



GBAS and GLS Avionics

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Honeywell

GLS Product Offerings



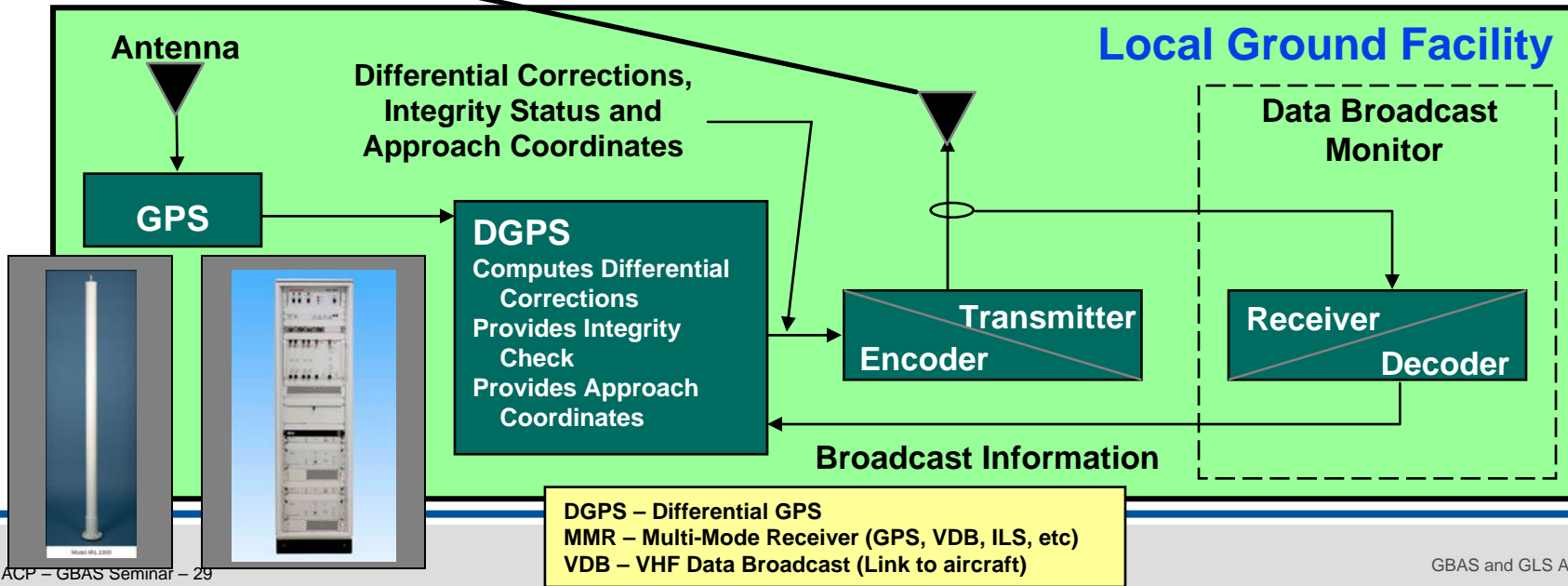
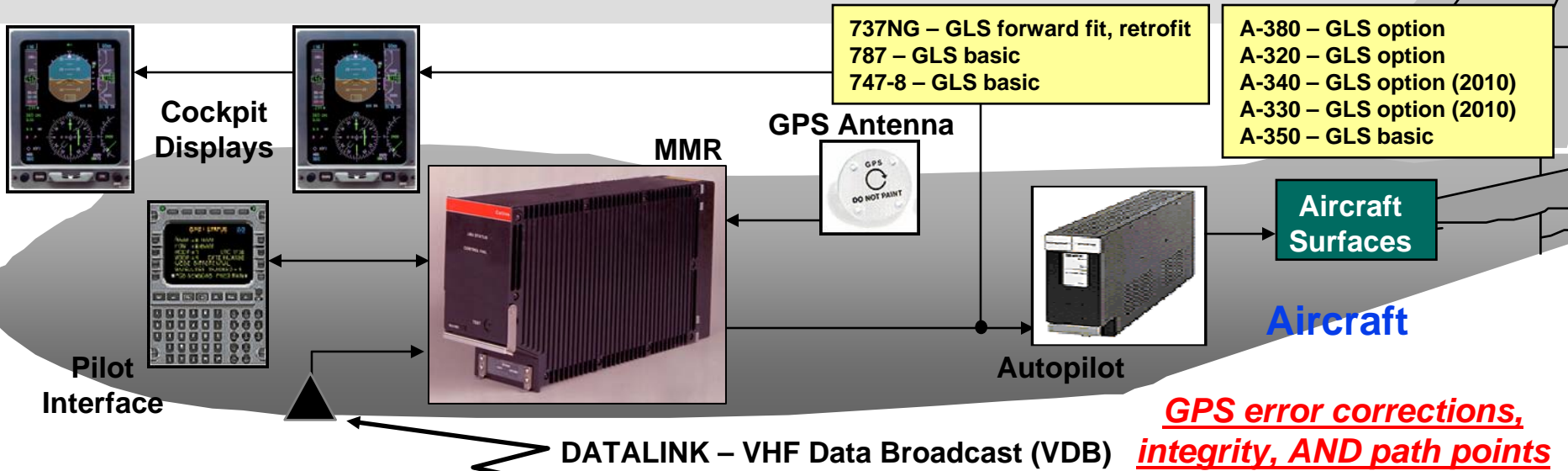
- Overview
- Airborne Architecture
- Product Offerings By Market
 - Air Transport (AT)
 - Business, Regional (BR)
 - General Aviation (GA)
 - Helicopters
- GLS-equipped, capable aircraft in India

Navigation Environment beyond 2015

- GPS based landing system (GLS) will be in wide use by 2020
 - GPS Landing Systems (GLS) provide Category III capability
 - ILS will continue to be used until GLS is deployed
 - New Airports use GLS for primary precision landing
 - Existing Airports phase in GLS, retire or minimize ILS
- GPS will be primary navigation with DME as a back-up NavAid
 - Inertial navigation for certain markets
 - VOR use will decline, VOR antenna used for VHF Data broadcast
 - Omni-coverage of VOR antenna better than LOC antenna coverage
 - ADF still needed in regions where no other NavAids are available
 - Radar Altimeters provide primary altitude information
 - GPS required for ADS-B, supporting position and time

GPS Navigation Continues to be Core in Future Environment

GBAS Guidance Implementation



Product Offerings

- Air Transport (AT)
 - Integrated Navigation Receiver (INR)
 - Multi Mode Receiver (MMR-755)
- Business/Regional (BR)
 - VOR/ILS Data Link with GPS (VIDL-G)
- General Aviation (GA)
 - KSN-770
- Helicopters
 - Use BR/GA solutions



Provide GPS Functionality from Take-off to Landing

Integrated Navigation Receiver (INR)

- Air Transport market
 - Designed specifically for Boeing 787
 - Global Nav Satellite System (GPS, GBAS)
 - VOR Navigation
 - ILS (GS/LOC), Marker Beacon
 - GLS CAT I Auto Land
 - Aligned with ADS-B Requirements
- Growth to
 - New GPS Constellations
 - Galileo and Others
 - GLS CAT II & III Autoland
 - Radio Altimeter Processing
- Certification (TSO) submitted 24 Dec 09
- Basis for Multi-Mode Receiver (MMR-755), 2012Q1 TSO submittal



VOR/ILS/DataLink with GPS (VIDL-G)

- Business/Regional market
 - VOR navigation
 - ILS (LOC/GS), Marker Beacon navigation
 - GNSS (GPS, GBAS, SBAS) navigation
 - GLS/LPV approach capability
 - RNP-0.1 capability
 - GPS Landing System (GLS) CAT I Autoland
 - Growth to GPS Landing System (GLS) CAT II and III
- Product certification
 - Part of Primus EPIC Modular Radio Cabinet (MRC)
 - Developed to DO-178B Level A to provide Cat III capability
 - Environmentally qualified to DO-160E categories
 - Approved to latest ILS LOC & GS, VOR, Marker, WAAS, LAAS TSOs
- GLS Capability provisioned



Bendix-King KSN-770

- General Aviation market
 - Advanced Integrated Panel Mount NAV/COM
 - Full-Featured Navigator with Flight Planning and Nav Database
 - Moving Map Display
 - Sensor SW updates to use GBAS VHF Data Broadcasts
- Contains
 - Multi-Mode Digital Sensor (MMDS)
 - Simultaneous multi-channel VHF
 - COM, NAV, VDL
 - VOR, LOC, COM - software defined
 - Mercury3 GA LAAS/GRAS sensor
- GLS capability provisioned



Summary

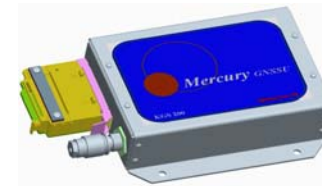
- Honeywell provides GPS/GLS Navigation products
 - Reduced Volume and Weight
 - Improved Airport and Enroute Operations
 - RNP, APV, GLS, LPV
 - Growth to GPS GLS CAT II and III approach
 - Meet ADS-B navigation accuracies
- Products offered in all markets
 - Air Transport
 - Business/Regional
 - General Aviation
 - Helicopters



MMR-755



INR



GNSSU



KSN-770



VIDL-G

Recent News: Air India, 787



Air India Goes Ahead With Delivery Plans

Air India will receive the first of 27 Boeing 787s on order in the first quarter of 2011 (April). The first 787 will be delivered to ANA in the last quarter this year, confirmed Dinesh Keskar, Boeing India President.

Air India (AI) will receive about 15 787s by the end of 2012, according to an airline official...

GLS equipped aircraft flying in Indian Airspace soon

Overall Passenger Aircraft Movements

TOTAL A/C OPERATIONS



	Destination			% OF ALL	
	AIRPORT	#	TOTAL A/C OPS	INDIAN AIRPORTS	% Cumulative
Mumbai India	BOM	1	112,929	18.2%	18%
Delhi India	DEL	2	109,863	17.7%	36%
Chennai India	MAA	3	56,808	9.2%	45%
Bangalore India	BLR	4	50,936	8.2%	53%
Kolkata India	CCU	5	41,610	6.7%	60%
Shamshabad India	HYD	6	40,268	6.5%	67%
Kochi India	COK	7	19,896	3.2%	70%
Ahmedabad India	AMD	8	16,083	2.6%	72%
Thiruvananthapuram India	TRV	9	12,010	1.9%	74%
Goa India	GOI	10	11,401	1.8%	76%
Guwahati India	GAU	11	11,105	1.8%	78%
Pune India	PNQ	12	10,809	1.7%	80%

Source: OAG Database, Jan-Dec 2009, scheduled passenger movements

Top 12 airports handle 80% of traffic

GLS-Capable Aircraft Movements



TOTAL 737/A320 OPS

	Destination AIRPORT	GLS-capable rank	TOTAL A/C OPS	TOTAL 737/A320 OPS	% 737/A320 OPS	% OF ALL INDIAN AIRPORTS
Pt. Blair Andaman Is. India	IXZ	1	1,742	1,742	100.0%	0.4%
Varanasi India	VNS	2	2,769	2,607	94.1%	0.6%
Srinagar India	SXR	3	3,906	3,629	92.9%	0.9%
Bagdogra India	IXB	4	2,727	2,387	87.5%	0.6%
Jammu India	IXJ	5	3,621	3,106	85.8%	0.7%
Dibrugarh India	DIB	6	1,412	1,197	84.8%	0.3%
Rajkot India	RAJ	7	1,098	919	83.7%	0.2%
Nagpur India	NAG	8	5,216	4,309	82.6%	1.0%
Ahmedabad India	AMD	9	16,083	12,946	80.5%	3.1%
Goa India	GOI	10	11,401	9,052	79.4%	2.1%
Mumbai India	BOM	11	112,929	89,527	79.3%	21.2%
Lucknow India	LKO	12	5,723	4,508	78.8%	1.1%
Jaipur India	JAI	13	9,347	7,192	76.9%	1.7%
Vadodara India	BDQ	14	2,902	2,221	76.5%	0.5%
Kozhikode India	CCJ	15	8,243	6,213	75.4%	1.5%

Source: OAG Database, Jan-Dec 2009,
scheduled passenger movements

15 airports, more than 75% of traffic are GLS-capable

GLS Avionics



- **Overview**
- **Product Offerings by Market**
- **GLS-equipped, capable aircraft in India**

Avionics for all markets