Description: Future Long Range Assault Aircraft (FLRAA) Request for Information (RFI)

RFI Intent
The intent of this RFI is to inform the potential FLRAA trade space for new development aircraft in support of requirements refinement and acquisition planning for a potential FLRAA Program of Record (PoR). The Army is pursuing an accelerated FLRAA program using a leader-follower approach, with the Army designated as the lead Service with Special Operations Command (SOCOM) participation and the United States Marine Corps (USMC) acquisition program following approximately two years later. To the maximum extent possible, respondents are requested to address:

a) The design’s ability to meet all requirements given in Appendix A, both threshold and objective. This information should include individual sensitivity analyses of speed, range, and payload to both cost and performance. Flight Cards are provided for context.

b) Any recommended changes to the threshold requirements given in Appendix A necessary to meet the US Government affordability and schedule goals provided.

c) Any design risks and recommended risk reduction efforts for the proposed design to meet the affordability goals and schedule provided.

d) Schedule and cost estimate Rough Order of Magnitude (ROM) for both the Preliminary Design Review (PDR) and Critical Design Review (CDR) completion.

e) Acquisition cost, schedule, risks, and potential acquisition approaches that could accelerate a FLRAA prototype delivery.

f) Provide cost (development and recurring), schedule and performance trade-offs needed to accommodate the SOCOM and USMC unique requirements documented in Appendix B and Appendix C, respectively.

Army Schedule Goals
The US Government desires a materiel solution that supports, at a minimum, the following developmental timeline: Contract Award: Q4FY21, PDR: Q2FY23, CDR: Q4FY24, First Flight: Q3FY24, First Unit Equipped: Q2FY30

Army Affordability Goals
The US Government desires a materiel solution that supports, at minimum, the following affordability objectives: $43M AUMC (Average Unit Manufacturing Cost) (BY18$).

Army ROM Estimates
The US Government desires the following information to further refine program cost and schedule estimates:

- AUMC cost (BY18$). AUMC includes costs such as the air vehicle structure, rotor group, drive group, wing, propulsion, landing gear, and avionics. It does not include non-recurring production and engineering changes, contractor System Engineering & Program Management and Contractor System Test and Evaluation costs. Provide quantity by year, learning curve, and the other assumptions used in the fly-away cost estimate.

- Cost per Flight Hour (BY18$)

- PDR and CDR completion costs (BY18$). Provide a development cost estimate for the effort required to advance the weapon system design through CDR. This includes all preceding development activities and design reviews (i.e. SRR, SFR, etc.) leading to and completing CDR.

- Develop a detailed schedule which accelerates fielding of a FLRAA capability. Provide a detailed description of tailored, alternative or innovative approaches that streamlines the acquisition process to accelerate the program as much as possible. Provide detailed descriptions of the tailored approach to include, but not limited to, what non-essential or duplicative activities from your viewpoint should be tailored or eliminated, how commercial practices in-lieu of standard DoD practices can be used, and a recommended program management structure to facilitate improved risk, airworthiness, and test decision timelines. Specifically, address the following topics: Government Oversight, Communication/Deliverables, and Data Requirements, Qualification Approach, Test and Evaluation,

**Air Vehicle Description and Assumptions**

For each potential weapon system platform, please provide the following for proposed conceptual designs which meet the requirements in Appendix A:

- General description of the conceptual weapon system which includes the airframe, propulsion, drivetrain, rotor system, flight controls, landing gear, aircrew and passenger survivability as well as other major system and sub-systems technologies that may be integrated onto and into the weapon system.
- A detailed description of the effort completed to date or planned to be completed by 4QFY21 for potential material solutions that fulfill the requirements listed in Appendix A. Based on this description, describe the remaining efforts required for a PoR to design, develop, integrate, test, and field a material solution that is operationally effective, suitable and survivable in a 2030 threat environment.
- Provide a general description of growth potential in the weapon system to increase capability and maintain relevancy of the aircraft over a 50 year useful life.
- A general description of approach to apply modular open systems approach to integration of mission equipment.
- Maximum structural gross take-off weight (MGTOW) (lbs)
- Available or modification of currently available engine, to include manufacturer, uninstalled performance rating data, power turbine output shaft speed, direction of rotation.
- Transmission description to include weight, main rotor shaft output power rating, tail rotor shaft output power rating, overall gear reduction ratio to main rotor, tail rotor drive gear reduction ratio, other accessory drive ratings (power limits and shaft speeds)
- Maximum usable fuel quantity

### Appendix A – Army Requirements

<table>
<thead>
<tr>
<th>Operational Attribute</th>
<th>ICRD Value</th>
<th>Threshold Requirement</th>
<th>Objective Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide Performance</td>
<td>HOGE at combat radius with payload at 6k/95, HIGE at takeoff in mission configuration at 6k/95</td>
<td>95% maximum rated power to perform a 500 feet per minute vertical rate of climb from a hover out of ground effect at mission start, at up to 6k/95°F, at the 12 passenger design gross weight configuration with sufficient fuel to achieve a 122 NM combat radius and a 30 minute reserve.</td>
<td>100% maximum continuous power to perform a 500 feet per minute vertical rate of climb from a hover out of ground effect at mission start, at up to 6k/95°F, at the 12 passenger design gross weight configuration with sufficient fuel to achieve a 122 NM combat radius and a 30 minute reserve.</td>
</tr>
<tr>
<td>Unrefueled Combat Radius</td>
<td>170-229 NM unrefueled with 30 min loiter</td>
<td>200 NM</td>
<td>300 NM</td>
</tr>
<tr>
<td>Maximum Continuous Cruise Speed</td>
<td>&gt;230-270 kts with full payload</td>
<td>250 KTAS at maximum continuous power and design gross weight and configuration.</td>
<td>280 KTAS at maximum continuous power and design gross weight and configuration.</td>
</tr>
<tr>
<td>Internal Payload – Cargo area in addition to crew</td>
<td>3.5-4.0k lbs. internal</td>
<td>Cabin floor loading capacity minimum of 300 lbs per square foot, equipped with tie down fittings rated at a minimum of 5000 lbs each in any direction.</td>
<td></td>
</tr>
<tr>
<td>External Payload</td>
<td>6.0-8.0k</td>
<td>8,000lbs with 25 square feet flat plate drag, 110 NM at no less than 140 KTAS. Cargo hook capacity no less than 10,000 lbs</td>
<td>10,000 lbs with 25 square feet flat plate drag, 110 NM at no less than 140 KTAS. Cargo hook capacity no less than 13,100 lbs</td>
</tr>
<tr>
<td>Operational Attribute</td>
<td>ICRD Value</td>
<td>Threshold Requirement</td>
<td>Objective Requirement</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Inflight Refuel</td>
<td>Compatible as an aerial refueling receiver or donor, all platforms &quot;A-Kit&quot;</td>
<td>Shall include airframe structural engineering that will facilitate installation of an aerial refueling system.</td>
<td></td>
</tr>
<tr>
<td>Inflight Refuel</td>
<td>Compatible as an aerial refueling receiver or donor, all platforms &quot;A-Kit&quot;</td>
<td>Installation of aerial refuel &quot;B-Kit&quot; to include probe and all applicable plumbing, pumps and fuel management system.</td>
<td></td>
</tr>
<tr>
<td>Air Transportability</td>
<td>N/A</td>
<td>Aircraft shall be configurable for transport in a single C17</td>
<td></td>
</tr>
</tbody>
</table>

See Attachment 1 - Draft Mission Profiles/Flight Cards

Appendix B – SOCOM Unique Requirements
Appendix C – USMC Unique Requirements

To the maximum extent possible, respondents are requested to address impacts of the USMC unique requirements both in proposed design changes within the Army variant as well as if it were a stand-alone design (if considered unfeasible or cost prohibitive to modify from the Army Variant). This should include both an Attack and Utility Variant (with as much commonality between the Attack/Utility variants as practical) with cost and schedule deltas based on the design changes and acquisition path (modified or stand-alone) for a buy size of 349 aircraft.

<table>
<thead>
<tr>
<th>Operational Attribute</th>
<th>Threshold Requirement</th>
<th>Objective Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide Performance</td>
<td>Ability to operate in all weather conditions and from Sea Level HOT day to high/hot conditions of 3K/91.5F. Ability to operate from and be based on all L-class ships and meet all ship suitability requirements.</td>
<td>Ability to operate in all weather conditions and from Sea Level HOT day to high/hot conditions of 3K/91.5F. Ability to operate from and be based on all L-class ships and meet all ship suitability requirements.</td>
</tr>
<tr>
<td>Unrefueled Combat Radius</td>
<td>365 NM with 30 min loiter using Mission Profiles #1 - #5 (in attachment B) and max payload</td>
<td>450 NM with 30 min loiter using Mission Profiles #1 - #5 (in attachment B) and max payload</td>
</tr>
<tr>
<td>Maximum Continuous Cruise Speed</td>
<td>275 KTAS at 90% maximum continuous power and 305 KTAS at 100% of intermediate rated power using Mission Profile #3 (in attachment B) and max internal payload</td>
<td>295 KTAS at 90% maximum continuous power and 330 KTAS at 100% of intermediate rated power using Mission Profile #3 (in attachment B) and max internal payload</td>
</tr>
<tr>
<td>Internal Payload</td>
<td>Ability to carry a max internal payload of 4.4k lbs (combination of people/weapons/mission equipment) and accommodate room for 8 troops plus 2 pilots and 2 crew</td>
<td>Ability to carry a max internal payload of 5.2k lbs (combination of people/weapons/mission equipment) and accommodate room for 8 troops plus 2 pilots and 2 crew</td>
</tr>
<tr>
<td>Inflight Refuel</td>
<td>Shall include the capability to aerial refuel</td>
<td></td>
</tr>
<tr>
<td>Weapons Integration - Attack</td>
<td>Shall be capable of a combination of external and internal weapons carry to include a turreted or fixed gun system capable of being employed at distances greater than 2km, hellfire/JAGM like capability, guided/unguided rockets, Air to Air Missiles and ability to employ tactical UAV’s from onboard the aircraft,</td>
<td>Shall be capable of internal weapons carry to include a turreted or fixed gun system capable of being employed at distances greater than 2km, hellfire/JAGM like capability, guided/unguided rockets, Air to Air Missiles and ability to employ tactical UAV’s from onboard the aircraft,</td>
</tr>
<tr>
<td>Weapons Integration – Utility</td>
<td>Shall be capable of a combination of external and internal weapons carry to include a turreted or fixed gun system capable of employed at distances greater than 2km, crew-served defensive weapons, guided/unguided rockets, and ability to employ tactical UAV’s from onboard the aircraft,</td>
<td>Shall be capable of a combination of internal weapons carry to include a turreted or fixed gun system capable of employed at distances greater than 2km, crew-served defensive weapons, guided/unguided rockets, and ability to employ tactical UAV’s from onboard the aircraft,</td>
</tr>
<tr>
<td>Marinization</td>
<td>Shall be marinized to accommodate all aspects as specified in attachment A.</td>
<td></td>
</tr>
</tbody>
</table>

See USMC Attachment A – Marinization
See USMC Attachment B – Mission Profiles
**Flight Card – TAA-PZ-LZ**

**Description**
1. T/O TAA to 200’ AHO  
2. Cruise at the higher of $V_{	ext{BR}}$ or 225 KTAS  
3. Descend to land PZ  
4. PZ Load (ground idle)  
5. T/O PZ to 80’ AHO  
6. Cruise at the higher of $V_{	ext{BR}}$ or 225 KTAS  
7. Descend to land LZ  
8. Unload at LZ (ground idle)  
9. T/O LZ to 80’ AHO  
10. Cruise at $V_{	ext{BR}}$  
11. Climb vic. PZ to 200’ AHO  
12. Cruise at $V_{	ext{BR}}$  
13. Descend to land TAA (no hover)  
14. 30 minute fuel reserve (cruise)

**Time (min)**
- 0.5
- 21.3
- 1.0
- 5.0
- 0.5
- 29.3
- 1.0
- 5.0
- 0.5
- 1.0
- 30.0

**Total Time for Assault:** 58.6 min

**Narrative:** The geometry of the air assault mission is derived from MDO doctrinal distances and experimentation results of Unified Challenge (UC) 17. Relative sanctuary of 80 NM was determined in UC17 as the distance at which the assault battalion could remain in place for up to 48 hours without losses due to threat artillery. The 110 NM between PZ and LZ is the doctrinal distance of the MDO close and deep maneuver areas. The enroute speed of 225 KTAS is the speed required for FLRAA to transit from the TAA in relative sanctuary to the LZ in the same amount of time for the UH-60M to transit at best range airspeed (130 KTAS) from the PZ to the LZ. No times are provided for outbound legs as they do not have hard speed requirements (flown at fallout $V_{	ext{BR}}$).
2 – Mountain Air Assault (TAA/PZ-LZ-PZ)

Departure
Fuel as required
HOGE Takeoff (500 fpm VROC at 95% MRP)
12 Soldiers at 365 lbs each
6K/95F

Unload at LZ

122 NM

Expected Attribute Driver
Engine Power

Narrative: The geometry of the Mountain Air Assault was derived from Analysis of Alternative distances based on current operations. Hover powered requirements for this mission are hover out of ground effect at 6K/95F at the PZ. However, the distance for this mission (122 NM) is not as long as the S7 air assault mission (190 NM), thus it is expected that the fuel load for the mountain air assault will not be full fuel (only that required for the mission). No times are provided for the segment legs as they do not have hard speed requirements (flown at fallout $V_{BR}$).

Flight Card – PZ-LZ-PZ

<table>
<thead>
<tr>
<th>Description</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. HOGE T/O PZ to 200’ AHO</td>
<td>0.5</td>
</tr>
<tr>
<td>2. Cruise at $V_{BR}$</td>
<td></td>
</tr>
<tr>
<td>3. Descend to HOGE at LZ</td>
<td>1.0</td>
</tr>
<tr>
<td>4. Unload at LZ (HOGE)</td>
<td>5.0</td>
</tr>
<tr>
<td>5. HOGE T/O LZ to 200’ AHO</td>
<td>0.5</td>
</tr>
<tr>
<td>6. Cruise at $V_{BR}$</td>
<td></td>
</tr>
<tr>
<td>7. Descend to land PZ (no hover)</td>
<td>1.0</td>
</tr>
<tr>
<td>8. 30 minute fuel reserve (cruise)</td>
<td>30.0</td>
</tr>
</tbody>
</table>
3 – S7 External Load (PZ-LZ-PZ)

Environmental Conditions:
1. 2K/85F (90th percentile hot day for S7)
2. 0K/59F (ISA Standard Day)
3. 0K/-1F (90th percentile cold day for S7)

Narrative: The external load mission is designed to transport infantry battalion organic support equipment to include up to the M998 and tandem fuel blivets both of which weigh between 7500 and 8000 lbs. The 110 NM distance between PZ and LZ is the doctrinal distance of the MDO close and deep maneuver areas. The enroute speed is expected to be limited by the stability of the external load and is estimated to be a maximum of 140 KTAS. No times are provided for the segment legs as they do not have hard speed requirements (flown at fallout $V_{BR}$ or max controllable airspeed).
**4 – Self-Deployment**

**Narrative:** The self deployment mission represents standard long range overwater planning for the longest segment of the shortest possible route across the Pacific Ocean which is from Eareckson, AK (in the Aleutian Island chain) to Chitose, Japan. For this mission, it is expected that all non-essential equipment to include passenger seats and weapons will be removed from the aircraft, and the aircraft will be equipped with auxiliary fuel tanks to provide the necessary range. There is no expectation that the aircraft cockpit will be pressurized, thus the transit altitude is limited to 10,000 ft MSL maximum IAW AR 95-1. The aircraft will be flown at the fallout best range airspeed. Times provided on the flight card are not intended to drive a speed requirement, but are shown as an estimate of the time required for the longest leg of the self deployment.

**Flight Card – POE-POD**

<table>
<thead>
<tr>
<th>Description</th>
<th>Time (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rolling T/O</td>
<td>1</td>
</tr>
<tr>
<td>2. Climb at $V_y$ to cruise altitude</td>
<td>5</td>
</tr>
<tr>
<td>3. Cruise @ $V_{BR}$ (~225 KTAS)</td>
<td>460</td>
</tr>
<tr>
<td>4. Descend for landing @ POD</td>
<td>1</td>
</tr>
<tr>
<td>5. 30 minute fuel reserve</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL TIME</strong></td>
<td><strong>467 min</strong></td>
</tr>
<tr>
<td></td>
<td><strong>7 hr + 47 min</strong></td>
</tr>
</tbody>
</table>
**Narrative:** The MEDEVAC mission represents the longest distance that FLRAA would be able to provide “golden hour” support IAW current DoD guidance at threshold max continuous airspeed of 250 KTAS at 100% MCP. Current UH-60M radius of “golden hour” support is 45 NM versus 88 NM for FLRAA. “Golden hour” support is defined as one hour from receipt of MEDEVAC mission to delivery of the patient to level 2 or level 3 care.

**Environmental Conditions:**
1. 2K/85F (90th percentile hot day for S7)
2. 0K/59F (ISA Standard Day)
3. 0K/-1F (90th percentile cold day for S7)

**Flight Card – PZ-LZ**

<table>
<thead>
<tr>
<th>Description</th>
<th>Time (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Receipt of Mission</td>
<td>8.0</td>
</tr>
<tr>
<td>2. Rapid start-up</td>
<td>2.0</td>
</tr>
<tr>
<td>3. T/O CASH to 200’ AHO</td>
<td>0.5</td>
</tr>
<tr>
<td>4. Cruise at ≥250 KTAS (MCP)</td>
<td>21.0</td>
</tr>
<tr>
<td>5. Descend to land LZ</td>
<td>1.0</td>
</tr>
<tr>
<td>6. Load Patients (ground idle)</td>
<td>5.0</td>
</tr>
<tr>
<td>7. T/O LZ to 200’ AHO</td>
<td>0.5</td>
</tr>
<tr>
<td>8. Cruise at ≥250 KTAS (MCP)</td>
<td>21.0</td>
</tr>
<tr>
<td>9. Descend to land CASH</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**TOTAL TIME** 1 hour
Attachment A

Marinization and Shipboard Suitability
Marinization Design

• Minimum deck spot and fit in hanger
• Ability to quickly slow/stop spinning rotor during shutdown
• Compatibility with support equipment available on ship
• Landing gear provide maneuverability while eliminating tip-backs or tip-overs
• Interoperability with Landing Assist Devices
• Compatible with ship facilities
• Survive in dense electromagnetic shipboard environment

• Structural
  ▪ Landing loads (12fps, pitching/rolling/heaving deck)
  ▪ Chain attachment points on A/C
  ▪ Folding for Operational needs (automatic)

• Material
  ▪ Corrosive sea-salt environment
  ▪ Water intrusion/absorption
  ▪ Alternatives can add weight/cost
Design Features (cont.)

- Survive water landings and remain afloat (per spec)
- Water egress capability and raft storage
- A/C must have power levels of HOGE +10% for take-off/landings ops
- Field of view to see the LSE and shipboard visual cues day and night
- Handling Qualities/Flight Control characteristics to account for maneuvering and additional control to account for ship airwake/motion to land/take-off within confined landing spot
  - SH-60R TRAP, SH-60S wheel boxes, or 15’ clearance
  - Airwake and deck motion affect workload (acceptable DIPES ratings day/night)
  - Acceptable gust rejection characteristic
  - Low airspeed envelope/critical azimuth must allow operations (V-22 PUWSS)
  - Slope landing limits for launch and recovery must factor in ship motion
Operation Needs

• Deck and Hanger movement
• Maintainability and Supportably
  ▪ Conducted in the “showdown of the A/C
  ▪ Components designed for ease of inspection
  ▪ A/C design incorporates:
    ▪ Fold out maintenance platforms
    ▪ Walkways
    ▪ Footsteps and handholds
Operational Needs (cont.)

• Downwash/outwash
  ▪ Needs to be limited to prevent injury/damage to personnel, equipment, and other A/C
  ▪ Needs to be limited to allow safe operations
    ▪ Multi-spot and single-spot deck operations
    ▪ SAR capable to hoist personnel from the water
    ▪ Personnel transfer from/to ships/submarines
    ▪ VERTREP capability for hookup
  ▪ Personnel limit zones: Caution (80-87 lbf), Hazard (87-115 lbf), Avoid (>115 lbf)

• Deck heating
  ▪ Direct impingement of engine exhaust onto the flight deck should be minimized to
    prevent deck or equipment damage
Attachment B

Attack and Utility Mission Profiles
(Attack) Mission #1 CAS & #2 DAS

Entire mission at MIL-STD-3013 Hot Day conditions

1. Warm-up for 10 minutes at Idle Power at SL / 39.4°C.
2. VTO to HOGE for 1 minute at MRP.
3. Climb at IRP at $V_{BROC}$ to best cruise altitude
4. Cruise to 284 nm (or 144 nm for CAS) at $V_{90\%MCP}$
5. Descend to 300 ft (no fuel / time / distance credit).
6. Cruise to mission radius at $V_{90\%MCP}$
7. Combat, 5 minutes at $V_{IRP}$ (at max available IRP), 10 minutes at $V_{BE}$ . Climb to best endurance altitude, 15 minutes at $V_{BE}$.
8. Off load expendable ordnance, retain launchers.
9. Cruise back at $V_{LRC}$ at best cruise.
10. Descend to SL (no fuel / time / distance credit).
11. Land with reserves (greater of 10% of initial mission fuel or fuel for 20 minutes at $V_{BE}$ at SL).
(Attack) Mission #3 V-22 Escort

Entire mission at MIL-STD-3013 Hot Day conditions

1. Warm-up for 10 minutes at Idle Power at SL / 39.4°C.
2. VTO to HOGE for 1 minute at MRP.
3. Climb at IRP at $V_{BROC}$ to 10,000 Ft PA.
4. Cruise for 324 nm at $V_{90\%MCP}$ (275 KTAS (T) / 295 KTAS (O)).
   • Must be able to dash ahead at $V_{100\%IRP}$ (305 KTAS (T) / 330 KTAS (O)).
5. Descend to 300 Ft PA (no fuel / time / distance credit).
6. Cruise for 41 nm at $V_{90\%MCP}$
   • Must be able to dash ahead at $V_{100\%IRP}$
7. Combat, 5 minutes at $V_{IRP}$ (at max available IRP), 25 minutes at $V_{BE}$.
8. Off load 80% expendable ordnance, retain launchers.
9. Climb at IRP at $V_{BROC}$ to best range altitude.
10. Cruise back at $V_{LRC}$ at best range altitude.
11. Descend to SL (no fuel / time / distance credit).
12. Land with reserves (greater of 10% of initial mission fuel or fuel for 20 minutes at $V_{BE}$ at SL).
Entire mission at MIL-STD-3013 Hot Day conditions

1. Warm-up for 10 minutes at Idle Power at SL / 39.4°C.
2. VTO to HOGE for 1 minute at MRP.
3. Climb at IRP at $\text{V}_{\text{BROC}}$ to best cruise altitude.
4. Cruise to 324 nm at $\text{V}_{90\%\text{MCP}}$.
5. Descend to 3,000 ft PA (no fuel / time / distance credit).
6. Cruise to mission radius at $\text{V}_{90\%\text{MCP}}$.
7. Combat, 5 minutes at $\text{V}_{\text{IRP}}$ (at max available IRP), 10 minutes at $\text{V}_{\text{BE}}$.
8. Off load expendable ordnance, retain launchers.
9. Land at 3,000 Ft. PA, at flight idle for 10 minutes and load 8 troops.
10. Climb at IRP at $\text{V}_{\text{BROC}}$ to best cruise altitude.
11. Cruise back at $\text{V}_{\text{LRC}}$ at best cruise.
12. Descend to SL (no fuel / time / distance credit).
13. Land with reserves (greater of 10% of initial mission fuel or fuel for 20 minutes at $\text{V}_{\text{BE}}$ at SL).
(Utility) Mission #5 Troop Insertion

Entire mission at MIL-STD-3013 Hot Day conditions

1. Warm-up for 10 minutes at Idle Power at SL / 39.4°C.
2. VTO to HOGE for 1 minute at MRP.
3. Climb at IRP at $V_{BROC}$ to best cruise altitude.
4. Cruise to 324 nm at $V_{90\%MCP}$
5. Descend to 3,000 PA ft (no fuel / time / distance credit).
6. Cruise to mission radius at $V_{90\%MCP}$
7. HOGE for 5 minutes at 3,000 Ft PA at MRP.
8. Offload 8 combat equipped troops via fastrope.
9. Loiter for 30 minutes at $V_{BE}$ (weapons expended at end of segment; retain launchers).
10. Climb at IRP at $V_{BROC}$ to best cruise altitude.
11. Return at $V_{LRC}$ at best cruise altitude.
12. Descend to SL (no fuel / time / distance credit).
13. Land with reserves (greater of 10% of initial mission fuel or fuel for 20 minutes at $V_{BE}$ at SL).