

**RQ-4A Global Hawk (USN Maritime Demonstrator model)
Visual Surveillance / Detection Capability**

Airborne based (Chase Aircraft)

Generally, a chase aircraft will not be required, except when the UAS is operating below 18,000 feet in the National Airspace System (NAS).

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 Global Hawk Maritime Demonstration (GHMD) 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. 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 GHMD 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.

a. What are the communications capabilities between the patrol or chase aircraft and UA pilot?

UHF/VHF radio communications

b. Will the pilot of the patrol or chase aircraft be responsible for observing the UA and providing deconfliction information to the UA pilot?

Yes.

c. What are the skills, knowledge, and certifications of the airborne observer to detect other airborne operations?

The chase aircraft pilot will be a Naval pilot designated in writing by the (b) (3) commanding officer as a chase pilot.

d. Will the patrol or chase aircraft be treated as a “formation flight” with the UA by ATC (i.e., MARSA, etc.)?

Yes, however, the chase aircraft shall not execute a formation takeoff or landing with the GHMD aircraft.

e. Will the airborne observer maintain visual observation with the UA at all times?

Yes.

f. How many aircraft will the patrol or chase aircraft observer be responsible for monitoring?

One.

g. Will the airborne observer also pilot the UA?

No.

Ground Based (Chase Aircraft)

a. GHMD utilizes a ground chase vehicle (car/truck) not a ground based aircraft, as described in the "Visual observation from one or more ground sites section below."

Visual observation from one or more ground sites.

a). What are the skills, knowledge, and certifications of each ground observer to detect other airborne operations (i.e., familiarity with FARs, AT operations, and procedures, etc.)? Ground observers will be employed for launch and recovery operations at (b) (3) The ground observers are experienced military trained pilots or Navy qualified personnel that are familiar with aircraft operations, operation of airspace rules and regulations, and the proper methods of observation of other aircraft.

Visual observers shall maintain direct voice communication with the GHMD UAS pilot. Visual observers are responsible for seeing other aircraft and providing the GHMD pilot with a change of course and/or altitude to prevent a collision. Two-way radios are provided for all observers and the Ground Station personnel. The GHMD pilot and the visual observers shall have no other duties or responsibilities when performing their function, and maintaining aviation safety shall be more paramount than achieving mission objectives.

The driver of the ground chase vehicle shall hold a current authorization to drive on the airfield. The chase vehicle shall carry an individual certified by the GHMD Qualifications Officer and designated by the Commanding Officer as qualified to act as a GHMD ground chase observer. Certification as a GHMD pilot shall constitute GHMD

ground chase observer qualification. The driver of the ground chase vehicle and the GHMD ground chase observer may be the same individual.

b). How will each ground observer detect other airborne operations in comparison to human visual capabilities from the cockpit perspective (on the UA)? The ground observers visually assess the surrounding airspace and are capable of notifying the UAS pilot in the event of a potential conflict. The UAS pilot will take appropriate action to avoid other airborne traffic upon notification by an observer or ATC personnel via radio communications.

c). What are the lateral and vertical range limits that ground observers will be employed? The lateral and vertical limits of visual responsibility established for ground observers are 1 statute mile laterally, and Surface to 3000' AGL vertically. The ground observers will be briefed on the affected area the UAS will be operating in and be given the most likely avenues of other aircraft approaches.

d). What are the communications capabilities between each ground observer and UA pilot? The main communications procedure is UHF/VHF radios installed in the ground chase vehicle and the ground station. In the event radio communications is disrupted, observers will possess a cell phone which will have the mission commander station set on speed-dial.

e). How many aircraft will each ground observer be responsible to monitor? Observers will monitor the airspace around only one (1) UAS at a time.

f). Will any ground observer also pilot the aircraft? No. The aircraft will be under command by the UAS pilots located in either the LRE or MCE at all times during ground operations and in flight. The ground observer will coordinate traffic and obstacle avoidance with the UAS pilot and/or ATC. The ground observer will have no other duties than to aid the UAS pilot in the LRE or MCE.

Forward or side-looking cameras

a). What types or models of cameras are being used to detect other airborne operations? There is an ^{(b)(3)} nose camera, however it is not intended to be used to see other aircraft in-flight, but supplementary obstacle avoidance on the ground.

b). What are the characteristics of these cameras? (Including field of vision, resolution, scan rates, etc.) See paragraph a) above.

c). How will these cameras function in comparison to human visual capabilities from the cockpit perspective (on the UA)? See paragraph a) above.

d). Describe the display system and the presentation available to the pilot. The display system is in the Ground Station on 18" monitors.

e). What are the interfaces and communications links between the camera and display system? Video link between vehicle and ground station through a Tactical Common Data Link (TCDL) connection.

f). What is the reliability of the camera, display, and communications link being used by the pilot? No discrepancies reports written on the camera to date.