



HFGCS Status

4 February 2010

Dwayne Harris
Rockwell Collins
(972)705-3851
deharri1@rockwellcollins.com

**Rockwell
Collins**

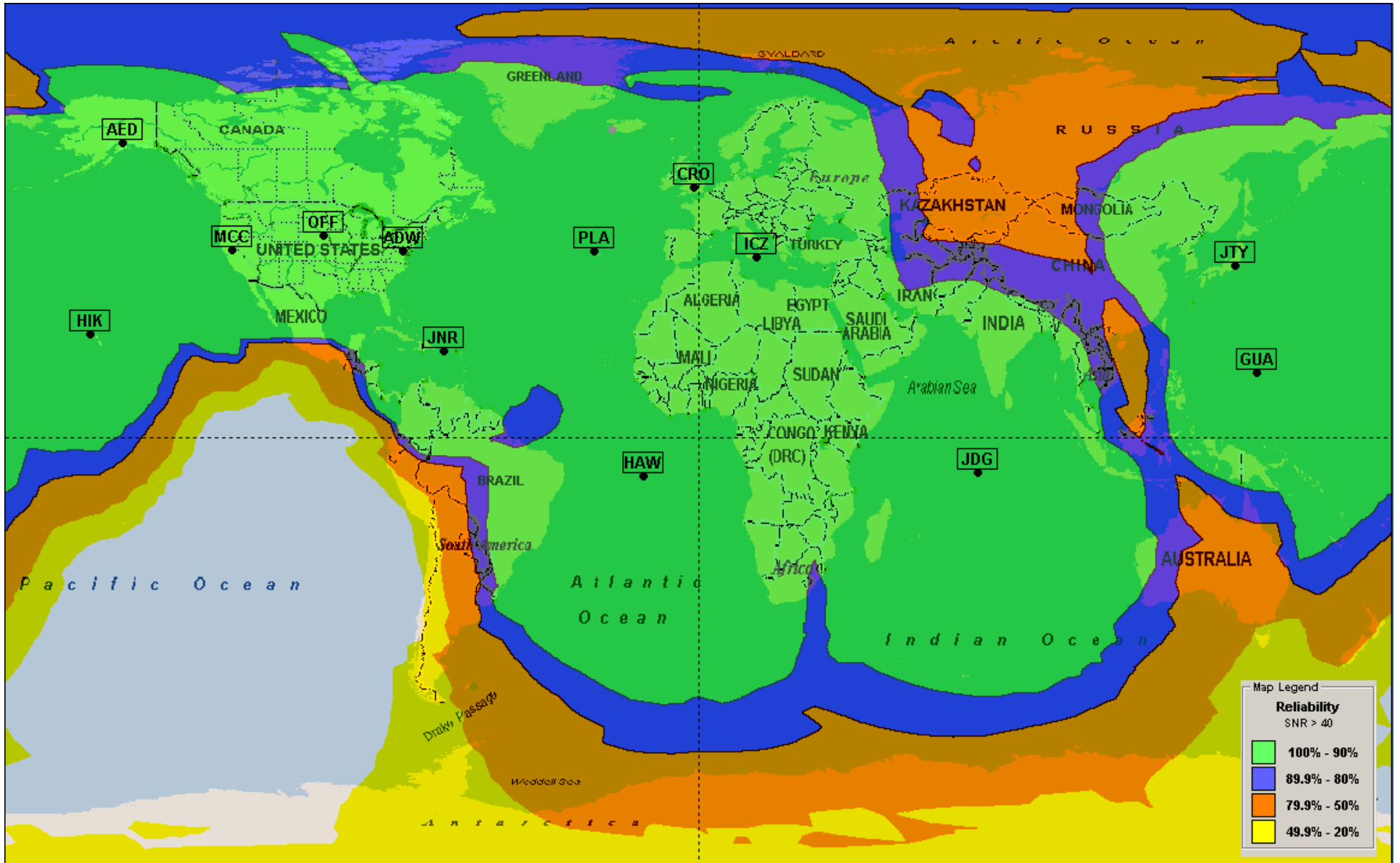
HFGCS Description

- High Frequency Global Communication System, f.k.a. SCOPE Command
- Network of 13 worldwide, high power, HF ground stations
- Operations centralized at NCS-East at Andrews AFB, MD.
 - Alternate (NCS-West) to become operational at Grand Forks AFB, ND.
- United States Air Force program, HFGCS SPO at Tinker AFB
- Lead Command
 - Air Force Space Command

HFGCS Station Locations



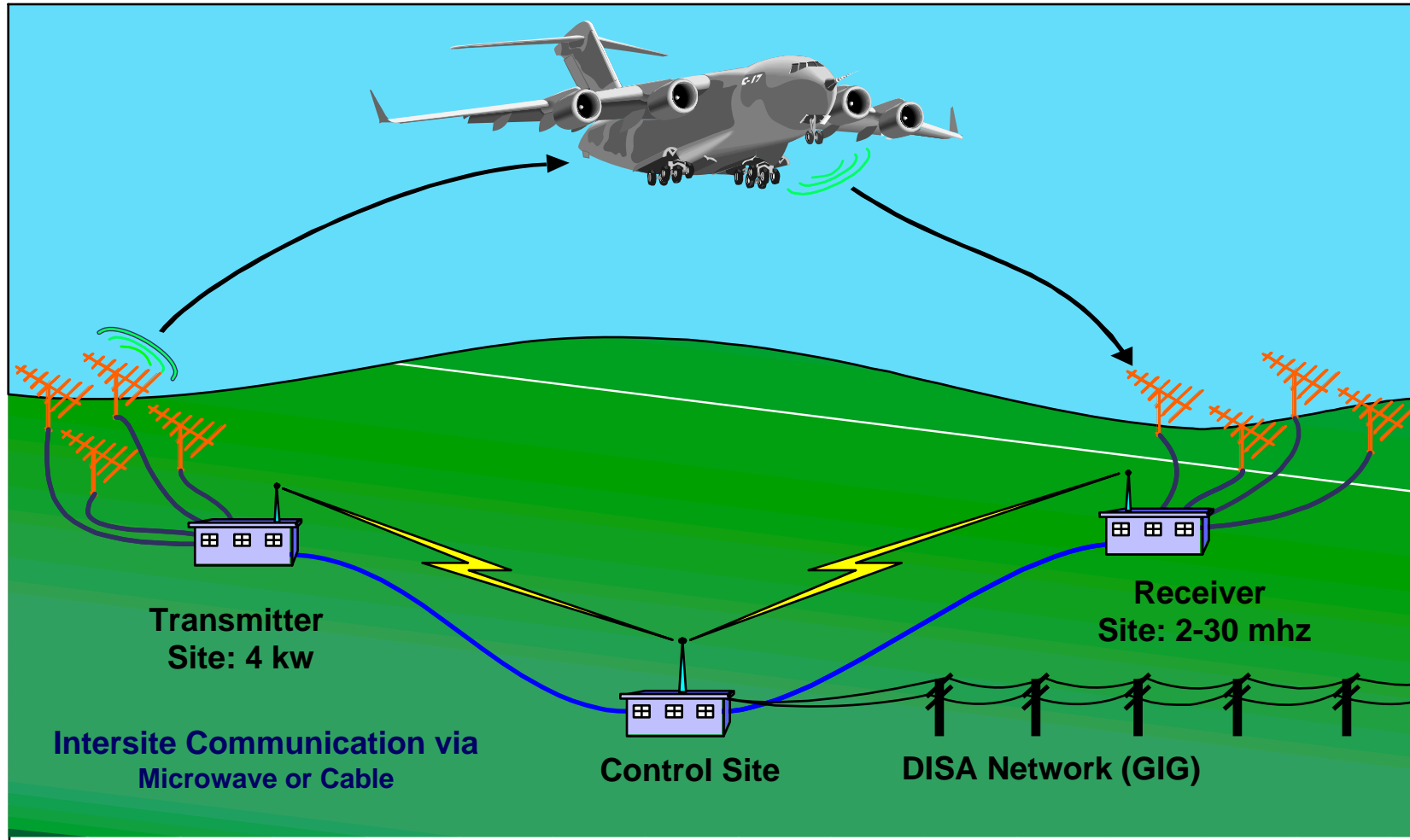
Site Coverage



HFGCS Missions

- Primary command and control for mobility air forces
- Presidential and executive DOD support
- National Command Authority dissemination of Emergency War Orders through Emergency Action Messages – Single Integrated Operational Plan
- Spanish speaking network between US, Southern and Central American Air Forces
- Global Humanitarian/NATO Mission support
- High Frequency Secure Email
- US Navy
 - Voice, data broadcast, Link-11
- Space Command
 - Eastern/Western test ranges support

Typical Remote HF Station



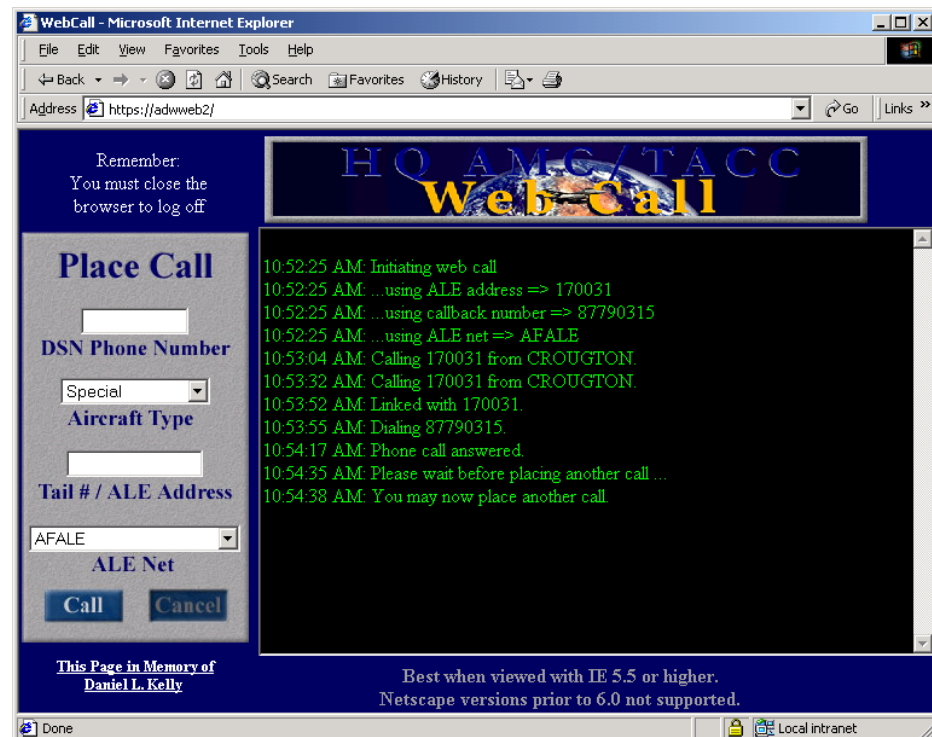
Basic Features



- 10 to >30 radio levels at each station with Navy consolidation
 - Automatic Link Establishment (ALE)
 - Group ALE supports Multiple Simultaneous ALE Calls per Station
-
- Automatic Air/Ground Phone Patching
 - Scanning Receivers/Voice Detection with Automatic Handoff
 - World-Wide All-Frequency Broadcasts (Within 60 Seconds)
 - Web-Based Automatic Ground/Air Phone Patching (with ALE)
 - HF Email
 - Ground Routing Automatically Locates Best Station For ALE Call
 - Knowledge of Actual Aircraft Position Not Required

WebCall Feature

- Command Center Able to Establish Voice Comm with ALE-Equipped A/C Through Web Browser
 - No HFGCS operator involvement
 - Automatic routing to best station
 - Requestor telephone called when ALE link established to complete phone patch
- Accessibility Via NIPRNET
- Future Availability Via SIPRNET



HF Email Capabilities

- Both secure (SIPRNET) and non-secure (NIPRNET) networks
- Forwards standard email between ground network users and mobile nodes over HF
- Best station routing used for ground-to-air deliveries
- Messages queued for later delivery if immediate delivery not possible
- Standards-based implementation
 - 2G ALE for link establishment
 - Up to 9600 bps modem (STANAG 4539, MIL-STD-188-110B)
 - STANAG 5066 & CFTP client used for reliable over-the-air data delivery
 - Standard SMTP email protocols into the ground network
- Multiple ALE networks in each HF email domain

Current Activities

- NCS-West expected to be operational this year (2010)
 - Both NCSs to be capable of using and controlling assets at all stations
- Audio and data connectivity between NCS and stations migrating to “over IP”
- AoIP for voice & modem audio connectivity between NCS and station
 - Audio Access Points (AAP) at station provide audio for up to 10 simultaneous users for each radio circuit using AoIP
 - Establishes potential for future user access directly to station via IP without NCS access
- Serial, synchronous data over IP
 - Q9604 HF modems at station accept IP data & control
 - For HF Email, S9600 at NCS-E converts serial-to-IP to station
- Digital Voice Proof-of-Concept Demonstration
 - Demonstrates ability to digitize voice on the RF link
 - MELPe @600/1200/2400 bps
 - AES 128-bit encryption
- Automated EAM Broadcast
 - Automates the management of EAM broadcasts to ensure all frequencies and stations participate

Digital Voice

- A two stage digital voice program was recommended in a previous study
 - Stage 1 demonstrates a clear/private voice capability
 - Stage 2 implements secure voice capability
- Stage 1 clear voice implementation
 - Current step is proof of concept demonstration
 - Ground Gateway at the NCS performs PCM-to-MELPe transcoding
 - HF modem located at station with IP connectivity to Ground Gateway
 - Supports operator voice as well as phone patch operation & voice broadcast at NCS
 - Need users with MELP digital voice
 - Ground tactical community already using
 - Not yet in airborne community

Digital Secure Voice Considerations

- End-to-end encryption desired, i.e. mobile-to-telephone, mobile-to-operator
- Current telephone (STU-III/STE) and HF radio voice cryptos (ANDVT) are not interoperable
 - Interoperation requires decrypt & interconnect baseband audio
- Secure Communication Interoperability Protocol (SCIP) envisioned as the protocol to link users regardless of transport
 - 2400 bps MELP required
 - SCIP capable telephones currently available
 - STE
 - Cell phones
 - SCIP not yet implemented for two-way radio ops
- Vinson ANDVT Crypto Modernization (VACM) program looking at replacement for Vinson & ANDVT cryptos
 - Contract has not yet been awarded (expected award decision ~July 2010)