BROAD AREA MARITIME DEMONSTRATOR (BAMS-D) RQ-4A STANDARD OPERATING PROCEDURES

1.0 Personnel.

1.1 BAMS-D Officer-In-Charge (OIC).

The BAMS-D OIC is the direct representative for the assigned CTG. The OIC shall be the final arbitrator of conflicts, mission safety-of-flight, supervision of detachment personnel and all administrative requirements for the detachment. Additionally, the OIC will be responsible for the smooth coordination of operational requirements through the BAMS-D Liaison Officer (LNO) co-located with the operational commander. Furthermore, the OIC will also be responsible for coordinating all maintenance and logistic requirements of the BAMS-D system. The BAMS-D OIC shall administratively report to and be designated by the assigned CTG and shall be noted as such on the Flight Schedule. Operationally, the OIC shall report to the supported Task Force Commander.

1.2 BAMS-D Qualifications Officer (QO).

The CTG shall designate a BAMS-D Qualifications Officer, who shall be responsible for determining and certifying BAMS-D pilot and aircrew qualifications, administering check flights, recommending aircrew designations to the CTG and performing other duties noted in this instruction. Contractor pilot qualifications must also be approved by the GFR. A contractor may serve as QO as evaluated and approved by the GFR and designated by the CTG. The QO shall be considered functionally equivalent to a NATOPS Officer for aircraft with a NATOPS program.

1.3 Government Flight Representative (GFR).

The GFR is responsible aircraft operations conducted by commercial contactors using DoD aircraft and also for reviewing and approving contractor positions of UAC, AVO, MPO, and Engine System Operators (ESO).

1.4 BAMS-D Liaison Officer (LNO).

The LNO is responsible for the coordination of mission planning and execution with the associated CTF. LNO shall be co-located with the supported CTF.

1.5 Aircrew Definitions.

The aircrew shall consist of all personnel who are performing mission tasks in the LRE, MCE and TAGS. Aircrew roles and responsibilities are defined as follows:

a. UAS Mission Commander (UMC): commissioned officer responsible for all phases of the assigned mission except those aspects of safety of flight that are related to the control of the UA and are within the prerogative of the UAC.

b. UAS Aircraft Commander (UAC): ultimately responsible for the safe, orderly flight and physical condition of the aircraft and has the authority to override the Air Vehicle Operator (AVO). All flights shall have a designated UAC. The UAC shall be designated by name on the flight schedule for all flight and/or high speed

taxi events requiring a UAC. UACs shall be designated as such by the CTG.

c. Air Vehicle Operator (AVO): The AVO monitors and operates the aircraft and inputs contingency plans to the UAV as required in accordance with OPNAVINST 3710.7. The primary duty of the AVO is safety-of-flight. The AVO is responsible for communicating with ATC and obtaining taxi, takeoff and flight clearances and for handling in-flight emergencies in accordance with approved procedures. The AVO is also responsible for executing the midair collision avoidance plan using available resources. The AVO performs duties similar to those of pilot-in-command on a manned aircraft. This individual has ultimate control over aircraft flight path, is the ultimate decision-maker as to safe aircraft operation during the mission, unless overridden by the UAC. The AVO shall be designated as such by the CTG.

d. UAS Tactical Coordinator (UTC): The UTC coordinates all mission-related action as delineated by the Mission Commander (UMC) within the MCE. The UTC is responsible for the tactical employment of the air vehicle. UTCs are approved for operations by the BAMS-D OIC.

e. Mission Payload Operator (MPO): The MPO operates the payload systems from the MPO station in the MCE. All MPOs shall be designated as such by the CTG.

f. TAGS Operations Officer (TAGS OPSO): The TAGS OPSO is responsible for maintaining mission flow and is the primary UAS Mission Commander (UMC) for mission tasking and re-tasking from external sources and from the UAC/AVO. He is primarily responsible for the completion of mission requirements, tactical employment of the platform and sensors as well as the direction of the TAGS staff. TAGS Officers are approved for operations by the BAMS-D OIC.

g. TAGS Sensor Operator (TSO): The TSO is responsible for the exploitation and handling of all sensor products from the platform sensors. TSOs are approved for operations by the BAMS-D OIC.

h. Common Tactical Picture Operator (CTP): The CTP coordinates all maritime search related information and manipulation of GCCS-M and interfaces within the TAGS. CTPs are approved for operations by the BAMS-D OIC.

1.6 Aircrew Qualifications.

NOTE 1

GFR positional approval applies only to contracted maintenance and crew members.

Aircrew qualification shall be as follows:

a. UAC:
   i. Qualified as Global Hawk pilot.
   ii. Minimum of 700 hours manned pilot flight time and 100 hours Global Hawk pilot flight time.

iii. FAA Commercial Pilot Certificate and Instrument Rating or military equivalent.
iv. Successful completion of BAMS-D training syllabus.
v. Meets FAA or Navy currency requirements to act as a pilot-in command in IFR conditions.
vi. Shall be Takeoff and Landing current for emergency takeoff/landing requirements. Currency may be maintained by means of MCE primary takeoffs and landings.
vii. Annual standardization qualification.
viii. Annual FAA or AVMED physical examination.
ix. Approved by the GFR.
x. Designated by the assigned CTG.

b. AVO:
i. Minimum of 250 hours manned pilot flight time and have completed Global Hawk pilot training syllabus.
ii. FAA Commercial Pilot Certificate and Instrument Rating or military equivalent.
iii. Successful completion of BAMS-D training syllabus.
iv. Meets FAA or Navy currency requirements to act as a pilot-in-command in IFR conditions.
v. Annual standardization qualification.
vi. Annual FAA or AVMED physical examination.
vii. Approved by the GFR
viii. Designated by the assigned CTG.

NOTE 2

If aircraft are not available for local LRE training flights, AVOs may complete initial qualification and fly in the MCE only until such time as they can complete LRE training.

c. TAGS OPSO:
i. Designated Naval Aviator, NFO, LDO/CWO or assigned government employee (GS or CTR).
ii. Complete the established TAGS OPSO personnel qualification syllabus.
iii. Approved as a TAGS OPSO by the BAMS-D OIC.

d. UTC, MPO, TSOs and TAGS CTPs:
i. Complete the BAMS-D UTC, MPO, TSO or CTP syllabus and/or complete the BAMS-D differences training for previously qualified RQ-4 MPO.
ii. Designated by the GFR. (MCE SENSO only)
iii. Designated by the assigned CTG (MCE SENSO only)
iv. Approved as a UTC, TSO or CTP by the BAMS-D OIC.

1.7 Aircrew Currency.

Aircrew currency requirements shall be as follows:

a. AVO: Civilian AVOs shall maintain IFR currency in accordance with FAA regulations. Military AVOs shall maintain IFR currency in accordance with

NATOPS. BAMS-D specific currency requirements are presented in Table 1-1.

AVO CURRENCY REQUIREMENTS[1]

Event (RQ-4A)	Period
1 Sortie (actual or simulated)	90 Days[2]
6 Sorties (actual or simulated)	180 Days[2]
5 RQ-4A Flight Hours (no more than 50% simulated)	90 Days[2]
2 Takeoffs (actual or simulated)	90 Days[2]
2 Landings (actual or simulated)	90 Days[2]
1 Emergency Procedures Simulation	180 Days
40 Flight Hours (no more than 50% simulated)	180 Days[2]
100 Flight Hours (no more than 50% simulated)	1 Year[2]

Table 1-1

[1] Does not include IFR currency requirements
[2] In compliance with OPNAVINST 3710.7 Series.

b. MPO:
   i. Shall perform a minimum of one MCE Pre-mission (must include Target Deck processing, setup of SO workstations, and ISS Startup) every 90 days.
   ii. Shall perform three MCE Pre-Missions every 180 days. In the event flight operations cease for greater than 30 days, simulated Pre-Missions shall be accomplished to maintain currency until flight operations resume.

c. UTC and TAGS OPSO: Shall perform UTC/TAGS OPSO duties in a flight once every 60 days.

1.7.1 Aircrew Back-In-the-Saddle.

Aircrew requalification requirements shall be as follows:

a. AVO: One flight under the supervision of a qualified AVO Instructor Evaluator (AVO IE). AVOs who have exceeded Take-Off and/or Landing currency must re-qualify under the supervision of an AVO IE.

b. AVOs may maintain takeoff and landing currency by means of the LRE or MCE Primary takeoffs and landings. AVOs who have been in a non-current status for less than 6 months may accomplish only those events required to re-establish currency. AVOs that have not flown the Global Hawk for more than 6 months are required to complete the annual standardization qualification check-ride process.

c. MPO: One flight operating sensors under the supervision of a qualified MPO Instructor Evaluator (MPO IE).

d. UTC and TAGS OPSO: One flight exercising UTC/TAGS OPSO duties under the supervision of a qualified UTC/TAGS OPSO.

1.8 Other Aircrew.

RQ-4A rated aircrew from other Global Hawk flying organizations may be assigned to the flight schedule provided they are appropriately designated by the assigned CTG. All aircrew are required to be familiar with this instruction.

a. Other aircrew operating the BAMS-D at NAS Patuxent River shall receive a course rules brief, a briefing on divert fields, a brief on BAMS-D aircraft and operations and discuss the CTG specific mishap/ORM procedures.

b. In addition to the items listed in the above paragraph, aircrew operating the BAMS-D during operational missions shall receive a briefing on BAMS-D tactical operations and procedures, complete a SPINS review and test, and shall execute at least one operational mission under the direct supervision of an instructor.

1.9 Crew Relief.

a. Contractor crew day shall not exceed twelve hours. Authority to waive crew duty periods resides with the assigned CTG and the GFR. GFR may approve a 2 hour extension if necessary.

b. Military crew day shall not exceed 18 hours. Authority to waive crew duty periods resides solely with the assigned CTG. Crew day and rest requirements of OPNAVINST 3710.7 shall be observed.

c. At least two AVOs shall be assigned to each event longer than four hours. AVOs occupying different shelters shall count toward this requirement only if the ground stations are close enough to allow the AVOs to switch from one shelter to another, or if the manned shelter has two operating command links with the UAV in order to maintain dual link redundancy with one shelter unmanned.

d. Crew day and rest requirements of OPNAVINST 3710.7 shall be observed by all MCE/TAGS personnel.

2.0 <u>Flight Definitions and Manning Requirements</u>

The minimum aircrew requirements for the BAMS-D UAS are established to safely meet the needs of each mission as set forth in the following mission hierarchy:

2.1 Local Training Operations.

Local training operations are flights for the purpose of training, currency or tactics development. These flights may be flown in the areas defined by Ref (a) and (b).

a. Local UAV training operation flights must have the following minimum crew:
   i. One AVO per shelter used for the mission. At least one of the AVOs must be a designated UAC.
   ii. One of the AVOs may be an RQ-4A AVO under instruction, or upgrading AVO under the supervision of an RQ-4A AVO IE.

b. Local UAV training operation flights must have the following minimum support personnel:
   i. Adequate Landing Recovery Element (LRE)/Mission Control Element (MCE) mission field support representative.
   ii. Adequate maintenance personnel to include: ground segment support personnel and a qualified ground chase observer.

2.2 Operational Missions.

Operational missions are those missions that are flown in direct support of mission requirements as set forth by an operational commander. They may or may not be flown locally.

a. BAMS-D operational missions must have the following minimum crew:
   i. One AVO per shelter used for the mission. At least one of the AVOs must be a designated UAC. One of the AVOs can be an AVO under instruction, or upgrading AVO under the supervision of an AVO IE.
   ii. One UMC
   iii. One TAGS OPSO
   iv. One TSO
   v. One CTP
   vi. One MPO

b. UAV operational flights must have the following minimum support personnel:
   i. Adequate LRE/MCE mission field support representatives.
   ii. Adequate maintenance personnel to include: ground segment support personnel and a qualified ground chase observer, as well as TAGS server support.

2.3 Maintenance Flights.

These flights shall be performed in accordance with approved GFR procedures. Procedures shall be in accordance with the applicable BAMS-D RQ-4A Technical Orders. They shall be supported and manned the same as BAMS-D local training operations set forth in paragraph 2.1 above.

2.4 Test Flights.

All BAMS-D Test flights shall be performed IAW an approved NAVAIR test plan. The test plan shall be signed by the assigned CTG as well as the cognizant test squadron. These flights shall be performed in accordance with approved GFR procedures and the applicable BAMS-D RQ-4A Technical Orders.

3.0 <u>Flight Operations Policy</u>.

3.1 Ground Operations.

a. Taxi Operations. Unless specifically authorized, Taxi operations will be limited to those approved for particular airfield configuration. The UAV shall not be taxied over field arresting gear, including takeoff or landing roll. When taxiing, the pilot

shall send the STOP TAXI command at least 150 feet short of all hold short lines to prevent runway incursions.

b. Take Off and Landing Operations. Departure end gear may remain rigged if current TOLD calculations indicate that the UAV can become airborne at least 1500 feet or stopped prior to the arresting gear. At NAS Patuxent River, both approach and departure end arresting gear shall be de-rigged for Takeoff and Landing.

c. Ground Power. Ground power carts will have electric current protection; otherwise, an in-line circuit breaker (for example: Northrop-Grumman Power Pedestal) will be used to protect the aircraft from over-currents.

3.2 Hawk Mobile (Ground Chase) Procedures.

3.2.1 General.

A ground chase vehicle will be used to provide the UAV operators with enhanced situational awareness during taxi, takeoff, and recovery operations. All events involving the movement of the UAV on the ground under its own power, including taxi, takeoff aborts, launch, and landing operations, shall be conducted using a ground chase. Detailed procedures are presented below.

3.2.2 Engine Start.

The Hawk Mobile vehicle should be positioned such that key locations of the aircraft are visible by the crew of the chase vehicle. All RQ-4A aircraft anomalies observed during startup will be transmitted to the Vehicle Test Controller (VTC) and LRE. The Starting Engine and Before Taxi Checklist may proceed up to but not including Step 15: Aircraft Taxi Preparation prior to the ground chase vehicle being in position.

3.2.3 Taxi.

The Hawk Mobile vehicle will follow the RQ-4A during all taxi operations in a relative position not less than 60 ft behind the aircraft and at least 20 ft to one side of aircraft centerline. Any aircraft anomalies observed during taxi will be transmitted to the LRE.

3.2.4 Takeoff.

The Hawk Mobile vehicle will be positioned to provide the chase observer the best field of view before the pilot gives the takeoff command. The driver of the chase vehicle will be responsible for maintaining/increasing spacing during the initial portion of the takeoff roll. The ground chase operator is responsible for making tracking calls, confirmation of takeoff, and, if necessary, to call for abort. Any aircraft anomalies observed during the takeoff will be transmitted to the LRE. Once the aircraft is airborne, the ground chase will proceed to the end of the active runway or to a taxiway and exit with a confirmation radio call to the tower operator. In the event of an aborted or rejected takeoff, ground chase personnel will follow standard RQ-4A procedures to render the aircraft safe and remove it from the runway.

3.2.5 Landing.

During approach and landing of the UAV, the Hawk Mobile vehicle will preposition near the approach end of the active runway and observe the UAV crossing the runway threshold. When the aircraft clears the chase position, the ground vehicle will proceed onto the runway behind the landing aircraft. This allows the chase personnel to call touchdown and provide status to the pilot. The aircraft will be followed as it decelerates to a stop. If fuel load, landing distance, and mission plan configuration permit taxiing off the runway, the chase crew will advise the AVO as to the ability to taxi. The chase crew will follow the aircraft during taxi to the end of mission or planned shutdown waypoint. Checklist procedures for shutdown of the UAV will be followed. Once the aircraft is secured, it will be towed to the hangar. Ground chase personnel will remain in radio contact with the airfield until the tow is complete.

3.2.6 Hawk Mobile Speed Limit.

The ground chase vehicle shall not be intentionally operated at speeds above 80 mph.

3.2.7 Hawk Mobile Personnel Requirements.

a. Hawk Mobile Driver. The driver of the ground chase vehicle shall hold a current authorization or airfield drivers license to drive on the airfield. The Hawk Mobile Driver may also serve as the Hawk Mobile Observer if so qualified.

b. Hawk Mobile Observer. The ground chase observer shall be certified by the BAMS-D Qualification Officer after completion of the Hawk Mobile qualification syllabus. Certification as an RQ-4A AVO or completion of the Hawk Mobile training syllabus shall constitute ground chase observer qualification. The ground chase observer duties are to communicate to the LRE, observe VTC and preflight procedures and act as taxi/takeoff safety observer for the chase effort. As a minimum, the chase vehicle shall be manned by a qualified ground chase safety observer each time RQ-4A ground chase operations are required. The Hawk Mobile Observer may also serve as the Hawk Mobile Driver if so qualified.

3.2.8 Hawk Mobile (Ground Chase) Vehicle Requirements.

The Hawk Mobile (ground chase) vehicle must meet airfield access requirements and be capable of communication with the LRE, Tower, and VTC using both FM ground radios and standard ATC communications capable radios.

4.0 Flight Operations.

4.1 Mission Planning.

All BAMS-D flights shall be flown using only a validated and approved mission plan.

4.1.1 Mission Plan Validation.

Mission plans shall be validated by the BAMS-D team consisting of the BAMS-D Officer-in-Charge, Mission Planner and Lead Pilot or his designee (Aircraft Commander) using the following process:

a. The BAMS-D team shall provide the mission planner with the mission plan requirements, including proposed divert airfields and candidate crash/ditch points.

b. The mission planner shall develop a rough mission plan and submit it for review by the BAMS-D team.

c. The BAMS-D team and mission planner shall iterate the mission plan until it meets the needs of the mission.

d. The mission planner shall submit the final draft mission plan to Northrop-Grumman for kinematic validation in a 6-degree-of-freedom (6-DOF) computer model. Any problems identified shall be corrected and this process repeated to validate the corrections.

e. The approved 6-DOF mission plan shall be manually reviewed by at least two designated AVOs. The 6-DOF mission plan should also be reviewed by at least one mission planner not involved with the development of the original mission plan. The AVOs and mission planner who perform the review shall complete the Mission Plan Review Checklist. Any problems identified shall be corrected and this step repeated to check the corrections.

f. The mission plan and signed mission plan review checklist shall be submitted to a Mission Plan Technical Analysis (MPTA) team for review. The MPTA team shall include, at minimum, one AVO, one mission planner, one individual involved in the 6-DOF check process, one representative of Northrop-Grumman management, the BAMS-D Class Desk Engineer or his designee, and the BAMS-D OIC or his designee.

g. At least one AVO should fly the draft mission plan in a closed loop simulation on the Pilot Stand Alone Trainer (PSAT).

h. The mission plan shall be briefed to the assigned CTG or his designated representative for final approval. Final approval shall include the MPTA signature page.

4.1.2 Divert Fields.

Contingency approaches to diverts or crash points may be either "stitched" or "unstitched" into the mission plan. "Stitched" approaches are segments that may be executed autonomously should the aircraft encounter a lost communications (C1) contingency. "Unstitched" approaches exist in the mission plan, but cannot be executed without AVO intervention (necessitating a command and control data link). Divert fields may be utilized when approved in accordance with this instruction or theater doctrine.

4.1.2.1 Divert Field Approval Procedures.

The following sequence of events will be followed in order to fully approve and incorporate a divert field into a mission plan:

a. Draft mission plan of divert routing.

b. Brief prospective divert field personnel on BAMS-D system and operating characteristics, to include contingency/emergency conditions and procedures. The following minimum personnel should attend the BAMS-D divert field brief:
   i. Air Operations Officer
   ii. Airfield Manager
   iii. Airfield ATC supervisors (Senior Radar Supervisor & Senior Tower Chief)
   iv. Airfield Frequency Manager
   v. Fire Chief
   vi. Senior Transient Line Supervisor
   vii. Any other interested party that the divert airfield may deem necessary.

c. Coordinate with divert ATC and airfield representatives on the contingency/ emergency routing into the divert field. Survey applicable runway/taxiway points needed to plan and execute a safe divert into the field, if existing field survey data does not include the necessary data. Include in discussions the decision for autonomous (stitched) or non-autonomous (un-stitched) routing. No autonomous routing will be planned into a divert field unless approved by the divert field CO or his representative.

d. Incorporate any changes to divert mission plan as result of route discussions with divert personnel.

e. Initiate 6-DOF analysis and mission plan review. This shall be completed prior to incorporation of the divert field into the mission plans.

f. Identify EMI/EMC hazards and points of contact. This may be performed in parallel with route planning.

g. Draft a MOU with the divert field, to be co-signed by the assigned CTG and divert field CO or his designated representative. The MOU shall contain the following:
   i. Coordinated routing depiction.
   ii. Runways to be utilized in the case of divert.
   iii. Agreed-to procedures between the assigned CTG, divert field personnel and BAMS-D AVOs to follow in the case of divert.
   iv. Applicable telephone numbers and radio frequencies for local ATC, approach, tower, airfield crash crew, divert field POC for BAMS-D, CTG personnel, BAMS-D experiment team, and Northrop Grumman engineering support.
   v. Divert ground personnel tow/maintenance procedures.

h. Update divert binder with updated approved divert information to be placed in BAMS-D ground station shelters. Send a signed copy of the approved MOU to the divert field(s).

4.2 Pre-Flight Procedures.

4.2.1 Pre-Mission Coordination.

At forward operating locations, pre-mission coordination shall comply with applicable command guidance.

a. For operations at NAS Patuxent River, the following actions shall be taken not less than three working days before planned UAV event time:
   i. All affected ATC facilities and divert fields shall be notified of the planned event time and mission operating areas in accordance with the FAA Certificate of Authorization (COA).
   ii. A Notice to Mariners (NOMAR) shall be submitted stating the planned at-sea crash points. The NOMAR may be long-term and submitted well in advance of flights.

b. The following actions shall be taken not less than 24 hours before the planned UAV event time:
   i. A Notice to Airmen (NOTAM) shall be submitted stating the planned operating areas, altitudes, and approximate times.
   ii. All affected ATC facilities and divert fields shall be notified of any updates to the mission or timeline.

4.2.2 Mission Briefings.

A flight briefing shall be held prior to each mission.

a. The main flight briefing shall be attended by the flight crew, and key TAGS and maintenance personnel. Attendance may be by telephone. Personnel may be excused from those portions of the briefing that do not impact their duties or require their support. The main flight briefing shall review the UAV and ground station maintenance status including outstanding discrepancies, the route of flight, the mission tasks, the mission timeline, divert fields, weather, communications procedures, and any hazards peculiar to that mission.

b. A turnover briefing shall be conducted between each shift. The turnover brief shall update the UAV and ground station maintenance status, the weather, and any other relevant mission information.

4.3 Operating Limitations.

All flights will be flown within the limits established by the most recent version of the Navy's RQ-4A NATOPS supplement, Operation and Maintenance Manual Set, Global Hawk Technical Orders, RQ-4A Block 10 Pubs and these STAN Notes.

4.3.1 Weather Limits.

Flight Manual weather limits apply. The CTG approved specific weather limits for all BAMS-D Operations are presented in Table 4-1.

Weather Limits for BAMS-D Operations

Parameter	Limit
Thunderstorm and lightning activity	None within 25mi
Winds aloft	When operating inside the Patuxent River restricted areas: a. The RQ-4 will climb safely with strong westerly winds (>125 knots) as long as the track remains on the mission plan or all turns are made into the winds at high wind altitudes. The climb should be maintained to avoid level off at the altitudes with the strongest winds. b. The Figure 8 mission plan works well with strong westerly winds as turns are made into the wind at all times. **It is not recommended to make downwind turns at altitudes with the strongest winds (>125 knots).** c. Strong easterly winds will require pilot use of the Override steering function to prevent spilling out of the restricted area on westerly turns. d. Due to the confined airspace in the NAS Patuxent River restricted area, it has proven desirable to use PSAT simulations to develop precise winds aloft envelopes.
Airfield weather minimums for launch and recovery (± 1 hour recovery)	500 ft ceiling and ¾ mi visibility (RVR=4000ft or 1200m)
Ceiling and/or visibility below mins for takeoff	Approval is required from the CTG and the following additional procedures shall be followed: a. AVO will request that ATC/Tower make a warning call in the blind on all appropriate airfield frequencies. b. Ground chase will perform a runway sweep. c. If available, ground chase will request that the Tower activate any anti-bird devices. d. Ground chase will position behind the aircraft throughout taxi evolution until positioned onto the runway. e. Ground chase will not attempt to follow the aircraft after it begins its takeoff roll. f. Ground chase vehicles shall remain in sight of each other during all movements, and will provide tower with position calls as appropriate.
Ceiling and/or visibility below mins for recovery (± 1 hour)	Approval is required from the CTG and the following additional procedures shall be followed: a. Notify ATC/Tower, BAMS-D maintenance, and ground chase crew of required low ceiling/visibility approach one hour prior to landing time. Low-visibility procedures will be reviewed by the ground chase crew. b. AVO will request that ATC/Tower make a warning call in the blind on all appropriate airfield frequencies. c. Ground chase will perform a runway sweep. d. If available, ground chase will request that the Tower

	activate any anti-bird devices. c. Ground chase will position with the maintenance vehicles at a central location on the airfield no earlier than 30 minutes prior to landing. f. Ground chase will remain well clear of the landing runway until the Global Hawk aircraft comes to a complete stop on the runway and the LRE AVO provides an approximate position. g. Ground chase vehicles shall remain in sight of each other during all movements and will provide tower with position calls as appropriate. For visibility less than ¼ mi (RVR=1600ft or 400m), the following additional procedures shall be followed: h. For recoveries near busy taxi areas, consider posting a stationary observer with a radio clear of the runway to ensure no runway intrusions. i. The UAV shall not taxi following landing. The UAV shall remain in position on the runway until the ground chase and maintenance crew reach the aircraft and perform post-flight shutdown procedures. There will be additional emphasis on ground position reporting to the tower during towing operations from the landing point to the hangar. The lead maintenance vehicle or ground chase will report all changes in position, turns, stops, and starts to the Tower.

Table 4-1

4.3.1.1 Takeoff and Landing Temperature Limitations.

The following temperature limitations for takeoff and landings shall take precedence over the Flight Manual IQ-4(R) A-2-WA-2.

a. Do not takeoff or conduct unnecessary C4A (Go Around) maneuvers when the field ambient temperature is less than 23 degrees Fahrenheit or (-5 C).

b. When field temperature is between 23F and 41F, land with 4000 lb Fuel Quantity Remaining (FQR) or greater.

c. When field temperature is between 41F and 59F, land with 2500 lb FQR or greater.

4.3.2 Frequency Management.

Frequency coordination has been performed with NAVAIRSYSCOM. Emitters at NAS Patuxent River that could pose a hazard are presented in Table 4-2. Emitters that pose a potential risk will be put in STANDBY or OFF modes when the UAV is taxiing or flying within their field of regard, and within 10 nm of NAS Patuxent River below 10,000 ft MSL. The AVO shall be responsible for calling to have emitters secured.

POTENTIAL EMI/EMC HAZARDS AT NAS PATUXENT RIVER

Emitter	Purpose	Hazard Distance	POC	Phone (301 prefix)
AN/SPN-46(v)	Precision Approach and Landing System	Directed toward UAV	(b)(6)	(b)(6)

Table 4-2

NOTE 1

For offsite operations, frequency coordination shall be performed prior to operations at the offsite location.

4.3.3 Other Operating/Tactical Guidance.

All missions shall be scheduled to minimize adverse impact on manned aircraft operations to the maximum extent practicable.

a. The BAMS-D aircraft shall not be operated within 500 ft of tactical jet aircraft running at MAXIMUM power.

b. Standoff shall be IAW Ref (e): "Approval (CTF-57 – Actual) for request to operate BAMS-D inside a 2nm buffer of all required stand-offs unless directed by NAVCENT."

c. The BAMS-D aircraft is required to return to base if more than 5 consecutive sensor package reboots without successful restart are performed while on-station.

4.4 In-Flight Procedures

4.4.1 General

All flights will be conducted in accordance with the FAA COA (as applicable), OPNAVINST 3710.7, Technical Order procedures, and these STAN Notes.

4.4.2 Terminology

The following terminology shall be used in BAMS-D operations:
"TERMINATE, TERMINATE, TERMINATE": Terminate the vehicle (after prior discussion).

WARNING

The word, "TERMINATE," shall not be used to refer to any activity other than destruction of the UAV. During a flight, the word "TERMINATE" shall be used only to direct the destruction of the UAV.

4.4.3 Airspace.

All climbs and descents associated with approaches to and departures from NAS Patuxent River shall be conducted within the boundaries of the NAS Patuxent River restricted airspace, unless explicitly authorized by the assigned CTG or necessitated by a declared emergency. The BAMS-D OIC shall be notified immediately of a declared emergency.

4.4.4 Communication Links.

The UAV shall be flown with at least two operating communications links. These links can be in a single shelter or split between two shelters. An operational link is defined as a green RDY/RDY light with an AVO available to take control. For launch and recovery, at least one link shall be a Line-of-Sight (LOS) link, unless specifically approved by the assigned CTG, or included in an Experiment or Test Plan, or when returning to base after a system failure. In the event of communications system failures reducing the UAV to one operating link, the crew will attempt to regain a second link with the aircraft. If the crew is unable to re-establish a second link with the aircraft, the crew shall RTB.

To the maximum extent practicable both the LRE and MCE should be operating and have an *available* link to the aircraft for all flights. Momentary losses of link to the MCE to cycle landing gear or temporary INMARSAT re-dials are not considered to be "loss of link" events for the purpose of an RTB decision.

Pre-planned single link operations for Trans-oceanic ferry flights may be approved on a case by case basis by the BAMS-D OIC.

4.4.5 External Lighting.

External lights, including strobes, landing lights, and taxi lights, shall be used to the maximum extent possible.

4.4.6 Flight Log.

An electronic or paper logbook shall be kept throughout the duration of the flight, including pre-launch and post-launch operations. Required entries shall be: takeoff, landing, entering or leaving restricted airspace (intentional or otherwise), crew changes, and transfer of command to another ground element.

4.4.7 Transfer of UAV Control.

Transfer of UAV control from one shelter to another shall be accomplished as detailed in the RQ-4A flight manuals and checklists.

4.4.8 Visitor Policy.

Visitors are defined as any person entering the LRE or MCE who are not essential to the conduct of the mission.

All visitors shall be briefed prior to entering a shelter during a flight, and shall not enter without the approval of the UAC, and prior approval by the CTG, or the BAMS-D OIC. Visitors shall be escorted at all times, and shall at no time be allowed to interfere with UAV operations. No visitors shall enter the LRE or MCE while the UAV is below 18,000 ft MSL unless they have attended the flight briefing. Visitors may be removed from the LRE or MCE at the discretion of the AVO, UAC or UMC.

4.4.9 IMMC Yellow Faults.

The following procedures for operations of UAVs during Yellow IMMC Faults shall take precedence over the Flight Manual 1Q-4(R) A-2-WA-2 until rescinded or superseded by the CTG.

a. On occurrence of an IMMC Yellow 99, RTB or land as soon as practicable.

b. On occurrence of an IMMC Yellow subsystem fault with no associated fault code, RTB or land as soon as practicable.

c. On occurrence of an IMMC Yellow that fails to clear, RTB, or land as soon as practicable.

4.4.10 Flight Termination.

Flight termination, if deemed necessary, will be executed by the pilot. If time permits, the OIC shall be notified of any emergency requiring termination of the UAV. It should be noted that the flight termination command is irreversible, and may be sent through any available RQ-4A encrypted command and control link.

The preferred termination location for operations in the NAS Patuxent River restricted area is west of Bloodsworth Island, at 38° 10' N, 76° 6' W.

4.4.11 Chase Aircraft.

Safety chase aircraft will not normally be used to support RQ-4A operations. Should safety chase operations be required, it will be authorized by the CTG for that event.

4.4.12 Airborne Chase Procedures.

All airborne chase operations shall observe the following precautions:

a. Chase operations shall be briefed prior to takeoff of the UAV and chase.

b. The chase aircraft shall not approach closer than 100 feet from any part of the UAV.

c. The chase aircraft shall not illuminate the RQ-4A aircraft with its radar at ranges less than 100 yards (300 feet).

d. The chase aircraft shall not pass directly under the UAV at altitudes below 20,000 ft MSL, in order to prevent inadvertent triggering of the radar altimeter.

e. Unless specifically authorized by the CTG, all chase operations shall be performed in day VMC conditions.

f. The chase aircraft should be provided with the waypoints for the portion of the mission plan where chase coverage is expected in sufficient time for the waypoints to be entered into the navigation system of the chase aircraft.

g. The chase aircraft shall not execute a formation takeoff or landing with the RQ-4A aircraft.

h. Airborne chase pickup is authorized.

i. In the event of an airborne emergency requiring a safety chase, airborne briefing of a compatible chase airplane is authorized.

j. If providing see-and-avoid support pursuant to the FAA COA, the chase airplane separation from the UAV shall not exceed 1 mile laterally and 3,000 feet vertically, in accordance with the COA requirements.

APPENDIX A – ACRONYMS AND ABBREVIATIONS

6-DOF	6-Degree-of-Freedom
ACAT	Acquisition Category
ACTD	Advanced Concept Technology Demonstration
AESG	Aeronautical Equipment Systems Group
AFB	Air Force Base
AFFTC	Air Force Flight Test Center
AIU	Antenna Interface Unit
ASF	Auxiliary Support Facility
ATC	Air Traffic Control
AVO	Air Vehicle Operator
AVO IE	Air Vehicle Operator, Instructor and Evaluator
BAMS-D	Broad Area Maritime Surveillance-Demonstrator
C2	Command and Control
C4I	Command, Control, Communication, Computer, and Intelligence
CDL	Common Data Link
CG	Center of Gravity
COA	Certificate of Authorization
COI	Contact of Interest
COMSEC	Communications Security
CONOPS	Concept of Operations
COP	Common Operating Picture
CR	Cruise
CRS	Coarse Resolution Search
CTF	Commander, Task Force
CTG	Commander, Task Group
CTP	Common Tactical Picture
CTR	Contractor
CWO	Chief Warrant Officer
DARPA	Defense Advanced Research Projects Agency
DAWS	Data Analysis Workstation
DGPS	Differential Global Positioning System
DOD	Department of Defense
EIS	Environmental Impact Statement
EMD	Engineering Manufacturing Development
EO/IR	Electro-Optical/Infrared
ESH	Environmental, Safety, and Health
ESM	Electronic Support Measures
ESO	Engine System Operator
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control
FQR	Fuel Quantity Remaining
GHEN	Global Hawk Engineering Network
GCCS-M	Global Command and Control System - Maritime
GFR	Government Flight Representative
GIG	Global Information Grid
GMTI	Ground Moving Target Indicator

GPS	Global Positioning System
HAE	High Altitude Endurance
HRS	High Resolution Search
IFR	Instrument Flight Rules
IMMC	Integrated Mission Management Computer
INS	Inertial Navigation System
ISAR	Inverse Synthetic Aperture Radar
ISEET	Integrated Systems Evaluation, Experimentation, and Test Department
ISR	Intelligence, Surveillance, and Reconnaissance
LDO	Limited Duty Officer
LOS	Line of Sight
LNO	Liaison Officer
LRE	Launch and Recovery Element
MCE	Mission Control Element
MFR	Memorandum for Record
MOU	Memorandum of Understanding
MPO	Mission Payload Operator
MPO IE	Mission Payload Operator, Instructor and Evaluator
MPRC	Mission Plan Review Committee
MPTA	Mission Plan Technical Analysis
MRS	Medium Resolution Search
MS	Maritime Search
MST	Mobile Ship Target
MTA	Maritime Target Acquisition
NAS	Naval Air Station
NATOPS	Naval Air Training and Operating Procedures Standardization
NAWC	Naval Air Warfare Center
NAWCAD	Naval Air Warfare Center, Aircraft Division
NAWCWD	Naval Air Warfare Center, Weapons Division
NOAA	National Oceanographic and Atmospheric Administration
NFO	Naval Flight Officer
NOMAR	Notice to Mariners
NOTAM	Notice to Airmen
OEP	Operational Environmental Planning
OIC	Officer In Charge
OPSO	Operations Officer
OS	Operational Security
PA	Powered Approach
PAC	Product Acceptance Criteria
PSAT	Pilot Stand-Alone Trainer
QO	Qualifications Officer
RAID	Redundant Array of Inexpensive Disks
RDTE	Research Development Test and Evaluation
RDY/RDY	Ready/Ready
RPU	Receiver/Processor Unit
RTB	Return To Base
RVR	Runway Visual Range
SAR	Synthetic Aperture Radar

SC	Satellite Communications
SIL	Systems Integration Laboratory
SPINS	Special Instructions
TAGS	Tactical Auxiliary Ground Station
TO	Takeoff
TSC	Tactical Support Center
TSO	TAGS Sensor Operator
TX	Taxi
UAC	UAS Aircraft Commander
UAV	Unmanned Aerial Vehicle
UAS	Unmanned Aircraft System
UMC	UAS Mission Commander
UHF	Ultra High Frequency
UTC	UAS Tactical Coordinator
VHF	Very High Frequency
VTC	Vehicle Test Controller
WAS	Wide Area Search