

A quick review on the methods used for L&R
followed by the specific problems of working in
ice covered regions



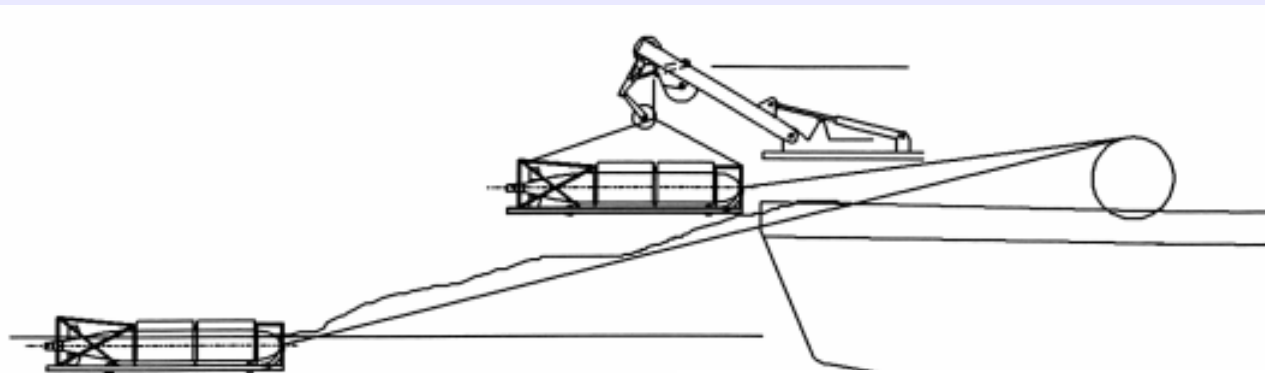


 **Handling Systems for UUVs** 

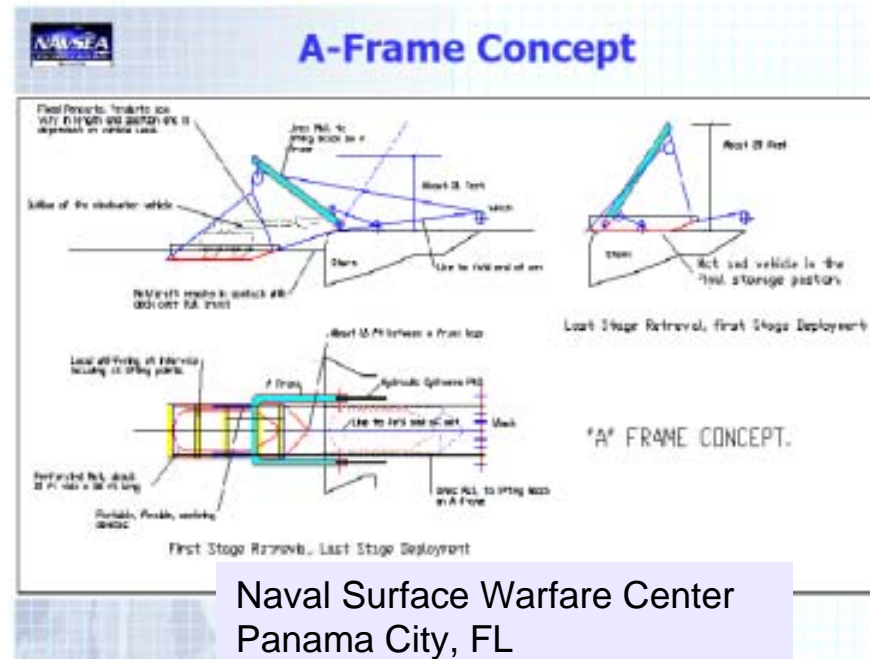


ASNE Launch/Recovery Symposium

6

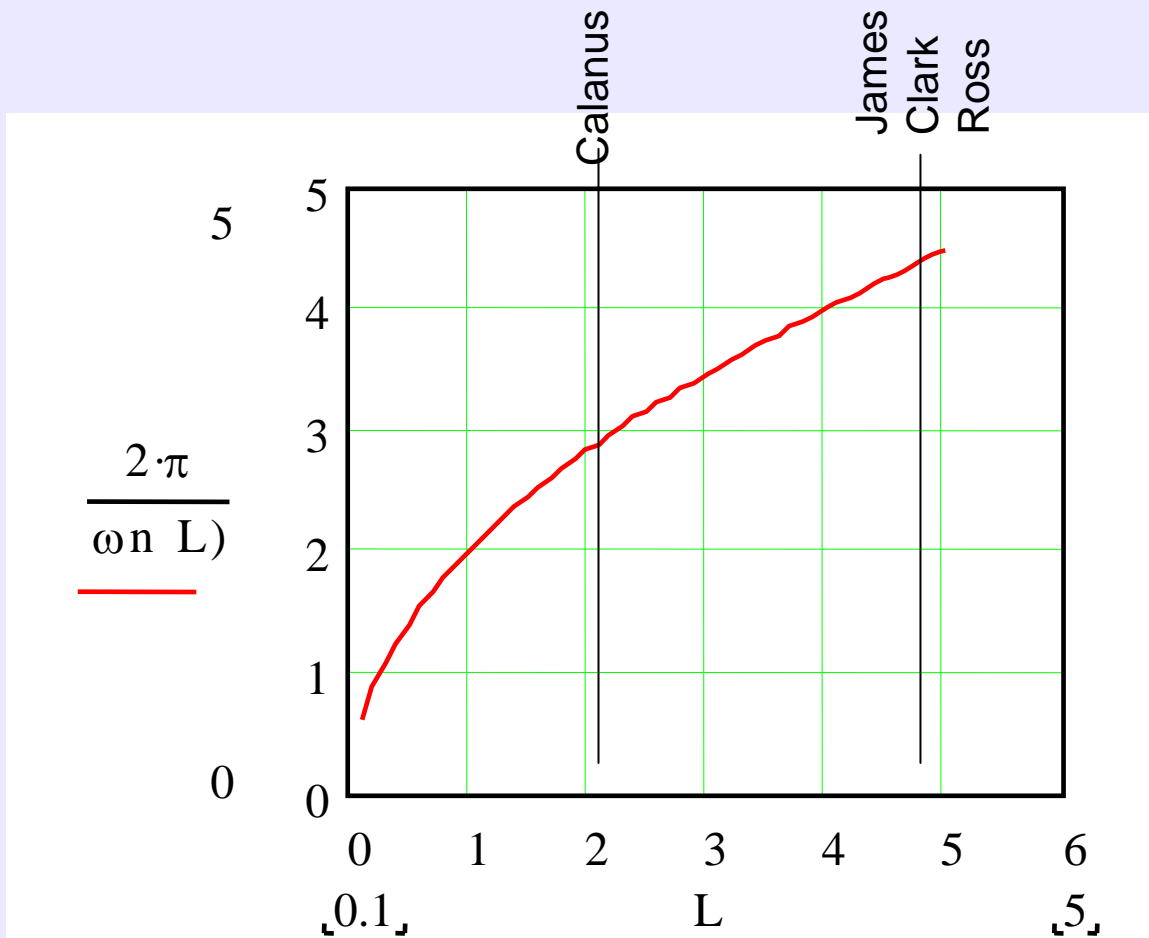


Proposed Garage and A frame method for Autosub in 1999



Naval Surface Warfare Center
Panama City, FL





Periodic time of AUV swinging on a line



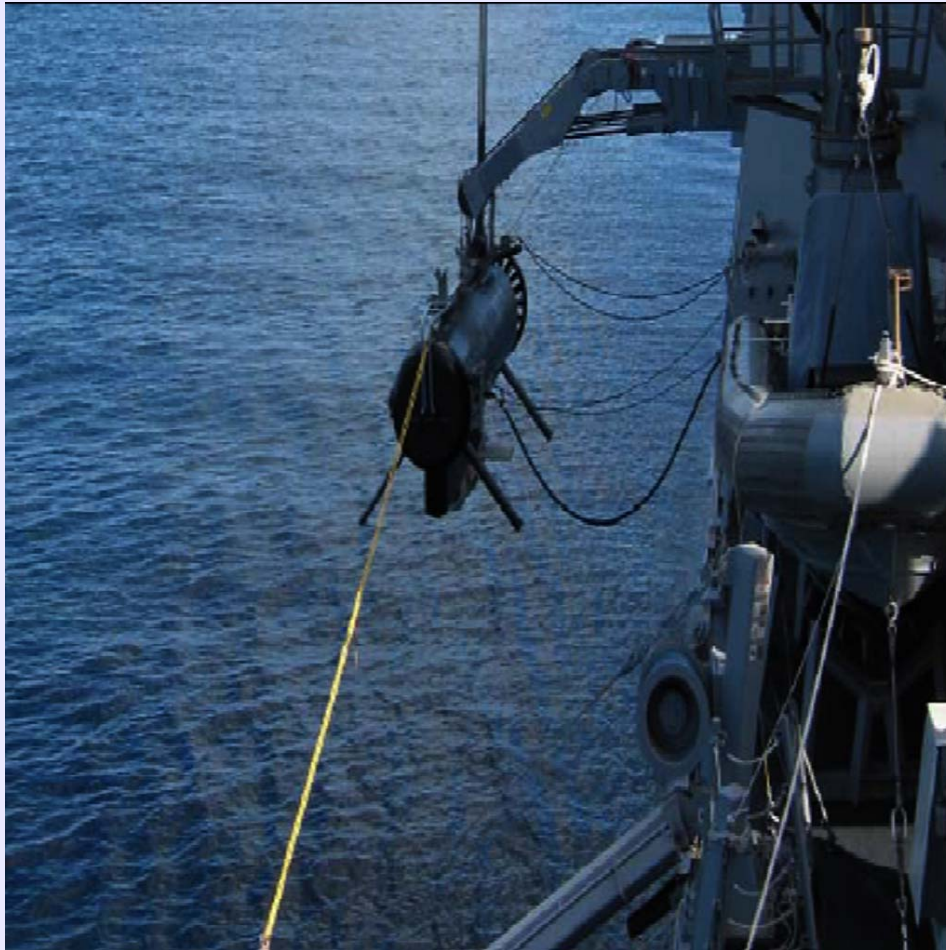
Hugin 3000

Kongsberg Underwater Technology



American Society of Naval Engineers – Launch and Recovery of Unmanned Vehicles from Surface Platforms. Annapolis ML. Nov 2005

Approx 14 presentations extolling the idea of a ships fitted with large stern ramps



Remote Minehunting
System AN/WLD-1 on
USS MOMSEN (DDG 92)
2004

(NAVSEA Panama City Fl)



NOC, Southampton Autosub Under Ice





Subsea7 Geosub

L&R has tended to concentrate on getting the vehicle in and out of the water but...

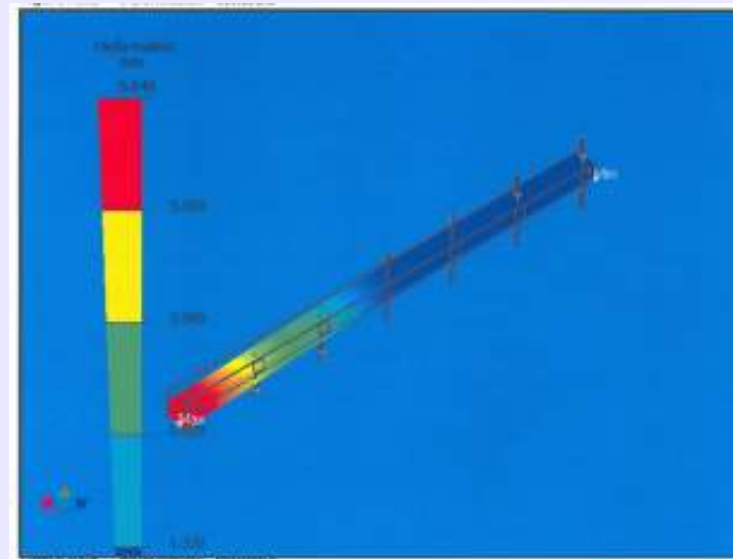
- Launch is not completed until the mission has started.
- Recovery begins with wanting to rendezvous with the vehicle



Snags, Difficulties and Experience

Non ice related:-

- Ship deck matrix loadings (can be as low as 1Tonne tensile/M24 bolt)
- New frames for each different ship (expense)



❑ Snags, Difficulties and Experience

Non ice related:-

- Hydraulic or electrical power supply (limited to 60kW, 60A off 63A supply; ideally we would like more)
- Learning curve on each new ship (people communications, explaining what works best, accommodating different views – side recovery, reverse to sub)



Snags, Difficulties and Experience

Ice related:-



Snags, Difficulties and Experience Ice related:-

Working Conditions: Autosub containers and gantry fitted to James Clark Ross

Roller front door

Work benches

0.5 T gantry crane

12kW Heating

Telephone

Fire safety equipment

Side door and window



Snags, Difficulties and Experience Ice related:-

Picking ones moment to launch in heavily ice covered regions (seconds count)



Snags, Difficulties and Experience Ice related:-

Large Changes in Water Density at the Surface near Glacier Fronts

4 kg/m³ difference between undisturbed water at the bow and slightly disturbed water at the stern (circa 10kg difference in Autosub wt in water)

➤ Wings added mid section to increase sink force.

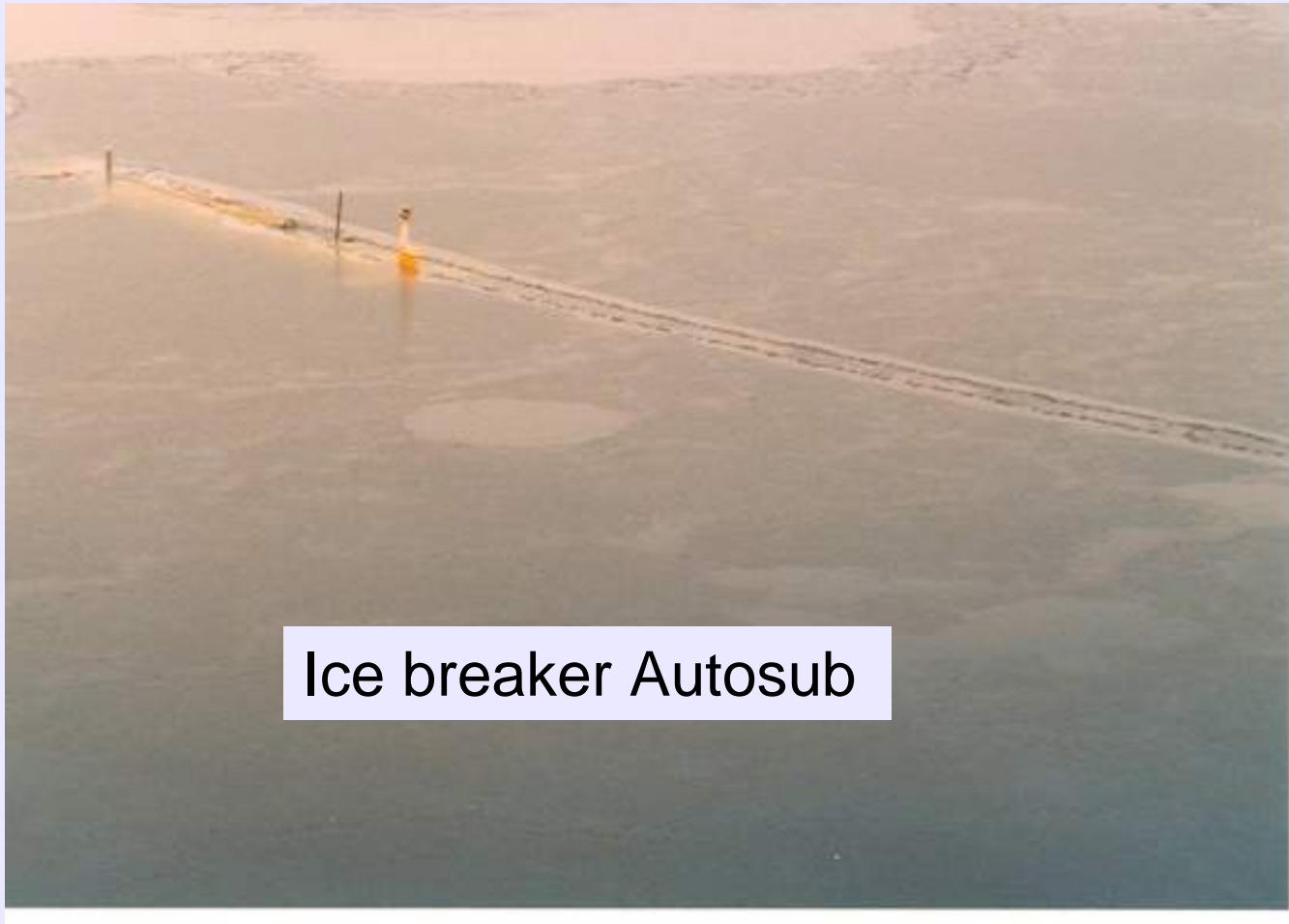
➤ Sub ballast and sink weight checked and modified for each mission



Snags, Difficulties and Experience Ice related:-



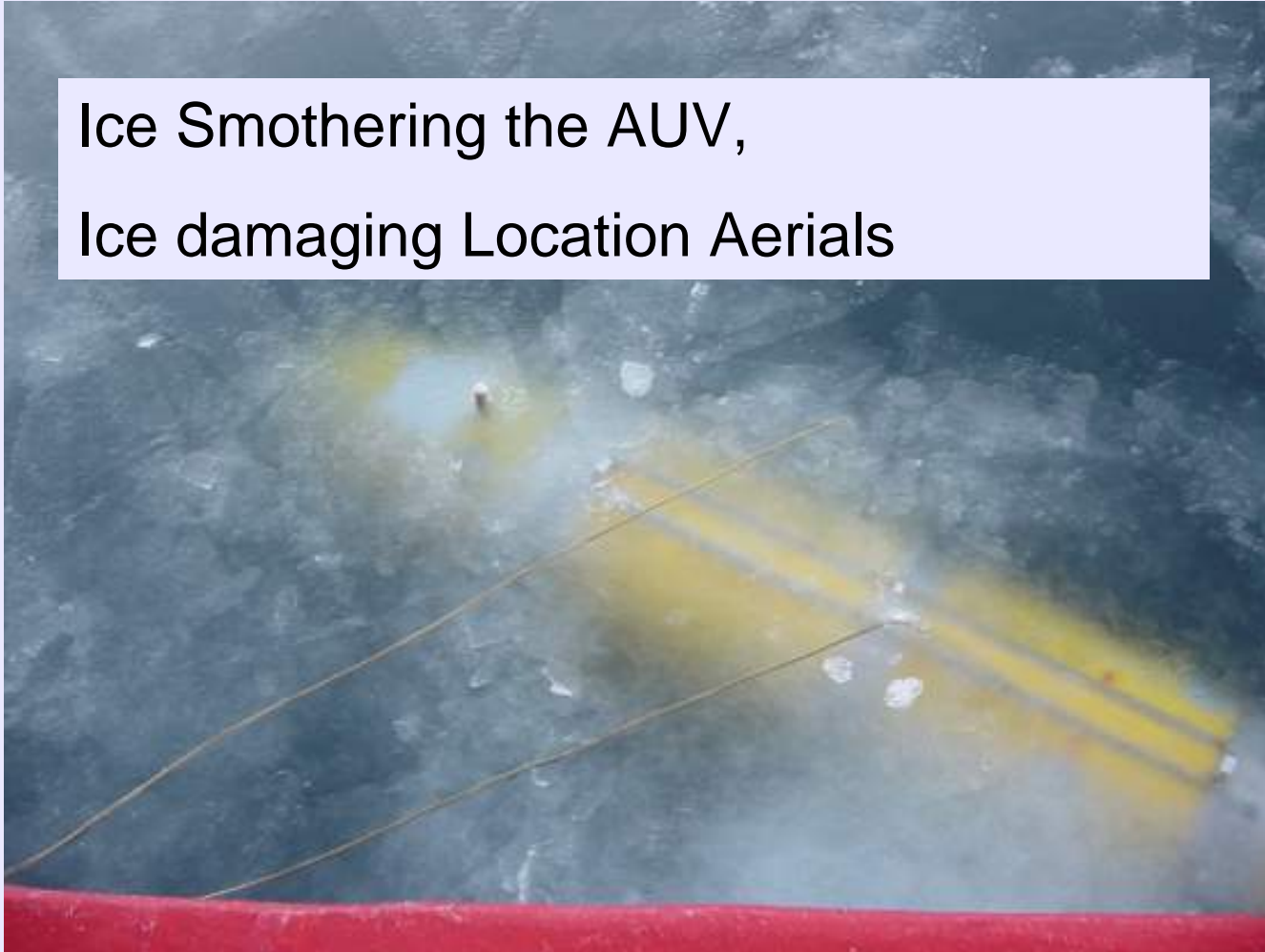
Snags, Difficulties and Experience Ice related:-



Ice breaker Autosub

Snags, Difficulties and Experience Ice related:-

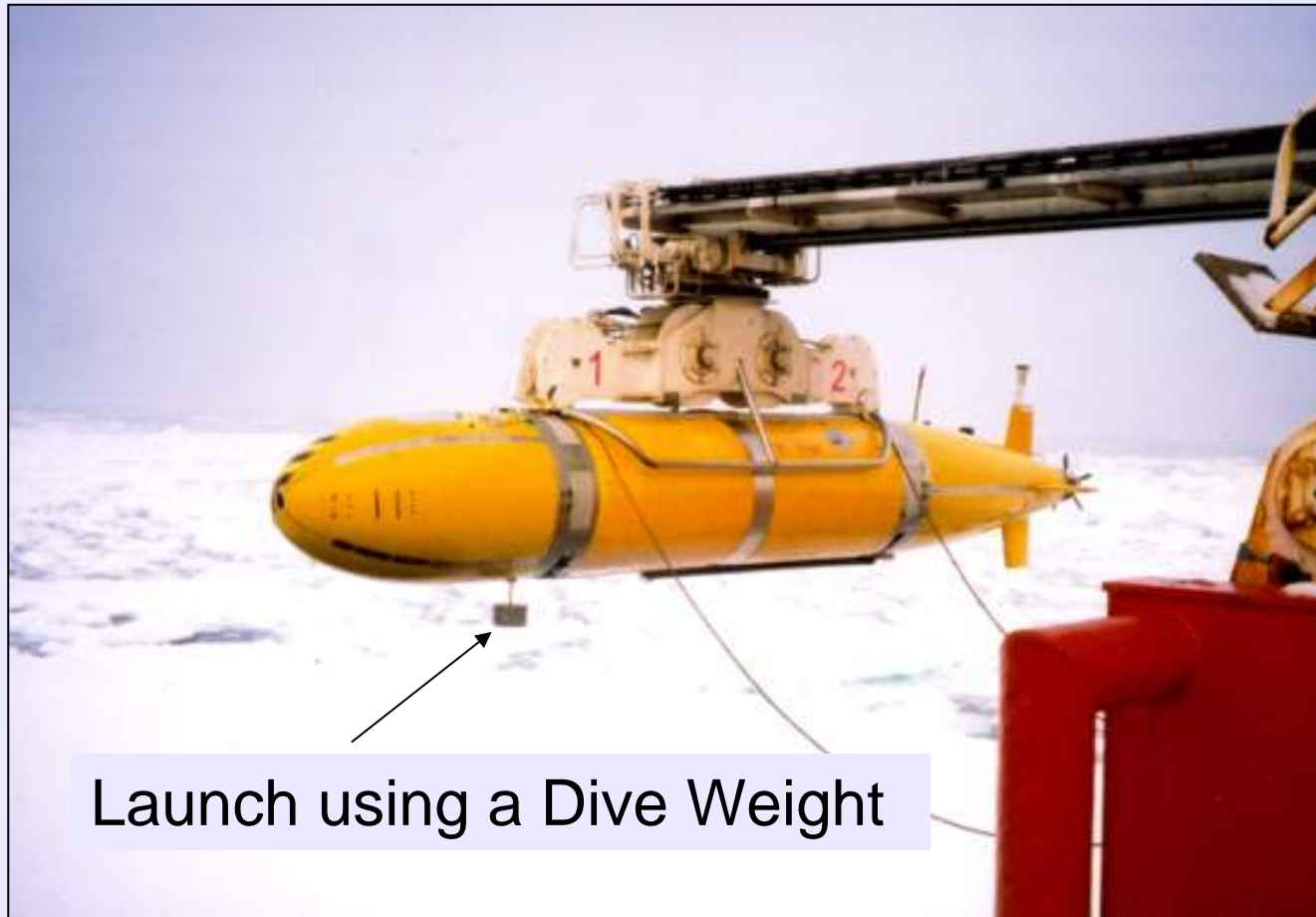
Ice Smothering the AUV,
Ice damaging Location Aerials



Snags, Difficulties and Experience Ice related:-



Systems we have proved...



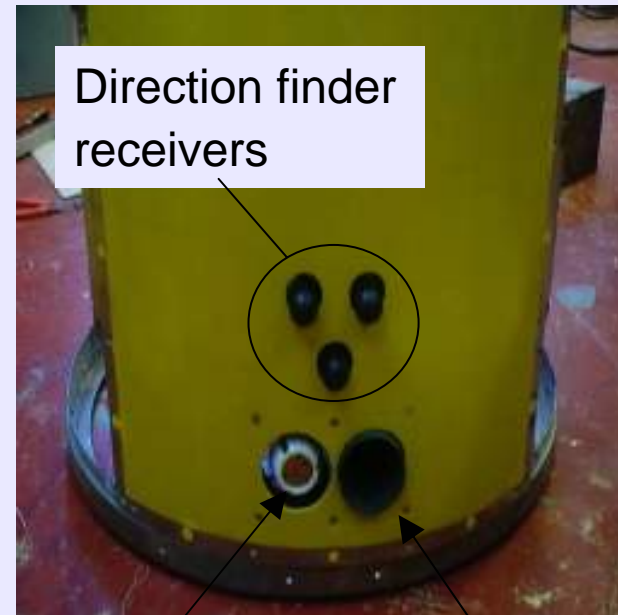
Launch using a Dive Weight

Systems we have proved...

Homing and Emergency Beacons (but bulky and significant effort taken to develop the system)



Emergency 4.5kHz beacon drops on 15m cable.



Sink weight release

Emergency Abort Release

Systems we have proved...

Collision avoidance (part of the recovery process)

- Forward looking echo sounder
- Upward and downward looking ADCPs

