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ABBREVIATIONS

Abbreviation	Definition
AUV	Autonomous Underwater Vehicle
DPR	Daily Progress Report
FRC	Fast Recue Craft
HAUV	Hybrid Autonomous Underwater Vehicle
HIRA	Hazard Identification & Risk Assessment
HSE	Health & Safety Executive

Abbreviation	Definition
HSEQ	Health, Safety, Environment & Quality
LARS	Launch and Recovery System
L&R	Launch & Recovery
PFD	Personal Floatation Device
PPE	Personal Protective Equipment
PTW	Permit to Work
TBT	Tool Box Talk
TRA	Task Risk Assessment
UHF	Ultra-High Frequency

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-003
[104]	Tool Box Talks	HS-FM-001
[105]	Risk Assessment Proforma	HS-FM-004
[106]	HAUV3 Launch and Recovery Procedure	23-0022-OPS-PR-002
[107]	FRC Procedure	23-0022-OP-PR-004
[108]	Project Execution Plan	FESL-SPDC-WEP-1909/2201

1 INTRODUCTION

1.1 PURPOSE OF DOCUMENT

This document is intended to be utilised as a Guidance Document only, Emergency Responses and Emergency Recovery Procedures should be developed and briefed based on the nature of the potential problem and the resources available at that given time.

Risk Assessments should be completed, filed and available to all personnel for review and reference using these guidelines and the appropriate Risk Assessment forms [105] with participation from all HAUV crew both at the scene and remote so that they understand their roles and responsibilities should an emergency situation occur.

1.2 SCOPE OF DOCUMENT

The scope of this document is to provide guidelines and examples for the preparation of Site Specific HAUV Emergency Procedures, which will include Risk Analysis [103] for the various scenarios.

2 RESPONSIBILITIES

2.1 COMPETENCE

All personnel working on the project will be suitably qualified to carry out the scope of work. CVs of all offshore personnel will be shared with the client to ensure that the required standards are met. All offshore personnel will have all the relevant certifications and medicals in place prior to mobilisation.

2.2 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 be responsible for ensuring that all HSEQ procedures are adhered to
HAUV Supervisor	• Shall be responsible for ensuring this procedure is adhered to by applicable personnel under their jurisdiction • Shall be responsible for completing Site Specific Risk Assessments and drafting Emergency Response Procedures • Briefing Emergency Response Procedures with all personnel involved so that they understand their Roles and Responsibilities.
HAUV Pilot Technicians	• Shall be responsible to comply with the procedure for emergency recovery of equipment
Vessel Captain	• Shall be responsible for maintaining vessel security & safety at all times • Shall be responsible for maintaining vessel position & stability during all operations. • Shall be responsible for all maintenance and certification for all vessel supplied equipment.

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.

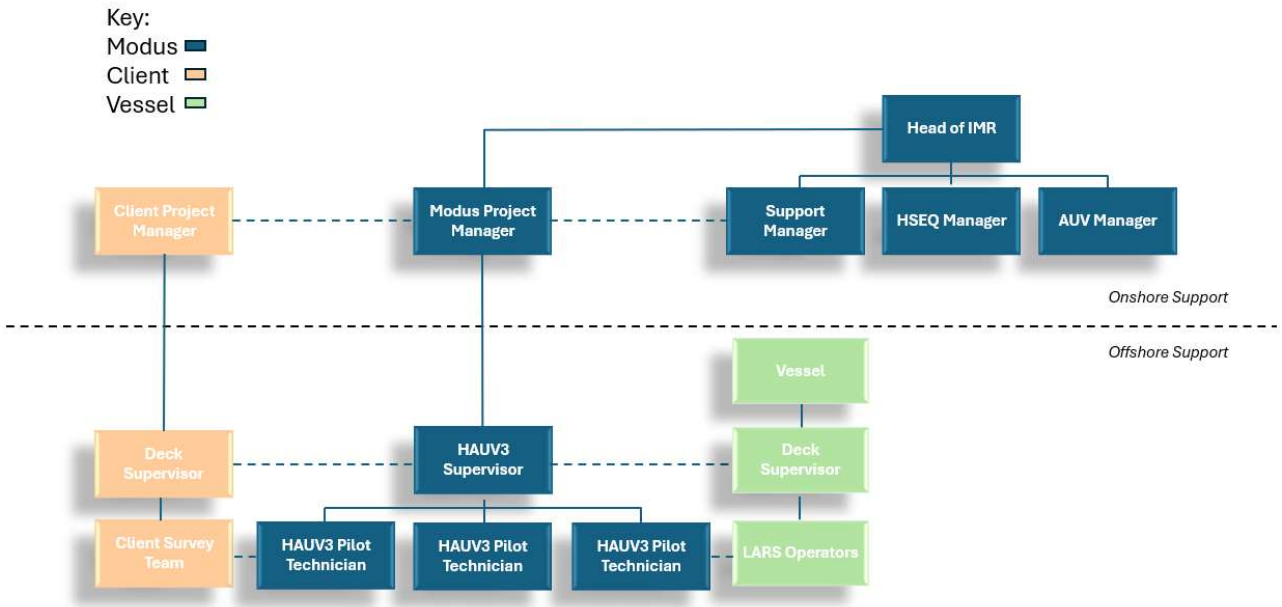
3 ORGANISATION

3.1 GENERAL

The following personnel will be required to be available either physically onsite, or remotely, where possible, during the Emergency Recovery operations:

- 1x Modus on-call support
- 1x HSEQ Manager as required
- 1x HAUV Supervisor
- 3x 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 HAUV3 crew will be via Clear COMM's / 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.

In case of an emergency or an urgent requirement, there will be a dedicated onshore Duty Manager who will always be accessible by mobile phone. The Duty Manager role will rotate around the onshore management team on a weekly basis, and the dedicated individual will be clearly communicated to the offshore team.

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.

The 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
Survey Team Lead	Daniel Osarobo	Email: surveyteamlead@fadfae.com.ng Mobile: TBC

3.4.4 THIRD PARTY CONTACT DETAILS

Job Title	Name	Contact Details
N/A		

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 Emergency Procedures required will be dependent on the HAUV's configuration, the resources available and the recovery vessel and/or ROV systems available at the time to aid recovery, and therefore the examples and procedures in this document are Guidelines for preparation of Site Specific Procedures and cannot always be used directly as Worksite Procedures.

The HAUV Supervisor shall ensure the preparation and issue of Site and System specific Emergency Procedures, using these procedures as a guideline.

The Emergency Procedures and the TRA's that will be developed will be required to cover the following possible situations and the appropriate steps that need to be taken to ensure the safe recovery of the equipment.

- Dead HAUV
  - INS Failure
  - EPOD Flood/Loss of Tether
  - Thruster Failure etc.
- Garage undock failure
- HAUV Entrapment (Structure or Garage)

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 EMERGENCY RECOVERY LOCATION

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

Emergency 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 and the HAUV Supervisor jointly. In the event of disagreement however, the ultimate decision to Emergency Recover the HAUV is that of the HAUV Supervisor.

Hs and wind speed only play a part in the environmental conditions to be considered when conducting an Emergency Recovery. The decision to recover the 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 FRC will be judged by the HAUV Supervisor and the Bridge/FRC Coxswain on a case-by-case basis.

6 EMERGENCY RECOVERY PROCEDURE GUIDELINES

6.1 DEAD HAUV

In case of a fatal HAUV failure the HAUV will have to be recovered to deck by use of the vessels crane and possibly with the assistance of an ROV.

- Monitor and plot the HAUV's USBL position.
- Produce relevant Emergency Procedure.
- Perform tool-box talks with the involved parties.
- Confirm all HV power is isolated to the tether.
- If HAUV is negatively buoyant & independently launched.
    - Deploy an ROV to assess the situation; if required stabilise the HAUV on the seabed.
    - Deploy the vessel crane to the recovery location if water depth allows.
    - Use ROV to attach the HAUV Emergency Recover Strop to the crane
    - Recover the HAUV to deck, use handling/tag lines and other suitable methods at the splash zone to stabilise any load swing
    - Bring the HAUV onboard and land on the work stand.
    - Secure HAUV to deck.
    - Disconnect the crane-hook from the HAUV.
- If HAUV is positively buoyant.
    - If time allows let the HAUV to surface under own buoyancy, monitor and plot the HAUV's position and depth from USBL data
    - Launch FRC [107] to HAUV's surfaced position
    - Manoeuvre the vessel to the HAUV location whilst continually carrying out tether management
    - Once safe to do so attach the HAUV Emergency Recover Strop to the crane
    - Recover the HAUV to deck, use handling/tag lines and other suitable methods at the splash zone to stabilise any load swing

6.2 GARAGE UNDOCKING FAILURE

In case of a Garage undocking failure the HAUV Garage will have to be recovered to deck. The situation may have to be assessed by an ROV.

- Produce relevant Emergency Procedure.
- Perform tool-box talks with the involved parties.
- Assess the HAUV's position via onboard cameras.
- Confirm HAUV & latch positions.
- Recover the Subsea Garage i.a.w L&R Procedure [106].
- Secure Garage to deck.
- Investigate fault.

6.3 HAUV ENTRAPMENT

In case of HAUV Entrapment the situation may have to be assessed by an ROV.

- Produce relevant Emergency Procedure.
- Perform tool-box talks with the involved parties.
- Deploy ROV to assess the situation if required.
- Attempt to free the HAUV.
- When HAUV is free, recover to deck i.a.w. section 6.1 or L&R Procedure [106].
- Recover HAUV to deck and place on maintenance stand.
- Secure HAUV to deck
- Investigate damage.