

**ADDENDUM NO. 2**  
**KR5427/TE**  
**TO**  
**FRAMEWORK COLLABORATION AGREEMENT**  
**KN 4657/DG**

**BETWEEN:** THE EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH (“CERN”), an Intergovernmental Organization having its seat at Geneva, Switzerland,

**AND:** THE ITALIAN NATIONAL INSTITUTE FOR NUCLEAR PHYSICS (“INFN”), established in Rome, Italy,

**AND** THE DUTCH NATIONAL INSTITUTE FOR SUBATOMIC PHYSICS (“Nikhef”), established in Amsterdam, The Netherlands,

Hereinafter each individually referred to as a “Party” and collectively as the “Parties”,

**CONSIDERING THAT:**

Framework Collaboration Agreement KN4657/DG (the “Agreement”) concluded between the Parties defines the framework applicable to collaboration between them in domains of mutual interest.

Article 2.1 of the Agreement provides that the scope, each Party’s contributions, and all other details of each specific project shall be set out in Addendums to the Agreement.

The Parties have identified the collaborative project set out below, which shall be covered by the provisions of this Addendum No. 1 (the “Addendum”),

**AGREE AS FOLLOWS:**

**Article 1**  
**Purpose**

- 1.1 Under the terms of this Addendum, the Parties shall collaborate on the development of the Civil Engineering Study for the Einstein Telescope (“ET”) (the “Project”). The Project is outlined in Annex 1.
- 1.2 The Parties shall use the results and resources of their collaboration for non-military purposes only. INFN and Nikhef shall ensure compliance with this obligation by the ET Consortium members.
- 1.3 This Addendum shall be subject to the provisions of the Agreement, it being understood that in case of divergence the provisions of this Addendum shall prevail.

**Article 2**  
**Duration of the Project**

Subject to the continued validity of the Agreement, the Project shall begin upon signature by the last Party to sign and shall be completed after 36 months.

**Article 3**

### **INFN's contribution**

As part of its contribution to the Project, INFN shall provide financial contributions in the amount(s) stated in Annex 2 of this Addendum, which also sets out the necessary payment details.

### **Article 4 Nikhef's contribution**

As part of its contribution to the Project, Nikhef shall provide financial contributions in the amount(s) stated in Annex 2 of this Addendum, which also sets out the necessary payment details.

### **Article 5 CERN's contribution**

5.1 CERN's SCE-DOD-FS section shall provide support in the civil engineering activities.

5.2 CERN shall execute the following tasks:

- 5.2.1 Support in drafting the requirements and specific deliverables for the civil engineering consultant(s) for design and costing.
- 5.2.2 Guidance on the development a design tool (Geoprofiler, GIS data, BIM model etc.)
- 5.2.3 Technical review of civil engineering reports (e.g., preliminary TDR, cost and risk documents).
- 5.2.4 Give technical input on civil engineering aspects of the site selection process.

5.3 CERN shall make available personnel for participation in the definition, follow-up, and evaluation of the scientific objectives of the Project

5.4 In respect of any staff CERN appointments to be made in the context of the execution of this Project, CERN shall manage the recruitment process in accordance with CERN's standard recruitment practice and such staff shall be subject to CERN's Staff Rules & Regulations.

### **Article 6 Technical co-ordination and contact persons**

The Parties shall each nominate a technical coordinator, who together shall coordinate the technical execution of the Project, as well as contact persons. Their names and contact details are set out in Annex 6.

### **Article 7 Deliverables and Milestones**

The list of the deliverables is set out in Annex 3.

**Article 8  
Acceptance Procedure**

INFN and Nikhef Technical Coordinators shall grant acceptance of the deliverables set out in Annex 3 within two (2) months from submission by CERN of the relevant report demonstrating successful completion.

**Article 9  
Amendments**

Any amendment to this Addendum shall be made in writing and signed by the authorized representatives of the Parties.

Done in the English language and signed by the authorized representatives of the Parties.

The European Organization  
for Nuclear Research (CERN)

The European Organization  
for Nuclear Research (CERN)

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Mike Lamont

Jose Miguel Jimenez

Signed on .....2023

Signed on.....2023

The European Organization  
for Nuclear Research (CERN)

The European Organization  
for Nuclear Research (CERN)

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Christopher Hartley

Anders Unnervik

Signed on .....2023

Signed on 2023

The Dutch National Institute for Subatomic  
Physics (“Nikhef”)

The Italian National Institute for Nuclear  
Physics (“INFN”)

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Stan Bentvelsen

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Pierluigi Campana

Signed on .....2023

Signed on 2023

## ANNEX 1

### Contribution of CERN to the Civil Engineering Study of Einstein Telescope

#### Introduction

Over the years, the Future Studies section (SCE-DOD-FS) of the Site and Civil Engineering Department (SCE) have developed expertise in the co-ordination of the civil engineering and infrastructure studies for large scale physics projects such as HL-LHC, Future Circular Colliders (FCC), Linear Colliders (ILC and CLIC), Muon Colliders and Physics Beyond Colliders.

The SCE-DOD-FS Mandate includes:

- Lead of the studied in conjunction with other SCE groups from conception, feasibility- and technical design towards construction preparation.
- Inspections and monitoring of all existing underground assets within the ‘Tunnel Asset Management’ unit, including some research and development for monitoring technologies like photogrammetry and fibre optic monitoring.

#### Aims of CERN’s contribution

CERN will collaborate on the Project activities for civil engineering studies of the ET in collaboration with other involved ET partners.

#### External Civil Engineering Consultant(s)

Civil Engineering (CE) costs for projects such as the Einstein Telescope typically represent a significant proportion of the overall implementation budget. For this reason, particular emphasis needs to be placed on CE studies to ensure a cost-efficient design and construction methodology.

CERN will provide guidance and recommendations on formulating the requirements and deliverables for the provision of civil engineering consultant(s) responsible for developing a civil engineering design together with a construction cost and schedule.

#### Design Tool

CERN will provide technical guidance in the development of a design tool similar to the ones used for the CLIC, ILC, FCC and Muon Collider studies (e.g., Geoprofiler, TOT). This tool should optimise the location of the tunnels to ensure they are situated in the best geological conditions and at the same time taking into account surface constraints.

#### Civil Engineering Documents

At the end of preparatory phase 1 and preparatory phase 2 CERN will comment and provide recommendations during the technical review of the prepared civil engineering documents.

These will include:

- Technical specifications for the provision of civil engineering consultancy services
- Cost and risk documents
- Preliminary TDR

Final TDR

### Site Selection Committee

The final choice of the preferred site will be made after the preparatory phase 1. The preparatory phase 1 of the project identifies several options that meet the project requirements and are developed with sufficient technical and commercial detail to allow a detailed comparison and evaluation.

The process of a site selection involves the evaluation of many factors. The role and the contribution of the civil engineering team are vital in the decision-making process.

CERN will give technical input on civil engineering aspects of the site selection matrix and participate in the final review committee meeting.

The key considerations in site selection are:

- Geology and geological long profiles.
- Proposed construction methodology.
- Management of excavated material.
- Carbon footprint.
- Environmental impact.
- Cost.

## **ANNEX 2**

### **Collaboration Contributions**

The manpower contribution will be based on a “QUEST” type staff member, in the form of one person per year for three years, so three person-years in total. The costs incurred through those staff members will be funded by INFN and Nikhef. It is being understood that there will be no payments by CERN to INFN and Nikhef.

The cost of CERN staff member involved in the Project by an amount of 318k CHF, which is equivalent to CERN’s costs for 3 person-years (CERN salary grid 2023).

**ANNEX 3**  
**Milestones, Deliverables**

**Table 2: Project deliverables**

<b>Deliverable</b>	<b>Description</b>	<b>Date</b>
D1	Support in drafting the requirements and specific deliverables for the civil engineering consultant(s) for design and costing	Q1/Q2 2024
D2	Guidance on the development a design tool (Geoprofiler, GIS data, BIM model etc.	2024
D3	Technical review of the cost and risk documents	Q2/Q3 2024
D4	Technical review of the preliminary TDR	Q4 2024
D5	Site selection committee meeting	Q1/Q2 2025
D6	Technical review of the final TDR	Q3/Q4 2025
D7	Review of design updates/refinement and optioneering for the selected site	Q4 2026



**ANNEX 4**  
**Payment schedule**

Based on the financial contributions outlined in Annex 2, INFN's and Nikhef's payment schedule is summarised in Table 3.

**Table 3: Payment schedule**

<b>Description</b>	<b>INFN Payment [kCHF]</b>	<b>Nikhef Payment [kCHF]</b>	<b>Date</b>
QUEST (3 years)	P1: 159	P1: 159	2024-2026
Travel expenses (site visits, committee meetings) 1 meeting / year 2 attendees from CERN	P2: 6	P2: 6	2024-2026

CERN will send the invoices to INFN and Nikhef technical contacts. The invoices shall be paid within 30 days upon its receipt.

**ANNEX 5**  
**Commercial or contractual documents**

All commercial or contractual documents shall be sent to:

CERN — IPT Department  
Procurement Service  
1211 Geneva 23  
Switzerland

**ANNEX 6**  
**Technical Coordinators and Contact Persons**

**CERN's Technical Coordinator will be:**

John Andrew Osborne

- Email: John.Andrew.Osborne@cern.ch
- Tel: +41-75-411-3752
- CERN Address:  
M28110  
CERN  
1211 Genève 23  
Suisse

**INFN Technical Coordinator will be:**

Fernando Ferroni

- Email: fernando.ferroni@roma1.infn.it
- Tel:
  - Cell phone: +39-33-518-64000
  - Office: +39-08-624-280-301
- Address:  
Fernando Ferroni  
Gran Sasso Science Institute  
Via Francesco Crispi 7, 67100 L'Aquila

**Nikhef Technical Coordinator will be:**

Patrick Werneke

- Email: p.werneke@nikhef.nl
- Tel: +31 205925057
- Mobile: +31 651275253
- Address:  
Nikhef - National Institute for Subatomic Physics  
Science Park 105  
098 XG Amsterdam  
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