



USCGC BERTHOLF NOTICE 3710

BERTNOTE 3710
10 MAY 2013
CANCELLED: 31 MAR 2014

Subj: SCANEAGLE (SE) UNMANNED AIRCRAFT SYSTEM (UAS) STANDARD
OPERATING PROCEDURE (SOP)

- Ref:
- (a) ScanEagle Block D Flight Clearance Recommendation 092016Z May 13
 - (b) INSITU Maintenance Handbook, V2.0 of Sep 07
 - (c) INSITU ScanEagle Unmanned Aircraft System Pocket Reference Guide, Revision 1.0 of 19 Nov 09
 - (d) INSITU ScanEagle Unmanned Aircraft System Operations Handbook, Revision 1.0 of 06 Apr 12
 - (e) ScanEagle to CGC BERTHOLF Interface Control Document (ICD)
 - (f) Air Operations Manual, COMDTINST M3710.1G
 - (g) Shipboard-Helicopter Operational Procedures Manual, COMDTINST M3710.2E
 - (h) Safety and Environmental Health Manual, COMDTINST M5100.47
 - (i) Naval Engineering Manual, COMDTINST M9000.6F

1. PURPOSE. To establish policies and procedures for the shipboard demonstration of the ScanEagle (SE) Unmanned Aircraft System (UAS) in BERTHOLF.
2. SCOPE. This instruction applies to all aspects of SE operations, maintenance, and stowage aboard CGC BERTHOLF, from system installation through removal.
3. DIRECTIVES AFFECTED. None.
4. CANCELLATION. This bill shall be cancelled on 31 Mar 2014. Future UAS operations will require an update or replacement of this bill.
5. RESPONSIBILITY. BERTHOLF's Operations Officer is responsible for the maintenance of this bill. The Aviation Training Team (ATT) is responsible for maintaining crew proficiency with this bill and sustaining minimum training and qualification requirements for all billet assignments. Insitu, Inc., is providing SE crewmembers for this demonstration, and is training one Coast Guard aviator to also participate as part of the SE detachment. This detachment is responsible for all SE operations, maintenance, and stowage.

6. INFORMATION.

- a. Aircraft Description. SE is a multi-mission, persistent system with space, weight, and power accommodations to support a variety of integrated sensor and processor payloads. SE employs a long-endurance, tailless aircraft composed of six modules that are replaceable on site and features a high-aspect, ratio-swept wing. Its power plant consists of a rear-mounted engine which drives a pusher propeller. The aircraft is constructed of carbon fiber composite with fiberglass winglets, and weighs approximately 44 pounds, depending on payload configuration. Additional equipment includes a Ground Control Station (GCS), SuperWedge catapult launcher, SkyHook recovery system, line-of-sight (LOS) antenna for communications, and miscellaneous support items listed in enclosure (2).
- b. BERTHOLF will provide a platform from which to demonstrate SE's ability to provide organic airborne surveillance, and assist in developing operating procedures for routine use throughout the National Security Cutter fleet.
- c. BERTHOLF will be certified to conduct SE operations per reference (a). This bill provides further operational and procedural guidance for the entire demonstration effort.

7. ACTION.

- a. The Commanding Officer shall:
 - (1) Approve, oversee, and direct all SE operations.
 - (2) Maintain ultimate responsibility for safety of flight.
- b. The Executive Officer shall:
 - (1) Coordinate scheduling of SE operations within the ship's plan of the day (POD).
 - (2) Serve as the safety officer during all SE operations.
- c. The Operations Officer (OPS) shall:
 - (1) Oversee the coordination of SE evolutions within the ship's POD.
 - (2) Ensure the Watch Quarter Station Bill (WQSB) is correct and current.
 - (3) Plan, coordinate, deconflict, and manage all SE operations.
 - (4) Assist as necessary to coordinate setup of remote video terminal on small boat or other locations, as required.

- (5) Ensures that a SE mission brief is conducted prior to each day's flight operations, with emphasis on communications, airspace deconfliction, weather, time of sortie, and risk assessment.
 - (6) Coordinate and supervise the planning and execution of all SE operations.
 - (7) Ensure that all SE equipment, tools, and consumables are properly loaded, stored, and secured for sea.
 - (8) Determine and designate radiotelephone frequencies and internal nets between the Helicopter Control Officer (HCO), Pilot-in-Command (PIC), bridge personnel, safety personnel, and launch/recovery personnel, per the communications plan.
 - (9) Establish procedures for moving, staging, and stowing SE equipment before, during, and after operations underway.
- d. The Helicopter Control Officer (HCO) shall:
- (1) Ensure all SE equipment, tools, and consumables are correctly staged during operations.
 - (2) Ensure that the flight deck is properly prepared.
 - (3) Ensure that all SE stations are properly manned per this SOP.
 - (4) Conduct radio checks between HCO, bridge, and pilot-in-command (PIC).
 - (5) Operate installed fire monitors in the event of a fire or crash on deck.
 - (6) Coordinate SE operations with PIC and OOD. HCO maintains direct communications with PIC for SE launch and recovery, then passes communications to the Air Direction Controller (ADC) in the Combat Information Center (CIC) for all other phases of flight.
 - (7) Monitor and record launch and recovery operations from the Helicopter Control Station (HCS).
 - (8) Inform the OOD of SE flight operations requirements in a timely manner so the ship may be maneuvered to meet the needs of the UAS while ensuring the ship's safe navigation and execution of other concurrent missions.
 - (9) Conduct SE operations strictly per operational tasking and this document.

- e. The Officer of the Deck (OOD) shall:
 - (1) Maintain radio or intercom contact with the HCO and PIC to alert the SE crew of possible launch, recovery, and flight hazards, including those caused by significant changes in ship heading.
 - (2) Monitor the weather, radar picture, and vessel traffic in the area of operations; advise the SE crew accordingly.
 - (3) Maneuver the ship to provide the necessary relative wind for launch and recovery per wind limitation guidance provided in reference (a).
 - (4) Ensure that crash, rescue, fueling, and fire fighting preparations have been completed per enclosure (5).

- f. The Mission Commander (MC) shall:
 - (1) Coordinate with the Operations Officer and the Pilot in Command for SE planning and operations.
 - (2) Maintain a current certification from Insitu, Inc. to fill the position of MC.
 - (3) Attend the daily mission brief to discuss SE operations for the next 24 hours.
 - (4) Work with the PIC to prepare and conduct pre-flight and post-flight briefs.
 - (5) Be familiar with references (a), (c), (d), and (g).

- g. The Pilot in Command (PIC) shall:
 - (1) Be responsible for the safe and efficient conduct of all activities during launch, mission, recovery, and preparations per references (a) thru (h). The PIC is the final authority for determining whether mission parameters and weather conditions are safe for conducting SE operations.
 - (2) Maintain a current certification from Naval Air Systems Command (NAVAIR) or Insitu, Inc. to operate the SE.
 - (3) Coordinate with the Operations Officer and MC for SE planning and operations.
 - (4) Attend the daily mission brief to discuss SE operations for the next 24 hours.
 - (5) Work with the MC to prepare and conduct pre-flight and post-flight briefs.
 - (6) Conduct all SE flight planning.

- (7) Pass “manned and ready” reports to the HCO prior to launch and recovery.
 - (8) Ensure all necessary equipment is correctly staged prior to conducting flight operations.
 - (9) Maintain an accurate navigational plot of the aircraft position.
 - (10) Coordinate SE fueling, defueling, and equipment movement with the OOD.
 - (11) Maintain the aircraft log.
- h. The Combat Information Center Watch Supervisor (CICWS) shall:
- (1) Manage CIC functions and supervise the Air Direction Controller (ADC).
- i. The Air Direction Controller (ADC) shall:
- (1) Be qualified to operate the ship’s air search radar as a Level II ADC, at a minimum.
 - (2) Establish and maintain communications with, and tasking for, the PIC for the duration of flight operations.
 - (3) Ensure that SE maintains at least 1nm lateral separation and at least 500’ vertical separation with other air traffic.
 - (4) Immediately notify the PIC of possible intruding aircraft by reporting range, altitude (when known), and bearing using the clock format (1 o’clock, 2 o’clock, etc.), at a minimum.
 - (5) When conducting flight operations within a range complex, maintain communications with range control for duration of flight operations as necessary; ensure range is clear at all times.
- j. The SE Test Director (TD) shall:
- (1) Oversee all test evolutions.
 - (2) Ensure that data analysis plans and products meet test program objectives.
 - (3) Consult with OPS and SE Detachment Lead on daily go/no-go decisions.
 - (4) Debrief the SE detachment after each flight.
 - (5) Maintain a daily log of all test activities and significant events.

k. The SE Detachment Lead shall:

- (1) Ensure a Hazard Control Brief has been presented to all personnel involved with SE operations within two days of system embarkation.
- (2) Verify all SE personnel are properly qualified and certified. Ensure they have read and understood this SOP.
- (3) Ensure the Material Safety Data Sheets (MSDS) for hazardous materials required to comply with this SOP are available (located in the Ground Control Station), and that all personnel conducting this operation are briefed and understand the potential hazards.
- (4) Ensure that all SE personnel use proper personal protective equipment (PPE), per enclosure (2).
- (5) Ensure SE operations are executed per this SOP and any supporting documentation, including the flight envelope specified in reference (a).
- (6) Ensure equipment used for SE operations are properly maintained, stowed, and secured as necessary. Notify OPS of any cutter-related concerns.
- (7) Ensure all applicable rules and regulations are complied with, and all necessary safety precautions are taken to conduct SE operations per this SOP.
- (8) Ensure communications frequencies have been coordinated with OPS prior to commencing SE operations.
- (9) Coordinate the demonstration schedule with XO, OPS, and TD.
- (10) Ensure references (a) through (g) are on site.

l. The Launch and Recovery Technician (LRT) shall:

- (1) Perform all mission functions outside the Ground Control Station (GCS) during takeoff and recovery operations.
- (2) Operate the launch and recovery systems.
- (3) Perform as an observer during launch and recovery operations; responsible for calling “wave-off” during the recovery phase.
- (4) Coordinate SE deck personnel during launch and recovery operations.
- (5) Perform all required maintenance procedures and record all actions taken in the aircraft logs with the current date and flight hours per reference (b).

m. The Fire Marshall shall:

(1) Supervise the storage and administration of SE fuel supplies.

8. SAFETY.

- a. During launch and recovery, the ship will avoid sudden changes in course and speed to the greatest possible extent; HCO shall notify the PIC of impending turns or speed changes if necessary.
- b. SE operations shall adhere to weather criteria per paragraph 10 of this SOP. The OOD shall notify the HCO and PIC if these parameters are expected to negatively impact flight operations.
- c. Communications equipment such as telephone, radio, Keyswitch Integrated Terminal Equipment (KITE), Hierarchical Yet Dynamically Reprogrammable Architecture (HYDRA), etc. shall be available on the flight deck for mission coordination and emergency purposes. Transmission restrictions, as posted on the radios, must be complied with at all times. Radio frequency (RF) restrictions apply within ten feet of fuel handling operations.
- d. Ship's company associated with SE flight deck operations shall be provided with and wear PPE to include: an appropriate aviation cranial, hearing and eye protection, safety shoes, long sleeve shirt/jersey, and approved flotation devices.
- e. Insitu, Inc. personnel conducting SE flight deck operations shall use proper PPE per enclosure (2) of this SOP.
- f. All personnel shall be aware of and restrict their movement into and within the vicinity of the flight deck during SE launch and recovery. Only personnel assigned to a specified billet are permitted on weather decks exposed to the mission area during SE operations.
- g. Supervisors shall advise their personnel on which shipboard tasks to delay (e.g. rounds, preventive maintenance, etc.) until after SE launch or recovery.
- h. In the event of a casualty to the installed Aqueous Film Forming Foam (AFFF) monitors, a modified fire fighting party shall be equipped with AFFF and posted on the hangar deck during SE launch, recovery, fueling, and defueling operations.
- i. Two fire extinguishers shall be available on site prior to commencing operations. One CO2 extinguisher shall be located in the GCS, and one 18 lb. AFFF extinguisher shall be located on the flight deck.
- j. Smoking and flame- or spark-producing devices are prohibited in the hangar, on the flight deck, or on the fantail during Flight Quarters.

- k. All flammable liquids and/or ammunition in the area of flight operations shall be removed prior to flight operations.
- l. MSDSs for hazardous materials (HAZMAT) shall be available at the GCS and HAZMAT locker.

9. COMMUNICATIONS.

- a. Positive voice communications are required between the OOD, HCO, ADC, and PIC during all SE flight operations, including launch and recovery.
- b. The PIC will request permission from HCO to launch after positive communications have been established, all stations have reported “manned and ready,” pre-flight information has been passed, and pre-flight checklists are complete. These requirements shall also be met prior to recovering the aircraft.
- c. If SE imagery and position data is not available in CIC, the PIC shall provide operations normal and position reports to the ADC every thirty minutes. Should the aircraft lose link with the GCS, the PIC shall perform lost link procedures per reference (d) and/or as established during the pre-flight brief, and notify the ADC accordingly.
- d. Figure 1 depicts the communications plan; all internal communications are expected to occur via CGC BERTHOLF’s UHF and N12 nets.

Location	GCS (PIC)	SkyHook	Launcher	Bridge (OOD)	HCO	CICWS/ADC	Helo (PIC)
GCS (PIC)		UHF	UHF	N12	N12	N12	Primary
SkyHook	UHF				UHF		
Launcher	UHF				UHF		
Bridge (OOD)	N12				N12	N12	
HCO	N12	UHF	UHF	N12		N12	
CICWS/ADC	N12			N12	N12		
Helo (PIC)	Primary						

Figure 1: UAS Communications Plan

- 10. WEATHER REQUIREMENTS. Launch and recovery flight parameters shall comply with GO/NO-GO criteria in enclosure (3) or as prescribed in reference (a), whichever is more restrictive.

11. PROCEDURES.

- a. A thorough mission brief, including an operational risk assessment, shall be conducted before each mission in accordance with reference (g). The brief shall be prepared and led by the ADC.

- b. The SE crew brief is conducted on the flight deck or in the hangar after the mission brief, and includes PIC, MC, LRT, and others per PIC discretion. The PIC conducts the brief in accordance with reference (c).
- c. Ship's company shall lower nets and act as a fire watch in accordance with enclosure (5).
- d. Pre-flight:
 - (1) When the SE detachment is ready to traverse launch and/or recovery equipment, the PIC shall inform the OOD. The OOD will request approval from the CO and advise the PIC accordingly.
 - (2) Flight Quarters Condition 5 (FLICON 5), preparation to launch, shall be set immediately after SE launch and/or recovery devices are chained to the flight deck. The flight deck status will initially be at red deck, per reference (g).
 - (3) HCO verifies with the OOD that ship systems which may cause interference with SE have been set to stand by/shut down. These systems shall be identified prior to the demonstration during SE/ship electromagnetic interference testing.
 - (4) PIC follows the GCS Startup checklist per reference (c), Section 5 (GCS/I-MUSE).

WARNING

The assembly checklist in reference (c) shall be used each time the aircraft and related equipment is assembled. Failure to complete air checklist items, in order, could result in the loss of the aircraft.

- (5) LRT verifies that the aircraft has been assembled per reference (c).
- (6) PIC requests HCO to set fueling detail.
- (7) Fuel aircraft per reference (c).

WARNING

Personnel must wear proper PPE (i.e. safety glasses, and Nitrile gloves). HCO shall perform fire watch during the fueling operation.

WARNING

To avoid the risk of fire, the UAS engine must be cool to the touch before fueling shall begin.

WARNING

All power to the aircraft shall be off before fueling commences.

- (8) Any fuel that has spilled in the drip pan shall be expended to the cutter's propulsion system or disposed of in accordance with reference (i).
- (9) PIC informs HCO that fueling is complete and requests to secure from fueling detail.
- (10) PIC verifies the tool inventory checklist is complete.
- (11) LRT places aircraft on launcher.
- (12) PIC and LRT verify glow plug is connected to aircraft while on launcher.

WARNING

Verify that voltage is greater than 19V. Attempting flight with depleted batteries may result in loss of the aircraft.

WARNING

Foreign Object Debris (FOD) can be thrown from the propeller at great distances, causing injury to people and damage to property.

WARNING

Hearing and eye protection shall be worn by the crew members near the aircraft for engine start. Foreign objects drawn into the propeller can cause severe injury.

WARNING

Contact with a running propeller can cause loss of limb or death. Be sure to keep hands and face clear of propeller during starting.

WARNING

Never attempt to start the engine with your hands or fingers.

- (13) PIC requests permission to run engine for 20-25 minutes for warm-up and final flight checks.
- e. Launch Procedures:
- (1) Tower passes numbers to PIC; OOD ensures ship maintains course and speed and calls green deck.
 - (2) LRT verifies and reports to PIC that the flight deck is clear of all nonessential personnel and equipment.

- (3) HCO ensures winds are in the required direction, per the mission brief, relayed to the PIC, and that all variables are within parameters for green deck (i.e. winds, sea state, pitch and roll).
- (4) Upon completion of the SE launch checklist, the PIC requests permission to launch from the HCO.
- (5) After receiving launch clearance and green deck notification from the HCO, the PIC commands the LRT to launch the aircraft per references (c) and (d).
- (6) After successful launch and transition to flight, the PIC reports “operations normal” to the HCO and LRT.
- (7) The HCO sets red deck, prompting the LRT to secure SE equipment as required.
- (8) HCO sets FLICON 2 when an immediate takeoff or landing is not planned, or when the aircraft is secured on deck for a short period; ADC and OOD maintain shipboard communications with PIC.
- (9) OOD ensures ship systems that were set to stand by/shut down are reconfigured for normal operations.

f. During Flight Operations:

WARNING

Reliable power must be supplied to the GCS at all times. Loss of power to the GCS can cause loss of transmission signal to the UAS which will initiate the autopilot 'lost communications procedure.'

- (1) Any changes in status of the SE or its operation are reported to the MC, who will ensure the appropriate personnel are made aware of the change.
- (2) The ADC shall continuously monitor airspace from launch to recovery, using the ship's sensors.
- (3) PIC performs flight operations per the mission brief, and communicates with the proper personnel, as required.

g. Recovery Operations:

- (1) Approximately 25 minutes prior to recovery, the PIC requests to set FLICON 5 for recovery.
- (2) HCO resumes shipboard communications with PIC.
- (3) PIC performs Capture Checklist located within the I-MUSE software.

- (4) After the ship has maneuvered into position and the flight quarters checklist is complete, the PIC requests to recover the aircraft.

NOTE

Once the SE commences its approach, the ship shall not deviate from its course, except when required for the safety of the ship. A deviation will require aircraft to divert to a holding position 1/4NM abeam the ship and loiter until re-directed.

- (5) PIC initiates retrieval of the SE per references (c) and (d).
 - (6) Once the SE is captured and safely placed in the aircraft stand, the HCO sets red deck.
 - (7) PIC notifies the HCO that recovery operations are complete.
- h. Post Flight:
- (1) SE detachment performs post-flight inspection per reference (c).
 - (2) HCO sets defueling detail.
 - (3) SE detachment defuels and returns aircraft, ground equipment, fuel, etc. to approved storage location.
 - (4) HCO secures defueling detail.
 - (5) HCO notifies CO, and requests permission to secure from flight quarters.
- i. Ground Runs/Maintenance: It is not required to set FLICON 5 for SE ground runs because these operations are performed on the launcher. The PIC need only request permission from the OOD and secure the area. The PIC shall notify the OOD when ground operations are complete.
12. EMERGENCY PROCEDURES. Any malfunction of the aircraft shall be reported immediately to the OOD, MC, and HCO (when the position is manned). The PIC shall implement emergency procedures per reference (d), and report as soon as possible, the extent and implications of the malfunction to the MC, who will relay to the OOD, HCO, and the ship's command.
- a. Fire/Flight Deck Crash.
- (1) HCO sounds crash on deck alarm.
 - (2) Personnel respond in accordance with CGC BERTHOLF helicopter operations bill.

- (3) XO initiates applicable procedures per BERTHOLF's mishap plan; SE operations are suspended pending investigation and guidance from the Office of Safety and Environmental Health, (CG-113).

b. Water Landing.

- (1) PIC and/or other personnel notify the OOD.
- (2) OOD directs manning the ready boat deck and directs a recovery team to retrieve the aircraft after crash/landing, as applicable.
- (3) Utilize spill kits to contain any spills, as necessary. Turn in polluted material to the Hazardous Materials Coordinator as hazardous waste.
- (4) XO initiates applicable mishap procedures; SE operations are suspended pending investigation and guidance from the Office of Safety and Environmental Health, (CG-113).

c. Injury.

- (1) OOD makes appropriate pipe for personnel casualty. Duty Corpsman responds.

d. Stranger Aircraft.

- (1) If the OOD/lookout visually observes a non-participating aircraft in the vicinity of the SE, or the ADC observes an unknown and conflicting airborne track on the ship's air search radar, the ADC shall immediately notify PIC of possible stranger aircraft.
- (2) PIC will determine the best method to separate the SE from stranger aircraft. Separation methods may include, but are not limited to:
 - i. Altitude deconfliction, maintaining at least 500' separation at all times.
 - ii. Lateral deconfliction, maintaining at least 1nm separation at all times.
 - iii. Direct the SE to orbit the ship.
 - iv. Cease operations and land if it will not aggravate the situation.

e. Lost Link.

- (1) PIC notifies MC, OOD, and ADC with the following information:
 - i. Time of lost link.
 - ii. Last known position.
 - iii. Last known altitude.
 - iv. Last known direction of flight.
 - v. Confirm execution of lost link procedures.

- vi. Advise when PIC, observer, or ADC reacquire aircraft (via GCS, visual, and/or radar).

f. Spills.

- (1) If a spill or other chemical release occurs, immediately contact the OOD.

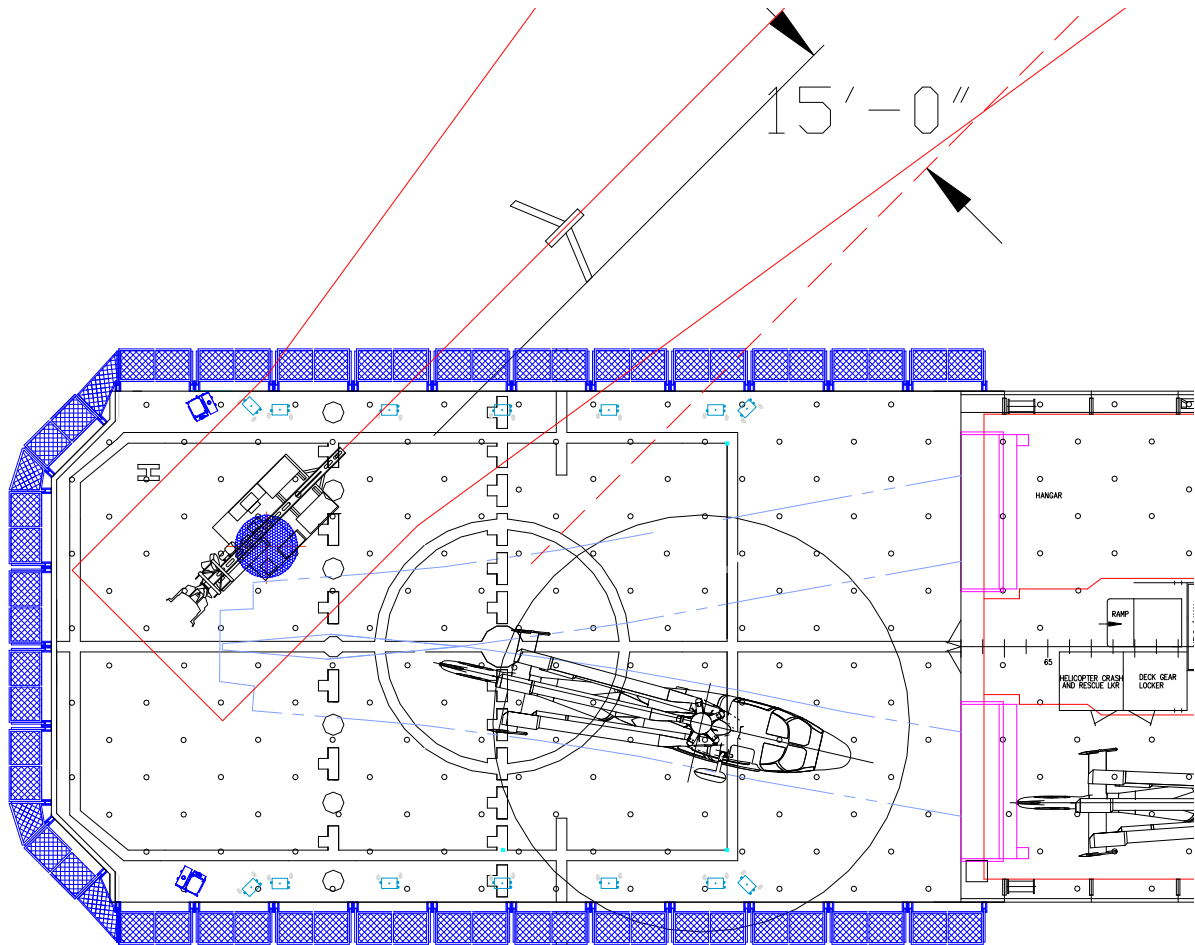
13. POST-MISHAP PROCEDURES. In the event of a SE mishap, required aviation mishap investigations shall be conducted as directed by CG-113. In the event of damage to Coast Guard property and/or injuries to Coast Guard personnel or civilians, CGC BERTHOLF shall investigate, classify, and report per reference (h). Regardless, CGC BERTHOLF shall execute its aircraft mishap plan, and take the following additional actions:

- a. Secure the incident site to prevent further damage to persons, property, or the environment.
- b. Retrieve the aircraft, if possible, and photograph.
- c. Photograph the mishap site.
- d. Secure all SE logbooks.
- e. Initiate a safety stand-down (duration at XO's direction).
- f. Contact CG-113 point of contact, LCDR Brian Potter, 202-475-5198 or LT Eric Cooper, 202-475-5217.
- g. Perform follow-on actions, as requested by CG-1131, if safety and operations permit.
- h. Initiate data investigation by SE detachment to determine probable cause.
- i. Conduct safety meeting with all involved parties to determine way forward.
- j. Confer with Office of Safety and Environmental Health (CG-113) and Office of Aviation Forces (CG-711) on whether to:
 - (1) Issue a Return to Flight status with/without conditions, or
 - (2) Cease further SE operations, and prepare to embark an investigation team.

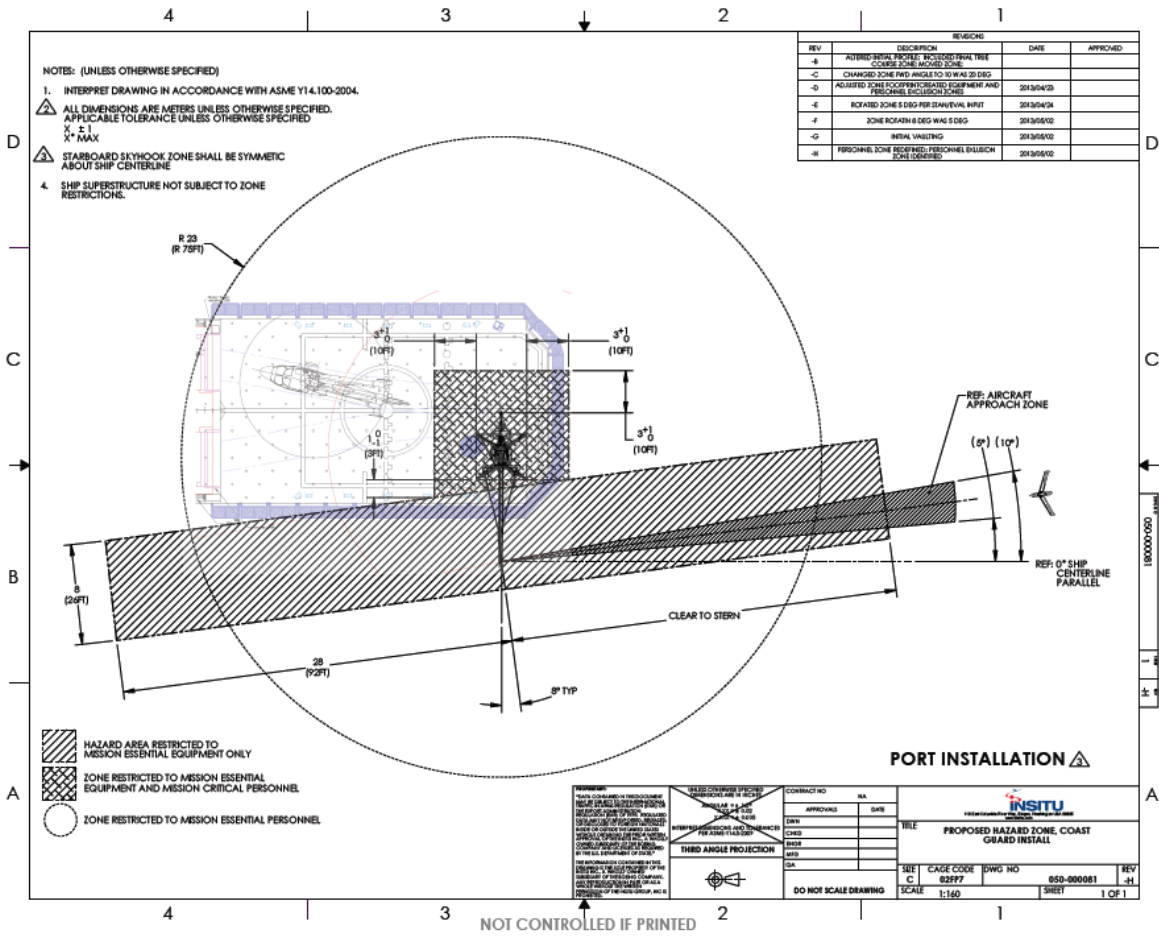
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Enclosures: (1) ScanEagle Launcher and SkyHook Recovery Hazard Zones
(2) ScanEagle Support Equipment List
(3) ScanEagle GO / NO-GO Checklist
(4) CGC BERTHOLF UAS Watch Quarter Station Bill
(5) HCO Launch/Recovery Checklists
(6) Concurrent Helicopter/UAS Procedures

ENCLOSURE 1
ScanEagle Launcher and SkyHook Recovery Hazard Zones



Launcher Hazard Zone



SkyHook Hazard Zones

ENCLOSURE 2
ScanEagle Support Equipment List

Safety and Personal Protective Equipment (PPE)

Safety glasses
Approved hearing protection
Nitrile gloves
Fire extinguisher ABC
Hard hat or Flight Deck Helmet
Life Vest
Strobe Light

Tools and Operation Equipment

General hand tools
Electric starter system
Cleaning equipment
Fuel can
Drip pan
Fuel pump
Funnel
Spill kits (Contents include: oil absorbent pads and receptacle for pad disposal)
BCS-40 scale (calibrated)

Petroleum, Oils, and Lubricants

Bel-Ray H1R 2-Cycle Oil (HFE)

ENCLOSURE 3
ScanEagle GO/NO-GO Checklist

SE launch and recovery parameters shall comply with GO/NO-GO criteria below, or as prescribed in reference (a), whichever is more restrictive.

Variable	Minimum	Maximum	Description/Notes
Maximum Take-off Weight	NA	Configuration dependant	Aircraft weight must be calculated before each mission.
Max Wind Speed	NA	35 Kts (rel) Launch 40 Kts (true) Mission 40 Kts (rel) Retrieval	
Max Tailwind	NA	0 Kts (rel) Launch 0 Kts (rel) Retrieval	
Max Crosswind	NA	10 Kts (rel) Launch 20 Kts (rel) Retrieval	
Min Visibility	0.25NM	NA	
Cloud Ceiling	300' AGL	NA	
Ambient Temperature	14° F	122° F	Avionics bay may be at lower or higher temps.
Aircraft Battery Voltage	19 V	25 V	Check battery voltage before every flight. Monitor voltage closely during the flight. Do not take off with < 19V.
Sea State	None	(+/-) 3° pitch (+/-) 5° roll	

ENCLOSURE 4
CGC BERTHOLF UAS Watch Quarter Station Bill

Position	Personnel
Mission Commander	ITC Overstreet
HCO	CWO Spencer/ ETC Mason
ADC	As per watch schedule
Deck/ Conn	As per watch schedule
OSL	As per watch schedule
PIC	Contractor

ENCLOSURE 5
HCO Launch/Recovery Checklists

FLIGHT QUARTERS LAUNCH (Day or Night) **Revised: 06 MAR 2013**

UAS CALL SIGN: SCANEAGLE HCO CALL SIGN: TOWER

FREQUENCIES: PILOT TO LRT: _____ PILOT TO TOWER/BRIDGE/COMBAT: _____

Estimated Mission Duration: _____ + _____

- _____ 1. SE CREW CONDUCTS PREFLIGHT BRIEF, COMMENCES EQUIPMENT SETUP, AND FUELS AIRCRAFT IF NECESSARY (PIC requests permission from Bridge for setup and fueling). SHIP'S COMPANY LOWERS FLIGHT DECK NETS (approx 2 hours prior to launch).
- _____ 2. **FROM PIC:** "TOWER, SCANEAGLE, REQUEST PERMISSION TO START ENGINE."
- _____ 3. **FROM TOWER:** "SCANEAGLE, TOWER, YOU HAVE PERMISSION TO START ENGINE."
- _____ 4. **FROM PIC:** "TOWER, SCANEAGLE, ENGINE STARTED. REQUEST TO SET FLIGHT QUARTERS CONDITION FIVE FOR UAS LAUNCH."
- _____ 5. **BRIDGE PIPES:** "NOW SET FLIGHT QUARTERS FIVE FOR UAS LAUNCH. REMOVE HATS TOPSIDE. THE SMOKING LAMP IS EXTINGUISHED THROUGHOUT THE SHIP. ENSURE ALL TOPSIDE HATCHES, DOORS AND SCUTTLES AFT OF FRAME 52 ARE SECURED. ALL PERSONNEL NOT ASSOCIATED WITH UAS OPERATIONS REMAIN CLEAR OF WEATHER DECKS. NOW SET FLIGHT QUARTERS CONDITION FIVE."
- _____ 6. HCO CONFIRMS "FOXTROT" AND DAY SHAPES/LIGHTS FOR R.A.M.
- _____ 7. HCO ENSURES DECK LIGHTING IS ILLUMINATED AS BRIEFED.
- _____ 8. HCO ENSURES FDVS ENERGIZED AND RECORDING: **RED DECK**
- _____ 9. MANNING REPORTS:
 _____ BRIDGE _____ LRT
 _____ COMBAT _____ SCANEAGLE
- _____ 10. **HCO REQUESTS PERMISSION FROM THE CO:** "CAPTAIN, ALL STATIONS REPORT MANNED AND READY, CHECKLISTS ARE COMPLETE, CUTTER IS WITHIN PARAMETERS. REQUEST PERMISSION TO CONDUCT FLIGHT OPERATIONS."
- _____ 11. **FROM TOWER:** "SCANEAGLE, TOWER, HAVE NUMBERS WHEN READY TO COPY"
 (Cutter must maintain course and speed):

 CUTTER'S CSE: _____ °T SPEED: _____ KTS
 PITCH: _____ ROLL: _____
 REL WIND: _____ °T @ _____ KTS TRUE WIND: _____ °T @ _____ KTS
 ALTIMETER: _____ READ BACK ALTIMETER, OVER."
- _____ 12. **FROM PIC:** "PRE-TAKEOFF CHECKS COMPLETE, REQUEST TAKEOFF TO PORT/STARBOARD."
- _____ 13. **FROM TOWER:** "YOU ARE CLEARED FOR TAKEOFF TO PORT/STARBOARD: "**GREEN DECK**."
- _____ 14. **FROM TOWER (When aircraft is clear of flight deck):** "**RED DECK.**"
- _____ 15. **FROM PIC:** "TOWER, SCANEAGLE, OPERATIONS ARE NORMAL"
- _____ 16. **FROM TOWER:** "ADC, TOWER, TAKE CONTROL."
- _____ 17. **FROM COMBAT:** SCANEAGLE, ADC, I HAVE CONTROL."
- _____ 18. ONCE COMBAT ESTABLISHES COMMUNICATIONS WITH PIC, HCO INFORMS CO OF UAS AND FLIGHT DECK STATUS AND REQUESTS PERMISSION TO SET **FLICON 2** or **SECURE**.

FLIGHT QUARTERS RECOVERY (Day or Night)**Revised: 06 MAR 2013**UAS CALL SIGN: **SCANEAGLE** HCO CALL SIGN: **TOWER**

FREQUENCIES: PILOT TO LRT: _____ PILOT TO TOWER/BRIDGE/COMBAT: _____

- _____ 1. SCANEAGLE CREW COMPLETES RECOVERY SYSTEM SETUP ON THE FLIGHT DECK, IF NOT ALREADY SETUP (at least 25 minutes prior to recovery).
- _____ 2. **FROM PIC:** “ADC, SCANEAGLE, REQUEST TO SET FLIGHT QUARTERS CONDITION FIVE FOR RECOVERY” (approx 10 minutes prior to recovery).
- _____ 3. **BRIDGE PIPES:** “NOW SET FLIGHT QUARTERS, SET FLIGHT QUARTERS, SET QUARTERS CONDITION FIVE FOR UAS RECOVERY. REMOVE HATS TOPSIDE. THE SMOKING LAMP IS EXTINGUISHED THROUGHOUT THE SHIP. ENSURE ALL TOPSIDE HATCHES, DOORS AND SCUTTLES AFT OF FRAME 52 ARE SECURED. ALL PERSONNEL NOT ASSOCIATED WITH UAS OPERATIONS REMAIN CLEAR OF WEATHER DECKS. NOW SET FLIGHT QUARTERS CONDITION FIVE.”
- _____ 4. **FROM TOWER:** “ADC, TOWER, I HAVE CONTROL.”
- _____ 5. HCO ENSURES DECK IS ILLUMINATED AS BRIEFED.
- _____ 6. MANNING REPORTS:
 _____ BRIDGE _____ LRT
 _____ COMBAT _____ SCANEAGLE
- _____ 7. **HCO REQUESTS PERMISSION FROM THE CO:** “CAPTAIN, ALL STATIONS REPORT MANNED AND READY, CHECKLISTS ARE COMPLETE, CUTTER IS WITHIN PARAMETERS. REQUEST PERMISSION TO CONDUCT FLIGHT OPERATIONS.”
- _____ 8. **FROM TOWER:** “SCANEAGLE, TOWER, HAVE NUMBERS WHEN READY TO COPY” (Cutter must maintain course and speed):
 “CUTTER’S” CSE: _____°T SPEED: _____ KTS
 PITCH: _____ ROLL: _____
 REL WIND: _____°T @ _____ KTS TRUE WIND: _____°T @ _____ KTS
 ALTIMETER: _____ READ BACK ALTIMETER OVER.”
- _____ 9. **FROM PIC:** “TOWER, SCANEAGLE, RECOVERY CHECKLIST COMPLETE, REQUEST PERMISSION TO RECOVER AIRCRAFT.”
- _____ 10. **FROM TOWER:** “SCANEAGLE, TOWER, YOU ARE CLEARED TO RECOVER AIRCRAFT.”
GREEN DECK”
- _____ 11. **FROM PIC (After recovery):** “TOWER, SCANEAGLE, AIRCRAFT RECOVERED, ENGINE IS OFF.”
- _____ 12. SCANEAGLE CREW REMOVES AIRCRAFT FROM RECOVERY DEVICE AND PLACES IN AIRCRAFT STAND.
- _____ 13. **FROM TOWER:** ANNOUNCE “**RED DECK**” AFTER AIRCRAFT IS SECURED IN STAND.
- _____ 14. **HCO INFORMS CO:** “UAS SECURED ON DECK, REQUEST PERMISSION TO SECURE FROM FLIGHT QUARTERS.”
- _____ 15. **BRIDGE PIPES:** “NOW SECURE FROM FLIGHT QUARTERS, STOW ALL GEAR.”

ENCLOSURE 6
Concurrent Helicopter/UAS Procedures

The cutter's ability to concurrently employ the embarked helicopter and UAS greatly enhances its ability to execute a variety of missions. However, this adds an additional level of complexity, and shall only be conducted after thoroughly evaluating the associated risks and benefits. Helicopter procedures shall comply with references (f) and (g), regardless of ongoing or impending UAS operations. The following additional guidance is intended for ship's company and embarked helicopter/UAS detachments to ensure safe, concurrent flight operations:

When helicopter is airborne:

- When the helicopter is airborne, the flight deck may only be fouled with UAS equipment when the helicopter is beyond a 15-minute transit from the cutter.
- UAS launch and recovery equipment shall not be traversed, set up, or operated simultaneously.
- The helicopter shall report when operating within a 15-minute transit to the cutter. This gives the UAS detachment sufficient time to clear the flight deck in the event the helicopter must land immediately for emergencies or operational necessity.
- When the helicopter is airborne and beyond a 15-minute transit from the cutter, UAS equipment may be traversed, set up, and operated on the flight deck for ground runs, launch, or recovery operations.
- When the helicopter is airborne, UAS equipment shall be cleared from the flight deck as soon as possible after UAS ground runs, launch, or recovery evolutions are complete.

When helicopter is static on deck:

- UAS equipment may be traversed, set up, and operated for UAS ground runs, launch, or recovery operations when the helicopter is secured to the flight deck with Talon, primary tiedowns, or secondary tiedowns.
- Helicopter ground runs are prohibited while UAS equipment is on the flight deck, regardless of rotor engagement.
- Simultaneous refueling (hot or cold) of the helicopter and UAS is prohibited.
- UAS detachment personnel are not permitted on the flight deck during any helicopter evolution.
- Helicopter detachment personnel are not permitted on the flight deck during UAS launch or recovery evolutions.

When helicopter and UAS are airborne:

- Helicopter and UAS shall have direct radio communications at all times.
- Helicopter and UAS shall maintain at least 1nm lateral separation and at least 500' vertical separation.
- UAS PIC shall advise helicopter any time UAS loses link, and when link has been regained.