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Digital Modular Radio (AN/USC-61(V))

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**Digital Modular Radio (AN/USC-61(V))**

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**Office of the Chief of Naval Operations**

This briefing takes a look at the DMR mission and how DMR works. It also looks at the legacy equipment that is capable of being replaced by DMR.
DMR Mission

“Acquire an Affordable, High-Capacity, Capable Tactical Radio to Provide Interoperable LOS/BLOS C4I Capabilities to the Fleet”

- Built to Open Systems Architecture
- Maximizes COTS/NDI
- Able to Evolve As Commercial Technology Advances
- Not Tied to Original Manufacturer for Updates
- Supports Future Proofing
- Interoperable, Affordable, Scaleable, Flexible!
Why DMR?

- Plethora of Narrowband Stovepipe Radios are now 20+ years old—represents 60’s, 70’s technology that:
  - require extensive manpower to maintain & operate,
    - difficult to find obsolete, replacement parts.
    - limited or non-existent production base.
  - are a drain on limited fleet resources,
  - have limited capability, singular functionality, no automation & incapable of growth.

### System | IOC
---|---
AN/WSC-5 | 1972
AN/WSC-3 | 1976
AN/URT-23 | 1960s
AN/URC-109 | 1989
R-1051 | 1960s
R-2368 | 1980s
VRC-46 | 1960s

### HF
- AN/URT-23 HF Transmitter
- AN/URT-24 HF Transmitter
- R-1051/URR Receiver
- SRA-49 Receive Multicoupler
- SRA-56/7/8 Multicoupler
- URA-38 RF Control & Coupling System
- R-2368 HF Receiver
- URC-131 HF Transmit Group
- AS-2537 Antenna
- AS-3772 Antenna
- OE-404V Antenna System
- OE-418 Antenna System
- AS-3771 Antenna
- IHFA Wire Antenna System
- OE-()V/SRC Antenna
- OA-9243 Tilt Whip Antenna System

### VHF
- VRC-46 Transceiver
- GRT-21 VHF Transmitter
- GRR-23 VHF Receiver
- GRC-211 VHF Trans
- AN/URC-80 VHF Trans
- AN/URC-139 Bridge to Bridge
- TD-1456 Multicoupler
- TD-1289 Multicoupler
- SRC-54B
- AS-3226 Antenna
- AS-2809 Antenna
- NT-66095 Antenna
- AS-4293 Antenna
- AN/VRC-49 Transceiver
- AN/URC-94 Transceiver
- GRC-171 Transceiver
- SRA-60

HF, VHF, UHF Radios and Ancillary Equipment
Too Many Stovepipe Radios in Service Today!
What is DMR?
Software Programmable Digital Radio

Information Superiority Requires New Capabilities

Today
Transmit, Receive, Bridge, and Gateway Between Similar and Diverse Waveforms Over Multiple Communications Media and Networks

Legacy Systems

- Single Frequency
- Single Waveform
- Not Capable of Simultaneous Voice, Data, Video
- Low to Medium Data Rates
- Limited Routing, Networking, Network Management
- Can Not Automatically Adjust Performance
- Not Capable of Simultaneous Operation With Other Systems in Same or Other Domains
- Lacks Adequate Frequency Flexibility to Operate Globally

Software Programmable Digital Radio

- Multi-band, Multi-mode, Secure, Non-secure (Voice, Video & Data)
- Operate across a wide frequency range (e.g. 2 MHz to 2 GHz)
- Dynamic Bandwidth Management
- Retransmit/Cross Band Between Frequency Bands and Waveforms
- Software Reprogrammable
- Network Between & Across Geographical & Organizational Boundaries
- Backwards Compatible With Legacy Systems
Legacy Equipment Capable of Being Replaced by DMR

**UHF**
- **AN/WSC-3**
  - HAVEQUICK II
  - UHF SATCOM
  - UHF LOS

- **AN/WSC-5**
  - Shore UHF SATCOM

- **TD-1271**
  - 25 KHz DAMA Modem

- **AN/USC-54 (VICS)**
  - UHF SATCOM
  - 25 KHz DAMA

- **AN/USC-42(V)1,2 (MINIDAMA)**
  - 5/25 KHz SATCOM
  - UHF SATCOM
  - UHF LOS

- **AN/URC-93**
  - LINK 11

- **MD-1324**
  - 5/25 KHz DAMA Modem

**VHF**
- **AN/GRC-211**
  - AM/FM Voice

- **AN/VRC-46**
  - AM/FM Voice

- **AN/SRC-54**
  - SINCGARS
  - SINCGARS SIP

**HF (planned for future)**
( Receivers & Exciters only)
- **AN/URT-23**
- **AN/URC-109**
- **AN/URC-131 (HFSST)**
- **R-2368/URR**
- **R-1051/URR**
- **AN/FRT-96**

<table>
<thead>
<tr>
<th><strong>Baseline</strong></th>
<th><strong>Options</strong></th>
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<tbody>
<tr>
<td>ship, shore, sub</td>
<td>30-400 MHz 200W PA</td>
</tr>
<tr>
<td>0.1-2000 MHz, 4 Chs</td>
<td>HF 110A/ALE</td>
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<tr>
<td>5/25 kHz UHF SATCOM DAMA</td>
<td>MDR UHF SATCOM</td>
</tr>
<tr>
<td>AM/FM/HQII UHF LOS</td>
<td>HDR LOS (up to 4.6 Mbps)</td>
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<tr>
<td>SINCGARS, VHF LOS</td>
<td>SINCGARS SIP</td>
</tr>
<tr>
<td>Embedded TRANSEC/COMSEC</td>
<td>SATURN</td>
</tr>
<tr>
<td>Open System Architecture</td>
<td>Embedded Link 4A, Link 11</td>
</tr>
<tr>
<td>Software (re)Programmable</td>
<td></td>
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</tbody>
</table>
# DMR Size Comparison With Existing Systems

## Dual DAMA
- **DDG**
  - Transmitter Space: OK-326
  - Radio Space: DAMA KG-84A KG-84C KYV-5 (ANDVT)

## Mini-DAMA
- **DDG**
  - Transmitter Space: AM-7543 Power Amplifier
  - Radio Space: MINI-DAMA KG-84A KG-84C KYV-5 (ANDVT)

## DMR w/ Embedded TRANSEC/COMSEC
- **DDG**
  - Transmitter Space
  - Radio Space

### Boxes/Components
- **54 Boxes/Components, Single Function Radios, Multi-plexers and Cryptos (2194 lbs)**
- **46 Single Band, Single Function Radios and Cryptos (1744 lbs)**
- **1 Multi-Band, Multi-Function Radio (550 lbs)**
Where We’ve Been

- Awarded 2 FFP/IDIQ Contracts—Sep ‘98 to Raytheon & Motorola
  - Architecture for UHF SATCOM, UHF LOS, MIL-188-181/182/183, SINCGARS which:
    - ensures compliance with performance specs from JTRS ORD/Maritime\Fixed Annex,
    - offers options for other advanced capabilities.

- Conducted Extensive 8-Week Test on Initial Units
  - No Clear Technical Winner - both products showed weaknesses
  - Vendors afforded additional time to improve products

  - Winning vendor: Motorola - announced 2 Feb ’00.
Where We’re At

- Delivery of First LRIP Unit expected Nov ‘00
  - Version 2.0 hardware currently being produced by Motorola.
  - Balance of the LRIP 1 Units will be delivered to Version 3.0 configuration during May/Jun ‘01.

- Testing Required Prior to LRIP 2 Award
  - Additional testing on Version 2.0 H/W to determine progress on identified deficiencies.

- OPEVAL
  - Scheduled Jun ‘01.
  - Install and Check-out of Motorola's S/W ver. 5.1, begins Jan ’01.

- INFOSEC Certification
  - Working with NSA to further define the evaluation criteria for the NSA certification process and to pin specific “HARD” requirements.
Where We’re Going

FY 01
- DMR LRIP Option Year 1
  - UHF SATCOM
  - DAMA
  - UHF LOS
  - HQ I/II
  - SINCgars
  - VHF AM/FM LOS
  - VHF ATC
  - Embedded INFOSEC

FY 02
- DMR FRP Option Year 2
  - UHF MDR
  - SINCgars
  - SIP/ASIP
  - HF ISB w/ALE
  - HF SSB w/ALE
  - STANAG 4285 (HF)
  - STANAG 4529 (HF)
  - UHF Link-11B/4A
  - HF Link-11B/4A
  - STANAG 4231 (UHF)
  - JTRS Compliance

FY 03
- JTRS-M Option Year 3
  - HDR LOS

FY 04
- JTRS-M Option Year 4
  - Waveform Translation
  - ATC HF Data Link
  - ATC VHF Data Link
  - VMF
  - Cellular Radio
  - Wideband Digital Waveform
  - SATURN

FY 05
- Future Growth

Waveform Translation
- ATC HF Data Link
- ATC VHF Data Link
- VMF
- Cellular Radio
- Wideband Digital Waveform
- SATURN
Purpose: Determine if DMR is ready to enter Operational Test and Evaluation (OPEVAL)

Objectives:
- Evaluate DMR performance, effectiveness, and suitability.
- Verify DMR interoperability with UHF SATCOM legacy systems.
- Assess UHF Line-of-Sight (LOS) capabilities.
- Exercise designated shipboard operators & maintainers.
Exercise DMR in a manner identical to the way COMOPTEVFOR will test. . .

- Conduct TECHEVAL on Not-to-Interfere basis with normal shipboard operations.

- Record data as it occurs during ship’s normal course of operations.

- Measure End-to-End performance using UHF SATCOM networks.

- Confirm compliance With JTRS ORD Annex B Maritime/Fixed:
  - record data and voice statistics
  - test to a 97% confidence level

- Verify Integrated Logistics Support (ILS):
  - validate ILS certification
  - review documentation (i.e., Technical Manuals, etc.)
  - Assess training
## DMR Procurement Plan

<table>
<thead>
<tr>
<th>Platforms</th>
<th>FY99 Lrip One</th>
<th>FY00 LRIP TWO</th>
<th>FY01</th>
<th>FY02</th>
<th>FY03</th>
<th>FY04</th>
<th>FY05</th>
<th>FY06</th>
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<td>15</td>
<td>26</td>
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<td>22</td>
<td>49</td>
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<td>6</td>
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<td><strong>39</strong></td>
<td><strong>80</strong></td>
<td><strong>130</strong></td>
<td><strong>76</strong></td>
<td><strong>10</strong></td>
<td><strong>38</strong></td>
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Methodology:

- No units will be fielded until **Milestone III**.
- Installation priorities IAW IT-21 implementation matrix.

Planned ship class DMR quantities:

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<th>SHIP CLASS</th>
<th>DMRs REQUIRED</th>
<th>SHIP CLASS</th>
<th>DMRs Required</th>
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<tr>
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<td>AGF</td>
<td>3</td>
<td>MCS</td>
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<td>LCC</td>
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<td>MCM</td>
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<td>AO</td>
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</tr>
<tr>
<td>CG</td>
<td>2</td>
<td>AS</td>
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Conclusions

- DMR – state-of-the-art system that will revolutionize RF communications in the fleet.
  - Consolidated capability
  - Automated
  - Flexible
  - Smaller
  - More powerful
  - Software Upgradeable

- Progressive acquisition strategy will provide “Best Value” product.

- The revolution that DMR/JTRS brings the user, will serve as the cornerstone in the overall radio room automation vision of PMW179.

- Need feedback from the user to best help us help you.

- Need you (user) to help us win support for greater expansion of DMR and future DMR capabilities with Navy leadership.
Points of Contact

◆ Program Manager: CAPT Madsen (619) 524-7530; madsenc@spawar.navy.mil
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