Agenda

➤ GX Aviation vision

➤ GX infrastructure
  • Satellite build – F2 and F3
  • GX terminal development - Honeywell
  • Satellite Access Stations

➤ GX Satellite update

➤ Gateway (formerly SEP)

➤ GX Service in use

➤ GX Regulatory update

➤ GX Aviation launch and maintenance services
Connected aircraft

Future is Ka-band!
More spectrum
Spot Beams and seamless handovers
Designed for Mobile Service

100% connected
Cockpit to cabin: ensure the latest services to meet needs:
- ACARS over IP
- Voice over IP
- Large Bandwidth Global Xpress
- Flexible IP services

GX Aviation - high-data-rate global service
Ka-band is the future of PAX connectivity

<table>
<thead>
<tr>
<th>Seamless</th>
<th>Experience</th>
<th>50Mbps</th>
<th>1 operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spot beam technology</td>
<td>Minimum guarantees</td>
<td>More spectrum than others</td>
<td>Dedicated satellite constellation</td>
</tr>
</tbody>
</table>

inmarsat
Inmarsat-5 Ka-band satellites.....

- F1 launched in December 2013 covering the Indian Ocean region
- Remaining 2 satellites are completed and being packed for shipping
- Satellites built by Boeing and launched on ILS Protons from Baikonur
- Fourth satellite ordered for delivery in 2016
I-5 Ka-band dual ground stations

IOR
Nemea, Greece and Fucino, Italy
Operational now

AOR
Lino Lakes, USA and Winnipeg, Canada
Installation completed

POR
Warkworth and Auckland New Zealand
System checkout underway
GX Aviation Program Status

- **SAS and Network Infrastructure**
  - POR SAS Checkout Complete
  - Final SAT
  - Velocity 1.0
  - Velocity 1.1 Beta
  - Velocity 1.1

**Schedule**

- AOR SAS Checkout Complete
- Apr 14
- Jul 15
- 5/14
- 6/14
- 7/14
- 8/14
- 9/14
- 10/14
- 11/14
- 12/14
- 1/15
- 2/15
- 3/15
- 4/15
- 5/15
- 6/15
- 7/15
Honeywell’s Role in the Business

• Exclusive manufacturer of avionics for the air transport and business and general aviation markets

• Delivering two ARINC 791 based products to market
  – JetWave MCS-8000 for corporate jets
  – JetWave MCS-8200 for Air transport

• Working with airframe manufacturers to ensure line fit availability and with MROs to build an STC base

• Master reseller of services to the business aircraft market selling through distribution partners Aircell, ARINC, OnAir, Satcom Direct and Satcom One
Development Status

✓ Engineering models built and currently in testing against ground station simulators in lab

✓ Accelerated life testing on all units complete

✓ 3 major integration facilities commissioned and operational (Ottawa, Canada; Tewkesbury, UK; Brno Czech Republic)

✓ Pre-qualification testing starting: 13 streams in 8 locations

✓ Successful initial over the air tests performed in Europe May 2014
Aircraft Certifications

✔ Boeing TSA well advanced
  - Phase 1 complete
  - Phase 2 in progress

✔ All other air transport and business jet manufacturers engaged

✔ Hardware reseller agreements in place with:
  - Thales - Air Transport
  - Satcom Direct – Business and General Aviation
  - Others in progress
JetWave MCS-8200 System

FUSELAGE ANTENNA AND RADOME

KANDU

KRFU

MODMAN

+ AIRPLANE PERSONALITY MODULE (APM)

System Weight: 135 lbs
Power Consumption: 440 W

System Weight: 135 lbs
Power Consumption: 440 W
Air Transport Radome Packages

Performance

Drag: ~50 to 80 lbs
Dimensions: 74”l x 44”w x 14”h
Weight:
• 101 lb
• Combined radome, fairing and adaptor plate

Two system Solutions

• Aftermarket Package
  – Radome skirt and fairing
  – Antenna mounts to fuselage
  – Lighter and less expensive than ARINC 791 solution

• ARINC 791 package
  – Radome and baseplate
  – Antenna mounts to baseplate
  – Solution the OEMs have provisioned for
JetWave MCS-8000 System

System Weight: 54 lbs
Power Consumption: 300W
Tail Mount Antenna & Radome

Key Characteristics

- 12” swept volume same size as current Ku antennas
- Ensures aircraft aerodynamics are unchanged
- Installable in same location as Ku

Ka/K/L Radome

- Supports Ka (Ka for Tx & K for Rx); L band transmissive (cockpit safety services)
- Form fit/drop-in for existing Ku/L radomes – same attach pts

Ideal Retrofit Solution
In Summary

• Hardware development is well advanced and on schedule for first half 2015 product launch
• Product is meeting or exceeding its design goals for size, weight, power consumption and reliability
• Key aircraft certification activities are on target both for OEM line fit and the aftermarket
GX Aviation Program Status

### Schedule

- **5/14**: AOR SAS Checkout Complete
- **6/14**: POR SAS Checkout Complete
- **7/14**: Final SAT
- **8/14**: POR SAS Checkout Complete
- **9/14**: OR SAS configured Velocity 1.0
- **10/14**: Velocity 1.1
- **11/14**: Velocity 1.1
- **12/14**: Final SAT
- **1/15**: AOR SAS Checkout Complete

#### Red Label Development

- **3/15**: POR SAS Checkout Complete
- **4/15**: POR SAS Checkout Complete
- **5/15**: POR SAS Checkout Complete
- **6/15**: POR SAS Checkout Complete
- **7/15**: POR SAS Checkout Complete

#### Honeywell FMA/TMA 8000 Series Terminal

- **5/14**: Day 5 A and B
- **6/14**: Reg Svr EASA App
- **7/14**: Reg Svr EASA App
- **8/14**: Reg Svr EASA App
- **9/14**: Day 5 C
- **10/14**: PCTA 1
- **11/14**: PCTA 2
- **12/14**: OTAT
- **1/15**: CTA
- **2/15**: STC Completed

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*Note: This schedule is a representation of the GX Aviation Program Status as of the current date.*

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*Image credit: [Inmarsat](https://www.inmarsat.com)*
Service achievable per terminal type

<table>
<thead>
<tr>
<th></th>
<th>To aircraft Spot beam capacity</th>
<th>From aircraft Spot beam capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Airlines</strong></td>
<td>38 – 50 Mbps</td>
<td>3 – 4.7 Mbps</td>
</tr>
<tr>
<td>(Fuselage mount antenna)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Business jets</strong></td>
<td>21 – 33 Mbps</td>
<td>1.4 – 2.2 Mbps</td>
</tr>
<tr>
<td>(Tail mount antenna)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- These figures show achievable throughputs and are based on the current system simulations and performance measurements.
- GX Aviation Services will operate as a managed subscription service model.
  - Actual throughputs achieved by the terminal are dependent on the customer subscription.
  - Each subscription will have a defined Committed Information Rate (CIR) which is the minimum throughput guaranteed to each subscriber.

The only network that guarantees CIR
Integrated satellite and network

Access network (3GPP Core)

Value Added Resellers and Distribution Partners

Thales, Rockwell Collins (formerly ARINC), OnAir, gogo Honeywell
MDA – Rockwell Collins, Satcom One, Satcom Direct, OnAir and Aircell

Inmarsat (Ka-Band) GX Aviation

Fucino, Nemea, Lino Lakes, Winnipeg, Warkworth, Auckland
Global Xpress® satellite update
Global Xpress® satellite update

- **F1** satellite successfully launched - December 2013
  - F1 has completed an comprehensive on orbit checkout
  - F1 is operational and providing leased service traffic

- **F2** satellite is built and has completed all of its factory testing
  - F2 was put into its shipping container at the end of May 2014
  - Most recent Proton launch mishap - May 2014
  - Russian commission feels they have identified the cause and will be ready to resume launches shortly
  - F2 launch date is not firm but is expected to launch in late summer

- **F3** satellite is built and has completed all of its factory testing
  - F3 will be put into its shipping container in late June 2014
  - F3 launch date will have a maximum delay of 3 months

- **F4** satellite is under contract and will be available for launch in 2016

Global Service is expected shortly after F3 launch in early 2015
Global Xpress® service

1st Global Xpress® customer in operation on June 1st!

- F1 service has begun services
- Passing operational traffic from both Fucino and Nemea Satellite Access Station (SAS) locations
- iDirect Network Management System (NMS) version 1.0 is being used and operational in SAS
- Regional commercial services are being tested and F1 trials will begin August 2014
- Enterprise, Government, and Maritime services will begin before Aviation’s
  - All services utilize a common infrastructure
  - Unique configurations for each market service
  - Consolidated Customer Service operational end of 4Q/2014
GX Aviation Program Status

<table>
<thead>
<tr>
<th>Date</th>
<th>AOR SAS Checkout Complete</th>
<th>POR SAS Checkout Complete</th>
<th>Final SAT</th>
<th>Red Label Development</th>
<th>LRU Qualification</th>
<th>Type Approval Testing and STC</th>
<th>Flight Test</th>
<th>IOR Checkout Complete</th>
<th>Trials</th>
<th>AOR Checkout</th>
<th>POR Checkout</th>
<th>F2 Complete</th>
<th>F3 Complete</th>
<th>F2 Launch</th>
<th>F3 Launch</th>
</tr>
</thead>
</table>
GX Service Enablement Platform (Gateway)
Inmarsat “Eco-System Enablement”
Gateway formerly Subscriber Enablement Platform (SEP)

Gateway enables:

- **Simplified operations** and business processes within the eco-system
- Automated business relationships within the eco-system
- A larger partner eco-system – Support Services, Applications, reporting

Gateway leverages Inmarsat’s

- **Bulletproof services** that have redundancy and scalability to meet mandated regulatory, enterprise, carrier and government customer requirements
- Strong focus on **mobility** – globally!

A unified network (initially GX + SB later) for mobile users

- Presented to VARs / customers through a **single IP** connection at the edge

A core set of Inmarsat services delivered globally

- Self-care for everyone and portable user accounts with **VAR specific** customizations
- Service infrastructure: voice, video chat, internet browsing, content delivery
- **Application hosting** cloud infrastructure and associated App Store
- Built on top of basic services e.g. Firewall, content control, acceleration, traffic shaping
Gateway

The main components

➤ **Service Delivery Platform (SDP) – In London and Burum**
  - Centralized interconnection with other business systems
  - Mediated interface to legacy/proprietary systems through APIs and fulfillment engines
  - Provides control, policy and provisioning information to all other parts of the system
  - Built on industry-standard APIs and Web2.0 presentation for most cloud and internet developers

➤ **Access Network – Network infrastructure in Meet-Me-Point (MMP) and Satellite Access Station (SAS)**
  - Addressing, mobility and policy responsibility across GX access technologies
  - Optimized infrastructure for bandwidth-intensive services such as voice, video
  - Provides onward connectivity toward corporate clients (IP, IPL, IP-VPN, MPLS, etc.)

➤ **Network Service Device (NSD) – Virtual CPE router on the aircraft**
  - Single integrated auto-configured intelligent edge appliance or “virtual appliance” that is deployed on a aircraft.
  - Has interfaces to on-board equipment e.g. Video Distribution, LANs, WLANs, etc. as well as network terminals
  - Hosts applications and content from Inmarsat, CAPs and VARs
  - The configuration provisioned by service partner and downloaded to the NSD from the cloud SDP
Schedule

GX Aviation Program Status

SAS and Network Infrastructure
- Red Label Development
- LRU Qualification

Red Label Development
- AOR SAS Checkout Complete
- POR SAS Checkout Complete
- Final SAT

Honeywell FMA/TMA 8000 Series Terminal
- LRU Qualification
- Type Approval Testing and STC
- Flight Test

Honeywell FMA/TMA 8000 Series Terminal
- Day 5 A and B
- Reg Svr EASA App
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- Day 5 C
- PCTA 1
- PCTA 2
- OTAT
- CTA
- STC Completed

Satellites
- IOR Checkout Complete
- Trials
- AOR Checkout
- POR Checkout

Satellites
- F2 Complete
- F3 Complete
- F2 Launch
- F3 Launch

Gateway (SEP)
- 1.0 Release
- 1.5 Release from Cisco
- 2.0 Release from Cisco

Gateway (SEP)
- ‘1.0 Checkout
- User API Training Academy
- Aviation User Training

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GX regulatory update
## GX regulatory overview

### Authorizations to date

<table>
<thead>
<tr>
<th>National authorizations</th>
<th>GX has already received <strong>108</strong> national authorizations for aero operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Latin America: (18 Authorizations); CIS (6); Middle East: (13); Africa: (28) Asia: (25); Europe: (18)</td>
</tr>
<tr>
<td></td>
<td>- Ongoing work on US and Europe applications / declaration</td>
</tr>
<tr>
<td></td>
<td>- Timeline still on schedule for global CSI – save for India</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Coverage statistics</th>
<th>Percentage of world Authorised for GX Aviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>By population: <strong>27.48%</strong></td>
</tr>
<tr>
<td></td>
<td>By total world land mass (incl. oceans): <strong>81.07%</strong></td>
</tr>
<tr>
<td></td>
<td>By world land mass (excluding oceans): <strong>35.18%</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Changes since last update</th>
<th>Recently authorized:</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Nicaragua, South Africa, Switzerland, Italy, Jordan, Iran, Lebanon, Albania, Cambodia, Bangladesh, Estonia, Congo, Nepal, and a number of smaller islands</td>
</tr>
</tbody>
</table>
GX regulatory

Regional overview

› Africa
  › Authorization process underway in all countries. No problems expected

› Americas
  › Authorization process underway in all countries. No problems expected

› Asia
  › Japan – working with authorities on national requirements as well as ITU
  › China – in active discussions with potential partners and authorities re licensing
  › India – in discussions with authorities to meet Indian government regulatory requirements
  › Australia – in discussions with authorities re requirements for domestic carriers

› CIS / Russia
  › Several authorizations already received
  › Russia strategy on schedule – new partner in country and new subsidiary

› Europe
  › Majority will follow ECC Decision. No difficulties expected

› MENA
  › Authorization process underway in all countries. No problems expected
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- Aviation User Training

Satellites
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- Trials
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- POR Checkout
- F2 Complete
- F3 Complete
- F2 Launch
- F3 Launch

Regulatory
- ESA Approvals
- F2 Approvals
- CSI Approvals except India
- Test Location Approvals
- 108 of 209 Authorized
GX Aviation launch and maintenance services
GX launch service support

› Developing an integrated and comprehensive strategy
  • Key focal point is the VAR’s
  • Integrating with the suppliers
  • Inmarsat is revamping its Aviation Customer Services
  • Network Management System – provides a detailed reporting and monitoring

› VAR’s are going through a 3 phased approach
  • Planning phase for recently signed VARs
  • Development of system integration capabilities and business processes
  • Testing with infrastructure, over the air and trials
Terminal service support

Integrate capabilities to evaluate terminal status
  • Rapid issue identification and acknowledgement
  • Seamless support of service and terminals
  • Establishing global maintenance and support programs

Working with Honeywell
  • Defining standards and processes for support
  • Flexible service levels to meet airline requirements
  • Preventative programs to ensure high availability levels
Honeywell service and support programs

Global customer service center and spares depots

- Not to exceed repair pricing
- Maintenance Service Agreement (MSA) programs
- Tailored asset availability / repair programs
- “SPEX” Global Asset Availability
- Program (via subscription)
GX Aviation Service

...in the final phase of construction

Opening in 2015!
Thank you