

# Characterizing the Extent of Sub-surface Oil and Dispersants DWH Incident

**Critical Partnerships -  
NOAA, Academia, Industry**



# Cruise Objectives

- Map the 3-Dimensional Structure of the “plume” of sub-surface oil and dispersants and characterize the rates and directions of flows including the possibility of entrainment into the “Loop Current”.
- Inter- calibrate multiple sensing technologies to attain a high degree of reliability of detection and differentiation of various sources of “back-scatter” (e.g., oil/dispersants from normal “biologics”)
- Sample sub-surface biological communities to help understand the potential impacts of sub-surface oil and dispersants on affected ecosystems



# Collaborators

- NOAA –Office of Marine and Aviation Operations, Southeast Fisheries Science Center, Office of Response and Restoration
- University of South Florida, School of Marine Sciences
- Monterey Bay Aquarium Research Institute
- University of New Hampshire – Center for Ocean and Coastal Mapping and Joint Hydrographic Center



# Assets in Use



NOAA Fishery Survey Vessel (FSV)  
GORDON GUNTER  
Run EK-60 sonar for broad scale  
plume mapping, deploy MOCNESS  
Net, Standard bottle sampling  
deploy MBARI “Gulper” AUV



Hydrocast/shiptek bottle sampling  
at depth, deploy flurometer,  
Glider release, bottom trawling

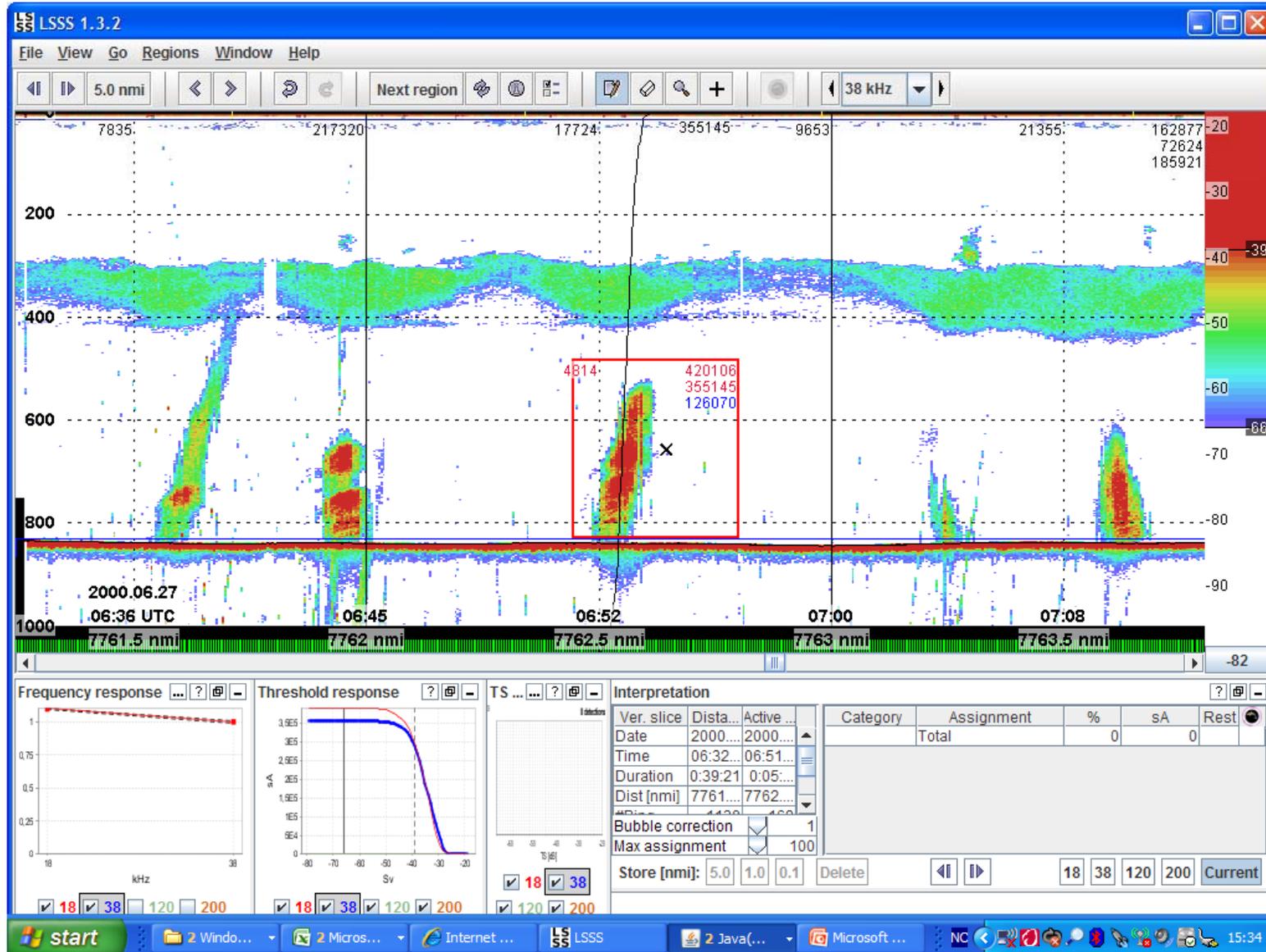


# Broad Scale Plume Detection - Sonar

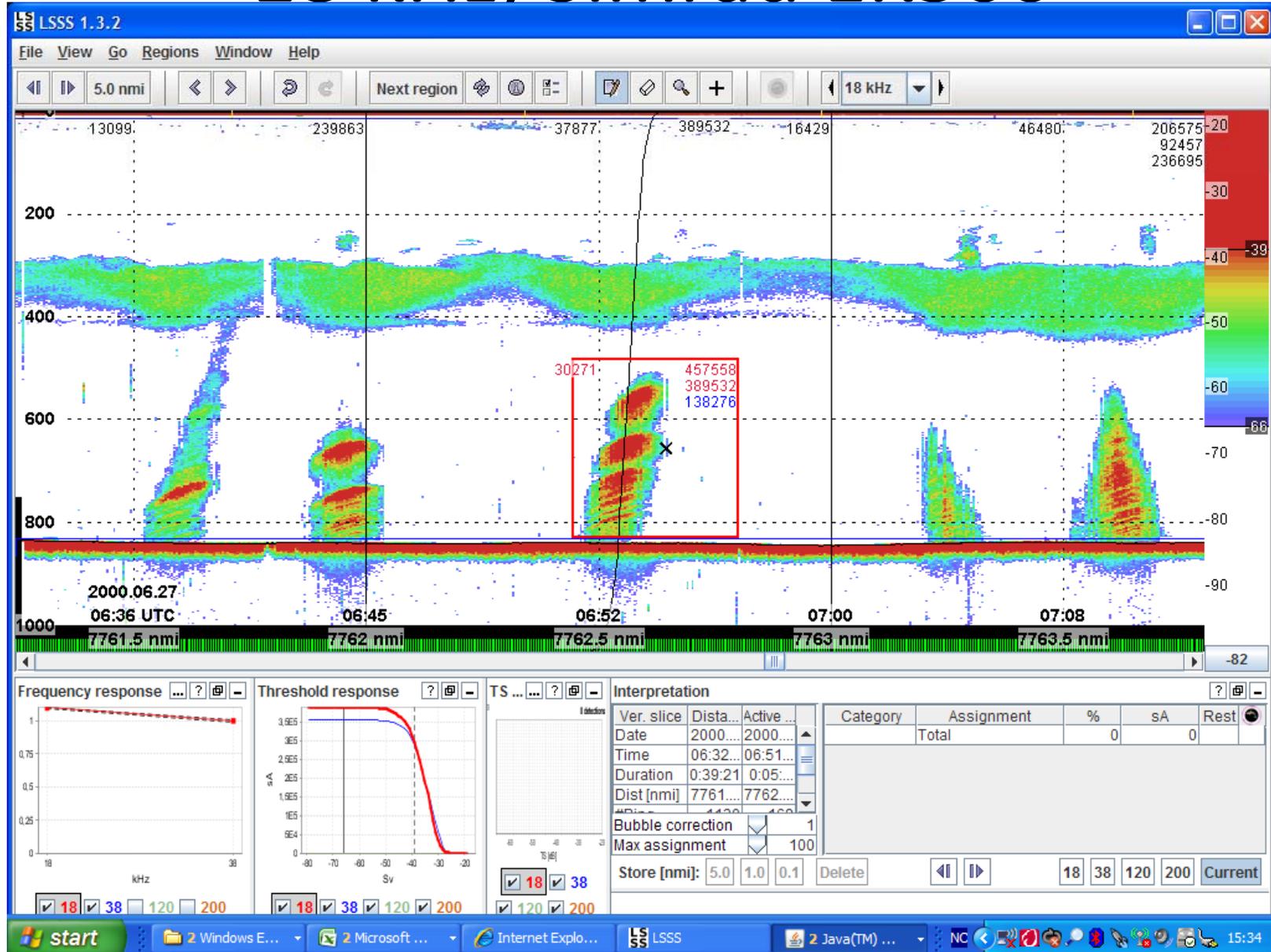


- In June 2000 the Norwegians **initiated a controlled release of oil and gas at >800 meters water depth.** Proved the utility of using 18 and 38 khz mapping sonars for tracking the released particles
- The FSV GUNTER has the EK-60 SIMRAD sonar package, UNH-Joint Hydrographic Center will process transect data in real time onboard and produce three dimensional maps of back-scatter density distribution
- Sampling will be adaptive to identify the vector direction and density of identified “plumes” at depth

# Norwegian Experiment 38 kHz, Simrad EK500



# 18 kHz, Simrad EK500



**To help calibrate sonar, need *in situ* water sampling  
and other sensing (fluorometry)**

## **1500 meter version Instrument Payload – The Gulper**

1. 2 SBE25 boardsets
2. 2 SBE3 Temp Sensors
3. 2 SBE4 Conductivity Sensors
4. Paroscientific Pressure Sensor (UCB4000)
5. SBE43 Dissolved Oxygen (O<sub>2</sub> measurements at depth)
6. HobiLabs Hydroscat 2 (fluorometer)
7. WetLabs ECO-CDOM Puck fluorometer
8. 10 – 1.8 liter water samplers (the “Gulper”)

Supplemented with Niskin bottle rosette aboard GUNTER



MBARI Upper Ocean AUV

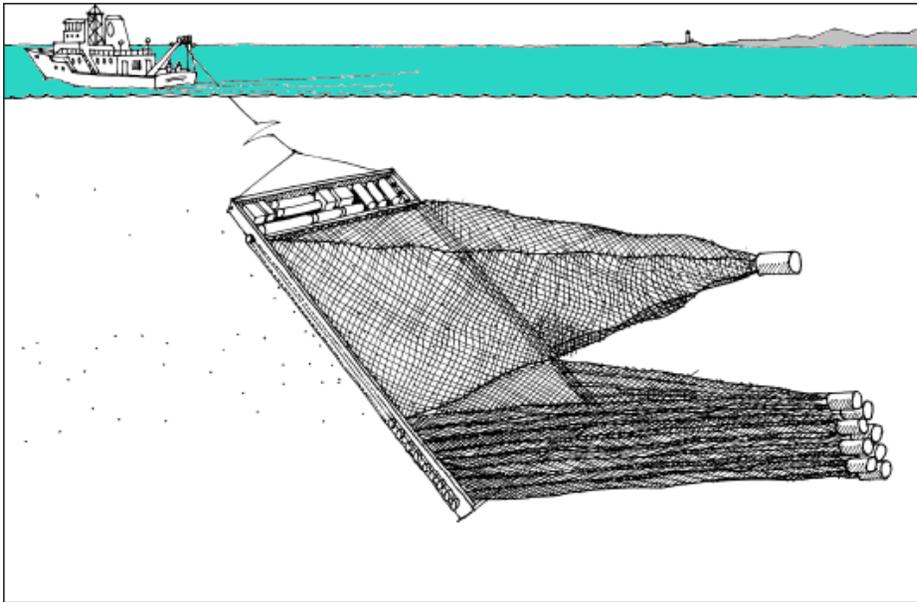
Water Sampler  
Midsection 10  
separate samples



“Gulper” Requires a  
knuckle crane to deploy/  
retrieve – highly  
Likely the crane aboard  
GUNTER is compatible



# Ecological Effects Sampling



## MOCNESS – Multiple Opening and Closing Net Environmental Sampling System

Computer controlled, sampling at discrete depths, able to sample distinct Layers, challenge to clean nets once oiled

Bottom trawling to evaluate impacts on benthos – Weatherbird II



NOAA | National Marine Fisheries Service | Southeast Fisheries Science Center  
 Deepwater Horizon Subsurface Plume Monitoring and Mapping Cruise

