PLUME HUNTER (DEEP1)
AUV SPECIFICATIONS

Owned by: Fukada Salvage & Marine Works (FSM), Japan
Operated by: Ocean Floor Geophysics Inc. (OFG), North Vancouver, BC, Canada

Platform: ISE Explorer Class AUV
- Depth rating: 3000 m
- Hull Diameter: 0.69 m
- Overall Length: 4.80 m
- Footprint: 4.80 x 1.47 x 1.31 m (length x outside dims of planes and rudder)
- Weight:
  - Dry: 950 kg
  - Flooded approx. 2000 kg
- Endurance: 20-22 hours @ 1.5 m/sec, 80% payload duty cycle
- Batteries:
  - 14.4 kWh Lithium Ion battery pack (certified for air transport),
  - 6 hour total re-charge time
- Control Planes:
  - 5 planes for optimal roll, pitch, yaw control
  - Enable AUV to maintain level cruise whilst following topography for optimal MBES / SSS measurements
- Launch & Recovery System:
  - ISE open frame Launch and Recovery System
  - Suitable for up to Sea State 4 for host vessels without A-frame or suitable crane.

Factory Equipped Sensors
- Multibeam Echosounder: R2Sonic 2022
  - Adjustable frequency 200 to 400 kHz,
  - 256 beams, width 1" x 1" at 400kHz, 2"x2" at 200 kHz
  - Adjustable swath angle 10°-160°
  - Range to 500 m, range resolution 1.25 cm
  - 35 watt power for increased endurance
- Sound Velocity Probe: Valeport Mini
- Combined Side Scan Sonar / Sub Bottom Profiler: Edgetech 2200m
  - 120/410 kHz Full Spectrum Chirp Side Scan Sonar
  - 2/16 kHz Full Spectrum Sub Bottom Profiler
  - Power 50 Watts, 48 VDC
- CTD: Sea-Bird FastCAT-49,
  - Range 0-9 S/m,
  - Resolution 0.4 ppm

**Navigation & Positioning Suite**
- Inertial Navigation: IXSEA PHINS fiber optic gyro system
  - Outputs heading, pitch, roll, depth, velocity, heave
  - Position Accuracy 0.1% of distance travelled
  - Pitch & Roll Accuracy 0.01°
- USBL: IXBLUE GAPS
- DVL: Teledyne Workhorse 300 kHz
- DGPS (in AUV): Ashtech
- Altimeter: Kongsberg Mesotech 1007 675 kHz
- Depth: Paroscientific Digiquartz
- Obstacle Avoidance: Imagenex/ISE forward-looking 330 kHz sonar array
- NTP Server: Masterclock, syncs to GPS when AUV surfaces

**Communications Suite**
- Acoustic Modem: Sercel MATS 3G
- Satellite Modem: Iridium 9522A

**Surface Control Equipment**
- Mission Planning Station with electronic charting / DGPS interface
- AUV Operating Console

**Emergency Equipment & Contingency**
- Strobe: Novatech ST-400-AR
- Drop Weight: 18 kg, drops on command or computer time out
- Spares Kit: Complete spares kit including topside / subsea control systems, thruster, charger, planes

**OFG Seabed Prospecting Suite**
- Dedicated Data Acquisition computer in AUV
- Magnetometers: 3 axis fluxgates, 0.5 nT and 2 nT resolution
- Sample Pumps: Seabird Miniature Submersible Pumps
- Self Potential (SP): T&R SC-4
- pH and Oxidation Reduction Potential: Idronaut Ocean Seven 306
- Nephelometer: Seapoint Optical Backscatter Sensor
- Methane sensor: Franatech METS
- Hydrocarbons: Seapoint UV and Chlorophyll Fluoreometers
Additional Payload Bays, Buoyancy and Power
- Dry Hull (1 atmosphere)
  - >22 litres
- Flooded Hull
  - Nose Cone: ~8 litres
  - Top Hatch: ~12 litres
  - Belly: ~2 litres
  - Tail: ~1 litre
- Electrical Interfaces
  - Data logging for analogue, RS-232, Gigabit Ethernet
  - Power:
    - Payload 1 Relay: 48V, 2amps
    - Payload 2 Relay: 48V, 5amps
- Buoyancy: Up to 27 kg of removable ballast

Data Processing
- On Board (concurrent with AUV Operations)
  - Digital Terrain Map with precision bathymetry from MBES data (preliminary)
  - Geo referenced Side Scan Sonar and Sub Bottom Profile images (preliminary)
  - Layered map with Magnetometer, pH, eH/ORP, SP, UV, METS and NTU data
- On shore (via Satellite Internet)
  - 3-D Inversion of Magnetometer data (if appropriate)
- Post Cruise
  - Side Scan Sonar Mosaic & Seabed Classification (optional)
  - Final MBES precision bathymetry, and Sub Bottom Profiler images

AUV Operations Team
- Factory trained / certified AUV Engineers & Technicians (mission planning and authorised to undertake field repairs, component replacement)
- Geophysicists / Hydrographic specialists for navigation & data processing