

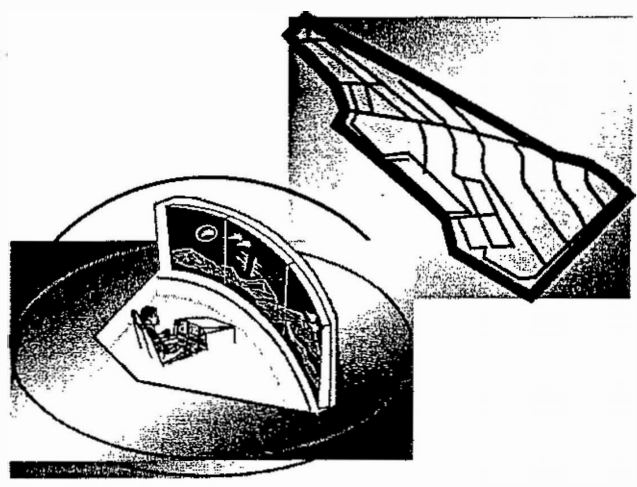
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**UNMANNED COMBAT AIR VEHICLE  
ADVANCED TECHNOLOGY DEMONSTRATION  
(UCAV ATD)**

**PHASE I**

**SELECTION PROCESS DOCUMENT  
("SOLICITATION")  
MDA972-98-R-0003**



**March 9, 1998**

**Defense Advanced Research Projects Agency  
DARPA/TTO  
3701 N. Fairfax Drive  
Arlington, VA 22203-1714**

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# 1.0 Introduction

The Defense Advanced Research Projects Agency (DARPA), in conjunction with the United States Air Force (USAF), is pleased to offer you the opportunity to respond to the Unmanned Combat Air Vehicle (UCAV) Advanced Technology Demonstration (ATD) solicitation. As you explore this solicitation we believe you will appreciate this unique opportunity to work in partnership with the US Government to demonstrate the technical feasibility of a UCAV system which can effectively and affordably prosecute 21st century Suppression of Enemy Air Defenses (SEAD)/Strike missions within the emerging global command and control architecture.

## 1.1 Vision

The Unmanned Combat Air Vehicle vision is an affordable weapon system that expands tactical mission options for revolutionary new air power as an integrated part of a system of systems solution. The UCAV weapon system will exploit the design and operational freedoms of relocating the pilot outside of the vehicle to enable a new paradigm in aircraft affordability while maintaining the rationale, judgment, and moral qualities of the human operator. In our vision, this weapon system will require minimal maintenance, can be stored for extended periods of time, and is capable of dynamic mission control while engaging multiple targets in a single mission under minimal human supervision. We believe such a UCAV weapon system has the potential to fully exploit the emerging information revolution and provide advanced airpower with increased tactical deterrence at a fraction of the total Life Cycle Costs (LCC) of current manned systems.

Our vision of the post 2010 battlespace includes UCAV weapon systems as an integral part of the force structure. UCAV systems will augment the force on high risk, high priority missions where mission accomplishment is key. These force enablers will be operationally effective for the whole spectrum of operations encompassing transnational threats, small-scale contingencies, and major theater wars. UCAVs will be globally deployable and safely operate over populated areas and in controlled air space. The UCAV will conduct missions from ordinary airfields as part of an integrated force package complementary to manned tactical and support assets. UCAV controllers will observe rules of engagement and make the critical decisions to use or refrain from using force. Operating across the full spectrum of conflicts, the UCAV can perform new combat missions that do not currently exist; high-risk missions where the risk to human life is unwarranted; or current missions where the UCAV is more cost effective than current platforms.

The initial operational role for the UCAV is a "first day of the war" force enabler which complements a strike package by performing the SEAD mission. In this role, UCAVs accomplish preemptive destruction of sophisticated enemy integrated air defenses (IADs) in advance of the strike package, and enable the attacking forces by providing reactive suppression

against the remaining IADs. Throughout the remainder of the campaign, UCAVs provide continuous vigilance with an immediate lethal strike capability to prosecute high value and time critical targets. By effectively and affordably performing those missions the UCAV system provides "no win" tactical deterrence against which an enemy's defenses would be ineffective, thereby ensuring air superiority. This SEAD/Strike mission will be the first instantiation of an UCAV vision that will evolve into a broader range of combat missions as the concept and technologies mature, and the UCAV affordability potential is realized.

As a member of a tightly coupled system of systems, the UCAV will work cooperatively with manned systems and exploit the emerging command, control, communications, computer, intelligence, surveillance and reconnaissance (C4ISR) architecture to enable successful achievement of campaign and mission level objectives. Intelligence preparation of the battlefield will provide an initial mission/threat database for mission controllers. Controllers will exploit real-time data sources from the theater information architecture to plan for, and respond to, the dynamically changing battlefield. The UCAV will penetrate enemy IADs and external systems such as the Miniature Air Launched Decoy (MALD) will stimulate potential targets. Sensor cueing and off-board targeting can be provided by national systems or airborne assets in real time and/or UCAVs may be part of multi-ship Time Difference of Arrival (TDOA) targeting architectures. The system will create superior situation awareness by leveraging the many sources of information available at both the tactical and theater levels.

To facilitate operations in a combat environment, a flexible and agile control and communications architecture will be employed to ensure robust connectivity among large numbers of vehicles. The mission control station will be transportable and modular to the extent that all or portions of its functions can be land, sea, or air-based. A single control station using variable levels of autonomy will control multiple UCAVs. The controller will provide executive level mission management to remain in the decision process. Intelligent function allocation will allow autonomous control of appropriate tasking. Communications will be seamless with data passed through a variety of paths. Wide area and local airborne networks will allow redundancy among the force package and bandwidth sharing to ensure robust connectivity with the control station via line-of-sight, relay extension and/or satellite communications.

The UCAV weapon system will enable a new affordability paradigm by reducing both acquisition, and operation and support (O&S) costs. We envision a UCAV air vehicle unit cost which is less than one-third that of a Joint Strike Fighter. Removing the pilot from the vehicle eliminates man-rating requirements, pilot systems, and interfaces. New design philosophies can be used to optimize the design for aerodynamics, signature, reduced maintenance and low cost manufacturing processes. The UCAV offers new design freedoms that can be exploited to produce a smaller, simpler aircraft. Advances in small smart munitions will allow these smaller vehicles to attack multiple targets during a single mission and reduce the cost per target killed.

Cost of ownership for UCAV weapon system will be fundamentally different than those of the manned aircraft fleet. These systems will break the linkage between total force size and cost of ownership of the force. A reduced maintenance design with condition based maintenance, minimized on-board sensors, reduced fluid systems, maintainable signature, and a modular

avionics architecture will reduce touch labor in the fashion of commercial aircraft. Without the requirement to fly sorties to retain pilot proficiency, UCAVs will fly infrequently. Designed for reduced maintenance, UCAVs can be maintained in flight ready storage with controllers training at actual control stations through transparent simulation. These concepts will result in significant reduction in consumables, maintenance, and personnel enabling O&S cost reductions of 50-80% when compared to a current tactical aircraft squadron.

This UCAV vision looks towards a revolutionary new set of options with enormous long-term payoffs to US air power in terms of expanded mission options, tactical deterrence and most importantly, affordability.

## **1.2 Program Philosophy**

The UCAV ATD will develop new paradigms in aircraft design and manufacturing, human system interaction, command and control, supportability, and battlespace management. Developing a new demonstrator system will allow us to fully exploit the synergistic combination of these technical advances. We look forward to working with you as members of a select government/industry team that integrates and validates the critical technologies in each of these key areas.

In this solicitation you are being asked to “think out of the box” and propose your own unique collaborative design methodologies, modeling and simulation tools, processes, capabilities, concepts, and innovative teaming arrangements to reduce the cost of product development, manufacturing, and operations and support. We will not provide traditional specifications and a statement of work. Instead, we will describe our objectives in this solicitation and provide guidance on preparing your response. We will set the bounds of the problem and you, the offeror, will perform system analyses, trade studies and risk reduction activities throughout the program to refine your Operational System Concept (OSC) into a UCAV Operational System (UOS) and ultimately a UCAV Demonstration System (UDS) which provides a best value solution to our objectives. This program will culminate with a UDS flight demonstration of human-in-the-loop, target detection, identification, location, targeting, weapons authorization, weapons delivery, and target damage assessment.

The products of the UCAV ATD must enable decision-makers to determine whether it is technically feasible and fiscally prudent to continue development of a UCAV system which prosecutes post 2010 missions. ACC/DR divides the spectrum of potential UCAV missions into three categories: special application, force enabler, and alternative strike aircraft. Special application UCAVs perform punitive strike missions where we are unwilling to risk a pilot. Force enablers conduct SEAD and deep strike missions in support of manned strike packages. Alternative strike aircraft are a major element of the force for a wide variety of missions competitive with the Joint Strike Fighter. We believe focusing on the force enabler will allow the UCAV ATD program to answer the fundamental technical questions for all three potential UCAV mission categories. Properly balancing the trade-offs between mission specific and overarching UCAV technologies will be critical to the success of the program.

We are not interested in an ATD program that follows an evolutionary path from manned aircraft to a UCAV weapon system. Removing the pilot from the vehicle opens up the design space and provides the catalyst for exploring “clean sheet of paper” system design philosophies and CONOPS. Creative integration of the latest advances across a broad suite of component technologies, lean and agile manufacturing methods, supportability concepts, innovative tactics and CONOPS will enable a revolutionary advance in affordable airpower. The offeror is expected to judiciously exploit this design freedom while incorporating the best practices from the space and missile industries and the commercial sector along with lessons learned from past manned and unmanned aircraft systems.

The offeror shall treat life cycle cost as a technical requirement and make intelligent choices so that the ultimate UOS and UDS design requirements reflect a balance between capability and affordability. There are no unit fly away price requirements. For the UOS this ratio of effectiveness to affordability should be optimized against the scenarios and mission benchmarks representative of operations in the post 2010 timeframe. For the UDS, the emphasis switches to providing the maximum benefit to the Government for a fixed Phase II level of funding.

The Phase II solicitation will challenge the offeror to put affordability up-front and tell the Government what can be delivered for an “affordable” price. This is the essence of Price as an Independent Variable (PAIV). For Phase II the Government level of funding for the entire program (Phase I and II) is the independent variable. The dependent variable is how far the results of Phase II will propel us toward the goal of entering a formal acquisition program at the EMD phase.

### **1.3 Solicitation Package Overview**

In response to this solicitation you are asked to submit your own Operational System Concept (OSC), Task Description Document (TDD), Integrated Master Plan (IMP), Integrated Master Schedule (IMS), and Cost Responses. Your solicitation response will be integrated into a Section 845 Agreement that will govern the relationship between you and the government during this program. An outline of the material contained in each section of the solicitation follows.

#### **1.3.1 Section 2: Program Description**

Section 2 provides an overview of the motivation, goal, and objectives of the entire program and provides information on the scope of your work effort. This section also provides the offeror with an overview of the contracting mechanism and financial resources available to the program.

#### **1.3.2 Section 3: Phase I Statement of Objectives**

Section 3 provides a detailed description of the Government’s objectives for Phase I of the program. This section contains the information on: milestones, system design trades and CONOPS analysis, life cycle cost analysis, figures of merit, transition plans, and system test needed to prepare a Phase I proposal.

### **1.3.3 Section 4: Proposal Guidance**

Section 4 provides the offeror guidance for the development of a unique: work outline, executive summary, TDD, IMP, IMS, OSC, and cost response. The guidance contained in this section applies to Phase I of the UCAV ATD program. It is anticipated that these instructions will evolve as the UCAV ATD program matures and will be updated for the Phase II solicitation. The instructions are not intended to be all-inclusive, but should be considered as each offeror develops their proposed Agreement.

### **1.3.4 Section 5: Evaluation Criteria**

Section 5 is intended to give the offeror a clear picture of how the government will evaluate offerings throughout the solicitation/award process.

### **1.3.5 Section 6: Model Agreement**

This section provides a model agreement for assistance in preparing your proposal.

### **1.3.6 Section 7: General Information**

This section provides general information and statutes required to make this solicitation complete.

### **1.3.7 Appendix A: System Capability Document**

This appendix describes the design and performance trade space boundaries for the offeror's OSC and Phase I development of their UOS. Additional guidance on the desired UDS capabilities will be developed based on the system analyses, design trades, and CONOPS analyses conducted during Phase I. The government will finalize this guidance within one month after Phase 1 Milestone 2.

### **1.3.8 Appendix B: Mission Description Document**

This classified appendix describes the SEAD/Strike mission envisioned for the UCAV in the post 2010 timeframe. The specific scenarios and mission benchmarks the UOS will be evaluated against are also presented. The offeror's OSC and UOS should be designed to effectively and affordably accomplish these mission objectives.

**OFFERORS ARE EXPRESSLY CHARGED WITH KNOWLEDGE OF THE  
CONTENTS OF THE ENTIRE SOLICITATION.**



## 2.0 Program Description

### 2.1 Motivation

Joint Vision 2010 calls for the Armed Forces to achieve full spectrum dominance in the 21st century. The Air Force core competency of Air and Space Superiority delivers a fundamental benefit to the Joint Force. It prevents adversaries from interfering with our battlespace operations and is the precursor for the Joint Vision 2010 operational concepts of Dominant Maneuver and Full Dimensional Protection. With Air and Space Superiority, Joint Forces can achieve full spectrum dominance of the enemy. Without it, everything on the battlefield is at risk.

The recent trend among our adversaries has been to invest in integrated air defense systems (IADS) rather than aircraft to ensure their own air superiority. DIA and service intelligence branches, project those IADS will apply the lessons learned from Desert Storm by becoming more sophisticated, mobile and integrated. With the U.S. and her allies continuing to field new surface based air defenses, proliferation will force the Joint Force to face a Red, Blue, and Gray threat array. Large portions of these arrays are mobile and possess improved multi-targeting capability. To counter this asymmetric threat and maintain their core competency, the Air Force must maintain an effective and affordable Suppression of Enemy Air Defense (SEAD) and precision strike capability. These requirements are documented in Mission Need Statements (MNS) entitled; Lethal Suppression of Enemy Air Defenses (MNS 329-92); Updated EF-111 Tactical Jamming System (SON 319-88); and Counter C3I in Support of Defense Suppression (SON 318-88).

The USAF is committed to an aggressive program of exploiting UAV technology for SEAD in the mid-term and movement into a broader range of combat missions depending on technology maturation, affordability, and migration to other forms of warfare. The joint DARPA/USAF UCAV ATD will provide the information necessary to enable decision-makers to determine whether it is technically and fiscally prudent to continue development of a UCAV system to perform the post 2010 SEAD/Strike mission. Ongoing studies are addressing the mix of manned versus unmanned systems. Those studies will further refine the numbers, cost effectiveness and optimum timeline to meet the future needs of the USAF in the complete range of mission areas. Viable UCAV system candidates will compete with other potential solutions based on cost, capability, reliability, and suitability. The knowledge gained from the ATD will be a key input to on-going efforts to define the "best" force mix for the post 2010 timeframe.

## **2.2 Goal**

The goal of the joint DARPA/USAF UCAV ATD program is to demonstrate the technical feasibility for a UCAV system to effectively and affordably prosecute 21st century SEAD/Strike missions within the emerging global command and control architecture.

## **2.3 Objectives**

The primary objective of the UCAV ATD is to design, develop, integrate, and demonstrate the critical technologies pertaining to an operational UCAV system. The critical technology areas are command, control, and communications, human-systems interaction, targeting/weapons delivery, and air vehicle design. The specific objectives of the UCAV ATD include:

- Development and demonstration of a low life-cycle cost, survivable design for the SEAD/Strike unmanned air vehicle.
- Development and demonstration of a reconfigurable mission control station for multi-ship UCAV operations.
- Demonstration of robust and secure command, control and communications, including line-of-sight, non-line-of-sight, and over-the-horizon.
- Exploration of the full range of vehicle control, human-computer function allocation, mission planning and mission management approaches.
- Evaluation of off-board/on-board sensor integration, weapon targeting, and loadouts.
- Demonstration of human-in-the-loop, detection, identification, location, real-time targeting, weapons authorization, weapons delivery and target damage assessment.

Another key objective is to validate a UCAV weapon system's potential to affordably perform SEAD/Strike missions in the post 2010 timeframe. Life cycle cost models will be developed which include verifiable estimates of acquisition and O&S costs. The critical affordability assumptions and technologies will be validated through concept and process demonstrations.

It is the Government's intent to execute this program as a model for future ATDs. Your ability to define future operational system effectiveness and affordability requirements, and then use them as a filter to select the critical technologies matured and validated during the ATD, is vital to the success of this program. Defining the critical cost drivers and associated critical processes early in system development is a key component of this program. This ATD will serve as a focal point for national efforts to quickly and affordably transition advanced technologies and reduce the acquisition cycle for new weapon systems.

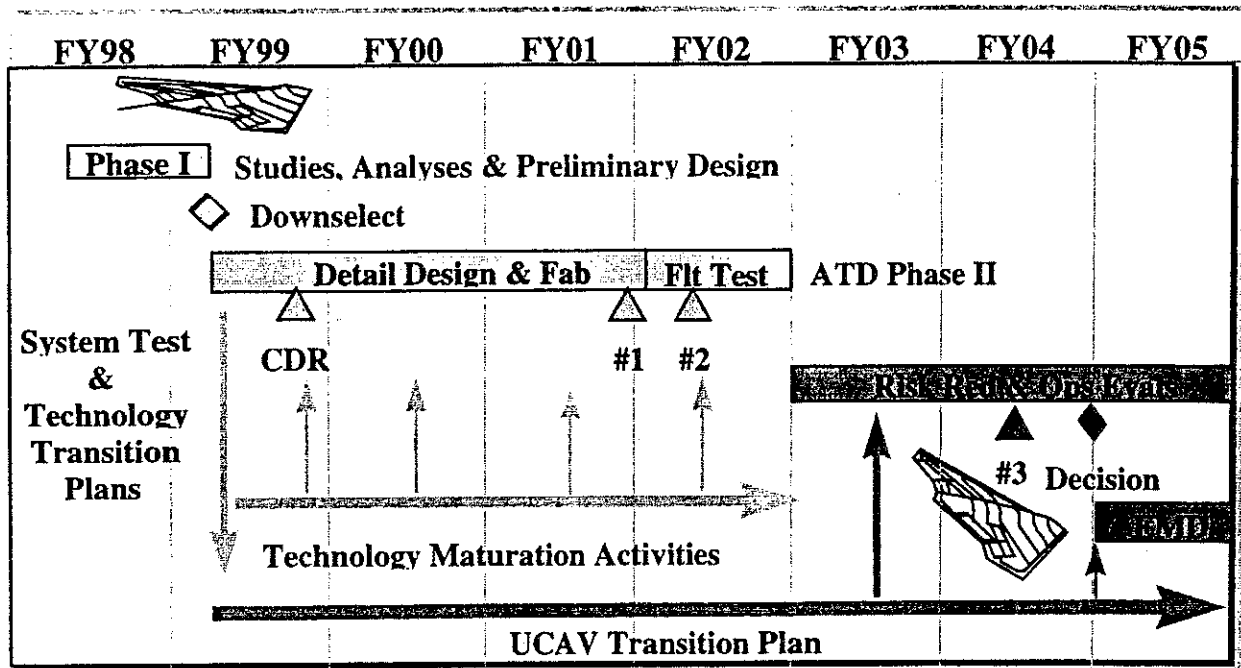


Figure 2.1: UCAV Acquisition Strategy

## 2.4 Program Plan

The UCAV ATD program plan directly supports the UCAV acquisition strategy shown in Figure 2.1. The goal of this proposed strategy is to provide the information necessary to enable decision-makers to determine whether it is technically and fiscally prudent to develop a UCAV weapon system to perform the post 2010 SEAD/Strike mission. In keeping with the DARPA and the USAF's legacy of technical and operational innovation we are pushing to determine the technical feasibility, operational utility, and affordability of a performing the SEAD/Strike mission with a UCAV system by FY05. Entering an acquisition program at the EMD phase in FY05 would enable an initial operational capability before 2015.

The UCAV ATD program is divided into two distinct phases. During Phase I, DARPA will award multiple, 10 month, Section 845 agreements for the design of a UCAV Operational System (UOS), risk reduction activities, and the preliminary design of a UCAV Demonstrator System (UDS). The UDS will be designed to mature and validate the integrated set of critical technologies required to implement the contractor's UOS. At the conclusion of Phase I, DARPA, in consultation with the USAF, will determine whether to enter Phase II or terminate the program. The decision will be based on a thorough assessment of the results of Phase I as well as the extent to which the contractor's proposed Phase II program will provide significant value added to the government. If the government decides to proceed, one Phase I contractor will be selected to complete the UDS design, fabricate the UDS (two vehicles and a reconfigurable mission control station), develop and integrate the critical technologies, continue risk reduction activities, and conduct flight tests. Phase 2 is scheduled to be completed by the end of FY02.

The program plan calls for the development of both a System Test Plan (STP) and UCAV Transition Plan (UTP) during Phase I. Together these plans will provide an integrated roadmap for all activities necessary to meet the acquisition strategy goal. The STP will detail all the Phase II risk reduction efforts, subsystem and component verification, vehicle check-out and flight safety, critical technology evaluation and assessment, and flight demonstration of the UDS. The UTP will address all the operational evaluations, and technology and manufacturing process: development, maturation, transition, risk reduction activities which are outside the scope of the ATD, but necessary to continue development of a UCAV system up to the point of a decision to enter into an acquisition program at the EMD phase. Both plans will be coordinated with industry and the DoD to ensure maximum advantage is taken of any leverage opportunities, and scarce research and development dollars are focused on supporting the acquisition strategy. Both plans will also be continually updated during the entire ATD.

The UTP will provide the basis for constructing the Risk Reduction and Operational Evaluation (RR&OE) program that is schedule to follow the ATD. The RR&OE phase will provide an opportunity to validate and demonstrate technologies matured in parallel with the ATD while performing a series of operational evaluations. The up-front focus on the overall acquisition strategy will allow the UDS to be designed and built so that the ATD residual hardware systems will support the RR&OE activities without a wholesale redesign of any major subsystems. A successful RR&OE program will address all the remaining questions that must be answered before entering into the EMD phase.

The RR&OE phase is where our up front emphasis on the 2010 mission description will pay high dividends. By considering all the mission performance requirements up front, we will be able to validate and demonstrate the critical survivability features of the air vehicle by exercising an option, and not a complete redesign. One of the existing ATD vehicles could be modified, or as Figure 2.1 suggests, a third vehicle with full survivability feature could be acquired. The flexibility to seamlessly transition from ATD to EMD will play a key role in compressing the time required to transition new technologies into effective and affordable weapon systems for the warfighters.

## **2.5 Management Approach**

DARPA is responsible for overall management of the UCAV ATD, including technical direction, acquisition, and security. DARPA will provide the Program Manager (PM) and the Air Force will provide the Deputy Program Manger (DPM). The PM and DPM are responsible for implementing a streamlined approach to program management. Major tenets of that approach include: close cooperation between government and contractor teams, small staffs, abbreviated oversight, face-to-face communication, real-time decision making, emphasis on solving problems instead of assigning blame, and short direct lines of authority.

The Air Force Research Laboratory (AFRL) is responsible for providing expert technical advice to the UCAV ATD program as requested by the PM and DPM. AFRL/CC has chartered the UCAV ATD Technical Support Team (TST) to meet that responsibility. The TST has a mandate

to draw upon the full spectrum of AFRL technical expertise and reach out to other USAF, Navy, and NASA organizations. The TST includes a team lead and individual focal points for: air vehicles, command and control, human systems interface, and weapons. These five individuals are the AFRL representatives to the small government team.

ACC/DR and AF/XOR have agreed to provide operational expertise and insight throughout the program. These organizations have participated in the definition of the UCAV ATD and are incorporating the program into their long-range plans.

ASC/XR and ASC/RA will assist the Government team by verifying the contractors mission effectiveness and affordability analysis.

## **2.6 Other Agreements**

The joint DARPA/USAF UCAV ATD program will utilize DARPA's Other Agreements Authority (Other Transactions for Prototypes Section 845/804) which allows the offeror to be creative in designing the system and in the selection of the management framework which best suits the proposed technical and management approach. The government will share information and data throughout the program. However, the data will always be advisory, not directive in nature, and offered as a way to foster better communications on the program. Our intent is to provide the best possible insight into what the government thinks while minimizing oversight. To this end, the government will focus on accurately defining WHAT they want and letting the offeror determine HOW best to provide it. Government oversight will be provided through the same management framework proposed by the offeror.

The government will allow the offeror to use either commercial or DoD streamlined processes, reporting and management practices. The use of Other Agreement Authority requires compliance with applicable laws but allows the latitude to depart from acquisition specific laws, FARs, and DoD practices where it makes sense. The offeror should take full advantage of this latitude to propose innovative/revolutionary approaches to team building. The resulting offeror proposal must clearly demonstrate a robust method to assure and control costs, quality, reliability, system engineering, program schedule, system design, and test planning and execution.

Commercial, industrial, and corporate specifications and standards should be used in lieu of military specifications and standards where appropriate. Military specifications and standards, if needed, should be used as guides, with any modifications, tailoring or partial application described. A rigorous formal process should be employed to design and implement software. Information system architectures must comply with the Joint Technical Architecture (JTA) and the Technical Architecture Framework for Information Management (TAPIM).

All agreement awards will be based on evaluations and decisions made by a government source selection evaluation board (SSEB) established to review all responses to the solicitations. The government reserves the right to conduct a rolling downselect from the end of Phase I until the Phase II critical design review (CDR). Rules and criteria for the rolling downselect process will

be included in the Phase II Solicitation provided to the Phase I contractors approximately seven months after the start of Phase I

## **2.7 Funding**

The government anticipates having \$120M available to fund the Phase I and II agreements. It is anticipated that up to four competitive agreements will be awarded for the Phase I effort with a total value per contract of \$4.0M. It is anticipated that DARPA will use agreements as authorized for DARPA procurements in Section 845 of the 1995 Defense Authorization Act for both phases. Offerors are encouraged to propose innovative, value added use of this acquisition mechanism. We expect the offeror to provide a realistic proposal for best achieving the program objectives within the outlined budget and schedule. If for any reason during Phase II there is a total program cost overrun, it is anticipated that the offeror will be responsible for sharing at least 50% of all program costs exceeding the \$120M baseline.

## 3.0 Phase I Statement of Objectives

This section outlines the Government's objectives for Phase I, Studies, Analyses and Preliminary Design, for the UCAV ATD program. The primary objective of Phase I is to conduct the requirements and CONOPS analysis, trade studies, risk reduction, and preliminary design activities necessary to demonstrate that the development and flight testing of a UCAV Demonstrator System (UDS) provides sufficient value to the government to justify investing in Phase II. The results from a successful Phase I program will convince the Government that: (1) UCAV weapon systems are an effective and affordable option for conducting post 2010 SEAD/Strike missions, (2) the Phase II proposals can accomplish the ATD objectives within the funding constraints, and (3) the ATD will provide a residual test system with the ability to answer all the remaining questions necessary to make an informed decision to enter into a major weapon system acquisition program at the EMD phase.

### 3.1 Overview

The contractor will implement a complete systems engineering process to complete the objectives of the UCAV ATD. The contractor shall formulate and perform system requirement analyses, design trades, CONOPS analysis, risk reduction activities, system life cycle cost assessments, system test and technology transition planning, and maintain visibility of the UCAV Operational System (UOS) and UCAV Demonstrator System (UDS) designs as shown in Figure 3.1. The major Phase I activities represent a progressive refinement of the contractor's UCAV Operational System Concept (OSC), to a UOS design, to identification of critical technologies, to development of the UDS preliminary design. The contractor will implement their proposed Risk Mitigation Plan (RMP) and develop a System Test Plan (STP) which identifies Phase II risk reduction efforts, critical technology evaluation and assessment, subsystem and component verification, vehicle check-out and flight safety, and flight demonstration of the UDS. The contractor will also develop a UCAV Transition Plan (UTP) which identifies all the technology maturation, demonstration, and development activities and operational evaluations which are outside the scope of the ATD, but are critical to making an informed decision to enter into a formal acquisition program at the EMD phase as shown in Figure 2.1. The UTP will also identify emerging technologies and leverage opportunities that have high payoff for future UCAV applications.

System requirements and CONOPS analyses, trade studies, and the UOS engineering design shall be conducted in accordance with the Government System Capability Document (SCD), the Mission Description Document (MDD), and the Phase I objectives described in this section. All studies and analyses performed during this phase shall be documented and accomplished in accordance with the Integrated Master Plan (IMP). The contractor will be responsible for considering all systems and subsystems associated with a UCAV weapon system, including the

air vehicle, mission control segment, and supportability to a level of detail necessary to justify their UOS, life cycle cost analyses, ATD program plan, and system test and transition plans. The offeror is encouraged to define Phase I risk reduction activities that are generic to any UCAV concept independent of their specific UOS configuration. All Phase I analyses, trade studies, and risk reduction activities will be documented and accomplished in accordance with the IMP.

We do not anticipate a UOS defined to the design level of a traditional acquisition program. However, sufficient detail must be provided to enable the Government and contractor to use the UOS as the primary filter in selecting the integrated set of critical technologies which will undergo initial risk reduction during Phase I and further development and demonstration during Phase II as part of the STP. The UOS design must also be sufficiently detailed to allow identification of the full set of technology maturation or risk/cost reduction activities identified in the contractor's UTP.

A comprehensive analysis of aircraft survivability is a critical aspect of the UOS design, however the Government does not consider the demonstration of low observable and self defense technologies as a primary objective of the UCAV ATD. Therefore, the demonstrator air vehicle should not incorporate reduced signature materials and treatments, but should be built in a manner that is fully compatible with the low observable design details prescribed in the UOS. As an example, the demonstrator air vehicle wing leading edge should not incorporate any RF materials or treatments but must maintain the appropriate internal and external design compatible with the UOS design. This includes maintaining the appropriate external signature-driven surface characteristics and internal structural layout consistent with the UOS requirements for RF bulk absorbers, termination, graded resistance or other advanced signature reduction techniques. The degree to which the UDS air vehicle incorporates other low observable features, such as antennas and apertures, will depend on the trades done in Phase I.

Phase I results will serve as the foundation and roadmap for achieving the UCAV ATD vision and objectives during Phase II. The UOS and UDS designs, UTP, and other results of the Phase I efforts will serve, in part, as evaluation factors for award of Phase II efforts. Phase II proposals should include an option that would permit the addition of reduced signature materials and treatments, and self-defense measures to the demonstrator aircraft should the Government choose to restructure the program at a later date.



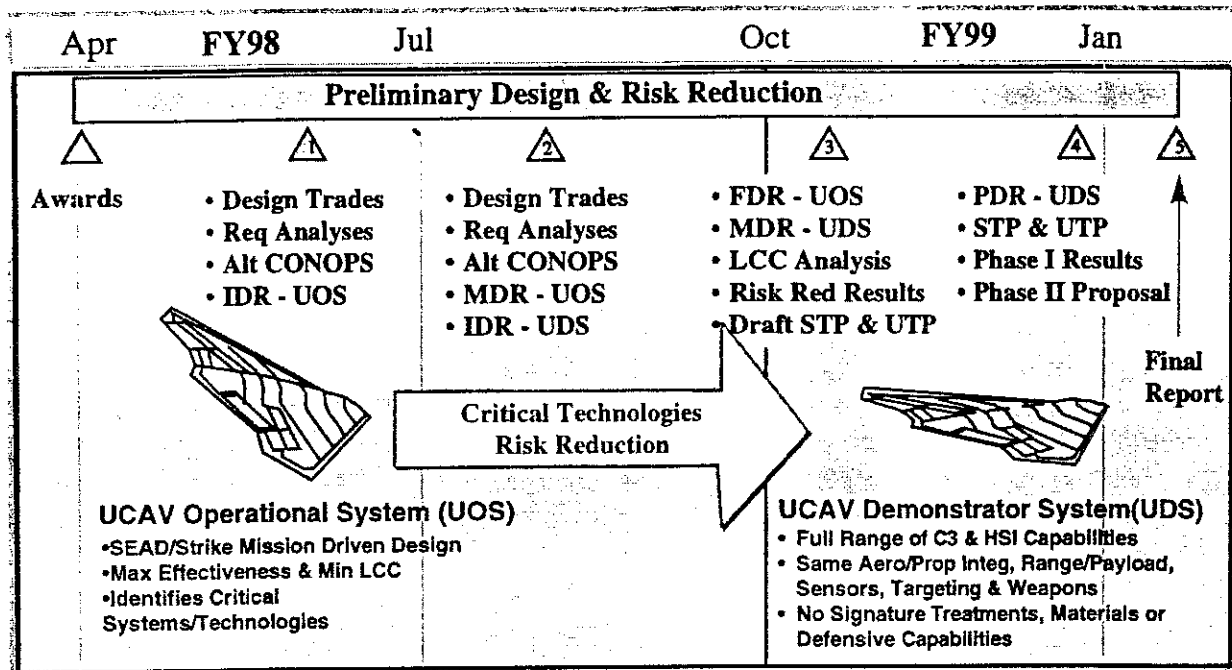


Figure 3.1: Phase I Milestones

### 3.2 Milestones

The government envisions five Phase I milestones. The fourth milestone review shall be conducted no later than one month before the end of Phase I to allow the government time to review the Phase II proposals and thereby minimize the time between completion of Phase I and start of Phase II. At a minimum, at each milestone the contractor must provide the following information and meet the listed minimum exit criteria:

- Milestone 1 - within 2 Months After Award (MAA)
  - Information provided:
    - Preliminary results of system requirements analyses, design trades, and alternative CONOPS studies
    - Methodology and preliminary results of UOS life cycle cost analysis
    - UOS Initial Design Review (IDR)
  - Minimum Exit Criteria:
    - Entire system design and CONOPS trade space described in Section 3.3 explored at the conceptual level
    - Key trades which require further exploration identified
    - Key LCC model components and assumptions defined
    - UOS IDR demonstrated sufficient merit to warrant proceeding to the next milestone

- Milestone 2 - within 4.5 MAA
  - Information provided:
    - Results of system requirements and life cycle cost analysis
    - Results of design trades and alternative CONOPS studies
    - UOS Midterm Design Review (MDR)
    - Preliminary listing of critical and enabling technologies
    - UDS Initial Design Review
  - Minimal Exit Criteria:
    - All system design and CONOPS trades described in Section 3.3 fully explored
    - LCC models fully defined
    - Key critical and enabling technologies identified
    - UOS MDR demonstrated sufficient merit to warrant proceeding to the next milestone
    - UDS provides a direct legacy to the UOS
    - UDS IDR demonstrated sufficient merit to warrant proceeding to the next milestone
- Milestone 3 - within 7 MAA
  - Information provided:
    - UOS Final Design Review
    - UDS Midterm Design Review
    - Results of risk reduction activities
    - Final UOS life cycle cost assessment
    - Draft System Test Plan (STP)
    - Draft UCAV Transition Plan (UTP)
  - Minimum Exit Criteria: Information presented demonstrates a sufficient;
    - level of UOS effectiveness and affordability as measured against the figures of merit in Section 3.5,
    - level of UOS detail to validate all aspects of their UDS design,
    - progress toward reducing the risk of key critical technologies,
    - level of validation in the life cycle cost model,
    - level of refinement in the midterm UDS design, and
    - understanding of the key features of their STP and UTP
 to warrant proceeding with their UDS design.
- Milestone 4 - within 9 MAA
  - Information provided:
    - UDS Preliminary Design Review (PDR)
    - System Test Plan
    - UCAV Transition Plan
    - Review of Phase I results
  - Minimum Exit Criteria: Information presented demonstrates a;
    - UDS design:
      - with direct legacy to the final UOS,

- which addresses the critical technologies for the UOS, and
  - with all functional and physical interface requirements established,
- STP which clearly articulates all the Phase II risk reduction efforts, critical technology evaluation and assessment, subsystem and component verification, vehicle check-out and flight safety, and flight demonstrations of the UDS,
- UTP which clearly articulates all programmatic and technical activities, outside the ATD, which must be accomplished prior to entering an EMD phase, and
- satisfactory completion of all the TDD activities.
- Milestone 5 - 10 MAA
  - Information: Final report
  - Exit Criteria: Information presented clearly articulates all the results of their TDD activities

All milestone reviews will be conducted at the contractor's location. The purpose of the milestone reviews is to demonstrate accomplishment of milestone exist criteria as a basis for payment. The objective is to convey information and discuss issues, not to generate formal documentation. Instead of written milestone reports, a complete copy of the annotated milestone review briefings shall be provided to the meeting attendees. The contractor will forward an electronic copy of the meeting minutes and briefing slides to the DP and DPM within a week of the review. All meeting minutes and briefings should be in Office 97 compatible format. The government anticipates sending 10-20 people to each milestone review.

The ATD milestones call for three levels of informal design review. To assist the offeror in determining the anticipated level of effort for each design review, we offer the following definitions.

- Initial Design Review - Results of empirical and parametric methods used to produce a system design where the top level performance and relationships between all major system components (air vehicle, mission control station, and external infrastructure) are defined. Internal arrangement of major subsystems for the air vehicle and mission control station has been accomplished. Supportability concepts are defined.
- Midterm Design Review - Results of engineering analysis performed to iterate and advance the system design yielding a configuration with confident performance and estimated constraints.
- Final Design Review - Configuration performance is optimized throughout and documentation of a baseline can be confirmed. Integrated (synergistic) results of technologies become obvious. The critical technologies are readily identified and there need justified and validated.

Phase I will include one formal design review. A UDS preliminary design review (PDR) will be conducted at milestone 4. This review shall provide a level of detail consistent with the MIL-STD 499B requirements for a system level prototype PDR. The contractor will use their approach and format for the PDR.

The government anticipates a kick-off meeting and up to two technical interchange meetings (TIMs) prior to milestone 1, and at least one TIM between each remaining milestone. The objective of a TIM is to allow coordination of government objectives and contractor activities. TIMs are small working level meetings without formal documentation. Attendance at each TIM will be tailored based on the agenda, but the maximum government attendance should be ten people. The TIMs provide an opportunity for the government to view the trades in progress and provide additional insight or information as required. The value of the meetings will be in the breadth of material and level of detail and interaction with the team. These meetings do not have to be face-to-face – they could be conducted via telephone or video teleconference if the appropriate facilities can be made available and the information can be communicated adequately.

### **3.3 System Analyses, Design Trades and CONOPS Analysis**

The contractor shall concurrently conduct a series of system requirements and CONOPS analyses and system design trades that progressively refine their OSC into a final UOS design. The specifications in the SCD should serve as bounds for the UOS and are tradable except for the following:

- Non-expendable air vehicle
- Global deployment
- Operations within the force structure and C4I architecture projected for the post 2010 timeframe
- System integrity and reliability shall be consistent with safe and effective operations.

Within this design space, the contractor shall conduct comprehensive trades and analyses to identify the system performance required to accomplish the SEAD/Strike missions described in the mission description (Appendix B) and identify the corresponding suite of critical technologies for achieving that performance. All trades shall consider the UCAV supportability segment including the concepts of reduced maintenance, long term storage, logistics, and deployability. The trades shall fully explore innovative approaches to the operational concept and evaluate the battlespace management and logistical requirements for employing multiple formations of UCAVs in a realistic operational environment. During these studies the contractor should exploit the freedom to incorporate design philosophies from the space and missile industries and the commercial sector.

All mission level simulations will be conducted using the 1996 Southwest Asia (SWA) Multi-Service Force Deployment (MSFD). The government will provide the contractors with all the necessary pedigreed data to run SUPPRESSOR and ESAMS for the legacy force mission benchmarks described in Appendix B. The government will establish a mission effectiveness review process to assess the contractor's results and review their key assumptions in conjunction with each milestone review. The government reserves the right to modify the pedigreed databases and require the use of additional simulation programs to ensure a fair and equitable environment for comparing competing CONOPS and UOS designs. We anticipate the mission benchmarks described in Appendix B will be refined during the first two months of Phase I and then finalized before Milestone 1.

Mission effectiveness is not the only driver in the trade studies. While the contractor must determine the specifications required to conduct the SEAD/Strike missions, the real challenge is to determine the niche or “sweet spot” in the post 2010 force structure that produces the optimum blend of mission effectiveness and affordability. To facilitate that challenge, the government will work with the contractors to develop a consistent and realistic set of assumptions regarding post 2010 force structure and infrastructure.

### 3.3.1 CONOPS

The contractor shall perform the trades, analyses, and modeling and simulation to define the UOS CONOPS. These activities shall consider all segments of the SEAD/Strike mission timeline: mission planning, detection/location/identification, decision, execution, and target damage assessment feedback for the target set defined in the appendices. At a minimum, the trades should be conducted in terms of mission effectiveness and affordability on:

- Mission range and loiter time
- Number of aircraft per sortie
- Sortie generation rate
- Aircraft survivability (including, signature, ECM, and tactics)
- Timelines for generating targeting information
- Integration of on-board and off-board information sources and processing
- Total weapon system communications requirements
- Weapons stand-off and targeting accuracy requirements
- Operations and support concepts
- Counter IW techniques/tactics
- Non-combat attrition rates

ACC/DR will work closely with the contractors to provide insight on how alternative UCAV system CONOPS impact the overall CONOPS for air operations in the post 2010 battlespace.

### 3.3.2 Air Vehicle

The contractor shall perform the trades, analyses, modeling and simulation, and risk reduction tasks necessary to define the configuration, attributes, performance, and life cycle cost of the UOS air vehicle and its subsystems. At a minimum, trades should be conducted in terms of mission effectiveness and affordability on:

- Combat range
- Loiter capabilities
- Speed, altitude, and cruise efficiency
- Active/passive survivability attributes & defensive countermeasures/tactics
- Munitions size, load-out, survivability, standoff range, and versatility
- Aircraft size and weight
- Aircraft avionics, sensors, and communications requirements
- Level of control system robustness and redundancy

- Level of hardening against EMI/EMC/High Power generation and emission

These trades will be conducted iteratively with the CONOPS trades to define an optimized solution. The government anticipates these trades will lead to a UOS air vehicle design with a projected unit cost that is less than one-third of the cost of a Joint Strike Fighter.

### **3.3.3 Mission Control Station**

The contractor shall perform the trades, analysis, modeling and simulation, and risk reduction tasks necessary to define the configuration, attributes, performance, and life cycle cost of the UOS mission control station. The mission control station will include: (1) command and control of the air vehicle, (2) communications, (3) mission planning, management and execution, (4) near-real-time targeting using onboard and off-board data, (5) mission reporting and other data dissemination capabilities. The mission control segment should leverage existing capabilities to the maximum extent possible and be compatible with the projected C2 and mission planning architecture. At a minimum, trades should be conducted in terms of mission effectiveness and affordability on:

- Mission control CONOPS
- Mission team functional segmentation and control station configuration
- Ratio of mission control station personnel to air vehicles
- Level of vehicle autonomy
- Human-computer function allocation
- Level of situation awareness
- Location and sizing of the mission control station

### **3.3.4 Supportability**

The contractor shall evaluate logistics issues such as reduced maintenance, reduced personnel, deployment, and long term storage in all trade studies in the development of the UOS design and alternative CONOPS. The objective is to design a UOS whose operations and support costs are a 50-80% less than a current tactical aircraft squadron. At a minimum, trades and analyses should be conducted in terms of mission effectiveness and affordability on:

- Reduced maintenance technologies
- Redundancy and condition based maintenance
- Commercial turnaround practices for military operations
- Sortie rates and turnaround time vs. maintenance concept
- Deployment timelines for global rapid force projection
- Deployment via ferry versus in-flight refueling
- Long-term storage technologies vs. vehicle performance vs. deployment readiness
- Vehicle configuration for long term storage and "upgrade in place"
- Peacetime vs. wartime personnel requirements
- Maintainer and operator training and proficiency requirements

- Maintenance diagnostic tools
- Logistics support concept vs. employment responsiveness

### **3.4 Life Cycle Cost Analysis**

Life cycle cost analyses shall center on supporting two Major Theater Wars (MTWs) within a 20-year life cycle, but the contractor shall also demonstrate their UOS is effective and affordable in support of transnational threats and small-scale contingencies. The contractor's CONOPS and trade studies will determine the unit fly away costs and the required number of UCAV systems. The analyses shall include the cost of development, acquisition, ownership, and disposal. Particular attention will be paid to a thorough and accurate estimate of all the support costs associated with the contractors preferred CONOPS.

The contractor will provide a process for analyzing system life cycle cost that allows visibility into, and sensitivity determination of, all key parameters. The contractor should also identify all key assumptions and the rationale for their use. All life cycle cost analyses shall clearly demonstrate the cost sensitivity to variations in key parameters and assumptions. The government will conduct a series of "truth boards" in conjunction with the Phase I milestones to validate/verify key cost assumptions and estimates.

To ensure a consistent basis of comparison and an official benchmark to evaluate potential reductions in operational and support (O&S) costs, the government will provide a set of baseline O&S costs to the contractors at agreement award. At the same time, the government will also provide the contractor with the exact number of transnational threats and small-scale contingencies to include in their life cycle analysis. The government and contractor will work together throughout the program to ensure all aspects of the contractor's UOS and CONOPS are properly reflected in their LCC results. Ground rules and methodologies for estimating the cost of using elements of a 2010 system of systems architecture will be established as part of this interaction.

### **3.5 Figures of Merit**

In order to facilitate all the previously defined trade studies and analyses, and provide a fair basis for comparison, the mission effectiveness and affordability of the UOS should be measured against an identical set of defined criteria, or figures of merit. At a minimum, the contractor should use the following figures of merit during Phase I:

- Mission effectiveness:
  - Percentage of total non-hardened target set put at risk
  - Percentage of escorted strike package which safely returned
  - Percentage of SAM threat destroyed/hindered
  - Percentage of UCAVs which survive
  - Kills per sortie
  - Number of weapons choices
  - Sortie generation rate

- Logistics footprint and personnel requirements
- Percentage of accessible operating locations
- Percentage of common logistics support
  
- Affordability
  - Total UCAV system life cycle cost
  - Cost of new infrastructure
  - Cost savings of unneeded/retired infrastructure
  - Total acquisition cost
  - Cost per target kill
  - Total operations and support costs
  - Sorties per aircraft life

The offeror may suggest alternative figures of merit in their Phase I proposal. We anticipate the figures of merit will be refined during the first two months of Phase I and finalized before Milestone 2. The government will provide the contractor with baseline mission effectiveness figures of merit for all legacy force mission benchmarks.

### **3.6 UCAV Transition Plan (UTP)**

The contractor shall develop their initial UTP to provide the government with the fiscal and technical information necessary to develop an acquisition strategy that supports the USAF Long-Range Plan. The UTP should describe all the additional risk reduction, technology and process development and maturation, and operational evaluation activities which are outside the scope of the ATD program, but must be conducted prior to entering into an acquisition program at the EMD phase. All critical technologies must “buy” their way onto the ATD program. All UOS technologies and functionality not incorporated in the UDS shall be addressed in the UTP. The UTP will also identify emerging technologies and leverage opportunities that have high payoff for future UCAV applications. The UTP should capture all acknowledged on-going and planned government and industry programs and include appropriate cost and schedule information. The UTP will be a living document that is updated and refined throughout Phase II.

### **3.7 System Test Plan (STP)**

The contractor shall develop a system test plan to demonstrate and validate the integrated set of critical technologies required to validate the potential for their UOS to perform the post 2010 SEAD/Strike mission. The STP should build on the Phase I results of the contractor’s Risk Mitigation Plan (RMP). This test plan shall include (but is not limited to) Phase II risk reduction efforts, subsystem and component verification, vehicle check-out and flight safety, critical technology evaluation and assessment, and flight demonstration of the UDS. The STP will address the role of modeling and simulation in both the planning and conduct of the risk reduction, verification, and testing. Particular attention should be paid to areas that are difficult to evaluate in a “traditional” ATD (technical maturity/risk of virtual production facilities, supportability, training, etc.). Innovative methods for their test and evaluation should be discussed. This overall demonstration effort should explicitly address all ATD program technical



objectives including; mission effectiveness, logistics functionality, command, control, and communications, and affordability.

The proposed test locations, methods and major test parameters are to be identified and shall include any proposed requirements for government test facilities or resources. The PM and DPM shall endorse those needs and permit the contractor to make arrangement for their use/availability. The cost for the use of those facilities/resources shall be included in the contractor's Phase II proposal.

## 4.0 Proposal Guidance

This section of the solicitation provides the offeror guidance for the development of a unique Operational System Concept (OSC), Task Description Document (TDD), Integrated Master Plan (IMP) and Integrated Master Schedule (IMS). These documents will be inserted into the Model Agreement (Section 6) and form the basis for the offeror's proposal in response to the UCAV ATD Phase I solicitation.

The guidance contained in this section applies to Phase I of the UCAV ATD program. It is anticipated that these instructions will evolve as the UCAV ATD program matures and will be updated with the Phase II solicitation. The instructions are not intended to be all-inclusive, but should be considered as each offeror develops their proposal.

### 4.1 Work Outline

The work outline provides a common numbering system that ties all program elements together. This numbering system integrates the OSC, TDD, IMP and IMS and must be used throughout all program documentation. The OSC, TDD, IMP, and IMS shall be consistent down through level 3 of the work outline. As the program progresses, this same numbering system shall be used to define the UCAV Operational System (UOS) and the UCAV Demonstrator System (UDS).

This section describes the work outline as viewed by the Government and was used to organize the System Capability Document found in Appendix A. The government work outline is provided only for reference and represents the minimal set of program elements. The offeror is free to propose a completely different Work Outline. However, to allow for an equitable comparison of competing concepts the offeror shall ensure their Work Outline addresses all the program elements shown below:

Outline Code	Level			
	1	2	3	4
00000	Unmanned Combat Air Vehicle (UCAV) System			
10000	Air Vehicle			
				Airframe
				Propulsion
				Vehicle Management System
				Mission Management System
				Communications
				Payload

	Weapons
	Survivability
	Software
	Integration and test
20000	Mission Control Station
	Mission Planning & Control
	Human System Interface
	Human Computer Function Allocation
	Decision Aids
	Communications
	Infrastructure
	Software
	Integration and test
30000	Supportability
	Reliability & Maintainability
	Maintenance Planning
	Deployability
	Support Equipment
	Long Term Storage
	Manpower, Personnel & Training
	Supply Support
	Safety & Health Hazards
40000	Systems Engineering/Program Management
	Systems Engineering Management
	System Integration
	System Software Development Process
	System Life Cycle Cost
	Manufacturing and Production Planning
	Human Factors
	Specialty Engineering
	Program Management
	Configuration Management
	Financial Management
50000	System Test
	Risk Reduction
	Systems Integration Laboratory
	Check-out & Flight Safety
	Mission Effectiveness
	Logistics Functionality
	Command & Control
	Communications
	Affordability

## **4.2 Organization**

The offeror shall use the following outline in response to this solicitation.

- Executive Summary
- Technical Approach and Substantiation
- Proposed Agreement with Attachments
  - Task Description Document (TDD)
    - Trade Study and Analysis Plan
    - Risk Mitigation Plan (RMP)
    - UDS Design Plan
    - Systems Engineering/Program Management
  - Integrated Master Plan (IMP)
    - Product IMP
    - Process IMP
  - Operational System Concept
- Integrated Master Schedule
- Cost Response
- Classified Annex

## **4.3 Executive Summary**

This document is meant to be an executive level description of key elements and unique features of each offeror's proposedUCAV ATD Phase I program. The Executive Summary should at least address the offeror's:

- 1) Program Objectives and Approach
- 2) Acquisition Approach, including schedule, technical performance risk areas, risk mitigation or reduction activities, and leveraging from Independent Research and Development (IR&D) or other government research activities
- 3) Top Level Program Schedule
- 4) Proposed Cost

## **4.4 Technical Approach and Substantiation**

This section of the proposal provides the offeror with the opportunity to explain and substantiate the significant features of their OSC, trade study and analysis plan, RMP, IMP, IMS, and overall technical approach and management plan. The offeror should provide significant details to address all the relevant evaluation criteria outlined in Section 5.

## **4.5 Proposed Agreement with Attachments**

The offeror's agreement shall follow the outline described in Section 6 (Model Agreement). This section provides specific guidance for preparing Article III and attachments 1 and 2 of that agreement.

#### **4.5.1 Article III: Task Description Document (TDD)**

The TDD describes the work effort necessary to meet the milestones and Statement of Objectives for Phase I of the UCAV ATD program. The TDD will include the offeror's plans for: trade studies and analyses, risk mitigation, UDS design, and systems engineering/program management. This solicitation identifies work effort to Level 3 of the Work Outline. The offeror may choose to define work at lower levels to better explain their approach toward meeting program and system objectives.

##### **4.5.1.1 Trade Study and Analysis Plan**

The trade study and analysis plan shall describe the offeror's approach to progressively refining their OSC into a final UOS design. Those refinements will be based on a series of concurrent system requirements analyses, alternative CONOPS explorations, and system design trades as discussed in section 3.3. The specifications in the System Capability Document (appendix A) should serve as bounds for the UOS.

##### **4.5.1.2 Risk Mitigation Plan**

The RMP will identify the key technical risk areas in the OSC and provide a roadmap of critical Phase I risk reduction activities. The plan shall include a process for quantifying the maturity, risk, system performance enhancement/value, and life cycle cost reduction benefits of candidate technologies. At a minimum, the RMP should identify:

- the type of risk reduction activity required to validate the technologies (e.g., wind tunnel test, flight test, simulation)
- the cost and schedule required to mature these technologies
- the cost and schedule required to mature critical manufacturing processes
- the fallback technologies and processes that would be implemented if the maturation activities are unsuccessful.

##### **4.5.1.3 UDS Design Plan**

The UDS design plan will identify the top level metrics, processes, and system level performance and affordability trades the offeror intends to use to select the critical technologies validated by their UDS. The offeror is encouraged to take full advantage of emerging collaborative design methodologies and advanced modeling and simulation tools. The UDS shall be designed to validate the critical technologies and satisfy the ATD objectives in a system with direct legacy to the UOS. At a minimum, the UDS air vehicle design should incorporate the same aero/propulsion integration and outer mold line as the UOS. The UDS air vehicle should be capable of supporting the exploration of the full range of UCAV ATD objectives but in the interest of affordability will not incorporate signature treatments, materials, or defensive

countermeasures. The mission control station should be capable of supporting the exploration of the full range of UCAV ATD objectives. The plan will also consider the use of Government Furnished Equipment (GFE). Additional guidance will be provided after Milestone 2 to help the offerors refine their UDS preliminary design.

#### **4.5.1.4 Systems Engineering/Program Management**

The offeror shall describe a complete systems engineering process for conducting Phase I and II of this program. This description shall describe how the offeror will execute the systems engineering process activities of requirements analysis, functional analysis and allocation, synthesis, and systems analysis and control commensurate with the statement of objectives. The offeror shall describe the organizational responsibilities and authority for the systems engineering effort, including control of team member engineering. Similarly a program management process based on the concepts of Integrated Product and Process Development (IPPD), shall be established.

The offeror shall integrate their systems engineering and program management processes to ensure the program progresses successfully through the Phase I milestones. This process should establish a series of tracking tools which should be updated monthly and shall include:

- **Technical performance measures (TPM):** The offeror should provide a series of TPMs that track the maturity of key program technical parameters and provide management indicators that forecast the achievement of program objectives. The offeror should initially develop TPMs that delineate key technical goals and objectives through Level 2 of the Work Outline. Metrics should be developed for systems engineering, program management and test and evaluation. Example TPMs are UOS performance parameters and system life cycle costs.
- **Integrated Master Schedule (IMS):** The offeror will establish and maintain a master scheduling system that complements the IMP and provides continuous status of program accomplishments against time. This tiered system will provide visibility to Level 3 and Level 4 items as appropriate.
- **Financial Management System:** The offeror will provide a financial management system that allows the government electronic access and on-line visibility into their program budget and spend plan and is tied to their work outline. The offeror will provide regular cost reports to the Government, at least monthly, in offeror preferred format.
- **System Software Development Process:** The offeror will implement and maintain a rigorous formal process for software development and integration that follows an established military, national, or international standard.

#### **4.5.2 Attachment 1: Integrated Master Plan (IMP)**

The offeror shall develop a comprehensive IMP that describes Phase I of the UCAV ATD program. The IMP is divided into the Product IMP and the Process IMP.

##### **4.5.2.1 Product IMP**

The Product IMP shall address specification, verification, and significant management accomplishments necessary to complete the requirements analyses, design trade studies, and risk reduction activities for Phase I. The Product IMP should contain, accomplishments/criteria sections tied to the Work Outline (section 4.1) and program milestones (section 3.2). Each task will be accompanied by specific criteria that will be used to judge the completion of the task for a given milestone. Definitions and characteristics of the key elements of the IMP are given below:

#### **Significant Accomplishment**

- Desired result at a specified event which indicate a level of design maturity or progress directly related to each product/process.
- Discrete step in the progress of the planned development.
- Describes functional interrelationships of different disciplines applied to the program (e.g. test, manufacturing, system engineering).
- Must be event related, not just time coincidental

#### **Event**

- The conclusion/initiation of an interval of major program activity
- Decision oriented maturation events
- Events need not be sequential
- Number of events should increase for lower levels

Phase I milestone criteria were provided in section 3.2.

#### **4.5.2.2 Process IMP**

The Process IMP is used to describe the technical, management, systems engineering, and business processes the offeror plans to apply to the UCAV ATD program. The Process IMP will fulfill the role of functional plans (QA, Configuration, etc.) and will be an essential part of the Agreement. The format should be limited to 5 pages and address:

- Statement of Objectives
- References - The offeror may propose his existing internal procedures and systems
- Approach - This section should describe what the offeror will do, how the offeror will interface with DARPA and the USAF and how they will meet the objectives of the program

#### **4.5.3 Attachment 2: UCAV Operational System Concept (OSC)**

The offeror's OSC will serve as a point of departure for all subsequent Phase I design and CONOPS trade studies. For the development of the OSC the offeror shall use the System Capability, Mission Description, Mission Scenario and Threat Description documents, provided in Appendixes A and B as guidance to bound the design space. The offeror's OSC description shall conform to the single, common program numbering system outlined in their TDD.

#### **4.6 Integrated Master Schedule (IMS)**

The IMS should outline the detailed tasks and the amount of time expressed in calendar schedules necessary to achieve the milestones and significant functional accomplishments in Phase I. It is a tiered scheduling system corresponding to the UCAV ATD work outline. The first iteration of the IMS should be to level 3 of the offeror's TDD or lower as determined by the offeror. Definitions and characteristics of the key elements of the IMS are given below.

Detailed Tasks: Detailed work effort to be completed in support of a specific significant milestone or functional accomplishment.

Calendar Schedule: Detailed schedule (dates) of the period of performance for each work effort.

An initial IMS shall be delivered with the Phase I proposal.

#### **4.7 Cost Response**

The cost response should be in the offeror's format. Certified cost or pricing data is not required. However, in order for the Government to determine the reasonableness, realism and completeness of your cost proposal, the following data must be provided for each team member and in a cumulative summary:

Labor: Total labor includes direct labor and all indirect expenses associated with labor, to be used in the UCAV ATD Phase I period of performance. Provide a breakdown of labor and rates for each category of personnel to be used on this project.

Direct Materials: Total direct material that will be acquired and/or consumed in the UCAV ATD Phase I period of performance. Limit this information to only major items of material and how the estimated expense was derived. For this agreement a major item exceeds \$250,000.

Subcontracts: Describe major efforts to be subcontracted, the source, estimated cost and the basis for this estimate. For this agreement a major effort exceeds \$500,000.

Travel: Total proposed travel expenditures relating to the UCAV ATD Phase I period of performance. Limit this information to the number of trips, and purpose of each cost.

Other Costs: Any direct costs not included above. List the item, the estimated cost, and basis for the estimate.

Remember the cost proposal should tell the story of how and why you are planning to complete your proposed TDD. Activities such as demonstrations required to reduce the various technical risks should be identified in the TDD and reflected in the cost proposal.

The offeror should provide a total estimated price for the major IR&D activities associated with the program. The offeror should state whether each program is a dedicated IR&D or if it is being pursued to benefit other programs as well.



## 4.8 Classified Annex

The UCAV ATD has a SECRET collateral level mission description and an acknowledged SAR component. The classified annex provides the offeror with an opportunity to describe the details of their proposal that require collateral and SAR control. While the government anticipates Sensitive Compartmented Information (SCI) information will be required during Phase I, that level of information is not required in the proposal. Teams are required to contact the DARPA Deputy Director of Security and Intelligence for complete instructions prior to submitting any classified information.

## 4.9 Administrative Instructions

### 4.9.1 Page and Print Information

The Solicitation Response should be submitted in standard three-ring, loose leaf binders with individual pages unbound and printed single sided to facilitate page changes. The response shall not exceed 150 pages total, including attachments and the classified annex. Indexes, cross reference tables, and tabs will not be included in the page count. Page count will be based on the offeror's hardcopy submission. Six copies shall be provided. The suggested page limits for each section are as follows:

1) Executive Summary	5 pages
2) Technical Approach and Substantiation	35 pages
3) Proposed Agreement with Attachments	65 pages
4) Integrated Master Schedule	5 pages
5) Cost Response	10 pages
6) Classified Annex	30 pages

Authorized representatives of the offeror must sign proposal volumes.

Each page should be printed on an 8-1/2" x 11" sheet using Times New Roman 12-point font. Graphics should not include text in smaller than 8-point font. Fold out pages will be counted as multiple pages. Pages should be marked **SOURCE SELECTION SENSITIVE**.

Teams are required to submit their proposal in Microsoft Office 97 compatible electronic format. Documents containing imported graphics (drawings, charts, photos, etc.) should be accompanied by the originally imported graphics files. Acceptable media includes 3.5" diskettes, 100MB ZIP cartridges or CD-ROM. Electronic copies of the SAR annex shall be submitted separately in accordance with instructions in Section 4.8.

### 4.9.2 Response Delivery Information

All responses must be received on or before 31 March 98 at 4:00 PM Eastern Standard Time. Late responses will not be accepted.

#### 4.9.2.1 Unclassified Information

The unclassified portion of the offeror's proposal shall be mailed or hand carried to:

Defense Advanced Research Projects Agency (DARPA)  
Unmanned Combat Air Vehicle Program  
3701 North Fairfax Drive  
Arlington, VA 22203-1714  
Attn: Contracts Management Office  
Solicitation Number: MDA972-98-R-0003

Responses and response modifications (which will only be accepted prior to the deadline for receipt of response) shall be submitted in sealed envelopes or packages to the address shown above and marked with the following information on the outer wrapping:

Offeror's name and return address  
The response receipt address above  
Solicitation Number: MDA972-98-R-0003  
Hour and due date:

#### **4.9.2.2 Classified Information**

The proposal's classified annex should be submitted through the DARPA Deputy Director of Security and Intelligence using the appropriate procedures.

#### **4.9.3 Changes to the Model Agreement**

The offeror can propose any changes, additions, or deletions to the Model Agreement that should be considered during Agreement negotiations. Fully explain the rationale for the changes made in an addendum to the Agreement. Rationale located in other areas of the solicitation response may be cross-referenced. It is the governments' intent to begin negotiating the Phase I agreements as soon as the final solicitation package is released.

#### **4.9.4 Regulations Governing Objections to Solicitation and Award**

Any objections to the terms of this solicitation or to the conduct of receipt, evaluation or award of agreements must be presented in writing within ten calendar days of (1) the release of this solicitation, or (2) the date the objector knows or should have known the basis for its objection. Objections should be provided in letter format, clearly stating that it is an objection to this solicitation or to the conduct of evaluation or award of an agreement, and providing a clearly detailed factual statement of the basis for objection. Failure to comply with these directions is a basis for summary dismissal of the objection. Mail objections to the address listed in the proposal delivery information.

## **5.0 Evaluation Criteria**

### **5.1 Introduction**

DARPA will award multiple Agreements for Phase I of the UCAV ATD program and anticipates the award of a single Phase II Agreement under a separate solicitation based upon Phase I results. The selection will be accomplished based on a subjective evaluation of proposals as described in this section of the solicitation. There are three specific areas of evaluation that will be used: Product Capability and Technical Approach, Management Process and Tools, and Cost. Each offeror's proposal will receive an integrated evaluation by a single multi-functional team. The government reserves the right to award without discussions.

### **5.2 Basis for Phase I Award**

Successful Phase I proposals will incorporate a balanced consideration of all three evaluation areas and provide best value to the government.

#### **5.2.1 Product Capability and Technical Approach**

The offeror's Operational System Concept (OSC), Trade Study and Analysis Plan, UDS Design Plan, and Risk Mitigation Plan (RMP) will be evaluated to determine how well they satisfy the objectives of the Systems Capability Document (SCD), Mission Description Document (MDD), and the UCAV ATD as a whole. The following sub-factors and criteria will be used to perform the technical evaluation.

##### **5.2.1.1 Operational System Concept**

- 1) To what extent does the offeror's concept creatively integrate the latest advances across a broad suite of component technologies, lean and agile manufacturing methods, supportability concepts, innovative tactics, and CONOPS?
- 2) Has the offeror addressed all aspects of a post 2010 UCAV system defined in the SCD?
- 3) Has the offeror addressed the integration of the UCAV system into the post 2010 force structure and global C4I Architecture?
- 4) Has the offeror addressed the ability of the UCAV system to be globally deployable?
- 5) Has the offeror addressed UCAV integrity consistent with safe operations over populated areas and in controlled air space?
- 6) Has the offeror presented a good understanding and sound approach to designing and integrating the air vehicle and mission control station?

- 7) Has the offeror demonstrated a focus on affordability in its air vehicle, mission control station, and supportability concept?
- 8) Has the offeror proposed a concept that is an acceptable point of departure for trade studies to effectively and affordably meet the objectives of the MDD and SCD?

#### **5.2.1.2 Trade Study and Analysis Plan**

- 1) Has the offeror proposed a plan to thoroughly evaluate the design space and determine an optimal design for a post 2010 UCAV weapon system that effectively and affordably meets the objectives of the MDD and SCD?
- 2) Has the offeror shown an understanding of the government provided mission scenarios and their utilization in establishing major performance goals and focusing design trade-off analyses?
- 3) Has the offeror proposed the exploration of innovative CONOPS to maximize effectiveness and affordability?
- 4) Has the offeror proposed a plan that uses sound systems engineering practices to judiciously exploit the design freedom enabled by removing the pilot from the cockpit?
- 5) Has the offeror demonstrated an understanding of affordability principles and how they should be applied in weapon system development?
- 6) To what extent has the offeror identified an appropriate life cycle cost model?

#### **5.2.1.3 UDS Design Plan:**

- 1) Has the offeror presented a design methodology, which will allow the UCAV Demonstrator System (UDS) to validate the critical technologies for, and provide a direct legacy, to, their UOS design?
- 2) To what extent does the offeror's proposed plan describe a robust process and suitable metrics for selecting the critical technologies?
- 3) Has the offeror demonstrated an understanding of affordability principles and how they should be applied in technology demonstrator development?

#### **5.2.1.4 Risk Mitigation Plan:**

- 1) Has the offeror proposed a plan that identifies and proposes to reduce areas of high technological risk throughout Phase I?
- 2) To what extent does the offeror's proposed plan take advantage of on-going government and industry research and development activities?
- 3) To what extent do the offeror's proposed risk mitigation activities produce non-proprietary results?

#### **5.2.2 Management Process and Tools.**

The offeror's management and system engineering processes will be evaluated to ensure that overall sound methodologies that represent good management practices are used to complete all the Phase I activities described in their TDD, IMP, and IMS. Streamlined and innovative business, teaming, and technical management practices are desired. The sub-factors and criteria which will be considered in this evaluation are listed below and are not in priority order:

#### **5.2.2.1 Management Plan**

- 1) To what extent has the offeror described an organizational structure that facilitates the innovation needed to accomplish the tasks in the UCAV ATD program? Has the offeror proposed adequate organizations which can coordinate large efforts and assert effective management control and supervision of personnel (including internal and external team members, if any) to ensure quality assurance of deliverables for this effort?
- 2) Has the offeror identified a qualified and experienced program manager and chief engineer?
- 3) Has the offeror described a systems engineering process compatible with MIL-STD 499B?
- 4) Has the offeror addressed their team's capability to perform work at the appropriate security classification levels, up to and including TOP SECRET/SPECIAL ACCESS REQUIRED/SCI?
- 5) To what extent does the offeror's Integrated Master Plan (IMP) define the efforts that must be accomplished to meet the Phase I statement of objectives?
- 6) Does the offeror's Integrated Master Schedule (IMS) depict a realistic, time-phased plan to achieve the goals of the IMP and Task Description Document (TDD)?
- 7) Does the offeror clearly identify the Technical Performance Measures and selected tools efficiency in tracking technical accomplishments?
- 8) Does the proposed tracking system permit sufficient and timely Government visibility to gauge the accomplishments of the program objectives?
- 9) To what extent has the offeror taken advantage of the management flexibility provided by an 845 agreement?
- 10) Does the offeror's proposal demonstrate top team management commitment?
- 11) Has the offeror identified a formal software engineering process?

#### **5.2.2.2 Facilities Capability**

- 1) Has the offeror addressed their modeling and simulation capabilities, from the engineering through the campaign levels, to perform system requirements analyses, vehicle design trades, CONOPS assessment, C4I implementations, system effectiveness and life cycle cost?

- 2) Has the offeror addressed their capability to fabricate and test scaled models and other hardware components to support proposed risk reduction activities?
- 3) Has the offeror addressed their capability to fabricate, integrate and ground and flight-test both the UDS air vehicle and mission control station?
- 4) Has the offeror addressed their capability to support program security requirements? Has the offeror presented adequate working space that adheres to SAR and SCI requirements?

### 5.2.3 Cost.

This evaluation factor will focus on the cost realism, reasonableness and cost benefit of the proposed program to achieving the complete set of UCAV ATD goals and objectives. The criteria which will be considered in this evaluation are listed below and are not in priority order:

- 1) To what extent is the offeror's cost proposal based on realistic man-hour estimates for performing the efforts of the UCAV ATD Solicitation? Is every task described in the UCAV ATD Solicitation included in the cost estimate?
- 2) To what extent are the offeror's rates for labor and other rates/charges reasonable and fair? Are they within reasonable limits? Have the offeror's rates taken into account special security requirements for personnel, facilities, and control of information that may be part of the proposed program?
- 3) Has the offeror provided a fair and reasonable estimate for the material and supplies required to develop, fabricate, and test risk reduction hardware?
- 4) Has the offeror allotted the appropriate and reasonable amount of team member support? If external team members are identified in the offeror's proposal, are the estimates for their tasks appropriate, realistic, and fair?
- 5) Has the offeror estimated the appropriate amount for Other Direct Charges (ODC)? Are the offeror's travel estimates realistic and are the rates cited within allowable government per diem rates?

### 5.3 Basis for Phase II Award.

Prior to Phase II, each Phase I contractor will be provided updated evaluation criteria defining the basis for award. Each contractor will be required to submit a Phase II proposal. The selection will be accomplished based on a subjective evaluation of proposals in the areas of Product Capability and Technical Approach, Management Process and Tools, and Cost with heavy emphasis placed on results and lessons learned from Phase I. A partial list of significant criteria which will be considered in this evaluation are listed below, and are not in priority order:

- 1) To what extent does the offeror's UOS demonstrate the potential for a post 2010 UCAV weapon system to effectively and affordably meet the objectives of the MDD and SCD?
- 2) To what extent does the offeror's UDS meet the specific technical objectives of the UCAV ATD program and provide a direct legacy to the UOS?

- 3) To what extent does the offeror's UTP address all the additional risk reduction, technology maturation, and operational evaluation activities which are outside the scope of the ATD program, but must be conducted prior to entering into an acquisition program at the EMD phase?
- 4) To what extent does the offeror's Life Cycle Cost analysis demonstrate a concept that can significantly reduce the cost of performing the SEAD/Strike mission?
- 5) To what extent has the offeror's Phase I risk reduction activities demonstrated a high probability of successful demonstration of the UCAV ATD goals and objectives?
- 6) To what extent does the offeror's software development, integration, and review process mitigate the risk of cost overruns?
- 7) To what extent does the offeror's cost proposal demonstrate the realism and reasonableness of the government obtaining the UCAV ATD objectives within the funding available to the program?
- 8) To what extent did the offeror's Phase I performance demonstrate their ability to plan and execute a rigorous system engineering process?

**6.0 Model Agreement**

**AGREEMENT**

**BETWEEN**

(INSERT NAME AND ADDRESS)

**AND**

**THE DEFENSE ADVANCED RESEARCH PROJECTS AGENCY  
3701 NORTH FAIRFAX DRIVE  
ARLINGTON, VA 22203-1714**

**CONCERNING**

(INSERT Proposal Title)

Agreement No.: MDA972-98-R-0003

DARPA Order No.:

Total Estimated Government Funding of the Phase I Agreement: \$

Funds Obligated: \$

Authority: 10 U.S.C. 2358 and 10 U.S.C. 2371 and Section 845 of the 1994 National Defense Authorization Act.

Line of Appropriation: AA

This Agreement is entered into between the United States of America, hereinafter called the Government, represented by The Defense Advanced Research Projects Agency (DARPA), and the (INSERT NAME) pursuant to and under U.S. Federal law.

FOR (INSERT CONTRACTOR NAME)      FOR THE UNITED STATES OF  
AMERICA THE DEFENSE ADVANCED  
RESEARCH PROJECTS AGENCY

(Signature)

(Signature)

(Name, Title)

(Date)

(Name, Title)

(Date)



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## **ARTICLE I: SCOPE OF THE AGREEMENT**

This article should state your vision for the Phase I of the joint DARPA/USAF Unmanned Combat Air Vehicle (UCAV) Advanced Technology Demonstration (ATD) Program and describe how your proposed program satisfies the statement of objectives. This article should summarize the scope of the work you are committing to (as described in detail in Article III, Task Description Document) by entering into this Agreement.

In addition, this article should discuss the way you will interact with the DARPA/USAF program team. Suggested wording (paragraphs used in other DARPA Agreements) for your consideration follows:

"DARPA/USAF will have continuous involvement with the Contractor. DARPA/USAF will obtain access to program results and certain rights to data and patents pursuant to Articles VIII and IX. DARPA/USAF and the Contractor are bound to each other by a duty of good faith and best effort in achieving the program objectives."

"This Agreement is an 'other transaction' pursuant to 10 U.S.C. 2358 and 10 U.S.C. 2371 and section 845 of the 1994 National Defense Authorization Act. The Parties agree that the principal purpose of this Agreement is to stimulate the Contractor to provide best efforts in development even though the acquisition of property or services for the direct benefit or use of the Government is present. The Federal Acquisition Regulation (FAR) and Department of Defense FAR Supplement (DFARS) apply only as specifically referenced herein. This Agreement is not intended to be, nor shall it be construed as, by implication or otherwise, a partnership, a corporation, or other business organization."

Terms such as "Contractor", "parties", "program", etc. should also be defined in this article. Should "Contractor" be a team, alliance, partnership or other arrangement, this article must reflect these provisions and specifically document the relationship between DARPA/USAF and the "unique" Contractor arrangement.

## **ARTICLE II: TERM**

### **A. The Term of this Agreement**

This Agreement commences upon the date of the last signature hereon and continues for the duration of Phases I through II of the UCAV ATD Program. This Agreement will be updated at various points to provide for downselection and phase transition. This Agreement ends at any downselect decision point at which the Contractor is unsuccessful.

**B. Termination Provisions**

Subject to a reasonable determination that the project will not produce beneficial results commensurate with the expenditure of resources, the Government may terminate this Agreement by written notice to the other Party, provided that such written notice is preceded by consultation between the Parties. In the event of a termination of the Agreement, the Government shall have paid-up Government purpose license rights to all data developed and delivered under this Agreement. The Government and the Contractor will negotiate in good faith an equitable reimbursement for work performed toward the accomplishment of Payable Milestones at the time of Government termination. Failure of the Parties to agree to an equitable adjustment will be resolved pursuant to Article VII.

**ARTICLE III: TASK DESCRIPTION DOCUMENT (TDD)**

The offeror will submit a TDD in accordance with the guidance provided in the section four of this solicitation.

**ARTICLE IV: PAYABLE EVENT SCHEDULE**

**A. Payment Schedule**

The Contractor shall be paid for performing the work required by Article III in accordance with the amounts and schedule set forth below. Milestone content, locations, and exit criteria are described in section 3.2. Both the Schedule of Payments and the Funding Schedule set forth below may be revised or modified in accordance with paragraph C.

**B. Schedule of Payments and Payable Milestones**

**Phase I:** Each Phase I contractor will receive \$250K upon agreement award.

MS	Payment	Schedule
1	\$0.8M	2 months after award
2	\$1.0M	4.5 months after award
3	\$1.0M	7 months after award
4	\$0.75M	9 months after award
5	\$0.2M	10 months after award

**Phase II:** While the details will be negotiated prior to Phase II award, it is anticipated that the Phase II payment schedule will be based on cost reimbursement plus an incentive fee at specified milestones.

### C. Modifications

1. At any time during the term of the Agreement, progress or results may indicate that a change in the TDD and/or the Payable Milestones, would be beneficial to program objectives. Recommendations for modifications, including justifications to support any changes to the TDD and/or the Payable Milestones, will be documented in a letter and submitted by the Contractor to the DARPA Program Manager with a copy to the DARPA Agreements Administrator. This letter will detail the technical, chronological, and financial impact of the proposed modification to the research program. Any subsequent modification is subject to mutual agreement. The Government is not obligated to pay for additional or revised Payable Milestones until the Payable Milestones Schedule is formally revised by the DARPA Agreements Administrator and made part of this Agreement.
2. The DARPA Program Manager shall be responsible for the review and verification of any recommendations to revise or otherwise modify the Agreement TDD, Schedule of Payments and Payable Milestones, or other proposed changes to the terms and conditions of this Agreement.
3. For minor or administrative Agreement modifications (e.g., changes in the paying office or appropriation data, changes to Government or Contractor personnel identified in the Agreement, etc.) no signature is required by the Contractor.
4. The Government will be responsible for effecting all modifications to this agreement.

### **ARTICLE V: AGREEMENT ADMINISTRATION**

Administrative and contractual matters under this Agreement shall be referred to the following representatives of the parties:

**DARPA, Elaine Ely, Agreements Administrator, Tel: (703) 696-2411**

**CONTRACTOR:(INSERT NAME)(Contractor Administrator)(INSERT TELEPHONE NUMBER)**

Technical matters under this Agreement shall be referred to the following representatives:

**DARPA: Larry Birckelbaw, Program Manager, Tel: (703) 696-2362**

**USAF: Mike Leahy, Deputy Program Manager, Tel: (703) 696-2369**

**CONTRACTOR: (INSERT NAME) (INSERT TITLE) (INSERT TELEPHONE NUMBER)**

Each party may change its representatives named in this Article by written notification to the other party. The Government will effect the change as stated in item C.4 of article IV above.

## **ARTICLE VI: OBLIGATION AND PAYMENT**

(NOTE): The parties will negotiate payment methods for later phases prior to the start of performance for each phase. If the payment method agreed upon is a type of cost reimbursement, then we anticipate compliance with current Cost Accounting Standards (CAS) will be required. If the offeror's accounting system does not comply with CAS, the government will consider other payment approaches.)

### **A. Obligation**

The Government's liability to make payments to the Contractor is limited to only those funds obligated under this Agreement or by amendment to the Agreement. DARPA may obligate funds to the Agreement incrementally.

### **B. Payments**

1. Prior to the submission of invoices to DARPA by the Contractor Administrator, the Contractor shall have and maintain an accounting system which complies with Generally Accepted Accounting Principles (unless CAS applies), and with the requirements of this Agreement, and shall ensure that appropriate arrangements have been made for receiving, distributing and accounting for Federal funds.
2. The contractor shall document the accomplishments of each Payable Milestone by submitting or otherwise providing the Payable Milestones Report as required. The contractor shall submit an original and one (1) copy of all invoices to the Agreements Officer for payment approval. After written verification of the accomplishment of the Payable Milestone by the DARPA Program Manager, and approval by the Agreements Officer, the invoices will be forwarded to the payment office within fifteen (15) calendar days of receipt of the invoices at DARPA. Payment approval for the final Payable Milestone will be made after reconciliation. Payments will be made by Defense Accounting Office, DFAS, Attention: Vendor Pay, 8899 East 56th Street, Indianapolis, IN 46249-1325 within fifteen (15) calendar days of DARPA's transmittal. Subject to change only through written Agreement modification, payment shall be made to the address of the contract's Administrator set forth below.
3. Address of Payee: (INSERT NAME AND ADDRESS OF PAYEE)
4. Limitation of Funds: In no case shall the Government's financial liability exceed the amount obligated under this Agreement.
5. Financial Records and Reports: The Contractor's relevant financial records are subject to examination or audit on behalf of DARPA by the Government for a period not to exceed three (3) years after expiration of the term of this Agreement. The Contractors shall provide the

Agreements Administrator or designee direct access to sufficient records and information of the Contractor to ensure full accountability for all funding under this Agreement. Such audit, examination, or access shall be performed during business hours on business days upon prior written notice and shall be subject to the security requirements of the audited party.

## **ARTICLE VII: DISPUTES**

### **A. General**

Parties shall communicate with one another in good faith and in a timely and cooperative manner when raising issues under this Article.

### **B. Dispute Resolution Procedures**

1. Any disagreement, claim or dispute between the Government and the Contractor concerning questions of fact or law arising from or in connection with this Agreement, and, whether or not involving an alleged breach of this Agreement, may only be raised under this Article.
2. Whenever disputes, disagreements, or misunderstandings arise, the Parties shall attempt to resolve the issue(s) involved by discussion and mutual agreement as soon as practicable. In no event shall a dispute, disagreement or misunderstanding which arose more than three (3) months prior to the notification made under subparagraph B.3 of this article constitute the basis for relief under this article unless the Director of DARPA in the interests of justice waives this requirement.
3. Failing resolution by mutual Agreement, the aggrieved Party shall document the dispute, disagreement, or misunderstanding by notifying the other Party (through the DARPA Agreements Administrator or Contractor Administrator, as the case may be) in writing of the relevant facts, identify unresolved issues, and specify the clarification or remedy sought. Within five (5) working days after providing notice to the other Party, the aggrieved Party may, in writing, request a joint decision by the DARPA Deputy Director for Management and Representative of the Contractor ("Contractor Representative"). The other Party shall submit a written position on the matter(s) in dispute within thirty (30) calendar days after being notified that a decision has been requested. The Deputy Director for Management and the Contractor Representative shall conduct a review of the matter(s) in dispute and render a decision in writing within thirty (30) calendar days of receipt of such written position. Any such joint decision is final and binding unless a Party shall, within thirty (30) calendar days, request further review as provided in this Article.
4. Upon written request to the Director of DARPA, made within thirty (30) calendar days or upon unavailability of a joint decision under subparagraph B.3 above, the dispute shall be further reviewed. The Director of DARPA may elect to conduct this review personally or through a designee or jointly with a representative of the other Party who is a senior official of the Party. Following the review, the Director of DARPA or designee will resolve the issue(s) and notify

the Parties in writing. Such resolution is not subject to further administrative review and, to the extent permitted by law, shall be final and binding.

## **ARTICLE VIII: PATENT RIGHTS**

### **A. Definitions**

1. "Invention" means any invention or discovery that is or may be patentable or otherwise protectable under Title 35 of the United States Code.
2. "Made" when used in relation to any invention means the conception or first actual reduction to practice of such invention.
3. "Practical application" means to manufacture, in the case of a composition of product; to practice, in the case of a process or method, or to operate, in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is capable of being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.
4. "Subject invention" means any Contractor invention conceived or first actually reduced to practice in the performance of work under this Agreement.

### **B. Allocation of Principal Rights**

Unless the Contractor shall have notified DARPA (in accordance with subparagraph C.2 below) that the Contractor does not intend to retain title, the Contractor shall retain the entire right, title, and interest throughout the world to each subject invention consistent with the provisions of the Articles of Collaboration, this Article, and 35 U.S.C. § 202. With respect to any subject invention in which the Contractor retains title, DARPA shall have a non-exclusive, nontransferable, irrevocable, paid-up license to practice or have practiced on behalf of the United States the subject invention throughout the world. Notwithstanding the above, the Contractor may elect as defined in its Articles of Collaboration to provide full or partial rights that it has retained to Contractor or other parties.

### **C. Invention Disclosure, Election of Title, and Filing of Patent Application**

1. The Contractor shall disclose each subject invention to DARPA within four (4) months after the inventor discloses it in writing to his company personnel responsible for patent matters. The disclosure to DARPA shall be in the form of a written report and shall identify the Agreement under which the invention was made and the identity of the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological, or electrical characteristics of the invention. The disclosure shall also identify any publication, sale, or public use of the invention and whether a manuscript describing the invention has been

submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. The Contractor shall also submit to DARPA an annual listing of subject inventions.

2. If the Contractor determines that it does not intend to retain title to any such invention, the Contractor shall notify DARPA, in writing, within eight (8) months of disclosure to DARPA. However, in any case where publication, sale, or public use has initiated the one (1)-year statutory period wherein valid patent protection can still be obtained in the United States, the period for such notice may be shortened by DARPA to a date that is no more than sixty (60) calendar days prior to the end of the statutory period.
3. The Contractor shall file its initial patent application on a subject invention to which it elects to retain title within one (1) year after election of title or, if earlier, prior to the end of the statutory period wherein valid patent protection can be obtained in the United States after a publication, or sale, or public use. The Contractor may elect to file patent applications in additional countries (including the European Patent Office and the Patent Cooperation Treaty) within either ten (10) months of the corresponding initial patent application or six (6) months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications, where such filing has been prohibited by a Secrecy Order.
4. Requests for extension of the time for disclosure election, and filing under Article VII, paragraph C, may, at the discretion of DARPA, and after considering the position of the Contractor, be granted.

#### D. Conditions When the Government May Obtain Title

Upon DARPA's written request, the Contractor shall convey title to any subject invention to DARPA under any of the following conditions:

1. If the Contractor fails to disclose or elects not to retain title to the subject invention within the times specified in paragraph C of this Article; provided, that DARPA may only request title within sixty (60) calendar days after learning of the failure of the Contractor to disclose or elect within the specified times.
2. In those countries in which the Contractor fails to file patent applications within the times specified in paragraph C of this Article; provided, that if the Contractor has filed a patent application in a country after the times specified in paragraph C of this Article, but prior to its receipt of the written request by DARPA, the Contractor shall continue to retain title in that country; or
3. In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceedings on, a patent on a subject invention.

#### E. Minimum Rights to the Contractor and Protection of the Contractor's Right to File



1. The Contractor shall retain a non-exclusive, royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the Contractor fails to disclose the invention within the times specified in paragraph C of this Article. The Contractor license extends to the domestic (including Canada) subsidiaries and affiliates, if any, of the Contractor within the corporate structure of which the Contractor is a party and includes the right to grant licenses of the same scope to the extent that the Contractor was legally obligated to do so at the time the Agreement was awarded. The license is transferable only with the approval of DARPA, except when transferred to the successor of that part of the business to which the invention pertains. DARPA approval for license transfer shall not be unreasonably withheld.

2. The Contractor domestic license may be revoked or modified by DARPA to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted consistent with appropriate provisions at 37 CFR Part 404. This license shall not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of DARPA to the extent the Contractor, its licensees, or the subsidiaries or affiliates have failed to achieve practical application in that foreign country.

3. Before revocation or modification of the license, DARPA shall furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor shall be allowed thirty (30) calendar days (or such other time as may be authorized for good cause shown) after the notice to show cause why the license should not be revoked or modified.

#### F. Action to Protect the Government's Interest

1. The Contractor agrees to execute or to have executed and promptly deliver to DARPA all instruments necessary to (i) establish or confirm the rights the Government has throughout the world in those subject inventions to which the Contractor elects to retain title, and (ii) convey title to DARPA when requested under paragraph D of this Article and to enable the Government to obtain patent protection throughout the world in that subject invention.

2. The Contractor agrees to require, by written agreement, that employees of the Members of the Contractor, other than clerical and non-technical employees, agree to disclose promptly in writing, to personnel identified as responsible for the administration of patent matters and in a format acceptable to the Contractor, each subject invention made under this Agreement in order that the Contractor can comply with the disclosure provisions of paragraph C of this Article. The Contractor shall instruct employees, through employee agreements or other suitable educational programs, on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

3. The Contractor shall notify DARPA of any decisions not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceedings on a patent, in any country, not less than thirty (30) calendar days before the expiration of the response period required by the relevant patent office.

4. The Contractor shall include, within the specification of any United States patent application and any patent issuing thereon covering a subject invention, the following statement: "This invention was made with Government support under Agreement No. MDA972-9\*-3-00\*\* awarded by DARPA. The Government has certain rights in the invention."

#### G. Lower Tier Agreements

The Contractor shall include this Article, suitably modified, to identify the Parties, in all subcontracts or lower tier agreements, regardless of tier, for experimental, development, or research work.

#### H. Reporting on Utilization of Subject Inventions

The Contractor agrees to submit, during the term of the Agreement, an annual report on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the subcontractor(s), and such other data and information as the agency may reasonably specify. The Contractor also agrees to provide additional reports as may be requested by DARPA in connection with any march-in proceedings undertaken by DARPA in accordance with paragraph J of this Article. Consistent with 35 U.S.C. § 202(c)(5), DARPA agrees it shall not disclose such information to persons outside the Government without permission of the Contractor.

#### I. Preference for American Industry

Notwithstanding any other provision of this clause, the Contractor agrees that it shall not grant to any person the exclusive right to use or sell any subject invention in the United States or Canada unless such person agrees that any product embodying the subject invention or produced through the use of the subject invention shall be manufactured substantially in the United States or Canada. However, in individual cases, the requirements for such an agreement may be waived by DARPA upon a showing by the Contractor that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that, under the circumstances, domestic manufacture is not commercially feasible.

#### J. March-in Rights

The Contractor agrees that, with respect to any subject invention in which it has retained title, DARPA has the right to require the Contractor, an assignee, or exclusive licensee of a subject invention to grant a non-exclusive license to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Contractor, assignee, or exclusive licensee refuses such a request, DARPA has the right to grant such a license itself if DARPA determines that:

1. Such action is necessary because the Contractor or assignee has not taken effective steps, consistent with the intent of this Agreement, to achieve practical application of the subject invention;
2. Such action is necessary to alleviate health or safety needs that are not reasonably satisfied by the Contractor, assignee, or their licensees;
3. Such action is necessary to meet requirements for public use and such requirements are not reasonably satisfied by the Contractor, assignee, or licensees; or
4. Such action is necessary because the agreement required by paragraph (I) of this Article has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such Agreement.

## **ARTICLE IX: DATA RIGHTS**

### **A. Definitions**

“Data”, as used in this article, means recorded information, regardless of form or method of recording, which includes but is not limited to, technical data, software, trade secrets, and mask works. The term does not include financial, administrative, cost, pricing or management information and does not include subject inventions included under Article VIII.

### **B. Allocation of Principal Rights**

It is the Government’s intent to allow for innovation in processing, handling and ownership of data in the UCAV ATD program. In furtherance of this principle, the government does not intend to acquire any rights in data during Phase I of this agreement. Data developed under this agreement during Phase I and provided to the Government for evaluation purposes will be used solely to evaluate the efficacy and desirability of the CONOPS and technologies proposed for further development in a possible Phase II agreement.

The Government does not intend to acquire any rights in data developed outside of this agreement, for use in performance of work under Phase I of this agreement, except as may specifically be provided for in the Contracts under which that data was developed.

In Phase II of the UCAV ATD program, the government intends to acquire all data rights necessary for operation, maintenance, and system support of the UCAV Demonstrator System (UDS). As part of its Phase I proposal, the contractor will be required to propose a definition for “UDS operation, maintenance and system support.” If the Consortium is selected for a Phase II agreement, the Consortium agrees to negotiate rights to data prior to that Phase II award, including data that may have been developed, in full or in part, during the Phase I agreement, which is consistent with the Government’s Phase II data requirements and with the principles stated in this Article.

### C. Lower Tier Agreements

The Consortium shall include this Article, suitably modified to identify the Parties, in all subcontracts or lower tier Agreements, regardless of tier.

## **ARTICLE X: FOREIGN ACCESS TO TECHNOLOGY**

(NOTE: It is DARPA's intention to restrict this technology from flowing overseas without approval to ensure the economic and security issues have been resolved prior to any release. If the offerors desire proposed changes to this article they should explain the rationale completely.)

This Article shall remain in effect during the term of the Agreement and for five years thereafter.

### A. Definition

"Foreign Firm or Institution" means a firm or institution organized or existing under the laws of a country other than the United States, its territories, or possessions. The term includes, for purposes of this Agreement, any agency or instrumentality of a foreign government; and firms, institutions or business organizations that are owned or substantially controlled by foreign governments, firms, institutions, or individuals.

"Know-How" means all information including, but not limited to discoveries, formulas, materials, inventions, processes, ideas, approaches, concepts, techniques, methods, software, programs, documentation, procedures, firmware, hardware, technical data, specifications, devices, apparatus and machines.

"Technology" means discoveries, innovations, Know-How and inventions, whether patentable or not, including computer software, recognized under U.S. law as intellectual creations to which rights of ownership accrue including, but not limited to, patents, trade secrets, maskworks, and copyrights developed under this Agreement.

### B. General

The Parties agree that research findings and technology developments in (INSERT TYPE OF TECHNOLOGY) technology may constitute a significant enhancement to the national defense, and to the economic vitality of the United States. Accordingly, access to important technology developments under this Agreement by Foreign Firms or Institutions must be carefully controlled. The controls contemplated in this Article are in addition to, and are not intended to change or supersede, the provisions of the International Traffic in Arms Regulation (22 CFR pt. 121 et seq.), the DoD Industrial Security Regulation (DoD 5220.22-R) and the Department of Commerce Export Regulation (15 CFR pt. 770 et seq.)

### C. Restrictions on Sale or Transfer of Technology to Foreign Firms or Institutions

1. In order to promote the national security interests of the United States and to effectuate the policies that underlie the regulations cited above, the procedures stated in subparagraphs C.2, C.3, and C.4 below shall apply to any transfer of Technology. For purposes of this paragraph, a transfer includes a sale of the company, and sales or licensing of Technology. Transfers do not include:

- (a) sales of products or components, or
- (b) licenses of software or documentation related to sales of products or components, or
- (c) transfer to foreign subsidiaries of the Contractor for purposes related to this Agreement, or
- (d) transfer which provides access to Technology to a Foreign Firm or Institution which is an approved source of supply or source for the conduct of research under this Agreement provided that such transfer shall be limited to that necessary to allow the firm or Institution to perform its approved role under this Agreement.

2. The Contractor shall provide timely notice to the Government of any proposed transfers from the Contractor of technology developed with Government funding under this Agreement to Foreign Firms or Institutions. If the Government determines that the transfer may have adverse consequences to the national security interests of the United States, the Contractor, its vendors, and the Government shall jointly endeavor to find alternatives to the proposed transfer which obviate or mitigate potential adverse consequences of the transfer but which provide equivalent benefits to the Contractor.

3. In any event, the Contractor shall provide written notice to the DARPA Program Manager and Agreements Administrator of any proposed transfer to a foreign firm or institution at least sixty (60) calendar days prior to the proposed date of transfer. Such notice shall cite this Article and shall state specifically what is to be transferred and the general terms of the transfer. Within thirty (30) calendar days of receipt of the Contractor's written notification, the DARPA Agreements Administrator shall advise the Contractor whether it consents to the proposed transfer. In cases where the Government does not concur or sixty (60) calendar days after receipt and the Government provides no decision, the Contractor may utilize the procedures under Article VII, Disputes. No transfer shall take place until a decision is rendered.

4. Except as provided in subparagraph C.1 above and in the event the transfer of Technology to Foreign Firms or Institutions is approved by the Government, the Contractor shall (a) refund to the Government funds paid for the development of the Technology and (b) negotiate a license with the Government to the Technology under terms that are reasonable under the circumstances.

#### D. Lower Tier Agreements

The Contractor shall include this Article, suitably modified, in all subcontracts or lower tier Agreements, for experimental, developmental, or research work.

## **ARTICLE XI: CIVIL RIGHTS ACT**

This Agreement is subject to the requirements of Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. 2000-d) relating to nondiscrimination in employment.

## **ARTICLE XII: INSURANCE**

Contractor shall maintain the types of insurance listed in FAR 28.307-2(a), (b), and (c) with the minimum amounts of liability indicated, or commercial equivalent.

## **ARTICLE XIII: GOVERNMENT FURNISHED EQUIPMENT PROPERTY, INFORMATION FACILITIES AND SERVICES**

The following Government Equipment property, information facilities, and services shall be provided upon the written approval of the cognizant contracting officers:

(Offeror will list all desired GFE, GFP, GFI, GFF, and GFS.)

## **ARTICLE XIV: SECURITY**

This program shall be provided protection as required by the appropriate security requirements required by the DD Form 254 (Attachment 3; to be provided by DARPA). The highest level of classification involved in the performance of this Agreement is Top Secret/SAR. It is the government's position that the highest security classification of any item deliverable as a result of this Agreement is Top Secret/SAR. In order to develop certain technologies, it is anticipated that a Contractor may need capability to access and handle access to Sensitive Compartmented Information (SCI). This agreement is unclassified.

## **ARTICLE XV: SUBCONTRACTORS**

The Contractor is authorized to use best commercial practices under this Agreement. This authorization includes, but is not limited to, waiver from competitive bidding where appropriate and the relief from normal flow-down requirements to subcontractors where it impacts the UCAV/ATD Program.

## **ATTACHMENTS**

ATTACHMENT 1 INTEGRATED MASTER PLAN

ATTACHMENT 2 UCAV OPERATIONAL SYSTEM CONCEPT

ATTACHMENT 3 DD FORM 254 CONTRACT SECURITY  
CLASSIFICATION SPECIFICATION

## **7.0 DARPA Agreements Authority and Section 845 of the 1994 National Defense Authorization Act**

DARPA "Agreements authority" was enacted as section 251, Public Law 101-189, the FY 1990 National Defense Authorization Act (codified at 10 U.S.C. § 2371) and is currently found in part of 10 U.S.C. § 2371. Section 845 of the 1994 National Defense Authorizations Act allows DARPA, on a pilot basis to use non-procurement Agreements for purely military Research and Development and, prototype projects and technology demonstrations of hardware directly relevant to weapon systems.

The primary benefit of this authority is that DARPA can tailor the contracting process to each project rather than conforming to predetermined contracting rules. This authority should increase the efficiency of DARPA's limited resources. DARPA also hopes use of this authority will shorten development time for these projects and enhance affordability.

This Section 845 Authority allows DARPA to:

- 1) Use Agreements even if a procurement contract would be appropriate or feasible.
- 2) Execute projects with or without cost sharing.
- 3) Implement streamlined acquisition procedures (e.g., using Generally Accepted Accounting Practices in lieu of Government Cost Accounting Standards).
- 4) Focus on goals and objectives rather than acquisition regulations.

Commercial Agreement Participants benefit from:

- 1) Increased government flexibility in structuring these Agreements (e.g., flexibility on patent and intellectual property issues).
- 2) Being able to use commercial rather than government procedures for doing business.
- 3) Government funding with minimum government bureaucracy.

Both Groups Benefit in that:

- 1) Armed Services Procurement Act, CICA, FAR, DFARS, and all procurement system regulations are inapplicable.
- 2) Existing regulations, MILSPECS, directives may but need not be applied.



## APPENDIX A System Capability Document (SCD)

### 0.0 Unmanned Combat Air Vehicle System

This document describes the design and capabilities for a notional Unmanned Combat Air Vehicle (UCAV) Operational System (UOS) which effectively and affordably prosecutes SEAD/Strike missions as part of an integrated air campaign in the post 2010 timeframe. During the high threat, early phases of a campaign, the UCAV will penetrate enemy air defenses and provide preemptive and reactive SEAD and prosecute non-hardened high value targets within the adversary's infrastructure. Throughout the remainder of the campaign, the UCAV will provide continuous vigilance and an immediate lethal strike capability to effectively prosecute real-time and time critical targets and to maintain suppression of enemy IADs.

The UOS SCD is not intended to specify the design, but to provide government insight on the basic bounds to the solution space. The intent of the SCD is to provide guidance on WHAT the UOS should be, not HOW to achieve those objectives. There is no list of advanced technologies that must be included in your UOS. The offeror is encouraged to fully exploit innovative concepts and advanced technologies for radically reducing the acquisition and total life cycle cost of the UCAV system for all aspects of a UOS. The government envisions a UOS air vehicle with unit cost less than one-third of the Joint Strike Fighter, and reduction in total life cycle of 50-80% compared to a current tactical aircraft squadron.

The specifications in this appendix should serve as bounds for the UOS and are tradable except for the following:

- Non-expendable air vehicle
- Global deployment
- Operations within the force structure and C4I architecture projected for the post 2010 timeframe
- System integrity and reliability shall be consistent with safe and effective operations.

The UOS will be judged on its documented potential to effectively and affordably perform the SEAD/Strike mission. Only through a thorough exploration of the trade space can the offeror define a UOS that will form the basis of an ATD program that provides best value to the government.

The offeror's UOS design will focus the UCAV Demonstrator System (UDS) on maturing and demonstrating the critical technologies fundamental to the operational implementation of the UCAV vision. The government acknowledges that the UDS will not demonstrate all aspects and functions of the UOS, and is not meant to be a product prototype or provide a residual operational capability. We believe focusing on the SEAD/Strike mission will allow the UCAV ATD program to answer the fundamental technical questions for any UCAV application.

Properly balancing the trade-off between mission specific and generic UCAV technologies will be critical to the success of the UCAV ATD program.

This document follows the format of the Work Outline described in Section 4.1 and provides a minimum framework for describing the offeror's Operational System Concept (OSC). In many instances specific sub-levels do not contain a description of desired system capability but are defined as a placeholder for the OSC. The offeror is free to propose a completely different work outline. However, to allow for an equitable comparison of competing concepts the offeror shall ensure their work outline addresses all the program elements in this document.

## **1.0 Air Vehicle**

**1.1 Airframe Subsystem.** The UOS airframe design is not limited to current strike aircraft flight hour or man-rated constraints. Flight hour lifetimes should be selected consistent with the offeror's UCAV CONOPS and supportability concept. Advanced design methodologies that enable low cost manufacturing techniques should be fully explored. The two primary subsystem drivers are mission effectiveness and affordability.

**1.1.1 Flight Characteristics.** The UOS must have sufficient range and loiter capability to perform the missions described in Appendix B. It is desired that the UOS be capable of performing several missions as a means of achieving cost effectiveness. Due to its unique characteristics, it may be possible to combine roles and missions not normally viewed as complementary or compatible.

**1.1.2 Takeoff and Landing Capability.** The UOS should not require any unique basing requirements and should be able to operate from NATO standard 8,000 ft runways.

**1.1.3 Operating Environment.** The UOS must have a weapons delivery and targeting capability to effectively strike targets in adverse weather, day or night. The UOS must be able to operate under the same conditions (temperature, humidity, altitude, etc.) as other combat aircraft. The airframe design should have measures to minimize the effects of static electricity and lightning strikes. In order to operate with manned systems, external lighting must be compatible with Night Vision Devices.

**1.1.4 Air Worthiness.** Flight safety shall not be sacrificed to meet system capability. System integrity shall be consistent with Federal Aviation Administration (FAA), International Civil Aviation Organization (ICAO) and other international standards. The UOS should be capable of safe operation in worldwide deployments over populated areas and in controlled air space.

**1.1.5 Fuselage.** The fuselage design and manufacture should take full advantage of advanced design methodologies and low cost manufacturing techniques to exploit the advantages of non-man rated designs. It is desired to radically reduce production and support costs relative to the Joint Strike Fighter program goals.

**1.1.6 Wing.** The wing design and manufacture should take full advantage of advanced design methodologies and low cost manufacturing techniques to exploit the advantages of non-man rated designs. It is desired to radically reduce production and support costs relative to the Joint Strike Fighter program goals.

**1.1.7 Control Effectors.** It is desired that the control effectors provide enhanced survivability characteristics at a lower life cycle cost.

**1.1.8 Engine Nacelles, Inlet & Exhaust Ducts.** The UOS should represent the optimal combination of inlet(s), low observable materials, and thrust vectoring which meets the mission performance goals and maximizes affordability.

**1.1.9 Landing Gear.** It is desired to radically reduce production and support costs relative to the Joint Strike Fighter program goals..

**1.1.10 Airframe Mounted Systems.** It is desired to radically reduce production and support costs relative to the Joint Strike Fighter program or other combat capability that is equivalent to the offeror's UCAV concept.

**1.1.11 Radomes.** Radio Frequency surface structures for sensors and communications shall be compatible with mission requirements and support concepts.

**1.1.12 Apertures.** The UOS shall have low observable apertures consistent with mission requirements and support concepts.

**1.2 Propulsion.** The propulsion system should be designed to provide overall system performance consistent with mission performance goals. In addition, the propulsion system should be designed consistent with maintainability, long term storage, and deployability requirements. Propulsion subsystem components do not have to be man-rated. Life cycle contingency management issues such as propulsion maintenance and upgrades/changes during dormancy should be addressed.

**1.2.1 Engine.** The engine shall have performance and affordability features consistent with mission requirements and support concepts. To that end, existing core engines, are acceptable if cost/performance trades prove they are effective and can meet the long-term storage concept requirements.

**1.2.2 Nozzle.** The UOS shall have a nozzle consistent with mission requirements. It is desired to radically reduce production and support costs relative to the Joint Strike Fighter program goals.

**1.2.3 Engine Mounted Accessories.** It is desired to radically reduce production and support costs relative to the Joint Strike Fighter program goals.

**1.2.4 Power Management & Distribution.** It is desired to radically reduce production and support costs relative to the Joint Strike Fighter program goals. The UOS should take full advantage of advances in electric power management and distribution subsystems and maintenance free aircraft batteries.

**1.3 Vehicle Management System (VMS).** The on-board VMS must be compatible with the offeror's CONOPS and supportability concepts. It is desired that the VMS architecture is modular to the point that systems can be tested, replaced and/or changed while in operational status or dormancy without impact to the system. This VMS shall enable the variable control architecture consistent with the UCAV mission description, concept of operations and the combination on-board/off-board targeting architecture. It is desired that the VMS coordinate the activities of all avionics sub-systems and provide appropriate interfaces to the payload and weapons sub-systems. The VMS should allow both autonomous control of vehicle systems and interaction with the mission management system as described in Section 1.4 of this appendix.

**1.3.1 Flight Controls.** This function performs the actual mechanical operations of the vehicle to accomplish the mission and should be highly automated. This function continually implements the collision avoidance, terrain avoidance, and attack maneuvering to the accuracy required by the MMS (see section 1.4).

**1.3.2 Air Data System.** The UOS shall have low observable air data system consistent with mission requirements and support concepts.

**1.3.3 Navigation.** The navigation subsystem shall provide accurate navigation throughout the mission profile and be capable of dynamically responding to course changes during all phases of the mission profile. This subsystem shall be compliant with the Global Air Navigation System (GANS). The navigation subsystem should support the MMS operations described in Section 1.4 of this appendix.

**1.3.4 Integrated Operations/Identification Friend or Foe (IFF).** The UOS shall have the capability to operate in mixed manned/unmanned force packages. The UOS shall have a highly reliable IFF capability. It is desired that the UOS air vehicle support an on-board/off-board information exchange architecture that allows the mission control team to maintain the knowledge of friendly and hostile forces required to accomplish the mission.

**1.3.5 System Status.** It is desired that the avionics suite incorporate a system status architecture which allows autonomous on-board analysis, top level mission control station monitoring and in-depth mission control station analysis.

**1.4 Mission Management System (MMS).** The MMS should take full advantage of the information technology revolution. It is desired to make maximum use of on-board and off-board intelligent decision aids to minimize mission control team workload and enable graceful degradation of system functionality during emergency operations. At a minimum, the avionics suite should have the embedded intelligence to autonomously respond to dynamic real-time events such as pop-up threats and loss of data link. All lethal operations shall require prior

human authorization, but given prior consent the UOS should be capable of autonomous self-defense actions and engagement of pop-up threats. The MMS shall be controlled and configured through the mission control station as described in Section 2.0 of this appendix.

The MMS shall provide a primitive survival mode, capable of self-diagnosis and compensation. This will allow the UOS to respond to problems such as temporary data link loss or loss of on-board computer systems. Autonomous return to base routing shall be executed when mission options exceed pre-authorized parameters and self-diagnosed flight termination should be executed for catastrophic system failures. Even though the UOS will be capable of operating in adverse weather conditions, it is desired that the aircraft have the ability to avoid areas of heavy precipitation and thunderstorms.

**1.4.1 Targeting.** Combinations of on-board and off-board sensors should enable precise location of SEAD/Strike targets. The resultant target acquisition capability should be able to search, detect, track, identify, and prioritize multiple targets at tactically significant ranges to the accuracy required to cue and employ weapons in adverse weather, day or night. Integration of on board and/or off board systems shall provide positive, timely, and reliable identification of hostile, friendly, and neutral forces. The identification process shall provide accurate information in sufficient time to allow employment of associated weapons at ranges that ensure force effectiveness and eliminate fratricide.

**1.4.2 Flight Termination.** The UOS shall have a flight termination system for destruction of the vehicle from both the ground station and based upon on-board intelligent reasoning. This will prevent the aircraft from becoming a hazard or penetrating prohibited airspace in emergency situations such as non-recoverable losses of flight control. This system shall work in conjunction with autonomous return to base routing and the primitive survival mode.

**1.5 Communications.** All communications shall be robust and secure. It is desired to minimize bandwidth requirements consistent with mission effectiveness. The UOS must be compatible with the projected global command and control architecture in the post 2010 timeframe. Maximum use should be made of existing communications hardware and software consistent with an integrated system.

**1.5.1 Narrowband.** Narrowband communications should be consistent with the minimum set of functionality required to maintain mission operations over both LOS and SATCOM. These communications should be two-way with enough connectivity in each direction to assure safe flight and message acknowledgment.

**1.5.2 Wide Band Line of Sight.** Wideband line of sight (LOS) communications should enable full mission functionality.

**1.5.3 Wide Band Beyond Line of Sight** Wideband beyond line of sight communications should enable full mission functionality.

**1.5.4 Air Traffic Control (ATC).** The UOS shall be able to communicate with ATC under FAA, ICAO, and U.S. military control authorities in a manner that is transparent to the ATC authority.

**1.5.5 Antennae.** The UOS shall have low observable antennas consistent with mission requirements and support concepts.

**1.6 Payload.** It is desired to minimize payload requirements. Payload integration should be compatible with long term storage, easy upgrades, rapid turn-around, and minimized maintenance concepts. The UOS shall have an on-board recorder capable of recording aircraft system status, payload products, and mission execution

**1.7 Weapons.** It is desired to fully exploit the capabilities of emerging munitions technologies consistent with accomplishing the SEAD/Strike mission in the post 2010 timeframe. Maximum flexibility for internal and/or external weapons carriage should be considered in order to permit the integration of current and future weapons. The structural integrity of the airframe and suspension equipment should permit carriage and delivery of a wide range of weapons as well internal fuel tanks, practice munitions, and defensive countermeasures. Safe carriage, release, separation, and effects of planned weapons should be a principal concern when investigating payload options. The UOS should be capable of safe recovery with unexpended ordnance.

**1.7.1 Guidance.** The UOS weapons shall have guidance subsystems consistent with mission requirements and support concepts.

**1.7.2 Targeting.** The UOS weapons shall have targeting subsystems consistent with mission requirements and support concepts.

**1.7.3 Ordnance/Kill Mechanism.** The UOS shall employ ordnance consistent with mission requirements and support concepts.

**1.8 Survivability.** The UOS shall have survivability characteristics consistent with mission requirements and support concepts. A balanced approach to reduced vehicle signature and employment of on board advanced countermeasures is essential for affordable survivability. Primary consideration must be given to radio frequency (RF) and infra-red (IR) spectra from both surface-to-air and air-to-air threats. Additional guidance is provided under separate cover.

**1.8.1 RF Signature.** The UOS should fully exploit current and developing technologies, materials, and treatments in RF signature reduction. Low life cycle cost technologies, long term storage, logistics support, and maintenance requirements shall be considered as a driving signature design parameter. Signature reduction features shall be compatible with long term storage without degradation and/or special maintenance requirements.

**1.8.2 IR Signature.** The UOS should fully exploit current and developing technologies, materials, and treatments in IR signature reduction. Low life cycle cost technologies, long term storage, logistics support, and maintenance requirements shall be considered as a

driving signature design parameter. Signature reduction features shall be compatible with long term storage without degradation and/or special maintenance requirements.

**1.8.3 Self-Defense Systems.** The UOS should be capable of enhancing the survivability of the aircraft against anticipated threats in a balanced approach with signature reduction. This could include electronic support and counter measures, on-board jammers, expendables, towed decoy systems or other innovative methods for surviving enemy actions.

**1.8.4 Visual Signature.** Efforts should be made to reduce visual signatures to the maximum extent consistent with affordability constraints.

**1.8.5 Acoustic Signature.** The UOS design shall take into consideration the existence of acoustic tracking systems.

**1.8.6 Electronic Emission Control.** It is desired that the UOS eliminate, reduce, mask, or diffuse any or all electronic emissions to reduce the probability of detection, tracking, or engagement by a threat.

**1.8.7 System Redundancy.** The UOS should be designed to minimize the impact of and/or prevent single point failure of flight and mission critical items within the affordability constraints.

**1.8.8 Hardening and Protection.** It is desired that the UOS reduce vital system vulnerability to combat damage to the maximum extent possible consistent with affordability constraints. It is desired to protect against intrusive information warfare threats.

**1.8.9 Speed.** The UOS shall have performance consistent with mission requirements and support concepts.

**1.8.10 Maneuverability.** The UOS shall have instantaneous and sustained maneuverability consistent with mission requirements and support concepts.

**1.9 Software.** All aircraft segment software shall be developed and integrated using a rigorous formal design and validation process. It is desired that all software be object-orientated, portable, modular, and easy to maintain and modify.

**1.9.1 Computer Architecture.** Air vehicle computer architecture shall comply with the Joint Technical Architecture (JTA) and Technical Architecture Framework for Information Management (TAPIM).

**1.9.2 Software Architecture**

**1.10 Integration and test**

## 2.0 Mission Control Station

The mission control station shall serve as the focal point for UCAV integration into the existing C<sup>4</sup>I architecture. The mission control station should provide air vehicle mission planning and control, a human-system interface, all ground communications, and the infrastructure required to conduct all UCAV operations. The UOS control station shall be transportable and modular to the extent that all or portions of the mission control station can be land, sea, or air-based.

**2.1 Mission Planning & Control.** Mission planning and control should be a continuous and seamless function that begins with mission assignment and wing planning as a result of the Joint Forces Air Component Commander (JFACC) Air Tasking Order (ATO) and continues through mission execution with mission monitoring, control and replanning. The mission control station should automatically load and translate ATO information into the mission planning system. Mission planning and control shall be flexible and adaptable to react to the dynamics of operations, conflict level, and communications capacity.

**2.1.2 Launch & Recovery.** As a minimum, the launch and recovery function shall consist of mission upload, necessary ground checks, engine start, taxi, take-off, approach, landing, taxi back and mission download. The UOS shall be able to respond to ATC instructions for terminal coordination and safety. It is an objective to have the UOS routinely operate from airfields with manned aircraft present and operating. The mission control station should be able to redirect and recover the UOS from alternative landing sites.

**2.1.3 Flight Planning.** The mission control station should have the capability to autonomously calculate an optimal flight plan based on an operator approved constraint set and provide the flexibility to update the current flight plan in real-time.

**2.1.4 Systems Management.** The mission control station should have the capability to monitor the health of the air vehicles and MCS as well as the status of mission parameters.

**2.1.5 Weapon Authorization.** Combinations of on-board and off-board sensors shall provide integrated targeting information to the mission control team consistent with weapons authorization for manned platforms. The mission control station should provide the mission control team with authority to dynamically re-target the UCAV weapon system all the way to the point of weapon release/employment.

**2.2 Human-System Interface.** The effectiveness of the UCAV system will depend in large part on the human-system interface. It should be designed using human factors principles to provide the mission control team the information and control methodology required to efficiently operate multiple UCAVs in a dynamic battlespace.

**2.2.1 Situation Awareness.** The mission control station should take the information from a combination of on-board and off-board assets to efficiently present the mission control team an understanding of the dynamic battlespace and operational environment to the



extent required to effectively conduct the post 2010 SEAD/Strike mission. An objective is to provide the mission control team with a level of situation awareness unavailable by either off-board or on-board assets alone. The control station should provide the appropriate combination of system, tactical, operational, and strategic levels of information. Individual workstations should be reconfigurable for mission segment and/or team member preferences. An extensive amount of information will be available and human factors display design principles should be applied to present the maximum amount of relevant intelligence in an intuitive format which permits accurate and timely team and individual decisions.

**2.2.2 Mission Control Station Configuration.** The station configuration should allocate mission functions within the team members to maximize the ratio of air vehicles to mission control station personnel. The focus of operator activity should be on executing the mission instead of physically flying the vehicle. Interaction with the mission control elements should be intuitive and re-configurable to minimize recurring actions. Control allocation should be user-friendly with the capability to store customized allocation configurations. Work task execution should be storable in a manner to minimize execution across multiple UCAVs.

**2.3 Human-Computer Function Allocation.** The mission control station shall support variable levels of autonomy and provide a capability for dynamic human-computer function allocation. It is desired to provide the mission control team with the ability to reallocate control of tasks among the vehicle, control station and one another based on flight conditions and changing mission requirements at any time during the mission

**2.4 Decision Aids.** The mission control station should incorporate intelligent agents and decision aids executing in parallel with UCAV operations to monitor, assess, and recommend actions for effective mission accomplishment. The objective is to maximize operator productivity and enhance mission effectiveness.

**2.5 Communications.** The mission control station shall support communications between the mission control segment and the air vehicle, communications within the mission control segment and integration into the evolving C<sup>4</sup>I infrastructure. Maximum use should be made of standards consistent with a need to integrate into the proposed communications architecture and CONOPs. All communications shall be robust and secure.

**2.5.1 Vehicle.** The mission control station shall support the vehicle communications architecture discussed in Section 1.5 of this appendix.

**2.5.2 Internal.** Internal communications networks shall support real-time dissemination and exchange of information as needed among elements internal to the mission control station.

**2.5.3 External.** The mission control station should have modular interfaces with the emerging C<sup>4</sup>I infrastructure to exploit archived and real-time data sources. The mission

control station shall have an interface with the JFACC via the command and control network for air tasking orders, real-time mission updates, and target folders. The mission control station should provide team members with real-time situation awareness, tasking, targeting, and threat identification through real time intelligence sources or operational links with the projected 2010 C4I infrastructure. In addition, the UCAV or MCS should be capable of real time reporting back to the JFACC and into the intelligence networks. This capability should leverage the existing infrastructure to the maximum extent possible.

**2.6 Infrastructure.** The MCS infrastructure shall be consistent with the offeror's CONOPS and supportability concept.

**2.7 Software.** All mission control segment software shall be developed and integrated using a rigorous formal design and validation process. It is desired that all software be object-orientated, portable, modular, and easy to maintain and modify. It is desired for the mission control station to maximize the use of open system standards for future growth and ease of software augmentation.

**2.7.1 Computer Architecture.** The MCS computer architecture shall comply with the Joint Technical Architecture (JTA) and Technical Architecture Framework for Information Management (TAPIM).

**2.7.2 Software Architecture**

**2.8 Integration and test**

**3.0 Supportability**

The UOS shall provide significant reductions in operations and support costs while effectively performing the SEAD/Strike mission. The logistics/support and infrastructure components should be designed in accordance with the flexible basing, availability, rapid turn-around and sortie generation rate required to support the UCAV CONOPS. This sortie generation rate is anticipated to be 3-4 sustained with a surge to 4-5 per day. Operational availability should be greater than 90%.

**3.1 Reliability & Maintainability.** The UOS shall be reliable, easily maintained in all operational environments and fault tolerant to achieve availability and sortie generation requirements. On-board and off-board diagnostics should be integrated. Particular attention should be placed on high engine reliability. It is desired to avoid the added cost and maintenance burden of removing/replacing misdiagnosed components.

**3.2 Maintenance Planning.** It is desired to fully exploit commercial and innovative maintenance and support concepts such as prognostics, autonomous inspection, BIT, lean logistics, just in time replenishment, commercial leasing, and system redundancy to minimize life cycle costs. The objective is to enable rapid turnaround and limit manpower requirements using a condition based maintenance concept where components are repaired/sustained based on

condition rather than flight hours flown. It is desired to significantly reduce intermediate and depot level maintenance requirements. On-equipment maintenance should be kept at an absolute minimum and would encompass all actions required to launch and recover the air vehicle, maintain operations in the field or repair all mission control system hardware and software.

**3.3 Deployability (Pack, Handle, Store & Transport).** It is desired that a UCAV force package be globally deployed and operational within 24 hours of tasking utilizing the same air transportation and refueling architecture available to post 2010 force packages. UCAV deployment should be consistent with, but not limited to, the force structure deployment set forth in the SWA MSFD for MTW's.

**3.4 Support Equipment.** The support equipment should leverage the existing support infrastructure to minimize life cycle cost. Adapters and interface devices should be included in the basic system design to allow use of the common support equipment available at deployed locations rather than developing unique support equipment. Support equipment, when required, should include all software and hardware required to set up, support and maintain the system. Common test and support equipment should be used where feasible.

**3.5 Long Term Storage.** The UOS should be capable of long-term system storage in excess of 1 year between operational exercises. Contact and hands-on maintenance should be kept at an absolute minimum to reduce manpower requirements. However, some means of monitoring air vehicle status is desirable. Removal, integration, and checkout from storage should be consistent with deployability requirements. Any unique facility and facility support requirements shall be identified.

**3.6 Manpower, Personnel, & Training.** It is desired to minimize manpower and personnel requirements consistent with the offeror's UCAV employment, maintenance and long term storage concepts. The training concept for maintenance and support personnel should be consistent with the requirements for limited manpower during peacetime and full manpower during combat operations. A sufficient set of personnel shall be fully trained and certified at all times. The offeror shall also propose a concept for bringing reserve personnel up to combat proficiency levels.

Training of operators should replicate mission conditions. The operator should not be able to tell the difference between training and combat operations. It is desired to optimize the skill mix and training level for the mission control team.

**3.7 Supply Support.** Spare and repair parts should meet all original equipment specifications. Pack up kits or Mission Spare Kits (MSKs) should support the system for 30 days of continuous operations and should fit within deployability requirements.

**3.8 Safety & Health Hazards.** All UCAV operations including maintenance, checkout, storage and flight operations should comply with all applicable safety and health regulations.

**4.0 Systems Engineering/Program Management.**

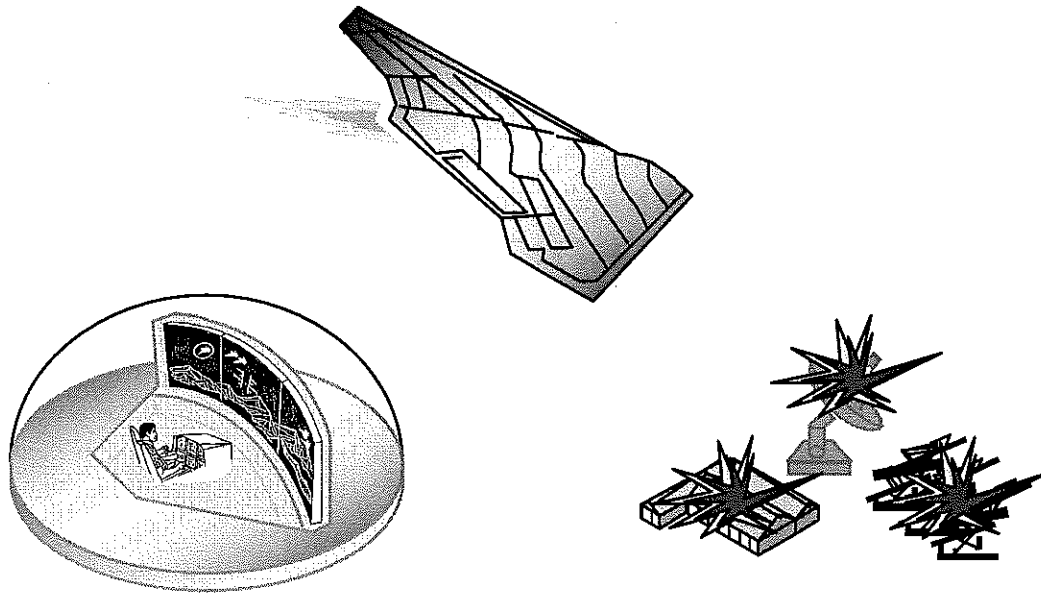
## 5.0 System Test.



**UNMANNED COMBAT AIR VEHICLE  
ADVANCED TECHNOLOGY DEMONSTRATION  
(UCAV ATD)**

**PHASE II**

**SELECTION PROCESS DOCUMENT  
("SOLICITATION")  
MDA972-99-R-0001**



**January 15, 1998**

**Defense Advanced Research Projects Agency  
DARPA/TTO  
3701 N. Fairfax Drive  
Arlington, VA 22203-1714**

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**UNMANNED COMBAT AIR VEHICLE  
ADVANCED TECHNOLOGY DEMONSTRATION  
(UCAV ATD)**

**PHASE II**

**FINAL DRAFT  
SELECTION PROCESS DOCUMENT  
("SOLICITATION")**

**January 6, 1998**

**Defense Advanced Research Projects Agency  
DARPA/TTO  
3701 N. Fairfax Drive  
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## 1.0 Introduction

The Defense Advanced Research Projects Agency (DARPA), in conjunction with the United States Air Force (USAF), is pleased to offer you the opportunity to respond to the Unmanned Combat Air Vehicle (UCAV) Advanced Technology Demonstration (ATD) Phase II solicitation. DARPA and the USAF look forward to working in partnership with you during this phase to successfully demonstrate the technical feasibility for your UCAV system design to effectively and affordably prosecute 21st century Suppression of Enemy Air Defenses (SEAD)/Strike missions within the emerging global command and control architecture.

Our fundamental program philosophy remains unchanged: in partnership with industry and the warfighter execute an innovative ATD program which keeps the UCAV weapon system on a success orientated roadmap to a low risk Engineering, Manufacturing & Development (EMD) phase in 2005. Towards this end, we brought the users, the acquisition community, the Government labs, and the Intelligence, Surveillance and Reconnaissance communities together right up front. In this way, we were able to provide you with access to the necessary technologies, tools, and expertise to insure that your studies, analyses and preliminary design truly captured the best that the Government had to offer. The quality of your Phase I efforts is a testimony to the success of this process.

Each of your UCAV Operational System (UOS) designs have been developed to effectively and affordably perform the SEAD/Strike mission in the post 2010 timeframe. You have also each developed a preliminary design for a UCAV Demonstrator System (UDS) based on your UOS vision and the Phase II ATD objectives. The Government will evaluate both your UOS and UDS designs as part of the Phase II source selection process.

You are now being asked to provide a complete UCAV System Maturation Plan (SMP) that defines your approach for conducting both the Phase II ATD and unfunded follow-on Risk Reduction and Operational Evaluation (RR&OE) activities. This plan should represent your assessment of the most cost effective and efficient manner to addresses the specific objectives of each phase while remaining on the optimal path toward a low-risk entry into an EMD phase in FY2005.

Since each of your UOS designs has unique risk reduction requirements the Government will not provide a detailed list of critical and enabling Technologies, Processes and System Attributes (TPSAs) or system performance specifications that must be demonstrated during Phase II or the RR&OE phase. Instead your SMP should define what you believe to be the optimal path based on a compilation of the individual risk mitigation plans associated with each of your TPSAs and the Government's technical and programmatic objectives. The specific activities proposed in

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your SMP will therefore be unique to your operational design and its system maturation requirements.

It is up to you to define an appropriate process for defining the technical and programmatic risks associated with your 21<sup>st</sup> Century SEAD/Strike UCAV operational vision and laying out a program plan that will address them. You should construct an overall program that addresses all critical and enabling TPSAs associated with your operational system and will provide the data required for the Government to conduct an Analysis of Alternatives (AOA) in FY2005. To insure that your UOS is capable of entering a low-risk EMD program in 2005, your SMP activities must convincingly demonstrate that your UCAV vision is technically feasible, sufficiently mature and will provide the mission utility and operational value that the customer requires.

Based on your SMP you will provide separate, but integrated, Phase II & RR&OE Program Plans and UDS System Definitions. The Phase II portions of your Task Description Document (TDD) and Integrated Master Plan (IMP) along with your Phase II Program Plan and Milestone Review & Incentive Plan and form the basis for your proposed Phase II agreement. You are also being asked to provide a priced (but unfunded) option for your proposed follow-on RR&OE phase activities. Depending upon the success of Phase II, this option may be exercised through a bilateral agreement. You will also identify outside funded activities that are an integral part of your overall SMP in a UCAV Transition Plan (UTP) and describe any Government leveraging agreements.

Once again we have not provided traditional specifications or a statement of work. Instead, we have described our objectives in this solicitation and provided guidance on preparing your response. We have set the bounds of the problem and you must define the overall SMP, and specific Phase II and RR&OE program plans that will provide the best value approach to meeting our objectives.

Your Phase II challenge is to complete the design, development, fabrication and demonstration of your UDS within an aggressive funding constraint. Your UDS must be capable of addressing all the UCAV Phase II ATD objectives, meet all your Phase II demonstration requirements, be compatible with your overall SMP and TPSA risk mitigation plans, and provide a residual test asset that supports your proposed RR&OE follow-on activities.

You must use your best judgement in developing a proposal that will maximize the amount of technology demonstration and risk reduction, provide the best value to the Government, and maintain a seamless path to a positive acquisition decision. To successfully meet this challenge, you will have to use lean business practices, leverage Government and industry research programs, facilities, and technical expertise and define an innovative combination of simulation, ground, and flight test activities. DARPA and the USAF look forward to working together with you to demonstrate that UCAVs can effectively and affordably prosecute 21<sup>st</sup> Century SEAD/Strike missions and to making your operational UCAV vision a reality.

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## 2.0 Program Description

This section describes the Government's program vision for maturing and demonstrating an effective and affordable SEAD/Strike UCAV system by 2005. It outlines the Government's objectives and desired approach for the Phase II UCAV ATD and the follow-on RR&OE Phase.

### 2.1 Motivation

DARPA and the USAF are committed to an aggressive program of exploiting UAV technology for SEAD in the mid-term and movement into a broader range of combat missions depending on technology maturation, affordability, and migration to other forms of warfare. Phase II of the UCAV ATD program will provide the information necessary to enable decision-makers to determine whether it is technically and fiscally prudent to continue development of a UCAV system to perform the post 2010 SEAD/Strike mission. Viable UCAV system candidates will compete with other potential solutions based on cost, capability, reliability, and suitability. The knowledge gained from this phase will be a key input to on-going efforts to define the "best" force mix for the post 2010 timeframe.

The results from a successful Phase II program will convince the Government that:

- (1) the effectiveness, affordability and system attributes predicted for the UOS are technically feasible,
- (2) sufficient risk reduction has occurred to proceed to RR&OE phase,
- (3) remaining technical risks can be affordably reduced to support low risk entry into EMD in 2005, and that
- (4) a UCAV weapon system is the optimal choice for a post 2010 force enabler.

### 2.2 Goal

The goal of the joint DARPA/USAF UCAV ATD program is to demonstrate the technical feasibility for a UCAV system to effectively and affordably prosecute 21st century SEAD/Strike missions within the emerging global command and control architecture. The goal of the follow-on RR&OE phase is to further reduce system risk and to demonstrate that the proposed operational system design provides the military utility, operational value, and technical maturity required for a low-risk entry into EMD by 2005.

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## 2.3 Objectives

### 2.3.1 UCAV ATD Phase II

The primary objective of the UCAV ATD is to design, develop, integrate, and demonstrate the critical Technologies, Processes, and System Attributes (TPSAs) pertaining to an operational UCAV system. The objective of Phase II is to design, develop and fabricate a UDS and to execute the risk reduction, modeling and simulation, ground and flight test, and system level demonstration activities necessary to meet the Phase II objectives and to validate that UCAV system development is on a seamless path to EMD. The Phase II contractor will conduct an innovative demonstration program to validate the technical feasibility of their UOS vision and address all the critical and enabling TPSAs associated with their unique UOS design and CONOPS.

At a minimum, the offeror's Phase II program plan will achieve the following specific ATD objectives in such a way that they explicitly address all aspects of their UOS design:

- Development and demonstration of a low life-cycle cost, survivable design for the SEAD/Strike unmanned air vehicle.
- Development and demonstration of a reconfigurable mission control station for multi-ship UCAV operations.
- Demonstration of robust and secure command, control and communications, including line-of-sight, non-line-of-sight, and over-the-horizon.
- Exploration of a full range of vehicle control, human-computer function allocation, mission planning and mission management approaches.
- Evaluation of off-board/on-board sensor integration, weapon targeting, and loadouts.
- Demonstration of human-in-the-loop, detection, identification, location, real-time targeting, weapons authorization, weapons delivery and target damage indication.
- Continued refinement of the operational SEAD/Strike UCAV design and assessment of its projected effectiveness and affordability.

The contractor's approach to meeting each of these objectives is directly dependent on their UOS CONOPS, system design, and unique product development philosophies and processes. Focus should be placed on those TPSAs that are unique to their UOS and are critical to validating its performance capabilities. Some of these objectives may be met through careful melding of ATD and external Government and industry funded activities.

Phase II results will serve as the foundation and roadmap for achieving the UCAV acquisition strategy. The ATD demonstration results, refined UOS design and metrics, updated UTP, and other results of the Phase II efforts will serve, in part, as evaluation factors for award of any post ATD agreements.

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## 2.3.2 RR&OE Phase

The objectives of the RR&OE phase are to complete the maturation and demonstration of the system to a level consistent with a low-risk entry into EMD by 2005. Increased emphasis should be placed on demonstrating military utility and operational value to the warfighter in addition to technical maturity. The contractor's UDS System Demonstration Plan (SDP) for this phase should be tightly coupled to their UTP, indicating maximum leveraging of outside Government technology developments, operational exercises and system/subsystem demonstrations. The contractor shall pursue an aggressive, cost-effective path to maturing and demonstrating their operational system design during this phase.

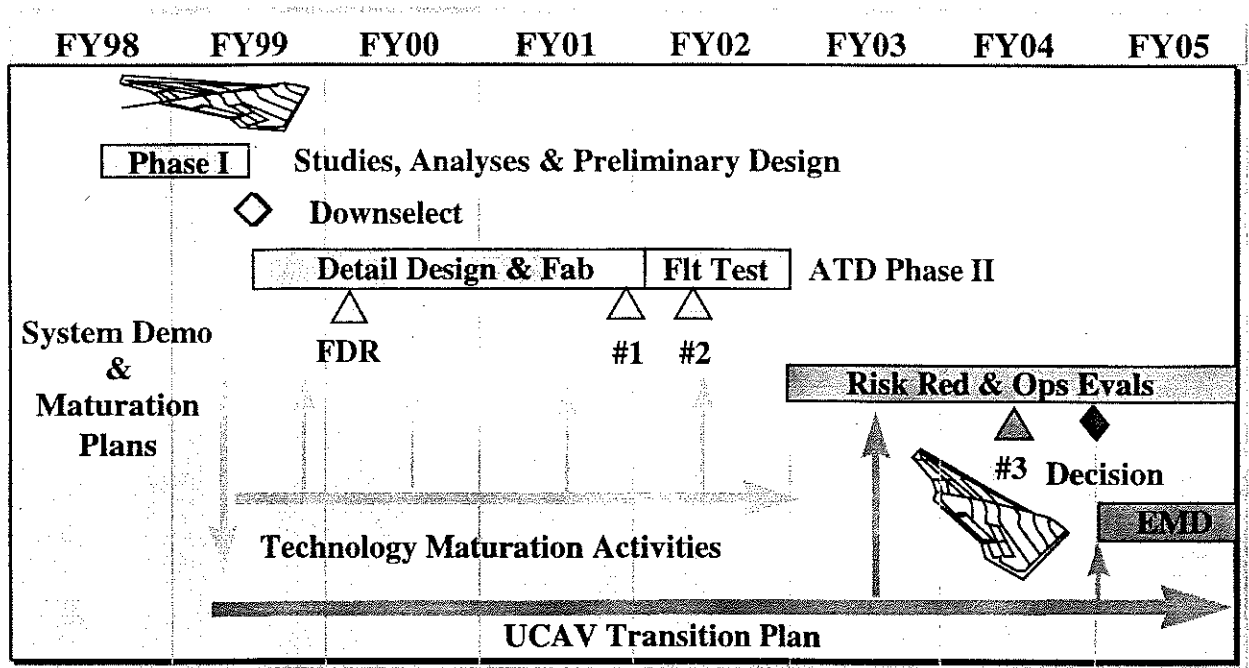
A successful RR&OE phase will validate UOS system effectiveness, affordability, technical maturity, supportability and CONOPS. A set of notional RR&OE demonstrations might include: full exploration of the flight envelope, live fire testing for all baseline weapons, deployment, redeployment, system testing in an operationally representative environment (against threats, with jamming), interoperability with base infrastructure and blue forces (integrated combat turn, reactive mission demonstration with manned strikers), and validation of key vehicle signature attributes. The exact nature of the RR&OE UDS and demonstrations, like the Phase II activities, is dependent on the contractor's UOS design and assessment of the risks and cost/benefits of demonstration during RR&OE versus EMD

The contractor's ability to use their UOS CONOPS and system design as a filter to select the critical TPSAs matured and validated during the ATD and RR&OE phases is vital to the success of this program. Defining the critical cost drivers and associated critical processes early in system development is a key component of this program. This ATD will serve as a focal point for national efforts to quickly and affordably transition advanced technologies and reduce the acquisition cycle for a new UCAV weapon system.

## 2.4 Program Approach

The UCAV ATD program plan directly supports the UCAV acquisition strategy shown in Figure 2.1. This approach seeks to compress the normal acquisition cycle by merging a two-phase ATD with a Risk Reduction and Operational Evaluation (RR&OE) phase to produce a low-risk entry into EMD by FY2005. Successful execution of this strategy will provide the information necessary to enable decision-makers to determine whether it is technically and fiscally prudent to build a UCAV weapon system to perform the post 2010 SEAD/Strike mission. In keeping with the DARPA and USAF legacy of technical and operational innovation we are pushing to demonstrate the technical feasibility, mission utility, and operational value of performing the SEAD/Strike mission with a UCAV system by FY05. Entering an acquisition program at the EMD phase in FY05 would enable an initial operational capability before 2015.

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**Figure 2.1 UCAV Acquisition Strategy**

The UCAV ATD program is comprised of two distinct phases. During Phase I, DARPA awarded four, 10 month, Section 845 agreements for the definition of an effective and affordable SEAD/Strike UOS design, risk reduction activities, and the preliminary design of a UDS. For Phase II, the Government intends to award one, 42 month, Section 845 agreement covering the detailed design, fabrication, flight tests and integrated system demonstrations of the winning contractor's UDS design. The Phase II contractor will fabricate at least two (2) demonstrator air vehicles and one reconfigurable mission control station suitable for meeting all Phase II program objectives and capable of supporting the projected RR&OE activities to the maximum extent possible. A UCAV System Maturation Plan (SMP) will be developed and maintained, that along with the contractor's UCAV Transition Plan (UTP) will define an integrated roadmap for all activities necessary to mature the UOS system and execute the acquisition strategy shown in Figure 2.1

During Phase II of the ATD, the contractor will design, develop, integrate and demonstrate a UDS that will address all the Phase II program objectives and will mature and validate the critical and enabling TPSAs associated with their UOS design. Phase II activities should be prioritized so that the fixed resources are applied to the specific objectives of the ATD and to the most important issues associated with validating the effectiveness and affordability projections for the contractor's UOS design. Once the ATD has successfully demonstrated the technical feasibility for a UCAV system it is important to seamlessly shift the focus to the demonstrations of mission utility and operational value. The SMP should address all aspects of the UOS design maturation consistent with the contractor's approach.

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The Phase II demonstrator system hardware and software must not only be sufficient for addressing the Phase II program objectives but should also provide the best possible foundation for the RR&OE activities. In this way the total SMP can be executed at the minimum cost and risk to the Government. During the RR&OE phase, the SMP should define all activities necessary to assure that the Government has sufficient data to validate the military utility, operational value and technical maturity of the system sufficient for low-risk entry into an EMD program in FY2005.

While at a minimum the Phase II UDS shall consist of: two air vehicles, one re-configurable mission control element, associated unique support equipment and documentation, the complete system will consist of more than just these physical items. The UDS is defined as the unique set of software and hardware systems required to accomplish all the risk reduction, flight testing, end-to-end system demonstrations, and operational evaluations necessary to achieve the objectives of the SMP. It is highly desirable to design and fabricate the Phase II UDS such that it provides a robust capability to address all the Phase II ATD and RR&OE objectives.

While the UDS design, due to its lineage to the UOS, should support all the system demonstrations prior to EMD, the full functionality of the UDS necessary to support all the planned RR&OE activities doesn't need to be incorporated in the Phase II version of the UDS. The Government realizes that it may not be feasible, or necessarily desirable, to attempt to address them all within the funding and schedule constraints of the Phase II ATD. It is the contractor's responsibility to define an overall approach to the UDS design that maximizes the value to the Government during the Phase II ATD and provides the residual capability necessary for immediate application in the RR&OE phase.

To the extent possible, the contractor will develop all segments of their UDS such that they are capable of modification or upgrade to address evolving phases of the program with the exception of the addition of advanced signature reduction materials or treatments. The flexibility to leverage from, and build directly off the ATD results in the RR&OE phase is critical to creating a seamless path from ATD to EMD. If successful, this approach will dramatically compress the time required to transition new technologies into effective and affordable weapon systems for the warfighter.

As Figure 2.1 suggests, during the RR&OE phase the contractor may decide that additional air vehicles or additional mission control hardware with additional operational features are necessary to address risk reduction or operational evaluation issues beyond the scope of the Phase II ATD. The contractor may choose to follow an upgrade path consistent with the demonstration requirements of each Phase. In addition, while technologies, manufacturing processes and supportability features that enable the low life cycle cost predictions for the UOS need to be validated, they do not necessarily have to be incorporated on the UDS flight test vehicles or mission control systems.

In order to validate the key aeronautical performance predictions the Phase II air vehicle shall be constructed in a manner that is fully compatible with the low observable design details prescribed in the UOS. As an example, the demonstrator air vehicle wing leading edge should maintain the

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appropriate internal and external design compatible with the UOS design. This includes maintaining the appropriate external signature-driven surface characteristics and internal structural layout consistent with the UOS requirements for RF bulk absorbers, termination, graded resistance or other advanced signature reduction techniques. The degree to which the Phase II version of the UDS air vehicle incorporates other low observable features, such as antennas and apertures should be based on the criticality of their demonstration and funding constraints. No low observability materials or treatments will be demonstrated on the UDS during Phase II.

The UDS MCS shall, at a minimum, be re-configurable to the extent necessary to support exploration of the full range of vehicle control, human computer function allocation, mission planning and mission management approaches identified as potential UOS solutions in the contractor's Phase I trade studies. This MCS should be capable of controlling, at a minimum, the maximum number of air vehicles and performing all the command and control tasks associated with the contractor's CONOPS for pre-emptive destruction and reactive suppression missions. There are no predefined requirements for the physical instantiation of the UDS MCS during the ATD. The MCS physical appearance should be driven by the requirement to demonstrate or validate the supportability TPSAs. However, during the RR&OE the contractor may need to demonstrate a version of their MCS with direct legacy to their UOS design to validate military utility and operational value.

### 2.4.1 UCAV System Maturation Plan (SMP)

The contractor will develop and maintain a UCAV System Maturation Plan (SMP) that will define their overall approach to mitigating risk and maturing their UOS design. The SMP should describe all risk reduction, technology and process development and maturation, and operational evaluation activities that must be conducted prior to entering into an acquisition program at the EMD phase. The plan will address all activities proposed for the Phase II and RR&OE phases and will specifically address the individual risk mitigation plans associated with each of the contractor's critical and enabling TPSAs. It will provide a summary of all risk mitigation/system maturation activities, indicating the proposed cost, schedule, criticality, degree of risk mitigation/system maturation achieved and all contingency or fall back plans.

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### Figure 2.2 UCAV System Maturation Plan (SMP)

The contractor's SMP shall contain at a minimum the information shown in Figure 2.2. This plan will provide the Government with the fiscal and technical information necessary to develop an acquisition strategy supporting a potential low risk entry into EMD by 2005. Only in this way can the Government gain a full appreciation for the total cost of bringing the contractor's operational system concept to a level suitable for low-risk entry into EMD. A priced option for the unfunded RR&OE activities will be included in the Phase II Agreement.



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The SMP will contain an overview Development and Execution section describing the contractor's approach for developing, maintaining and executing this plan. The SMP will define the specific Phase II and RR&OE program plans and UDS system definitions. It will also indicate any inter-relationships or leveraging of outside technology or system developments that are critical to the overall system maturation approach. These outside activities will be more fully addressed in the UTP. All portions of the SMP will be linked to the standard Work Outline common to the entire Agreement.

The contractor shall implement the Phase II portion of their SMP and will maintain and update this document on an on-going basis based on the developments both within and outside the program. This document will be formally revised on a regular basis to incorporate all changes to date including any revisions in cost, schedule or technical content. At the completion of the Phase II ATD, the contractor will deliver a revised SMP defining their revised plans for the RR&OE activities. The rest of this section provides additional detail on each key element of the SMP.

### 2.4.1.1 System Maturation Plan Development and Execution

This Development and Execution section of the SMP will contain at a minimum:

- 1) the processes used, and the definition of each of the critical and enabling TPSAs,
- 2) the assessment of the risks associated with each TPSA,
- 3) the individual TPSA Risk Mitigation Plans (RMPs) and all contingency or fall back plans,
- 4) the process used to define an optimal multi-phase SMP based on the overall program goals and objectives, and finally,
- 5) how the SMP will be maintained and executed throughout the life of the ATD and RR&OE phases.

The SMP should be based on a compilation of individual RMPs defined for each of the contractor's critical and enabling TPSAs. These RMPs should be developed using a risk assessment for each TPSA based on a variation of the Defense Systems Management College (DSMC) risk assessment process. Assessment of the risks will be based on appropriate definitions and calculations of the consequence and probability of failure for each TPSA associated with the UOS system.

Each TPSA RMP will define the specific steps planned to reduce the risks for each TPSA to a level sufficient for a low risk EMD entry in FY2005. They will define the specific proposed risk reduction activity, when it will occur, what it will cost, how much risk reduction it will achieve and what back up or fall-back approaches are planned to insure program success. Figure 2.3 provides a sample format for the RMPs.

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## TPSA #1 Notional Risk Mitigation Roadmap

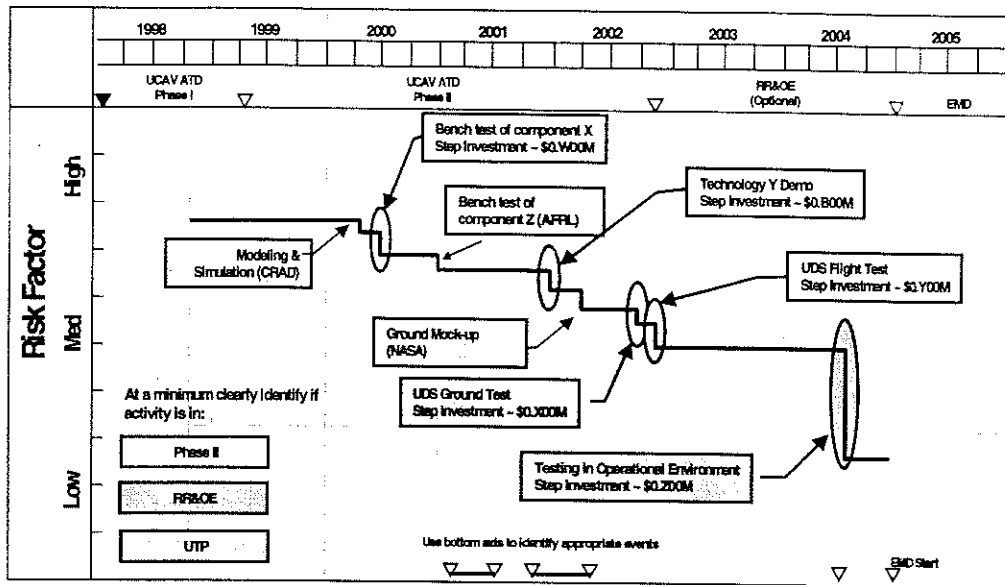


Figure 2.3 Notional Risk Mitigation Roadmap (RMP)

Based on the priority and cost/benefit associated with each TPSA RMP, an optimized overall SMP consistent with the program goals and objectives described above will be defined. This optimized overall SMP will address all activities to be conducted during both Phase II of the ATD and the RR&OE phase. Figure 2.4 illustrates the overall intended process.

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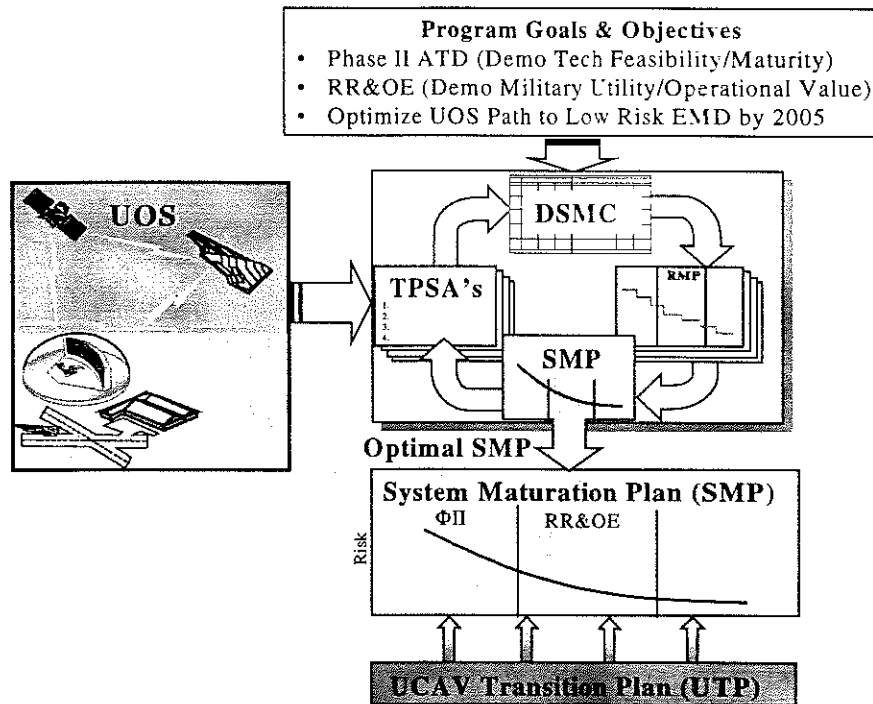


Figure 2.4 UCAV System Maturation Plan Development

## 2.4.1.2 Phase II and RR&OE Program Plans

As shown in Figure 2.2, separate, but coordinated, program plan and system definition sections for the Phase II and RR&OE (optional) phases will be defined in the SMP. The program plans will contain, at a minimum, details of the planned approach for continuing to refine the UOS design, developing the UDS, and conducting demonstrations with the UDS to achieve the objectives of that phase. These details will be delineated in a UOS Refinement Plan, UDS Development Plan and UDS System Demonstration Plan (SDP). The following sections provide additional information regarding these documents.

### 2.4.1.2.1 UOS Refinement Plans

A key objective throughout the program is to continue to mature and validate the operational UCAV weapon system's potential to effectively and affordably perform SEAD/Strike missions in the post 2010 timeframe. The UOS Refinement Plans will describe how the Phase II contractor will continue to refine their UOS system throughout the Phase II ATD and RR&OE phase at a level consistent with the focus of each phase. The individual plans for each phase will describe the systems analysis, design trades, CONOPS and life cycle cost analysis required to continue to refine their operational system design. Each plan will address how lineage will be maintained between the emerging UOS design and the ongoing SMP and UTP activities.

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The UOS Refinement Plans will also define how periodic updates to the UOS design and mission effectiveness and affordability figures of merit (FOMs) will be provided based on results emerging from ongoing Phase II, UTP, and other Government or contractor activities. They will describe how the contractor will continue to work with the Government throughout the Phase II and RR&OE phases to conduct operational effectiveness and life cycle cost analysis on the emerging design. Each plan will address how the contractor will work with the Government to incorporate changes in the threat environment into their CONOPS analysis and total system design. At the end of the Phase II ATD the offeror will provide an updated set of RR&OE UDS system definitions based on their revised UOS design.

### 2.4.1.2.2 UDS Development Plans

The UDS Development Plans will describe how the contractor will complete the detailed design, development, fabrication and development and verification testing of their UDS during both the Phase II ATD and the RR&OE Phase. They will describe the approach, processes, procedures and tools that the contractor will use to execute these tasks and the planned schedule of completion. Both plans will supplement the IMP by providing additional details on the overall plan for achieving each phase of the UDS development. Together, these plans will address all major events associated with the development and verification of each segment of the overall UDS system. These include, at a minimum, the mission control segment, the air vehicle segment, and the supportability segment. The RR&OE UDS Development Plan will describe the planned approach to both modifying the Phase II UDS hardware and software and to designing and fabricating additional hardware and software required to meet the RR&OE objectives.

The UDS Development Plans will include a description of all risk reduction activities such as component testing, subsystem verification and integration and segment and system build-ups. Details will be provided on critical activities such as software development, testing, installation and verification, and advanced command and development of control and mission management algorithms. Major mission control simulations, development testing and human system interface tests will be identified. Planned air vehicle development tests such as wind tunnel, flight control, propulsion and flight simulation activities will also be indicated. Manufacturing approaches, assembly, hardware-in-the-loop and system/segment verification testing will be described. The UDS Development Plans, along with the TDD and IMP should completely document what, when and how the Phase II and RR&OE UDS design, development, fabrication, verification and modification will be conducted.

### 2.4.1.2.3 UDS System Demonstration Plan (SDP)

The UDS System Demonstration Plans will detail all the UDS system, segment, subsystem or component demonstrations necessary to address the specific Phase II and RR&OE objectives. They will include all critical risk mitigation efforts, and all system, segment, subsystem or component verifications, demonstrations or evaluations designed to specifically address the program objectives and to demonstrate the technical feasibility and cost realism of the integrated set of TPSAs associated with their UOS. These activities shall include (but are not limited to) risk reduction efforts, subsystem and component verification, vehicle check-out and flight safety,

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critical technology evaluation and assessment, simulations, ground and surrogate flight tests, UDS flight tests, and system level demonstrations. Particular attention should be paid to those technology areas that are difficult to evaluate in a “traditional” ATD but that are critical to meeting the affordability goals for the UOS (technical maturity/risk of virtual production facilities, supportability, training, etc.). Innovative methods for their test and evaluation should be used. The SDPs replaces the System Test Plan called for in the Phase I agreements.

Demonstrations should exploit, to the maximum extent possible, technology maturation and operational concept demonstrations, which are separately funded by other Government sponsored programs, and IRAD activities. Demonstration goals will be defined that (1) are highly focused; (2) have legitimate effectiveness, technical, affordability and/or supportability value; and (3) are realistic given funding constraints. The types of demonstrations (e.g., simulation, component test, ground tests, surrogate and UDS flight tests) are at the discretion of the contractor. Approaches will vary depending on the specific challenges inherent in realizing each individual offeror’s UOS.

To meet the program goals, the contractor must demonstrate the technical feasibility and cost realism of the integrated set of all critical and enabling TPSAs associated with their design. The Phase II SDP should explicitly address the minimal set of ATD program objectives defined in Section 2.3.1. In addressing these objectives, the contractor will define a demonstration plan that not only validates the technical feasibility and cost realism of their operational system, but also validates the predicted mission effectiveness and affordability of their UOS design. The contractor’s approach to addressing each of these objectives is dependent on their assessment of the objectives technical risk and impact on achieving their unique UOS CONOPS and system performance. Phase II should culminate with an innovative combination of simulation and UDS flight test which conclusively demonstrates human-in-the-loop, detection, identification, location, real-time targeting, weapons authorization, weapons delivery and target damage indication.

Both mission effectiveness and affordability are critical attributes of the UCAV operational system. Assumptions regarding mission CONOPS, weapons, C4I, and survivability can greatly effect the overall effectiveness predictions. Similarly, assumptions regarding technologies, manufacturing processes, and supportability concepts drive the LCC estimates for the UOS. To the maximum extent possible, the contractor should seek to validate these assumptions and cost models during Phase II. This validation can be accomplished through the UDS, ground test, simulation, parallel R&D programs, or external activities. Rigorous mission effectiveness and cost modeling activities will help to provide confidence to the Government that the UOS meets the effectiveness and affordability objectives as defined in Phase I.

The RR&OE SDP will describe the risk mitigation and demonstration activities that will be conducted during the RR&OE Phase to validate military utility and operational value and further increase the level of technology maturity. It should include all system, segment, subsystem or component verifications, demonstrations or evaluations necessary to address these objectives. It will describe the specific risk reduction, operational evaluations, joint exercises, demonstrations and tests that are planned and to what degree they will validate and demonstrate the overall system military utility, operational value and technical maturity.

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This living document should provide the Government with the fiscal and technical information necessary to continue to defend and execute the UCAV acquisition strategy shown in figure 2.1. The SDP should also identify critical decision dates for any Government actions required for the UCAV acquisition strategy to remain on a seamless path to EMD. The SDP will be updated on a continuous basis and formally revised on an annual basis along with the SMP and UTP.

### 2.4.1.3 Phase II and RR&OE UDS System Definitions

The SMP will contain separate UDS system definition sections for the Phase II and RR&OE UDS systems as shown in Figure 2.2. Each of these sections will contain a Systems Requirement Document (SRD) and the UDS System Description Document (SDD) unique to that phase. These living documents shall serve as a single source for definition of the ongoing UDS configurations as they evolve. Both documents shall be updated to provide a continuous definition of the entire system, incorporating all changes to date. Any major changes shall be incorporated and delivered as a revision to these documents at each Milestone Review.

The initial SRDs and SDDs delivered with the proposal will be restricted to the page limits shown in Section 3.2.1. During the execution of Phase II and the RR&OE Phase, the contractor shall incorporate additional information, in the contractor's format, to expand these documents to the level required to fully define the maturing designs. Maximum page limits for each document shall not exceed 500 pages. An executive level section of these documents shall be maintained that provides a stand-alone summary of the design. These executive level sections shall not exceed 50 pages.

Within these documents, the contractor shall also provide references to other internal drawings, specification sheets, databases or configuration control documents that supplement the information provided within the SRD and SDD to provide additional detailed definition of the entire UDS. In this way, the SRD and SDD can be kept to a manageable size and the amount of effort required to keep them current will be minimal. The following sections provide additional information regarding these documents.

#### 2.4.1.3.1 UDS Systems Requirement Documents (SRD)

These living documents will serve as reference documents that define the requirements for the Phase II and RR&OE UDSs based upon the contractors program plans for each Phase and their UTP. They should parallel the UOS System Capability Document (SCD) in form and content and clearly maintain a direct legacy to the evolving UOS design. They will describe the system requirements for the demonstrator air vehicles, re-configurable mission control systems, and support systems (including unique support equipment) that will be developed to meet the Phase II and RR&OE program objectives. They should document the requirements for the entire UDS systems, segments and major sub-systems and components for each phase.

The Phase II UDS SRD shall define all aspects of the Phase II demonstrator system, and through the contractors work outline, should relate directly to the UOS system capabilities defined in the

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contractor's Phase I UOS SCD. Using the System Maturation Plan (SMP) and individual TPSA Risk Mitigation Plans (RMPs) as a filter, there should be a one-to-one correlation between the Phase I UOS SCD and the Phase II UDS SRD. The Phase II UDS SRD should indicate how all critical and enabling TPSAs associated with the UOS design are to be addressed and how robust the proposed Phase II UDS design will be in addressing all Phase II and RR&OE program objectives.

The RR&OE UDS SRD shall define all aspects of the proposed RR&OE demonstrator system including how all TPSAs associated with the UOS design will be addressed during this phase. It shall address the requirements for the UDS to fully support the demonstration of military utility, operational value and technical maturity necessary for this phase. The particular system requirement for the RR&OE UDS shall be consistent with the contractor's overall SMP and the program objectives.

### **2.4.1.3.2 UDS System Description Documents (SDD)**

These living documents will define the entire Phase II and RR&OE UCAV demonstrator systems, segments, major subsystems and components, both hardware and software elements. The SDDs will serve as reference documents that track the evolving design of the UDS through Phase II and the RR&OE activities.

The SDDs will provide sufficient design detail to document the UDS hardware and software and to fully define all subsystems and major components. The SDDs will fully define each component's physical, functional and performance characteristics. System, segment, and subsystem architecture, functional allocation and software requirements will be defined. The format should conform to the contractor's single common Work Outline. The contractor will be responsible for the configuration control of all specifications and drawings (i.e., control of the SDDs) throughout each phase.

### **2.4.2 UCAV Transition Plan (UTP) and Government Leveraging**

The UTP will address all operational evaluations, technology and manufacturing processes, development, maturation, transition and risk reduction activities which are outside the scope of the ATD and RR&OE, but integral to complete the development of the contractor's UOS system up to a low-risk EMD entry. It should identify all activities that are an integral part of their SMP and are funded and performed outside of the ATD and RR&OE, including both Government and corporate research and development. The SMP, SDPs and UTP should be coordinated with industry and the Government to ensure maximum advantage is taken of any leverage opportunities, and scarce research and development dollars are focused on supporting the overall UCAV acquisition strategy shown in Figure 2.1.

The UTP will also identify emerging technologies/processes and leverage opportunities that have high payoff for future UCAV applications. The UTP shall capture the current status of all relevant on going and planned Government and industry programs and include appropriate cost and schedule information. Classified or proprietary information should be properly marked

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and/or maintained as a separate document if necessary. Any specific UCAV Government Leveraging Agreements that the contractor has a firm commitment for should also be documented in the UTP.

This living document will ensure the program is maximizing the leveraging opportunities from other Government and corporate research and development activities. The UTP should also identify critical decision dates for any Government actions required for the UCAV acquisition strategy to remain on a seamless path to EMD. The UTP will be updated on a continuous basis and formally revised on an annual basis along with the SMP.

### 2.5 Management Approach

DARPA remains responsible for overall management of the UCAV ATD, including technical direction, acquisition, and security. DARPA will provide the Program Manager (PM) and the USAF will provide the Deputy Program Manager (DPM). The PM and DPM are responsible for implementing a streamlined approach to program management. DARPA will establish a small joint program office lead by the DARPA PM. ACC/DR, ASC/XRA, ASC/FM and AFRL will continue to provide support to the program office as requested by the PM and DPM. In addition, the PM and DPM will continue to foster value added interactions between the industry, DARPA, other USAF offices and DoD Agencies, and other Government Research Labs as required to ensure program success. Program management responsibilities are scheduled to transition to the USAF at an appropriate time during Phase II.

#### 2.5.1 Government/Industry Interaction

The Government's fundamental streamlined management approach has not changed. Major tenants of that approach include: close cooperation between Government and contractor teams, small staffs, abbreviated oversight, face-to-face communication, real-time decision making, emphasis on solving problems instead of assigning blame, and short, direct lines of authority. The PM and DPM are dedicated to the principle of open collaborative teaming between industry and Government, and support the principals of Integrated Product and Process Development (IPPD). The Government program management team will constantly work to maintain open channels of communication, provide value-added inputs and expertise and work together with the industry team to insure total program success.

The Government intends to maintain a small joint program office staffed with personnel that are totally committed to these principals and dedicated to working together to find solutions, not create problems. This team will work closely with the industry team leads to provide information, technical assistance, and additional expertise as required to assist in the successful execution of the program. As in Phase I, the contractor is responsible for the management and technical direction of the program.

The contractor should commit to a similar open, collaborative, teaming relationship with the Government. Direct, sincere communications, true collaboration, forthright reporting and open sharing of all program data with Government teammates should characterize this relationship.



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The contractor should define a system engineering/program management approach that will foster this type of relationship and provide the highest probability for success throughout both the Phase II ATD and the RR&OE phase.

The contractor shall develop and administer a secure (Program Sensitive/Proprietary) UCAV ATD program website. This website will facilitate appropriate levels of communication within industry teams and between the program management teams. At a minimum the website should provide the program office with real-time insight into the technical and financial status of the program and provide an efficient mechanism for exchanging milestone materials.

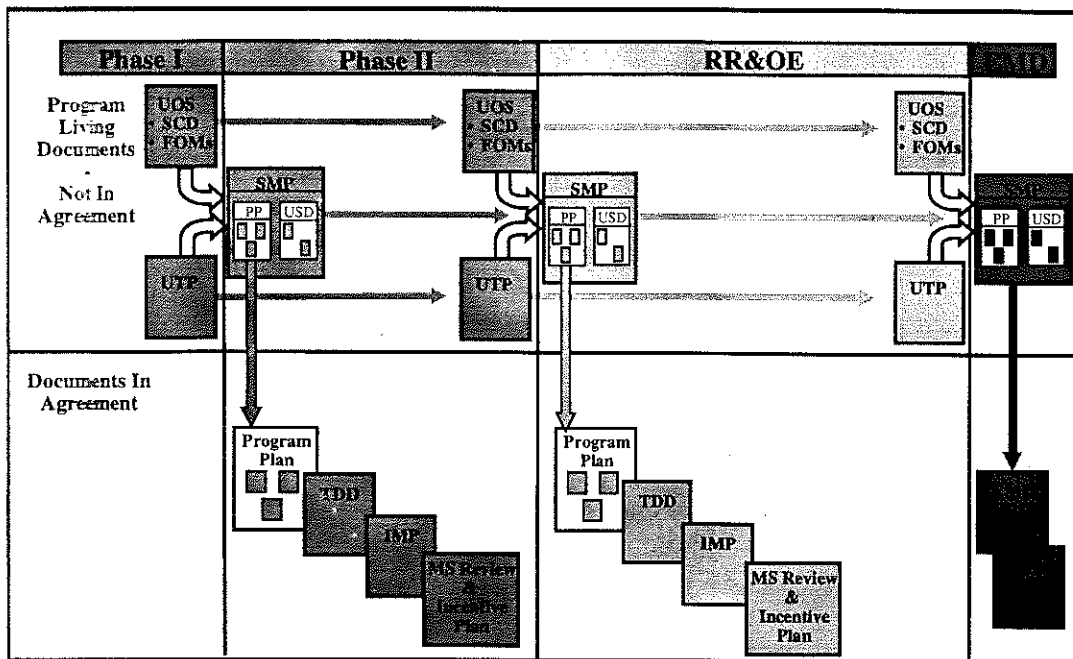
The contractor shall incorporate the principals of (IPPD) into their systems engineering and management processes. The Government anticipates active participation on the top-level industry teams. Government participants on these top-level teams will be assigned to the joint program office and report directly to the PM and DPM. This core management team may be supplemented by additional Government technical expertise on the working level industry teams. The composition and responsibilities of all teams are at the sole discretion of the contractor. Any Government personnel requested by the contractor to participate on any team will have roles and responsibilities similar to the industry team members. In no instances will a Government person be the team lead.

The Government and industry teams shall interact on a variety of formal and informal levels throughout Phase II. Interaction is required for the Government to receive the information required to meet its fiscal and management responsibilities and for the Government to provide value added feedback and insight to the industry team. During Phase II, the contractor will conduct a series of formal milestone reviews defined in their Milestone Review and Incentive Plan. During these Reviews the Government will assemble a team of technical experts to review the specific areas of interest and assist the PM and DPM with their performance assessments. It is the Government's objective to provide the most equitable and highest quality feedback possible to the contractor during these reviews.

### 2.5.2 Program Documents and Deliverables

Execution of the UCAV Phase II ATD and RR&OE Phase will require the development, maintenance and delivery of a number of program documents. Some of these will be a formal part of the Agreement while others will not. Due to the nature of the program, almost all of these documents will evolve throughout the program. The objective of this section is to describe the inter-relationships between these documents and define the exact deliverable nature of each. Figure 2.5 illustrates the main documents and their inter-relationships throughout the program.

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**Figure 2.5 UCAV Program Documents**

The contractor's Phase II program plan will be incorporated as part of the agreement while the remaining portions of the SMP will not. The Phase II Agreement will contain the Phase II Program Plan, TDD, IMP, and the contractor's Milestone Review and Incentive Plan (described in the next section). Similarly, the contractor's optional RR&OE Phase Agreement will incorporate their proposed RR&OE Program Plan, RR&OE portions of their TDD, IMP and their RR&OE Milestone Review and Incentive Plan.

The UOS design and its defining documents (SCD and FOMs), the remaining portions of the SMP and the UTP are all meant to be living documents that are continuously updated throughout the life of the program. Based on refinements made to the UOS design, progress made during the Phase II ATD, and outside technology developments, the contractor will continuously refine their overall SMP. In the advent that a significant change in the SMP indicates that a modification to the Phase II Program Plan is warranted, the contractor's change process will be used to formally modify the agreement.

Prior to entry into the RR&OE phase it is anticipated that the contractor will be given an opportunity to provide a revised SMP which defines in greater detail their proposed RR&OE program plan and UDS system definition. If RR&OE funding is available, and the Government feels there is sufficient merit to proceed, the contractor's priced option may then be finalized based on this revised program plan, system definition and other agreement documents. Similarly, at an appropriate point during the RR&OE phase, the contractor may again be asked to provide a revised SMP defining their proposed program plan and system definition for the EMD phase.

It is the Government's desire that these documents be used to maintain a clear, unambiguous definition of the program's planned and actual progress, both from a process and product

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standpoint. To facilitate this, the contractor shall define and maintain a formal Change Process as called for in the Process IMP. By using this process to define when a revision is required, both the living documents, and those documents incorporated in the agreement, will be kept current with emerging system designs, risk reduction activities and technology developments.

It is the Government's intent that major changes be agreed to on an on-going basis, reviewed at the next formal Milestone Reviews and incorporated into the agreement at that time if required. In this manner, no cumbersome contractual requirements will impact the workflow. All major changes that require agreement modification will be formally made a part of the agreement through the delivery of a new version of the document and written confirmation of the agreement modifications. Major changes to documents that are not a part of the agreement will be delivered in the contractor's standard format with all revisions clearly indicated. Figure 2.6 defines the minimum set of documents to be provided and the procedures for changes. The contractor should supplement this list with any additional documents, plans, reports or program information that they intend to provide.

Documents	Agreement?	Changes/Deliverables
SMP - Program Plans TDD IMP	Yes	<ul style="list-style-type: none"> <li>• Major Changes               <ul style="list-style-type: none"> <li>- Consult With PM &amp; Incorporate</li> <li>- Review @ Milestones</li> <li>- Mod Agreement If Required</li> <li>- Deliver Revised Docs As Req'd</li> </ul> </li> </ul>
IMS SMP - Devel/Execution Plan - System Definitions	No	<ul style="list-style-type: none"> <li>• Major Changes               <ul style="list-style-type: none"> <li>- Consult With PM &amp; Incorporate</li> <li>- Review @ Milestones</li> <li>- Deliver Revised Docs As Req'd</li> </ul> </li> </ul>
UOS - SCD/CONOPS/FOMs UTP	No	<ul style="list-style-type: none"> <li>• No Formal Change Process Req'd               <ul style="list-style-type: none"> <li>- Deliver Revised Docs as Req'd</li> <li>- Deliver Annual Revisions @ Min</li> </ul> </li> </ul>

**Figure 2.6 Program Document Changes/Deliverables**

### 2.5.3 Phase II Milestone Reviews and Incentive Plan

The Government intends to continue to conduct periodic formal Milestone Reviews throughout Phase II. The primary purpose for these Milestone Reviews is to review all technical and programmatic progress on the program and assess the need for any modifications to the overall program plan. The contractor shall define the dates and content of these Milestone Reviews

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consistent with their IMP. Milestone dates may be chosen to coincide with major technical or programmatic events (e.g. first flight), by calendar date (e.g. every 6 months) or by a combination of both. Specific timing should be determined based on the need for a periodic review of all aspects of the program and the need for specific, focused meetings to cover major events such as IDR and FDR.

The contractor will define the specific dates and content for a series of Milestone Reviews subject to the following:

- 1) Milestone Reviews shall be scheduled no more frequently than every 3 months and no less frequently than every six months.
- 2) Milestone Reviews shall be scheduled to coincide with at least one IDR, FDR and FRR.
- 3) All IDR(s) and FDR(s) will provide a level of detail consistent with the MIL STD 499B requirements for a system level PDR and CDR respectively.
- 4) The final Phase II Milestone Review must include a Government review and determination that all Phase II Completion Criteria have been successfully met.

It is the Government's intent that these Milestone Reviews also be used to assess the contractor's performance as part of their Phase II Incentive Plan. The purpose of the Incentive Plan is to track and financially motivate excellent performance by the contractor. The Government will set aside a separate pool of money to financially motivate many different facets of the contractor performance, such as timeliness, technical excellence, and effective system engineering and program management.

The contractor's Incentive Plan should define the Milestone Review Dates, contents, amount of financial incentive associated with each Milestone and the overall process for evaluating and awarding incentives throughout Phase II. It must also define how the Phase II Completion Criteria will be used to define the satisfactory completion of all Phase II activities.

It is the Government's desire that the specific areas of interest and incentive fee evaluation criteria for each Milestone be negotiated prior to the beginning of each evaluation period. In this way, the Government and contractor management teams can work together to identify timely areas of concern and to properly motivate all parties. At each Milestone Review, the contractor will present their assessment of their performance in each area of interest for the current Milestone period along with their proposal for the next Milestone period.

The amount of the award pool earned at each Milestone will be determined by the Government's review of management and performance areas under the control of the contractor. The joint program office will assemble an appropriate set of technical experts for each Milestone review, consistent with the focus of that review, to assist them in the assessments. Based on this evaluation, the UCAV ATD PM will decide whether to award all, or a portion of the allotted amount. Any unawarded amounts will either be removed from the award pool or rolled-forward to a future period at the Government's discretion.

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While a notional Milestone Review and Incentive Plan is provided in the Model Agreement (Section 5), the offeror is encouraged to submit their own incentive approach that provides a win-win business arrangement.

### 2.5.4 Phase II Completion Criteria

The contractor will define a definitive, unambiguous, quantitative set of Phase II Completion Criteria (PCC) that defines successful completion of the Phase II ATD. At a minimum, this set of criteria must explicitly address how all specific Phase II objectives have been satisfied, how all critical and enabling TPSAs associated with their UOS design have been addressed, and how technical feasibility for a UCAV system to effectively and affordably prosecute 21<sup>st</sup> century SEAD/Strike missions within the emerging command and control architecture has been demonstrated.

The PCCs must be submitted with the contractor's original proposal and will become a formal part of the Agreement. They can only be modified through the mutual agreement of the contractor and UCAV ATD PM and Agreements Officer. These criteria should be the subject of review at each Milestone Review and incorporated into the areas of interest and evaluation criteria for the Milestone periods they are planned to occur in. Successful completion of individual PCC by a specific date may be used as specific criteria for award as part of the contractor's Incentive Plan. At each Milestone, the contractor will present a review of each completed PCC and formally document successful completion through written concurrence by the UCAV ATD PM.

The final Phase II Milestone Review will be conducted upon successful completion of all Phase II Completion Criteria (PCC). Until all these criteria are completed, the program will proceed on a cost overrun basis with additional Milestone Reviews conducted as required. Completion of the Phase II ATD is defined as the successful completion of all PCCs or the program has reached its agreed to cost over-run ceiling and both parties have agreed not to proceed.

### 2.6 Other Agreements

The joint DARPA/USAF UCAV ATD program will employ the Other Transactions for Prototypes Section 845/804 authority. This procurement approach allows the offeror to be creative in designing their Phase II program and in selecting a management framework that best suits the proposed technical and management approach. The Government will share information and data throughout the program. However, the data will always be advisory, not directive in nature, and offered as a way to supplement contractor data with the full range of expertise available from the Government, foster better communications on the program and achieve our mutual goals. Our intent is to provide the best possible insight into what the Government thinks while minimizing oversight. To this end, the Government will focus on accurately defining WHAT we want and letting the offeror determine HOW best to provide it. Government oversight will be provided through the same management framework proposed by the offeror.

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The Government will allow the offeror to use either commercial or DoD streamlined processes, reporting and management practices. The use of Other Agreement Authority requires compliance with applicable laws but allows the latitude to depart from acquisition specific laws, FARs, and DoD practices where it makes sense. The offeror should take full advantage of this latitude to propose innovative/revolutionary approaches to team building. Your proposal must clearly demonstrate a robust method to monitor and control costs, quality, reliability, system engineering, program schedule, system design, and test planning and execution.

Commercial, industrial, and corporate specifications and standards should be used in lieu of military specifications and standards where appropriate. Military specifications and standards, if needed, should be used as guides, with any modifications, tailoring or partial application described. A rigorous formal process should be employed to design and implement software. Information system architectures must comply with the Joint Technical Architecture (JTA) and the Technical Architecture Framework for Information Management (TAFIM).

The Government reserves the right to award a standard contract if the offeror cannot provide in their proposal any benefit for using the Other Transaction for Prototype authority. Include in your proposal a brief explanation of the ways in which the use of this authority, rather than a standard procurement contract, helped the Department of Defense better meet the national security policy goals and objectives that are the bases for the authority to use these instruments. Examples might include: involving commercial firms that would not otherwise have participated in the program, creation of new relationships among firms at the prime or sub-tier levels, among business units of the same firm or between firms that will help DoD obtain better technology, allow traditional Government contractors to use new business practices in the execution of the prototype program that will help achieve better technology, and obtaining better technology more quickly or less expensively. Be sure to include details of the scenario in which the benefit was derived so it is clear to others.

### 2.7 Funding

The Government anticipates having \$110M available to fund the Phase II agreement. We expect the offeror to provide realistic proposal for best achieving the program objectives within the outlined budget and schedule. Offerors are encouraged to propose innovative, value added use of the Section 845 agreement procurement mechanism and take maximum advantage of leveraging opportunities with the Government and within their own teams. The Government acknowledges any ATD program contains an element of technical risk. Therefore it is prudent to establish a strategy for sharing the risk of program cost overruns at the start of the program. As part of the agreement offerors are asked to propose such a strategy. As a minimum, it is required that the offeror be responsible for sharing at least 50% of all program costs exceeding the Phase II \$102M cost baseline up to a maximum of \$180M.

The Government proposes to conduct the Phase II ATD on a Cost Plus Milestone and Incentive Fee Plan basis. The Government proposes to hold \$8.0M of the \$110 available as a set-aside for award fees to incentivize cost, schedule and performance. The maximum level of Government

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## 3.0 Proposal Guidance

### 3.1 Scope

This section of the solicitation provides the offeror guidance for the development of a unique proposal for the UCAV Phase II ATD (funded) and an optional RR&OE Phase (unfunded). The offeror's Task Description Document (TDD), Integrated Master Plan (IMP), Phase II and RR&OE Program Plans, and Milestone Review and Incentive Plan will be inserted into the Model Agreement (Section 5). Together with the additional information described below they will form the basis for the offeror's proposal in response to the UCAV ATD Phase II solicitation.

In order to effectively integrate the agreement and the total program, the offeror will continue to use a common numbering system based on their Work Outline structure. This numbering system shall be used throughout the program documentation and all sections of the solicitation response.

### 3.2 Administrative Instructions

#### 3.2.1 Page and Print Information

The Solicitation Response should be submitted in standard three-ring, loose leaf binders with individual pages unbound and printed single sided to facilitate page changes. Indexes, cross reference tables, and tabs will not be included in the page count. Page count will be based on the offeror's hardcopy submission. Ten (10) copies shall be provided. Maximum proposal page limits are:

Volume 1	Phase II Overview	
	Executive Summary	10
	Technical & Management Approach	25
	Government Leveraging Agreements	15
	IMS	10
Volume 2	Proposed Agreements with Unclassified Attachments	
	Proposed Section 845 Agreement	(unlimited)
	Article III TDD	70
	Attachment. 1. IMP	70
	Attachment. 2. Phase II Milestone Reviews & Incentive Plan	15
Volume 3	Proposed Agreement Classified Attachments	
	Attachment 3. Phase II Program Plan	80
	UOS Refinement Plan	(10)
	UDS Development Plan	(30)

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	UDS Demonstration Plan	(40)	
	Attachment 4. RR&OE Program Plan Option	40	
	UOS Refinement Plan	(5)	
	UDS Development Plan	(15)	
	UDS Demonstration Plan	(20)	
Volume 4	Cost Response	(unlimited)	
Volume 5	UCAV Operational System		
	UOS SCD	50	
	UOS CONOPS & FOMS	25	
Volume 6	UCAV Plans		
	UCAV SMP	200	
	- SMP Devel & Exec	P-II/RR&OE (50)	
	- UDS SRD	P-II (50) RR&OE (25)	
	- UDS SDD	P-II (50) RR&OE (25)	
	UTP	25	
Volume 7	Classified Annex	25	
Volume 8	UOS FDR Materials		included by reference
Volume 9	UDS PDR Materials		included by reference

Note: Page numbers in brackets ( ) are recommended sub-allocations.

The Executive Summary, Technical and Management Approach, TDD, IMP, Government Leveraging Agreements, Milestone Reviews and Incentive Plan, IMS, and Cost Response portions of your response should all be kept unclassified. Any classified materials pertaining to these sections should be provided in the Classified Annex. All other sections may contain classified material, appropriately marked and segregated if required. All materials whether classified or unclassified count in the page count for each section.

Authorized representatives of the offeror must sign proposal volumes.

Each page should be printed on an 8-1/2" x 11" sheet using Times New Roman 12-point font. Graphics should not include text in smaller than 10-point font. Fold out pages will be counted as multiple pages. Pages should be marked **SOURCE SELECTION SENSITIVE**.

Teams are also required to submit a single copy of their proposal in Microsoft Office 97 compatible electronic format. Documents containing imported graphics (drawings, charts, photos, etc.) should be accompanied by the originally imported graphics files. Acceptable media includes 3.5" diskettes, 100MB ZIP cartridges or CD-ROM. Electronic copies of the classified annex shall be submitted separately in accordance with instructions in Section 3.2.2.

The offeror does not need to resubmit any Phase I milestone 4 deliverables.

### 3.2.2 Response Delivery Information

All responses must be received on or before 9 February 1999 at 4:00 PM Eastern Standard Time. Late responses will not be accepted.



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The unclassified portion of the offeror's proposal shall be mailed or hand carried to:

Defense Advanced Research Projects Agency (DARPA)  
Unmanned Combat Air Vehicle Program  
3701 North Fairfax Drive  
Arlington, VA 22203-1714  
Attn: Contracts Management Office/R. Swatloski  
Solicitation Number: MDA972-99-R-0001

Responses and response modifications (which will only be accepted prior to the deadline for receipt of response) shall be submitted in sealed envelopes or packages to the address shown above and marked with the following information on the outer wrapping:

Offeror's name and return address  
The response receipt address above  
Solicitation Number: MDA972-99-R-0001  
Hour and due date:

The classified portion of the offeror's proposal shall be submitted through the DARPA Deputy Director of Security and Intelligence using the appropriate procedures.

### **3.2.3 Changes to the Model Agreement**

The offeror can propose any changes, additions, or deletions to the Model Agreement that should be considered during Agreement negotiations. Fully explain the rationale for the changes made in an addendum to the Agreement. Rationale located in other areas of the solicitation response may be cross-referenced. It is the Governments' intent to begin negotiating the Phase II agreements as soon as the final solicitation package is released.

### **3.2.4 Regulations Governing Objections to Solicitation and Award**

Any objections to the terms of this solicitation must be presented in writing within fifteen (15) calendar days of the release of this solicitation. Any objections to the receipt or evaluation of proposals, or to the award of agreements under this solicitation must be presented in writing within fifteen (15) calendar days of the date the objector knows or should have known the basis for its objection. Objections must be provided in letter format, must clearly state that it is an objection to this solicitation or to the receipt or evaluation of proposals, or to the award of agreements, and provide a clearly detailed factual statement of the basis for objection. Failure to comply with these directions is a basis for summary dismissal of the objection. Failure to comply with these directions is a basis for summary dismissal of the objection. Objections must be mailed to the address listed in the proposal delivery information.

All objections will be reviewed and referred to the Director, Office of Management Operations for a decision. If circumstances are deemed to warrant, appropriate relief will be granted.

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## 3.4 Technical and Management Approach

This section of the proposal provides the offeror with the opportunity to explain and substantiate the significant features of their UOS, UDS, SMP and overall technical and management approach.

## 3.5 Proposed Agreement with Attachments

The offeror's agreement shall follow the outline described in Section 5 (Model Agreement). This section provides specific guidance for preparing Article III (Task Description Document) and attachments 1-4 of that agreement.

### 3.5.1 Task Description Document (TDD)

Based on the guidance in this section, the offeror should prepare a Task Description Document (TDD) that defines the tasks and work effort they will perform to complete their program. The TDD describes the work effort necessary to meet the program objectives described in Section 2.3. The TDD shall address all proposed work efforts for both the Phase II ATD and RR&OE phase. The proposal shall clearly differentiate between those tasks that are part of the Phase II ATD (funded) and those that are part of the proposed RR&OE (unfunded) phase. All tasks must be defined against the offeror's common Work Outline. The TDD must identify work effort to two levels below the segment level of the offeror's Work Outline. The offeror may choose to define work at lower levels to better explain their approach toward meeting program objectives. TDD format should follow the example contained in Table 3.2.

This guidance is not intended to be all-inclusive. It represents minimum tasks that must be included in your program and format guidance information for consideration as each offeror develops their proposed Agreement.

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### 00000 UCAV DEMONSTRATOR SYSTEM

#### PHASE II

##### 00000 UCAV Demonstrator System

(Phase II Level 1 Task Description provided here.)

##### 01000 Level 2 Title

(Phase II Level 2 Task Description provided here.)

##### 01100 Level 3 Title

(Phase II Level 3 Task Description provided here.)

##### 01110 Level 4 Title

(Phase II Level 4 Task Description provided here.)

##### 01111 Level X Title

(Continue Phase II Level 5 and lower Task Descriptions as required to adequately describe the tasks to be performed.)

##### RR&OE Option

(Continue same format as shown for Phase II)

### 10000 AIR VEHICLE

#### PHASE II

(Continue same format as shown for Phase II WO 00000 UCAV Demonstrator System Task Description shown above. Offeror must show tasks to a level commensurate with the importance of the task.)

##### RR&OE Option

Continue same format as shown for Phase II 00000 UCAV Demonstrator System Task Description shown above. Offeror must show tasks to a level commensurate with the importance of the task.)

### 20000 - X0000

(Continue same format for the remainder of the Work Outline tasks. Offeror must show tasks to a level commensurate with the importance of the task.)

Table 3.2 Task Description Document Format

### 3.5.1.1 UCAV Demonstrator System (UDS)

#### Phase II

During the second phase the offeror will complete the design, development, manufacture and demonstration of a fully integrated UCAV Demonstrator System (UDS). The offeror will prepare for and conduct the system development, validation, and testing required to verify full functionality of the UDS. The offeror will conduct tests and demonstrations as defined in their

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System Demonstration Plan (SDP) to meet the Phase II ATD program objectives. The UDS design will continue to be documented in a System Description Document (SDD) that provides a detailed description of all segments, major subsystems and components of the system, and in other drawings and specifications required by the offeror to produce the UDS and prepare for subsequent phases.

The studies, analysis, demonstrations and simulations performed during this phase will be documented in, and the program accomplished in accordance with, the Integrated Master Plan. All program documentation, specifications, blueprints and other materials will be provided to the Government upon request in the contractor's format.

### **RR&OE Option**

The RR&OE effort will consist of the additional subsystem, segment, and integrated system demonstrations necessary to further reduce risk and validate operational utility to the level required to enter a low risk EMD in FY2005. Efforts may include the fabrication, manufacture and assembly of additional UCAV demonstration system segment(s) and their delivery and support for field demonstration and evaluation depending upon the offeror's proposed UCAV System Maturation Plan.

#### **3.5.1.2 Air Vehicle Segment**

##### **Phase II**

During this phase the offeror will complete the design, development, integration, and manufacture of the UDS Air Vehicle Segment. The offeror will deliver for test at least two (2) demonstrator air vehicle systems completely integrated with propulsion, payload, and avionics subsystems. The offeror will conduct their Phase II SDP to demonstrate technical feasibility and initial operational performance of this segment. The offeror will perform Air Vehicle Segment, subsystem and component hardware and software tests to ensure that the performance of this segment will meet system specification requirements. Special attention should be paid to the software development process.

Final air vehicle segment performance will be documented in a set of revised UDS system requirements and description documents, interface control documents and other specifications and drawings that the offeror deems necessary for the continued use of the air vehicle and its subsystems in the RR&OE Phase. This evolving series of drawings and specifications will be one of the principal subjects of the Phase II reviews and will be delivered to the Government prior to completion of this phase.

### **RR&OE Option**

The offeror will continue to develop and demonstrate the UDS Air Vehicle Segment during this phase of the program. Additional flight testing of the UCAV air vehicles will be conducted to further define their performance envelope and to demonstrate increasing levels of military utility and operational value. Design, fabrication, integration and testing of modifications to the air

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vehicles may occur as well as the manufacture of additional air vehicles to address operational capabilities not present on the Phase II vehicles. The offeror's proposal should define the specific tasks required to meet their overall SMP and RR&OE phase SDP.

### 3.5.1.3 Mission Control Segment

#### Phase II

During this phase the offeror will complete the design, development, integration and manufacture of the UDS reconfigurable mission control segment. External system interfaces will be defined and the mission control system designed to facilitate both initial flight testing of the air vehicles and representative mission performance in accordance with the Phase II program objectives. The offeror will perform Mission Control Segment, subsystem, and component hardware and software tests to ensure that the performance of this segment will meet system specification requirements. Special attention should be paid to the software development process.

Final mission control segment performance will be documented in a set of revised UDS system requirements and description documents, interface control documents, and other specifications and drawings that the offeror deems necessary for the continued use of the mission control segment and its subsystems in the RR&OE Phase. This evolving series of drawings and specifications will be one of the principal subjects of the Phase II reviews and will be delivered to the Government prior to completion of this phase.

#### RR&OE Option

The offeror will continue to develop and demonstrate the UDS Mission Control Segment during this phase of the program. Additional testing of the mission control system will be conducted to further refine the operational systems and to demonstrate increasing levels of military utility and operational value. Design, fabrication, integration and testing of modifications to the mission control segment may occur as well as the manufacture of additional mission control segments to address operational capabilities not present on the Phase II systems. The offeror's proposal should define the specific tasks required to meet their overall SMP and RR&OE Phase SDP.

### 3.5.1.4 Support Segment

#### Phase II

The offeror will establish and conduct a disciplined systematic approach to the design and development of the Support Segment. The Support Segment concept developed during Phase I of the ATD shall be refined and validated to the maximum extent possible in the UDS segments produced and demonstrated during Phase II. This will entail performing and documenting trade-offs, economic analyses and life cycle cost decisions that will help establish the final logistics posture of the UCAV Operational System. The offeror should document the results of these analyses in the Support System Segment Specification and any necessary planning, concept, or training documents to support the Phase II effort and ensure a smooth transition to the RR&OE Phase. These documents should be updated as necessary throughout Phase II.

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The offeror will provide complete contractor logistics support for the Phase II test program. During this period the offeror will recommend and demonstrate initial support concepts to the Government consistent with their UOS design. The offeror shall identify and provide all of the secondary items - spares, repair parts, replacement assemblies, etc. necessary for UDS system support. The offeror will also provide logistics support, which has been determined through the above trade studies and analyses, to be the optimum support posture for Phase II.

### **RR&OE Option**

The offeror will continue to develop and demonstrate the UCAV Support Segment during this phase of the program. The offeror will provide that logistics support, which has been determined through trade studies in previous program phases, to be the optimum support posture for the RR&OE phase of the program. The offeror will update these trade studies and analyses as needed. Additional demonstrations of the support segment will be conducted to further refine the operational system design and to demonstrate increasing levels of military utility and operational. Design, fabrication, integration and testing of modifications to the support segment may occur as well as the manufacture of additional pieces of support equipment to address operational capabilities not present on the Phase II systems. The offeror's proposal should define the specific tasks required to meet their overall SMP and RR&OE Phase SDP.

### **3.5.1.5 Systems Engineering/Program Management**

#### **Phase II**

During this phase, the offeror will conduct systems engineering processes that lead to a complete and balanced system design and demonstration, apply their program management processes, and refine those processes.

The systems engineering processes include systems level analyses and application of specialty engineering. The results of systems level trades should be reflected in requirements and architecture flow down into the System and Segment Specifications with clear definitions of interfaces. Specialty engineering disciplines (e.g., software engineering, systems safety, reliability and fault tolerance, human factors, etc.) should be applied across the system. Emphasis should be placed on incremental demonstration of a complete, integrated, balanced system.

The offeror will refine the systems engineering process to formulate and assess design trades and capabilities trades, and provide continuous visibility of the configuration and all specifications via their program Configuration Management System (CMS). Similarly, the program management processes established during Phase I will be refined and these two processes will continue to be integrated. This integration will ensure that the program progresses successfully to the scheduled reviews (Initial Design Review, Final Design Review and Flight Readiness Review). The program will refine the established Phase I tracking tools to include those called for in the Process IMP. This tracking system will continue to provide updated information on a

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real time basis and will include at a minimum: Technical Performance Measures, Integrated Master Schedule and Financial Management System information.

The offeror will complete and maintain the CMS on a secure (Program Sensitive/Proprietary) UCAV ATD Website and provide the computer resources necessary to support this architecture. This architecture will provide visibility into all of the tracking tools defined during Phase I and Phase II and provide connectivity for the Government and contractor team members. This information system architecture will provide all team members with access to a common program database. All data should be maintained by the offeror and provided/updated to be timely and accurate.

The offeror will define, implement and maintain an Earned Value Management System. This system and the offeror's financial tracking system accessible through the secure website will be the basis for financial management of the system. The Earned Value Management System data will be kept current and will be available (electronically or in hard copy) within eight (8) working days from the close of the monthly accounting period. The contractor financial management system will provide customer visibility to contractor performance at the same time as it is available internally to the contractor.

The offeror will refine the Technical Performance Measures (TPMs) identified in Phase I to track the maturity of key program technical parameters and provide management indicators which forecast the achievement of program goals. The offeror shall define a set of key TPMs for the complete UCAV system, the system segments and major subsystems. These TPMs shall track the successful accomplishment of the overall program goal, specific Phase II and RR&OE objectives, the validation of the effectiveness and affordability of the proposed UOS design, and specific performance of the UDS systems.

The contractor will define a definitive, unambiguous, quantitative set of Phase II Completion Criteria (PCC) that defines successful completion of the Phase II ATD. At a minimum, this set of criteria must explicitly address how all specific Phase II objectives have been satisfied, how all critical and enabling TPSAs associated with their UOS design have been addressed and how technical feasibility for a UCAV system to effectively and affordably prosecute 21<sup>st</sup> century SEAD/Strike missions within the emerging command and control architecture has been demonstrated. The contractor will develop and maintain a process to track the successful completion of each PCC and insure that a formal review of their successful completion is conducted and documented through written concurrence by the UCAV ATD PM at the appropriate Milestone Review.

The offeror will continue to maintain an Integrated Master Schedule (IMS) that complements the IMP and provides continuous status of program accomplishments against time. This tiered system will provide visibility sufficient to manage the program.

The offeror will continue to provide visibility into their current budget and spend plan. At a minimum, the offeror will update the information contained within their IMS and financial tracking systems on a monthly basis.

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## RR&OE Option

During this phase the offeror will continue to apply and refine their systems engineering and program management tools to accommodate any changes which result from the Phase II system tests. The Phase II TPMs and PCCs will be updated consistent with the RR&OE objectives and the Government will continue to use an offeror managed Website to track technical, schedule and financial progress.

### 3.5.1.6 System Test

#### Phase II

During Phase II the offeror will develop and maintain, a UCAV Master Test Plan (MTP) to describe their entire Phase II test program. Test objectives should be described by top-level mission cards and tied to the offeror's SMP. The offeror should identify all Government facilities, hardware, software, documents, or other types of support required to perform their test tasks and the associated dates each item is needed.

The offeror will conduct a series of UDS system, segment and subsystem tests during Phase II. Critical UCAV support concepts and external interfaces including external exploitation systems will be tested during this period to ensure smooth transition to the planned RR&OE field demonstrations. These component, subsystem, hardware/software integration, and system test tasks should lead up to and include flight testing of a fully functional end-to-end UDS. The flight test program will be conducted at an offeror defined test location mutually agreed to by the offeror and Government. A full-up test system will consist of at least two complete Air Vehicle Segments and one reconfigurable Mission Control Segment as defined in the SDD. Prior to the conduct of the first flight the offeror will conduct a Flight Readiness Review (FRR). All readiness issues identified as part of the FRR will be documented and resolved prior to first flight.

## RR&OE Option

During the RR&OE Phase the offeror will develop and maintain a UCAV Master Test Plan (MTP) to describe their entire RR&OE test program. Test objectives should be described by top-level mission cards and tied to your SMP. The offeror should identify all Government facilities, hardware, software, documents, or other types of support required to perform their test tasks and the associated dates each item is needed.

The purpose of the RR&OE test program is to demonstrate the military utility, operational value and technical maturity of the offeror's UOS design and CONOPS. The offeror will conduct a risk reduction and operational evaluations program in accordance with their overall SMP and RR&OE SDP, and IMS. The RR&OE system tests should validate the overall mission effectiveness and affordability of your UOS design including all aspects of the projected systems performance, operations and support and logistics. Two, or more, UDS Air Vehicle Segments



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Key elements of the Product IMP and their definitions are:

### Event

- The conclusion/initiation of an interval of major program activity (i.e., "final design complete").
- Decision oriented maturation events (i.e., "Flight Test Readiness Review").
- Events need not be sequential.
- The number of events should increase for lower levels.
- The minimum set of four UCAV air vehicle, mission control and ground segment events for Phases II are as shown early in this section of the solicitation.

### Significant Accomplishment

- Desired result at a specified event which indicates a level of design
- Maturity (or progress) directly related to each product/process.
- Discrete step in the progress of the planned development.
- Describes functional interrelationships of different disciplines applied to the program (i.e., "test", "manufacturing", system engineering").
- Must be event related - not just time coincident.

### Accomplishment Criteria

- A definitive measure/indicator that the level of maturity (or progress) has been achieved.
- Work effort completions that ensure closure of accomplishment.

### Phase Accomplishment is Planned to Occur

- The phase of the UCAV acquisition strategy (i.e., Phase II, RR&OE) in which the accomplishment is planned to occur.

The offeror shall define and maintain a comprehensive Product IMP. The key elements should be provided in an easy to read table format.

### 3.5.2.2 Process IMP

The offeror shall describe a complete systems engineering process for conducting Phase II of this program. The offeror shall describe the organizational responsibilities and authority for the systems engineering effort, including control of team member engineering. Similarly a program management process based on the concepts of Integrated Product and Process Development (IPPD) shall be established.

The offeror shall integrate their systems engineering and program management processes to ensure the program progresses successfully through the Phase II and RR&OE Phase milestones. This process should establish a series of tracking tools which should be updated monthly and shall include:

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- Technical performance measures (TPM): The offeror should provide a series of TPMs that track the maturity of key program technical parameters and provide management indicators that forecast the achievement of program objectives. The offeror should initially develop TPMs that delineate key technical goals and objectives through Level 2 of the Work Outline. Metrics should be developed for systems engineering, program management and test and evaluation. Example TPMs are UDS performance parameters and Phase II component test costs.
- Phase II Completion Criteria (PCC): The offeror will define and track a definitive, unambiguous, quantitative set of Phase II Completion Criteria (PCC) that defines successful completion of the Phase II ATD. At a minimum, this set of criteria must explicitly address how all specific Phase II objectives have been satisfied, how all critical and enabling TPSAs associated with their UOS design have been addressed and how technical feasibility for a UCAV system to effectively and affordably prosecute 21<sup>st</sup> century SEAD/Strike missions within the emerging command and control architecture have been demonstrated. The offeror will develop and maintain a process to track the successful completion of each PCC and insure that a formal review of their successful completion is conducted and documented through written concurrence.
- Financial Management System: The offeror will provide a financial management system that allows the Government electronic access and on-line visibility into their program budget and spend plan and is tied to their work outline. The offeror will provide regular cost reports to the Government, at least monthly, in offeror preferred format. The offeror will develop and maintain an earned value management system and coordinate with the Government the key elements of its implementation. The offeror shall provide visibility into their subcontract management plan.

Additional system engineering and management processes shall include:

- System Software Development: The offeror will implement and maintain a rigorous formal process for software development, integration, and testing that follows an established military, national, or international standard.
- Change Management: The offeror will implement and maintain a rigorous formal process for tracking and documenting changes to the Phase II and RR&OE program documents as described in section 2.5.2. The offeror shall define major and minor changes and the process for managing both types of changes. This process must include consultation with the Government UCAV Program Manager before any major changes are implemented.
- Risk Assessment and Management: The offeror will implement and maintain a rigorous formal process for risk assessment and management.
- Security: The offeror will implement and maintain a rigorous formal process for maintaining program security at all required levels.
- Testing: The offeror will implement and maintain a rigorous formal process for preparing and conducting testing. Particular attention should be paid to flight readiness reviews, flight tests, and evaluating test results and certifying any corrective actions before resuming testing. A Master Test Plan shall be developed and maintained throughout the Phase II and RR&OE Phases as described in section 3.5.1.6.

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## 3.5.2.3 Work Outline Dictionary

All sections of the offeror's proposal shall follow a common Work Outline. To insure that this Work Outline is fully defined, the offeror will provide a work outline dictionary. This dictionary shall define the Work Outline to a level at least two (2) levels below the offeror's UCAV segment level to provide consistency with the TDD, IMP, IMS and Cost Response. Additional levels of definition shall be provided as necessary to fully define each item in the Work Outline.

## 3.5.3 Attachment 2: Milestone Review and Incentive Plan

The offeror shall document their unique Milestone Review and Incentive Plan in accordance with the guidance provided in Section 2.5 and 3.2 and the example provided as an attachment to the Model Agreement (Section 5).

## 3.5.4 Attachment 3: Phase II Program Plan

The offeror shall document their complete Phase II Program Plan in accordance with the guidance provided in Sections 2.4 and 3.2.

## 3.5.2 Attachment 4: RR&OE Program Plan Option

The offeror shall document their complete RR&OE Program Plan in accordance with the guidance provided in Sections 2.4 and 3.2.

## 3.6 Integrated Master Schedule (IMS)

The offeror shall establish and maintain an Integrated Master Schedule (IMS) that complements the Product IMP and provides continuous status of program accomplishments against time. The IMS outlines the specific detailed tasks and the amount of time expressed in calendar schedules necessary to achieve each significant event and/or functional accomplishment. It is a tiered scheduling system corresponding to the offeror's common work outline that links all program documents and management tools together. This tiered system will provide visibility to items below the UCAV segment level as appropriate.

The offeror's IMS shall be written to detail every task in the program. The schedule shall include traceability through both the funded Phase II ATD and the unfunded RR&OE Phase for all key events/accomplishments/dates. The offeror may provide additional elements if deemed necessary. The IMS shall also provide the basis for the earned value system. An initial IMS shall be delivered with the Phase II proposal. The offeror's submission shall include a summary level hardcopy and an electronic copy of the complete schedule in Microsoft Project compatible format.

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### 3.7 Cost Response

The offeror shall provide a Cost Response with sufficient cost information to substantiate that their proposed cost is realistic, reasonable, and complete for the proposed Phase II and RR&OE work. The Cost Response shall provide enough information to ensure the Government can conduct a complete and fair evaluation. The offeror's Cost Response should reflect their best estimate of the costs for the entire UCAV acquisition strategy. The Cost Response shall clearly differentiate between those costs that are part of the Phase II ATD (funded) and those that are part of the proposed RR&OE (unfunded) phase. It should convince the Government that the Phase II activities described in their proposal could be reasonably accomplished within the total \$110M program funding limit.

The Cost Response shall also define those costs associated with their proposal for the unfunded RR&OE phase. The Government intends to use your Cost Response data as the basis for developing the RR&OE budget building inputs. Therefore, the accuracy of your cost data for your RR&OE option is an important factor in maintaining a seamless path to low-risk EMD by 2005.

For the Government to determine the reasonableness, realism and completeness of your Cost Response, the following types of data must be provided for each of your team members and in a cumulative summary:

Labor: Total labor includes direct labor and all indirect expenses associated with labor. Provide a breakdown of labor and rates for each category of personnel to be used on this project.

Direct Materials: Total direct material that will be acquired and/or consumed in the program. Limit this information to only major items of material and how the estimated expense was derived. For this agreement a major item exceeds \$250,000.

Subcontracts: Describe major efforts to be subcontracted, the source, estimated cost and the basis for this estimate. For this agreement a major effort exceeds \$500,000.

Travel: Total proposed travel expenditures relating to the program. Limit this information to the cost, number of trips, and general purpose of each cost or the basis of estimate.

Other Costs: Any direct costs not included above. List the item, the estimated cost, and basis for the estimate.

The offeror shall provide a list of all Government furnished equipment required for execution of their proposal along with a cost estimate for its use. The cost of GFE shall be included in the offeror's total program cost and will be subtracted from the total funding available for Phase II if required during that Phase. If equipment is to be provided at no cost to the program, the offeror must provide a signed letter from the appropriate Government official indicating that no costs will be incurred by the UCAV program resulting from the acceptance of the equipment.

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To facilitate the Government's evaluation and to determine the realism and completeness of your Cost Response, submit it using the formats provided in the Tables 3.2 and 3.3 as a guide. You may tailor the formats to reflect your own Work Outline (WO), internal business practices and accounting procedures. Tables 3.2 and 3.3 are our notional representation of the type and level of data needed to do a thorough evaluation. Where not specified, the Government assumes that the level of the data will be to the appropriate WO level for hardware items and a similar level for software.

For elements in the WO which include computer resources, show how you allocated the computer resource development tasks among the prime, team members and subcontractors. Show for both the prime and major team members separate software and hardware non-recurring engineering hours. In Table 3.2 show the total labor separately for each WO line number. Describe how you estimated the cost of software development associated with each appropriate WO level. Cite any parametric relationships you used (e.g., hours per line of code, or complexity factors) in estimating the software development task. Software cost data for each software element should include the cost of developing re-used, modified and new Source Lines of Code (SLOC).

### Cost/Labor Matrix

Table 3.2 depicts the Government's notional work outline and associated level of indenture of the UDS system. This notional work outline reflects the level of insight we desire concerning the number of labor hours proposed, by Government fiscal year, at the lowest level of indenture indicated. The offeror's unique Table 3.2 shall be submitted with their Cost Response both in hard copy and as an Excel 97-spreadsheet file on magnetic media.

The offeror shall modify and expand Table 3.2 to reflect their proposed systems configuration and their approach to conducting the Phase II and RR&OE program. As with all other parts of your proposal, the work outline numbers in the far left of the matrix must be consistent. After modifying the spreadsheet to reflect their unique system configuration approach, the offeror should expand the spreadsheet to the right with a set of columns for each Government fiscal year of their proposed Phase II and RR&OE program as shown in Table 3.2. At the lowest level of indenture, enter the number of direct labor hours for each task for each year. For each year also enter material cost, the direct labor hours for each major subcontracted effort.

Software costs will be defined for each appropriate WO level. All software costs shall also be broken out and detailed separately in a format of the offeror's choice. This software breakout shall be organized in accordance with the offeror's work outline and linked to specific UDS capabilities. Insight into the individual software costs associated with each segment, subsystem and major component shall be provided. Details down to the specific processor unit and its functionality shall be provided.

At the bottom of the spreadsheets, make a single entry for the total indirect cost, management reserve, total other direct costs (ODCs), total general and administrative costs (G&A) and FCCM.

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								GFY 99				GFY XX			
DESCRIPTION								PRIME		SUB 1 => n					
WO #	0	1	2	3	4	5	6	7	Tot Hrs	Matl/ Sub \$	Tot Hrs	Matl/ Sub \$			
	Total System														
	Air Segment														
	Airframe														
	Fuselage														
	Wing														
	Horiz/Vert Tail														
	Tail Booms & Pods														
	Inlet, Exhaust Ducts														
	Landing Gear														
	Airframe Mounted Sub-Systems														
	Radomes														
	Aperture														
	Integration and Test														
	Propulsion														
	Engine														
	Engine Mounted Accessories														
	Integration and Test														
	Avionics														
	Flight Mgmt System														
	Air Data System														
	Navigation														
	ATC COMMS														
	Integration and Test														
	etc														

**Table 3.2 Cost/Labor Matrix**

### Spend Plan

The offeror shall provide a spend plan which shows how all expenses will be time phased for the program. Total program costs shall be shown for each segment in "Then Year" dollars broken out by quarters of Government fiscal years. This Plan shall cover all proposed activities from FY99 through FY2005. Separate lines should be provided to clearly differentiate the funded Phase II ATD costs from the unfunded RR&OE costs. This spend plan should match up as closely as possible to the Government Phase II ATD funding profile provided in Table 2.1.

### Labor Category Data

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The offeror shall use Table 3.3 as a format guide to display total annual prime and subcontractor labor hour distribution by labor and category. Provide a separate table for the prime contractor and for each sub-contractor with a subcontract value greater than \$500,000. Composite labor categories, such as Senior Engineer, Engineer and Junior Engineer may be used for subcontractors.

Labor Category	1999 Hrs	2000 Hrs	=====>	20XX Hrs	Total Hrs
<b>Lbr Cat 1</b>					
<b>Lbr Cat 2</b>					
<b>Lbr Cat n</b>					

**Table 3.3. Annual Labor Categories and Hours per Contractor (Prime and Subs)**

### Cost Approach and Substantiation

The offeror shall provide a narrative section that explains or substantiates the approach used to develop the costs reflected in the Cost/Labor Matrix. In this section, the offeror shall provide insight into estimate quality, estimating methodologies, and risks associated with key elements of their cost proposal. The Government is interested in all components of the offeror's UDS. We are also interested in software development costs since the anticipated mission control segment and on-board processors are software intensive. Therefore, the offeror shall provide insight into their methods for estimating source lines of code for software effort and provide a rationale for how software productivity is determined in number of source lines of code per month.

For the test and demonstration activities, the offeror's cost response shall identify assumptions, facilities, planning factors, etc. that drive the Phase II and RR&OE Phase cost. Examples include number of personnel required to support the test or deployments, planning for the test or deployment (e.g., pre-test/deployment meetings with the test/operational community for coordination, on-site support), and logistics considerations during the test/deployments (e.g., spares, training, maintenance and reliability). The offeror should provide sufficient detail to justify their cost for both their proposed Phase II and RR&OE Phase test and demonstration efforts.

### 3.8 UOS System Capability Document (SCD)

The offeror shall provide a final version of their UOS System Capability Document (SCD) that captures the full capability of their proposed operational design. The UOS SCD and UDS SRD shall follow a common format based on the common work outline that links all the proposal documents together. The UOS SCD should provide details on the total system and system segment capabilities as well as any additional major subsystems or components required to fully define the complete UOS system. Overall system and segment performance capabilities should

## Source Selection Sensitive

be defined along with all critical or enabling TPSAs associated with the systems or segment design, operation, or support. This living document will continue to evolve during both the Phase II and RR&OE activities and eventually transform into the EMD system specification. The UOS SCD is not part of the Phase II Agreement.

### 3.9 UOS CONOPS and Figures of Merit (FOMs)

The offeror shall provide a detailed description of their UOS concept of operations (CONOPS) for conducting the SEAD/Strike and Peacekeeping missions defined during Phase I. Aspects of their CONOPS directly responsible for overall system effectiveness and affordability will be described in detail. Specific characteristics of the offeror's; mission control, air vehicle, weapons, sensors and C4I architecture will be defined to the level necessary to fully illustrate their approach. All Figures of Merit (FOM) for both affordability and mission effectiveness defined during Phase I should be presented here in a straightforward tabular or graphical format. The basic robustness of the offeror's UOS design will be described with regards to alternative command and control, weapons loadouts, targeting approaches and sensor exploitation techniques that are inherent in their baseline design. The offeror may control this entire section at the appropriate security level or segregate the necessary data into a classified attachment at their discretion. An electronic copy of your TS level SUPPRESSOR database and your Secret level THUNDER database shall also be submitted a part of your proposal. These FOMs will continue to evolve during the program as lessons learned are translated into UOS refinements. The UOS CONOPS and FOMs are not part of the Phase II Agreement.

### 3.10 UCAV System Maturation Plan (SMP)

The offeror shall document their System Maturation Plan (SMP) in accordance with the guidance provided in Sections 2.4 and 3.2. This proposal document shall contain all portions of your SMP except for the Phase II and RR&OE Program Plans that will be provided in your Agreement Attachments 3 and 4 respectively. These portions of the SMP are not part of the offeror's Agreement.

### 3.11 UCAV Transition Plan (UTP)

The offeror shall document their UCAV Transition Plan (UTP) in accordance with the guidance provided in Sections 2.4 and 3.2. The UTP is not part of the offeror's Agreement.

### 3.12 Classified Annex

The Phase I activities used and produced information from multiple SAR caveats and various levels of Sensitive Compartmented Information (SCI). The Government anticipates the Phase II proposal will contain information at all those levels. The classified annex provides the offeror with an additional opportunity to describe the details of their proposal that require classification. In particular, this section should be used for any classified information that the offeror would like considered as part of their unclassified sections, i.e. Executive Summary, Technical and Management Approach, Task Description Document, IMP, Government Leveraging Agreements and Milestone Reviews and Incentive Plan. Any classified material provided in this section



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should be clearly linked to the appropriate sections of the rest of the proposal. All other sections of the offeror's proposal may contain classified material up to and including the DARPA SAR caveat. Information in those sections under other SAR caveats, or at the SCI level, should be included in a separate classified attachment if required.

### **3.13 UOS FDR Materials**

The offeror's UOS FDR information will be evaluated as part of the Phase II source selection. The offeror has the option to resubmit any revised FDR materials in conjunction with their Phase II proposal. The offeror should clearly state which subset of the Milestone 3 FDR materials are still valid and which are being revised and replaced. Any unchanged FDR briefing materials will be considered by the Government as submitted and should not be resubmitted here. In the absence of any direction to the contrary, the Government will use only the FDR materials originally presented at Milestone 3 during the source selection.

### **3.14 UDS PDR Materials**

The offeror's UDS PDR materials presented at Milestone 4 will be evaluated as part of the Phase II source selection. All such materials are incorporated as part of your submittal by reference here and must be submitted with the proposal.

### **3.15 Government Leveraging Agreements**

This offeror shall document all the Memorandums of Agreement/Understanding, CRADAs, or other instruments that leverage Government facilities, resources, and/or manpower. The offeror shall incorporate signed agreements from all Government agencies that they have negotiated support or leveraging agreements with. Each of these agreements must define the scope of the support provided by the Government, the cost, terms and conditions, and period of performance. An authorized representative of the Government agency making the commitment must sign each agreement. Signatures must be at a lab director level or higher. Within the offeror's proposal, all agreements should be referenced where appropriate the dependence of the program on this agreement defined and the proposed fallback or alternative approaches identified.

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## 4.0 Evaluation Criteria

### 4.1 Introduction

DARPA anticipates the award of a single Phase II Agreement. The selection will be accomplished based on a subjective evaluation of proposals as described in this section of the solicitation. There are three specific areas of evaluation that will be used: Product Capability and Technical Approach, Management Process and Tools, and Cost. Each offeror's proposal will receive an integrated evaluation by a single multi-functional team. The government reserves the right to award without discussions.

### 4.2 Basis for Phase II Award

Successful Phase II proposals will incorporate a balanced consideration of all three evaluation areas and provide best value to the government.

#### 4.2.1 Product Capability and Technical Approach

The offeror's UOS final design, UDS preliminary design, and all the components of the System Maturation Plan (SMP) will be evaluated to determine how well they satisfy the technical objectives of the Phase II and the Risk Reduction & Operational Evaluation (RR&OE) phase and theUCAV acquisition strategy as a whole. The evaluation will examine the offeror's proposal in the areas listed below:

#### UCAV Operational System (UOS) Design

All aspects of the proposed UOS design and CONOPS will be analyzed to determine if the offeror's UOS:

- demonstrates the potential to effectively and affordably accomplish the SEAD/Strike mission in the 2010 timeframe,
- meets the four Phase I non-tradable requirements,
- was the product of a rigorous set of trades studies and analysis, and
- is technically feasible in the 2010 timeframe.

#### UCAV Demonstrator System (UDS)

All aspects of the proposed UDS design and development plans will be analyzed to determine if they are well defined, technically feasible, support the SMP. The degree of legacy between the UDS and UOS will also be analyzed.

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## System Maturation

All aspects of the proposed SMP will be analyzed to determine if they are well defined, technically feasible, and sufficiently address all the Phase II and RR&OE objectives.

### 4.2.1 Management Process and Tools

The offeror's management and system engineering processes will be evaluated to ensure that overall sound methodologies that represent good management practices are used to complete all the Phase II activities described in their SMP, TDD, IMP, and IMS. Streamlined and innovative business, teaming and technical management practices are desired. Agreement terms and conditions and Phase I past performance will also be evaluated. The evaluation will examine the offeror's proposal in the areas listed below.

#### Management Plan

All aspects of the proposal will be analyzed to determine if the offeror has the planning, management, system engineering and software development processes, security, and qualified program team to successfully accomplish the tasks defined in their TDD, IMP, IMS and SMP.

#### Agreement Terms and Conditions

All aspects of the offeror's proposed agreement will be analyzed to determine the reasonableness of the terms and conditions.

#### Facilities Capability

All aspects of the proposal will be analyzed to determine if the offeror has the capability to conduct all the tasks defined in their TDD, IMP, IMS and SMP.

#### Phase I Performance

All aspects of the offeror's Phase I performance will be analyzed to determine their ability to plan and successfully execute a rigorous systems engineering and program management process.

### 4.2.2 Cost

This evaluation factor will focus on the reasonableness, completeness, and realism, of the offeror's cost estimates for performing the tasks defined in their TDD, IMP, IMS and SMP for both the Phase II and RR&OE Phase option.

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## 5.0 Model Agreement

AGREEMENT

BETWEEN

(INSERT NAME AND ADDRESS)

AND

THE DEFENSE ADVANCED RESEARCH PROJECTS AGENCY  
3701 NORTH FAIRFAX DRIVE  
ARLINGTON, VA 22203-1714

CONCERNING

UNMANNED COMBAT AIR VEHICLE  
ADVANCE TECHNOLOGY DEMONSTRATION  
(UCAV ATD)

Agreement No.: MDA972-98-9-0000

Modification No.: P0000

DARPA Order No.:

Total Estimated Government Funding of the Phase I and Phase II Agreement: \$

Total Funds Obligated: \$

Funds Obligated by this action:

Authority: 10 U.S.C. 2358 and 10 U.S.C. 2371 and Section 845 of the 1994 National  
Defense Authorization Act, as amended

Line of Appropriation: AA

This Agreement is entered into between the United States of America, hereinafter called the Government, represented by The Defense Advanced Research Projects Agency (DARPA), and the (INSERT NAME) pursuant to and under U.S. Federal law.

FOR (INSERT CONTRACTOR NAME)

FOR THE UNITED STATES OF AMERICA  
THE DEFENSE ADVANCED RESEARCH  
PROJECTS AGENCY

(Signature)

(Signature)

(Name, Title) (Date)

(Name, Title) (Date)

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## ARTICLE I: SCOPE OF THE AGREEMENT

This article should state your vision for both Phase II of the joint DARPA/USAF Unmanned Combat Air Vehicle (UCAV) Advanced Technology Demonstration (ATD) Program and the optional Risk Reduction and Operational Evaluation (RR&OE) Phase, and describe how your proposed program satisfies the statement of objectives. This article should summarize the scope of the work you are committing to (as described in detail in Article III, Task Description Document) by entering into this Agreement.

Once again, this article should discuss the way you will interact with DARPA/USAF program team. Suggested wording (paragraphs used in other DARPA Agreements) for your consideration follows:

"DARPA/USAF will have continuous involvement with the Contractor. DARPA/USAF will obtain access to program results and certain rights to data and patents pursuant to Articles VIII and IX. DARPA/USAF and the Contractor are bound to each other by a duty of good faith and best effort in achieving the program objectives."

"This Agreement is an 'other transaction' pursuant to 10 U.S.C. 2358 and 10 U.S.C. 2371 and section 845 of the 1994 National Defense Authorization Act as amended. The Parties agree that the principal purpose of this Agreement is to stimulate the Contractor to provide best efforts in development even though the acquisition of property or services for the direct benefit or use of the Government is present. The Federal Acquisition Regulation (FAR) and Department of Defense FAR Supplement (DFARS) apply only as specifically referenced herein. This Agreement is not intended to be, nor shall it be construed as, by implication or otherwise, a partnership, a corporation, or other business organization."

Terms such as "Contractor", "parties", "program", etc. should also be defined in this article. Should "Contractor" be a team, alliance, partnership or other arrangement, this article must reflect these provisions and specifically document the relationship between DARPA/USAF and the "unique" Contractor arrangement.

## ARTICLE II: TERM

### A. The Term of this Agreement

This Agreement commences upon the date of the last signature hereon and continues for the duration of Phases II of the UCAV ATD Program with an option for a Risk Reduction and Operational Evaluation (RR&OE) Phase.

### B. Termination Provisions

Subject to a reasonable determination that the project will not produce beneficial results commensurate with the expenditure of resources, the Government may terminate this Agreement by written notice to the other Party, provided that such written notice is preceded by consultation between the Parties. In the event of a termination of the Agreement, the Government shall have paid-up Government purpose license rights to all data developed and delivered under this Agreement. The Government and the Contractor will negotiate in good faith an equitable reimbursement for work performed at the time of Government termination. Failure of the Parties to agree to an equitable adjustment will be resolved pursuant to Article IX, Disputes.

## ARTICLE III: TASK DESCRIPTION DOCUMENT (TDD)

The offeror will submit a TDD in accordance with the guidance provided in the section three of this solicitation.

## ARTICLE IV: IDENTIFICATION AND SEGRAGATION OF WORK TO BE PERFORMED UNDER THIS AGREEMENT:

The contractor will separately account for cost by item number.

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## Item 0001

Item 0001 is to complete the Phase II activities defined and in accordance with the TDD, IMP and UCAV System Maturation Plan (SMP). For planning purposes, the estimated period of performance for Phase II is through \_\_\_\_\_.

Total Estimated Cost: \$ \_\_\_\_\_

This article is subject to the provisions of FAR clause 52.216-7, Allowable Cost and Payment. The contractor agrees to share with DARPA, all costs beyond \$102,000,000 at a share ratio of 50/50 up through \$180,000,000. Any award fee earned out of the award fee pool of \$3,000,000, can be used to offset the cost share.

## Item 0002 (OPTION)

Item 0002 is complete the optional Risk Reduction and Operation Evaluation RR&OE Phase activities defined and in accordance with the TDD, IMP and UCAV System Maturation Plan (SMP).

Total Estimated Cost: \$ \_\_\_\_\_

This option may be exercised within \_\_\_\_ days after the agreement award date for Phase II.

## ARTICLE V: AWARD FEE

Award Fee can be earned as described in the Milestone Review and Incentive Plan, Attachment 2. The specific dates and the associated maximum Award Fee available are as follows:

	Date	Pool Amount
#1	30 Sept 99	\$750K
#2	31 Mar 00	\$750K
#3	30 Sept 00	\$750K
#4	31 Mar 01	\$1.0M
#5	30 Sept 01	\$1.5M
#6	31 Mar 02	\$1.25M
#7	30 Sept 02	\$2.0M

Total Award Fee Available \$8,000,000

## ARTICLE VI: PAYMENT SCHEDULE

### A. Payment of Allowable Cost:

The Contractor will perform the work required by Article III. Phase II payment schedule will be based on cost reimbursement plus award fee. As work progresses, the contractor may submit invoices for payment of allowable cost as defined by FAR clause 52.216-7, ALLOWABLE COST AND PAYMENT (Jul 1991). Such invoices will be certified in the manner prescribed.

### C. Modifications

1. At any time during the term of the Agreement, progress or results may indicate that a change in the TDD would be beneficial to program objectives. Recommendations for modifications, including justifications to support any changes to the TDD, will be documented in a letter and submitted by the Contractor to the DARPA Program Manager with a copy to the DARPA Agreements Administrator. This letter will detail the technical, chronological, and financial impact of the proposed modification to the research program. Any subsequent modification is subject

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to mutual agreement. The Government is not obligated to pay for any proposed change until formally revised by the DARPA Agreements Administrator and made part of this Agreement.

2. The DARPA Program Manager shall be responsible for the review and verification of any recommendations to revise or otherwise modify the Agreement TDD, or other proposed changes to the terms and conditions of this Agreement.

3. For minor or administrative Agreement modifications (e.g., changes in the paying office or appropriation data, changes to Government or Contractor personnel identified in the Agreement, etc.) no signature is required by the Contractor.

4. The Government will be responsible for effecting all modifications to this agreement.

### ARTICLE VII: AGREEMENT ADMINISTRATION

Administrative and contractual matters under this Agreement shall be referred to the following representatives of the parties:

**DARPA**, Robin M. Swatloski, Agreements Officer, Tel: (703) 696-0081

**CONTRACTOR**:(INSERT NAME)(Contractor Administrator)(INSERT TELEPHONE NUMBER)

Technical matters under this Agreement shall be referred to the following representatives:

**DARPA**: Dr. Larry Birckelbaw, Program Manager, Tel: (703) 696-2362

**USAF**: Lt Col Michael B. Leahy Jr., Deputy Program Manager, Tel: (703) 696-2369

**CONTRACTOR**: (INSERT NAME) (INSERT TITLE) (INSERT TELEPHONE NUMBER)

Each party may change its representatives named in this Article by written notification to the other party. The Government will effect the change as stated in item C, 4 of Article VI above.

### ARTICLE VIII: OBLIGATION AND PAYMENT

The parties will negotiate payment methods for later phases prior to the start of performance for each phase. If the payment method agreed upon is a type of cost reimbursement, then we anticipate compliance with current Cost Accounting Standards (CAS) will be required. If the offeror's accounting system does not comply with CAS, the Government will consider other payment approaches.)

#### A. Obligation

The Government's liability to make payments to the Contractor is limited to only those funds obligated under this Agreement or by amendment to the Agreement. DARPA may obligate funds to the Agreement incrementally.

#### B. Payments

1. Prior to the submission of invoices to DARPA by the Contractor Administrator, the Contractor shall have and maintain an accounting system which complies with Generally Accepted Accounting Principles (unless CAS applies), and with the requirements of this Agreement, and shall ensure that appropriate arrangements have been made for receiving, distributing and accounting for Federal funds.

2. The contractor shall submit an original and five (5) copies of all invoices to the Agreements Officer for payment approval. After written verification of the work accomplishment by the DARPA Program Manager, and approval by



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the Agreements Officer, the invoices will be forwarded to the payment office within fifteen (15) calendar days of receipt of the invoices at DARPA. Payment approval for the final Payable Milestone will be made after reconciliation. Payments will be made by Defense Accounting Office, DFAS, Attention: Vendor Pay, 8899 East 56th Street, Indianapolis, IN 46249-1325 within fifteen (15) calendar days of DARPA's transmittal. Subject to change only through written Agreement modification, payment shall be made to the address of the contract's Administrator set forth below.

3. Address of Payee: (INSERT NAME AND ADDRESS OF PAYEE)

4. Limitation of Funds: In no case shall the Government's financial liability exceed the amount obligated under this Agreement.

5. Financial Records and Reports:

The Contractor's relevant financial records are subject to examination or audit on behalf of DARPA by the Government for a period not to exceed three (3) years after expiration of the term of this Agreement. The Contractors shall provide the Agreements Administrator or designatee direct access to sufficient records and information of the Contractor to ensure full accountability for all funding under this Agreement. Such audit, examination, or access shall be performed during business hours on business days upon prior written notice and shall be subject to the security requirements of the audited party.

6. Business Status Report:

A Business Status Report will be submitted monthly. The business status report will provide summarized details of the resource status of this Agreement. This report will be organized to track the contractor's Work Outline, and will include a monthly accounting of current expenditures as planned in your IMP and IMS, and will follow the Work Outline Structure at least two levels below the segment level. Any major deviations shall be explained along with discussions of the adjustment actions proposed. The monthly Business Status Report will also provide an updated Integrated Master Plan (IMP) and Integrated Master Schedule (IMS). Updates will include the status of IMS tasks (updated Gantt chart) and the status of the detailed criteria and significant accomplishments within the IMP. Any changes to the IMP or IMS other than status updated should be highlighted. Since the IMP is part of the Agreement, any changes (other than status) will required an amendment to this Agreement. **IMS changes do not require an Agreement amendment.**

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CONTRACT START DATE:  
 CONTRACT END DATE:  
 TOTAL CONTRACT VALUE:  
 FUNDING STATUS "AS OF" DATE:

TASK ELEMENT	CUMMULATIVE TO DATE			AT COMPLETION	
	PLANNED EXPEND	ACTUAL EXPEND	% COMPLETE	BAC*	LRE**
SUBTOTAL					
MANAGEMENT RESERVE					
UNALLOCATED RESOURCES					
TOTAL					

\*Budget At Completion (BAC) changes only with scope changes (not affected by underrun / overrun)

\*\*Latest Revised Estimate (LRE)

## ARTICLE IX: DISPUTES

### A. General

Parties shall communicate with one another in good faith and in a timely and cooperative manner when raising issues under this Article.

### B. Dispute Resolution Procedures

1. Any disagreement, claim or dispute between the Government and the Contractor concerning questions of fact or law arising from or in connection with this Agreement, and, whether or not involving an alleged breach of this Agreement, may only be raised under this Article.

2. Whenever disputes, disagreements, or misunderstandings arise, the Parties shall attempt to resolve the issue(s) involved by discussion and mutual agreement as soon as practicable. In no event shall a dispute, disagreement or misunderstanding which arose more than three (3) months prior to the notification made under subparagraph B.3 of this article constitute the basis for relief under this article unless the Director of DARPA in the interests of justice waives this requirement.

3. Failing resolution by mutual Agreement, the aggrieved Party shall document the dispute, disagreement, or misunderstanding by notifying the other Party (through the DARPA Agreements Administrator or Contractor Administrator, as the case may be) in writing of the relevant facts, identify unresolved issues, and specify the clarification or remedy sought. Within five (5) working days after providing notice to the other Party, the aggrieved Party may, in writing, request a joint decision by the DARPA Deputy Director for Management and Representative of the Contractor ("Contractor Representative"). The other Party shall submit a written position on the matter(s) in dispute within thirty (30) calendar days after being notified that a decision has been requested. The Deputy Director for Management and the Contractor Representative shall conduct a review of the matter(s) in dispute and render a decision in writing within thirty (30) calendar days of receipt of such written position. Any such joint decision is final and binding unless a Party shall, within thirty (30) calendar days, request further review as provided in this Article.

4. Upon written request to the Director of DARPA, made within thirty (30) calendar days or upon unavailability of a joint decision under subparagraph B.3 above, the dispute shall be further reviewed. The Director of DARPA may

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elect to conduct this review personally or through a designee or jointly with a representative of the other Party who is a senior official of the Party. Following the review, the Director of DARPA or designee will resolve the issue(s) and notify the Parties in writing. Such resolution is not subject to further administrative review and, to the extent permitted by law, shall be final and binding.

## ARTICLE X: PATENT RIGHTS

### A. Definitions

1. "Invention" means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the United States Code.
2. "Made" when used in relation to any invention means the conception or first actual reduction to practice of such invention.
3. "Practical application" means to manufacture, in the case of a composition of product; to practice, in the case of a process or method, or to operate, in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is capable of being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.
4. "Subject invention" means any Contractor invention conceived or first actually reduced to practice in the performance of work under this Agreement.

### B. Allocation of Principal Rights

Unless the Contractor shall have notified DARPA (in accordance with subparagraph C.2 below) that the Contractor does not intend to retain title, the Contractor shall retain the entire right, title, and interest throughout the world to each subject invention consistent with the provisions of the Articles of Collaboration, this Article, and 35 U.S.C. § 202. With respect to any subject invention in which the Contractor retains title, DARPA shall have a non-exclusive, nontransferable, irrevocable, paid-up license to practice or have practiced on behalf of the United States the subject invention throughout the world. Notwithstanding the above, the Contractor may elect as defined in its Articles of Collaboration to provide full or partial rights that it has retained to Contractor or other parties.

### C. Invention Disclosure, Election of Title, and Filing of Patent Application

1. The Contractor shall disclose each subject invention to DARPA within four (4) months after the inventor discloses it in writing to his company personnel responsible for patent matters. The disclosure to DARPA shall be in the form of a written report and shall identify the Agreement under which the invention was made and the identity of the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological, or electrical characteristics of the invention. The disclosure shall also identify any publication, sale, or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. The Contractor shall also submit to DARPA an annual listing of subject inventions.
2. If the Contractor determines that it does not intend to retain title to any such invention, the Contractor shall notify DARPA, in writing, within eight (8) months of disclosure to DARPA. However, in any case where publication, sale, or public use has initiated the one (1)-year statutory period wherein valid patent protection can still be obtained in the United States, the period for such notice may be shortened by DARPA to a date that is no more than sixty (60) calendar days prior to the end of the statutory period.
3. The Contractor shall file its initial patent application on a subject invention to which it elects to retain title within one (1) year after election of title or, if earlier, prior to the end of the statutory period wherein valid patent protection can be obtained in the United States after a publication, or sale, or public use. The Contractor may elect to file patent applications in additional countries (including the European Patent Office and the Patent Cooperation Treaty)

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within either ten (10) months of the corresponding initial patent application or six (6) months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications, where such filing has been prohibited by a Secrecy Order.

4. Requests for extension of the time for disclosure election, and filing under Article VII, paragraph C, may, at the discretion of DARPA, and after considering the position of the Contractor, be granted.

### D. Conditions When the Government May Obtain Title

Upon DARPA's written request, the Contractor shall convey title to any subject invention to DARPA under any of the following conditions:

1. If the Contractor fails to disclose or elects not to retain title to the subject invention within the times specified in paragraph C of this Article; provided, that DARPA may only request title within sixty (60) calendar days after learning of the failure of the Contractor to disclose or elect within the specified times.
2. In those countries in which the Contractor fails to file patent applications within the times specified in paragraph C of this Article; provided, that if the Contractor has filed a patent application in a country after the times specified in paragraph C of this Article, but prior to its receipt of the written request by DARPA, the Contractor shall continue to retain title in that country; or
3. In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceedings on, a patent on a subject invention.

### E. Minimum Rights to the Contractor and Protection of the Contractor's Right to File

1. The Contractor shall retain a non-exclusive, royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the Contractor fails to disclose the invention within the times specified in paragraph C of this Article. The Contractor license extends to the domestic (including Canada) subsidiaries and affiliates, if any, of the Contractor within the corporate structure of which the Contractor is a party and includes the right to grant licenses of the same scope to the extent that the Contractor was legally obligated to do so at the time the Agreement was awarded. The license is transferable only with the approval of DARPA, except when transferred to the successor of that part of the business to which the invention pertains. DARPA approval for license transfer shall not be unreasonably withheld.
2. The Contractor domestic license may be revoked or modified by DARPA to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted consistent with appropriate provisions at 37 CFR Part 404. This license shall not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of DARPA to the extent the Contractor, its licensees, or the subsidiaries or affiliates have failed to achieve practical application in that foreign country.
3. Before revocation or modification of the license, DARPA shall furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor shall be allowed thirty (30) calendar days (or such other time as may be authorized for good cause shown) after the notice to show cause why the license should not be revoked or modified.

### F. Action to Protect the Government's Interest

1. The Contractor agrees to execute or to have executed and promptly deliver to DARPA all instruments necessary to establish or confirm the rights the Government has throughout the world in those subject inventions to which the Contractor elects to retain title, and (ii) convey title to DARPA when requested under paragraph D of this Article and to enable the Government to obtain patent protection throughout the world in that subject invention.

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2. The Contractor agrees to require, by written agreement, that employees of the Members of the Contractor, other than clerical and non-technical employees, agree to disclose promptly in writing, to personnel identified as responsible for the administration of patent matters and in a format acceptable to the Contractor, each subject invention made under this Agreement in order that the Contractor can comply with the disclosure provisions of paragraph C of this Article. The Contractor shall instruct employees, through employee agreements or other suitable educational programs, on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

3. The Contractor shall notify DARPA of any decisions not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceedings on a patent, in any country, not less than thirty (30) calendar days before the expiration of the response period required by the relevant patent office.

4. The Contractor shall include, within the specification of any United States patent application and any patent issuing thereon covering a subject invention, the following statement: "This invention was made with Government support under Agreement No. MDA972-9\*-3-00\*\* awarded by DARPA. The Government has certain rights in the invention."

### G. Lower Tier Agreements

The Contractor shall include this Article, suitably modified, to identify the Parties, in all subcontracts or lower tier agreements, regardless of tier, for experimental, development, or research work.

### H. Reporting on Utilization of Subject Inventions

The Contractor agrees to submit, during the term of the Agreement, an annual report on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the subcontractor(s), and such other data and information as the agency may reasonably specify. The Contractor also agrees to provide additional reports as may be requested by DARPA in connection with any march-in proceedings undertaken by DARPA in accordance with paragraph J of this Article. Consistent with 35 U.S.C. § 202(c)(5), DARPA agrees it shall not disclose such information to persons outside the Government without permission of the Contractor.

### I. Preference for American Industry

Notwithstanding any other provision of this clause, the Contractor agrees that it shall not grant to any person the exclusive right to use or sell any subject invention in the United States or Canada unless such person agrees that any product embodying the subject invention or produced through the use of the subject invention shall be manufactured substantially in the United States or Canada. However, in individual cases, the requirements for such an agreement may be waived by DARPA upon a showing by the Contractor that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that, under the circumstances, domestic manufacture is not commercially feasible.

### J. March-in Rights

The Contractor agrees that, with respect to any subject invention in which it has retained title, DARPA has the right to require the Contractor, an assignee, or exclusive licensee of a subject invention to grant a non-exclusive license to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Contractor, assignee, or exclusive licensee refuses such a request, DARPA has the right to grant such a license itself if DARPA determines that:

1. Such action is necessary because the Contractor or assignee has not taken effective steps, consistent with the intent of this Agreement, to achieve practical application of the subject invention;

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2. Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Contractor, assignee, or their licensees;
3. Such action is necessary to meet requirements for public use and such requirements are not reasonably satisfied by the Contractor, assignee, or licensees; or
4. Such action is necessary because the agreement required by paragraph (I) of this Article has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such Agreement.

### ARTICLE XI: DATA RIGHTS

It is the Government's desire to obtain "unlimited" data rights to all data produced during and for the Phase I and the Phase II agreement. At a minimum, consider the list contained under ARTICLE XX (Agreement Deliverables). The Government also intends to use this data to compete any resultant EMD Phase. To streamline negotiation, the offeror may wish to site an existing FAR or DFAR data rights clause.

### ARTICLE XII: FOREIGN ACCESS TO TECHNOLOGY

(NOTE: It is DARPA's intention to restrict this technology from flowing overseas without approval to ensure the economic and security issues have been resolved prior to any release. If the offerors desire proposed changes to this article they should explain the rationale completely.)

This Article shall remain in effect during the term of the Agreement and for five years thereafter.

#### A. Definition

"Foreign Firm or Institution" means a firm or institution organized or existing under the laws of a country other than the United States, its territories, or possessions. The term includes, for purposes of this Agreement, any agency or instrumentality of a foreign government; and firms, institutions or business organizations which are owned or substantially controlled by foreign governments, firms, institutions, or individuals.

"Know-How" means all information including, but not limited to discoveries, formulas, materials, inventions, processes, ideas, approaches, concepts, techniques, methods, software, programs, documentation, procedures, firmware, hardware, technical data, specifications, devices, apparatus and machines.

"Technology" means discoveries, innovations, Know-How and inventions, whether patentable or not, including computer software, recognized under U.S. law as intellectual creations to which rights of ownership accrue including, but not limited to, patents, trade secrets, maskworks, and copyrights developed under this Agreement.

#### B. General

The Parties agree that research findings and technology developments in (INSERT TYPE OF TECHNOLOGY) technology may constitute a significant enhancement to the national defense, and to the economic vitality of the United States. Accordingly, access to important technology developments under this Agreement by Foreign Firms or Institutions must be carefully controlled. The controls contemplated in this Article are in addition to, and are not intended to change or supersede, the provisions of the International Traffic in Arms Regulation (22 CFR pt. 121 et seq.), the DoD Industrial Security Regulation (DoD 5220.22-R) and the Department of Commerce Export Regulation (15 CFR pt. 770 et seq.)

#### C. Restrictions on Sale or Transfer of Technology to Foreign Firms or Institutions

1. In order to promote the national security interests of the United States and to effectuate the policies that underlie the regulations cited above, the procedures stated in subparagraphs C.2, C.3, and C.4 below shall apply to any

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transfer of Technology. For purposes of this paragraph, a transfer includes a sale of the company, and sales or licensing of Technology. Transfers do not include:

- (a) sales of products or components, or
- (b) licenses of software or documentation related to sales of products or components, or
- (c) transfer to foreign subsidiaries of the Contractor for purposes related to this Agreement, or
- (d) transfer which provides access to Technology to a Foreign Firm or Institution which is an approved source of supply or source for the conduct of research under this Agreement provided that such transfer shall be limited to that necessary to allow the firm or Institution to perform its approved role under this Agreement.

2. The Contractor shall provide timely notice to the Government of any proposed transfers from the Contractor of technology developed with Government funding under this Agreement to Foreign Firms or Institutions. If the Government determines that the transfer may have adverse consequences to the national security interests of the United States, the Contractor, its vendors, and the Government shall jointly endeavor to find alternatives to the proposed transfer which obviate or mitigate potential adverse consequences of the transfer but which provide equivalent benefits to the Contractor.

3. In any event, the Contractor shall provide written notice to the DARPA Program Manager and Agreements Administrator of any proposed transfer to a foreign firm or institution at least sixty (60) calendar days prior to the proposed date of transfer. Such notice shall cite this Article and shall state specifically what is to be transferred and the general terms of the transfer. Within thirty (30) calendar days of receipt of the Contractor's written notification, the DARPA Agreements Administrator shall advise the Contractor whether it consents to the proposed transfer. In cases where the Government does not concur or sixty (60) calendar days after receipt and the Government provides no decision, the Contractor may utilize the procedures under Article VII, Disputes. No transfer shall take place until a decision is rendered.

4. Except as provided in subparagraph C.1 above and in the event the transfer of Technology to Foreign Firms or Institutions is approved by the Government, the Contractor shall (a) refund to the Government funds paid for the development of the Technology and (b) negotiate a license with the Government to the Technology under terms that are reasonable under the circumstances.

### D. Lower Tier Agreements

The Contractor shall include this Article, suitably modified, in all subcontracts or lower tier Agreements, for experimental, developmental, or research work.

## ARTICLE XIII: CIVIL RIGHTS ACT

This Agreement is subject to the requirements of Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. 2000-d) relating to nondiscrimination in employment.

## ARTICLE XIV: INSURANCE

Contractor shall maintain the types of insurance listed in FAR 28.307-2(a), (b), and (c) with the minimum amounts of liability indicated, or commercial equivalent.

## ARTICLE XV: GOVERNMENT FURNISHED EQUIPMENT PROPERTY, INFORMATION FACILITIES AND SERVICES

The following Government Equipment property, information facilities, and services shall be provided upon the written approval of the cognizant contracting officers:

(Offeror will list all desired GFE, GFP, GFI, GFF, and GFS.)

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## ARTICLE XVI: SECURITY

This program shall be provided protection as required by the appropriate security requirements required by the DD Form 254 (Attachment 3; to be provided by DARPA). The highest levels of classification involved in the performance of this Agreement is Top Secret/SAR and Sensitive Compartmented Information (SCI). It is the Government's position that the highest security classification of any item deliverable as a result of this Agreement is Top Secret/SAR or SCI. In order to develop certain technologies, it is anticipated that a Contractor may need capability to access, handle and generate both Top Secret/SAR and SCI information. This agreement is unclassified.

## ARTICLE XVII: SUBCONTRACTORS

The Contractor is authorized to use best commercial practices under this Agreement. This authorization includes, but is not limited to, waiver from competitive bidding where appropriate and the relief from normal flow-down requirements to subcontractors where it impacts the UCAV/ATD Program.

## ARTICLE XVIII: FLIGHT RISK

The Government's liability for risk of loss or damage to the air vehicles and mission control station during the initial flight and performance testing at \_\_\_\_\_, will be subject to the provisions of DFARS clause 252.228-7002, Aircraft Flight Risks (Dec 91).

## ARTICLE XIX: GOVERNMENT ACCEPTANCE

The Government will accept the UDS assets (air vehicles, mission control systems, and unique support and maintenance equipment) upon termination of all Phase II and funded RR&OE activities.

## ARTICLE XX: AGREEMENT DELIVERABLES

- A. Due with Proposal
  - 1) Proposal volumes 1-9
  - 2) Final Phase I SUPPRESSOR and THUNDER databases
- B. Due at the end of Phase I
  - 1) All data produced during and for Phase I
- C. Due annually
  - 1) Revised SMP
  - 2) Revised UTP
  - 3) Revised UOS SCD
  - 4) Revised UOS CONOPS and FOMs
  - 5) Revised SUPPRESSOR and THUNDER databases
- D. Due at every Milestone Review
  - 1) Hard and soft copy of all Milestone review materials
  - 2) Proposed incentive criteria for the next milestone evaluation period
  - 3) Revised program documents per Section 2.5, Table 2.6, and the contractor's change process described in their IMP
- E. Due monthly
  - 1) Business status report
- F. Due at completion of Phase II
  - 1) RR&OE Program Plan
  - 2) RR&OE UDS SRD and SDD
  - 3) RR&OE UOS SCD
  - 4) Final Phase II UOS CONOPS and FOMs
  - 5) Final Phase II SUPPRESSOR and THUNDER databases
- G. Due at completion of the RR&OE Phase
  - 1) EMD UOS SRD



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- 2) EMD UOS Preliminary System Specification
- H. Due at end of the Agreement
  - 1) Final UOS effectiveness and affordability FOMs
  - 2) Final SUPPRESSOR and THUNDER databases
  - 3) All residual UDS assets including all unique support equipment, data and software (source & executable)
  - 4) All the operating manuals, logs, and other documentation necessary for the Government to continue to independently operate, maintain and modify the residual UDS assets.
  - 5) All hardware/software developed or purchased with Government funds during this agreement

The data deliverables listed above are subject to the Data Rights provisions contained in Article XI.

## **ARTICLE XXI: FAR CLAUSES**

This article is intended to list any desired FAR clauses.

## **ARTICLE XXII – PHASE II COMPLETION DEFINITION**

**This article is intended to provide the contractor’s definition of their Phase II Completion Criteria.**

The contractor will define a definitive, unambiguous, quantitative set of Phase II Completion Criteria (PCC) that defines successful completion of the Phase II ATD. At a minimum, this set of criteria must explicitly address how all specific Phase II objectives have been satisfied, how all critical and enabling TPSAs associated with their UOS design have been addressed and how technical feasibility for a UCAV system to effectively and affordably prosecute 21<sup>st</sup> century SEAD/Strike missions within the emerging command and control architecture has been demonstrated.

This agreement ends 60 days after successful accomplishment of all the Phase II Completion Criteria or upon reaching the total team costs of \$180,000,000 if both parties do not agree to proceed further. Total team cost of \$180,000,000 will be in accordance with Article IV, paragraph 2, Allowable Cost and Payment.

## **ARTICLE XXII: OPTION FOR RISK REDUCTION AND OPERATIONAL EVALUATION (RR&OE) PHASE**

The priced option for Item 0002, Risk Reduction and Operational Evaluation (RR&OE) Phase will be exercised with \_\_\_ months after Phase II agreement award. The Government and the contractor may, upon bilateral agreement, exercise this option item. Exercise of this option must be in writing by the DARPA Agreements Administrator in sufficient time to allow the contractor to complete the RR&OE schedule requirement identified in the Integrated Master Schedule.

## **ATTACHMENTS**

ATTACHMENT 1	Integrated Master Plan
ATTACHMENT 2	Milestone Review and Incentive Plan
ATTACHMENT 3	Phase II Program Plan
ATTACHMENT 4	RR&OE Phase Program Plan
ATTACHMENT 5	Contracts Security Classification Specification (DD 254)

### **7.0 DARPA Agreements Authority and Section 845 of the 1994 National Defense Authorization Act**

DARPA "Agreements authority" was enacted as section 251, Public Law 101-189, the FY 1990 National Defense Authorization Act (codified at 10 U.S.C. § 2371) and is currently found in part of 10 U.S.C. § 2371. Section 845 of the 1994 National Defense Authorization Act allows DARPA, on a pilot basis to use non-procurement Agreements for purely military Research and Development and, prototype projects and technology demonstrations of hardware directly relevant to weapon systems.

The primary benefit of this authority is that DARPA can tailor the contracting process to each project rather than conforming to predetermined contracting rules. This authority should increase the efficiency of DARPA's limited resources. DARPA also hopes use of this authority will shorten development time for these projects and enhance affordability.

This Section 845 Authority allows DARPA to:

- 1) Use Agreements even if a procurement contract would be appropriate or feasible.
- 2) Execute projects with or without cost sharing.
- 3) Implement streamlined acquisition procedures (e.g., using Generally Accepted Accounting Practices in lieu of Government Cost Accounting Standards).
- 4) Focus on goals and objectives rather than acquisition regulations.

Commercial Agreement Participants benefit from:

- 1) Increased Government flexibility in structuring these Agreements (e.g., flexibility on patent and intellectual property issues).
- 2) Being able to use commercial rather than Government procedures for doing business.
- 3) Government funding with minimum Government bureaucracy.

Both Groups Benefit in that:

- 1) Armed Services Procurement Act, CICA, FAR, DFARS, and all procurement system regulations are inapplicable.
- 2) Existing regulations, MILSPECS, directives may but need not be applied.

**\*\*\*EXAMPLE ONLY\*\*\***

**EXAMPLE**

**UCAV ATD  
PHASE II**

**MILESTONE REVIEW  
And  
AWARD FEE PLAN**

DRAFT 1/99

**APPROVED:** \_\_\_\_\_

**DARPA Program Manager**

# **\*\*\*EXAMPLE ONLY\*\*\***

## **UCAV PHASE II MILESTONE REVIEW And AWARD FEE PLAN**

### **INTRODUCTION**

The specific criteria and procedures used to assess contractor performance and determine Award Fee payments are described in this plan. Award Fee is used to motivate excellent performance by the contractor in executing the Unmanned Combat Air Vehicle (UCAV) Advanced Technology Demonstration (ATD) Phase II effort. A separate pool of money is set aside specifically for the award fee. The established value of the award fee pool is intended to motivate many different facets of contractor performance, such as timeliness, technical ingenuity, and effective management. The awarded amount is determined by the Government's review of management and performance areas under the control of the contractor.

The total available Award Fee is \$8,000,000. The evaluation periods are based on completion of specific events, dates and or performance parameters. The contractor can earn all, a part, or none of the pool which is available each evaluation period. Earned award fee, that amount of the pool which the DARPA Program Manager (PM) determines the contractor has earned based on his performance, is paid at the end of each evaluation period.

Determination of contractor performance and Award Fee earned is subjective. However, the process is explicit enough to allow the contractor every opportunity to understand how the award amount is based on performance. The PM and USAF Deputy Program Manager (DPM) will assemble an appropriate set of technical experts for each Milestone review, consistent with the focus of that review, to assist them in their assessments. Based on this evaluation, the DARPA PM will decide whether to award all, or a portion of the allotted amount. Any un-awarded amounts will either be removed from the award pool or rolled-forward to a future period at the Government's discretion. The amount of the earned award fee shall not be subject to the Agreement's "Disputes" article. Every effort will be made by the Government to assure fairness of evaluation as well as prompt and consistent feedback.

### **DEFINITION OF GOVERNMENT RESPONSIBILITIES**

The DARPA PM is responsible for:

1. Approving the Award Fee Plan and authorizing any changes to the plan through the Agreements Officer for agreement modifications.

### \*\*\*EXAMPLE ONLY\*\*\*

2. Approving and assembling the members of a Milestone Review Team appropriate for the focus and content of each review.
3. Determining the amount of Award Fee earned and payable to the contractor for each evaluation period.
4. Notifying the contractor of the amount of fee awarded at the end of each period with a description of the items which impacted the Award Fee decision for that evaluation period.

#### **AWARD FEE EVALUATION REQUIREMENTS & PROCEDURES**

A. The standard Milestone Review and Incentive Fee period of performance is six months in duration and is aligned with the start and midpoints of the government's fiscal year. The evaluation periods for the UCAV Phase II ATD are:

<u>Milestone</u>	<u>Period of Performance</u>
#1	Award - 30 Sept 99
#2	1 Oct 99 - 31 Mar 00
#3	1 Apr 00 - 30 Sept 00
#4	1 Oct 00 - 31 Mar 01
#5	1 Apr 01 - 30 Sept 01
#6	1 Oct 01 - 31 Mar 02
#7	1 Apr 02 - 30 Sept 02

B. The Award Fee will cover six areas of emphasis which reflect the balanced approach desired in order to achieve the program objectives and deliver the final products within cost, and on schedule. The first three areas are integrally related; a strength or improvement item in one of the three areas will potentially impact the other two. The last area emphasizes other items of concern to the joint program office for a specific period.

1. Overall progress towards completing the development and demonstration of the UCAV Demonstrator System as described in the Task Description Document, Phase II Program Plan and System Definition, Integrated Master Plan (IMP), Integrated Master Schedule (IMS) and other program technical and management documents.

2. Overall progress toward meeting the UCAV ATD Phase II goals and objectives, as evidenced by progress towards satisfying all Technical Performance Measures (TPMs), satisfying all demonstration objectives defined in the UDS System Demonstration Plan (SDP) achieving all Phase II Completion Criteria (PCC) and achieving other program technical and management goals and objectives.

**\*\*\*EXAMPLE ONLY\*\*\***

3. Overall progress towards a low risk entry into an EMD program in FY2005 as evidenced by progress towards demonstrating military utility, operational value and technical maturity of an operational SEAD/Strike UCAV according to the Technologies, Processes and System Attributes (TPSA) Risk Mitigation Plans (RMPs), System Maturation Plan (SMP) and other program technical and management documents.

4. Overall schedule performance

5. Overall cost control

6. Other program considerations

C. Criteria, which more specifically define/modify the government's expectations, and which are subsets of the areas of emphasis, will be chosen each period as necessary. These criteria will further expand on the areas of emphasis. The criteria for the first milestone review period are provided below. The criteria for the areas of emphasis are listed in priority order, from highest to lowest.

D. At each Milestone Review, the contractor will present their assessment of their performance during the previous milestone evaluation period and submit proposed criteria within each area of emphasis for the next period of performance. Based on the Government's assessment and the focus of the next period of performance, the PM will approve a set of specific criteria in each area of emphasis for the next period of performance and transmit them to the contractor within ten (10) working days of the completed Milestone Review.

E. Prior to the beginning of any milestone evaluation period, the government reserves the right to change the Award Fee evaluation criteria, period duration, distribution of remaining Award Fee dollars, and other matters covered in this plan by written notice from the Agreement Officer (AO) to the contractor. Every reasonable attempt will be made to coordinate changes to future periods with the contractor prior to the changes taking place. Changes to the plan for the current period will be agreed upon mutually by the government and the contractor.

F. The contractor may also propose changes to this plan. The PM and DPM will evaluate the proposed changes sufficiently before the beginning of the next reporting period to allow coordination with the contractor. Approved changes to the plan will be formally provided to the contractor by the AO at least five working days prior to the beginning of the first period for which they are applicable. If changes in the current period evaluation criteria are agreed to, the contractor will be formally notified by the AO not later than one working day before the date they take effect.

G. Each Government milestone reviewer will develop an overall adjective rating based on their evaluations of the contractor's performance throughout the period, in accordance with the definition of the ratings described below. These individual criteria ratings will be integrated to develop an overall contractor rating.

OBJECTIVE ?  
↓

**\*\*\*EXAMPLE ONLY\*\*\***

H. The overall contractor rating provided by the Government review team will be used by the PM to assist in his determination of the percentage of fee the contractor will earn at the end of the period. The overall rating will be directly related to the percent of Award Fee paid as shown below:

<u>Rating</u>	<u>Percent of Award Fee</u>
Excellent	90-100%
Good	70-89%
Satisfactory	50-69%
Marginal	1-49%
Unsatisfactory	0%

I. The following definitions describe in general the types of performance associated with each adjectival rating. The specific ratings of excellent through unsatisfactory can be further defined in the briefings by using a + or - (excluding an EX+ or UNSAT-) to provide a more exact rating.

**Excellent:**

- A high probability exists that a quality product will be delivered and that all program goals and objectives will be met.
- Schedule is met as planned (deviations are minor and have no impact on overall program).
- Management initiatives are extremely effective. Potential problems are aggressively identified and resolved early
- Communications are exceptionally open, timely, and meaningful

**Good:**

- A moderate to high probability exists that a quality product will be delivered and that all program goals and objectives will be met.
- Schedule is met as planned, with minor rescheduling required (deviations are minor and have little impact on overall program)
- Management initiatives are highly effective. Problems are proactively identified and resolved
- Communications are consistently open, timely, and meaningful

**Satisfactory:**

- A moderate probability exists that a quality product will be delivered and that all program goals and objectives will be met.
- Schedule is usually met as planned, with some rescheduling required
- Management initiatives are usually effective. Contractor demonstrates ability to identify and resolve problems
- Communications are usually open, timely, and meaningful

**Marginal:**

**\*\*\*EXAMPLE ONLY\*\*\***

- A low to moderate probability exists that a quality product will be delivered and that all program goals and objectives will be met.
- Schedule deviations require replanning, and program impacts are increasing
- Management initiatives require strengthening. More aggressive actions by the contractor are needed to identify and resolve problems
- Communications are sometimes not open, timely, and meaningful

Unsatisfactory:

- A low probability exists that a quality product will be delivered and that all program goals and objectives will be met.
- Schedule control is nonexistent
- Management initiatives are ineffective or nonexistent. Inability to identify and resolve problems requires government intervention
- Communications are consistently lacking in openness, timeliness, and meaningfulness

J. The Award Fee available is divided into a milestone related pool. The milestone related evaluation periods start at Agreement award and are complete when the associated milestone is accomplished. The specific milestones and associated maximum Award Fee available are:

**1.1**

<u>Milestone</u>	<u>Date</u>	<u>Major Even</u>	<u>Pool Amount</u>
#1	30 Sept 99	IDR	\$750K
#2	31 Mar 00	FDR	\$750K
#3	30 Sept 00		\$750K
#4	31 Mar 01	FRR	\$1.0M
#5	30 Sept 01		\$1.5M
#6	31 Mar 02		\$1.25M
#7	30 Sept 02	Completion	<u>\$2.0M</u>
Total Award Fee Available			\$8.0M

K. The remaining portion of the fee pool available for any period, but not awarded, may, at the discretion of the DARPA PM, be carried forward to subsequent evaluation periods.

**1.1.1 AWARD FEE AREAS OF EMPHASIS AND CRITERIA FOR PERIOD 1**

(To be updated each period)

**AREA OF EMPHASIS:** Overall progress towards completing the development and demonstration of the UCAV Demonstrator System as described in the Task Description Document, Phase II Program Plan and System Definition, Integrated Master Plan (IMP), Integrated Master Schedule (IMS) and other program technical and management documents:



## \*\*\*EXAMPLE ONLY\*\*\*

- CRITERION U1:
- CRITERION U2:
- etc

**AREA OF EMPHASIS:** Overall progress toward meeting the UCAV ATD Phase II goals and objectives, as evidenced by progress towards satisfying all Technical Performance Measures (TPMs), satisfying all demonstration objectives defined in the UDS System Demonstration Plan (SDP) achieving all Phase II Completion Criteria (PCC) and achieving other program technical and management goals and objectives.

- CRITERION A1:
- CRITERION A2:
- etc

**AREA OF EMPHASIS:** Overall progress towards a low risk entry into an EMD program in FY2005 as evidenced by progress towards demonstrating military utility, operational value and technical maturity of an operational SEAD/Strike UCAV according to the Technologies, Processes and System Attributes (TPSA) Risk Mitigation Plans (RMPs), System Maturation Plan (SMP) and other program technical and management documents.

- CRITERION E1:
- CRITERION E2:
- etc

### **AREA OF EMPHASIS: Overall Schedule Performance:**

• **CRITERION S1: Schedule Management.** This criterion evaluates the contractor's performance against planned schedules. The assessment will encompass the integration of the Integrated Master Schedule with the Earned Value System including an assessment of the validity of the causes for schedule adjustments necessary to meet Integrated Master Plan criteria and the effectiveness of schedule recovery plans. The evaluation will also measure the contractor's ability to identify potential schedule problems early and project the impact of near-term schedule changes on long-term events.

### **AREA OF EMPHASIS: Overall Cost Control:**

## **\*\*\*EXAMPLE ONLY\*\*\***

- **CRITERION C1: Cost Management.** This criterion evaluates the contractor's actual cost performance compared to the established IMP and IMS as expressed in the Earned Value System and the effective use of the cost control system in the day-to-day management of the program, including evaluating the impact of variances and implementing corrective action planning. The continued improvement of the Earned Value System system will also be evaluated. This criterion also evaluates the cost management of subcontractor efforts and the timely and thorough development of revised cost estimates.

### **AREA OF EMPHASIS: Other Program Considerations:**

- **CRITERION O1: Program Website.** This criterion evaluates the contractor's efforts to establish and maintain a secure program Website to facilitate robust Government/contractor management of the program on a daily basis.
- **CRITERION O2: Configuration Management System (CMS).** This criterion evaluates the progress toward continued definition and implementation of the CMS products and services.