

CONFIDENTIALITY

The information in this document is confidential and is the property of Soil Machine Dynamics Limited. It is to be held strictly in confidence by the recipient. Disclosure of any such information is to be made only to those employees of the recipient who need to use the information and it is the responsibility of the recipient to bind any such employees to retain such information in strict confidence.

Copyright in this document is the property of Soil Machine Dynamics Limited. No copy is to be made without the written permission of Soil Machine Dynamics Limited.

Any patent applications, patents and/or registered design applications, registered designs or design rights arising from this document or information contained in it are the absolute property of Soil Machine Dynamics Limited and as such are subject to the obligation of confidence on the recipient set out above.

Soil Machine Dynamics reserve the right to revise, change, modify or otherwise alter any part or parts of the document(s) or information contained herein without prior notice.

Issue to MBARI for comment	Oct 2007	C.L.T	1
Description	Date	By	Issue



1 SAFETY



SAFETY NOTE

Appropriate personal protective equipment must be worn and safety precautions observed when witnessing tests on the factory floor. Customers are advised to come equipped with their own overalls and safety boots. Safety glasses and hardhats can be provided by SMD.

2 INTRODUCTION

The objective of the Factory Acceptance Test (FAT) Plan is to demonstrate the correct operation of the ROV and to verify compliance with the Customer's Specification.

Prior to the tests being conducted the equipment will be thoroughly tested and commissioned by SMD as part of the assembly and build program.

The ROV will be connected to the control system via the umbilical cable whilst in the factory and dunk tests. The system power supply will be 440 Volts @ 60Hz.

The tests will be carried out in accordance with the instructions and checklists in this document. The tests will not necessarily be completed in the order that they are listed.

Once the equipment has passed all relevant parts of the test plan, the factory acceptance test certificate on the last page of this document will be endorsed accordingly.



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

b. All weld inspections shall reveal no cracks, flaws or signs of deformation which may render the structure unsuitable for use.



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref : C903-18-001 - ROV FAT

3.3.2 Acceptance Tables

	SMDH	Third Party Test House
PRE-LOAD TEST		
a) Visual Examination		
b) Weld Tests		Report Ref:
LOAD TEST 1 (Standard Lift Point)		Certificate Ref:
LOAD TEST 2 (Emergency Lift Point)		Certificate Ref:
LOAD TEST 3 (ROV Frame)		Certificate Ref:
POST-LOAD TEST		
a) Visual Examination		
b) Weld Tests		Report Ref:
COMMENTS :		



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.4 SURVEILLANCE

3.4.1 Cameras

Check that each camera harness is routed to the required position, where no camera is supplied, check power and signals using test pattern generator at end of harness. Item 8 will be used to test items 9-12.

ID	Item /Function	Procedure	Comments	Witness SMD Client	
1.	HDTV Camera (Power)	Confirm power @ pins 1&2, 5&10 of harness +24VDC, pins 1&5 @ive			
2.	HDTV Camera (Fibre)	Test losses in fibre cable $\leq 0.5\text{dB}$ per connector to umbilical term			
3.	Pilots Cam	- Confirm power @ pins 1&2 of harness +12VDC, pin 1 @ive. - Confirm signal			
4.	Digi Still Cam	- Confirm power @ pins 1&2 of harness +24VDC, pin 1 @ive. - Confirm signal			
5.	Digi Still Cam Strobe	- Confirm power @ pins 5&10 of harness +5VDC, pin 1 @ive. - Confirm signal			
6.	Digi Still Cam/Digi Still Cam Strobe	Ensure continuity between Cam pin 5, strobe pin 2 & Cam pin 18, strobe pin 3			
7.	Internal P&T Cam	- Confirm power @ pins 3&5 of harness +24VDC, pin 5 @ive. - Confirm signal			
8.	Umb Cam	Confirm Operation			



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.4.4 Sonar

Verify that it is appropriately secured to the vehicle. The sonar processor should be powered up and the self test routine observed. Verify all sonar heads are positioned correctly.

ID	Item /Function	Procedure	Comments	Witness SMD Client	
27.	Obstacle Avoidance Sonar	Confirm Operation	Simrad MS1000		

3.4.5 Responder → Double check topside power through system

Verify that it is appropriately secured to the vehicle. A voltage will be supplied to the responder input at the back of the cabin to simulate HPR "ping". Confirm that signal is carried through system to responder. *2.4.0?*

ID	Item /Function	Procedure	Comments	Witness SMD Client	
28.	USBL Sonardyne 8070	- Confirm power @ pins 2,3&4 of harness +24VDC, pin 3&4 @ive. - Confirm power @ pins 1&2 of harness +24VDC, pin 1 @ive. When responder triggered			

3.4.6 Depth Sensor

Verify that it is appropriately secured to the vehicle. Verify that the depth sensor outputs data relating to external pressure. Demonstrate that pressure can be zeroed to simulate ROV entering water to give a referenced output.

ID	Item /Function	Procedure	Comments	Witness SMD Client	
29.	Digiquartz	Confirm Operation			

Check lubox



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref: C903-18-001 – ROV FAT

3.4.11 Spare Comms & Power

Demonstrate the spare serial ports on the junction box link to the control cabin using two PC's with RS232 / RS485 / Ethernet outputs.

Measure the voltage on terminals.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
34.	Spare, 24VDC RS232/485 <i>Check back.</i>	Confirm Operation JB1-13			
35.	Spare, 24VDC RS485	Confirm Operation JB1-14			
36.	Spare, 110VAC Ethernet	Confirm Operation JB1-16			
37.	Spare, 24VDC RS232	Confirm Operation JB2-15			
38.	Spare, 24VDC RS485	Confirm Operation JB2-16			

→ Check fuses on ~~some~~

→ Simulate power requirements for items not being shipped in order to test full load capability of system.

→ Check Piers reset ✓

3.4.12. → Does Daypro sensor interface.

→ MSAPI Mechanical controls.

• Permit
• Rule
• Library



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.5.3 Linear Transducers

Verify that the relevant graphics move and confirm operation of function.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
44.	Reservoir volume	Confirm Operation			
45.	Compensator #1 volume	Confirm Operation			
46.	Compensator #2 volume	Confirm Operation			
47.	Compensator #3 volume	Confirm Operation			
48.	Compensator #4 volume	Confirm Operation			



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.6.2 Hydraulic Oil Cleanliness

The SMDH oil cleanliness sampler will be used to monitor the oil cleanliness in the HPU during the tests. The sample will be taken from a test point in the manifolds.

	NAS Value	Test Printout Number	SMD	Client
Before Test				
After Test				

3.6.3 Power Pack

The power pack can only be operated for short periods in air without cooling. Careful monitoring of the temperature should be carried out whilst operating the motor in air. Ensure reservoirs are free of air and full of oil before operating the main motor.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
56.	Verify motor power rating	Note manufacturer plate. (Ziehl-Abegg)			
57.	Start Motor	Confirm Operation Note current at idle Note idle pressure in thruster	 Amps bar (thruster)		
58.	Auto shutdown	Confirm motor automatically shuts down in the event of the reservoir becoming less than 30% full			
59.	Motor Alarm	Demonstrate motor winding hi-temperature alarm	 deg C		
60.	Activate Load Pump	Confirm Operation Note pressure Demonstrate adjustability and return to factory setting	 bar		



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.7.3 Manipulator

Demonstrate the operation of the solenoids and full flow capability by plumbing in an in-line flow meter with hydraulic circuit pressure set at factory setting.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
71.	Manipulator	Confirm flow sufficient for manip			

3.7.4 Launch Line Release

With ROV attached to crane and tension on lift point, demonstrate that vehicle release function is operational.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
72.	Vehicle Release	Confirm Operation			

3.7.5 Spare Functions – 12 Station Vehicle HCU 1

Demonstrate the operation of the solenoids and pressure change on each spare function using standard pressure gauges. On one function demonstrate the full flow capability by plumbing in an in-line flow meter with hydraulic circuit pressure set at factory setting.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
73.	Spare #1	Confirm Operation			
74.	Spare #2	Confirm Operation			
75.	Spare #3	Confirm Operation			
76.	Spare #4	Confirm Operation			
77.	Spare #5	Confirm Operation			



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref: C903-18-001 - ROV FAT

ID	Item /Function	Comments	Witness	
			SMD	Client
88.	ROV weight in air (zero payload, oil reservoirs full)			
89.	Submerged weight of ROV (nominally. 250 kg buoyant with no-tools)	Get weight of ROV include tools		
90.	Trim in air (lifted on lifting sling)			
91.	Trim in water (neutrally buoyant)			



SOIL MACHINE DYNAMICS
LIMITED
UNDERWATER

5 SUMMARY

Agreed for SMD

Signed

Name

Position

Date

Agreed for MBARI

Signed

Name

Position

Date

