

  <p style="text-align: center;">Minutes</p>	No.: EDMS-ID:
CERN-GSI collaboration meeting on MM systems development Date: 2024-12-04	Name: T. Parfyo
Participants:	Carlo Petrone (CP), Stephan Russenschuck (SR), Matthias Bonora (MB), Vincenzo Di Capua (VC), Taras Parfyo (TP), Anna Szwangruber (ASz), Vassily Marusov (VM), Alexander Bleile (AB), Jan Patrick Meier (JPM), Frederic Savary (FS)
CC:	Participants, Christian Roux, Kei Sugita, Marco Buzio, Attilio Milanese, Guy Deferne

Agenda	TOP 1: Status of the CERN-GSI collaboration agreement. TOP 2: Single Stretched Wire/Vibration Wire System: 2.1 Current status. 2.2 ACS controller. 2.3 Metrology. 2.4 Acquisition system. TOP 3: Anticryostat. TOP 4: Rotating coil. TOP 5: Future steps.
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No.	Who	Type	Topic
TOP 1			Status of the CERN-GSI collaboration agreement
	CP	I	The budget must be approved by CERN. Agreement is under finding from CERN side. Contact person for document processing at CERN side - Germana Riddone. Carlo Petrone is responsible for magnetic measurement systems and Frederick Savary – for the anticryostat.
TOP 2			Single Stretched Wire/Vibration Wire System
2.1			Current status
	TP	I	GSI has prepared a specification for a new motion system for the SSW, which is essential for initiating the tender process. By the end of the year, it is planned to launch a tender for the purchase of one system. PI appears to be the only company capable of manufacturing this system. The main specifications of the new motion system are as follows: - Translators based on the HPS-170 models specifically designed for the CERN- GSI order - Travel range 155 mm

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			<ul style="list-style-type: none"> - Bidirectional repeatability: ± 100 nm - Pitch: ± 30 μrad - Yaw: ± 40 μrad - Straightness/Flatness: ± 1.5 μm <p>The proposed controller is the ACS Controller of the type G-901. For each translator 1D Mapping of the stages in an XY setup, mounted on granite brackets and measured with a laser interferometer, ensuring 1D accuracy of < 1 μm. 2D Mapping of positioning accuracy will be conducted at the customer's site in GSI in collaboration with PI and an external measurement service provider. Guaranteed 2D accuracy: ± 2 μm.</p>
2.2			ACS controller
	TP	I	<p>After a brief meeting with PI regarding the ACS controller of the type G-901, here are the key points:</p> <ul style="list-style-type: none"> - The G-901 controller can be used with the existing HPS-170 stages. However, the 2D mapping functionality included in the current controller would not be available. Transferring the 2D mapping from the old controller to the new one would be complex and time-consuming for PI. - PI can provide a special cable to connect the ACS controller with the HPS-170 stages. - Delivery time: 8–13 weeks. - Pricing (4-axis version) approximately €12,000.
	CP	A	<p>For CERN, purchasing a similar controller might be somewhat challenging due to procurement regulations. Perhaps GSI could purchase the controller for CERN as a spare part for the system, or obtain the controller earlier than the other system components? This would allow it to be integrated into the FFMM and tested with the current translators.</p>
	TP	A	<p>These questions will be forwarded to PI. During the next meeting, all potential options from GSI for purchasing an additional controller will be presented.</p>
2.3			Metrology
	TP	Q	<p>Do we need 2D mapping of the translators' motion before testing the entire system at CERN?</p>
	CP	D	<p>In the tender, 2D mapping at CERN can be specified as an option. If necessary, 2D mapping can be verified later at CERN.</p>
		I	<p>At this stage, it is difficult to determine whether it is better to perform the 2D mapping at CERN or GSI. The final decision will be made later, once the price for 2D mapping becomes clear after the tender.</p>
2.4			Acquisition system
	CP	I	<p>The integrator needs to be replaced with a new generation, as CERN can no longer manufacture the old version due to the unavailability of outdated components.</p> <p>As a replacement, ready-made PXI modules from National Instruments could be used, but this is not the most up-to-date option.</p>
		A	<p>Market research should be conducted to explore the purchase of a new integrator.</p>

No.	Type	Who	Topic
TOP 3			Anticryostat
	ASz	I	The information on how magnetic measurements will be performed using the Rotating Coil at GSI, as well as the main dimensions of the magnets, doublets, and the assembled cryostat, was presented in the presentation available at the link below. See the file "Basic requirements for testing of SIS100 quadrupole units.pdf"
	FS	Q	How will the support of the anticryostat be implemented in the magnet/doublet?
	ASz	I	The anticryostat can rest on the magnet poles.
	FS	Q	Is pressure equipment required inside the cryostat?
	ASz	I	We don't see over pressure inside.
	FS	Q	The vacuum pressure on the anticryostat walls needs to be verified.
	JPM	I	The vacuum pressure on the anticryostat walls has already been calculated, and the safety values are below 100 mbar (far below 5 bar).
	CP	D	CERN can provide information and drawings of the anticryostat (design features), as well as the assembly and production process for a closely related type of anticryostat. It is only necessary to modify the drawings to fit the specific dimensions.
	SR	A	It is necessary to conduct market research on materials used for anticryostats. Since there is no excess pressure inside the anticryostat, GSI can use a thin-walled construction.
	ASz	D	GSI will conduct market research and provide information on the closest available options to the existing CERN anticryostat and Rotating Coil.
TOP 4			Rotating coil
	VM	I	A brief overview of the magnetometer, including its sectional breakdown and coil positioning, is provided in the presentation available at the link below. See the file "Choice_of_basic_parameters_of_Magnetometer.V0.3.pdf"
		Q	Is it possible to obtain in Altium the PCB layout P. "Rogacki et al., DOI 10.5162/sensoren2019/3.4.3" used in CERN?
	VC	I	CERN ordered printed circuit boards of similar length from a German company. We will send you the contact details for communication.
	VM	I	The final design of the printed circuit boards and the sensor will be completed only after determining the internal diameter of the anticryostat.
	CP	I	In the final concept, the length limits for the calibration of the entire sensor in the reference magnet at CERN should be considered. I recommend focusing on the measurement of multipoles using the rotating coil method, as the integral field can be obtained using the single stretched wire method.
TOP 4			Future steps
	CP	D	At the next meeting CERN will present their measurement systems for the rotating coil method and anticryostat (Frederic Savary) that are closest to what GSI plans to develop.
			Next technical meeting agreed for 22th of January at 10:00 AM.

No.	Type	Who	Topic
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References/Comments

Name	Date	Comment	Reference to

History

Version	Date	Description	Author	Review / Approval
1.0	07-Jan -25	draft version	T. Parfylo	