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DOCUMENT TITLE:		**HAUV3 Launch & Recovery**		
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0.2	08.07.2024	Updated Organogram Removed Project Surveyor from Modus contacts Added USBL reference to launch & recovery	8 9 15, 18 & 20
1.0	08.07.2024	Issued for use	All

TABLE OF CONTENTS

TABLES

ABBREVIATIONS

Abbreviation	Definition
AHC	Active Heave Compensation
AUV	Autonomous Underwater Vehicle
BMS	Business Management System
CD	Crane Driver
CoG	Centre of Gravity
DPR	Daily Progress Report
Dwg	Drawing
EPOD	Electronics Pod
FO	Fibre Optic
GPS	Global Positioning System
HAUV	Hybrid Autonomous Underwater Vehicle
HIRA	Hazard Identification & Risk Assessment
HMI	Human Machine Interface
Hs	Significant Wave Height (m)
HSEQ	Health, Safety, Environment & Quality
HV	High Voltage
INS	Inertial Navigation System

Abbreviation	Definition
ISO	International Standards Organisation
Kg	Kilogram
L&R	Launch & Recovery
M	Meter
OCB	Operators Control Board
OM	Offshore Manager
PC	Party Chief
PEP	Project Execution Plan
PPE	Personal Protective Equipment
Pt.	Port
PTW	Permit to Work
SCU	Surface Control Unit
Stbd.	Starboard
TBT	Tool Box Talk
Te	Tonne
TRA	Task Risk Assessment
UHF	Ultra High Frequency
USBL	Ultrashort Baseline
VHF	Very High Frequency
VM	Vessel Master

Table 1: Abbreviations

Reference Documents

Ref No.	Document Title	Document Number
[101]	Management of Change Procedure	HS-PR-009
[102]	Permit to Work System Isolation Requirements	HS-PR-015
[103]	Risk Identification and Management procedure	HS-PR-0035
[104]	Tool Box Talk	HS-FM-001
[105]	Project HIRA	Detailed as required
[106]	HSE Plan	HS-PL-001
[107]	HAUV3 Operations Procedure	23-0022-OPS-PR-001
[108]	HAUV3 Pre/Post Dive Check list	23-0022-OPS-SCL-001
[109]	HAUV Garage Loading Procedure	23-0022-OPS-PR-005
[110]	Project Execution Plan	FESL-SPDC-WEP-1909/2201

Table 2: Reference Documents

Vehicle Weights

Item	Weight in Air	Weight in Water
HAUV Only	1.6Te	As configured
Winch	3.4Te	N/A
Maintenance Stand	0.2Te	N/A
Subsea Garage	1,350Kg	850Kg

Table 3: Asset Weights

1 Purpose and Scope

1.1 Purpose

The purpose of this document is to define and control the Launch & Recovery of a HAUV & Subsea Garage to ensure that these operations meet all necessary contractual requirements and conform to all relevant HSEQ requirements. It should be read in conjunction with the HAUV3 Operations Procedure [107].

1.2 Scope

This document covers the Launch & Recovery of the HAUV and Subsea Garage in a tethered configuration from a client vessel in the below configurations;

- Subsea Garage Loaded with the HAUV
- Subsea Garage only

2 Roles & Responsibilities

2.1 Key Responsibilities

Role	Responsibilities
Project/Support Manager	• Shall be responsible for ensuring this procedure is implemented for work scopes under their jurisdiction
HAUV Manager	• Shall be responsible for ensuring all personnel are SQEP
HSEQ Manager	• Shall support the maintenance of the Launch and Recovery procedure to ensure it remains accurate and effective for business activities • Shall act as a HSEQ adviser outside that of client & vessel specified processes

HAUV Supervisor	• Shall be responsible for ensuring this procedure is adhered to by applicable personnel under their jurisdiction
	• Shall complete all relevant project documentation including but not limited to:
	  ○ DPR's
	  ○ Defect Reports
	  ○ Maintenance
	  ○ Any relevant site specific risk assessments
	  ○ Toolbox Talks

HAUV Pilot Technicians	• Shall be responsible to comply with the procedure for launching and recovery of assets

All employees and contractors are responsible for effectively managing risk. All office, project, technical, and operational personnel are expected to identify hazards, understand consequences of potential incidents, and respond appropriately as part of their regular duties.

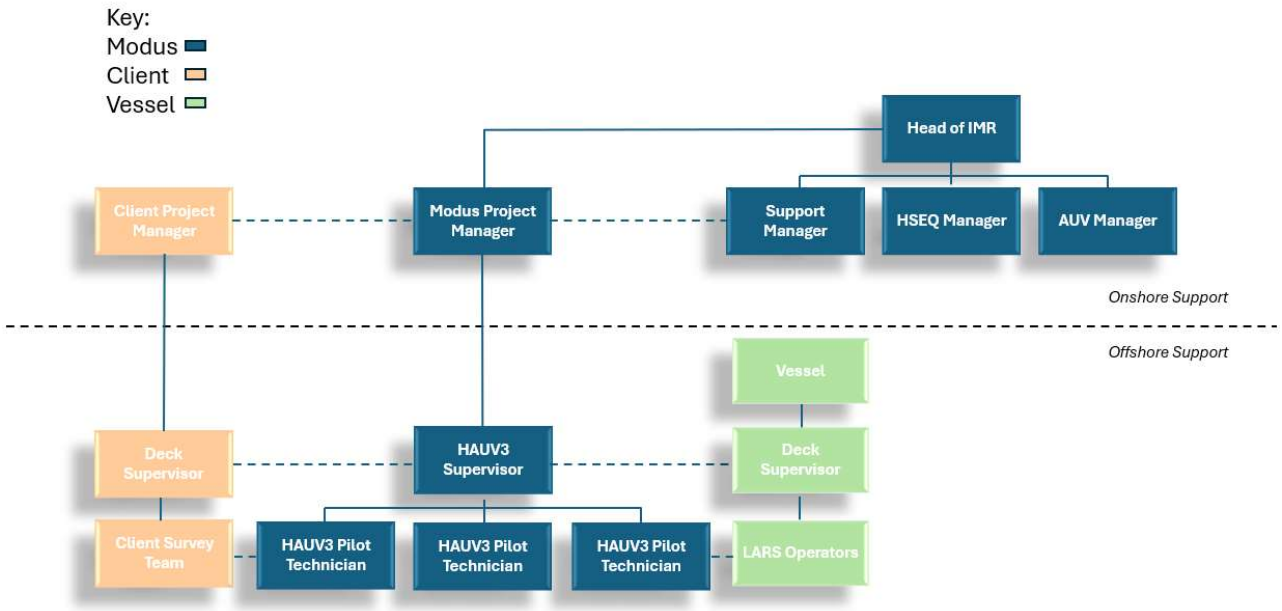
3 ORGANISATION

3.1 GENERAL

The following personnel will be required for the L&R operations:

- 1x HAUV Supervisor
- 2x HAUV Pilot Technicians
- 1x Surveyor
- 1x Crane Operator
- 1x Banksman/Controller

3.2 ONSITE ORGANOGRAM



3.3 COMMUNICATION

The primary form of communication between all parties and the HAUV crew will be via Clear Comms/VHF Radios. UHF radios may be utilised if required as a secondary or backup means of communication. It is especially important thatthe emergency channels are agreed, communicated to relevant parties, and tested prior to the commencement of operations.

For lifting operations, the primary form of communication will be via UHF radio. The secondary form of communication will be hand signals/verbal face to face.

3.4 CONTACT DETAILS

3.4.1 EMERGENCY CONTACT DETAILS

In the event of an emergency, the Duty Manager should be immediately informed so that emergency procedures may be brought into operation.

MODUS Emergency number is **+44 (0) 1325 387 478**

3.4.2 MODUS CONTACT DETAILS

Onshore, the primary MODUS project contacts will be:

Job Title	Name	Contact Details
Project Manager	Anthony Brown	Email: anthony.brown@modus-ltd.com Office: +44 (0) 1325 387 455 Mob: +44 (0) 7518125387
Support Manager	Derren Plaister	Email: derren.plaister@modus-ltd.com Office:+44 (0) 1325 387 481 Mob: +44 (0) 7570304381
HSEQ Manager	Adrew Millichap-Bell	Email: Andrew.Millichap-Bell@modus-ltd.com Office:+44 (0) 1325 387 449 Mob: tbc
Project Engineer	Joe Griffiths	Email: joe.griffiths@modus-ltd.com Office: +44 (0) 1325 387 507 Mob: +44 (0) 7834 104 834

3.4.3 CLIENT CONTACT DETAILS

Job Title	Name	Contact Details
Client Representative	TBC	Email: tbc Mobile: TBC
Project Engineer	Bright Adieze	Email: bright.adieze@fadfae.com.ng Mobile: +31 6 1310 7532

3.4.4 THIRD PARTY CONTACT DETAILS

Job Title	Name	Contact Details
tbc		

4 HSEQ

All work described within this document shall be performed in accordance with requirements given in the MODUS Business Management System (BMS) which is accredited in line with ISO:9001, ISO:14001 and OSHAS:18001 Standards.

The work shall in addition be performed in accordance with the requirements given in the Contract.

All internal documents for the project relating to this subject are referenced in the table of references at the front of this document and should be read in conjunction with this procedure. Any additional task related safety awareness that needs to be highlighted will be addressed in the body of this document.

4.1 WARNINGS, CAUTIONS & NOTES

This operating procedure will be interspersed warnings, cautions and notes, these are used to direct the readers attention to specific information.

4.1.1 WARNINGS

A WARNING is used to alert the reader to operational or maintenance activities that may, under certain circumstances, represent a threat to safety and health. A warning precedes the paragraph or procedure which gives rise to such a threat.

4.1.2 CAUTIONS

A CAUTION is used to alert the reader to operational or maintenance activities which, may under certain circumstances, cause damage to equipment and/or material. A caution precedes the paragraph or procedure to which it refers.

4.1.3 NOTES

A **Note** contains information of a specific or general nature and is printed immediately after the paragraph to which it refers.

4.1.4 SYMBOLS

The following symbols may be used throughout this document:

	**WARNING** RISK OF PERSONAL INJURY.
	**WARNING** RISK OF PERSONAL INJURY DUE TO MOVING PARTS.
	**WARNING** TAKE PRECAUTIONS AGAINST STATIC ELECTRICITY.
	**WARNING** RISK OF ELECTRIC SHOCK.
	**WARNING** RISK OF PERSONAL INJURY DUE TO HEAVY OBJECT.
	**WARNING** WEAR PROTECTIVE CLOTHING AND EQUIPMENT.
	**Caution** Risk of damage to equipment.
	Tool Box Talk Required

4.2 Risk Assessments

All operations will be executed in accordance with ref [103]: HS-PR-005, Risk Identification & Management Procedure.

The MODUS specific Risk Assessment should identify the risks associated with specific elements of Modus operational activities. The Risk Assessment also identifies the controls required, which also consider the different human behaviour traits that are exhibited performing the same task under different conditions. Risk Assessment shall be completed by the Team Leader/Chairman and a minimum of two experienced personnel in the activity to be assessed.

4.3 Management of Change

In the event of any unplanned circumstances which affect this procedure, then this procedure can be changed to ensure the safety and efficiency of the operation. Any change to this procedure will be performed in accordance with ref [101]: HS-PR-009, Management of Change Procedure and in clear understanding between the involved parties.

4.4 Tool Box Talks

Tool Box Talks are required at the beginning of each shift, if the task plan changes and if new people join the team. A TBT is not limited to these times and should be given where appropriate. TBT's, ref [104]: HS-FM-001, Tool Box Talks, are identified within Procedure Task Plans.

Relevant operating procedures and associated risk assessments must be reviewed during the TBT.

4.5 Permit to Work

All operations and related work will be controlled and co-ordinated by using the PTW system where required. The implementation of the PTW is the responsibility of Modus and will ensure that all applicable works undertaken are conducted in full compliance with ref [102]: HS-PR-015, Permit to Work System Isolation Requirements.

4.6 Stopping Operations

All team members are permitted and encouraged to stop an evolution/operation if they deem it to be unsafe, dangerous, risk of personnel injury, risk of damage to an asset or infrastructure, at no point will any blame be placed on the individual calling a stop. Two example methods of stopping an evolution/operation are explained below, however, the methods to be used during the project will be fully briefed during the onboard kick off meeting:

4.6.1 ALL STOP

This method of stopping an evolution/operation is the most urgent and is normally initiated by the way of depressing an emergency stop or calling **"ALL STOP"** over the preferred communication medium. All operations, vessel moves will be instantly stopped and the reasons investigated.

4.6.2 Controlled All Stop

This method is to be used if the ALL STOP in not appropriate and will bring evolution/operation to a controlled and safe stop for e.g. reducing the speed of a vessel move to gradually bring the vessel to a stop, likewise with the HAUV. This action would normally be initiated by calling for a **"CONTROLLED ALL STOP"** over the preferred communication medium.

5 PROCEDURE

The following operating procedure and task plan outlines the steps to be taken the safe deployment & recovery of HAUV, tethered using the Subsea Garage.

In the event that deviation to the steps in the task plan is desired or necessary, the Management of Change procedure [101] **must** be followed.

5.1 OPERATIONAL COMMUNICATIONS

The primary form of communication between all parties and the HAUV will be via Clear Comms/VHF Radios. UHF radios may be utilised if required as a secondary or backup means of communication. It is especially important that the emergency channels are agreed, communicated to relevant parties, and tested prior to the commencement of operations.

For lifting operations, the primary form of communication will be via UHF radio. The secondary form of communication will be hand signals/verbal face to face.

5.2 LAUNCH & RECOVERY LOCATION

The distance the launch and recovery location will be away from any subsea assets will be stipulated in line with vessel operational requirements and the PEP [110].

Launch and Recovery locations will be as directed by Client Representative/Survey. Survey will be responsible for identifying the location of any subsea infrastructure and assets in these areas. These locations will be publicised at the relevant daily briefings and information disseminated accordingly.

5.3 WEATHER & SEA STATE

The ultimate decisions in regard of standby due to weather, sea state, currents and visibility shall be that of the Vessel Manager, Party Chief/Superintendent and the HAUV Supervisor jointly. In the event of disagreement however, the ultimate decision to launch/recover the HAUV or Garage is that of the HAUV Supervisor.

Hs and wind speed only play a part in the environmental conditions to be considered when determining if HAUV is operable in a given scenario. The decision to operate HAUV is dependent upon all the conditions at the time and how the vessel is behaving in that scenario. In all cases, the safe limit to launch, recover or operate HAUV will be judged by the HAUV Supervisor on a case-by-case basis.

For operational control a workability limit of approximately Hs<1.5m is recommended.

5.4 CURRENTS

The actual launch & recovery and operational limit will depend on several factors including, but not limited to, current direction and vehicle payload.

In all cases the decision to launch HAUV/Garage or abort a dive in any current, regardless of what may be indicated by any current monitoring device will be made by the HAUV Supervisor and will be considered on a case-by-case basis.

5.5 VISIBILITY

HAUV is designed to operate in reduced and even zero visibility. However, under some circumstances, a minimum level of visibility may be required to continue operations safely.

If under such circumstance's visibility is not sufficient to continue, operations will be suspended and the HAUV Supervisor will inform the Party Chief/Superintendent. Operations will resume as soon as visibility conditions permit.

6 Operational Procedures

6.1 General Operations

HAUV3 is to be operated in line with normal manufacturers operating guidelines, within the normal capabilities of the system and at the discretion of the AUV Manager.

Prior to any operation, the work scope is to be assessed to ensure there is no additional risk, with specific consideration given to the implications of emergency scenarios.

6.2 HAUV Launch & Recovery Plan

6.2.1 Tether Management

Tether management is extremely important and will be continuously monitored both subsea by the Pilot and topside by the tether Winch Operator at all times. If at any time it is deemed unsafe or if there is any doubt by the Pilot or Winch Operator all operations/vessel movements are to be brought to a controlled stop and investigated accordingly. An **ALL STOP** can be implemented at any time by anyone that observes any event or perceives any event that is unsafe.

6.2.2 HAUV Deployment

The deployment task plan outlines the launch of HAUV & Garage using the vessels A-Frame/LARS. A summary of the operation is as follows:

- HAUV loaded into garage i.a.w 23-0022-OPS-PR-005 [109]
- Vessel positioned at the launch position
- Garage to be latched into the LARS snubber
- Garage & HAUV lifted overboard using the vessels LARS
- Garage & HAUV lowered to the seabed
- HAUV is flown out of garage on tether

Item	Task	Responsible Person
Note	**The purpose of this task plan is to detail the actions to be taken to safely perform the HAUV & Subsea Garage launch operation.**	INFO
1.	Prior to any work starting, all personnel must undergo relevant safety inductions according to the site that the work is carried out on. This will include but not be limited to, the following topics: • Explanation of the Permit to Work (PTW) System • Explanation of Tool Box Talk requirements • Explanation of Hazardous Observation Card System • PPE Requirements • Security arrangements • Lift plans, sequence of lifts and TRAs • Area barrier arrangements during lifting operations.	HAUV Supervisor
2. 	Undertake Toolbox talks with the relevant personnel. Command and control structure agreed. Toolbox Talks to be undertaken at the commencement of each shift or prior to complex tasks to review and update safety and operational requirements.	HAUV Supervisor
3.	Ensure that all Permits to Work and TRAs & Lift Plans and associated certificates are in place prior to commencing operations and communicated via Toolbox Talk (signed evidence required). If required, ensure PTW are renewed and put into place for the commencement of each shift.	HAUV Supervisor
4.	Ensure barriers are erected around the launch & recovery site prior to work commencing.	HAUV Supervisor
Note	All rigging described below can be changed at the discretion of the HAUV Supervisor to suit the conditions during the recovery. Suitable rated rigging must always be used.	HAUV Supervisor

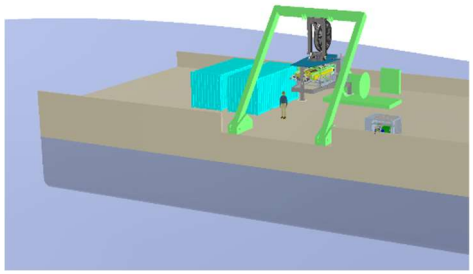
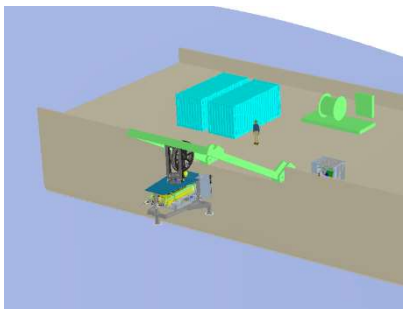
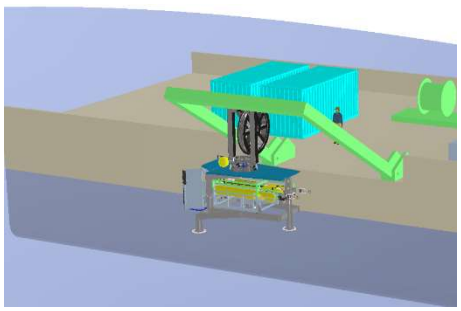
6.2.2.1 Pre-Requisites

Item	Task	Responsible Person
1.	• HAUV buoyancy configured as per project requirements (positive/neutral/negative) • ToolBox Talk complete • PTW Raised and in force • Barriers & Cordons in place and deck is clear of non-essential personnel • Garage to be fitted with 2 off USBL beacons • HAUV Loaded into garage [109] • Full communications check completed between all relevant parties ○ HAUV Supervisor	HAUV Supervisor

Item	Task	Responsible Person
	○ HAUV Control ○ Survey ○ Deck Supervisor ○ LARS Winch operator ○ Tether Winch operator ○ Bridge • HAUV Pre-dive checks complete [108] • HAUV Tether Winch check complete and in MANUAL mode. **NOTE: During operations, all comms to be limited to only the personnel directly involved in controlling the operation.**	
2.	Confirm all survey / navigation / logging systems are fully operational, with relevant survey data entered to the survey database.	HAUV Supervisor
3.	• Vessel to be in DP mode at launch location and positioned correctly for launch & recovery. **Ensure that position is such that currents will not pull theHAUV/tether back into the side of the vessel.** **NOTE:** Supervisor to ensure Vessel Master/ understands the vessel best heading "blow off" condition.	Bridge

6.2.2.2 Launch Procedure

Item	Task	Responsible Person
1.	Pay out on enough Tether winch to give slack for deployment	HAUV Supervisor
2.	Carry out final visual survey of HAUV prior to launching	HAUV Supervisor
3. 	**WARNING** RISK OF PERSONAL INJURY DUE TO MOVING PARTS. Connect garage lifting equipment to the LARS lift wire and latch into the snubber	HAUV Supervisor & LARS Operator
4. 	**WARNING** RISK OF ELECTRIC SHOCK. HAUV Tether shall remain unpowered until vehicle is in the water for tether handling requirements	HAUV Supervisor
5.	Remove earth straps and sea fastenings from the garage	HAUV Supervisor & Deck
6.	Ensure all deck crew (HAUV and Vessel) are in position for launch	HAUV Supervisor
7.	Obtain green light from the Bridge to commence HAUV Launch	HAUV Supervisor & Bridge

Item	Task	Responsible Person
8. 	**WARNING** RISK OF PERSONAL INJURY DUE TO HEAVY OBJECT. Lift garage overboard 	HAUV Supervisor & LARS Operator
9. 	**Caution** Risk of damage to equipment. **Note:** Tether is to be manually controlled during deployment and slack is to be managed correctly **Bend radius is to observed throughout evolution**	Winch Operator
10.	Once garage is fully over boarded the snubber may be rotated up to 90 degrees into the prevailing current.  	HAUV Supervisor & LARS Operator
11.	Unlatch the garage from the snubber and lower into the water.	LARS Operator
12.	Lower garage through the splash zone until just below the surface.	HAUV Supervisor & LARS Operator

Item	Task	Responsible Person
13.  	**WARNING** RISK OF ELECTRIC SHOCK. WEAR PROTECTIVE CLOTHING AND EQUIPMENT. **TETHER WILL BECOME LIVE ANY HANDLING REQUIRES CORRECT NON CONDUCTIVE GLOVES TO BE WORN.** Power up vehicle on tether and carry out initial vehicle in water checks.	HAUV Supervisor
14. 	**Caution** Risk of damage to equipment. Lower Garage towards seabed stopping with 5m clearance. Monitor vehicle heading throughout the water column (2 off USBLs required). If heading changes considerably that indicates the garage is spinning **HALT** operations to allow for the situation to be assessed and heading corrected accordingly.	HAUV Supervisor
15.	Set LARS winch to AHC mode	LARS Operator
16.	Slowly lower Garage to the seabed. Payout slack to compensate for vessel movement, pitch & roll	LARS Operator
17.	Shut down LARS winch	LARS Operator
18.	Record the garage position, pitch & roll	HAUV Supervisor
19.	Undock HAUV from the garage and commence tasking.	HAUV Supervisor
Task Complete		

6.2.3 HAUV RECOVERY

The Recovery task plan outlines the recovery of HAUV & Garage to deck using the vessels A-Frame/LARS. A summary of the operation is as follows:

- Garage deployed at recovery position
- HAUV docked in garage
- Vessel positioned at HAUV recovery position
- Garage recovered to surface and latched into the LARS snubber
- Garage & HAUV lifted onboard using the vessels LARS
- Garage & HAUV recovered to vessel deck and sea fastened

Item	Task	Responsible Person
Note	**The purpose of this task plan is to detail the actions to be taken to safely perform the HAUV & Subsea Garage recovery operation.**	INFO
1.	Prior to any work starting, all personnel must undergo relevant safety inductions according to the site that the work is carried out on. This will include but not be limited to, the following topics: • Explanation of the Permit to Work (PTW) System • Explanation of Tool Box Talk requirements • Explanation of Hazardous Observation Card System • PPE Requirements • Security arrangements • Lift plans, sequence of lifts and TRAs • Area barrier arrangements during lifting operations.	HAUV Supervisor
2. 	Undertake Toolbox talks with the relevant personnel. Command and control structure agreed. Toolbox Talks to be undertaken at the commencement of each shift or prior to complex tasks to review and update safety and operational requirements.	HAUV Supervisor
3.	Ensure that all Permits to Work and TRAs & Lift Plans and associated certificates are in place prior to commencing operations and communicated via Toolbox Talk (signed evidence required). If required, ensure PTW are renewed and put into place for the commencement of each shift.	HAUV Supervisor
4.	Ensure barriers are erected around the launch & recovery site prior to work commencing.	HAUV Supervisor
Note	All rigging described below can be changed at the discretion of the HAUV Supervisor to suit the conditions during the recovery. Suitable rated rigging must always be used.	HAUV Supervisor

6.2.3.1 Pre-Requisites

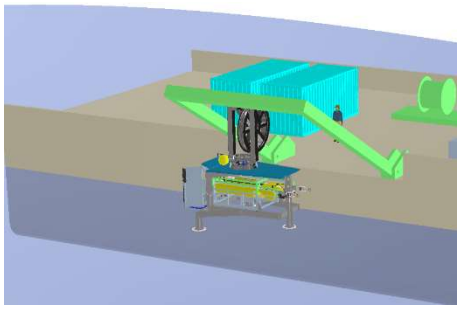
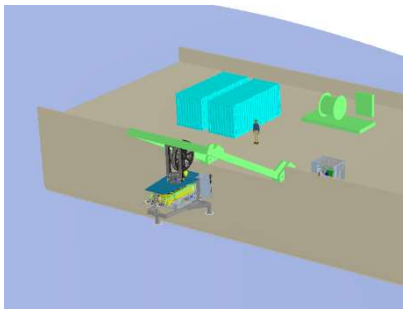
Item	Task	Responsible Person

1.	• PTW Raised and in force
	• ToolBox Talk complete
	• Barriers & Cordons in place and deck is clear of non-essential personnel
	• HAUV docked and secured into garage
	• Full communications check completed between all relevant parties
	  ○ HAUV Supervisor
	  ○ HAUV Control
	  ○ Survey
	  ○ Deck Supervisor
	  ○ LARS Winch operator
	  ○ Tether Winch operator
	  ○ Bridge
	• HAUV Tether Winch check complete and in MANUAL mode.
	NOTE: During operations, all comms will be limited to the personnel directly involved in controlling the operation.
		HAUV Supervisor

2.	• Vessel to be in DP mode at recovery location and positioned correctly for recovery. **Ensure that position is such that currents will not pull the HAUV/Tether back into the side of the vessel.** **NOTE:** Supervisor to ensure Vessel Master/ understands the vessel best heading "blow off" condition.	Bridge
3.	HAUV Docked and secure in Garage	HAUV Supervisor

6.2.3.2 Recovery Procedure

Item	Task	Responsible Person
1.	Ensure all deck crew (HAUV and Vessel) are in position for launch.	HAUV Supervisor
2.	Obtain green light from the Bridge to commence HAUV Recovery.	HAUV Supervisor & Bridge
3.	Haul in on LARS winch and take up slack, set LARS winch to AHC mode	LARS Operator
4.	Slowly lift garage clear of the seabed to approx. 5m, deactivate AHC mode on the LARS winch.	HAUV Supervisor & LARS Operator
5. 	**Caution** Risk of damage to equipment. Recover garage to the surface. Monitor vehicle heading throughout the water column(2 off USBLs required). If heading changes considerably that indicates the garage is spinning call an **ALL STOP** to allow for the situation to be assessed	HAUV Supervisor

Item	Task	Responsible Person
	and heading corrected accordingly.	
6. 	**WARNING** RISK OF ELECTRIC SHOCK. Power down the vehicle as it breaks the surface to enable tether handling	HAUV Supervisor
7.	Continue to recover and latch garage into the snubber.	HAUV Supervisor & LARS Operator
8. 	**Caution** Risk of damage to equipment. **Note:** Tether is to be manually controlled during recovery and slack is to be managed correctly. **Bend radius is to observed throughout evolution**	Winch Operator
9.	Rotate the snubber as required to align the garage for inboard recovery  	LARS Operator
10. 	**WARNING** RISK OF PERSONAL INJURY DUE TO HEAVY OBJECT. Transfer the garage inboard and set down on the deck.	HAUV Supervisor & LARS Operator
11. 	**WARNING** RISK OF ELECTRIC SHOCK. Connect earthing straps to the garage & HAUV prior to carrying out any work.	HAUV Supervisor
12.	Sea fasten Subsea Garage.	HAUV Supervisor & Deck

Item	Task	Responsible Person
13. 	**WARNING** RISK OF PERSONAL INJURY. Carry out post dive checks [108]	HAUV Supervisor
Task Complete		

6.3 SUBSEA GARAGE LAUNCH & RECOVERY PLAN

6.3.1 GARAGE DEPLOYMENT

The deployment task plan outlines the launch of the Garage using the vessels A-Frame/LARS. A summary of the operation is as follows:

- Vessel positioned at the launch position
- Garage to be latched into the LARS snubber
- Garage lifted overboard using the vessels LARS
- Garage lowered to the seabed

Item	Task	Responsible Person
Note	**The purpose of this task plan is to detail the actions to be taken to safely perform the Subsea Garage only launch operation.**	INFO
5.	Prior to any work starting, all personnel must undergo relevant safety inductions according to the site that the work is carried out on. This will include but not be limited to, the following topics: • Explanation of the Permit to Work (PTW) System • Explanation of Tool Box Talk requirements • Explanation of Hazardous Observation Card System • PPE Requirements • Security arrangements • Lift plans, sequence of lifts and TRAs • Area barrier arrangements during lifting operations.	HAUV Supervisor
6. 	Undertake Toolbox talks with the relevant personnel. Command and control structure agreed. Toolbox Talks to be undertaken at the commencement of each shift or prior to complex tasks to review and update safety and operational requirements.	HAUV Supervisor
7.	Ensure that all Permits to Work and TRAs & Lift Plans and associated certificates are in place prior to commencing operations and communicated via Toolbox Talk (signed evidence required). If required, ensure PTW are renewed and put into place for the commencement of each shift.	HAUV Supervisor
8.	Ensure barriers are erected around the launch & recovery site prior to work commencing.	HAUV Supervisor
Note	All rigging described below can be changed at the discretion of the HAUV Supervisor to suit the conditions during the recovery. Suitable rated rigging must always be used.	HAUV Supervisor

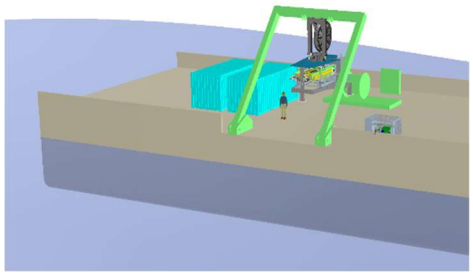
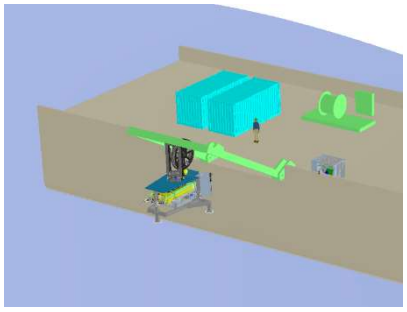
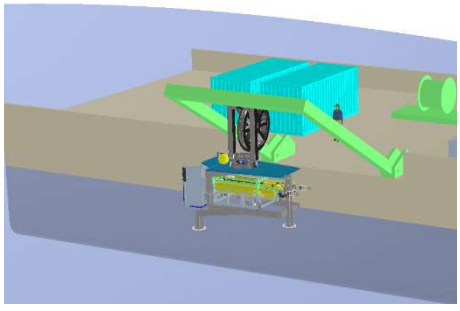
6.3.1.1 Pre-Requisites

Item	Task	Responsible Person

4.	• ToolBox Talk complete
	• PTW Raised and in force
	• Barriers & Cordons in place and deck is clear of non-essential personnel
	• Full communications check completed between all relevant parties
	  ○ HAUV Supervisor
	  ○ HAUV Control
	  ○ Survey
	  ○ Deck Supervisor
	  ○ LARS Winch operator
	  ○ Tether Winch operator
	  ○ Bridge
	NOTE: During operations, all comms to be limited to only the personnel directly involved in controlling the operation.
		HAUV Supervisor

5.	• Vessel to be in DP mode at launch location and positioned correctly for launch & recovery. **Ensure that position is such that currents will not pull theHAUV/tether back into the side of the vessel on subsequent recovery.** **NOTE:** Supervisor to ensure Vessel Master/ understands the vessel best heading “blow off” condition.	Bridge

6.3.1.2 Launch Procedure

Item	Task	Responsible Person
1.	Carry out final visual survey of Garage prior to launching	HAUV Supervisor
2. 	**WARNING** RISK OF PERSONAL INJURY DUE TO MOVING PARTS. Connect garage lifting equipment to the LARS lift wire and latch into the snubber	HAUV Supervisor & LARS Operator
3.	Remove sea fastenings from the garage	HAUV Supervisor & Deck
4.	Ensure all deck crew (HAUV and Vessel) are in position for launch	HAUV Supervisor
5.	Obtain green light from the Bridge to commence Garage Launch	HAUV Supervisor & Bridge
6. 	**WARNING** RISK OF PERSONAL INJURY DUE TO HEAVY OBJECT. Lift garage overboard 	HAUV Supervisor & LARS Operator
7.	Once garage is fully over boarded the snubber may be rotated up to 90 degrees into the prevailing current.  	HAUV Supervisor & LARS Operator

Item	Task	Responsible Person
8.	Unlatch the garage from the snubber and lower into the water.	LARS Operator
9.	Lower garage through the splash zone until just below the surface.	HAUV Supervisor & LARS Operator
10. 	**Caution** Risk of damage to equipment. Lower Garage towards seabed stopping with 5m clearance. Monitor USBL heading throughout the water column. If heading changes considerably that indicates the garage is spinning **HALT** operations to allow for the situation to be assessed and corrected accordingly.	HAUV Supervisor
11.	Set LARS winch to AHC mode	LARS Operator
12.	Slowly lower Garage to the seabed. Payout slack to compensate for vessel movement, pitch & roll	LARS Operator
13.	Shut down LARS winch	LARS Operator
14.	Record the garage position, pitch & roll	HAUV Supervisor
15.	Dock HAUV into the garage as required.	HAUV Supervisor
Task Complete		

6.3.2 GARAGE RECOVERY

The Recovery task plan outlines the recovery of the Garage to deck using the vessels A-Frame/LARS. A summary of the operation is as follows:

- Garage recovered to surface and latched into the LARS snubber
- Garage lifted onboard using the vessels LARS
- Garage recovered to vessel deck and sea fastened

Item	Task	Responsible Person
Note	**The purpose of this task plan is to detail the actions to be taken to safely perform the Subsea Garage recovery operation.**	INFO
5.	Prior to any work starting, all personnel must undergo relevant safety inductions according to the site that the work is carried out on. This will include but not be limited to, the following topics: • Explanation of the Permit to Work (PTW) System • Explanation of Tool Box Talk requirements • Explanation of Hazardous Observation Card System • PPE Requirements • Security arrangements • Lift plans, sequence of lifts and TRAs • Area barrier arrangements during lifting operations.	HAUV Supervisor
6. 	Undertake Toolbox talks with the relevant personnel. Command and control structure agreed. Toolbox Talks to be undertaken at the commencement of each shift or prior to complex tasks to review and update safety and operational requirements.	HAUV Supervisor
7.	Ensure that all Permits to Work and TRAs & Lift Plans and associated certificates are in place prior to commencing operations and communicated via Toolbox Talk (signed evidence required). If required, ensure PTW are renewed and put into place for the commencement of each shift.	HAUV Supervisor
8.	Ensure barriers are erected around the launch & recovery site prior to work commencing.	HAUV Supervisor
Note	All rigging described below can be changed at the discretion of the HAUV Supervisor to suit the conditions during the recovery. Suitable rated rigging must always be used.	HAUV Supervisor

6.3.2.1 Pre-Requisites

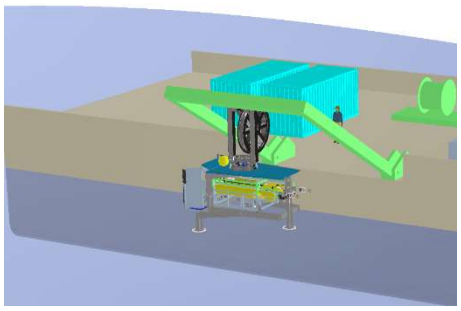
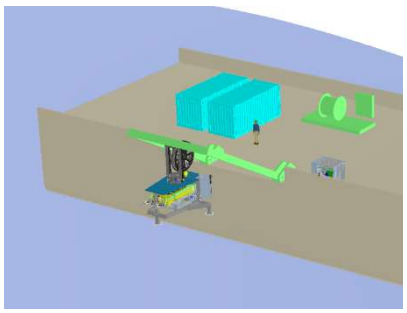
Item	Task	Responsible Person

4.	• PTW Raised and in force
	• ToolBox Talk complete
	• Barriers & Cordons in place and deck is clear of non-essential personnel
	• HAUV undocked from garage
	• Full communications check completed between all relevant parties
	  ○ HAUV Supervisor
	  ○ HAUV Control
	  ○ Survey
	  ○ Deck Supervisor
	  ○ LARS Winch operator
	  ○ Tether Winch operator
	  ○ Bridge
	NOTE: During operations, all comms will be limited to the personnel directly involved in controlling the operation.
		HAUV Supervisor

5.	• Vessel to be in DP mode at recovery location and positioned correctly for recovery. **NOTE:** Supervisor to ensure Vessel Master/ understands the vessel best heading "blow off" condition.	Bridge

6.3.2.2 Recovery Procedure

Item	Task	Responsible Person
1.	Ensure all deck crew (HAUV and Vessel) are in position for launch.	HAUV Supervisor
2.	Obtain green light from the Bridge to commence Garage Recovery.	HAUV Supervisor & Bridge
3.	Haul in on LARS winch and take up slack, set LARS winch to AHC mode	LARS Operator
4.	Slowly lift garage clear of the seabed to approx. 5m, deactivate AHC mode on the LARS winch.	HAUV Supervisor & LARS Operator
5. 	**Caution** Risk of damage to equipment. Recover garage to the surface. Monitor USBL heading throughout the water column. If heading changes considerably that indicates the garage is spinning call an **ALL STOP** to allow for the situation to be assessed and corrected accordingly.	HAUV Supervisor
6.	Continue to recover and latch garage into the snubber.	HAUV Supervisor & LARS Operator

Item	Task	Responsible Person
7.	Rotate the snubber as required to align the garage for inboard recovery  	LARS Operator
8. 	**WARNING** RISK OF PERSONAL INJURY DUE TO HEAVY OBJECT. Transfer the garage inboard and set down on the deck.	HAUV Supervisor & LARS Operator
9.	Sea fasten Subsea Garage.	HAUV Supervisor & Deck
10.	Carry out visual garage checks.	HAUV Supervisor
Task Complete		