

MARINE MAMMAL ACTIVE SONAR TEST (MAST) SCHEDULE

Overall Dates: January 4-31, 2003

Approximate Location:

Lat. 35-14.0N, 120-55.0W, 1 nm off the coast of Diablo Canyon Power Plant

1. GOALS

- A. Measure the performance of the HF/M3 system in shallow water.
- B. Perform an engineering test of the IMAPS hardware and measure its performance.
- C. Determine if there are any avoidance responses of the Gray Whales to the HF/M3 or IMAPS signals.
- D. Measure the target strength of Gray Whales at the HF/M3 and IMAPS frequencies.
- E. Measure avoidance reactions of the Gray Whales to sound at mid (1-20 kHz) frequencies.

2. OPERATIONS OFF THE R/V NEW HORIZON

The R/V New Horizon (RVNH) will load in San Diego on Monday January 6th and depart the same day at 2000. RVNH will arrive in San Luis Obispo early on Tuesday January 8th to load some of the science party and then proceed to the operations area.

Sonar operations and two ship-based visual observers will be conducted off the RVNH. RVNH will be moored offshore in the path of the Gray Whale migration. The first location will be in the middle of the path as determined by shore-based observers prior to the arrival of RVNH. Depending on sonar performance, and the reactions of the animals, the mooring may be moved to just inside or just outside the migration path during the course of the experiment.

There are two different sonar systems and an additional mid-frequency source that will be deployed off the RVNH. The sonar systems are referred to as HFM3 and IMAPS and will be deployed off the A-Frame at the stern of the ship. Tag lines and/or a fin will be used to keep the units from rotating. Simultaneous deployment of the two sonar systems is not anticipated. We will refer to the mid-frequency source as MFS. MFS is small and might be lowered off the side at another location on the ship, as is possible/desirable. Additional hydrophones to record signal transmissions might also be deployed off the RVNH at other locations.

Generally, the RVNH will be located on its mooring for the entire period. However, the RVNH may move into Port San Luis Obispo or offshore at night, as is deemed necessary or desirable. Reasons to do so include personnel transfers, conferences with the shore-based observers, ship maintenance functions, and weather. We anticipate operating the sonar systems for two nights towards the end of the experiment.

A test target might also be deployed by the RVNH at a distance of roughly 800 m off the small craft.

A CTD measurement should also be made three times per day at 0800, 1200, and 1600.

The RVNH will pull the mooring on the morning of January 30th and return to San Diego to arrive NLT 1600 hours on January 31st.

3. SHORE-BASED OPERATIONS

Shore based observers will be located at two locations on shore, four observers at each site. Shore-based operations will start on January 4th such that sufficient control information can be gathered prior to arrival of the RVNH. A network or other means for transferring the data from the shore-based observers to the New Horizon will be implemented. Generally, visual sightings from shore will be conducted everyday during daytime hours, weather permitting. The last day visual sightings will be required is January 29th.

4. SMALL BOAT OPERATIONS

Weather permitting, a small boat will be used to transfer passengers and deploy test targets for the sonar system.

5. TESTING

Tests will generally be conducted in 4 hour blocks. AM will be from 0800-1200 and PM from 1200-1600. Two night-time sonar operation periods will be conducted provided the systems are working well enough to ensure a 100 yd mitigation region around the ship. Test will be of the control type, when no sonar operations are being conducted but visual sightings are recorded, HF/M3 Sonar operations, IMAPS sonar operation, or MFS operations. These are designated below as CONTROL, HF/M3, IMAPS, or MFS.

6. PERMIT REQUIREMENTS

This operation is being conducted under a permit issued by the National Marine Fisheries Service. A general requirement of the permit is that we ensure that no animals are exposed to more than 180 dB re 1 μ Pa. To ensure this, source levels should not exceed

210 dB re 1 Pa unless necessary (but at no times above 220 dB re 1 Pa) and all sonar operations should be halted if any marine mammal is detected, visually or by the sonar, if they come within 100 m of the stern of the RVNH.

7. SCHEDULE

A schedule specifying test types and dates, along with known required in-port dates is given below. This schedule is only intended for preliminary guidance and will be modified as the experiment proceeds. The IMAPS system will see its first deployment during this test and problems should be expected. Also, there will be days when weather will not permit operations due to safety, sonar stability, or the ability to track the animals and meet the permitting requirements.

MAST SCHEDULE

CONTROL – Visual tracking from shore with no sonar operations

HFMS – HF/M3 sonar operations being conducted with visual tracking from shore.

IMAPS – IMAPS sonar operations being conducted with visual tracking from shore.

MFS – Mid-frequency source operations being conducted with visual tracking from shore.

Weather – Planned weather days. If not needed these will be used to advance the schedule, expand the tests, or repeat tests.

RVNH – R/V New Horizon

SBO – Shore-based observers

PSLO – Port San Luis Obispo

PT – Personnel Transfer

Jan 2003	MORNING	AFTERNOON	NIGHT
Sat 04	Shore based observers arrive Diablo Canyon and set up	Shore based observers begin visual tracking	No operations
Sun 05	CONTROL – no ship	CONTROL – no ship	No operations
Mon 06	CONTROL – no ship Loading RVNH at 0800	CONTROL – no ship Finish loading RVNH	RVNH departs San Diego at 2000
Tue 07	CONTROL – no ship RVNH Transits North	CONTROL – no ship RVNH Transits North	RVNH Transits North
Wed 08	RVNH Arrives PSLO at 0700 for PT and meeting with SBO. RVNH then proceeds to selected site, conducts survey, and deploys mooring. Visual tracking continues while ship moves into place.	HF/M3 deployed and system checks performed. Transmit signal survey conducted. Visual monitoring continues to protect 100 m zone.	No operations. New Horizon in PSLO if necessary for meetings with SBO.
Thu 09	HF/M3 at 30 kHz.	HF/M3 at 30 kHz	RVNH in PSLO for PT

Fri 10	CONROL	HF/M3 at 30 kHz	No operations.
Sat 11	IMAPS deployment and engineering trials Visual monitoring to protect 100 m zone	IMAPS engineering trials. Visual monitoring to protect 100 m zone.	No operations.
Sun 12	IMAPS Engineering trials	IMAPS Engineering trials	RVNH in PSLO for PT
Mon 13	IMAPS Engineering trials	IMAPS Engineering trials	No operations
Tue 14	Weather	Weather	No operations
Wed 15	CONTROL	IMAPS at 25 kHz.	No operations
Thu 16	IMAPS at 25 kHz	IMAPS at 25 kHz	No operations
Fri 17	Weather	Weather	RVNH in PSLO for PT
Sat 18	IMAPS at 25 kHz	CONTROL	No operations
Sun 19	IMAPS at 25 kHz	IMAPS at 25 kHz	No operations
Mon 20	Weather	Weather	No operations
Tue 21	HF/M3 at 30 kHz	CONTROL	No operations
Wed 22	CONTROL	HF/M3 at 30 kHz	HF/M3 nighttime operation
Thu 23	Weather	Weather	No operations
Fri 24	HF/M3 40 kHz	CONTROL	No operations
Sat 25	CONTROL	HF/M3 at 40 kHz	IMAPS nighttime operations
Sun 26	Weather	Weather	No operations
Mon 27	MFS at 10 kHz	CONTROL	No operations
Tue 28	CONTROL	MFS at 5 kHz	No operations
Wed 29	MFS at 1 kHz	CONTROL	RVNH in PSLO for PT
Thu 30	Retrieve mooring FINEX	RVNH leaves by 1200 for San Diego	Transit
Fri 31	Transit	RVNH arrives San Diego at 1600.	