

Mid-Tier Networking Vehicular Radio (MNVR)

Executive Summary

- In April through May 2016, the Army's Brigade Modernization Command (BMC) conducted a Mid-Tier Network and Mid-Tier Networking Vehicular Radio (MNVR) Operational Assessment (OA) as part of the Network Integration Evaluation (NIE) 16.2. The BMC assessed the concept of operations and basis of issue of a brigade's MNVR network operating in and out of a satellite-denied environment. The Army's assessment was not conducted according to a DOT&E-approved test plan, but DOT&E did observe the entire assessment and wrote an independent MNVR evaluation.
- The Army's BMC assessment of the NIE 16.2 MNVR OA is the following:
 - Recommend continued development of the mid-tier network solution to bridge the upper and lower tactical internets. Commanders validated the Army requirement for a mid-tier network solution.
 - Recommend the Army not field the MNVR as the mid-tier network solution. The limitations of the MNVR did not meet commanders' requirements to include the ability to provide consistent and reliable mission command services, maintain an effective operational range, and integrate into appropriate combat platforms.
- DOT&E's evaluation of the NIE 16.2 MNVR OA is the following:
 - MNVR did not meet commanders' requirements for a mid-tier network solution. Statistical analysis of NIE 16.2 results demonstrated there was no significant difference in the ability of commanders to accomplish their missions having the MNVR and not having the radio in a satellite-denied environment.
 - Commanders desired a 16-kilometer range for the mid-tier network, which is substantially further than the 6 – 10 kilometer requirement in the MNVR Capabilities Production Document. During NIE 16.2, infantry companies and cavalry troops operated in excess of 10 kilometers forward of their battalions for over 60 percent of the exercise.
 - The Army needs to conduct a complete IOT&E to test all features of MNVR and Joint Enterprise Network Manager (JENM) within an operationally representative unit.
- In July 2016, DOT&E approved the MNVR Test and Evaluation Master Plan (TEMP) in support of a September 2016 Milestone C decision to describe post-Milestone C developmental testing and an MNVR IOT&E.
- In September 2016, the Defense Acquisition Executive approved a low-rate initial production (LRIP) of 478 MNVRs. The Army intends to field the LRIP MNVRs to five Infantry Brigade Combat Teams (IBCTs), which far exceeds the one-brigade set needed to support the MNVR IOT&E.



- In September 2016, the Army published a new MNVR competitive acquisition that shifts the MNVR IOT&E to FY20. The new MNVR competitive acquisition is scheduled for a source selection against revised MNVR requirements and contract award in FY18-19. The results of this acquisition effort will likely result in a different radio and waveform to meet the Army's modified requirements and therefore, be of significantly different design than the LRIP MNVRs fielded to the five IBCTs.
- The Army needs to revise the approved MNVR TEMP to reflect the Army's new competitive strategy and testing that leads to an FY20 MNVR IOT&E.

System

- The Army's AN/VRC-118 MNVR program evolved from the terminated Joint Tactical Radio System, Ground Mobile Radio to provide software-programmable digital radios to support Army tactical communications requirements from company through brigade.
- The Army intends the MNVR to:
 - Operate at various transmission frequencies using the Soldier Radio Waveform (SRW) and the Wideband Networking Waveform (WNW).
 - Bridge the upper tactical communications networks at brigade and battalion with the lower tactical networks at company employing a terrestrial radio network.
 - Provide an alternative terrestrial transmission path in the absence or limited availability of satellite communications.
- The MNVR operates up to 75 watts maximum power output for WNW and up to 50 watts maximum power output for SRW.
- The JENM provides the means to plan, load, configure, and monitor MNVR networks.
- The MNVR includes both vehicle-mounted and Tactical Operations Center kit versions.

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- The MNVR is a non-developmental item selected through multi-vendor competition.

Mission

- Army commanders intend to use the MNVR to:
 - Provide networked communications for host vehicles and Tactical Operations Centers during all aspects of military operations
 - Communicate and create terrestrial radio networks to exchange voice, video, and data using the SRW and the WNW.

- Share data between different tactical communication networks and mission command systems
- Signal staffs employ the JENM to plan, load, monitor, control, and report on network operations of MNVR networks running SRW and WNW.

Major Contractor

Harris Corporation, Tactical Communications – Rochester, New York

Activity

- In November 2015, the Army conducted the MNVR Government Regression Test (GRT) at the Electronic Proving Ground in Fort Huachuca, Arizona. The GRT tested fixes to deficiencies discovered during the April to May 2015 NIE 15.2 MNVR Limited User Test and previous developmental testing, and assessed new MNVR capabilities. During the GRT, MNVR:
 - Demonstrated WNW and SRW data requirements
 - Demonstrated JENM configuration and over-the-air management of the MNVR
 - Was interoperable with Advanced Field Artillery Tactical Data System, Nett Warrior, and Joint Battle Command – Platform (JBC-P)
 - Met reliability requirements for all waveforms except the WNW anti-jam waveform
 - Did not demonstrate significant improvement in cybersecurity
- In April through May 2016, the Army BMC conducted a Mid-Tier Network and MNVR OA during NIE 16.2. During the MNVR OA, the Army equipped the 2nd Brigade, 1st Armored Division with MNVRs. The brigade headquarters and six battalions conducted missions under operationally realistic conditions. The BMC assessed the concept of operations and basis of issue of the MNVR network operating in and out of a satellite-denied environment. The mid-tier network and MNVR operated as part of the larger NIE 16.2 network during the OA, which included Warfighter Information Network – Tactical (WIN-T) Net Centric Waveform (NCW) satellite and JBC-P Blue Force Tracker (BFT) satellite. The Army's BMC assessment was not conducted according to a DOT&E-approved test plan, but DOT&E did observe the entire assessment and wrote an independent MNVR evaluation.
- In July 2016, DOT&E approved the MNVR TEMP in support of a September 2016 Milestone C decision to describe post-Milestone C developmental testing and an MNVR IOT&E.
- On July 5, 2016, DOT&E published a report on the results of BMC's NIE 16.2 Mid-Tier Network and MNVR OA.
- In September 2016, the Defense Acquisition Executive approved an LRIP of 478 MNVRs. The Army intends to

field the LRIP MNVRs to five IBCTs, which far exceeds the one-brigade set needed to support the MNVR IOT&E.

- In September 2016, the Army published a new MNVR competitive acquisition that shifts the MNVR IOT&E to FY20. The new MNVR competitive acquisition is scheduled for a source selection against revised MNVR requirements and contract award in FY18-19.

Assessment

- The Army's BMC assessment of the NIE 16.2 MNVR OA is the following:
 - Recommend continued development of the mid-tier network solution to bridge the upper and lower tactical internets. Commanders validated the Army requirement for a mid-tier network solution.
 - Recommend the Army not field the MNVR as the mid-tier network solution. The limitations of the MNVR did not meet commanders' requirements to include the ability to provide consistent and reliable mission command services, maintain an effective operational range, and integrate into appropriate combat platforms.
- DOT&E's evaluation of the NIE 16.2 MNVR OA is the following:
 - MNVR did not meet commander's requirements for a mid-tier network solution.
 - Statistical analysis of NIE 16.2 results demonstrated there was no significant difference in the ability of commanders to accomplish their missions having the MNVR and not having the radio in a satellite-denied environment.
 - Commanders did not detect a difference between having the MNVR and not having the MNVR when the BFT and NCW satellite were off.
 - Having the brigades full authorization of MNVRs (85 nodes) did not improve mid-tier communications.
 - Commanders desired a 16-kilometer range for the mid-tier network.
 - The MNVR Capabilities Production Document requirement is 6 – 10 kilometers.
 - During NIE 16.2, infantry companies and cavalry troops operated in excess of 10 kilometers forward of their battalions for over 60 percent of the exercise.

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- Commanders identified a need for a mid-tier network, but not the one provided by the MNVR WNW network.
- Soldiers identified position location information and text messaging as the most important messages. These messages do not require the bandwidth provided by WNW.
- MNVR requires more power to operate than legacy radio equipment. This requires vehicles to maintain continuous idle during MNVR operations.
- MNVR is too large and draws too much power to be integrated into the leader vehicles (Abrams and Bradley).
- The results of the new MNVR competitive acquisition effort will likely result in a different radio and waveform to meet the Army's modified requirements and therefore, be of significantly different design than the LRIP MNVRs fielded to the five IBCTs.
- Due to the program changes resulting from the MNVR competitive acquisition, the Army needs to revise the approved MNVR TEMP to reflect the Army's MNVR competitive source selection and testing leading to a FY20 MNVR IOT&E.

Recommendations

- Status of Previous Recommendations. The MNVR Program Office has addressed the previous recommendations to continue development and develop a Milestone C TEMP. Planning of the IOT&E has continued.
- FY16 Recommendations. The Army should:
 1. Reevaluate MNVR transmission range and throughput requirements to reflect operational mission needs of the unit.
 2. Revise its post-Milestone C MNVR TEMP to reflect the developmental test and activities leading to the planned FY20 MNVR IOT&E.
 3. Plan and conduct an MNVR IOT&E using an IBCT equipped with WIN-T, JBC-P, and MNVR in accordance with an Army-approved MNVR basis of issue plan.

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