PRESENTATION
ON

AN INNOVATIVE OCEAN PLATFORM FOR SPECIAL OBSERVATION CAMPAIGN & FAST DEPLOYMENT & MAINTENANCE OF DATA BUOYS

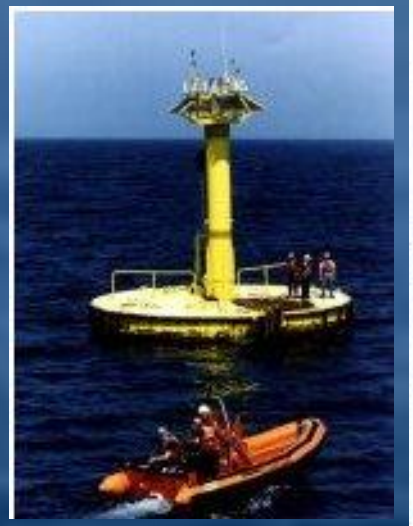
BY

UGI CONTI, K.PREMKUMAR, ISABELL CONTI

AT

DBCP XXV 2009 SCIENTIFIC & TECHNICAL WORK SHOP ON 28 SEPTEMBER 2009 IN PARIS

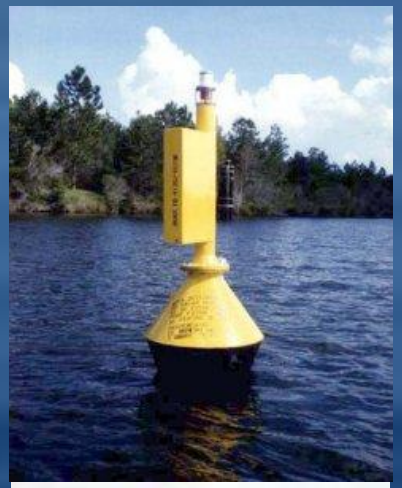
AVAILABLE OCEAN PLATFORMS



10 m Discus buoy

6 m Nomad buoy

3 m Discus buoy



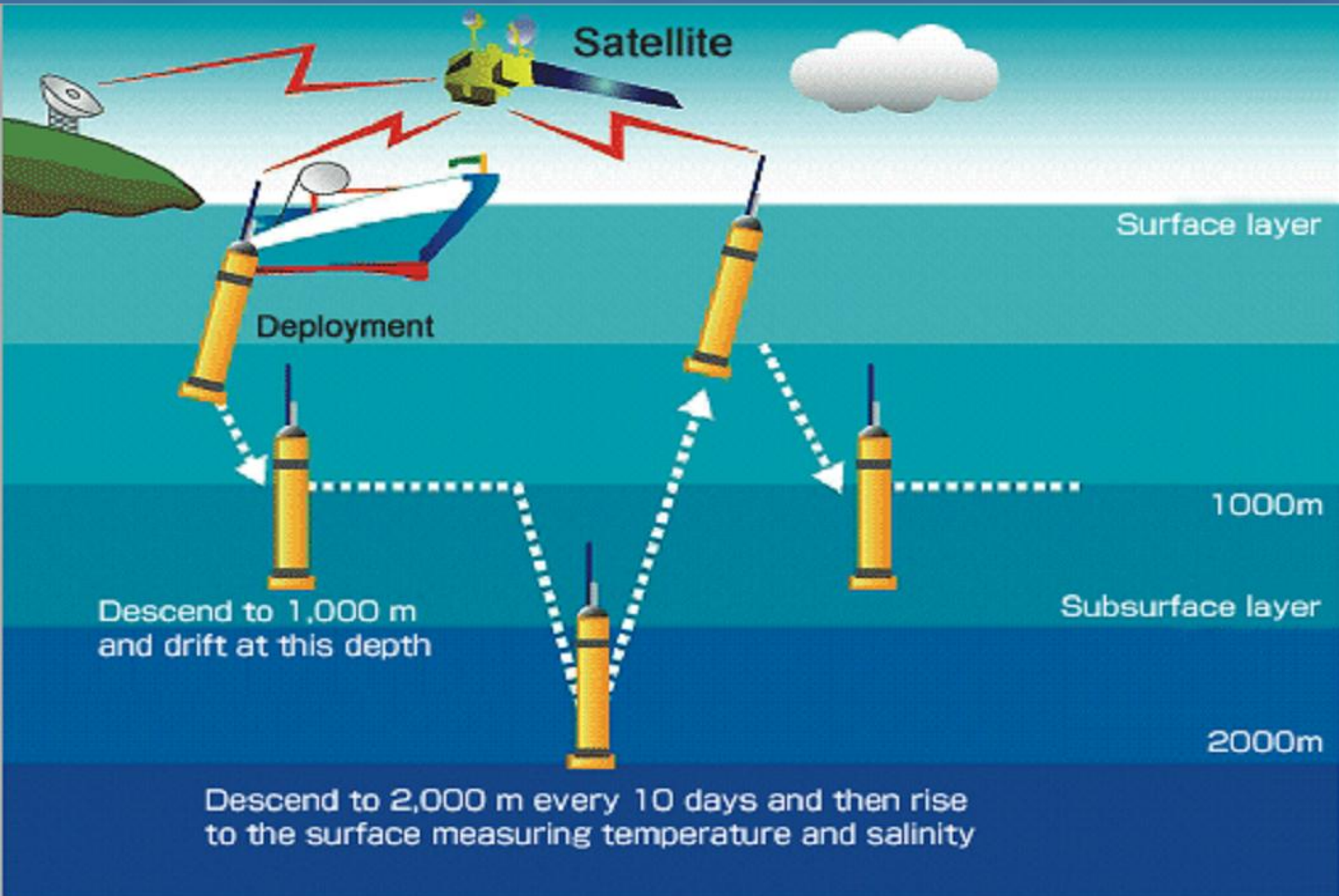
Drifting buoy

PIRATA buoy

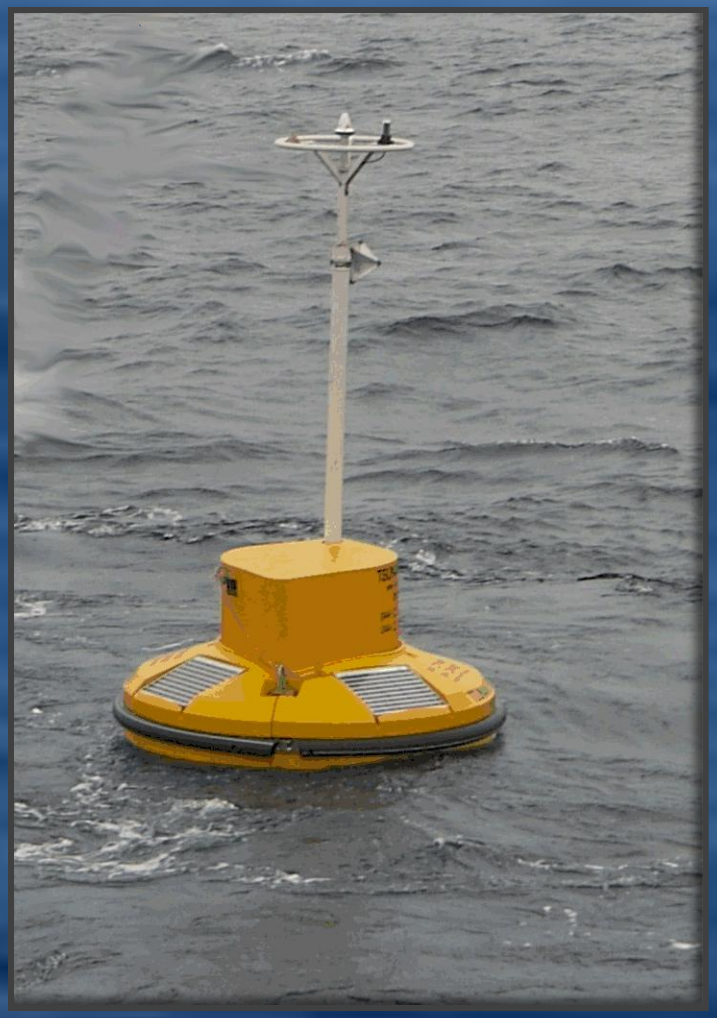
TRITON buoy

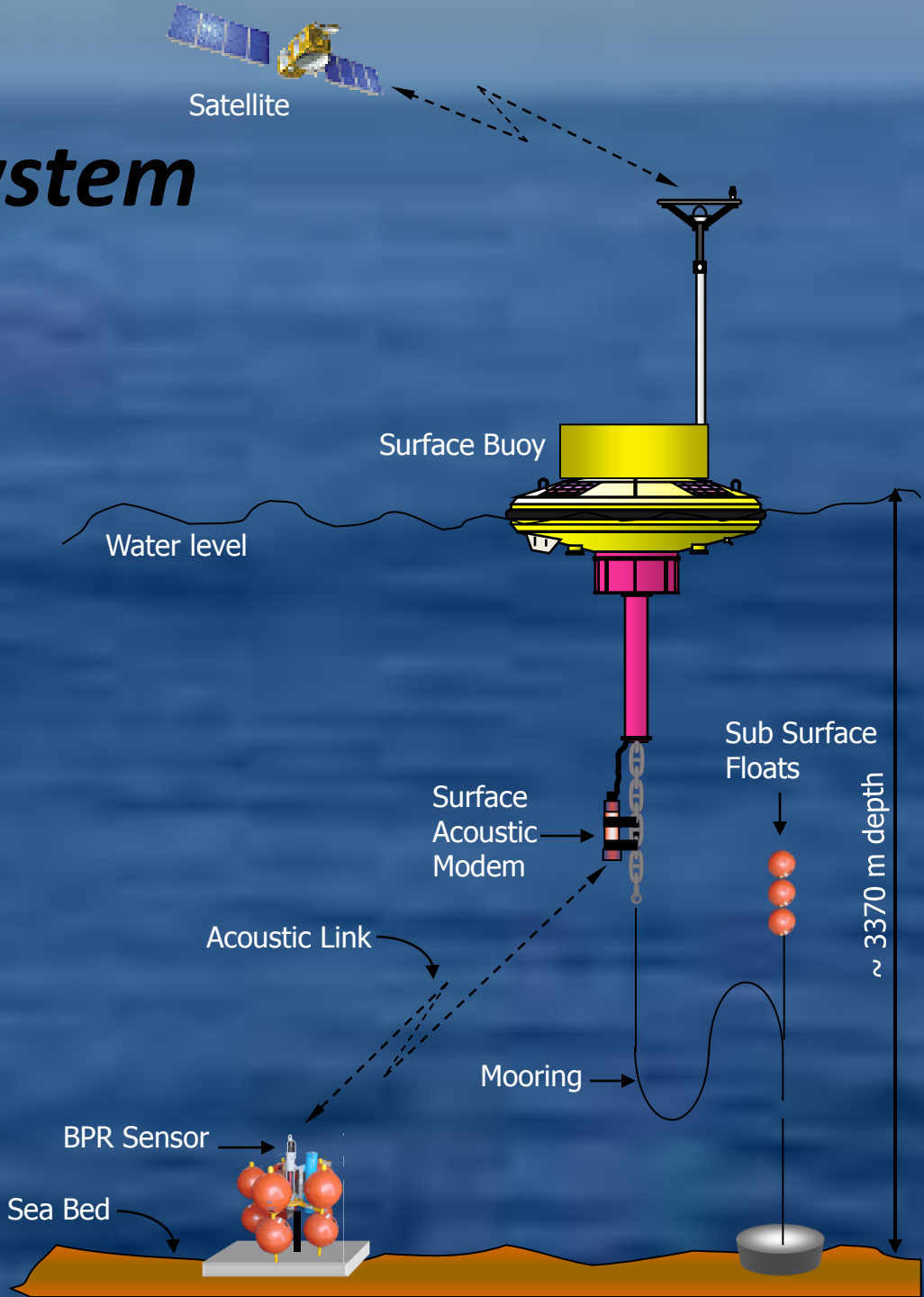
EGOS buoy

ARGO Float


Satellite
Surface layer
Deployment
1000m
Descend to 1,000 m
and drift at this depth
Subsurface layer
2000m
Descend to 2,000 m every 10 days and then rise
to the surface measuring temperature and salinity

Tsunami Buoy System





MARINE ADVANCED RESEARCH, USA

INTRODUCES

A NEW

CLASS OF VESSEL WHICH CAN BE WELL UTILISED AS OCEAN PLATFORM & FOR BUOY MAINTANENCE

WAM-V®

WAM - V

Based on a Totally New Concept:

Why fight the ocean?

instead

Absorb, slide, adjust!

WAM-V® :

Wave Adaptive Modular Vessels

Key Concepts:

- Marine Advanced Research, Inc., has created a revolutionary technology based on many innovations.
- The WAM-V technology complements existing vessels and opens new possibilities.
- WAM-Vs are to conventional vessels what helicopters are to airplanes.

Wave Adaptive:

- A WAM-V adapts its hull shape to the surface of the water.
- Instead of forcing the water to conform to the hulls, a WAM-V gives and adjusts; “dances” with the waves.
- Offering minimal resistance, WAM-Vs are ultra light craft that float like corks on the waves.
- Lower weight = lower fuel consumption.
- Springs, hinges, shock absorbers and ball joints articulate the vessel and mitigate stresses to structure, payload and crew.

Wave Adaptive:

Two different radio-controlled 8 ft. models demonstrate the “wave adaptive” behavior of the WAM-V technology.

VIDEO CLIPPING:

50 ft Test Platform

Demonstrates maneuverability and safety next to rocky coastline.

Video clipping:

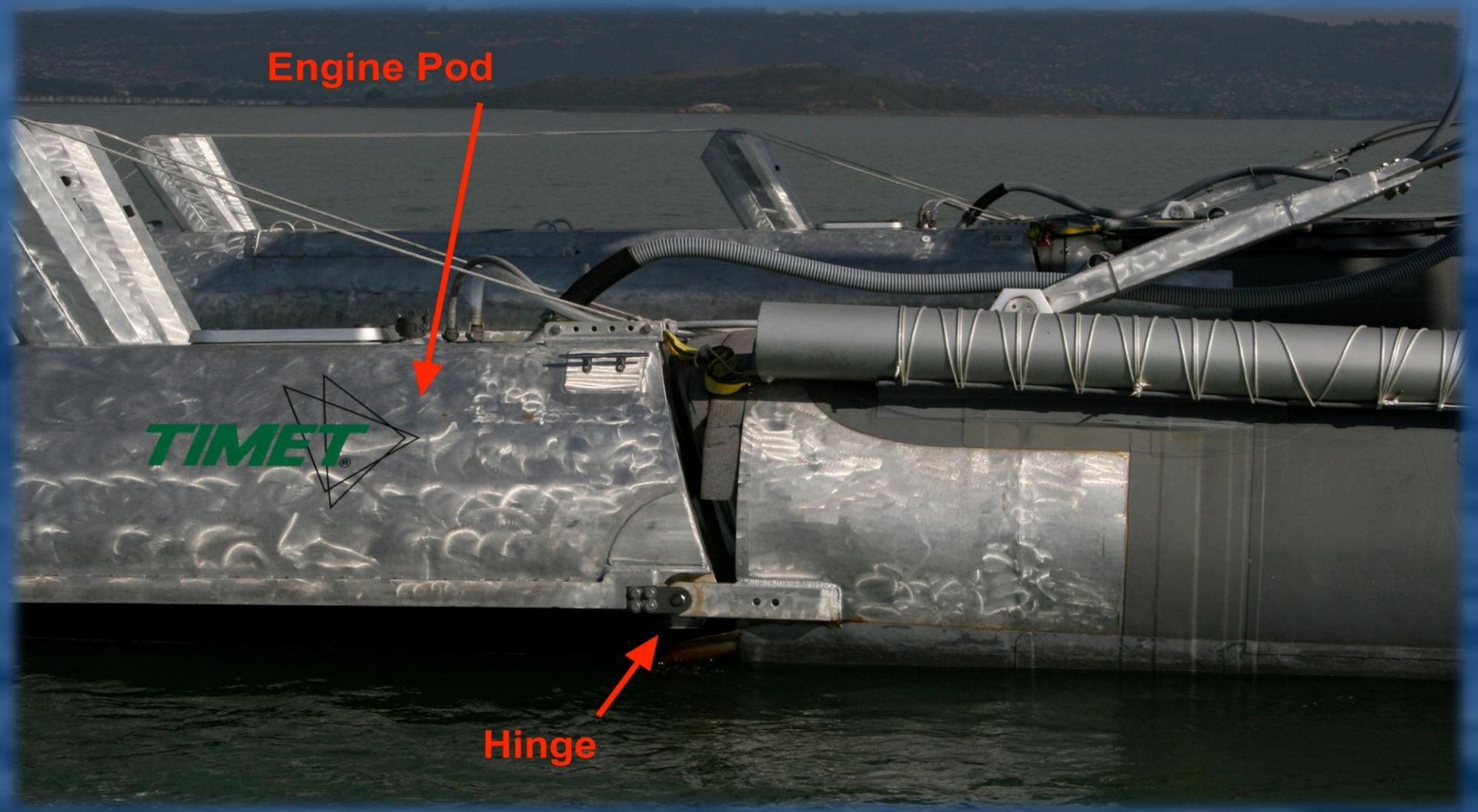
Video: 50 ft Test Platform

100 ft R&D Prototype:

- Built in 2006 and tested for several months in Puget Sound, WA.
- Named “Proteus” to signify that it was the first of its kind.
- Introduced to the public for the first time in San Francisco, CA in January 2007.

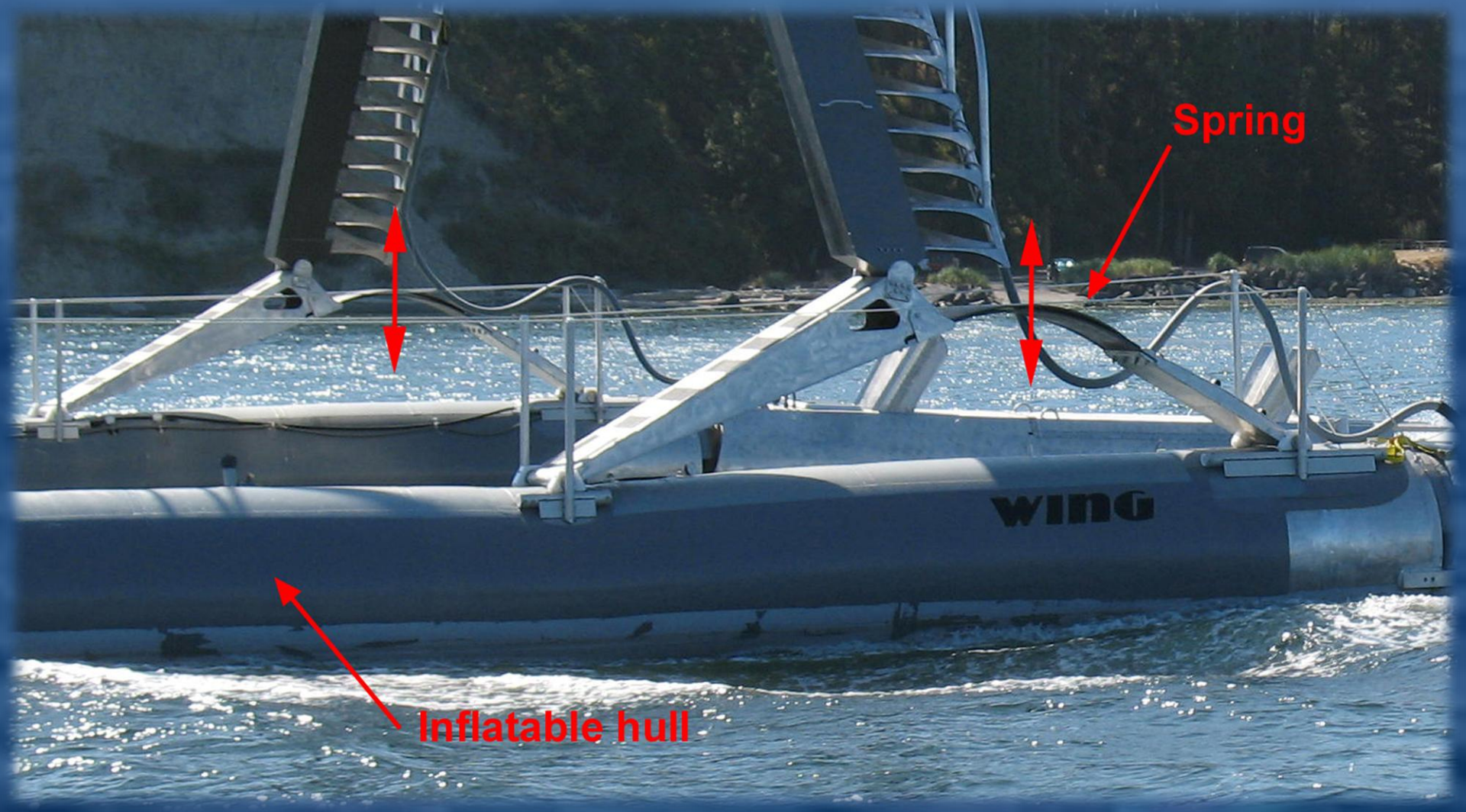
Wave Adaptive Elements: Inflatable Pontoons

Wave Adaptive Elements: Hinged Engine Pods



Hinged engine pods allow the pods to follow the shape of the waves and keep the propellers in the water at all times.

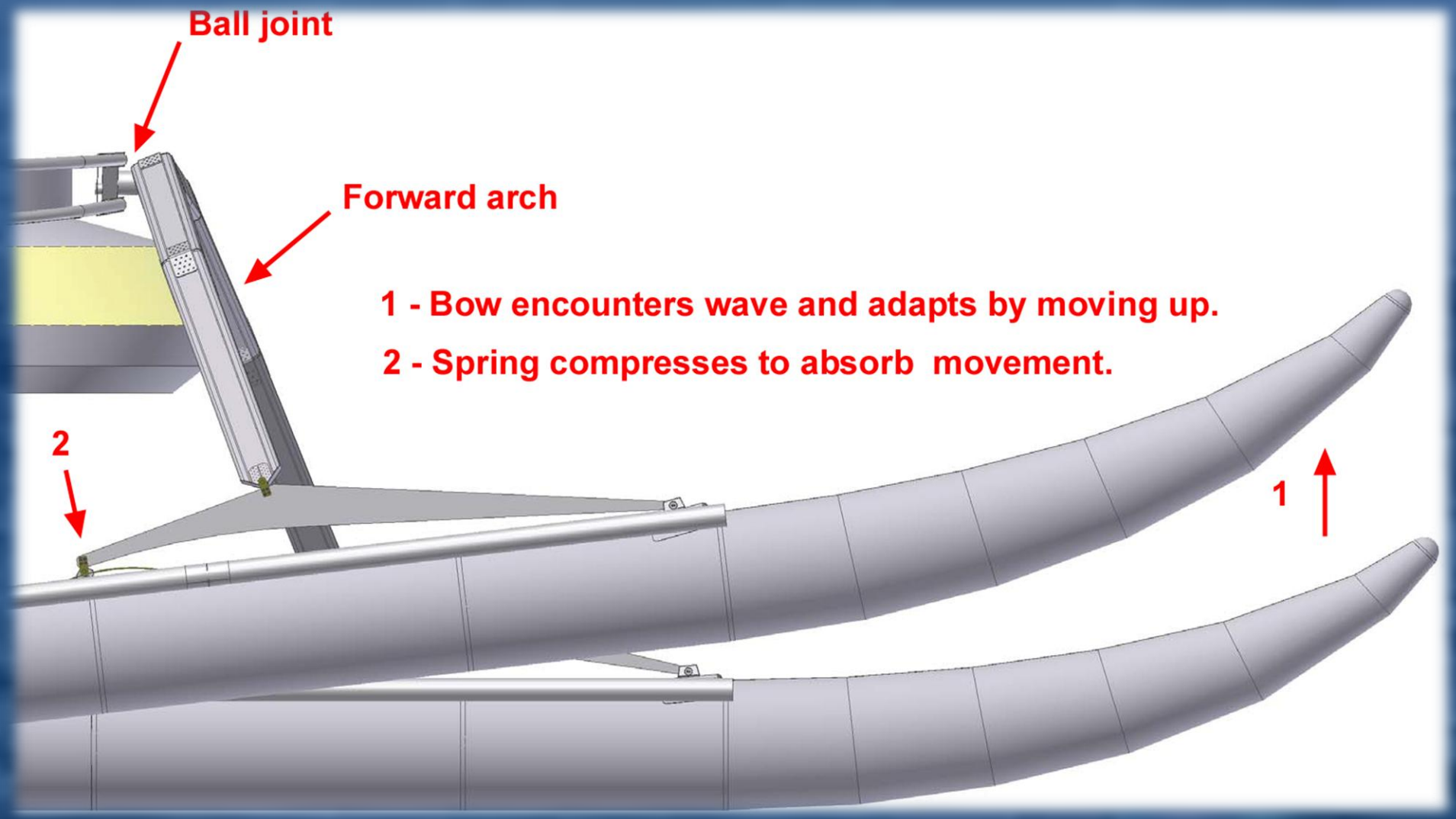
Wave Adaptive Elements: Springs



Springs help to absorb wave motion and reduce stresses

Wave Adaptive Elements: Spring Details

Wave Adaptive Elements: Ball joint `



Ball joint allows the forward arch to rotate such that the hulls can move semi-independently. This reduces the stresses on the structure.

Wave Adaptive: Advantages

Seaworthiness

- The 2:1 length to width ratio ensure extreme stability.

- Round and soft inflatable pontoons prevent digging of the catamaran hulls under waves and resist capsizing.

- Gentler ride: no pitching or rolling sensations.

Wave Adaptive: Advantages

Maneuverability

- 360° turning within the vessel length
- Vessel is operated by differential thrust - no steering wheel needed.
- Novice can learn to operate in minimal time.

Wave Adaptive: Advantages：

Environmental Friendliness

- Low fuel consumption
- Minimal wake
- Low draft
- Soft hulls

Wave Adaptive: Advantages

Safety

- 6 air chambers per inflated hull. Only 1 chamber per hull is required for vessel to remain afloat.
- Extremely durable fabric resists puncture and tearing.
- Soft hulls allow contact with rocks and other hard objects with no damage.

Modular:

A WAM-V can transform into different vessels for a variety of uses

- The engine pods, connected with hinges to the hulls, can be changed in half hour.
- The payload module can be switched with a different one in minutes.

Modular: Changeable Payload

Modular: Cabin/Payload lowers to Water

Modular: Advantages

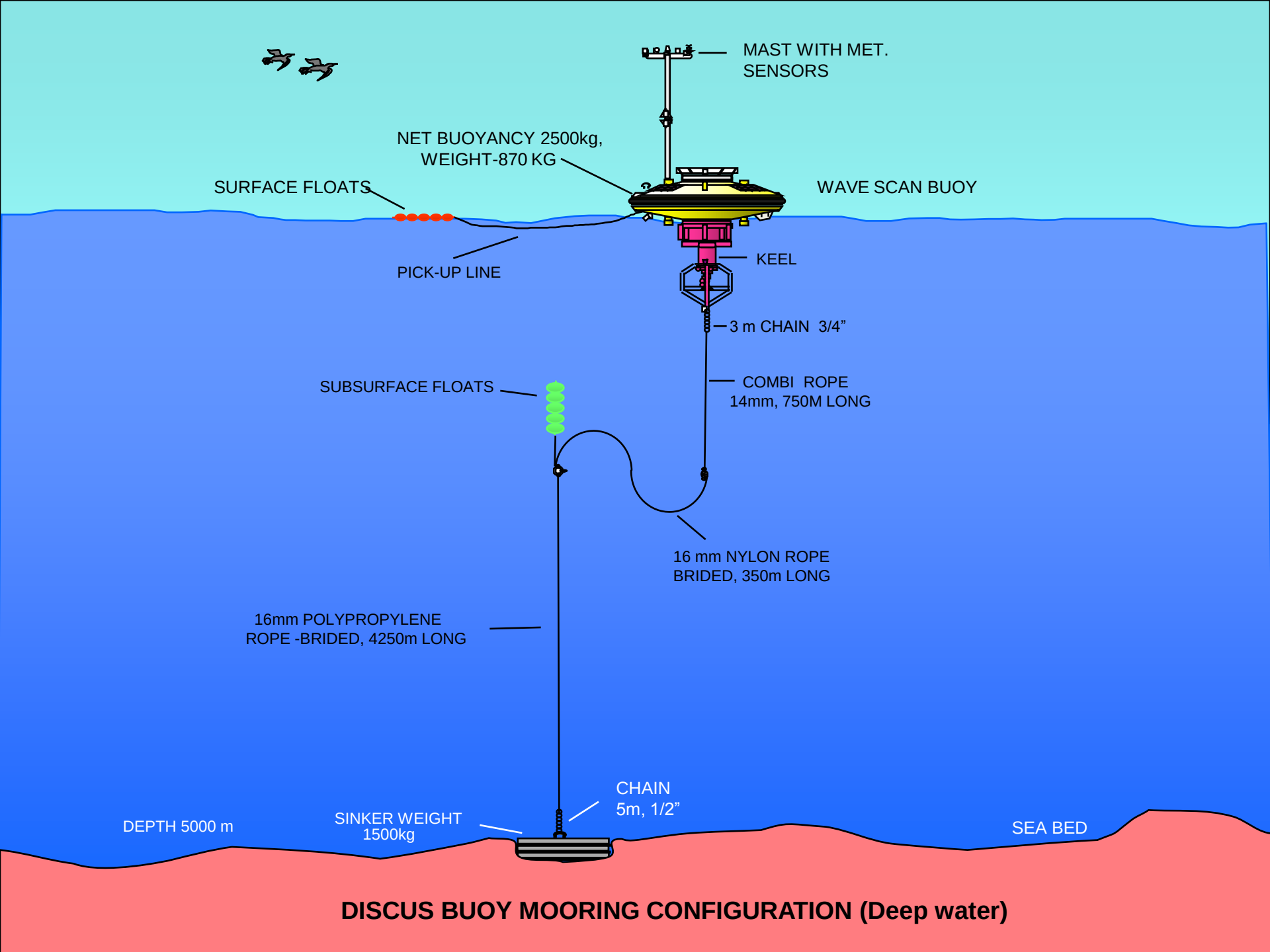
No down time

- With one spare engine pod, maintenance can be performed ashore while craft continues to operate.
- Fast switch to a different propulsion system (e.g. propellers to jets and vice versa) with two sets of engine pods, or
- Switch to more (or less) powerful engines according to required performance.
- Removable engine pods decrease the vessel's length for storage or transportation.

Modular: Advantages

Changeable Payload

- One vessel with a complement of payloads fits different needs for different users.
- Payloads can be custom built to users' specifications.



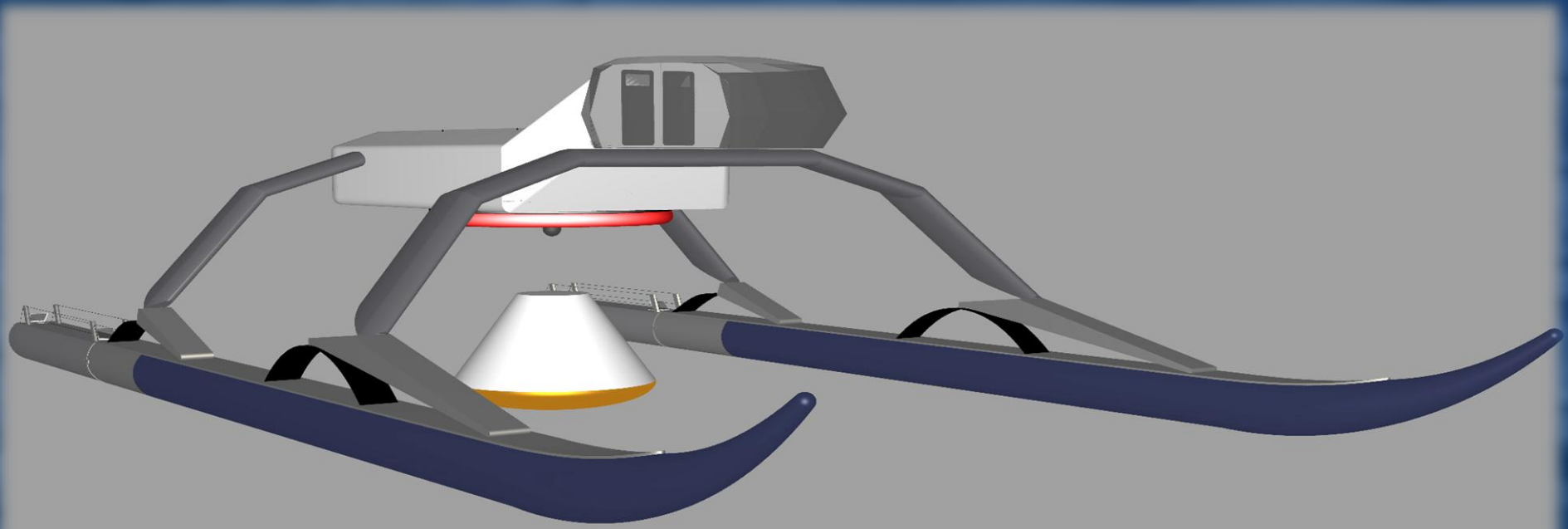
DISCUS BUOY MOORING CONFIGURATION (Deep water)

For Special met & Ocean Observation Campaigns

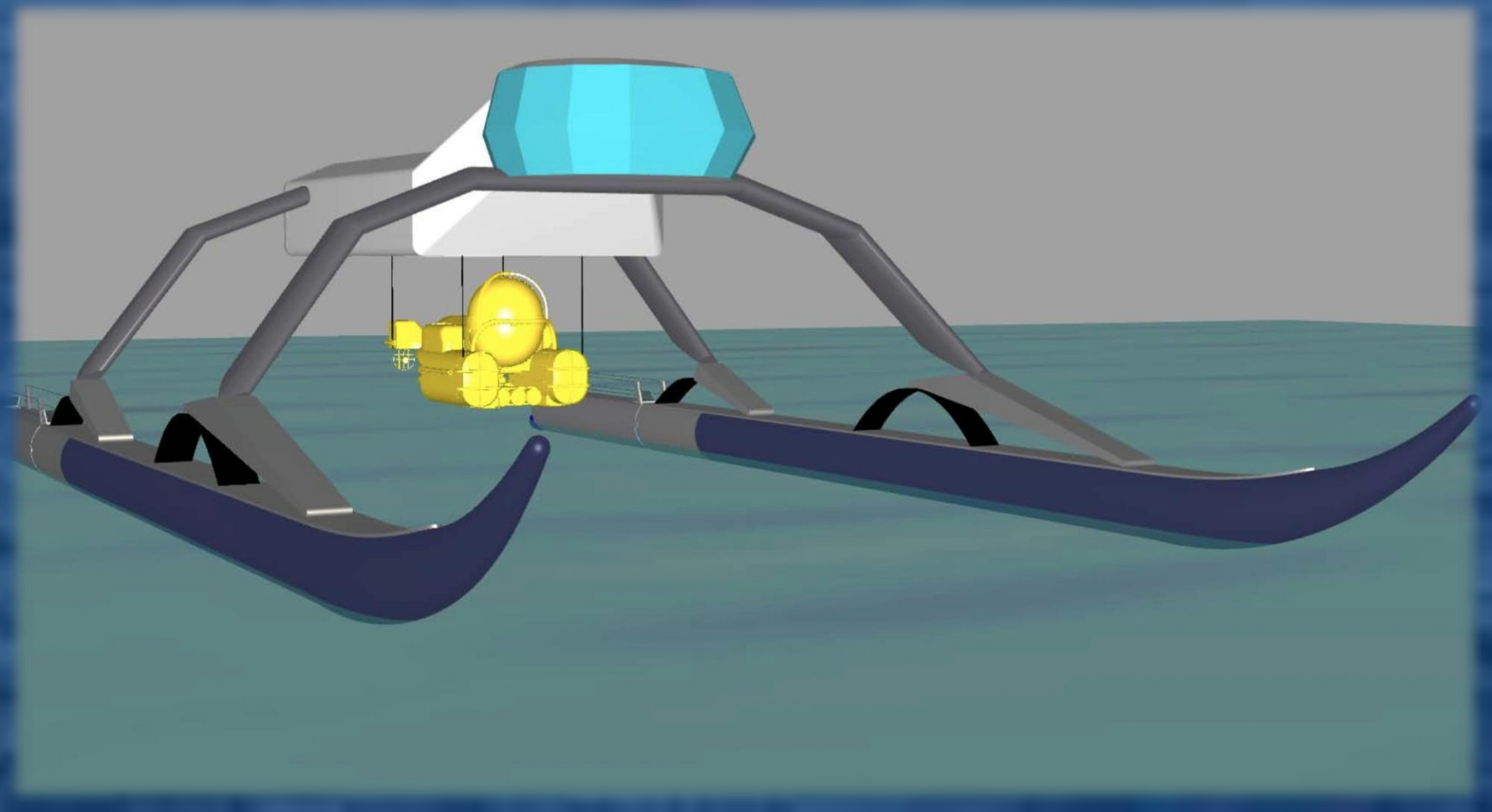
Buoy Deployment & Maintenance:

Unlike the conventional ships, the WAM-V can go over the buoy & can carry out insitu maintenance & retrieve with ease.

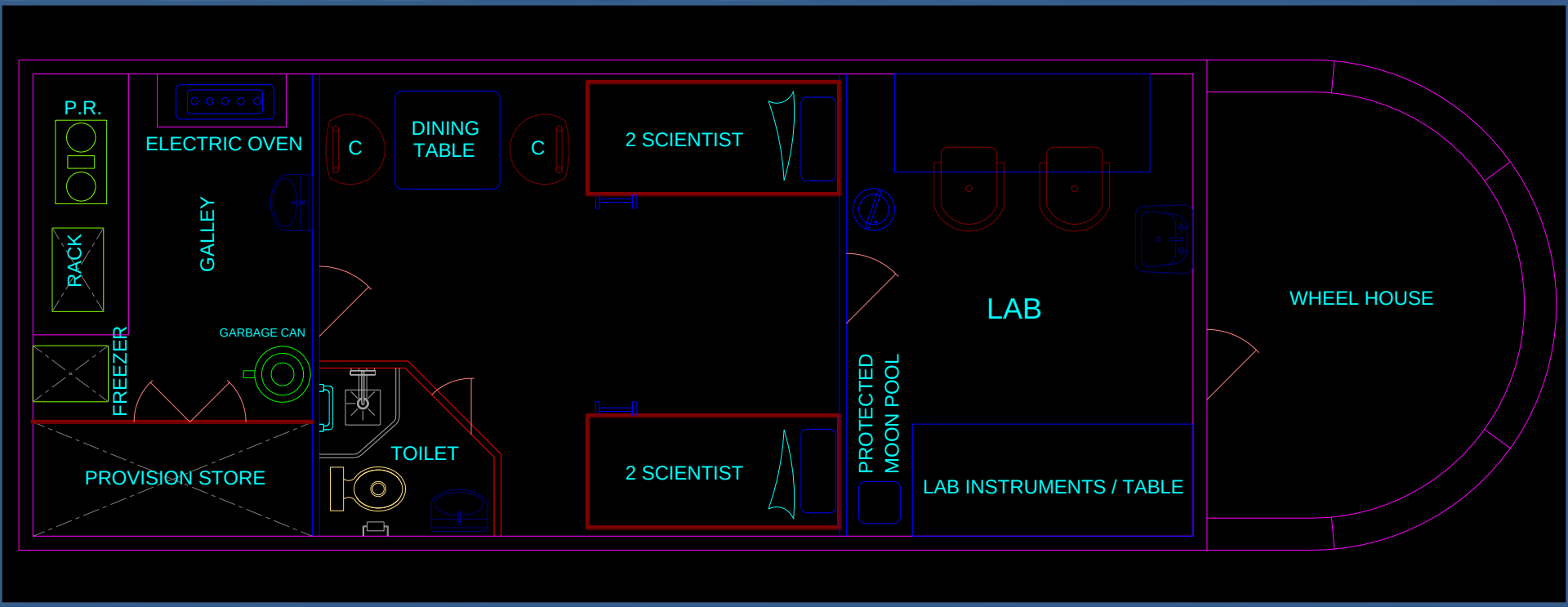
One can deploy the observation platform at the desired location.



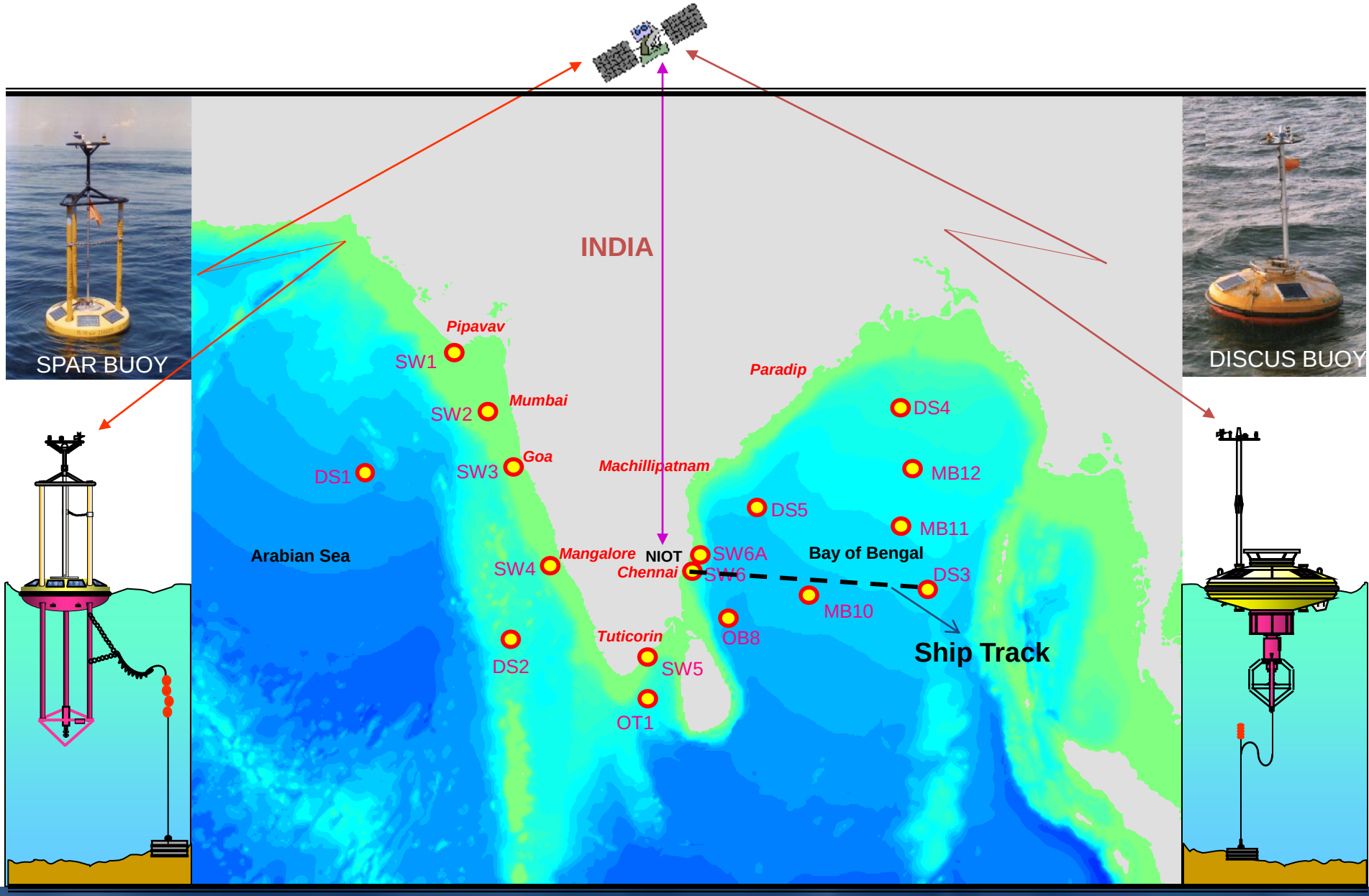
Application example: CTD/Special Instrumentation platform Deployment



LAYOUT FOR LABORATORY



NATIONAL DATA BUOY PROGRAMME (Moored)



Data buoy locations in India

Typical buoy maintenance cycle and response time

FACTORS TO ANALYSE	CONVENTIONAL SHIP	WAM-V
1. Speed	12 Knots (12-15knots)	> 25 Knots
2. Management	Large crew, Berth only in port	Very few
3.Voyage Cycle for maintenance(Say 600NM)	5+ days	2+ days

The WAM-V technology is scalable

WAM-Vs can range from 12 ft to 150 ft depending on applications.

Length in feet	Maximum payload weight
12	23 kg
50	225 kg
100	5400 kg
150	13500 kg

Proteus: Fuel Consumptions:

Engine RPM	**Speed** (knots)	**Fuel Consumption for both engines** (gallons per hour)	**Range for RPM** (nautical miles)
600	6.1	1.4	11,329
1390	14.0	7.0	5,200
1830	18.0	16.0	2,925
2220	21.7	26.2	2,153
2500	25.0	34.0	1,912
2800	30.0	42.0	1,857

Proteus' Performance to Date:

More than 3000 nm

- Sea trials in Puget Sound:
  - 300 nm - up to Beaufort 6 - seas from all directions.
- Puget Sound to San Francisco Bay:
  - 1,000 nm - up to Beaufort 5 - average speed: 18 kn
- Sea trials in San Francisco Bay:
  - 300 nm - up to Beaufort 5 - seas from all directions.
- Mediterranean cruise:
  - Genova to Cannes, Cannes to Genova, Genova to La Spezia, La Spezia to Corsica, Corsica to Sardina and surrounding Marine Sanctuaries, Sardinia to Ischia, Ischia to La Spezia and Genoa.
  - 1500 nm - up to Beaufort 6 - seas from all directions - cruising speed 15 to 23 kn

Applications: Military

- Manned format
  - Deliver / retrieve small teams to an undeveloped beach.
  - Transport personnel and supplies to and from seabase.
  - Screen small vessels for radioactive/nuclear threats
- Unmanned format
  - Port surveillance.
  - Chain-link defense system.

Applications: Coast Guard

- Conduct search & rescue operations with helicopter-like performance.
- Provide disaster assistance to undeveloped coastal areas.
- Patrol for extended periods from open ocean to shallow water with minimal crew.

Applications: Other Government Agencies

- Perform routine maintenance on buoy arrays.
- Deliver marine biology labs, diving platforms and instrument packages for scientific projects.
- Conduct environmental impact studies in shallow coastal and riparian areas with fragile ecosystems.
- Deliver environmental disaster recovery tools with minimal environmental impact.

"Proteus" at Port of San Francisco

- NOAA:
  - Perform routine maintenance on buoy arrays
  - Service National Marine Sanctuaries for whale and bird counting, delivering marine biology labs, diving platforms and instrument packages
- EPA:
  - Conduct environmental impact studies in shallow coastal and riparian areas with fragile ecosystems
  - Fast deployment of spill containment booms at reduced cost and with minimal crew

VIDEO CLIPPINGS:

Video: Proteus in San Francisco, California

Video: Proteus in Sardinia, Italy

HOPE AUDIENCE OF THIS DBCP S&T WORK

SHOP WILL CARRY THE MISSION OF

EMPLOYING THE NEW COMFORTABLE

PLATFORM FOR OCEAN OBSERVATION.

THANK YOU ALL & LET ME HOPE
TO MEET YOU ALL IN NEXT DBCP
SESSION