<table>
<thead>
<tr>
<th><strong>Report Date</strong></th>
<th><strong>Report Type</strong></th>
<th><strong>Dates Covered (from... to)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>17NOV2000</td>
<td>N/A</td>
<td>-</td>
</tr>
</tbody>
</table>

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

**Author(s)**
Draper, John

**Performing Organization Name(s) and Address(es)**
Booz Allen & Hamilton 8283 Greensboro Drive McLean, VA 22102

**Sponsoring/Monitoring Agency Name(s) and Address(es)**

**Distribution/Availability Statement**
Approved for public release, distribution unlimited

**Supplementary Notes**
Per conversation with Abe Usher, (IATAC), performing organization is Booz Allen & Hamilton., The original document contains color images.

**Abstract**

**Subject Terms**
IATAC COLLECTION

**Report Classification**
unclassified

**Classification of Abstract**
unclassified

**Number of Pages**
17
**Title and Subtitle:**
Digital Modular Radio (AN/USC-61(V))

**Authors:**
Draper, John

**Performing Organization Name(s) and Address(es):**
Booz Allen & Hamilton
8283 Greensboro Drive
McLean, VA 22102

**Sponsoring / Monitoring Agency Name(s) and Address(es):**
Office of the Chief of Naval Operations

**Abstract:**
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.

**Subject Terms:**
IATAC Collection, digital modular radio

**Distribution / Availability Statement:**
Approved for public release; Distribution unlimited

**Security Classification of Report:**
UNCLASSIFIED

**Security Classification of Abstract:**
UNCLASSIFIED

**Number of Pages:**
16

**Price Code:**
A

**Security Classification of This Page:**
UNCLASSIFIED

**Limitation of Abstract:**
UNLIMITED
Outline

- DMR Mission
- Why DMR?
- What is DMR?
- Program Status
- Developmental Testing
- Procurement Plan
- Fielding
- Conclusions
“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.

<table>
<thead>
<tr>
<th>System</th>
<th>IOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN/WSC-5</td>
<td>1972</td>
</tr>
<tr>
<td>AN/WSC-3</td>
<td>1976</td>
</tr>
<tr>
<td>AN/URT-23</td>
<td>1960s</td>
</tr>
<tr>
<td>AN/URC-109</td>
<td>1989</td>
</tr>
<tr>
<td>R-1051</td>
<td>1960s</td>
</tr>
<tr>
<td>R-2368</td>
<td>1980s</td>
</tr>
<tr>
<td>VRC-46</td>
<td>1960s</td>
</tr>
</tbody>
</table>

HF, VHF, UHF Radios and Ancillary Equipment
Too Many Stovepipe Radios in Service Today!

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-(J)/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
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

- 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>Baseline</th>
<th>Options</th>
</tr>
</thead>
<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>
</tr>
<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>
</tr>
<tr>
<td>SINCGARS, VHF LOS</td>
<td>SINCGARS SIP</td>
</tr>
<tr>
<td>Emedded TRANSEC/COMSEC</td>
<td>SATURN</td>
</tr>
<tr>
<td>Open System Architecture</td>
<td>Emedded Link 4A, Link 11</td>
</tr>
<tr>
<td>Software (re)Programmable</td>
<td></td>
</tr>
</tbody>
</table>

00 11 09 N6 DMR - 6 -
DMR Size Comparison
With Existing Systems

Dual DAMA

<table>
<thead>
<tr>
<th>DDG</th>
<th>Transmitter Space</th>
<th>Radio Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK-326</td>
<td>DAMA</td>
<td>KG-84A</td>
</tr>
<tr>
<td>OK-455</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

54 Boxes/Components, Single Function Radios, Multi-plexers and Cryptos (2194 lbs)

Mini-DAMA

<table>
<thead>
<tr>
<th>DDG</th>
<th>Transmitter Space</th>
<th>Radio Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM-7543 Power Amplifier</td>
<td>MINI-DAMA</td>
<td>KG-84A</td>
</tr>
</tbody>
</table>

46 Single Band, Single Function Radios and Cryptos (1744 lbs)

DMR w/ Embedded TRANSEC/COMSEC

<table>
<thead>
<tr>
<th>DDG</th>
<th>Transmitter Space</th>
<th>Radio Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK-455</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

**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

**JTRS-M Option Year 3**
- HDR LOS

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

**Future Growth**
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>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPN-DMR</td>
<td>15</td>
<td>26</td>
<td>0</td>
<td>22</td>
<td>49</td>
<td>9</td>
<td>2</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>OPN-JIMINI</td>
<td>59</td>
<td>12</td>
<td>0</td>
<td>16</td>
<td>8</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>HF-DMR</td>
<td>62</td>
<td>15</td>
<td>31</td>
<td>6</td>
<td>31</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPD 17-18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>CVN 69/76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>LPD 19-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>DDG 93-95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>DDG 96-98</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>LPD 21-22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>DDG 99-101</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>LPD 23-24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>DDG 102-103</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>LPD 25-26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>CVN 70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>LHD 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
<td><strong>122</strong></td>
<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>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>
Methodology:

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

Planned ship class DMR quantities:

<table>
<thead>
<tr>
<th>SHIP CLASS</th>
<th>DMRs REQUIRED</th>
<th>SHIP CLASS</th>
<th>DMRs Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVN</td>
<td>3</td>
<td>DD</td>
<td>2</td>
</tr>
<tr>
<td>CV</td>
<td>3</td>
<td>FFG</td>
<td>1</td>
</tr>
<tr>
<td>AGF</td>
<td>3</td>
<td>MCS</td>
<td>3</td>
</tr>
<tr>
<td>LCC</td>
<td>3</td>
<td>MCM</td>
<td>1</td>
</tr>
<tr>
<td>LHA</td>
<td>3</td>
<td>MHC</td>
<td>1</td>
</tr>
<tr>
<td>LHD</td>
<td>3</td>
<td>AOE</td>
<td>1</td>
</tr>
<tr>
<td>LPD</td>
<td>2</td>
<td>AO</td>
<td>1</td>
</tr>
<tr>
<td>LSD</td>
<td>2</td>
<td>ARS</td>
<td>1</td>
</tr>
<tr>
<td>CG</td>
<td>2</td>
<td>AS</td>
<td>1</td>
</tr>
</tbody>
</table>
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

◆ Assistant Prog Manager: Jim Stein (858) 537-0495; steinj@spawar.navy.mil

◆ Acquisition Prog Manager: Dave Murray, (619) 524-7549; murrayd@spawar.navy.mil

◆ Technical Director PMW 179: Karl Cain (619) 524-7614; kcain@spawar.navy.mil