



System Overview and Program Status

27 Oct 1999

**Presented by Lt Col Albert
CSEL Program Manager
Space and Missile Systems Center**

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Agenda

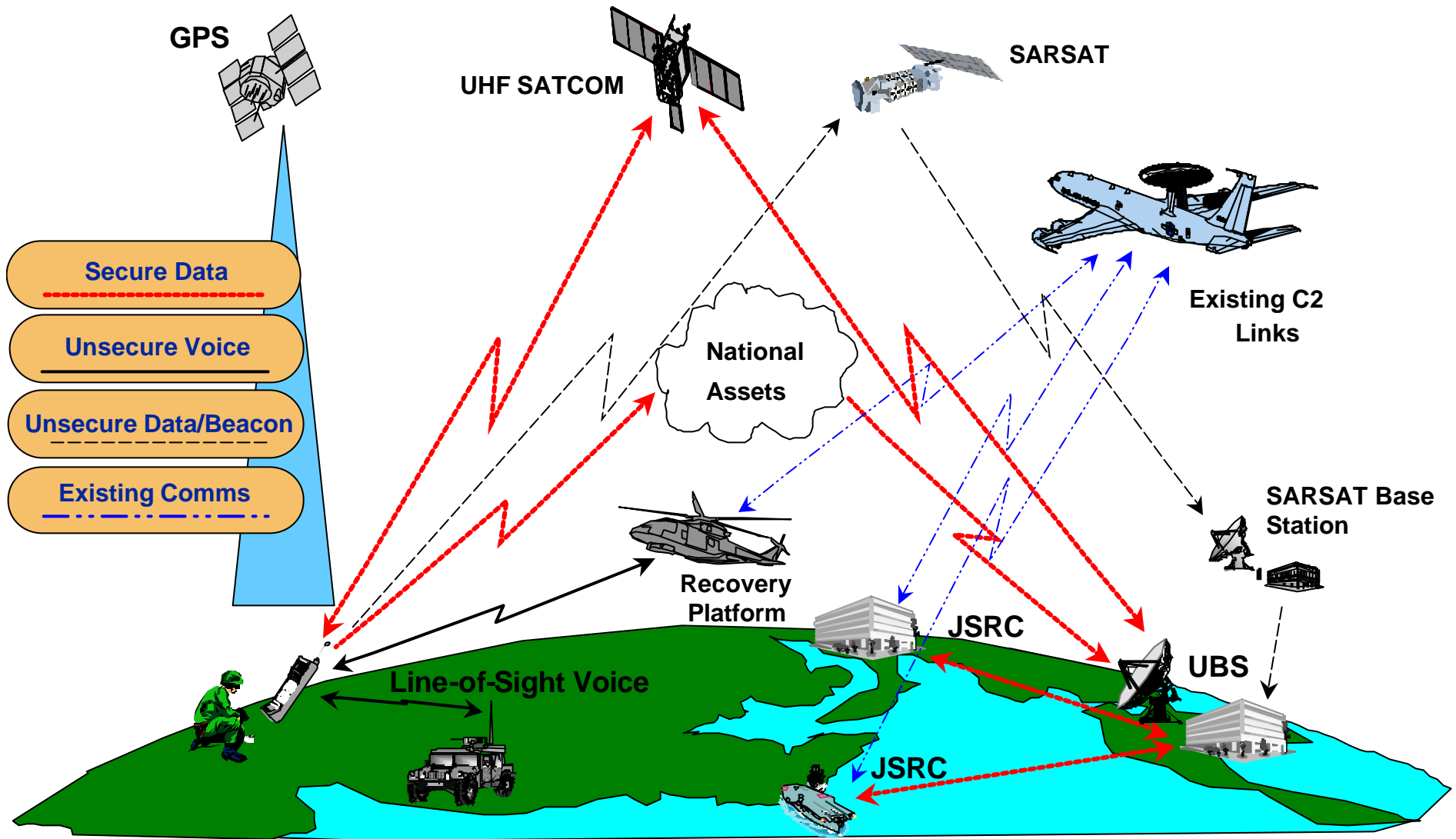


- **System Overview**
- **Program Status**
 - **Schedule**
 - **Deliveries**
 - **Funding**
 - **Recent Test Results**
- **Special Topic**
 - **Early Fielding**
- **Challenges**
- **Summary**

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CSEL System Architecture



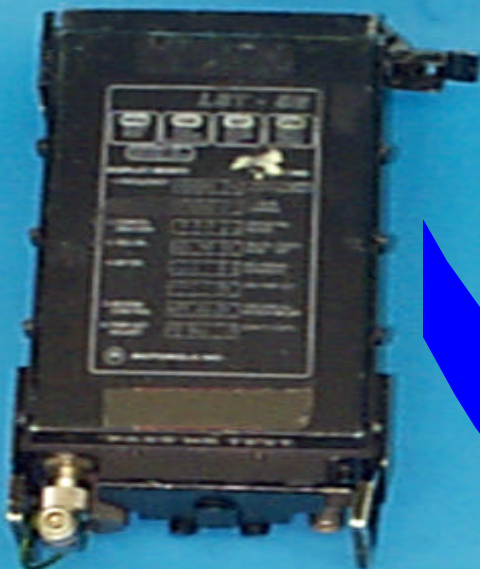
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CSEL - 287.2 Ounces of Capability in a 31.8 Ounce Package

**406 SARSAT
Beacon
35.2 Oz**



**LST-5
SATCOM
Transceiver
176 Oz**



**P(Y) GPS
Receiver
48 Oz**



**PRC-112
LOS SAR
Radio
28 Oz**



**CSEL
31.8 Oz**





CSEL Radio Features

- **Multi-Function – Voice/Secure Data**
 - 6 Programmable UHF Voice & 4 Fixed
 - 6 Programmable SATCOM Secure Data
 - 6 Programmable LPI/LPD Secure Data
- **Multi-Mode – OTH Data (UHF SATCOM, LPI/LPD, & SARSAT) & LOS (Voice/Beacon) For Global Coverage**
- **Multi-Band/Broadband -- VHF/UHF**
- **First Operational Selective Availability Anti-Spoofing (SAASM) -- Next Generation GPS**
- **Field Software Re-Programmable**



Extremely Capable Handheld

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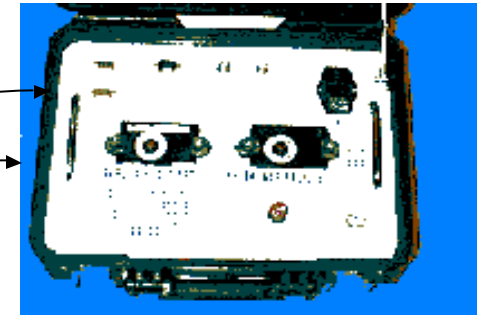
CSEL User Segment



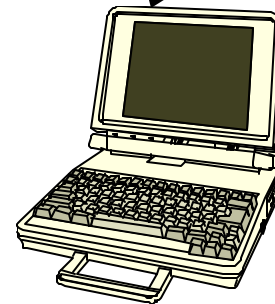
AN/PRQ-7 Radio

- Equivalent Size of PRC-112
- 19 Day Battery Life With Easy User Replacement (Non-Rechargeable)
- 10 Year Warranty

- GPS Time Transfer
- GPS Key Loading



Radio Set Adapter (RSA)



CSEL Planning Computer (CPC)

- Waypoint Input
- Frequency Input
- Commanded BIT



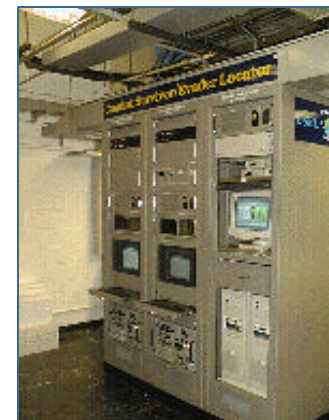
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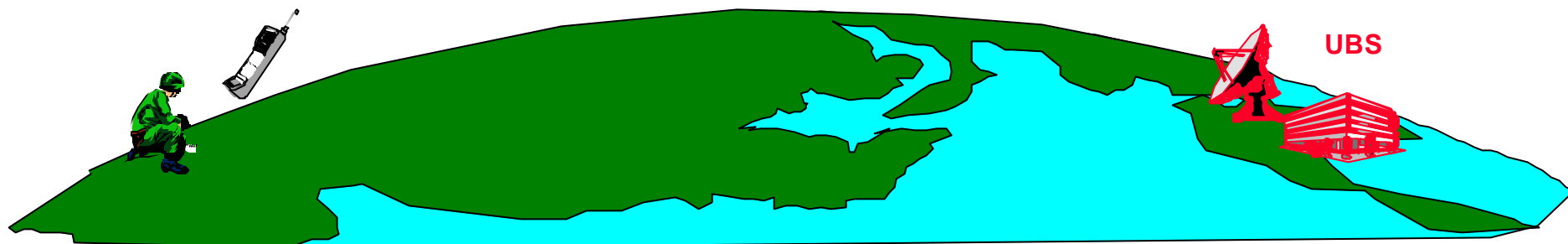
CSEL

Over-The-Horizon Segment

- **UHF Base Stations (UBS) for Worldwide Coverage**
 - Hawaii, Sigonella, Diego Garcia, and Norfolk
 - Collocated with Naval Communications Telecommunications Area Master Station (NCTAMS) Facilities
- **Compatibility with Demand Assigned Multiple Access (DAMA) Protocol for Efficient Channel Use**

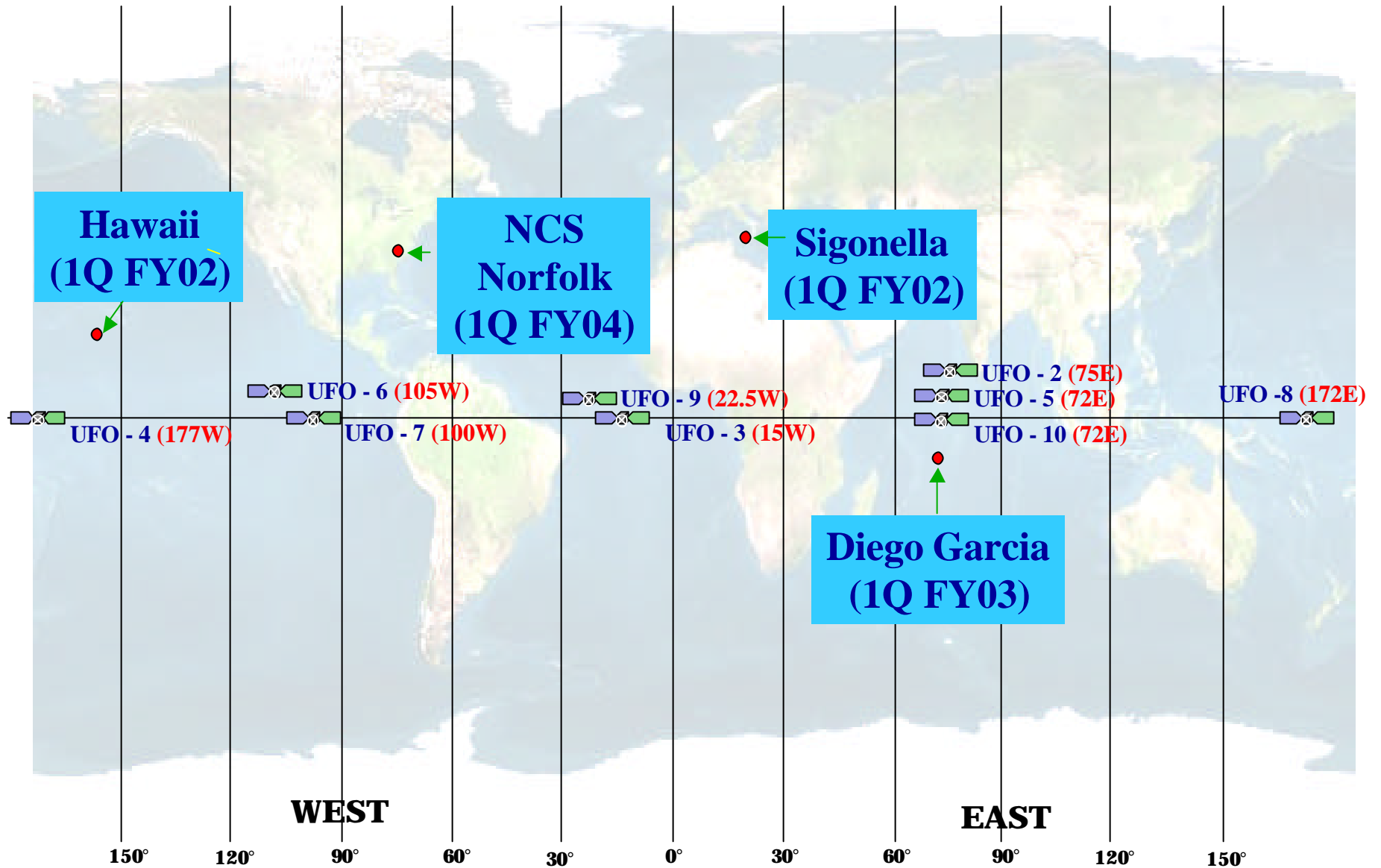


**AN/GRC-242 Radio Set
Base Station**



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UHF Base Station (UBS) Locations & Delivery Schedule



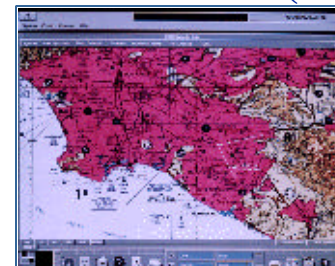


CSEL Ground Segment

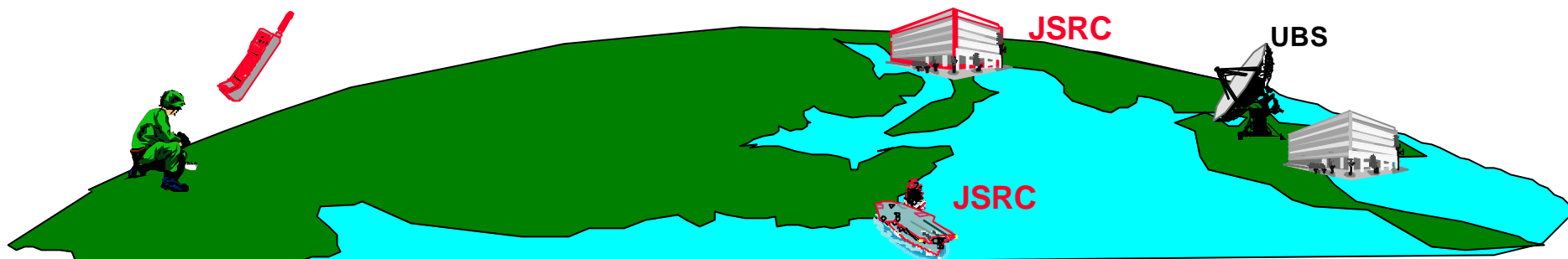


- Application on Any Defense Information Infrastructure Common Operating Environment (DII COE) Compliant C3I Computer Platform
- Send and Receive Survivor/Evader Messages
- Remotely Configure Survivor/Evader Radio
- JSRC Display
 - 100 Simultaneous Survivor/Evaders In Common Operations Picture (COP)
 - GPS Position
 - Evader Status

Joint Search and Rescue Center (JSRC)



DII COE Compliant
CSEL JSRC S/W

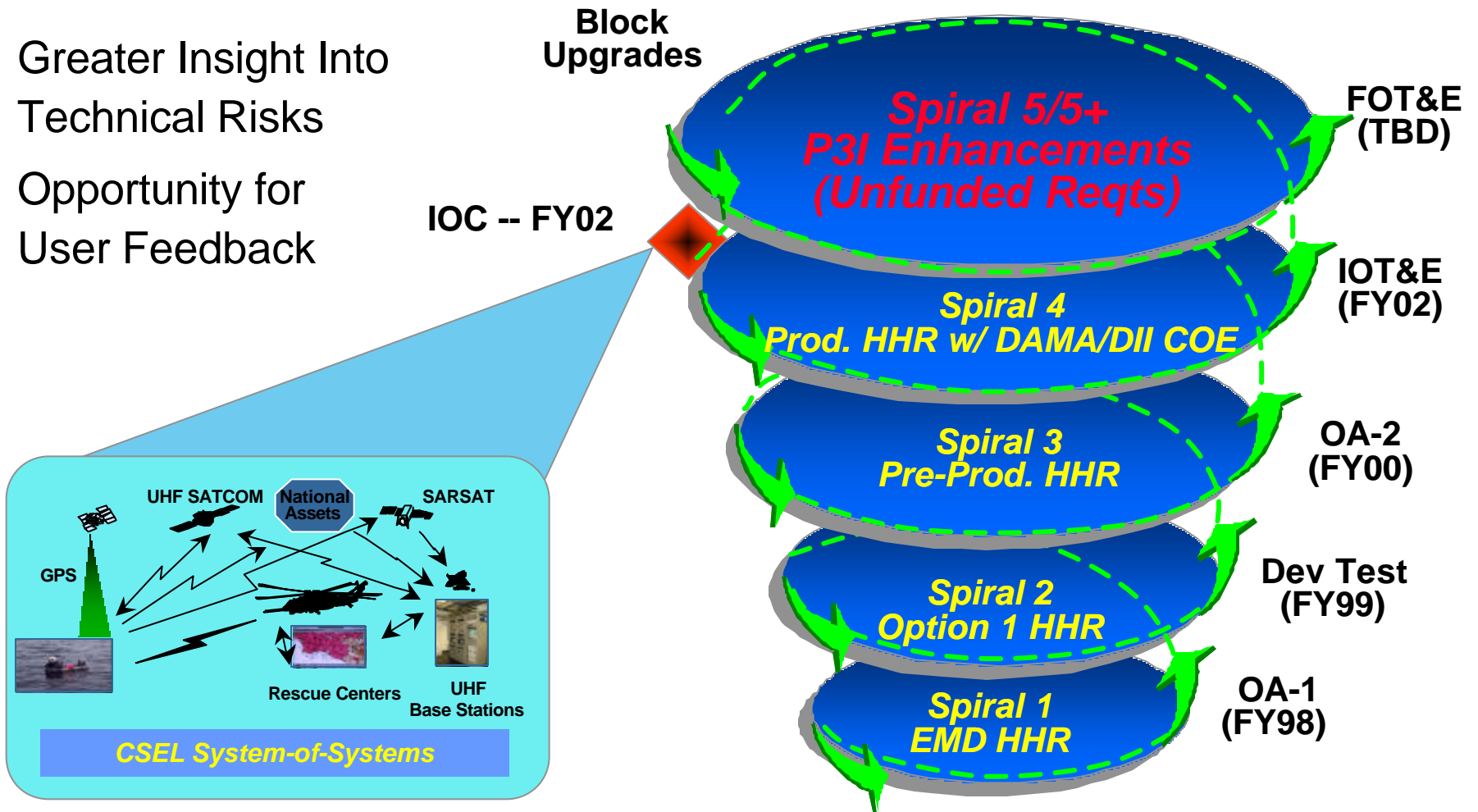


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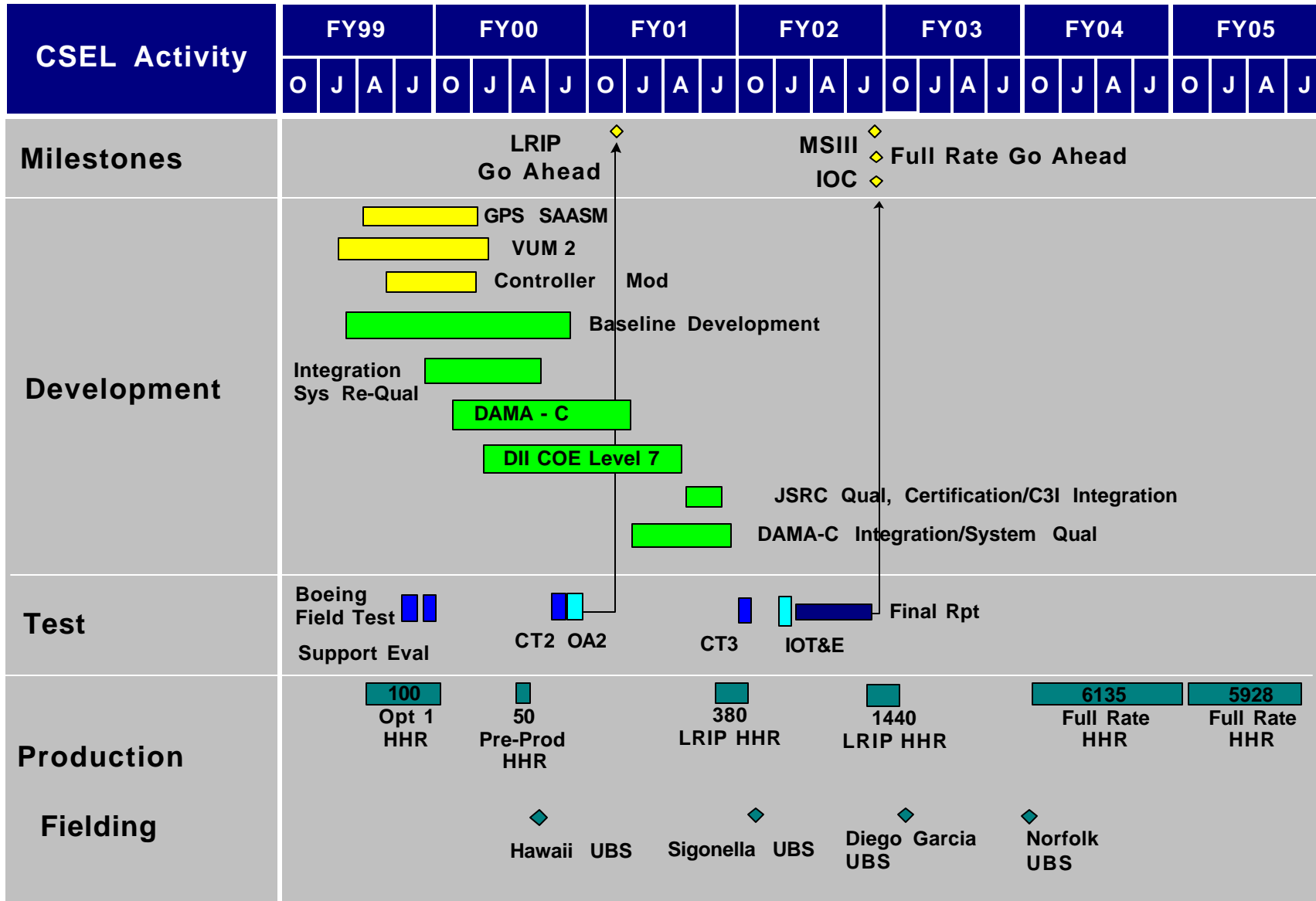
CSEL Spiral Development

- Greater Insight Into Technical Risks
- Opportunity for User Feedback





CSEL Program Baseline





CSEL HHR Buy Plan



Service Radios	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TC	Total Reqt
Air Force	50	50	467	643	647	628	605	20965	23450
Army	132	1030	3221	2680	2729	2106	2344	6633	18531
Navy(NAVAIR)	200	267	2239	2583	2754	985		0	9028
Navy (SEALS & EOD)		93	208	22	0	0		901	1224
Total	382	1440	6135	5928	6130	3719	2949	28499	52233
Base Stations	1	1	1						4

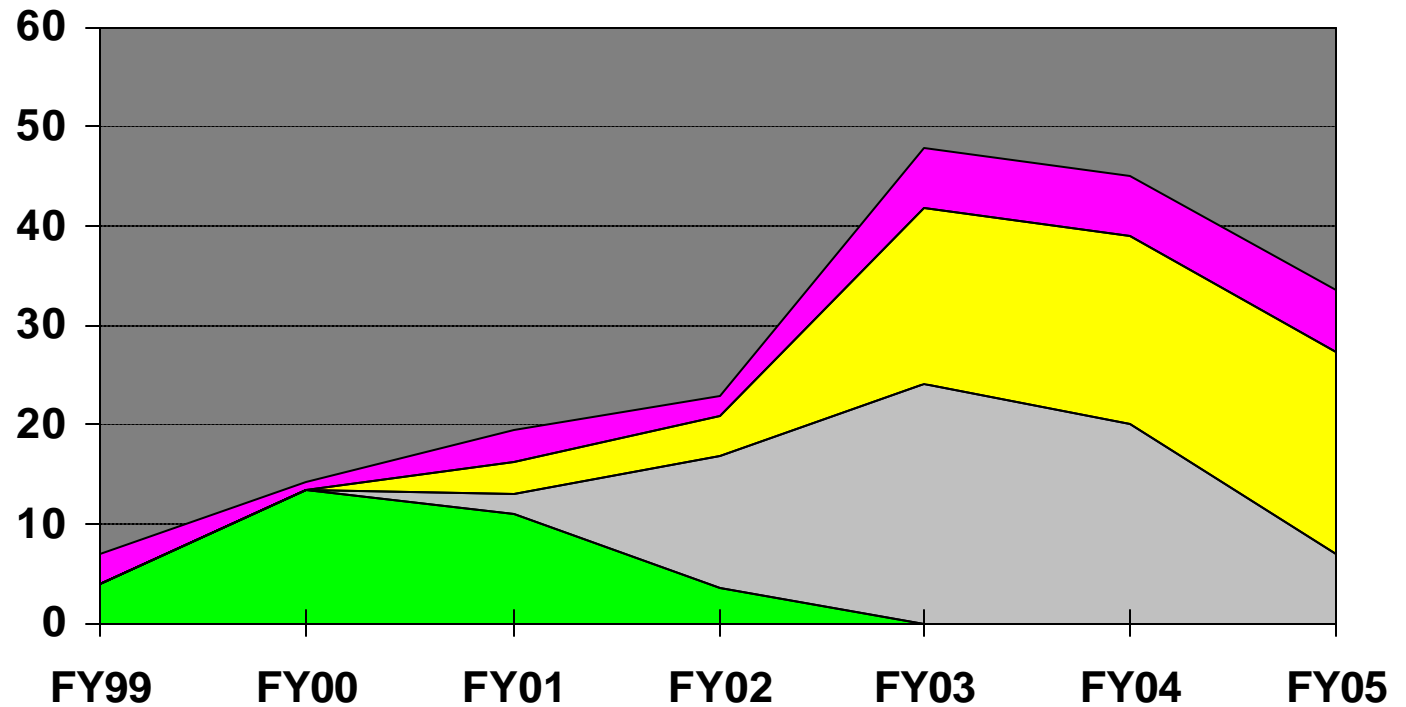
- **Radio Price Reduced Significantly at Quantities of 7000 Units/year**
 - Price Reduced From ~\$10.5K (350 Units) to \$5.4K (7001- 7500 Units)



CSEL FYDP Funding



- AF 3080
- NAVY 3080
- ARMY 3080
- AF 3600

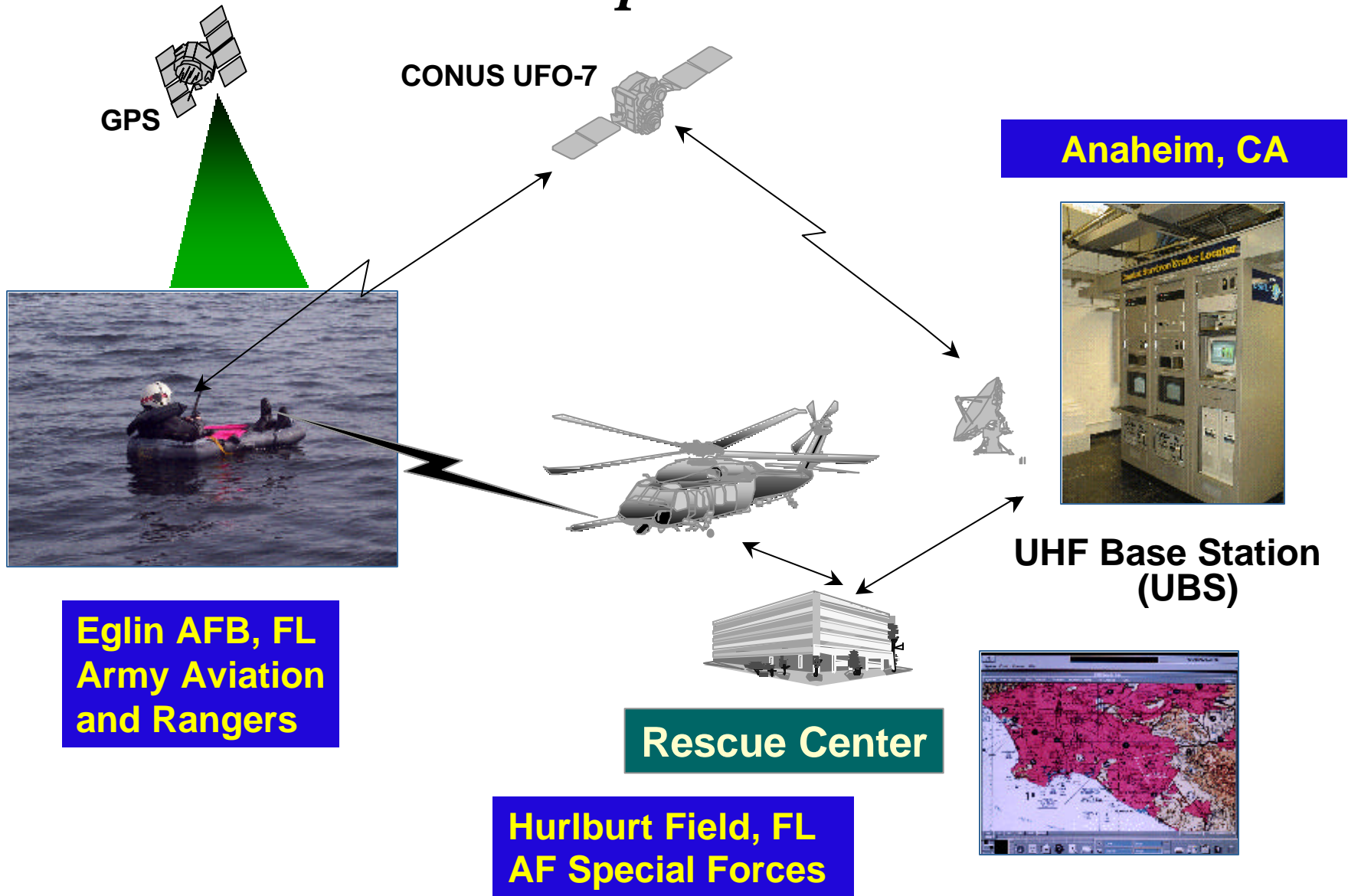


APPN (\$M)	FY99	FY00	FY01	FY02	FY03	FY04	FY05
AF 3080	2.9	0.8	3.1	2.3	5.9	6.0	6.2
NAVY 3080	0.0	0.0	3.2	4.0	17.9	19.1	20.5
ARMY 3080	0.0	0.0	2.2	13.2	24.0	20.0	6.9
AF 3600	4.0	13.4	10.9	3.5	0.0	0.0	0.0
Total	6.9	14.2	19.4	23.0	47.8	45.1	33.6

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Boeing Field Test - Sep 99 -





Preliminary Test Results

- **GPS Performance Significantly Improved Over EMD**
 - With 100 Km Offset, Position In <2 Minutes With Hot Start
 - Position in Heavy Foliage 39 Out 40 Times
- **LOS Voice**
 - Successful LOS Voice At 64 Miles (Radio-to-Radio)
 - Successful Interoperability With Aircraft
- **UHF SATCOM Communications**
 - Preliminary Results Above ORD Threshold Message Success Rate
- **Final Test Report Due 22 Nov**

Option I Performance Better than EMD

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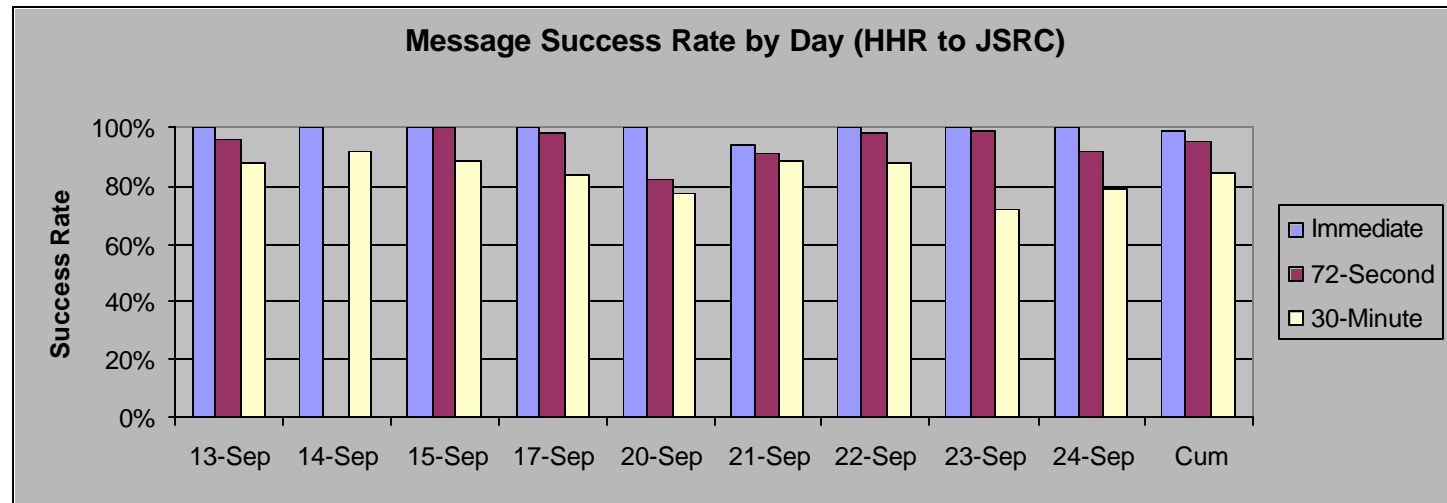


OTH Preliminary Results



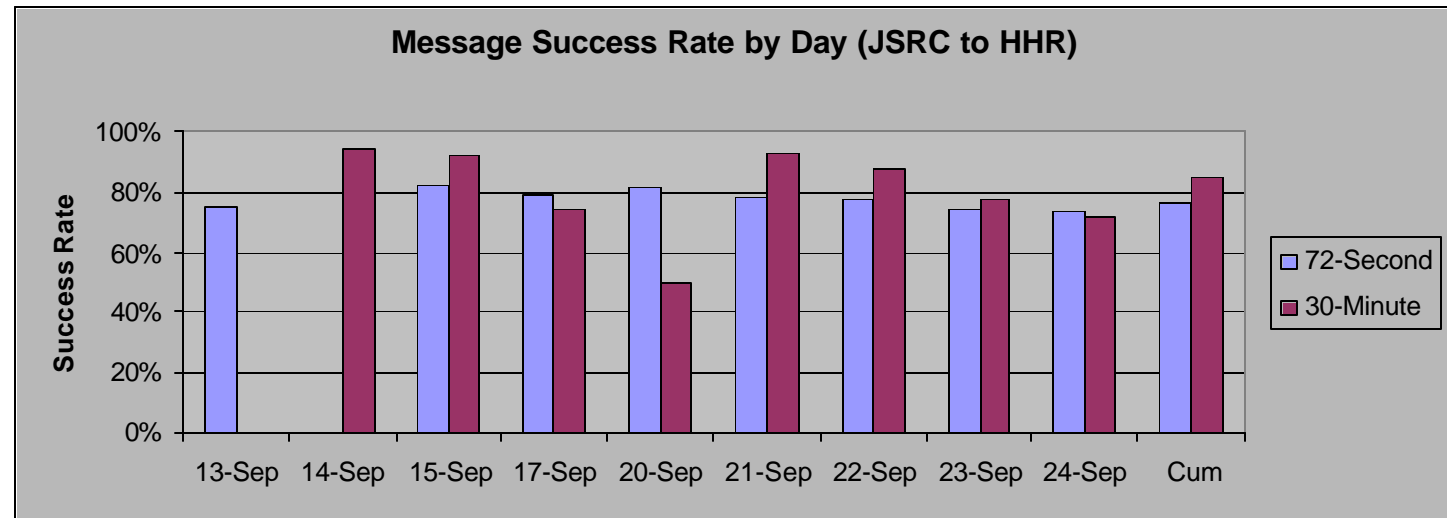
HHR to JSRC

93% Overall



JSRC to HHR

77% Overall



ORD Requirement

1-Way Communicate

85% Success

JORD Requirement

2-Way Communicate

95% Success

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Early Fielding



- **CINCSOC, CINCCENT, USD(P), and DUSD (AS&C) Support Early Fielding**
- **Would Require Formal Direction and Funding**
- **Users Must Define Fielding Assumptions/CONOPS, and Address Training, Waivers (DAMA/DII COE)**
- **Risks**
 - Current development risks delay early fielding
 - Ability to maintain CSAF Approved Baseline
 - Potential for new deficiencies identified in OA2 (Sep 00)
 - Services not able to maintain/sustain early delivery of system

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Early Fielding



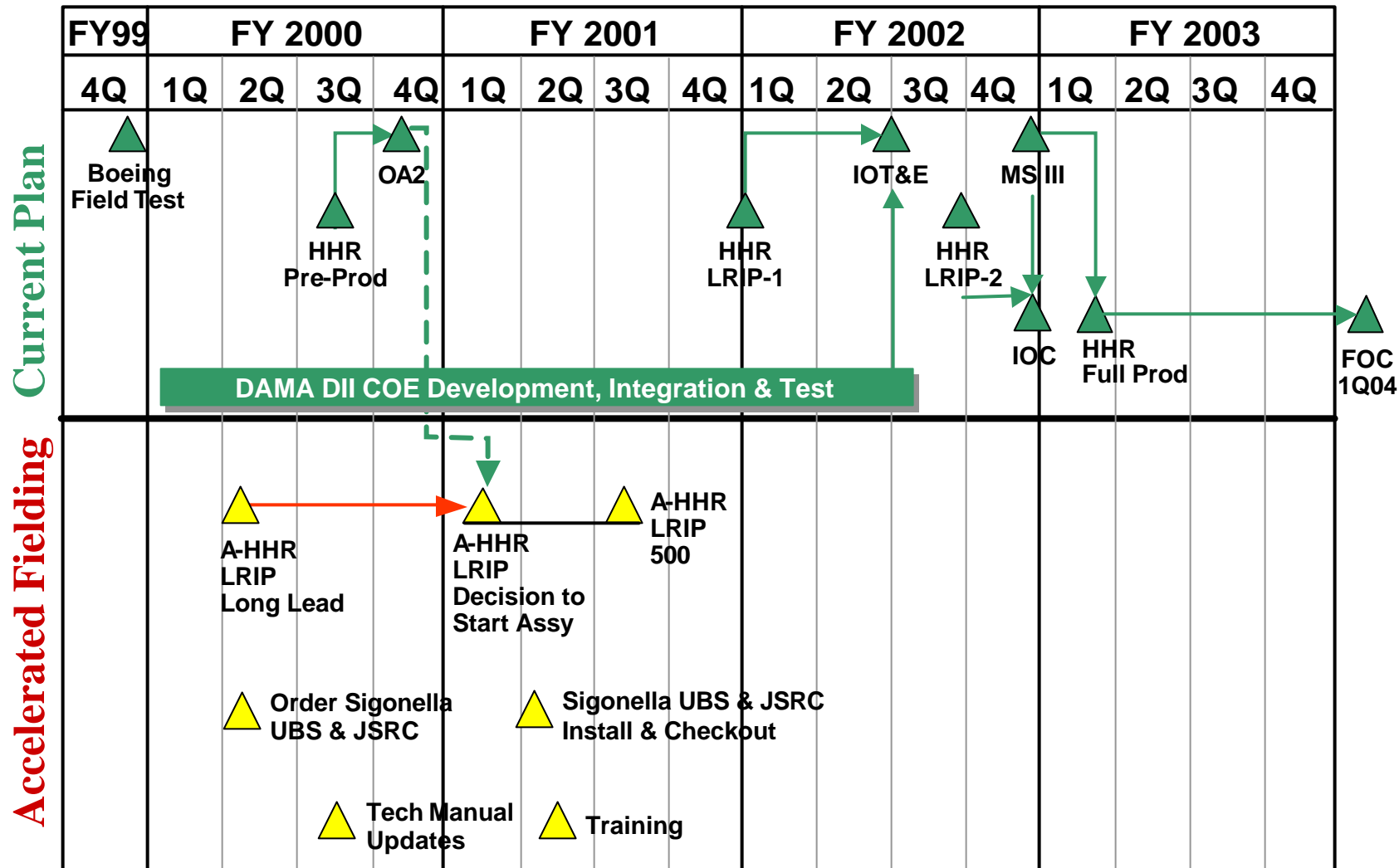
- **JPO Groundrules and Assumptions**

- Minimize Impact To CSAF Approved Baseline
- Field 500 Pre-production HHR Configuration with New Modules
 - With batteries (2000) and loaders (40)
- Authorize Contractor to Proceed w/Long Lead -- Jan 00
- Use OA2 Results to Start Final Assembly/Qual -- Nov 00
- Deliver HHRs -- Jan-Apr 01
- Early Fielding of UBS (Sigonella, IT) -- Jan 01
 - Navy assumes early maintenance responsibilities
- Standalone Workstations at Two JSRCs -- Jan 01
- Contractor Ops Support (until Services are capable)
- Tech Manuals Updates, Training, and Contractor Logistics Support
- Future System Upgrades To Meet DAMA/DII COE

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Early Fielding Strategy



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Challenges



- **Programmatic risks**
 - VHF/UHF module with over 900 densely packaged surface mounted components
 - DAMA/DII COE level 7 development
 - NSA signature software and security modules
- **UHF SATCOM channel management -- 24/7 availability**
 - Crosses CINC boundaries -- worldwide frequency plan needed
- **FMS roadmap**
 - Interoperability requirement and CONOPS
 - Security/releasability policy -- NSA encryption, GPS SAASM, National Waveform
- **New threshold requirements in JORD**
 - JPO approach is to address as future spirals/P3I block changes



Summary



- **Highly capable system of systems architecture**
 - More than just a radio
 - Spiral development approach
- **Focus is on next Operational Assessment in Sep 00 and initial deployment in 4Q FY02**
- **Time is NOW to get ready for paradigm shift**
 - Tactics, techniques, and procedures

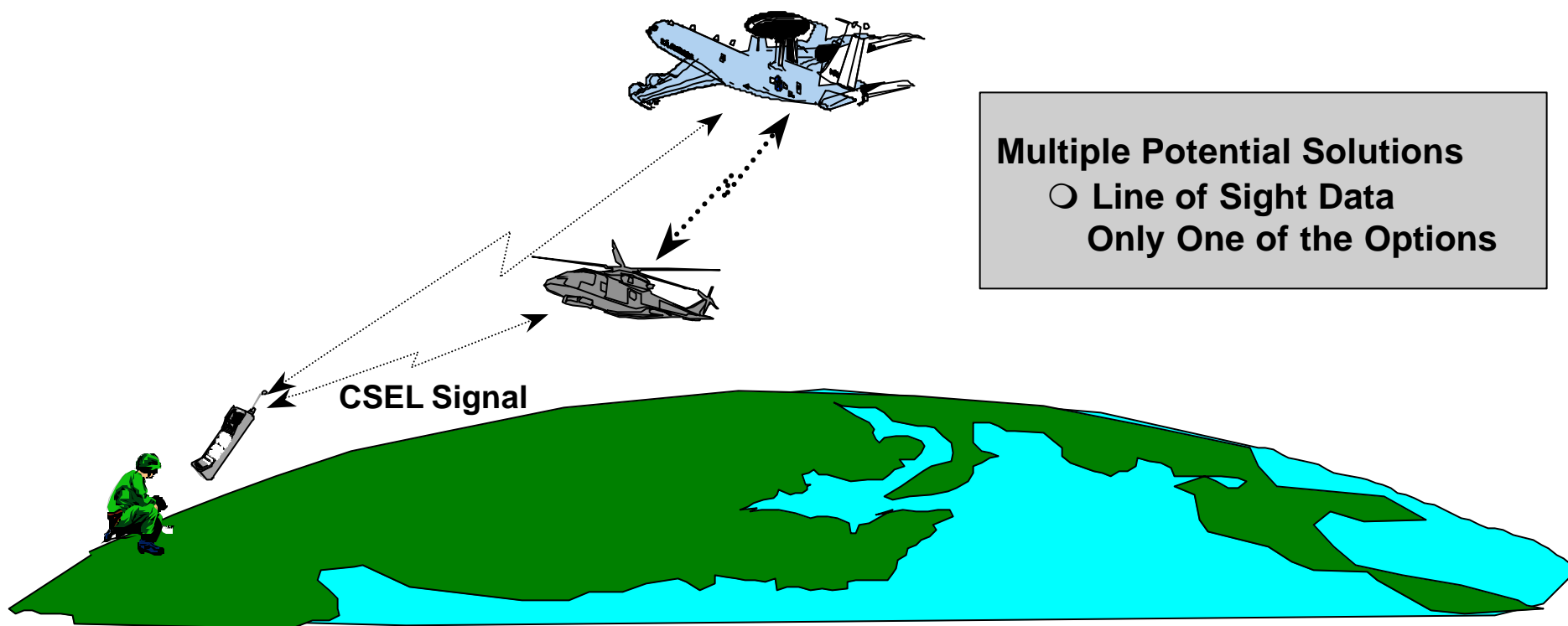
“We must never stop working on getting this capability fielded -- we owe it to our aircrews” -- General Ryan



Theater Communications P3I (Unfunded)

Requirement -- Timely And Reliable Update Of Survivor
Position/Status To Enroute Rescue Forces in Theater

Multiple Potential Solutions
○ Line of Sight Data
○ Only One of the Options



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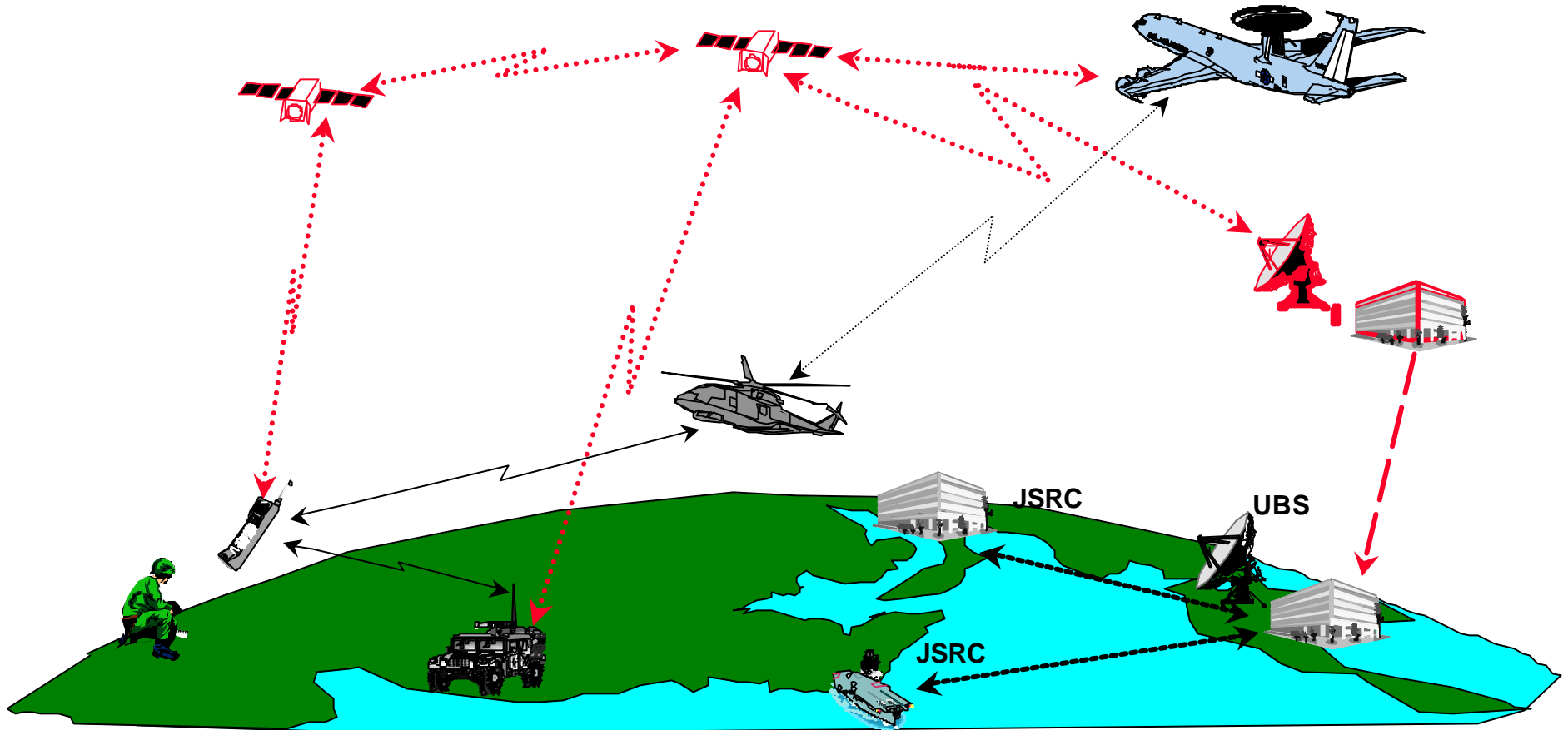


Commercial SATCOM P3I (Unfunded)



Global Commercial Two-Way Communications

- Greatly Increases Capacity
- Civil and Foreign Use Applications





UHFSATCOM Management



- **Reflects a Different Way of Doing CSAR -- Constant Availability (24/7)**
- **Crosses CINC Boundaries -- Need Joint Staff Support for Worldwide Frequency Authorization**
- **Requires Stable Channel Assignment for Radio Programming -- Recommend Full Year**
- **Radio Can Be Programmed With Primary and Backup Frequency for Every UFO Node**
- **Requires Central Frequency Request and Distribution -- JSSA Support Function**
- **Provided Comments to JS/J6 for *CJCS Joint UHF SATCOM Management Manual* -- Still In Coordination**

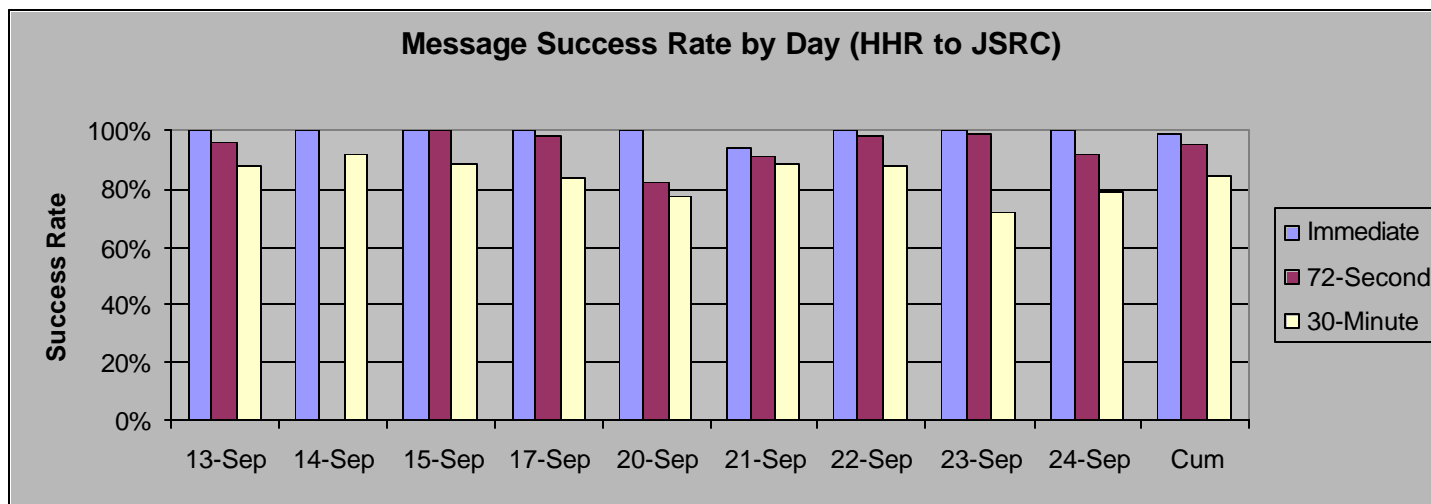


OTH Preliminary Results



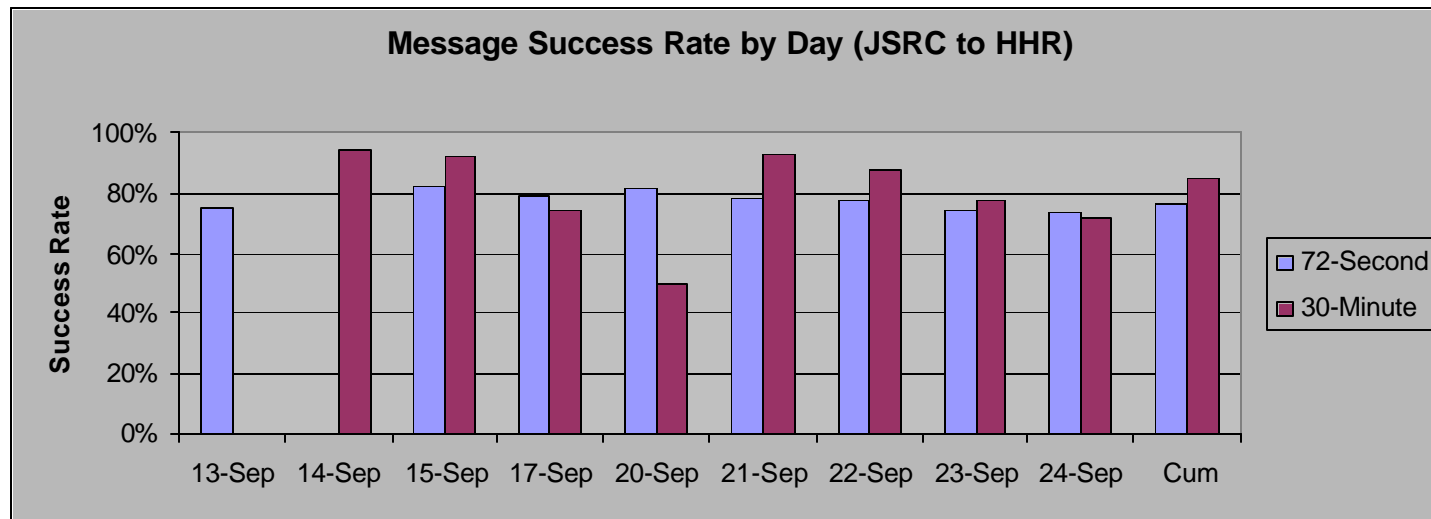
HHR to JSRC

IMM 99%
 72 sec 95%
 30 min 85%
 93% Overall



JSRC to HHR

72 sec 77%
 30 min 84%
 77% Overall



ORD Requirement

1-Way Communicate
 85% Success

JORD Requirement

2-Way Communicate
 95% Success

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