MOTION TEST OF BIFROST SPECTROMETER (RAMS)

	Name	Role/Title
Owner	Thomas Gahl	Motion Control and Automation Group Leader
Reviewer	Dirk Offermans	Area Co-ordinator
Reviewer	Liam Whitelegg	Instrument Lead Engineer
Approver	Dennis De Wit	Area Co-ordinator

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COVER SHEET SECTION

Provide the name, contractor company, and title of those who prepared and reviewed/approved this form in the signature box provided. The Area Co-Ordinator and OHS Engineer must review and approve the RAMS before the job may proceed. Any comments must be captured in this document.

Contractor Supervisor to Complete this Section:

ESS Division: NSS
Contractor: Motion Control and Automation Group

Job Description: Motion Test of BiFrost Spectrometer
Work Order No: 340416

Prepared By: Thomas Gahl Email: Thomas.Gahl@ess.eu

Date Submitted (dd/mm/yy): 21/04/21

INSTALLATION REVIEW

Owner: Installation Package Leader: Liam Whitelegg	Date:
Owner: Test Package Leader: Thomas Gahl	Date:
Reviewer: OHS Engineer: Dennis De Wit	Date:
Reviewer: Electrical Safety Leader:	Date:
Approver: Area Co-Ordinator: Dirk Offermans	Date:

Reviewer's Comments

#	Comments	Initials

SIGN ON RECORD

All persons expected to work on the installation detailed within, shall sign the table below to confirm they have read and understood this RAMS including appendix information.

Name	Position	Signed	Date
Thomas Gahl	MCAG Group Leader		
Liam Whitelegg	Bifrost Engineer		
Anders Sandström	MCAG Engineer		
Federico Rojas	MCAG Engineer		

How will information be communicated and explained to work force

	Y/N	
RAMS Communicated	Y	
Pre-Job Briefings	Y	

2.
METHOD STATEMENT

In-Kind Contributor/Contractor to enter information about equipment and materials to be used for the specific job.

Spectrometer Tank from AVS has arrived. As part of the SAT, the tank needs to be rotated on its motion stage within the cave

2.1. Description of Task/Process:

If the work is part of an Installation Binder, then align with Chapter 01 in that binder and detail:

If the work is not part of an Installation Binder, then describe below:

This work is part of IB378 – Spectrometer Vessel and Motion System.

There are two parts to this work – Pre installation checks and then SAT after installation

2.2. Sequence of work

(step by step) and the duration of each (align with Installation Binder):

Link to Chapter 3 of the Installation binder if used.

Sequence	Duration [hours or days]
Pre-Installation Checks	
Connect test crate to temporary power	10min
Connect motor, encoder and switch cables to components	50min
Check limit switch engagement through manual engagement of switch	10min
Remove restraining brackets	10min
Check motor operation	20min
Check encoder readout	10min
Re-attach brackets	10min
After tests are completed, disconnect components and remove power to crate	60min

SAT	
Connect test crate to temporary power	10min
Connect motor, encoder and switch cables to components	50min
Remove restraining brackets	10min
Repetition of pre-installation checks	3hours
Repetition of Tests in ESS-3208331 without load	2days

2.3. Temporary services

If temporary services are required i.e. scaffold, site logistics etc. detail below:

Link to Chapter 5 of the Installation binder if used

Temporary power, motion test crate and laser tracker

2.4. Training

Who will carry out the works and detail training i.e Lifting & Slinging /Forklift / Harness / Working at Height etc.

Link to Chapter 8 of the Installation binder if used

Operative Name	Training Required (e.g. Hot Work)	Training Received (Y/N)
Anders Sandström	N/A	N
Federico Rojas	N/A	N
	N/A	N
	N/A	N

2.6. Personnel protective equipment

*Mandatory PPE

Personnel Protective Equipment required Yes/No:			
Safety Helmet*	Y	Harness and Lanyard	N
Safety Boots*	Y	Dust Mask	N
High Visibility Vest*	Y	Welding Mask	N
Gloves (TYPE-suited to task) *	Y	Hearing Protection	N
Safety Glasses*	Y	Personal Oxygen Deficiency monitor	N
Goggles / Face-Shield	N	Personal dosimeter	N

2.7. Permits, Rescue plans and Authorizations

Indicate below what additional specific permits, rescue plans and/or authorizations will be required for this RAMS:

This only indicates what is needed and will have to be requested/applied separately, highlight with Y/N. Link to Chapter 8 of the Installation binder if used

Permit	Required	Permit	Required
Hot Works Permit	N	Electrical Works	N
Confined Space Work Permit	N	Electrical Lock out/Tag Out	N
Out of Hours Permit (if necessary)	N	Energisation Request	N
Radiological Permit	N		
Roof access Permit	N		
Ladder Permit	N		

Rescue plans	Required	Authorizations	Required
Work with Safety Harness Rescue Plan	N	Authorization for the use of: MEWP, Forklift, Crane	N
Rescue plan confined spaces	N		

If Electrical work and/or LOTO is required, please complete Permit request in EAM Work Order system and please consider electrical hazards in the risk assessment in section 2.

2.8. Adjacent Areas

Protection system for third party incl. public, adjacent workers etc.: (Fencing off areas, noise, flash from welding etc.)

Operative	Adjacent Areas

2.9. Temporary amendments

If Temporary amendments to escape routes, fire alarm, client rules etc. are required then detail below:

NO

2.10. Equipment and Tools

Description of Equipment and Tools

(If additional Hardware/Machinery is being brought to site)

Plant/MEWP/Scissor Lifts	Certification received
Basic Hand Tools	
Motion Test Box/Screen/Laptop	
Laser Tracker System (owned and operated by SAM)	

2.11. Emergency procedures

incl. first aid arrangements:

Procedure	Institution/Authority	Reviewed?
	ESS Emergency Notice	Yes

Contact person when working with MEWP			
Name:		**Telephone number:**	

First Aid Training including CPR	Institution/Authority	Training Received
No available training due to Covid-19	ESS	
Call gate guard to get first responders		

ESS strongly advises to have at least one person per working group trained in First Aid and CPR. This training becomes mandatory when working outside normal working hours.

2.13. Chemical & Substances – Safety Data Sheet (SDS):

These may be described as cleaners, paints, solvents, lubricants, gases, aerosols of any kind, greases, cement and its additives and supplementary Control of Substances Hazardous to Health Assessment may be required.

Product Name	Used For	Form: Liquid/Gas/Solid	Container Size	SDS Attached Yes / No

RISK ASSESSMENT

(Please use the Appendix for references to each column)

A							Initial rating				Residual rating		
Ref. no	Location	Area	What is the Task or Activity?	What is the Hazard?	What is the possible Consequence?	Who is affected?	S	L	Risk H, M, L	Mitigations to control risk	S	L	Risk H, M , L
1	E Building	E01	House Keeping	Slips, trips & falls		All Personnel	4	4	16	Waste must be separated into wood, plastic, paper and card and metal. Each waste must be removed to the appropriate skips daily also. Clear and safe access routes must be maintained at all times and work teams may need to barrier	4	1	4

										their work area to keep others safe. Alternate direction arrows should also be shown. All tools and equipment must be removed, stored and secured at the end of each shift and the work areas cleaned thoroughly.			
3	E Building	E01	Use of hand-tools	Entanglement, lacerations Muscular-skeletal injury		All Personnel	3	4	12	Personnel must be trained and competent to use the tools. All tools must be inspected prior to use with all guards and safety devices in place as per the manufacturer's guidance.			

										Only use the correct tool for the task. It must also be fit for purpose. All tools must have the correct monthly inspection equipment tag on. Ensure the correct body positioning to avoid muscle strain or over reaching. Power tools must be connected to a circuit breaker in case of a power surge/short.			
4	E Building	E01	Covid 19	Risk of becoming infected with Covid-19		All Personnel	3	3	9	Follow the authorities' recommendations and guidelines. Everyone who has cold or flu symptoms, even mild	2	2	4

										ones, must stay at home. Wash hands often, keep distance and use facemask.				
A							Initial rating				Residual rating			
Ref. no	Location	Area	What is the Task or Activity?	What is the Hazard?	What is the possible Consequence?	Who is affected?	S	L	Risk H, M, L, A	Mitigations to control risk	S	L	Risk H, M , L, A	
5	E Building	E01	Connecting cables and power supplies	Electrocution	Burns, nerve damage	Technician	2	2	L	All mains cables are CE marked. Ensure no damage to cables before connecting. All other cables carry a voltage of less than 72V(DC). (Protective Bonding)	2	1	A	
6	E Building	E01	Moving parts	Finger Traps	Cuts, entanglement, severed digits	Technician	3	3	M	Guards checked and installed before work commences. No personnel allowed near chains/toothed components whilst system is energised.	4	1	L	

										Emergency stop button provided that turns off power to the motor			
7	E Building	E01	Moving parts	Crushing	Broken limbs, internal injuries	Technician	4	2	M	Area to be cleared of obstacles before work commences. Area taped off to prevent un-controlled access. System speed will be limited to 5mm/s Emergency stop button provided that turns off power to the motor.	2	1	A
A							**Initial rating**				**Residual rating**		
Ref. no	**Location**	**Area**	**What is the Task or Activity?**	**What is the Hazard?**	**What is the possible Consequence?**	**Who is affected?**	**S**	**L**	**Risk H, M, L, A**	**Mitigations to control risk**	**S**	**L**	**Risk H, M , L, A**
13													

14													
15													
16													
17													

APPENDIX

Risk Assessment guidance

1.1 Define Scope and limitations

1.2 Describe the location for activity or task by stating the building name or number and area if applicable

1.3 Break the activities down into steps - Clearly and precise

1.4 Determine the hazards associated in column **What is the hazard**? Can be input from the Hazard identification checklist ESS-1713369 [1] or similar.

1.5 Next step is to state the possible consequence the Hazard could cause in column **What is the possible Consequence?** (What potential harm e.g. injury, fire, occupational health disease can the hazard cause)

1.6 Carry out the **Initial risk rating** of the hazard according to 1.6.1, 1.6.2 and 1.6.3

1.6.1 Considering the hazards involved without any controlling measures, determine the worst credible severity of an incident by using **Risk Matrix** 5x5. Write the severity number in column **S** (Severity).

1.6.2 Considering the hazards involved without any controlling measures being in place, determine the likelihood that an incident will result from this job step by using the **Risk Matrix** 5x5. Write the likelihood number in column **L** (Likelihood)

1.6.3 Colour occurs in column Risk in the corresponding table colours for Low, Medium and High to highlight the level and make it simple to see and understand.

1.7 Repeat steps 1.4-1.6 for each of the activities identified.

1.8 List any control measures that will be taken to ensure that step is done safely in column **Mitigations to control risk**. Use the Table **Risk reduction strategy with control measure examples** [2] down below provided to help your evaluation about different types of controls and their effectiveness at reducing risk. The Severity of an accident usually remains the same. It is only the likelihood score that will change following controls.

1.9 Once all controls are described follow the same process in 1.4-1.6 to complete the severity, likelihood and residual risk that potentially remains after mitigation- Residual risk

Risk reduction strategy with control measure examples

	Control	Examples
Least Effective	**PPE**	√ Safety glasses √ Hearing protection √ Hardhat √ Gloves
	Administrative	√ Work rotation to minimize exposure √ Inspect safety equipment √ Good housekeeping practices √ Training and supervision
	Warning	√ Signs √ Backup alarms √ Horns √ Beepers
	Engineering/Isolation	√ Ventilation √ Machine guarding √ Enclosures √ Circuit breakers
	Substitution	√ Use latex rather than oil-based paints √ Reduce energy, such as speed, force, amperage, pressure, and temperature √ Use water-based detergents instead of organic solvents
Most Effective	**Elimination**	√ Remove a dangerous machine from service √ Remove the hazard altogether

Risk Matrix

This risk matrix is suitable for assessment of conventional hazards occurring during task based activities at ESS. A consequence/likelihood matrix is used to assess the relative magnitude

Likelihood (L)	Severity (S) 1	2	3	4	5
1	A	A	L	M	M
2	A	A	L	M	H
3	A	L	M	H	H
4	L	M	M	H	H
5	M	M	H	H	H

Severity categories (S)	
Score	**Description**
1	**No injury**
2	**Minor** -Injuries that can be treated with a first aid kit
3	**Major** -Injuries requiring the support of emergency services or a reportable injury
4	**Single fatality**
5	**Multiple fatalities**
Likelihood categories (L)	
Score	**Description**
1	**Highly improbable**- Would not be expected to occur
2	**Unlikely**
3	**Remote**
4	**Occasional**
5	**Frequent**-Expected to happen

Risk categories	Action required
Acceptable(A)	If the risk is considered low and provided the correct processes are followed no further control measures are considered necessary. Work can proceed
Low (L) Risk (Green)	If the risk is considered low and provided the correct processes are followed further control measures should be considered if low or minimal cost. Work can proceed
Medium (M) Risk (Orange) Mitigation needed	If risk is considered medium and further control measures will be in place to reduce the risk. After the control measures are put in place, the risk will be re-assessed to determine the impact of the risk with the control measures in place. Work could proceed upon further evaluation.
High (H) Risk (Red) Unacceptabe	If the risk is considered high, no work will take place until control measures are in place to reduce the risk. After mitigations are considered, if the residual risk remains high, work will not commence, alternative solution need to be considered.

REFERENCES

[1] Hazard Identification (Hazid) checklist (ESS-1713369)
[2] Task Risk Assessment (TRA) (ESS-1549899)

GLOSSARY

Term	Definition
RAMS	Risk Assessment and Method Statement
ESS	European Spallation Source ERIC
OSH	Occupational Health and Safety
ESH	Environment Safety and Health
PPE	Personal Protective Equipment
MEWP	Mobile Elevated Platform
LOTO	Lock out / Tag out
EAM	Enterprise Asset Management system
CPR	Cardiopulmonary Resuscitation
SDS	Safety Data Sheet

DOCUMENT REVISION HISTORY

Revision	Reason for and description of change	Author	Date
1	First issue	Dennis de Wit	2020-02-21
2	Addition in section 1.7: Rescue plans and authorizations; Replaced risk matrix with revised version Addition of contact person when working with MEWP, section 1.11	Dennis de Wit	2020-08-21
3	Addition of sign off sheet and additional PPE	Dennis de Wit	2020-11-16
4	Addition of glossary and updated emergency notice	Dennis de Wit	2021-04-06