# *COMMUNICATIONS Engineering Services*

Richard Berg, Director

Charles Rollman, Deputy Director

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# *EMRC History*

- EMRC began with Federal Grant 1975
- EMRC was located at Sinai Hospital
- Designed with switch donated from CIA
- All mechanical switching
- Just connected hospitals in Baltimore City and five surrounding Counties
- SYSCOM located at University Hospital and connected by hotline

# *Original EMRC Circa 1975*

# Region 3 EMRC at Sinai Hospital

# *Generation II*

- Designed in house
- Consolidated EMRC and SYSCOM at Dunning Hall – 1988
- Statewide Helicopter Communications System operational
- Automated Flight Following - for safety
- CHATS – Hospital Status Tracking

# Dunning Hall

# *Generation III*

- New MIEMSS Building
- Needed center to replace Dunning Hall
- On-line 1998
- Uses latest digital technology for switching
- Region 5 EMRC added 1999
- Cecil and Frederick to Region 3 EMRC
- CHATS online to the Internet

# EMRC/SYSCOM 2000's

# EMRC/SYSCOM 2015

# EMRC Regions

# Contact Numbers and Frequencies

**HELICOPTER REQUEST**
410-706-8080
410-706-8081
410-706-8082
1-800-468-5090

**SYSCOM**
410-706-7813
410-706-7814
410-706-7815
1-800-648-3001

**TROUBLE REPORTS – RADIO REPAIR**
1-800-492-1185

**TONE FREQUENCY**
A=127.3 Hz    B=146.2 Hz
C=167.9 Hz    D=192.8 Hz

**HELICOPTER DISPATCH**
44.74 MHz    TONE 110.9 Hz

**HELICOPTER MEDICAL**
47.66 MHz    TONE 100.0 Hz

**Western EMRC**
301-777-7111 Administration

**Western EMRC Patch Line**
301-722-0494

**Region 3 EMRC**
410-706-0036 Administration

**Region 3 EMRC Patch Lines**
410-578-8400
410-578-8401
410-578-8402
1-800-492-3805

**MED FREQ  BASE/MOBILE**

| | | | |
|---|---|---|---|
| MED 1 | 463/468.000 | MED 5 | 463/468.100 |
| MED 2 | 463/468.025 | MED 6 | 463/468.125 |
| MED 3 | 463/468.050 | MED 7 | 463/468.150 |
| MED 4 | 463/468.075 | MED 8 | 463/468.175 |
| CALL 1 | 462/467.950 | CALL 2 | 462/467.975 |

**Region 4 EMRC**
410-822-0095 Administration

**Region 4 EMRC Patch Lines**
1-877-963-6963
410-822-5830

**Region 5 EMRC**
410-706-0092 Administration

**Region 5 EMRC Patch Lines**
301-333-4671
301-333-4672
301-333-4673
1-877-840-4245

**MIEMSS COMMUNICATIONS**
**1-410-706-3668**

# *MIEMSS Current Systems*

- Redcom Modular Switching Peripheral- analog patching solution utilizing control software developed in house

- JPS Voters- analog system that decides which Base Station is the best to transmit and receive from

- Motorola MCC 7500 Console- Maryland FiRST console allowing connections to MFiRST talkgroups and resources

- C2000 hospital consoles- analog "phone" used by some hospitals for medical patching –currently being replaced by DEMSTEL phones.

- Siemens Tradeboard- legacy phone system used by SYSCOM and EMRC partially unsupported

- Digital Microwave System- provides the transport for Circuit switched and Packet switched technologies

- UHF MED Radio Systems- analog nationally interoperable base stations

- Low Band Radio Systems- analog base stations used for Medevac helicopters

# *EMS System Upgrade Goals*

- Eliminate single point failures
- Provide geo-diversity
- Eliminate unsupported technologies
- Provide for "Next Generation" voice and data capabilities
- Utilize PSINet and DEMSTEL infrastructure under development
- Allow for the development of a true backup capability

# *MFiRST MCC7500 Console*

- Benefits
  - Eliminated unsupported Centracom II Console
  - Allowed native operation on MFIRST system
  - Brought additional capabilities to interact with partner agencies
  - Added administrative radio functionality
  - Allows limited operation from Shock Trauma Backup Center

# *MFiRST MCC7500 Console*

- Limitations
  - Allows limited geo-diversity with talkgroups
  - Air to ground design still dependent on the MIEMSS Building
  - Does not resolve EMRC's technology needs
    - Siemens phone system
    - Redcom MSP
    - JPS Voters
    - C2000 Hospital Consoles

# EMRC/SYSCOM Connections



Figure 2-2 — EMRC/SYSCOM

DiDonato Consulting Services, Inc.
Annapolis, Maryland
www.didonato.us
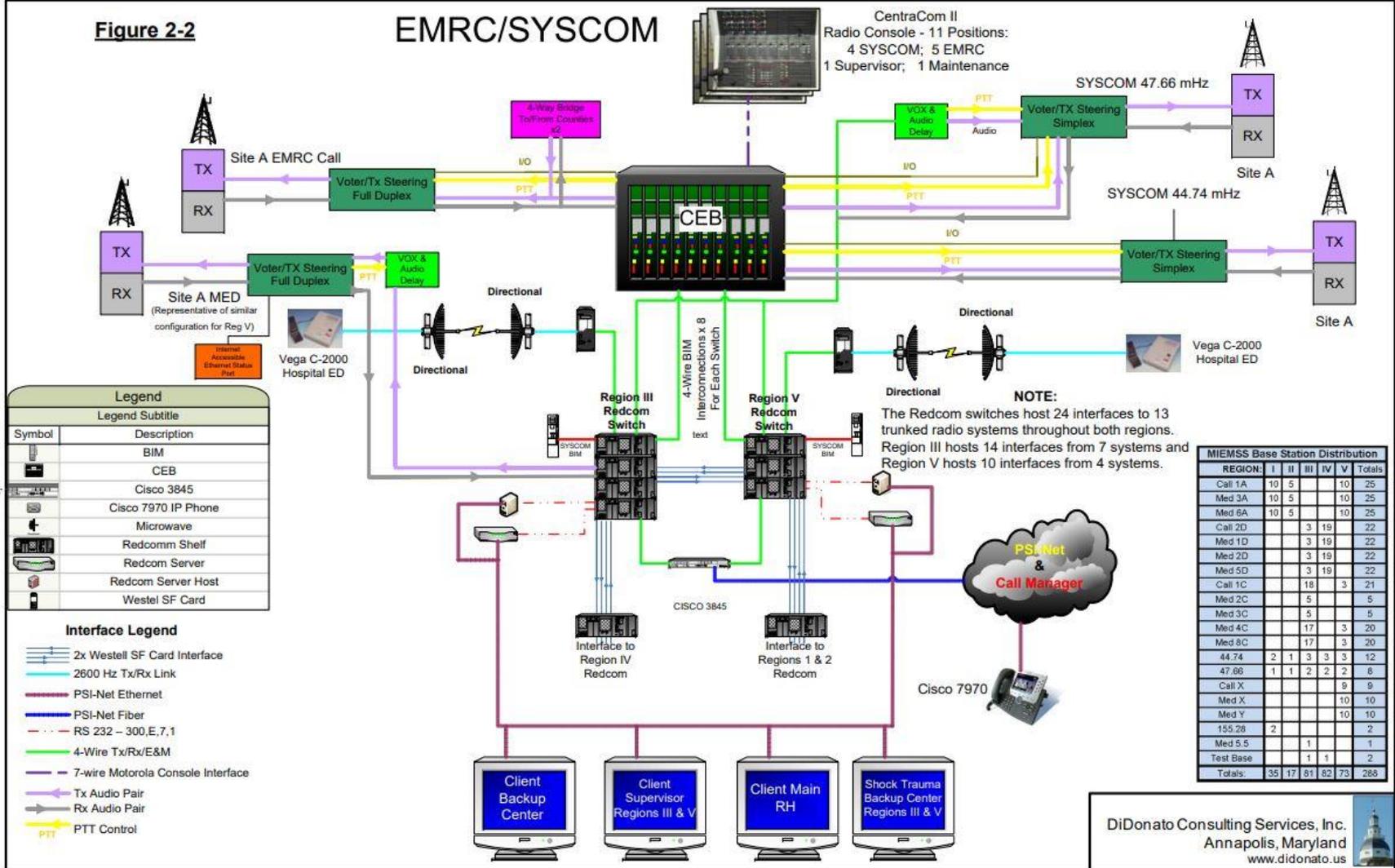
# *MIEMSS Base Stations*
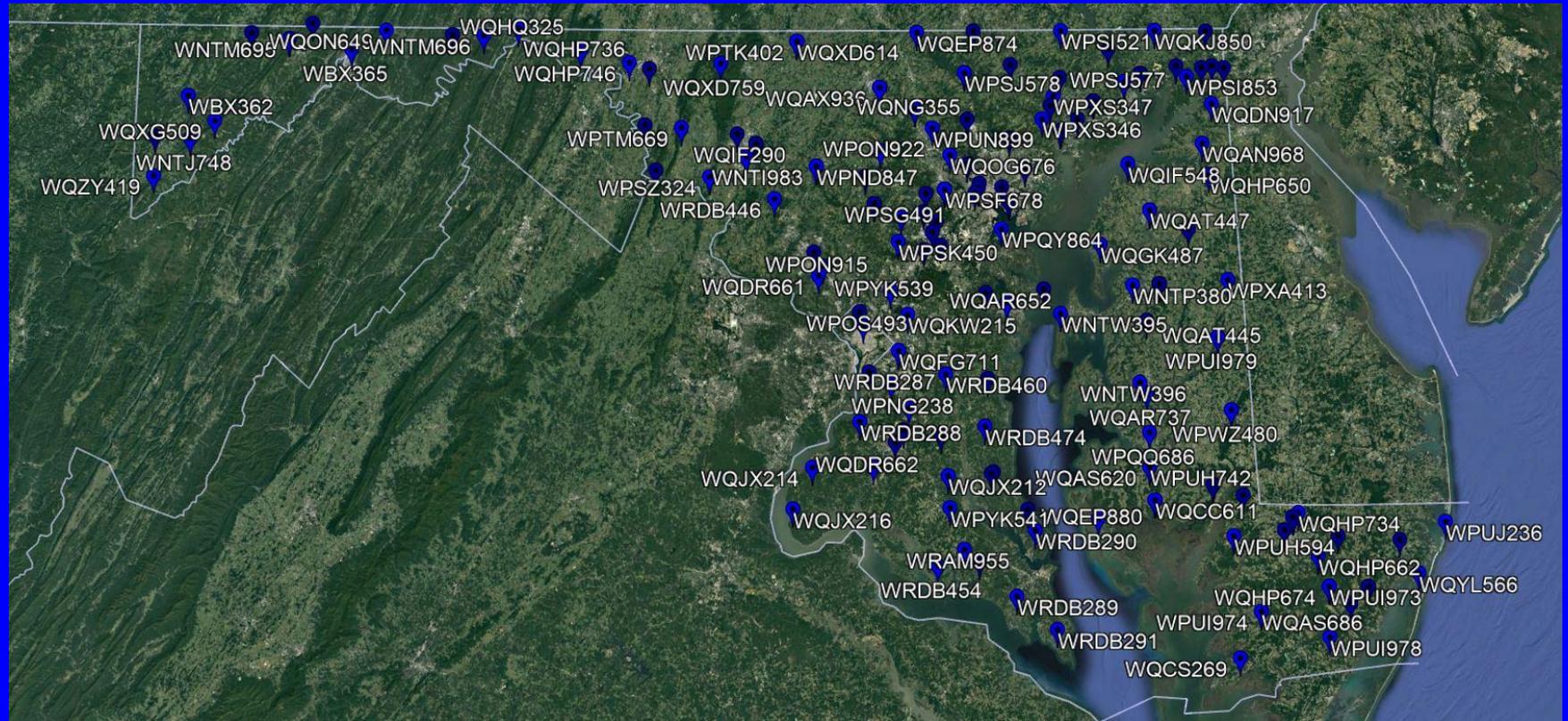
# *Connected Hospitals*
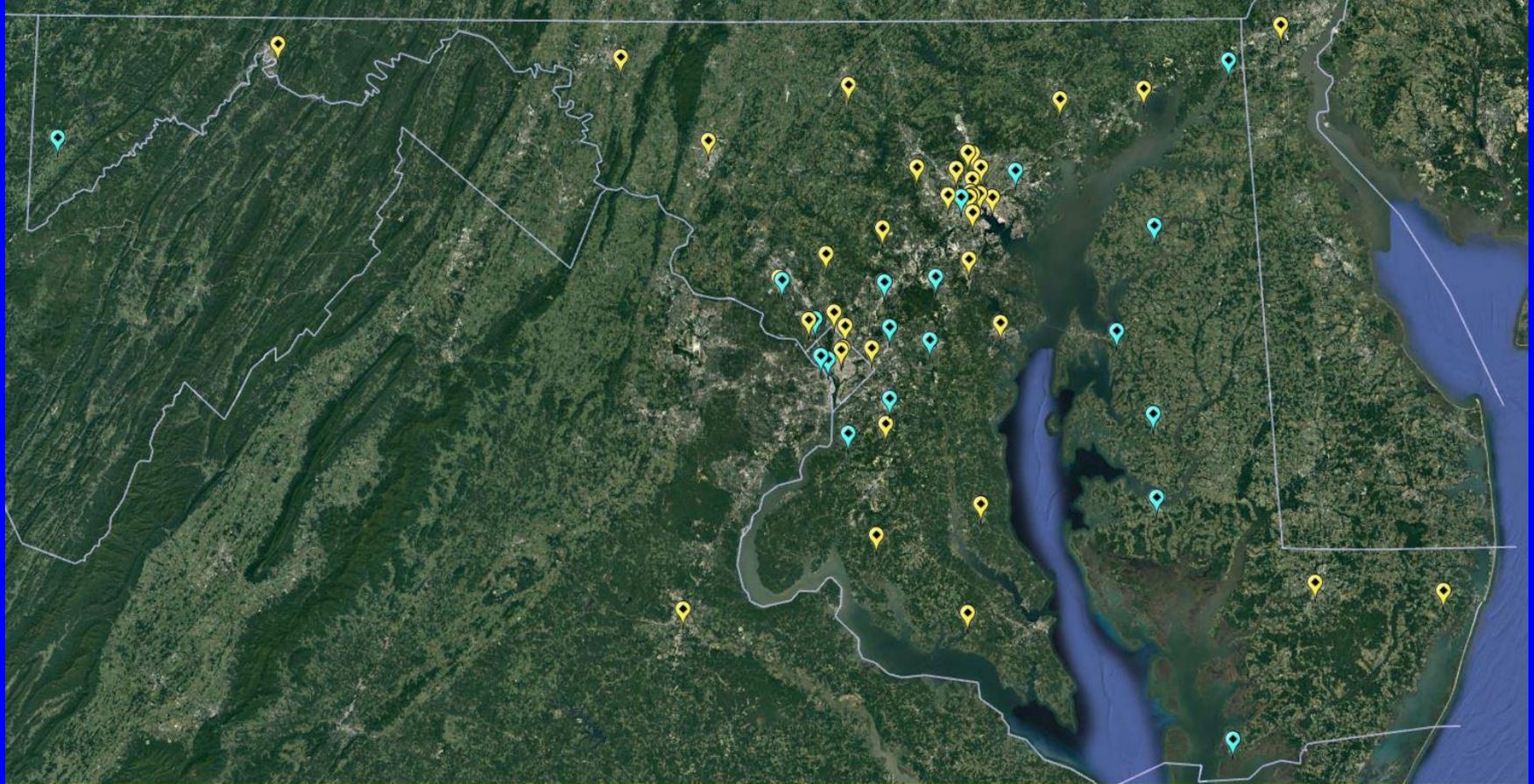
# *Microwave Transport Layer*

- 320 Digital Point-to-Point microwave hops at 166 locations

- Transports all EMS circuits

- Bandwidth is shared with Public Safety partners including

  - Maryland's 700 MHz Public Safety Radio System (MFiRST), Network Maryland, SHA, MEMA, MSP, DNR, FBI, National Guard, 16 local jurisdictions, Homeland Security Border Protection, etc.

# *MIEMSS Microwave Links*

# *PSINet*

- Public Safety Interoperability Network
  - All Cisco network
  - "Owned" and managed by MIEMSS
  - Basis for the EMS System upgrade

# *PSINet*

- Deployed to
  - PSAPs
  - MSP Barracks
  - MIEMSS EMRCs
  - EOCs
  - Health departments
  - State hospitals
  - Hospitals
  - Other allied agencies
  - Public Safety towers

# *PSINet*

- Interoperability applications
  - Digital Emergency Medical Services Telephone (DEMSTel)
  - Central Maryland Area Radio Communications (CMARC)
  - Maryland Eastern Shore Interoperability Network (MESIN)
  - Washington-Allegany-Garrett Interoperable Network (WAGIN)
  - Coordinated Highways Action Response Team (CHART)
  - Maryland Incident Management Interoperability Communications System (MIMICS)
  - Maryland Law Enforcement Information Network (MLEIN).

# *Public Safety Interoperability Network (PSInet)*



Maryland Institute for Emergency Medical Services

Maryland Public Safety Interoperability Network

PSInet
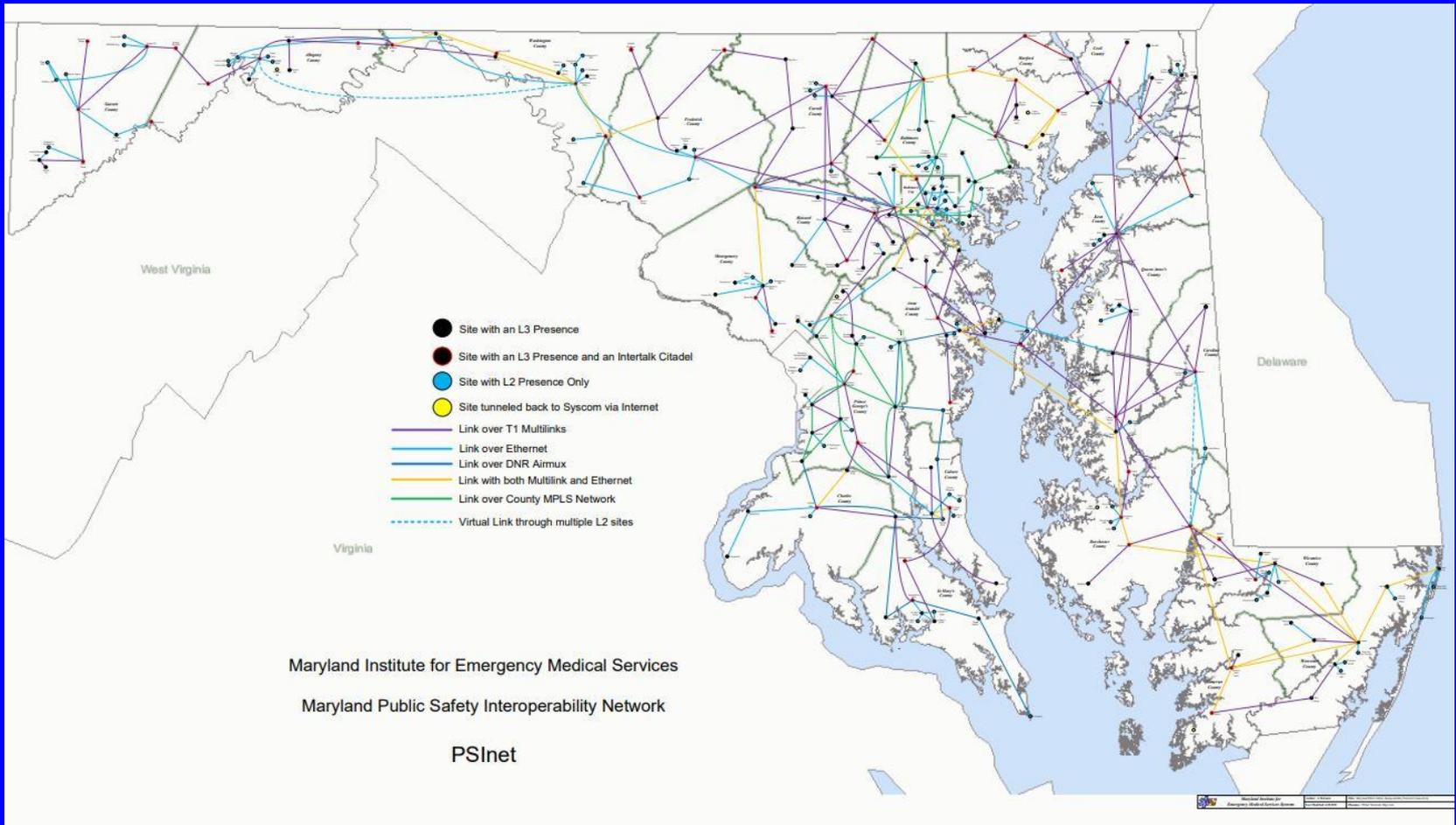
# Region 3 EMRC Radio Patching Resources

- Conventional UHF Med Channels
  - Call 1, Med 2, Med 3, Med 4, Med 8 (Tone 167.9 Hz)
  - TRAUMA LINE radio
- Conventional Low Band
  - "HELIMED" – 47.66 MHz (Tone 100.0 Hz)
- Conventional 700 MHz
  - 7AIRMED
- State and County Talkgroups
  - Maryland FiRST- 7R3-CALL, 7R3-MED1, 7R3-MED2, 7R3-MED3, HELIMED 1
  - Baltimore City- City C6, City C7, City C8
  - Baltimore County- BAC 221, BAC 224, BAC 228
  - Anne Arundel County- AA 800 CALL, AA 800 MED 4,  AA 800 MED 8
  - Howard County- Howard 800 CALL, Howard  MED 4, Howard MED 8
  - Harford County- Harford CALL, Harford 304, Harford 308
  - TRAUMA LINE

# Region 3 EMRC REDCOM

| TELEPHONES | | | | RADIOS | | | | Hospitals | | | | | | | Other Resources | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 410-578-8400 | | | BAC 224 | CARROLL 804 | Harford 304 | | Anne Arundel | Bayview Burn | Bayview ED | Baltimore Washinton BWMC | Carroll Hospital | Carroll VoIP | | | SYSCOM |
| R3 Temp 2 | 410-578-8401 | | MED 3 | BAC 228 | CARROLL 808 | Harford 308 | | Christiana | Franklin Square | Good Samaritan | Grace Medical | Greater Baltimore GBMC | | | | |
| Poison Center | 410-578-8402 | | MED 4 | 47.66 | AA 800 Med 4 | 7R3-MED1 | | Harbor | | Hopkins ED | Hopkins PEDS | Howard VoIP | | | | |
| Go Team | 800-492-3805 #1 | | Trauma Radio 5.5 | Balt City MED C7 | AA 800 Med 8 | 7R3-MED2 | | Mercy | Midtown | Northwest VoIP | RAC-CCRU | St Agnes VoIP | | Region 5 Patch In | Region 5 Patch Out | |
| DEMSTEL | 800-492-3805 #2 | | | Balt City MED C8 | Howard 800 Med 4 | 7R3-MED3 | | Saint Joseph | Shock Trauma TRU | Sinai Hospital | Union Hospital (CECIL) | Union Memorial | Union Hospital (Cecil) | Region 4 PATCH IN | Region 4 PATCH OUT | |
| | | | MED 8 | | Howard 800 Med 8 | HELIMED1 | | University | UCMC Aberdeen | UCMC Belair | | | | Poison on Campus | PRMC | |
| | | | | | | | | | | | | | | R5 Intertalk IN | R5 Intertalk OUT | |

| CCM CONF 1 Position 6 | | CCM CONF 2 Position 6 | | CCM CONF 3 Position 7 | | CCM CONF 4 Position 6 | | CCM CONF 5 | | CCM CONF 6 | | CCM CONF 7 | | CCM CONF 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC 224 | | MED 3 | | MED C8 | | 7R3-MED1 | | | | | | | | | |
| | | 7R3-MED3 | | | | | | | | | | | | | |

# *Region 5 EMRC Radio Patching Resources*

- Conventional UHF Med Channels
  - Call 2, Med 1, Med 2, Med 5 (Tone 192.8 Hz)
  - TRAUMA LINE
- Conventional Low Band
  - "HELIMED"- 47.66 (Tone 100.0 Hz)
- Conventional 700 MHz
  - 7AIRMED
- State and County Talkgroups
  - Maryland FiRST- 7R5-CALL, 7R5-MED1, 7R5-MED2, 7R5-MED3
  - Montgomery County- 7H CALL, 7H2, 7H3
  - Prince George's County- MED CALL, MED A, MED B, MED E
  - Frederick County- 800 CALL, 800 MED 4, 800 MED 8
  - Calvert County- 800 CALL, 800 MED 31, 800 MED 32
- Other
  - HMARS- DC's Hospital Mutual Aid Radio System

# Region 5 EMRC REDCOM

| TELEPHONES | | RADIOS | | | MONTGOMERY | | PRINCE GEORGES | | WASH DC | | CHARLES | CALVERT | SAINT MARY'S | FREDERICK | OTHERS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R5 Temp 1 | | MED 1 | Calvert 800 MED 31 | Fred 800 Med 4 | Germantown VoIP | | Bowie Voip | | Children's @ UMC VoIP | | Charles Reg VoIP | Calvert VoIP | St Mary VoIP | Fred Mem VoIP | SYSCOM |
| R5 Temp 2 | | MED 2 | Calvert 800 MED 32 | Fred 800 Med 8 | HOLY CROSS SS VoIP | | Capital Region Med Ctr DOC | Capital Region Med Ctr ED | Children VoIP | DC VA Hospital | | | | TRU VoIP | |
| R5 Temp 3 | | MED 5 | 7H2 CNSLT1 | 7R5-MED1 | Holy Cross Germantown VoIP | | Doctors VoIP | | George Washington Hosp | Georgetown Hospital | | | | | R3 PATCH OUT |
| | 877-840-4245 #1 | MED 5.5 | 7H3 CNSLT 2 | 7R5-MED2 | Mont Gen VoIP | | Ft Wash VoIP | | Howard University Hospital | MEDSTAR VoIP | | | | | R3 PATCH IN |
| DIGITAL EMSTEL | 877-840-4245 #2 | 47.66 | PG 700 Med A | 7R5-MED3 | SHADY GROVE VoIP | | Laurel Voip | | SIBLEY Hospital | United Med VoIP | | | | | Go Team |
| | | | PG 700 Med B | 7AIRMED | Suburban Voip | | Southern MD VoIP | | WALTER REED VoIP | | | | | WMHC/UPMC VoIP | Meritus Medical Center |
| | | HMARS | PG 700 Med E | | White Oak VoIP | | | | Washington Hospital Voip | | | | | | Region1 EMRC |

| CONFERENCE 1 Position 2 | CONFERENCE 2 Position 2 | CONFERENCE 3 | CONFERENCE 4 | CONFERENCE 5 | CONFERENCE 6 | CONFERENCE 7 | CONFERENCE 8 |
|---|---|---|---|---|---|---|---|
| PG 700 Med A | PG 700 Med B | | | | | | |
| | Capital Reg | | | | | | |
| | Cap Reg DOC | | | | | | |
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# *Region 4 EMRC*

- Talbot County host Region 4 EMRC
- Operational  since1999
- Use same technology developed for Baltimore EMRC
- Eight counties with seven hospitals
- Linked to Baltimore EMRC/SYSCOM

# Region 4 EMRC Radio Patching Resources

- Conventional UHF Med Channels
  - Upper Shore- Call 2, Med 3, Med 6 (Tone 127.3 Hz)
  - Lower Shore- Call 2, Med 4, Med 8 (Tone 146.2 Hz)
- State and County Talkgroups
  - Maryland FiRST- 7R4-CALL, 7R4-MED1, 7R4-MED2, 7R4-MED3

# Region 4 EMRC REDCOM

| TELEPHONES | | RADIOS | | | | | Hospitals | | | | Other Resources |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-877-963-6963 | | Med 3 Tone A | Med 4 Tone B | | | | ♥ Chester River VoIP | Wicomico's PRMC | ♥ PRMC VoIP | | R3 EMRC Patch Out |
| 410-822-5830 | | Med 6 Tone A | Med 8 Tone B | | | Easton Mem Hospital | ♥ Easton Mem Hospital VoIP | Worcester's PRMC | | | R3 EMRC Patch In |
| | | | MFiRST 7R4-MED1 | | | | ♥ Dorchester Gen Hospital VoIP | Atlantic General | ♥ Atlantic General VoIP | | |
| ♥ DEMSTEL Patch In VoIP | | | MFiRST 7R4-MED2 | | | ♥ Queen Anne Emergency VoIP | | | ♥ McCready Voip | | |
| | | | MFiRST 7R4-MED3 | | | | | | | | |
| | | | MFiRST 7R4-MED 4 | | | | | | | | |
| | | | | | | | | | | | ♥ Anne Arundel Medical Center VoIP |
| Conference 1 | Conference 2 | Conference 3 | Conference 4 | Conference 5 | Conference 6 | | | | | | |

The color scheme has been changed to Windows 7 Basic

# *Region 1 & 2 EMRC*

- Allegany County host Region 1 & 2 EMRC
- Operational 2006
- Use same technology developed for Baltimore EMRC
- Three counties with four hospitals
- Linked to Baltimore EMRC/SYSCOM

# *Region 1 & 2 Radio Patching Resources*

- Conventional UHF Med Channels
  - Call 2, Med 3, Med 6 (Tone 127.3 Hz)
- Conventional VHF
  - 155.280 MHz
- State and County Talkgroups
  - Maryland FiRST- 7R1-CALL, 7R1-MED1, 7R1-MED2, 7R1-MED3
  - Washington County- WC CALL 211, WC MED 213, WC MED 216

# Region 1 EMRC REDCOM

| PHONE CIRCUITS | | MED CHANNELS | | ALLEGANY | | | GARRETT | | | WASHINGTON | | | OTHER RESOURCES | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEMSTEL | | Med 3 | MFiRST 7R1-MED1 | WMHS1 | WMHS VoIP | | Garrett Memorial | Garrett VoIP | | Meritus VoIP | | | Maint | | |
| Region 5 EMRC | | Med 6 | MFiRST 7R1-MED2 | WMHS2 | | | | | | Meritus 1 | | | WAGIN | | |
| 301-722-0494 | | VHF Med 155.28 | MFiRST 7R1-MED3 | Potomac Valley | | | | | | | | | | | |
| | | WC Med 213 | | | | | | | | | | | | | |
| | | WC Med 216 | | | | | | | | | | | | | |
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| Conference 1 EMRC 4 | Conference 2 EMRC 4 | Conference 3 EMRC 4 | Conference 4 EMRC 4 | | | | |
|---|---|---|---|---|---|---|---|
| Med 3 | 7R1-MED3 | 7R1-MED1 | WC Med 213 | | | | |
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# New Patching and Console System

# *DEMSTEL*

- DEMSTEL, the Digital Emergency Medical Services Telephone system, was originally conceived as a means of communication between EMRC's, hospitals, health departments, and other public health related agencies.  Its purpose has since been expanded to include communication between any public safety agencies including, but not limited to, 911 Centers, Hospitals, Maryland State Police, local law enforcement, MEMA, DHMH, and MIEMSS.

# SYSCOM & EMRC
# Aviation Communications
# Overview

# SYSCOM's Current Radio Channel Capabilities for Aircraft

- 44.74 MHz (Tone Code 110.0 Hz)– Primary Command and Control for Aircraft utilizing a 12 site low band voted receive and transmitter steered system
  - Current Sites
    - Bressler (Baltimore City County)
    - Crownsville (Anne Arundel County)
    - Dans Rock (Allegany County)
    - Denton (Caroline County)
    - Dyson's (Prince George's County)
    - Eagle Rock (Garrett County)
    - Gambrill (Frederick County)
    - Salisbury (Wicomico County)
    - Sideling Hill (Washington County)
    - Stoney Forest (Harford County)
    - Johnson (Wicomico County)
    - Leonardtown SHA (St Mary's County)

# *SYSCOM's Current Radio Channel Capabilities for Aircraft*

- 7AG60 – Secondary Command and Control for airborne Aircraft utilizing 6 conventional 700 MHz digital repeaters with voted receive (automatic) and steered transmit (manual)
  - Sites
    - Dundalk (Baltimore County)
    - Salisbury (Wicomico County)
    - Lambs Knoll (Washington County)
    - Dans Rock (Allegany) Temple Hills (Prince George's County)
    - Leonardtown (St Mary's County)

# SYSCOM's Current Radio Channel Capabilities for Aircraft

- SYSCOM TG – Secondary Command and Control channel for the MSP Medevac fleet utilizing the Maryland FiRST 700 MHz trunked radio system
  - TDMA only !!!
  - This Talkgroup is active statewide
  - Is restricted to APCO P25 Phase II radios only

# SYSCOM's Current Radio Channel Capabilities for Aircraft

- 47.66 MHz (Tone Code 100.0 Hz) – Primary Medical Patching channel for airborne Aircraft utilizing an 8-site low band voted receive and transmitter steered system
  - Current Sites
    - Bressler (Baltimore City)
    - Easton (Talbot County)
    - Central Site (Worcester County)
    - Prince Frederick (Calvert County)
    - Sideling Hill (Washington County)
    - Stoney Forest (Harford County)
    - Thayerville (Garrett County)
    - District Heights (Prince George's County)

# SYSCOM's Current Radio Channel Capabilities for Aircraft

- HELIMED1 TG – Secondary medical patching channel for the MSP Medevac fleet utilizing the Maryland FiRST 700 MHz trunked radio system
  - TDMA Only !!!
  - This Talkgroup is active statewide

  - Is restricted to APCO P25 Phase II radios only

# SYSCOM's Current Radio Channel Capabilities for Aircraft

- "7AIRMED" – Secondary medical patching channel for airborne Aircraft utilizing six conventional 700 MHz digital repeaters with voted receive and multicast transmitters.

- Sites
  - Dundalk (Baltimore County)
  - Salisbury (Wicomico County)
  - Lambs Knoll (Washington County)
  - Dans Rock (Allegany County)
  - Temple Hills (Prince George's County)
  - Leonardtown (St Mary's County)

# SYSCOM's Current Radio Channel Capabilities (Misc)

- Unicom – System for pilot-to-pilot communications to coordinate activity at the Shock Trauma helipad

- MSP Barrack TGs

- MEMA MDCALL and MDTAC TGs

- AV OP SW – Aircraft maintenance talkgroup

- AV TAC TGs- on scene communications with local jurisdiction units

# SYSCOM's Current Radio Channel Capabilities for Aircraft

## 7AIRMED Frequencies

| EMRC Operations | FB Transmit | Aircraft Transmit | Aircraft Scans and Receives |
|---|---|---|---|
| Andrews - Primary RX Channel | 770.13125 | 800.13125 | 770.13125 and 800.13125 MHz |
| Hagerstown | 769.13125 | 800.13125 | 769.13125 and 799.13125 MHz |
| Salisbury | 770.63125 | 800.13125 | 770.63125 and 800.63125 MHz |
| Leonardtown | 773.11875 | 800.13125 | 773.11875 and 803.11875 MHz |
| Baltimore | 773.61875 | 800.13125 | 773.61875 and 803.61875 MHz |
| Allegany | 774.11875 | 800.13125 | 774.11875 and 804.11875 MHz |

# *SYSCOM Patches*

- A permanent three-way patch has been established between 44.74, 7AG60, and the SYSCOM Talkgroup
  - Allows all users of one system to be heard on the others
  - Provides situational awareness as we migrate to new primary communications channels

# *AVTAC Talkgroups*

- MSP has established 23 AVTAC (Aviation Tactical) talkgroups on the Maryland FiRST radio system for MSP aviation operations
  - One primary talkgroup per jurisdiction
  - Will be regionalized by current interoperability regions
    - MESIN, CMARC, WAGIN, NCR, and SMIEC
  - Regional AVTAC talkgroups will appear on each member jurisdiction's console either natively or by a consolette arrangement
    - Multiple talkgroups allow for multiple separate incidents
  - Allows the jurisdiction to patch the AVTAC talkgroup to the jurisdiction's ground based radio channels or talkgroups
  - Simplifies procedures for MSP Aircraft
  - Reduces quantity of channels to be programmed in the MSP radio package

# *On Scene Air to Ground Communications for Missions*

- Currently, when a medivac mission is requested by a jurisdiction, the requesting jurisdiction determines what frequency the responding aircraft need to operate on. SYSCOM passes this information on to the flight crew

- With the transition to the MD AVTAC channels, the local jurisdiction will still advise SYSCOM what AVTAC or other channel they want the aircraft to operate on. SYSCOM will continue to pass this information on to the flight crew

# *SYSCOM Console Changes*

- AVTacs have been added to the SYSCOM console configurations
  - A new AV TAC tab was added to the existing screen configurations
  - Allows SYSCOM to have improved situational awareness while helicopters are on the ground
  - Unencrypted

# *AV TAC Status*

The following counties currently use the AVTacs

- Queen Anne
- Talbot
- Kent
- Caroline
- Harford
- Cecil
- Washington
- Dorchester
- Allegany
- Garrett
- Dorchester
- Somerset
- Wicomico

# *Long Term Goals*

- The SYSCOM Talkgroup with be the primary channel for Command and Control and will be utilized while the MSP aircraft are on the ground or in the air

- 7AG60 will remain in place for aircraft not provisioned for the SYSCOM Talkgroup (typically commercial air-medical)

- The HELIMED1 talkgroup will be utilized for medical patching while the aircraft is on the ground or in the air by MSP Aviation and MFiRST Interoperability partners

- 7AIRMED will be utilized for aircraft not provisioned for the HELIMED1 Talkgroup

- 44.74 will remain until no longer operationally needed

- 47.66 will remain until no longer operationally needed

# *Long Term Goals*

- All MSP aircraft will be equipped with new APCO P25 Phase II capable radio package

- Allied aircraft will be authorized to operate on the MD FiRST talkgroups; SYSCOM and HELIMED1

- Foreign aircraft will be capable of operation on 7AG60 and 7AIRMED systems

# *Questions?*