Robotic Combat Vehicle Update

XX May 2021

Agenda

- RCV Campaign of Learning Update
- RCV (L) Desired Characteristics
- RCV Program Update

LTC Chris Orlowski– RCV PdM
MAJ Cory Wallace – RCV Requirements Lead

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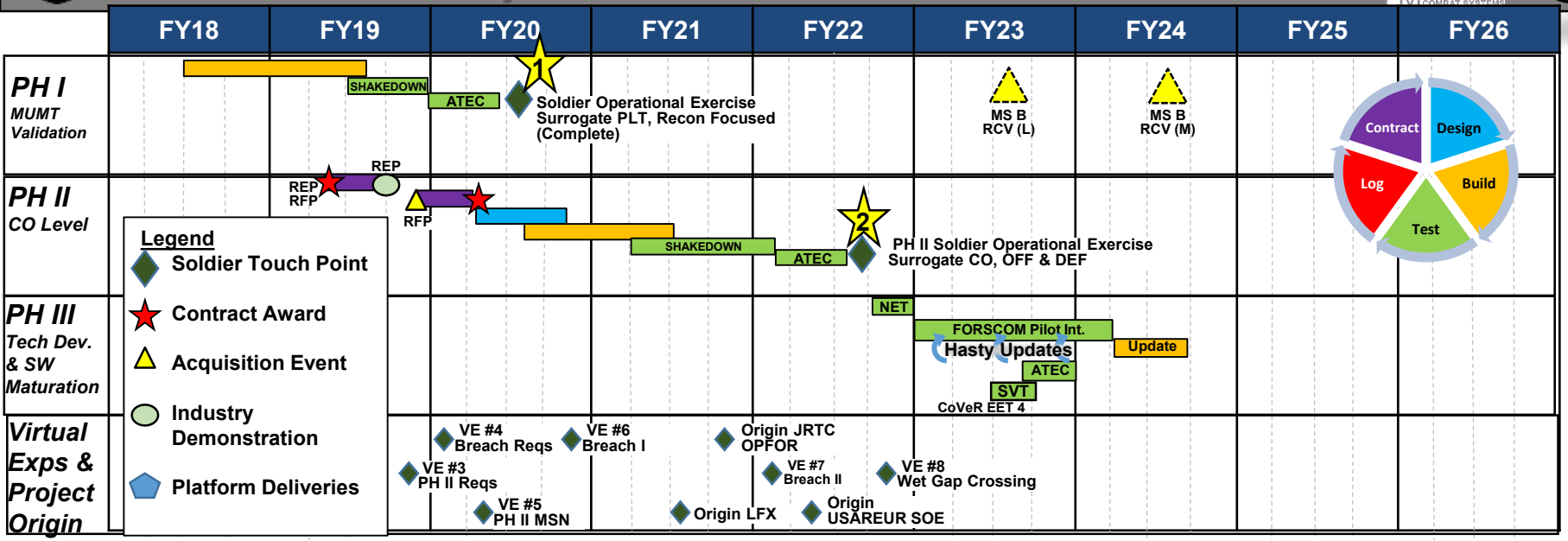
RCV/MET-D Experiment Schedule



Decision Points	
1	Does MUM-T, in its current state increase a unit's effectiveness? If so, proceed as planned.
2	Can the Army begin a PoR in FY23 given the current state of technology?

Key Points

- FORSCOM Pilot Integration = PH III
- FC Pilot vehicle package = PH II platforms
- FC Pilot will continue to shape and inform both government-owned autonomy package and user interface software (both PoR GFE).

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Government Furnished Equipment

Anticipated GFE

- Autonomy Software
- Radios
- Warfighter Machine Interface Software
- AiDT/R
- Guns and missiles (industry provides turrets)
- **A-PNT**
- **Modular architecture**

Potential GFE

- TeUAS
- Counter UAS
- Smoke generator
- CBRNE detection
- Mobility/ counter-mobility payloads
- EW payloads

A government team, other than the NGCV CFT, manages these capabilities and requirements. The primary focus of PM MCS and the CFT is to facilitate integration.

RCV (L) Draft Desired Characteristics

BLUF

Future experiments, industry feedback, and program analysis will continue to refine and update these desired characteristics.

The Army will not finalize the RCV (L) requirements until it is time.

Red boxes = long term goals
Desired Characteristics = initial steps

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Survivability

- **360º semi-hemispherical (flank and top) protect for critical sensor and communication equipment from small-arms fire.**
  - Supports armor applique kits installed at the battalion-level w/ common tools.
- **Endure the effects of chemical, biological, and radiological elements.**
- **Continue to send critical information in a contested environment.**
  - Possess a single, physical port to upload crypto, software, and firmware updates.
  - Meet the requirements to achieve a Cyber Security Endorsement by the Joint Staff J-6.
  - Adhere to all DoD policies regarding secure supply chain requirements.
  - Demonstrate path forward to enable operator to capture system state and signatures of an intrusion, store the data, and offload the data for exploitation.
  - Interdict intervention of normal weapon and platform function.

Survive first contact with dismounts; offset risk/reward cyber attack ratio.

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Sustainment and Energy

Sustainment

- **Initial Ao and Am goal:**
  - Ao= 90% < x
  - Am= 80% < x
- **Maximize the use of LRUs to facilitate rapid repairs at the user level.**

"Two tired Soldiers should be able to fix this thing using common tools and a red lens flashlight at night and in the rain."

Energy

- **Travel at least 140 miles on improved surfaces while maintaining speeds of 25 mph in full mission configuration.**
- **Provide power to its maximum power demands (loads) to facilitate constant and reliable remote operations while maintaining additional 40% electrical power as reserve power for growth to support future upgrades.**

Move from DIV support area to probable line of direct fire contact on a single tank of gas.

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Assured Control and Lethality

Assured Control

- **Maintain secure communications with the RCV (L) at ranges exceeding 1.5 Km with a clear line of sight and within the allotted spectrum with a single radio.**
- **Have a non-proprietary, wired interface/control mechanism to allow for administrative movement**

Operate within mutually supporting range of the control vehicle's direct fire weapon system in an ABCT.

Lethality

- **Primary weapon system:**
  - Defeat troops and trucks during the night and day and while stationary or on the move (stabilized).
  - Super elevation of (+60°)/ depress (-20°) with a 360° traverse.
  - Ammo must currently be in the Army's inventory.
  - Two operators can remove the entire weapon system w/ common tools in three hours or less.
- **ATGM:**
  - Host, stow, and launch one ATGM that is currently in the Army's inventory.
  - Support integration of new ATGMs or loitering munitions.

Kill troops and trucks; degrade one heavy armored threat.

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360° Situational Awareness/ Tethered UAS

360°SA

- **Provide operator with persistent 360° day/night SA while the vehicle is stationary or on the move.**
  - Detect audio of no less than 40 decibels and broadcast to the operator.
- **Shield driving/ SA cameras from weather effects, mud, and thrown inert projectiles.**
  - The cameras shall also have the means to “self-clean” themselves.
- **Provide operator with awareness of the vehicle’s current pitch, yaw, and slope.**
- **Demonstrate pathway to HMD control.**

Create a telepresence for the operator.

TeUAS

- **Integrate, launch, and recover one TeUAS that supports modular payloads.**
  - UAS flight= 80’<x<200’
  - Does not rely upon GPS to maintain station.
- **Priority TeUAS payloads:**
  - RETRANs, EO/IR, CBRN detection, and target designation.
  - Swap payloads in 5 minutes or less w/ common tools.
- **Remove TeUAS w/ common tools in less than one hour.**

Enhance operator SA and provide MMP options w/o de-conflicting airspace

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Autonomous Movement/ Transportability

Autonomous Movement

- **Move autonomously to pre-designated waypoints.**
  - Integrate future behaviors as they become available.
- **Degrade then auto-stop if the vehicle loses comms w/ the operator.**
- **Auto-stop when it meets pre-established limits to prevent rollovers.**
- **Move in leader/ follower mode.**

Autonomously move to the probable line of direct fire contact; reduce cognitive burden after the PLOC.

Transportability

- **Transportable at gross vehicle weight in full combat configuration by the following:**
  - Rotary wing sling load for 30 NM @ 4000'.
  - C130H transports two RCV (L)s for 1400 NM.
  - C17 transports eight RCV (L)s; able to Roll On/ Roll Off.
  - CH47 internally transports one RCV (L) for 30 NM @ 4000'.
- **Prepared for short mission (X<12hrs) within 15 minutes of arrival.**
- **Meets all NATO reqs (Rail Envelop M) for sea, rail, and mil/ commercial trailer movement.**
- **Air droppable (LVAD/ JPAD).**

"A CH47 should be able to drop an RCV (L) on a mountain top."

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Modularity/ Mobility

Modularity

- **Support any payload that is compliant with a government-approved architecture and fits within the available space, weight, power, computing resources, controls, and data interfaces.**
- **Three trained Soldiers shall transition the RCV (L) into a desired MMP configuration w/ common tools.**

Rapidly transition payloads in an austere, field environment.

Priority MMPs

- **The operator shall operate all MMPs remotely with the Operator Control Unit.**
- **Regardless of the MMP configuration, the operator shall always have direct access to the engine compartment to conduct maintenance.**
- **While the RCV (L), by design, can facilitate any MMP that adheres to its SWAP-C budget, the following MMPs are priority:**
  - Counter UAS (Type 1 & 2)
  - Obscuration (both visual and multi-spectral)
  - EW (both directional find and deception)
  - CBRN detection (both stand-off and immediate vicinity)
  - Explosive Breacher (both obstacle reduction and lane marking).

Provide Commanders with additional options and advanced MDO capability at the CO-level and below.

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Mobility

- **Navigate the following in full combat configuration:**
  - 60% frontal, 50% side slopes.
  - 24” of water.
  - 4’ trench.
  - 200m wet gap in less than 10 minutes w/ amphibious kits (install kit in 30 min or less).
  - 24” 90º step.
- **Pivot steer 360° within 1.5 vehicle length in less than 10 seconds.**
- **Have a forward dash speed of 0-30 MPH in less than 10 seconds.**
- **Have a stopping distance of 35 feet or less when traveling 20 MPH**
- **Have a physical tether to enable the vehicle to follow the same path as the user with an 80% accuracy of the same track**
- **Conduct self-recovery w/ human assistance; have a 100’ winch line.**
- **Towed by like-vehicle w/ onboard BII.**

Exceed the control vehicle’s mobility and maneuver through terrain that is inaccessible to its human counterpart.

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System Architecture/ Growth

System Architecture

- **The RCV (L) and its OCU will comply with the latest version of the required government-owned architecture.**
- **Integrate a new government-approved architecture in the future.**

Facilitate rapid upgrades and reduce future integration costs.

Growth

- **Exceed the following growth margins:**
  - 50% non - propulsion electrical power
  - 20% space
  - 20% weight (plus the defined MMP weights while still meeting all mobility requirements)
  - 150% computing, cooling, and sensor growth

Keep pace with rapid technology advances and maintain future relevance.

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Silent Watch & Drive/ Signature Management

Silent Watch & Drive

- **Perform Silent Watch while operating key systems in ambient temperatures (defined as 5°C to 49°C) for a period greater than eight hours.**
  - Start the main engine after performing a silent watch mission without any mission equipment powering off or cycling power
- **Perform Silent Drive while operating key systems at speeds up to 10 kph for a distance of 5 Km on improved surfaces, without the need to resupply the silent drive energy source.**

Infiltrate to a position of advantage and remain undetected.

Signature Management

- **Minimize acoustic, electromagnetic, and thermal signatures to inhibit detectability in all environments, day or night, while moving or stationary.**
- **Essential heat emitting signatures shall be located in the rear of the vehicle and not observable from the air.**
- **Remotely turn off all lights and LEDs on the RCV (L) while operating in "black out mode."**
- **Facilitate the application of a secondary "skin" camouflage system.**
  - Operator can remove or transition this system in less than 45 minutes w/ common tools.

Force the enemy to "unmask" to find the RCV (L) ["emit or quit"].

POC: MAJ Cory W. Wallace

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NGCV CFT Contact

If you would like to schedule a discussion with the NGCV CFT, please send an email to the address below and inquire about upcoming dates for our Modernization in the Motor City initiative.

usarmy.detroit.ccdc-gvsc.mbx.ngcv-cft@mail.mil

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Questions

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