



**DEPARTMENT OF DEFENSE
MISSILE DEFENSE AGENCY
7100 DEFENSE PENTAGON
WASHINGTON, DC 20301-7100**

TR

MEMORANDUM FOR COMMANDER, COAST GUARD PACIFIC AREA

SUBJECT: SBX-1 Operations Concept

In response to your letter of March 13, 2006, the SBX Program Manager has prepared the attached response that I believe addresses your concerns. We appreciate your concerns with regard to operating the SBX-1 and support vessels in the vicinity of Adak, Alaska. Your staff has been very cooperative and helpful working with us in multiple venues. Moreover, your assistance has been of great value, bringing local knowledge and maritime experience to support preparations for the SBX-1 arrival in Adak.

To continue our close cooperation, we would like to invite you to participate in a flag officer video teleconference to take place during the SBX FOGO Review in the May 23-25, 2006 timeframe. A close relationship between the Missile Defense Agency SBX team and the U.S. Coast Guard in District 17 is essential and will be key to the success of the SBX-1's national defense mission. We sincerely appreciate and welcome your continued involvement and input.

HENRY A. OBERING III
Lieutenant General, USAF
Director

Attachment:
SBX-1 Operations Concept

cc:
USPACOM J3
USSTRATCOM J3
USNORTHCOM J3
ALCOM J3
JFCC-IMD
CG, 17th District
OPNAV/N86
MSO Anchorage
COMDT (G-PC, G-PR, G-PCV, G-RC, G-RP, G-RPC)

SBX-1 Operations Concept

SBX-1 is a unique and innovative solution to the mid-course radar requirements of the Ballistic Missile Defense System (BMDS). SBX-1 includes a large X-band radar and mission communications equipment placed on a new semi-submersible platform originally intended for the offshore oil industry, but which was modified for SBX-1. The SBX-1 is a self-propelled vessel that will cruise to appropriate areas in the Pacific to support the BMDS flight test program, and will support BMDS defensive operations from the vicinity of Adak (or other open-ocean locations). The key aspects of SBX-1 that assure its seaworthiness are:

- Compliance with all applicable regulations and certifications pertaining to Commercial Cargo Vessels under 46 CFR Subchapter I
- Classed as A1, Column Stabilized Unit for unrestricted ocean service by American Bureau of Shipping, who oversaw the platform modification
- Lessons learned from the 35-year history of platforms in the harsh North Sea
- The inherent stability, safety, and durability of large 5th generation semi-submersible platforms
- Extensive analysis of worse case ocean conditions coupled with scale-model testing, built-in design margins, operational planning, and weather avoidance

Based upon environmentally severe SBX design requirements, acceptable site-specific availability analysis results and associated stability margins indicate the SBX is expected to perform well in the broad Pacific environment. The SBX Platform is designed to survive high (100 year) sea conditions based on entire operating region, including the Aleutian Chain, North Pacific, and Bering Sea.

Adak was chosen as the operating location based on the geometry of the threat ballistic missiles, the defending interceptors, and the desire for the greatest contribution to the defense of the United States. For the Western Aleutians, Adak has outstanding facilities – a protected ice-free harbor with pier space, fuel storage, housing and a large airport. As you are well aware, some of the major drawbacks to the area are its remoteness and the extreme weather. The following information is intended to provide you with background and status of issues you raised in your recent memorandum, reference (a).

- a. Extreme weather. Boeing teamed with the well-respected Naval Architecture Firm, Glosten Associates, to determine whether the Moss CS50 bare-deck platform would support the radar mission. Together they have performed a variety of analyses and tests to examine the structural integrity of the systems and its response to various forces and loads. The results of these analyses were reviewed by the American Bureau of Shipping, US Coast Guard and Oceaneering International, Inc., all with extensive semi-submersible experience. Scale model tank tests were conducted at the Offshore Model Basin, Escondido, CA, and boundary layer wind tunnel tests at

Cermak Peterka Petersen, Inc, Fort Collins, CO to demonstrate the actual platform motions induced by waves and wind. The stability analyses considered weather conditions with wind speeds of up to 55 m/sec (123 mph) and wave heights of up to 32 meters (105 feet). The platform motion studies were based on North Pacific (Climatology Buoy 44011 and 46003) and Bering Sea (Climatology Buoy 46035) using Navy Analytical Surface Ocean Wave Model correlation. The 100-year return wave heights for the North Pacific were greatest at a grid point at 40°N 180°W, 16.88 meters significant wave height or an individual wave height up to 36.2 meters, higher than has been observed at the Adak Loiter position. Test data derived from platform finite element modeling, testing at the model basin and testing in the wind tunnel, confirmed the stability and performance predictions of the platform, both at transit and operational depth. This extensive industry analysis and sea trials in the Gulf of Mexico provide confidence that the SBX-1 operations will be safe in the North Pacific and Bering Sea operating areas.

- b. Replenishment by Offshore Support Vessel. Motor Vessel Dove is on charter to support SBX-1 while operating offshore of Adak. M/V Dove is a large support vessel, 279 feet in length and 3,500 tons, and is equipped with dynamic positioning to aid in safe replenishment. Personnel and cargo transfers are expected in sea states up to sea state 4, and refueling to sea state 5, but the utmost priority is on personnel safety. The platform maintains 60-days of supplies and fuel. Forecast based planning will help to mitigate delays, but conditions at the vessel will dictate whether the transfer is safe, and cancellation of a transfer for safety reasons is always accepted. Extensive SBX-1 at-sea operational testing in the Gulf of Mexico was supported by M/V Dove with routine cargo, personnel and fuel transfers. The SBX-1 operations including hurricane avoidance (40 knot winds) and sea swell to 16 feet – providing confidence in Dove’s capability. Replenishment was carried out in a variety of conditions through sea state 3, building experience and confidence in the crew and equipment. It is worth noting that the M/V Dove has 12,000 horsepower propulsion – about 2/3 the propulsion capacity of SBX-1. An emergency towing bridle is rigged aboard SBX-1 for use if propulsion is lost, and at-sea towing by M/V Dove will be demonstrated.
- c. Station Keeping. An eight-point mooring is planned for installation in Kuluk Bay during the summer of 2007. Until the mooring is ready, SBX-1 will remain underway using its four 4,560 horsepower thrusters to maintain station. SBX-1 will ballast down to a keel draft of 77 feet when on station, reducing its wind area and increasing stability. In this condition, analysis based on the wind tunnel and wave tank testing as well as thruster performance predicts that the SBX-1 cannot make headway when winds reach sustained speeds of 50-55 knots using 95% of the thruster’s maximum continuous rating. Sustained winds are a 10-minute average that corresponds to 65-knot one minute speed and gusts to 80 knots. Higher sustained wind speeds will begin to push SBX-1 downwind, though SBX-1 will be capable of movement at an angle across the wind. Sustained wind speeds will exceed this limit periodically in Adak, so a loiter position was selected 50 nautical miles north of Adak to provide adequate sea room to maneuver during storms. Navy Climatology data for the loiter

area indicates winds from the east or west are more common than winds from the north (north winds would push SBX-1 toward shore). Weather forecasts from Weathernews Inc. and from the Naval Maritime Forecast Center at Pearl Harbor will be reviewed daily to determine if maneuvering for weather avoidance is prudent. Precision Station-keeping is not a requirement for operations.

d. Medical Evacuation. SBX-1 carries medical personnel, equipment and medicines that meet the requirements of the International Maritime Organization. No less than 4 licensed deck officers are trained as Medical Care Providers and no less than 2 personnel qualified as Medical Person in Charge (MPICs). The personnel are responsible for administering well care, first aid and trauma intervention for all personnel aboard SBX-1. The remote location and these times for medevac prompted an MDA reassessment of on-board medical support required. The decision was made on 30 March to add an additional crew member with the level of competency of a Navy Independent Duty Corpsman. This change will be made as soon as practical. SBX-1 medical personnel are supported by Maritime Medical Access (MMA). MMA provides twenty-four hour/day access to board-certified emergency physicians through association with the George Washington University Medical Center. Upon direction by the physician or when conditions warrant a decision on SBX-1, a person may be medevaced to provide better care at another location. Time to get to shore from the loiter position depends on the available transportation.

- 1) Near the loiter location in the vicinity of Adak, helicopters are not usually available, but might be available aboard a USCG cutter that happened to be nearby. If available, arrival might require 1.5 hours, followed by a 0.5 hour flight into Adak. Note that USCG helicopters will hoist from SBX-1 while underway, not use the flight deck because dynamic analysis for certification is currently not a requirement.
- 2) Helicopters are stationed at the USCG station at Kodiak (~8 hours in good weather including time for refueling).
- 3) The dedicated offshore support vessel (OSV) can transport personnel, and SBX-1 has a Reflex Marine FROG for personnel transfer by crane, including personnel in a stretcher. Transportation by OSV will usually require 4 hours transit out to 50 miles, transfer personnel, then 4 hours transit back to Adak.
- 4) Care at Adak is limited, but there is a clinic and usually a nurse practitioner or physician's assistant on island.
- 5) Medevac from Adak will be by commercial flight or by air ambulance provided by LifeFlight from Alaska Regional Hospital in Anchorage AK. Choice depends on circumstances and schedule. LifeFlight is expected to arrive at Adak about 5 hours after call, and require about 5 hours to load the patient and return.

Decision to medevac will be made in conjunction with SBX-1's chain of command and USCG District 17. The decision will consider the weather conditions, the support available, and the expected time required for

transporting the patient to better care. USCG situational awareness for vessels transiting near SBX-1 and location of helicopters is critical to the decision process.

- e. SBX-1 Underway Operations. Coordination between MDA, Boeing, Glosten, the Coast Guard and the American Bureau of Shipping on the classification of SBX-1 included the relatively high percentage of time to be spent underway compared to most semi-submersible platforms. As a result of this coordination, SBX-1 is considered an industrial vessel under 46 CFR Subchapter I and specified a regulatory standard that included requirements for cargo ships and for Mobile Offshore Drilling Units (MODUs). Acceptance of this classification is documented by USCG (G-MSE-2) letter dated 11 February 2004. Considerations for cargo ships resulted in such features as the two bow 15-ton anchors which can be used in shallow fair-weather anchorages, something not seen on most MODUs. These anchors are self-deployed and were tested during Builder's Trials. These anchors are not meant to augment the mooring (eight 38 ton anchors) or to be used for loitering in the deep waters north of Adak. The bow anchors can be used in an emergency to help stop SBX-1 in relatively shallow water.
- f. SBX-1 and M/V Dove Non-Tank Vessel Response Plans (NTVRP). The SBX-1 NTVRP is under development and is now being reviewed by the SBX-1 prime contractor and is expected to be submitted to the Coast Guard next month. M/V Dove NTVRP has been submitted and under review. Review and incorporation of recommended changes are planned to be complete before 1 May 2006.
- g. M/V Dove Alaska Oil Discharge Prevention and Contingency Plan. M/V Dove's operating company, the SBX-1 prime contractor and MDA have been meeting with the Alaska Department of Environmental Conservation on the oil spill plan for Dove. M/V Dove is currently planned for incorporation into the Adak fuel facility plan, and will use similar preparations and contingency planning as used by tankers bringing fuel to Adak. This plan requires a tug or other workboat to standby to assist Dove or to respond with containment and collection equipment in the case of a spill. Arrangements to hire the support vessel before SBX-1 and Dove arrive at Adak are in progress.
- h. SBX Antiterrorism/Force Protection (AT/FP) Plan. The SBX ATFP Plan and the SBX-1 Vessel Security Plan includes the use of an armed contract security force. Rules for the use of force are derived from CJCS Instruction 3121.01B and will be the subject of careful training for the security force. The Statement of Work for the contractor Security Force was coordinated with General Counsels for PACAF (for ALCOM), NORTHCOM, MDA, GMD, STRATCOM and PACOM, with all comments incorporated or adjudicated by GMD General Counsel. The plan and procedures will include the notification of key decision-makers aboard the SBX-1 as

- i. Loiter position Notice to Mariners. The position north of Adak was selected to provide adequate sea room (as described above), to take advantage of somewhat better sea conditions than south of Adak, and to minimize the transit distance and complexity for M/V Dove. SBX-1 will be operating near the Great Circle Route north of Adak and will have ships passing within surface radar range daily. The candidate operating location south of Adak was near other Great Circle Routes that pass south of the Aleutians and would have had approximately the same number of ships passing. The SBX-1 Deck Watch Officer will maintain a lookout aided by radar and the Automatic Identification System, and will request ships whose closest point of approach is less than a mile to pass clear via bridge-to-bridge radio. The added warning of a Notice to Mariners is welcomed. The loiter location is in international waters and MDA concurs that no exclusion or security zone can be established to bar vessels from safely passing SBX-1 at a fixed distance.
- j. Adak Facility Security Plan. The update for the Adak Facility Security Plan extends the fuel pier plan to piers 3 and 5. The plan incorporates additional contract security guards provided by the Missile Defense Agency. The use of additional guards is the same solution other ships in Alaska use to augment pier security at ports where facilities are not sufficient. The Adak Facility Security Plan and Addendum are planned to be submitted to MSO Anchorage by early May 2006. The contract security guards will be in place before M/V Dove arrives in Adak.
- k. Automatic Identification System (AIS) sites. The situational awareness provided by additional remote AIS sites in the western Aleutians would provide many benefits to the Coast Guard in addition to providing a watch on SBX-1 and M/V Dove. Funding for establishing these sites will be discussed within the Missile Defense Agency's Program Protection and other Directorates.

The Missile Defense Agency will be operating SBX-1 and support vessels in the Coast Guard District 17 area of responsibility while stationed near Adak. While operating from homeport in Adak, the Marine Safety Office in Anchorage will be responsible for inspections and surveys of material condition, management programs, security, crew training and proficiency, and environmental compliance. The Missile Defense Agency is funding one full time position at the Marine Safety Office for administering the SBX-1 voluntary compliance with regulations and Coast Guard inspections to retain a valid Certificate of Inspection for the vessel. This voluntary compliance takes advantage of Coast Guard expertise in these matters for the safe and sustainable operation of SBX-1.

U.S. Department of
Homeland Security

United States
Coast Guard



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16000
13 March 2006

MEMORANDUM

From: 
RADM J.C. OLSON
CGD SEVENTEEN (d)

Reply to dre
Attn of: CDR Woodring
(907) 463-2283

To: Brigadier General Marvin K. McNamara
Deputy Director, Missile Defense Agency

Thru: PACAREA (P)

Subj: COAST GUARD INPUT TO CONCEPT OF OPERATIONS FOR SBX-1

1. I recently met with Lieutenant General Fraser of Alaska Command to discuss defense operations in Alaska, including your work with the SBX-1 in Adak, Alaska. I appreciated the opportunity to review the progress that your organization is making on the radar project. My staff has also been actively engaged in many facets of the maritime nexus to SBX-1, including two joint agency working group meetings in Colorado Springs. In an effort to continue our cooperative efforts for the collective good of this project, I offer the following comments and concerns.

2. Operations in the Bering Sea are inherently dangerous as the weather is extreme. In just the past month, two storms with winds of 80 knots, with gusts to over 120 knots, have passed through the Adak region. As a frame of reference, the sea state offshore, in the vicinity of proposed SBX-1 loitering operations, exceeded 30 feet for many days. During the warmer season, fog becomes prevalent in the Bering Sea and along the Aleutian Islands. I urge you to consider safety as your first priority in this hostile environment. This emphasis must be an overarching consideration regarding all operations in the remote and hostile, yet resource rich, environment of the Aleutian Islands.

- a. It is my understanding, based on ship characteristics, that the SBX-1 is not capable of maintaining station, nor will the DOVE be capable of providing support, under these somewhat routine inclement weather conditions. Based on the proximity of the SBX-1 operating area to the Aleutian Island chain, this lack of station keeping ability presents an imminent safety threat to the platform, her crew, and the pristine environment of the Aleutian Islands. My concern is whether or not SBX-1's dynamic positioning capabilities are robust enough for the current operational plans. Having pre-determined storm avoidance plans, and well tested oil spill response plans in place for a worst case scenario, will be critical.
- b. Reprovisioning, transferring personnel, and refueling the SBX-1 in this area of operations will present many safety challenges. Your contractors report the capability of reprovisioning in up to Sea State 4 (approximately 8 foot seas), which will cancel many regularly scheduled operations in the winter months as seas often run in excess of 20 feet for long periods of time. A careful risk analysis of the sea condition before any transfer operations would be prudent as I consider safety of life at sea my highest priority.
- c. The remoteness of Adak also precludes any quick Coast Guard response to medical or other urgent situations: the response time of a helicopter from Coast Guard Air Station

Kodiak is approximately eight hours. While a cutter is always on patrol in the Bering Sea, it may be several days before it could arrive on scene to render aid.

- d. Lastly, my staff is consulting with the American Bureau of Shipping (ABS) classification society which has had significant involvement with SBX-1 regarding plan review and vessel inspection. I understand that the ABS evaluation and approval for many facets of its operation were done under the premise that SBX-1 was to operate in the moored mode. With the current shift to operations under the loitering mode, some of the approvals need to be revisited. For example, the anchor configuration onboard SBX-1 was designed to augment the fixed eight-point mooring system being permanently installed in Adak harbor. The onboard anchors are insufficient for offshore loitering operations and will probably not stop the vessel's movement by themselves.
3. Alaska's pristine environment is second to none when it comes to clean wilderness lands and productive sea waters. To help protect that environmental legacy, we maintain a prevention based focus on environmental response to pollution incidents in Alaska.
 - a. Based on a waiver from Coast Guard Headquarters, DOVE is considered a non-tank vessel despite carrying 600,000 gallons of fuel. Federal legislation was passed in 2004 requiring Vessel Response Plans for non-tank vessels, but regulations have not yet been published. Until regulations are in effect, the Coast Guard can issue interim authorization letters to operate if the owner or operator of a non-tank vessel submits a plan proving the availability of the necessary means to respond to a worst case discharge from their vessel. These requirements apply to the contract vessel DOVE. Since Coast Guard inspection of the government owned SBX-1 has been requested, it is expected that SBX-1 will also comply with this law. I am pleased to note your voluntary compliance in drafting an oil spill response plan for the SBX-1, and as required by law, for the contractor operated supply vessel DOVE.
 - b. The State of Alaska passed laws governing carriage of oil spill response equipment on non-tank vessels in 2001. It is my understanding that you have been in contact with the State of Alaska and are discussing State of Alaska contingency planning requirements for the DOVE. I note here for your awareness, that existing State plans do have requirements for tug availability in Adak. The fact that there currently are no tugs permanently present at Adak might have negative impacts on vessel operations subject to these requirements.
 4. The Anti-Terrorism Force Protection (ATFP) plan for the SBX-1 and the ship's own regulatory required Vessel Security Plan are integral parts of the asset protection. These plans are related but separate in nature.
 - a. The ATFP plan addresses the self-defense of the SBX-1. My staff informs me that a contract security force will be utilized for ATFP and I strongly urge you to very carefully outline the legal authorities for use of force associated with ATFP of a government owned vessel by contract security personnel and corresponding rules of engagement. Of particular concern is that one of the proposed area of operations for the SBX-1 will be within the Great Circle Route (GCR) for commercial vessels transiting to and from Pacific Rim nations. Many of these vessels will be transiting within close proximity of the SBX-1 when operating in the GCR. Fail safe ATFP procedures and in-depth training of this security team will be vital.
 - b. The Vessel Security Plan is regulated by federal law, and is required for the security of the ship. My inspectors from Marine Safety Office Anchorage will exercise this plan with the

vessel crew during their inspections of SBX-1. At the proposed loitering position of SBX-1, it is not possible for the Coast Guard to establish a Security Zone or "exclusion zone" for other vessels. My staff can issue a Broadcast Notice to Mariners warning shipping in the region of the presence of the SBX-1 and requesting they remain well clear of that position.

5. The shore-side facilities in Adak will require new Facility Security Plans under the Maritime Transportation Security Act (MTSA). The facility in Adak has been operating under a waiver due to its low security risk and consequence factor, as it relates to the impact on critical infrastructure. With the addition of the DOVE to the local community, the facility will no longer be allowed to operate under this waiver. Your staff and mine are working on this issue, and a new Facility Security Plan has been promised to Marine Safety Office Anchorage by 20 March 2006. As with the seaborne plans, the shore-side ATFP plan for the DOVE is a separate entity. Your staff has recently visited Adak and is developing tactics and procedures for shore-side security of DOVE.
6. The ability of the Coast Guard in District Seventeen to monitor the status and location of SBX-1 is crucial to our situational awareness and ability to respond. My staff advises me that we will be able to monitor the current location of SBX-1 via intelligence tools that we currently use. In addition to monitoring the position of SBX-1, it would benefit all parties to have the ability to monitor the DOVE and any other vessel traffic in the area that might pose a threat to SBX-1.
7. District Seventeen currently has Automatic Identification System (AIS) sites established in Unimak Pass. The addition of AIS sites in Adak and Attu would provide all parties with an awareness of commercial vessel traffic over 300 GTs in the region of SBX-1, which will be very near the heavily traveled Great Circle Route. Funding of these two new AIS sites is not currently available to the Coast Guard. I hope you will give serious consideration to funding for these additional AIS detection and monitoring sensors in the Aleutian Islands. District Seventeen would be willing to monitor any information provided by sites in these locations and input it to national sensor systems as we do currently with data from our AIS sites in Unimak Pass.
8. District Seventeen stands ready to support this National Defense project. With the shift from moored operations to loitering operations, there are some serious maritime and vessel related issues to be pursued which will ultimately ensure successful SBX-1 operations. Do not hesitate to call my point of contact, Commander Marcus Woodring at 907-463-2283, who can direct specific questions to subject matter experts under my command.

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Copy: NORTHCOM J3
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PacArea (Pr, Pp, Px)
MSO Anchorage
COMDT (G-PC, G-PR, G-PCV, G-RC, G-RP, G-RPC)