KM3781/EP

Addendum No. 2

to

Collaboration Agreement KN3774/EP for the SHiP Program at CERN

Prototyping the Active Muon Shield of SHiP

Considering that:

The SHiP Program is governed by Collaboration Agreement KN3774/EP ("the Agreement"), including its Annexes, Addenda and Amendments, which provides the organisational, managerial and financial framework for the execution of the SHiP Program;

Articles 3.1 and 3.3 stipulate that the SHiP Program shall be organised as projects ("the SHiP Projects") and that each SHiP Project shall be defined in a dedicated Addendum to the Agreement, to be signed by CERN as the Host Laboratory and the SHiP Institutions (as defined in the Agreement) participating in the Project;

The proposal for a SHiP Project entitled "Prototyping the Active Muon Shield of SHiP" ("the Project") (H. Dijkstra, https://indico.cern.ch/event/638036/contributions/2616941/attachments/1471030/2276263/Shield-Proto.pdf) describes the design, construction, testing etc. of a small scale prototype of the most demanding magnet of the active muon shield and testing its field properties with a low energy μ-beam at the PS.

It is agreed as follows

Article 1: Purpose

1.1 The purpose of this Addendum is to lay down the terms of participation of SHiP Institutions in the Project, which is described in Annex 1. This Addendum is subject to the provisions of the Agreement and signature of this Addendum therefore constitutes approval of the Agreement.

1.2 The Annexes form an integral part of this Addendum.

Article 2: Parties

2.1 The Parties to this Addendum shall be the SHiP Institutions contributing to the Project and CERN as the Host Laboratory. The current list of participating SHiP Institutions is included in Annex 2.

Article 3: Duration

3.1 This Addendum shall take effect on the date of its signature. It shall remain effective until the termination of the SHiP Program, subject to continued recommendation and approval of the SPSC and the CERN Research Board.

Article 4: The Project

4.1 The work plan consists of a number of sub-units, work packages and/or deliverables as listed in Annex 1.

4.2 The management structure of the Project is described in Annex 3.

4.3 Annex 4 sets out the deliverables, including their value, grouped by Funding Agency.

4.4 A set of Project milestones is included in Annex 5.

Article 5: Financial procedures

5.1 Pursuant to Article 9 of the Agreement, a dedicated budget code for the purposes of the SHiP Project is held and administered by CERN. Participating SHiP Institutions may financially contribute to this budget code on a voluntary basis in accordance with the estimated value of deliverables stated in Annex 4.

5.2 The aforementioned budget code is available to cover material, equipment and manpower costs connected to the SHiP Project, on condition that sufficient funds are available on the said budget code. This budget code may also be used by CERN for the execution of payments of subsistence allowance to experts of participating SHiP Institutions on behalf of such Institutions. It is understood that such payments shall be made in accordance with CERN's Rules and Regulations, including but not limited to Administrative Circular 11.

ANNEXES

Annex 1: Description of the Project

Annex 2: Participating SHiP Institutions

Annex 3: Management structure of the SHiP Program and of the Project

Annex 4: Value of deliverables grouped by Funding Agency

Annex 5: Project milestones

The European Organization for Nuclear Research (CERN)

and

National University of Science and Technology MISiS

declare that they agree on Addendum No 2 to Collaboration Agreement KN3774 for the SHiP Program at CERN concerning the prototyping of the Active Muon Shield of SHiP.

Done in Geneva

3.10.2017

For the European Organization for Nuclear Research (CERN), as the Host Laboratory of the SHiP Program

Eckhard Elsen
Director for Research and Computing

Eckhard Elsen

For the participating SHiP Institution

Institute / Funding Agency	Signatory (Rector)
National University of Science and Technology MISiS	
Place and Date	Signature (SHiP Team Leader)

ANNEXES TO ADDENDUM No. 2

ANNEX 1: Description of the Project

The objective of prototyping the Active Muon Shield of SHiP is to design a scaled down version of the most demanding magnet, to manufacture it and to test its field properties with a low energy μ-beam by measuring the deflection of the beam as a function of its impact angle and point on the magnet at the PS.

Prototyping the Active Muon Shield is organized in three work packages described in summary below.

Work package 1: Design of the prototype magnet.

Work package 2: Manufacturing the prototype magnet.

Work package 3: Measurement of the field properties at the PS.

ANNEX 2: Participating SHiP Institutions

1. National University of Science and Technology MISiS, represented by Y. Krasilnikova

2. Imperial College London, United Kingdom, represented by M. Patel

3. Rutherford Appleton Laboratory, United Kingdom, represented by S. Ricciardi

4. University of Hamburg, Germany (BMBF, DFG), represented by D. Bick

ANNEX 3: Management structure of the SHiP Program and of the Project

Spokesperson: **A. Golutvin**

Technical Coordinator: **R. Jacobsson**

Chairperson of the SHiP Board: **E. van Herwijnen**

Project leader of the prototyping of the Active Muon Shield of SHiP: **A. Golutvin.**

ANNEX 4: Value of deliverables grouped by Funding Agency

The following table summarizes the deliverables for the design of the prototype magnet.

	COST [kCHF]	MISiS	IC	RAL
Simulation	25	20		5
Engineering design	30	20	5	5
Total [kCHF]	**55**	**40**	**5**	**10**

Table 1: Work package 1, design of the prototype magnet

The following table summarizes the deliverables for the construction of the prototype magnet.

	COST [kCHF]	MISiS	IC
GOS steel	7	7	
Coil	4	4	
Magnet construction	5	5	
Transport	5	5	
Project management	10		10
Total [kCHF]	**31**	**21**	**10**

Table 2: Work package 2, construction of the prototype magnet

The following table summarizes the deliverables for the measurement of the field properties at the PS.

	COST [kCHF]	MISiS	IC	Hamburg
Recommissioning tracking detectors	5			5
DAQ	5			5
Offline	20	10	10	
Total [kCHF]	**30**	**10**	**10**	**10**

Table 3: Work package 3, measurement of the field properties at the PS

ANNEX 5: Project milestones

1. Design of the magnet: end 2017
2. Construction of magnet: spring 2018
3. Measurement of the field: summer/end 2018

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The Imperial College London

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Done in Geneva

4.10.2017

For the European Organization for Nuclear Research (CERN), as the Host Laboratory of the SHiP Program

Eckhard Elsen
Director for Research and Computing

Eckhard Elsen

For the participating SHiP Institution

Institute / Funding Agency	Signatory
The Imperial College of London	.....
Place and Date	Signature
.....	.....

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Director for Research and
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Institute / Funding Agency	Signatory
The Rutherford Appleton Laboratory	.....
Place and Date	Signature
.....	.....

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