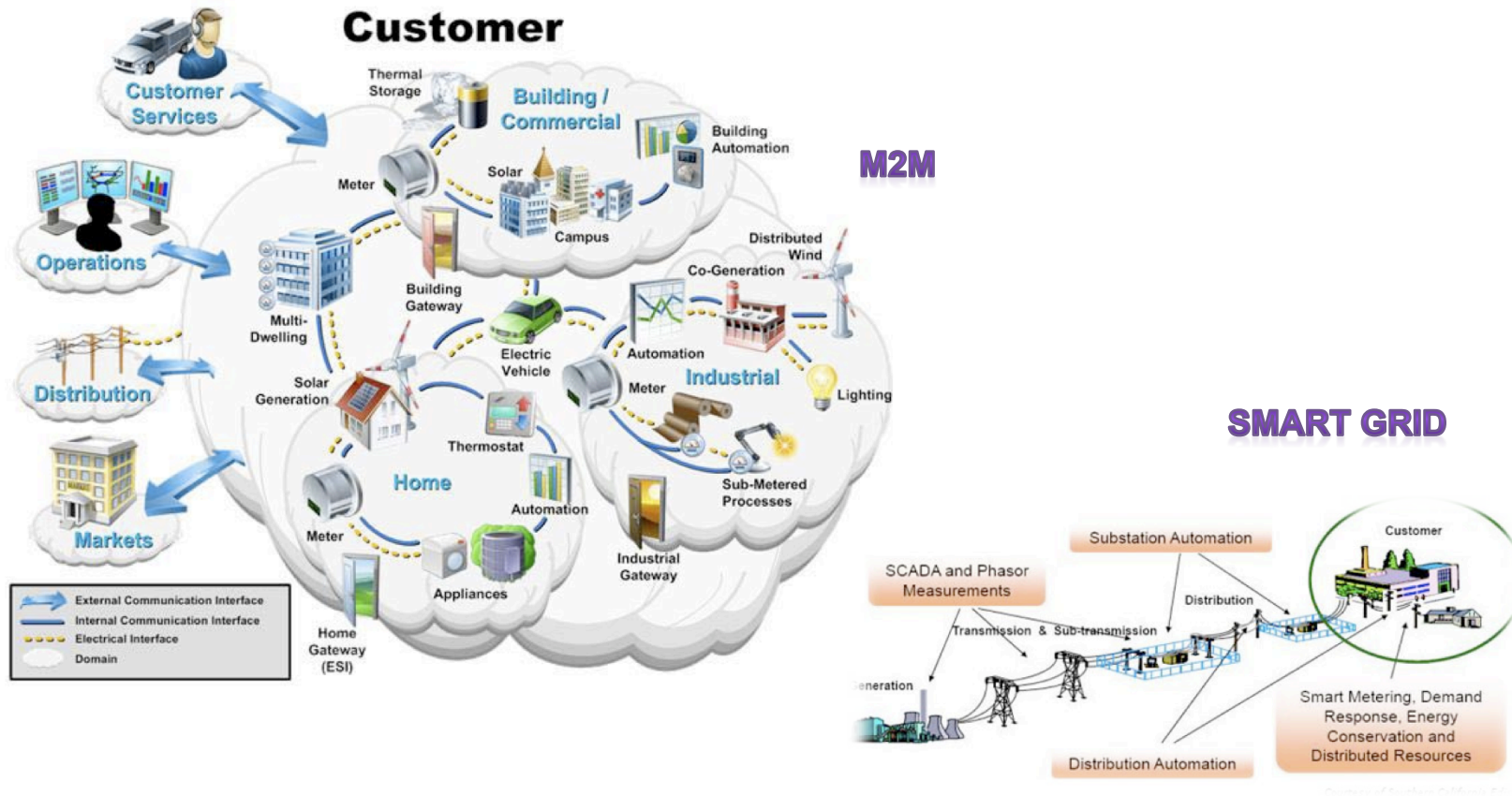


**INTELLIGENT
TRANSPORTATION SYSTEM**



LOGISTICS(TTL): Domestic freight movement expected to increase 40% by 2020

Energy



Developing future cognitive systems with applications that will converse with the user, anticipate their needs and adapt to meet them.



Thank you



Satellite System Coverage

- Iridium – pole to pole
- Inmarsat – up to about 70° N/S
- Globalstar – N. & S. America, most of Asia, Australia, Europe, most of N. Atlantic
- Thuraya – Europe, most of Africa, central/south Asia, Australia
- Orbcomm – complicated

Iridium 9523

- Voice/data module
 - 70.44 x 36.04 x 14.6 mm
 - 32g

