Joint Future Theater Lift (JFTL) Technology Study (JTS)

Capability Request for Information (CRFI)

20 October 10

US Air Force
Aeronautical Systems Center
Developmental Planning – ASC/XRX
2275 D St.
Area B, Bldg 16, Rm 0053C
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JFTL Technology Study (JTS)
CAPABILITY REQUEST FOR INFORMATION (CRFI)

1.0 Synopsis

The Aeronautical Systems Center (ASC) Requirements and Capabilities Integration Directorate, ASC/XR, Wright-Patterson AFB OH, is issuing a Capability Request for Information (CRFI). THIS IS A CAPABILITY REQUEST FOR INFORMATION ONLY. This CRFI solicits information from Department of Defense (DoD), other government agencies, US and/or foreign companies who can provide promising technologies and system concepts that can achieve a Joint Future Theater Lift (JFTL) capability. The Government will use the CRFI responses to inform on-going cost and capability analyses and provide an analytical foundation to inform the FY14 Program Objective Memorandum (POM). Small Businesses are encouraged to provide responses to this CRFI in order to assist ASC in determining potential levels of competition available in the industry.

This is NOT an Invitation for Bid (IFB) or a Request for Proposal (RFP). This announcement is not to be construed as a formal solicitation. It does not commit the Government to reply to information received, or to later publish a solicitation, or to award a contract based on this information. In accordance with Federal Acquisition Regulation (FAR) 15.201(e), responses to this notice are not offers and cannot be accepted by the US Government to form a binding contract. At this time, ASC is not seeking proposals, and will not accept unsolicited proposals. Not responding to this CRFI does not preclude participation in any future RFP, if any is issued.

The submitted documentation will not be returned. This CRFI does not commit the Government to contract for any supply or service whatsoever. Responders are solely responsible for all expenses associated with responding to this CRFI. Responders are not limited to a single response. It is the responsibility of the interested parties to monitor the FedBizOpps site (www.fbo.gov) for additional information pertaining to this CRFI.

2.0 Proprietary Materials Protection

This notice is part of Government Market Research, a continuous process for obtaining the latest information from industry. Any company proprietary information contained in the response should be clearly marked such that ‘publicly-releasable’ and ‘proprietary’ information are clearly distinguished. Any proprietary information received in response to this request will be properly protected from any unauthorized disclosure. Proprietary information must be clearly marked on the outside container and on the materials inside. The Government shall not be liable, or suffer any consequential damages, for

any proprietary information not properly identified. The Government will not use proprietary information submitted from any one firm to establish the capability and requirements for any future systems acquisition, so as to not inadvertently restrict competition.

CRFI responses which contain information that is marked as proprietary will be protected as proprietary information. Such information will be reviewed by a team comprised of Government as well as contractor personnel hired to provide technical assistance. All members of the team will sign nondisclosure agreements and will be reminded of their obligation to protect such information to the maximum extent permitted or required by the Economic Espionage Act, 18 U.S.C. 1831 et seq., and other applicable statutes or regulations. In addition, Government members will be reminded of their obligations to afford protection under the Trade Secrets Act, 18 U.S.C. 1905. All contractor members are required to protect the information by the terms of their contracts. The Government has also determined that the contractor personnel have no organizational conflicts of interest that could adversely affect protection of the information.

3.0 JFTL Capability Description

This CRFI initiates a call to investigate the realm of the possible in regards to aircraft concepts and associated technologies which could support Air Mobility Command's (AMC) JFTL Initial Capabilities Document (ICD) requirement. The Government will consider system concepts having anticipated technology and manufacturing readiness levels (TRL/MRL) of 6 no later than 2019. TRL/MRL applies to fully mission capable aircraft and their associated technologies and integrated logistics support (training, maintenance, supply, support equipment, etc).

3.1 JFTL Concept of Operations

JFTL is envisioned as a next generation theater lift capability that enables routine logistics and payload delivery/extraction airlift missions into complex, austere, unimproved/unprepared landing areas. JFTL capabilities will significantly contribute to the following operations within the Range of Military Operations: theater airlift of cargo and passengers, combat employment and sustainment (expanded to include Mounted Vertical Maneuver), aero-medical evacuation, support of special operations, forcible entry, strikes and raids, support of irregular warfare, noncombatant evacuation operations, recovery operations, and homeland defense. JFTL will be required to provide movement, maneuver, and distributed sustainment in an environment where increased capacity, speed, payload, range, agility, access, depth, precision, simultaneity and survivability will be at a premium. JFTL airlift capabilities will need to provide the battle space access, precision of delivery, and responsiveness of action needed for

rapid decision. To do this, the JFTL will be capable of (1) moving medium-weight armored vehicles and personnel to strategic, operationally and tactically significant depths and (2) supporting maneuver in close proximity to objectives and sustainment of distributed forces in complex, austere, unimproved/unprepared landing areas to point of need/point of effect. The platform must be able to carry and/or airdrop required cargo loads into and out of complex, austere, unimproved/unprepared landing areas (requiring no additional infrastructure or material handling support equipment) and exploiting these landing areas to achieve runway-independent takeoff and landing operations. JFTL must also be capable of operating in adverse weather conditions and in low to medium threat environments (2024+).

3.2 JFTL Capability Tradespace

A capability trade space has been identified for exploration (located in Table 1).

Table 1: JFTL Capability Trade Space

Alternative Categories of Interest	* Fixed & Tilting Wing Aircraft, Rotorcraft, Airship Vehicles * New Developments or Modified Existing Systems
Airlift a variety of payloads to strategic, operationally and tactically significant depths	* Medium Weight Vehicles (such as the Stryker Family of Vehicles), as well as palletized cargo, combat troops & aero-medical evacuation * Payload: 20 - 36 tons internal (and/or external, if applicable) * Internal cargo bay and ramp is desired (see Annex for description) * Self deployable to theater from CONUS (2,400 nm) * Mission radius with payload: 250 nm - 1,000 nm
Achieve runway independence for precision delivery & distributed sustainment	* Routine operations on complex, austere, unimproved/unprepared landing areas with payload retained & mission radius of military utility * Ambient Environment Conditions: Sea Level Standard Day up to 6,000 ft pressure altitude/95°F * Desired Mid Mission Takeoff & Landing Area Operations (over 50 ft obstacle): 0 ft Vertical Takeoff and Landing (VTOL) - 1,500 ft Short Takeoff and Landing (STOL) (concepts with 1,500 ft - 3,000 ft capability are also of interest)
Provide battle space access and responsiveness of action	* Operate in adverse weather, civil and military airspace, in times of day and night * Cruise speed/altitude expectations: C-130J Stretch performance or better * Fuel efficiency comparable to C-130J Stretch * Implement survivability techniques for operations in low to medium threat environments (2024+)

4.0 Requested Information

Submissions to this CRFI should include information detailing concepts that address the desired JFTL capability (as described in Sections 3.0 – 3.2). Respondents to this CRFI are encouraged to consider the combination of capabilities which best suits their proposed concept, and also the impact of variation from those capability values on their

proposed concept. Concepts of varying capability and risk level (Low, Medium and High) may be submitted as long as they will meet a technology availability date (TAD) of no later than 2019 (all technologies at a TRL of 6 or higher by no later than 2019). If development is required to achieve this TRL level, that development needs to be identified.

The following information listed in Sections 4.1 – 4.3 is requested (see Annex for additional information requests related specifically to individual concept categories).

4.1 Air Vehicle (applicable to all concept categories)

NOTE: Respondents are encouraged to provide as much of the requested information as is readily available. Incomplete responses are also acceptable and can still be valuable to inform the Government's analysis.

I. A total system concept overview with description of applicable operations/missions, deployment/employment, maintenance, logistics, and other support requirements for an end-to-end integrated system.

II. An annotated, dimensioned, three view sketch showing the locations of the cargo bay (if applicable), control surfaces, access/inspection panels, antennas and other noteworthy features (including wingspan and/or rotor/prop diameter (in all modes of operation), overall length, loading height and height from ground to top of tail).

III. An internal schematic and structural layout showing the approximate locations and volume occupied by crew, avionics, internal equipment, fuel tanks (include inerting technique, location, volume), landing gear (include type, number, retraction scheme and any additional equipment for complex, austere, unimproved/unprepared landing area operations), cargo bay (include loading techniques, if pressurized, floor load limits, door/ramp type and opening scheme) and other vehicle features. Include a discussion of available space, weight and power for mission and future equipment modifications. Also include electrical load and cooling air projections.

IV. Provide a dimensioned drawing of the concept's landing gear arrangement, tire sizes & inflation pressures, vertical and longitudinal center of gravity locations and Equivalent Single Wheel Loads (ESWL) for the nose gear and main gear at mid mission and takeoff gross weights. If available, provide the mid-mission weight, estimated California Bearing Ratio (CBR) for 50 passes and unpaved load classification number (LCN). These inputs will be used to calculate ground flotation capabilities of the submitted concepts for both limited and sustained use of unpaved sites.

V. Provide a group weight statement as well as the percentage of the structure that is made of composite, aluminum, steel, titanium, and other materials. If composites are implemented, provide an estimate of the amount of weight savings attained over an all aluminum or aluminum alloy alternative. Identify any management reserve, engineering or weight growth margins applied.

VI. Discuss whether the engines integrated into the submitted concept are available commercial off-the-shelf (COTS), modified COTS, or a new development. Provide the thrust/power available at sea level standard conditions, 4,000 ft pressure altitude (PA) / 95°F, and 6,000 ft PA / 95°F. Comment on whether the engine is flat rated, de-rated and/or has a 5 minute maximum thrust/power limit (if applicable) and the number of engines.

VII. Describe how the submitted concept may be employed to achieve the capabilities outlined in Sections 3.0 to 3.2.

VIII. Comment on ground handling operations at a landing zone (specifically on-load and off-load of cargo) as well as any unique logistics implications of the submitted concept. Provide any operational limits or unique equipment and/or manpower required for the proposed concept. Include discussion of ground environment effects and/or restrictions on operations (personnel, equipment, aircraft spacing/parking considerations on the ground, foreign object debris ingestion, etc). Comment on average time to offload a fully palletized load, where the pallets are at maximum weight.

IX. Discuss reconfiguration to aero medical mission, where stretcher components are stored, inflight reconfiguration capability, and time required to reconfigure.

X. Comment on the air refueling capability of the submitted concept as a receiver, method of tanking/receiving (boom, hose, UARRSI, drogue) and weight and performance impacts of adding the necessary air-to-air refueling equipment (extra tanks, plumbing, etc.).

XI. Comment on any operational safety limitations of the submitted concept with respect to adverse weather conditions (e.g., crosswinds/tailwinds during takeoff, landing and ground operations or low visibility/low ceiling conditions).

XII. Describe the concept's design features, operational concepts and strategies implemented for surviving in low to medium threat environments (2024+), including but not limited to threat avoidance, self-protection and damage tolerance. Discuss how these features, concepts and strategies impact performance across the range of military operations described in Section 3.1.

XIII. Provide maximum self-deployment range with no payload & provide maximum payload allowable at a range of 2,400 nm. Provide associated fuel loads and takeoff gross weights for each self deployment mission.

XIV. Provide a payload vs. range plot for a representative JFTL mission for each concept (and/or derivative). Include discussion on overload capability.

XV. Provide a level-flight operating envelope map for a representative JFTL mission. Include contours for max continuous power at a load factor of 1.0 and the maximum load factor.

XVI. At the concept's takeoff weight and mid-mission weight, provide the concept's maximum rate of climb and associated airspeed (at sea level standard conditions, 4,000 ft PA / 95°F, and 6,000 ft PA / 95°F).

XVII. Provide structural 'g' limit vs. vehicle gross weight and a design load V-N diagram.

XVIII. Provide center of gravity (cg) location vs. vehicle gross weight for representative mission with cg limits denoted for each mode of flight (if applicable). Comment on any stability and controls aspects unique to the submitted concept (e.g. active flight control system for cg instability, unique controls necessary for achieving short takeoff and landing, unique controls or cross shafting necessary for engine out during takeoff and landing, etc.).

XIX. Describe the crashworthiness of the proposed concept and any specific crashworthy design features (with respect to high sink rate operations, impacts, ballistic tolerance, fuel tanks, structure, cargo bay floor, landing gear, high mass item retention, cockpit & cabin, etc.).

XX. If the concept described is intended to operate to and/or from a sea base, describe the design features incorporated to enable this capability as detailed in the Annex.

XXI. Address considerations for system reliability, maintainability and supportability of the air vehicle. Include any unique items to the submitted concept that ease supportability and maintainability and/or increases reliability. If available, provide estimates of MTBCF, MTBFA, MA, OA, and MTTR as described in the Key Definitions on pages 19-20.

XXII. Address the training concept of the submitted vehicle concept for aircrew and maintenance crew proficiency. Estimate the amount of training that can be performed virtually with simulators.

XXIII. Using the following sub-bullets and Figure 1 JFTL Generic Mission Profile, provide three (3) complete JFTL mission performance outputs in the template provided in Table 2 (include any additional mission specific assumptions)

a. Payload & Mission Radius

i. Payload should be treated as a fallout capability for this analysis and must be retained throughout the entire mission. Specify the maximum allowable payload to achieve the following mission radii:

1. Mission 1: 250 nm unrefueled radius
2. Mission 2: 500 nm unrefueled radius
3. Mission 3: 1,000 nm unrefueled radius

b. Fuel Reserve

i. Fixed/Tilt Wing & Rotorcraft: Enough usable fuel on each flight to increase the total planned flight time between refueling points by 10 percent (up to a maximum of 45 minutes for fixed wing or 30 minutes for helicopters) or 20 minutes, whichever is greater.

ii. Airships: greater of 10% of initial fuel or 30 minutes

c. Limit Load Factor: minimum of 2.25g at the concept's Maximum Takeoff Weight

d. Mid Mission Environment for Takeoff/Landing: Specify the concept's design point at either 4,000 ft PA / 95°F or 6,000 ft PA / 95°F, and provide takeoff/landing performance at the both the design and off-design points.

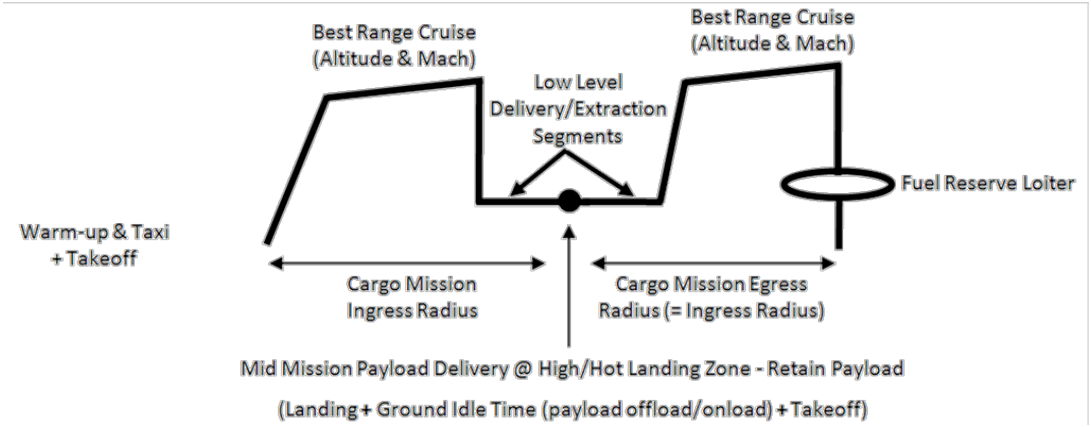

Figure 1: JFTL Generic Mission Profile

Table 2: JFTL Concept Mission Outputs

Mission Segment	Aircraft Weight after Segment (lb)	Speed (Mach & Knots)	Altitude (ft) & Temp (°F)	Range of Segment (nm)	Mission Segment Fuel Used (lb)	Segment Average Fuel Flow (lb/hr)	Mission Segment Time (hr)	Segment Average Power (hp) or Thrust(lb) Required
Taxi/Warm-up (reasonable for submitted concept)								
Takeoff (Describe whether unrestrained, STOL, V/STOL or VTOL)								
Climb								
Cruise Out								
Low Level Cruise (100 nm, nominal)								
Mid Mission Landing (Describe whether unrestrained, STOL, V/STOL or VTOL)								
Ground Maneuver & Payload Delivery (reasonable for submitted concept)								
Mid Mission Takeoff (Describe whether unrestrained, STOL, V/STOL or VTOL)								
Low Level Cruise (100 nm, nominal)								
Climb								
Cruise Back								
Fuel Reserve (as described in section 4.1)								
Landing (Describe whether unrestrained, STOL, V/STOL or VTOL)								

4.2 Technology & Risk (applicable to all concept categories)

NOTE: Respondents are encouraged to provide as much of the requested information as is readily available. Incomplete responses are also acceptable and can still be valuable to inform the Government's analysis.

I. Provide a description of major system components including enabling technologies to include but not limited to:

   a. Propulsion (including engines, gearbox, transmission, generators, complex, austere unimproved/unprepared landing area equipment, if applicable)

   b. Landing gear and survivable structures for complex, austere, unimproved/unprepared landing area operations

   c. Loading/unloading cargo handling equipment for complex, austere, unimproved/unprepared landing area operations (including buoyancy control, if applicable)

   d. High lift devices/equipment (give types and descriptions)

   e. Rotors/propellers (if applicable)

   f. Avionics (including communications, navigation, radar, situational awareness, all weather, complex, austere, unimproved/unprepared landing area operations)

   g. Self protection equipment (active, passive, etc.) for operations in low to medium threat environments (2024+)

   h. Weight reduction technologies and manufacturing techniques (especially describe composite techniques utilized if applicable)

   i. Modifications made to existing systems (if applicable)

   j. Any other enabling technologies unique to the submitted concept

II. Include an assessment and basis for technology and manufacturing readiness levels for all of the major systems listed above (in accordance with DoD definitions of technology and manufacturing readiness). DoD references for Technology (TRL) and Manufacturing (MRL) Readiness can be found at the links below:

   Technology Readiness Assessment Deskbook
   http://www.dod.mil/ddre/doc/DoD_TRA_July_2009_Read_Version.pdf

   Manufacturing Readiness Assessment Deskbook
   http://www.dodmrl.com/MRL_Deskbook_v1.pdf

III. Discuss which technologies/design features have the highest payoff for a JFTL capability and any associated integration and/or scalability issues.

IV. Discuss associated risks (operational, technical, and programmatic) with these technologies, major systems and vehicle concept. Include key performance and risk drivers for the concept's development, production, operation and sustainment.

V. For the submitted concept, discuss the required investment, development and maturation timelines to achieve the JFTL TAD goal of no later than 2019 (all technologies at a TRL of 6 or higher).

VI. For the submitted concept, indentify any industrial base capability and capacity requirements/concerns.

4.3 Cost Information (applicable to all concept categories)

NOTE: Respondents are encouraged to provide as much of the requested information as is readily available. Incomplete responses are also acceptable and can still be valuable to inform the Government's analysis.

I. Provide a Life Cycle Cost Estimate for the submitted concept. Assume a fleet size of 250 aircraft and 600 flight hours per year per aircraft. Each Life Cycle Cost Estimate should include the following information and be broken out by cost element and appropriation, summarized in Base Year 2011 and Then Year for the point estimate, 50% confidence level and 80% confidence level:

   a. The cost estimating methodology (including risk adjustments) and basis of estimate including assumptions, ground rules, and cost estimating relationships

   b. Key source data or inputs that are driving the cost results

   c. Description of the parametric cost studies conducted to trade off system performance requirements versus system price and identify a best value concept

   d. Descriptions for the estimate cost elements or work breakdown structure (WBS)

   e. Life cycle cost model in Microsoft Excel

   f. Life cycle cost model should address the relevant cost elements for the Operating and Support costs listed below along with additional development, modifications and upgrades post production:

      i. Unit Mission Personnel

ii. Unit Level Consumption
iii. Intermediate Maintenance
iv. Depot Maintenance
v. Contractor Support
vi. Sustaining Support
vii. Indirect Support

g. Description of logistics support concept and any unique training, support equipments or disposal costs
h. Identify cost impacts for hazardous or polluting materials required by the system
i. Include with software estimates a breakout of the integration costs, lines of code and key assumptions inputs to allow for cross checking of the estimate with other methodologies
j. Identify energy requirements (consumption rate, delivery methods and storage requirements) to estimate fully burdened cost of fuel
k. Provide an estimate for how many aircraft can be produced per year during full rate production.
l. Identify how estimating methodology uncertainty, requirements uncertainty, technology maturation risk and integration risks was quantified in the estimates

II. The submitting company should develop the cost element structure for the estimates in conformance with Mil-STD 881A. Acquisition related assumptions and inputs should be consistent with DoDI 5000.02. Estimates should include 30 years of peacetime sustainment cost. All Then Year costs should be calculated with OSD inflation rates. Non-recurring and recurring costs should be broken out for RDT&E and Production estimates. T_1 values for production recurring costs, average unit costs and improvement curve slopes used in the estimates should be provided and explained.

5.0 Response Format & Page Limit

Please provide responses in Microsoft Word compatible documents, Microsoft PowerPoint compatible presentations, Microsoft Excel compatible Spreadsheets, Adobe PDF, or any combination thereof **no later than 1700 EDT 7 December 2010**. Maximum page limit for responses is seventy-five (75) pages and must be indexed with respect to the outline of this CRFI, allowing for information to be easily located. Tables

delivered in spreadsheet format will not count towards the page limit. Respondents must limit administrative and company/agency overviews to four (4) pages.

In addition to providing the technical information requested in Section 4 and the Annex, please include a brief overview of your company's current and proposed engineering, technical and manufacturing capabilities (to include facilities and manning) that would be necessary to produce the submitted concept. Also include the following administrative information in all submissions:

- Company name
- Point of contact (POC) name & email address
- POC phone & fax numbers

Submit UNCLASSIFIED responses **in electronic form only** via e-mail or by sending the responses on a single compact disk (700 MB CD compatible with Microsoft Windows) by mail. Submit email responses to pete.kronbergs@wpafb.af.mil with "Response to JTS CRFI" in the subject line of the e-mail. Mail responses on CD to ASC/XRX, 2275 D St, Bldg 16, Room 0053, Wright-Patterson AFB, Ohio 45433-7224. Include "Response to JTS CRFI" on the CD and the outer wrapping of the mail package.

Classified responses (up through SECRET) may be submitted if your company feels a classified response is necessary. Please contact the POC's listed below for additional instructions prior to sending classified responses. The government reserves the right to deny any requests to submit classified responses to this CRFI. Companies must adhere to the National Industrial Security Program Operation Manual (NISPOM) procedures for the transmittal of classified responses.

6.0 Questions & Supplemental Package

The Government will accept written questions from Industry related to this CRFI via email until **1700 EDT on 29 October 2010**. Questions should be submitted to the POCs listed below. The Government reserves the right to not address questions received after this date.

The Government team will post written responses to the submitted questions on the FedBizOpps site **not later than 10 November 2010**. Submitted questions containing proprietary information will not be made publicly available on the FedBizOpps site. Answers to questions containing proprietary information will be sent directly to the appropriate Industry POC via email.

This notice may be updated as additional information becomes available. The Government may also request additional information to clarify the Government's understanding of Company request for RFI responses. Please check the FedBizOpps

site for updates to this announcement under JTS Capability Request for Information (CRFI) and register to receive e-mail notices of any updates to the FedBizOpps announcement. For more information on this "JTS CRFI", please contact these POCs:

Anthony Fisher, ASC Contracting Officer, 937-255-7761
anthony.fisher@wpafb.af.mil

Pete Kronbergs, ASC Program Manager, 937-904-4499
pete.kronbergs@wpafb.af.mil

The JFTL ICD can be requested as a supplemental package to this CRFI by contacting AMC. The AMC POC for the JTS CRFI supplemental package is:

Maj Roy Glassco, HQ AMC/A5Q JFTL Requirements Director, (618) 229-1334
roy.glassco@scott.af.mil.

The following information must be included in your request: contact name, company name, company address, phone number, email address and a completed DD Form 2345, Military Critical Technical Data Agreement.

7.0 Summary

THIS IS A CAPABILITY REQUEST FOR INFORMATION (CRFI) ONLY to identify promising technologies and potential system concepts that can achieve a JFTL capability. The Government will use the CRFI responses to inform on-going cost and capability analyses and provide an analytical foundation to inform the FY14 POM. The information provided in the CRFI is subject to change and is not binding on the Government. ASC has not made a commitment to procure any of the items discussed, and release of this CRFI should not be construed as such a commitment or as authorization to incur cost for which reimbursement would be required or sought.

JTS CRFI ANNEX

1.0 JFTL CONCEPT CATEGORY SPECIFIC INFORMATION

NOTE: Respondents are encouraged to provide as much of the requested information as is readily available. Incomplete responses are also acceptable and can still be valuable to inform the Government's analysis.

1.1 FIXED & TILTING WING SPECIFIC

I. Provide propeller efficiency vs. thrust and speed (if applicable)

II. Describe the field length capability of the submitted concept:

   a. Can the concept achieve this field length routinely or are assault rules necessary?

   b. Are the engines operating at a time limited setting to achieve this field length? If so, what is this setting and how long can the engine be operated while at this setting?

III. Describe the aeromechanical and/or aero-propulsive method(s) employed to achieve the field length of the submitted concept described above:

   a. Circulation control, flaps, powered lift, prop wash, other

   b. Provide supporting rationale/analyses for why this method was selected and give performance data of the selected method:

      i. Drag polars (C_L vs. C_D) and lift curves (C_L vs. angle of attack) for takeoff and landing settings. On the plots include flap setting and, if applicable, thrust and/or blowing coefficient with corresponding turning efficiency and turning angle.

   c. Provide substantiation data for how these plots were generated and/or validated (i.e. wind tunnel tests, flight tests, engineering analysis).

IV. Provide a max L/D vs. Mach plot

V. Provide a characterization of the downwash/outwash characteristics of the concept while utilizing high lift/powered lift/vectored thrust technologies and any additional design features that work to mitigate the potentially detrimental effects of the downwash/outwash environment

1.2 ROTORCRAFT SPECIFIC

I. Hover ceiling charts (gross weight vs. altitude) for standard day (100% MRP, HOGE), Constant 95°F day (95% MRP, HOGE), MIL-STD-3013 Hot Day (100% MRP HOGE)

II. Characterize the concept's downwash/outwash environment for various gross weights, up to maximum VTOL gross weight. Include consideration of effects on personnel, equipment and ground in landing zone. Also describe any additional design features that work to mitigate the potentially detrimental effects of the downwash/outwash environment

III. Provide information on external sling load capability of the concept. Include at a minimum the number of sling load hook attachments, capacity, and any limitations (including weight/size limitations of vehicles transported as sling loads).

IV. Describe the concept's short takeoff technique for 4,000 ft PA / 95°F and 6,000 ft PA / 95°F, including control scheduling and takeoff distance to 50 ft obstacle vs. gross weight.

V. For concepts which re-configure in flight, describe the approach employed to control the vehicle throughout the flight envelope.

VI. Provide L/De (Lift / Equivalent Drag) vs. speed plot at representative takeoff gross weight at 4,000 ft PA / 95°F and 6,000 ft PA / 95°F ambient conditions and preferred cruise altitude (if applicable).

1.3 AIRSHIP AIR VEHICLE SPECIFIC (HYBIRD or LIGHTER THAN AIR)

I. Describe and give limits of the airship's buoyancy control system (air cushion landing system, control of static heaviness, helium venting, control surface fans/engines) and how it relates to JFTL ground operations (e.g. time to stabilize vehicle once landed, time to on-load and off-load cargo, etc.).

II. Describe how airship operations would be integrated into fixed wing and rotor wing traffic patterns at air traffic controlled fields.

III. Address the scalability of the airship concept (i.e. structures, propulsion, buoyancy control and manufacturability) from current state of the art demonstrations to the size of airship necessary to provide JFTL capability.

IV. Provide mooring requirements and wind gust tolerance in order to maintain a stable loading/unloading condition. Also provide any additional weather limitations on operations.

V. Provide any issues with operating in a Chemical, Biological, Radiological, Nuclear (CBRN) environment

VI. Provide power vs. airspeed at varying percent static heaviness (representative of intended operational conditions)

VII. Provide rates of descent and ascent with payload.

VIII. Provide pressure ceiling vs. lift plot

IX. Provide a vulnerability assessment in context with operations within a low to medium threat environment that includes the use of incendiary projectiles.

X. Provide plan for unique fuel and/or buoyancy supplies and how these materials would be provided at an austere landing site.

2.0 SHIPBOARD COMPATIBILITY/CAPABILITY

I. Comment on the design features included in the submitted concept to address shipboard compatibility with CVN and amphibious assault ships (if applicable) including the following aspects: blade folding, wing folding/spot factor reduction, alighting gear arrangement, tipover/tipback angles, salt-spray corrosion-resistant materials, aircraft tie-down hardpoints, fire fighting/engine start firewatch equipment, electromagnetic interference (EMI) hardening, rotorwash characteristics including mean and peak horizontal velocity vs. distance from aircraft profiles, wave-off capability, shipboard landing and takeoff visual cues, landing gear sink rates, aircraft movement on the flight deck/taxi, external sling loading operations/procedures, open water floatation/submerge times, open-water ditching equipment, required/expected shipboard support equipment, and other expected CONOPS of the concept in the shipboard environment including launch and recovery techniques.

3.0 JFTL CARGO BAY TRADE SPACE

I. For concepts submitted to this CRFI designed to transport payload internally, comment on the rationale behind the selection of the cargo bay size chosen for the submitted concept. If the cargo bay of the concept does not allow for transporting medium weight vehicles in full combat configurations, comment on the capability of the concept (payload bay capacity, performance, etc.) to transport extra equipment (in addition to the medium weight vehicle payload, such as a forklift, vehicle armor, etc.) necessary to convert the vehicle to a full combat configuration once delivered to a short, austere, landing area.

The cargo bay should satisfy the trade space identified below:

- Cross Section: The cross section of the cargo bay should accommodate ground vehicles with dimensions equal to or greater than the Minimum Capability Vehicle Profile reflected below. If the cargo bay is designed to carry vehicles with dimensions equal to or greater than the Full Capability Vehicle Profile reflected below, comment on the impacts to the overall concept (including size, weight, cost, performance, and employment).

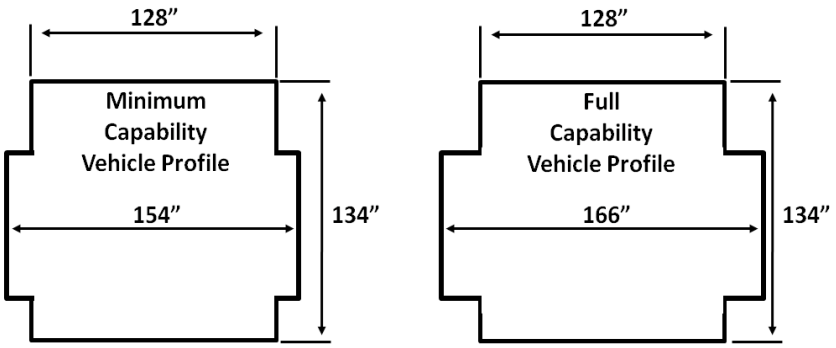

Figure 2: JFTL Minimum Capability Vehicle Profile

- Length: It is envisioned that JFTL will also transport palletized cargo. The length of the cargo bay should accommodate at least seven (7) fully loaded 463 L pallets (utilization of the cargo bay ramp is allowable).
- Additional Allowables:
    - The cargo bay door(s) should open to the maximum width and maximum height of the cargo bay.
    - The cargo bay dimensions should allow for appropriate clearance around the payload from the ceiling, sides and door(s) of the bay.
    - The fuselage must include at least one 12 inch x 72 inch safety aisle (the safety isle may be a catwalk; however, the catwalk may not be more than 36 inches above floor).

Key Definitions

Austere Landing Area: No support available to support airlift operations (air traffic control, fuel, crash fire rescue, material handling equipment, security, navigational aids).

Improvised Landing Area: Any landing area that is available (paved or unpaved) including airfields, runways, dirt or gravel road segments, cleared areas, etc.

Unimproved/Unprepared Landing Area: Unpaved area that is non-compacted, indigenous soil that will be used in the way it currently exists with no improvement.

Complex Landing Area: Area characterized by variable elevation, slope, obstacles, and/or man-made features that impede full exploitation of sensors, weapons, system capabilities and mobility.

Runway Independent: Operations not relying on designated paved runways but utilizing austere, improvised, unimproved/unprepared and complex landing areas.

Adverse Weather: Includes moderate crosswinds, tailwinds, fog, rain, snow, icing, and dust as well as low visibility/low ceiling conditions.

Mean Time Between Critical Failure: A measure of the average flying hours between failures that are critical (failures that prohibit further missions until the failure is resolved).

$$\text{MTBCF} = \frac{\text{Flying Hours}}{\text{Critical Failures}}$$

Mean Time Between Failure All: A measure of the average flying hours between all failures (critical failures, non-critical failures, and failures that result in a cannot duplicate (CND) condition)

$$\text{MTBFA} = \frac{\text{Flying Hours}}{\text{All Failures}}$$

Material Availability: A measure of the percentage of the total inventory of aircraft available for mission tasking. Material Availability is a fleet metric, and it includes downtime associated with depot maintenance (whether scheduled or unscheduled). When computing the Material Availability metric, include uptime/downtime associated with all aircraft, whether depot or unit possessed.

$$MA = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$$

Operational Availability: A measure of the percentage of unit-possessed aircraft available for mission tasking. This metric excludes depot-possessed aircraft/depot possessed time and is also known as Mission Capable Rate. When computing the Operational Availability metric, only include uptime/downtime for aircraft that are possessed by operational units.

$$OA = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$$

Mean Time To Repair: A measure of the average time required to repair the aircraft after failure. Repair time does not include any administrative or logistics delay time, but it does include troubleshooting, repair, and operational check time.

$$MTTR = \frac{\text{Repair Hours}}{\text{Repair Actions}}$$