

## Ion Therapy Research Facility / LhARA

### Bridging period 1; project definition

#### The ITRF/LhARA collaboration

5 Bridging resources of £2M have been provided through the UKRI Infrastructure Fund to continue the development of the Laser-hybrid Accelerator for Radiobiological Applications (LhARA) to serve the Ion Therapy Research Facility (ITRF) over the period 1<sup>st</sup> October 2024 to 30<sup>th</sup> September 2026. This document defines the scope of work to be carried out by the ITRF/LhARA collaboration over the 2-year Bridging Period (BP1). The  
10 overarching goal is to deliver a proposal for the staged implementation of the facility.

The UKRI Infrastructure Fund provided £2 million over the period October 2022 to September 2024 to support a Preliminary Activity (PA1) to kick-start research on the next generation of radiotherapy treatments for cancer. The objectives of ITRF PA1 were to:

- 15 • Prepare a conceptual design report (CDR) that defines the scope of the facility and the user-access model;
- End station and beam specification to support a staged *in-vitro* biomedical research programme; and
- After comparison and evaluation of three options (LhARA, synchrotron, linac) decide on the technology to be taken forward for the realisation of the facility.

The decision to develop LhARA to serve the ITRF was documented in the 18-month report [1]. The ITRF/LhARA  
20 CDR is now being prepared and will address each of the objectives for PA1 listed above.

In the summer of 2023, 9 months into PA1, the collaboration was encouraged to submit a proposal for a second Preliminary Activity (PA2). The PA2 proposal defined a 4-year programme to be delivered over 5 financial years that would deliver:

- Technical Design Reports for the staged implementation of the facility;
- 25 • A site study leading to site selection and a building implementation plan; and
- A proof-of-principle demonstrator system at an existing pulsed-laser facility.

The STFC Visions Team ranked proposal “High priority”, however, following peer review, STFC decided not to submit it to the UKRI Infrastructure Committee. While noting that the ambitious ITRF/LhARA proposal had high impact potential and had the potential to drive a step-change in technical capability, the reviewers  
30 were concerned regarding the fit to the international landscape and the potential for engagement with the target community.

The work in BP1 will build on the work carried out under the ITRF PA1 and address the issues raised in the peer review. Therefore, the goals for BP1 are to:

- Develop a proof-of-principle laser-driven radiobiology experiment (PoPLaR) on SCAPA at the University of Strathclyde as part of a radiobiology programme that exploits the novel techniques to be employed in LhARA; and
- 35 • Initiate the programme required to mitigate the principal risks in the development of LhARA to serve the ITRF: the laser-driven source, Gabor-lens capture, and fixed-field accelerator (FFA).

BP1 will be managed through three work packages:

- 40 Work package A: Radiobiology programme;
- Work package B: Initial ITRF/LhARA risk-mitigation programme; and
- Work package C: Project management, outreach and engagement.

In November 2024, the UKRI Infrastructure Fund gave notice that the bridging funding will be terminated with effect from 31 May 2025. Negotiations with STFC to ensure the continuation of the bridging activity beyond May 2025 are underway.

## Bridging Period 1 project-plan document development

This document will be developed in a number of stages, each documented in a unique “Issue” of the document. This version, “Issue 2”, contains the objectives by work package, the cost break down, the Bridging Period project plan, and the tracking milestones.

### 1 Work package details

#### 1.A Work package A: Radiobiological science and technology

**Work package managers:** J. Parsons, R. Amos

Work package A (WPA) will:

- Develop and execute a programme of radiation biology that incrementally deploys novel technologies relevant to ITRF/LhARA;
- Develop novel instrumentation and diagnostics for use in the radiation biology programme and to be deployed in LhARA;
- Develop outline functional design specifications for automated *in vitro* and *in vivo* experimentation; and
- Implement the PoPLaR proof of principle experiment on SCAPA at the University of Strathclyde.

#### Tasks and objectives

Task 7: *Radiobiology experiment and simulation:*

**Task leader:** J. Parsons

Development and execution of radiation biology programme including the proof-of-principle experiment, PoPLaR on SCAPA facility at Strathclyde University.

Task 4: *Ion-acoustic dose-profile measurement:*

**Task leader:** J. Bamber

Development of ion-acoustic dose measurement system for integration in PoPLaR.

Task 5: *Novel instrumentation, diagnostics and automated end-station specification:*

**Task leader:** R. Amos, T. Price

Development of concepts for novel instrumentation and diagnostics to maximise the science that can be delivered using the novel LhARA laser-hybrid source.

Development of design for automated *in vitro* and *in vivo* experimentation. Facilitation of commissioning and test of end-station components.

Task 9: *Implementation of PoPLaR on SCAPA at Strathclyde:*

**Task leader:** R. Gray

Development of proton source and permanent-magnet quadrupole beamline serving PoPLaR.

## Milestones

Milestones are labeled **Mm**, where **m** is the milestone number. The milestone due date is given in months from the start of PA1, i.e. October 2022 is taken to be month 1. Thus, for example, a milestone due in October 2025 will be labelled **M13**.

### **M7.1: Develop beamline and bespoke facilities at SCAPA for radiobiology experimentation; M30:**

We will develop the beamline at SCAPA to enable irradiation of well characterised cell lines, which will include establishing a staging system to hold the appropriate cell holders (bespoke glass rings) and to enable medium throughput irradiations. Appropriate radiobiological capabilities (e.g. biological safety cabinets, CO<sub>2</sub> incubators, microscopes) will also be established in close proximity to the beamline.

### **M7.2: Preliminary results from cell survival experiments at SCAPA; M36:**

Preliminary experiments will be performed to analyse the survival of well characterised tumour cell lines to laser-accelerated protons at SCAPA at different dose rates (including FLASH). These experiments and setup will be optimised to enable accurate and reproducible survival measurements to be made.

### **M7.3: Preliminary results from DNA damage and repair experiments at SCAPA; M39:**

Preliminary experiments will be performed to analyse the levels of DNA damage and kinetics of repair (using immunofluorescence microscopy and comet assays) in well characterised tumour cell lines following laser-accelerated protons at SCAPA at different dose rates (including FLASH). We will establish the experimental conditions and setup needed to enable more routine and reproducible DNA damage assessments to be made.

### **M7.4: Assessment of cell survival analysis (RBEs) of laser-accelerated protons; M48:**

We will establish survival rates (RBEs) of well characterised tumour cell lines following laser-accelerated protons at SCAPA at different dose rates (including FLASH). These will be comparatively analysed against pre-existing data using cyclotron-accelerated protons (and X-rays) in Birmingham to discover any novel radiobiological differences.

### **M7.5: Assessment of levels of DNA damage and kinetics of repair of laser-accelerated protons; M48:**

We will acquire data analysing the levels of DNA single and double strand break damage (directly or using surrogate markers) and the kinetics of their repair in well characterised tumour cell lines following laser-accelerated protons at SCAPA at different dose rates (including FLASH). These will be correlated with survival analysis, but also comparatively analysed against pre-existing data using cyclotron-accelerated protons (and X-rays) in Birmingham.

### **M2A.1: Demonstration of beam delivery to end station; M36:**

We will install a series of quadrupole magnets into the existing target chamber at the SCAPA laser facility, and integrate them with the laser driven proton source. We will demonstrate the transport of the proton beam and measure the beam properties at the end station, supported by numerical simulations.

### **M4.3: Design for ion-acoustic dose-profile measurement for PoPLaR; M42**

Building on the analysis of the data taken using the SmartPhantom on the LION beam line at the CALA facility at LMU, a second SmartPhantom will be designed that will be capable of determining the dose profile in three dimensions.

**M4.5: LhARA ion-acoustic test results on PoPLaR; M48** The second SmartPhantom will be exposed to the PoPLaR beam and results on the 3D profile of the dose deposited will be extracted from the data.

### **M5.4: Deliver PoPLaR end-station; M33:**

Construct an end-station compatible with the MC40 cyclotron at the University of Birmingham and SCAPA for the PoPLaR experiments. It will automate the movement of cell dishes using a custom stepping motor and cell dish holder designed for conventional 35mm cell dishes as well as 20mm diameter

glass rings with Kapton bases. Relevant additional beam monitors such as film holders, and ionisation chamber holders for dosimetry will also be included.

**M5.6: Report on LhARA stage 1 beam monitoring system; M48:**

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The report will build on the comprehensive literature review from PA1. We will report on the status of the gas jet profiler for measurements of proton beams at SCAPA as well as radiochromic films and novel detector systems identified and tested during the bridging funding.

**Resources**

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The resources required to execute the Work Package A contributions to the Bridging Period 1 project plan are summarised in table 1.

**Gantt chart and principal milestones**

The schedule for the work to be carried out in Work Package A is summarised in figure 1.

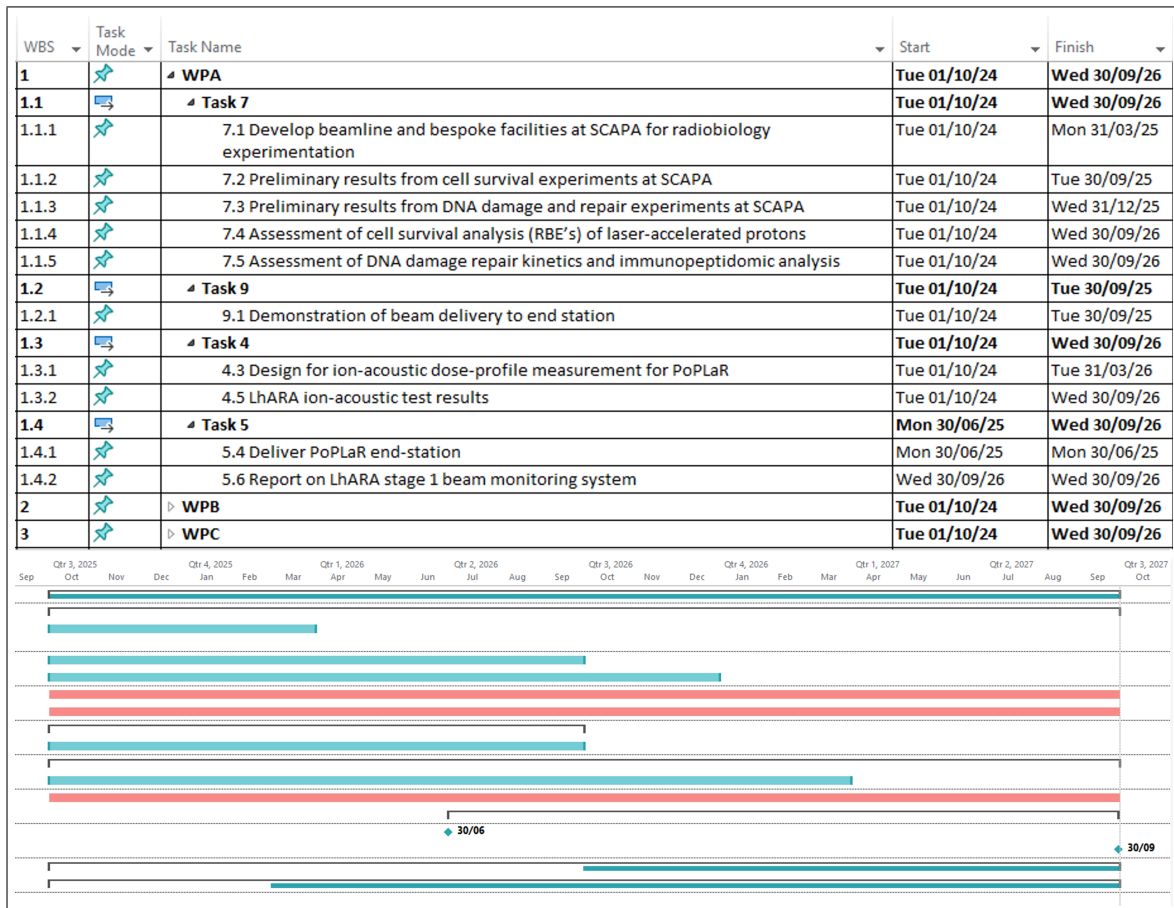


Figure 1: Gantt chart showing schedule for the work to be carried out in Work Package A.

## 1.B Work package B: ITRF/LhARA risk mitigation

Work package managers: R. Gray, W. Shields

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Work package B (WPB) will:

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- Demonstrate laser generation of protons and ions at energies relevant to LhARA;
- Through experiment and simulation, develop a conceptual design for a prototype Gabor lens appropriate for construction in the period of pre-construction R&D that will follow the Bridging Period; and
- Develop a self-consistent conceptual design for the FFA post accelerator that will form the basis of LhARA Stage 2 so that appropriate prototypes can be constructed in the pre-construction R&D period.

### Milestones

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Milestones are labelled **M<sub>m</sub>**, where **m** is the milestone number. The milestone due date is given in months from the start of PA1, i.e. October 2022 is taken to be month 1. Thus, for example, a milestone due in October 2025 will be labelled **M13**.

#### **M2.3: Investigation and demonstration of 10 Hz debris and damage challenges at ICL; M36:**

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Using the Zhi laser at Imperial College London, we will demonstrate a laser-driven ion source running at the LhARA baseline repetition rate of 10 Hz. Although the source will be generating proton beams with a lower maximum energy than required by LhARA, we will be able to use the setup to perform studies of debris generation and damage to laser beam line optics and other sensitive components critical to the laser source.

#### **M2.4: Assessment of beam performance in the PoPLaR experiment on SCAPA; M48:**

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We will diagnose and monitor the performance of the laser-driven ion source while providing the beam for the PoPLaR experiment, and determine beam stability and integrated system performance. This will aid in developing facility specifications and operational procedures to inform the design of LhARA.

#### **M3.3: Progress report on performance of increased voltage Penning trap operation and simulation; M36:**

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Towards developing a plasma suitable for use as a Gabor Lens, we will design and implement an upgrade of the Swansea Penning trap to accommodate voltages which are higher than those presently available. We will establish and characterise trapping performance at the higher voltages, and we will investigate electron plasma loading and diagnostics with larger space-charge. Simulation will be needed to aid in understanding details of the plasma and the diagnostics.

#### **M3.4: Report on higher voltage Penning trap operation; M48**

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We will present a comprehensive summary of results from the Swansea Penning Trap campaign to develop a Gabor lens. Quantitative experience will provide guidance for developing a functional Penning Trap plasma lens for use in LhARA.

#### **M6.2: Review of FFA de-risking R&D work; M42**

Under the auspices of WPC, a review of the status of the R&D programme will be reviewed by an independent expert panel in month 42.

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#### **M6.4: FFA design review meeting; M27**

We will hold a meeting to review the current FFA design and examine the outstanding critical issues.

#### **M6.5: Report on revised FFA optics and magnet design; M39**

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The report will review the revised optics and magnet design that addresses critical issues raised in design review in M6.4. This will also include performance assessment with ions, space charge tracking assessment.

## M6.6: Report on FFA concept feasibility; M47

We will report on the feasibility of employing an FFA in the LhARA accelerator design. This will build on the report in M39 and include a cost and engineering assessment and FFA instrumentation assessment.

## Resources

180 The resources required to execute the Work Package B contributions to the Bridging Period 1 project plan are summarised in table 2.

## Gantt chart and principal milestones

The schedule for the work to be carried out in Work Package B is summarised in figure 2.

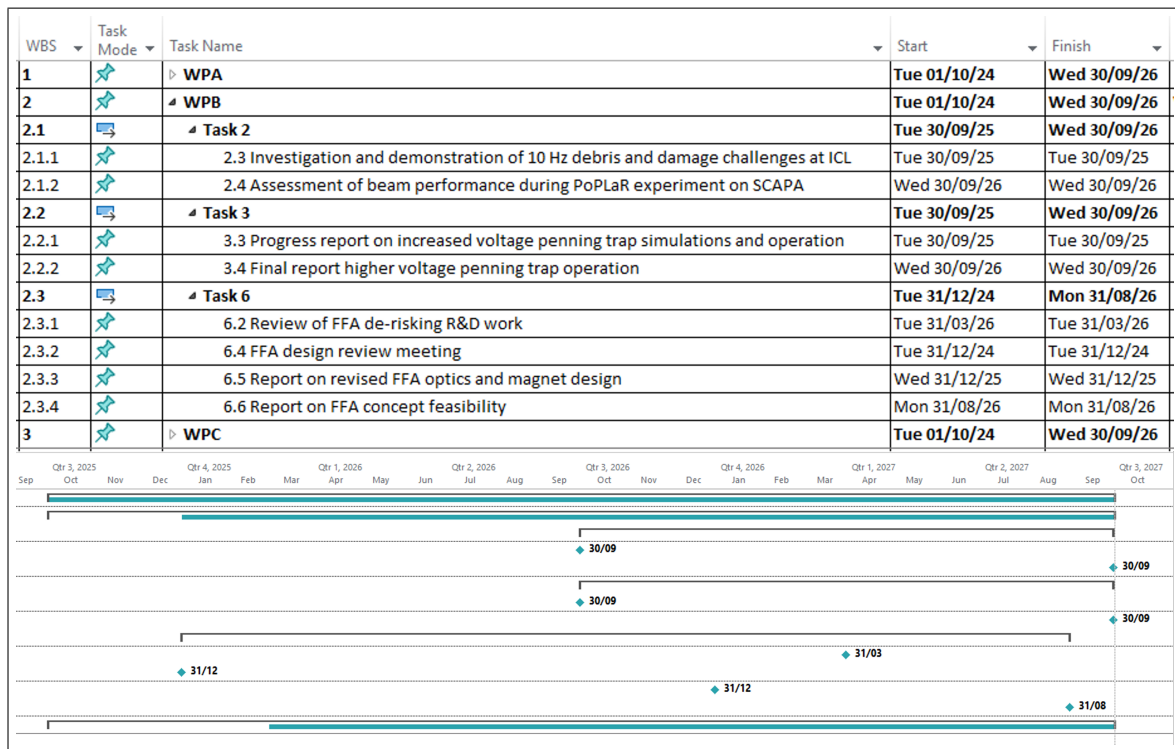


Figure 2: Gantt chart showing schedule for the work to be carried out in Work Package B.

## 1.C Work package C: Project management, outreach and engagement

185 **Work package managers:** C. Pugh, C. Whyte

Work package C (WPC) will:

- Organise fortnightly Project Management Board meetings;
- Report as required to ITRF management on project progress by work package, evolution of the register and spend; and
- Develop stakeholder and peer-group outreach and engagement, patient and public involvement.

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## Milestones

Deliverables are labeled **Dn**, where **n** is the deliverable number. Milestones are labeled **Mm**, where **m** is the milestone number. The deliverable or milestone due date is given in months from the start of PA1, i.e. October 2022 is taken to be month 1. Thus, for example, a milestone due in October 2025 will be labelled **M13**.

**D5: Initial PoPLaR and LhARA de-risk update; M30**

**D6: Interim PoPLaR and LhARA de-risk update; M36**

**D7: Final PoPLaR and LhARA de-risk update; M42**

**D8: PoPLaR and LhARA de-risk report; M48**

**M8.1: Creation of collaborative international clinical research group M40**

1. Launch of LhARA: Delivery of a launch event to inform stakeholders, potential users, and the public about the project's existence, purpose, and goals; It will provide a platform for networking, collaboration and forming partnerships with relevant industry members, potential collaborators, government and funders;
2. Website Build and Maintenance: Creation and ongoing maintenance of a website for the LhARA project; and
3. Patient Engagement Session: Delivery of a session aimed at involving patients in the project, gathering their insights and feedback. Creation of accessible content: Updating current information to improve accessibility and understanding.

**M8.2: Wider public engagement–All party parliamentary group on radiotherapy; M48:**

1. Patient Engagement Group programme: Development of a group representative of the patient community to offer their perspectives, preferences and experiences to inform and co-design the delivery of the LhARA project;
2. Content creation and development: working with all stakeholders, planning, creating and distributing high quality content to engage and educate; and
3. Website maintenance: ensuring website remains functional, secure and user-friendly.

## Resources

The resources required to execute the Work Package C contributions to the Bridging Period 1 project plan are summarised in table 3.

## Gantt chart and principal milestones

The schedule for the work to be carried out in Work Package C is summarised in figure 3.

## 2 Overview of bridging activity project costs

An overview of the breakdown of costs for the ITRF/LhARA bridging activity is shown in table 4. The costing has been obtained on the following basis:

- The capital and staff costs have been estimated in calendar year 2024 based on input from each institution.
- Inflation has not been included.
- Each staff member or role has been assigned a unique identifier in order to preserve anonymity. A confidential staff database is being maintained to establish the correspondence between individuals and the unique identifiers.

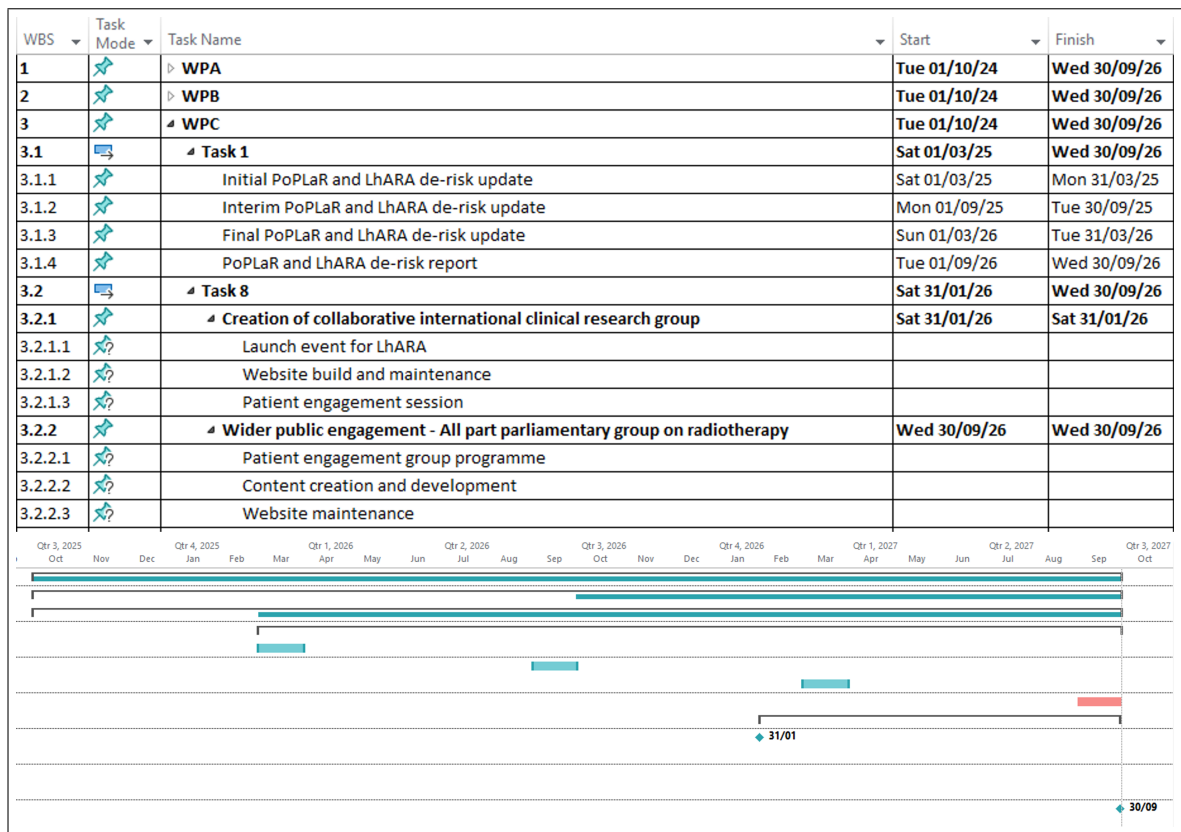


Figure 3: Gantt chart showing schedule for the work to be carried out in Work Package C.

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- VAT (at the rate of 20%) is included in all equipment costs by work package; the total cost of VAT is summarised by work package above.
  - The costs contain no working margin or contingency.

Table 5 provides a summary of the breakdown of the allocations by institute and work package.

### 3 Staff effort

235 Table 6 provides a summary of the staff effort by institute and work package.

### References

[1] **LhARA** Collaboration, C. Baker *et al.*, “Ion Therapy Research Facility / LhARA: eighteen month progress report,” Tech. Rep. LhARA-Gov-PMB-2024-08, 2024.  
[https://ccap.hep.ph.ic.ac.uk/trac/raw-attachment/wiki/Research/LhARA/](https://ccap.hep.ph.ic.ac.uk/trac/raw-attachment/wiki/Research/LhARA/Documents/LhARA-Gov-PMB-2024-08.pdf)  
 240 [Documents/LhARA-Gov-PMB-2024-08.pdf](https://ccap.hep.ph.ic.ac.uk/trac/raw-attachment/wiki/Research/LhARA/Documents/LhARA-Gov-PMB-2024-08.pdf).

Table 1: Resources required to execute the Work Package A contributions to the Bridging Period 1 project plan.

ITRF/LhARA Bridging Period  
Biology programme

Report date: 28-Oct-24

Managers: R. Amos, J. Parsons

Staff	Year 1		Year 2		Year 3		Total		
	Fraction	£k	Fraction	£k	Fraction	£k	Fraction	£k	
<i>Task 4: Ion acoustic</i>									
ICR, Radiotherapy and Imaging	ICR-Stf-1	0.01	2.00	0.01	2.50	0.01	2.00	0.03	6.50
UCL Biomedical Engineering	UCL-BioEng-Stf-1	0.01	2.50	0.02	5.00	0.01	2.50	0.05	10.00
UCL Medical Physics	UCL-MedPhys-Stf-1	0.01	2.50	0.02	5.00	0.01	2.50	0.05	10.00
QMUL Physics	QMUL-Phys-Stf-1	0.02		0.02		0.02		0.06	
<i>Task 5: End station</i>									
Birmingham Physics	Bhm-Phys-Stf-1	0.04	6.32	0.08	12.64	0.04	6.32	0.16	25.28
Liverpool Physics	Liv-Phys-PDRA-1	0.15	20.85	0.30	41.70	0.15	20.85	0.60	83.40
IC NHS HC Trust	IC-NHS-HCT-Stf-1	0.05	6.25	0.10	12.50	0.05	6.25	0.20	25.00
<i>Task 7: Radiobiology experiment</i>									
Birmingham Biology	Bhm-Bio-Stf-1	0.04	5.28	0.04	5.28	0.02	2.64	0.10	13.20
	Bhm-Bio-PDRA-1	0.50	32.12	1.00	64.25	0.50	32.12	2.00	128.50
<i>Task 9: PoPLaR</i>									
Imperial Physics	IC-Phys-Stf-2	0.12	21.25	0.25	42.50	0.12	21.25	0.50	85.00
Strathclyde Physics	Strathclyde-Phys-Stf-2	0.02	4.25	0.05	8.50	0.02	4.25	0.10	17.00
	Strathclyde-Phys-PDRA-1	0.12	16.25	0.25	32.50	0.12	16.25	0.50	65.00
Belfast Physics	QUB-Phys-Stf-1	0.02	2.55	0.03	5.10	0.02	2.55	0.06	10.20
Cost of risk mitigation, staff (not yet implemented):									
<b>Staff total:</b>		<b>1.13</b>	<b>122.13</b>	<b>2.18</b>	<b>237.47</b>	<b>1.11</b>	<b>119.49</b>	<b>4.41</b>	<b>479.08</b>
<b>Non-staff</b>			<b>-£k</b>		<b>-£k</b>		<b>-£k</b>		<b>-£k</b>
<i>Task 4: Ion acoustic</i>									
Sundry optics and electronics			1.00		1.00		1.00		3.00
<i>Task 5: End station</i>									
<i>Task 7: Radiobiology experiment</i>									
<i>Task 9: PoPLaR</i>									
SCAPA Access			12.50		25.00		12.50		50.00
<b>Equipment total:</b>			<b>13.50</b>		<b>26.00</b>		<b>13.50</b>		<b>53.00</b>
Inflation:									
Consumables			19.50		37.00		16.50		73.00
Travel			27.50		50.00		23.50		28.00
Cost of risk mitigation, equipment (not yet implemented):									
Working margin:									
Contingency, equipment:									
Contingency, CG staff:									
Contingency, all staff:									
<b>Total:</b>			<b>163.13</b>		<b>313.47</b>		<b>156.49</b>		<b>633.08</b>

Table 2: Resources required to execute the Work Package B contributions to the Bridging Period 1 project plan.

ITRF/LHARA Bridging Period

Report date: 28-Oct-24

Risk management

Managers: R. Gray, W. Shields

Staff	Year 1		Year 2		Year 3		Total		
	Fraction	£k	Fraction	£k	Fraction	£k	Fraction	£k	
<i>Task 2: Source</i>									
Imperial Physics									
	IC-Phys-Stf-2	0.12	21.25	0.25	42.50	0.12	21.25	0.50	85.00
Strathclyde Physics									
	Strathclyde-Phys-PDRA-1	0.12	16.25	0.25	32.50	0.12	16.25	0.50	65.00
	Strathclyde-Phys-Stf-2	0.02	4.25	0.05	8.50	0.02	4.25	0.10	17.00
Belfast Physics									
	QUB-Phys-Stf-1	0.01	1.70	0.02	3.40	0.01	1.70	0.04	6.80
<i>Task 3: Capture</i>									
Swansea Physics									
	Swns-Phys-Stf-1	0.08	13.18	0.20	34.00	0.09	15.62	0.37	62.80
	Swns-Phys-PDRA-1	0.25	33.50	0.50	67.00	0.25	33.50	1.00	134.00
Swns-Phys-Stf-2									
	Liverpool Physics	0.05	6.25	0.07	8.70	0.05	6.25	0.17	21.20
	Liv-Phys-PDRA-1	0.10	13.90	0.20	27.80	0.10	13.90	0.40	55.60
Manchester Physics									
	Man-Phys-Stf-1	0.02	4.44	0.05	11.10	0.03	6.66	0.10	22.20
	Man-Phys-PDRA-1	0.10	13.39	0.22	29.45	0.10	13.39	0.42	56.23
<i>Task 6: Design and integration</i>									
Imperial Physics									
	IC-Phys-Stf-3	0.15	26.69	0.32	55.12	0.16	27.12	0.62	108.94
RHUL Physics									
	RHUL-Phys-Stf-1	0.18	28.00	0.35	56.00	0.18	28.00	0.70	112.00
STFC-ASTeC									
	ASTeC Accelerator Physics	0.02	2.46	0.05	4.93	0.02	2.46	0.10	9.85
	TD Mechanical Engineering	0.20	27.06	0.40	54.12	0.20	27.06	0.80	108.24
	ASTeC Technical Services			0.02	2.03	0.02	2.03	0.04	4.06
	ASTeC Vacuum	0.05	4.93	0.10	9.85	0.05	4.93	0.20	19.70
	ISIS Magnet	0.25	24.62	0.50	49.25	0.25	24.62	1.00	98.50
	ASTeC Magnet	0.05	4.93	0.10	9.85	0.05	4.93	0.20	19.70
Cost of risk mitigation, staff (not yet implemented):									
<b>Staff total:</b>		<b>1.79</b>	<b>246.79</b>	<b>3.64</b>	<b>506.10</b>	<b>1.83</b>	<b>253.92</b>	<b>7.26</b>	<b>1006.81</b>
<b>Non-staff</b>			<b>-£k</b>		<b>-£k</b>		<b>-£k</b>		<b>-£k</b>
<i>Task 2: Source</i>									
Imperial Access			7.50		12.00		7.50		27.00
SCAPA Access			18.75		37.50		18.75		75.00
<i>Task 3: Capture</i>									
Penning trap development			4.00		2.00		1.00		7.00
<i>Task 6: Design and integration</i>									
<b>Equipment total:</b>			<b>30.25</b>		<b>51.50</b>		<b>27.25</b>		<b>109.00</b>
Inflation:									
Consumables			14.62		31.26		14.62		60.50
Travel			20.87		42.76		20.87		24.00
Cost of risk mitigation, equipment (not yet implemented):									
Working margin:									
Contingency, equipment:									
Contingency, CG staff:									
Contingency, all staff:									
<b>Total:</b>			<b>297.91</b>		<b>600.36</b>		<b>302.04</b>		<b>1200.31</b>

Table 3: Resources required to execute the Work Package C contributions to the Bridging Period 1 project plan.

ITRF/LhARA Bridging Period

Report date: 28-Oct-24

Project management, outreach and engagement

Managers: C. Pugh, C. Whyte

Staff	Year 1		Year 2		Year 3		Total	
	Fraction	£k	Fraction	£k	Fraction	£k	Fraction	£k
<b>Task 1: Project management</b>								
Imperial Physics								
IC-Phys-Stf-1	0.02	5.00	0.05	10.00	0.02	5.00	0.10	20.00
Strathclyde Physics								
Strathclyde-Phys-Stf-1	0.02	4.32	0.05	8.65	0.02	4.32	0.10	17.30
STFC-ASTeC								
ASTeC-Project-Manager	0.08	7.39	0.15	14.77	0.08	7.39	0.30	29.55
ASTeC-Project-Scientist	0.08	8.25	0.20	19.70	0.08	7.39	0.36	35.34
TD-Project-Support	0.08	7.39	0.15	14.77	0.08	7.39	0.30	29.55
<b>Task 8: Outreach and Engagement</b>								
Imperial Medicine								
IC-Med-Stf-1								
Cost of risk mitigation, staff (not yet implemented):								
<b>Staff total:</b>	<b>0.28</b>	<b>32.35</b>	<b>0.60</b>	<b>67.90</b>	<b>0.28</b>	<b>31.49</b>	<b>1.16</b>	<b>131.74</b>
<b>Non-staff</b>		<b>-£k</b>		<b>-£k</b>		<b>-£k</b>		<b>-£k</b>
<b>Task 1: Project management</b>								
<b>Task 8: Outreach and Engagement</b>								
<b>Equipment total:</b>								
Inflation:								
Launch Delivery ICL Med		3.00		3.00				6.00
Website build and Maintenance ICL Med		3.00		3.00		3.00		9.00
PEG programme ICL Med				4.00		4.00		8.00
Patient engagement session Icl Med		0.25		0.50		0.25		1.00
Content creation ICL Med		4.00		5.00		7.00		16.00
Consumables								
Travel		3.00		7.00		3.50		13.50
Cost of risk mitigation, equipment (not yet implemented):								
Working margin:								
Contingency, equipment:								
Contingency, CG staff:								
Contingency, all staff:								
<b>Total:</b>		<b>45.60</b>		<b>90.40</b>		<b>49.24</b>		<b>185.24</b>

Table 4: Overview of the cost breakdown in the ITRF/LhARA bridging activity.

ITRF/LhARA Bridging Period; cost overview

Report date: 24-Sep-24

Id	Work package Name	Year 1		Year 2		Year 3		Total	
		Fraction	£k	Fraction	£k	Fraction	£k	Fraction	£k
<b>Staff effort, summary by institute</b>									
<b>1</b>	<b>Radiobiology programme</b>								
	Birmingham Physics	0.04	6.32	0.08	12.64	0.04	6.32	0.16	25.28
	Birmingham Biology	0.54	37.41	1.04	69.53	0.52	34.77	2.10	141.70
	Belfast Physics	0.02	2.55	0.03	5.10	0.02	2.55	0.06	10.20
	IC NHS HC Trust	0.05	6.25	0.10	12.50	0.05	6.25	0.20	25.00
	ICR, Radiotherapy and Imaging	0.01	2.00	0.01	2.50	0.01	2.00	0.03	6.50
	Imperial Physics	0.13	21.25	0.25	42.50	0.13	21.25	0.50	85.00
	Liverpool Physics	0.15	20.85	0.30	41.70	0.15	20.85	0.60	83.40
	Strathclyde Physics	0.15	20.50	0.30	41.00	0.15	20.50	0.60	82.00
	QMUL Physics	0.02	0.00	0.02	0.00	0.02	0.00	0.06	0.00
	UCL Biomedical Engineering	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
	UCL Medical Physics	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
<b>2</b>	<b>Risk management</b>								
	Belfast Physics	0.01	1.70	0.02	3.40	0.01	1.70	0.04	6.80
	Imperial Physics	0.28	47.94	0.57	97.63	0.28	48.38	1.12	193.94
	Liverpool Physics	0.10	13.90	0.20	27.80	0.10	13.90	0.40	55.60
	Manchester Physics	0.12	17.83	0.27	40.55	0.13	20.05	0.52	78.43
	RHUL Physics	0.18	28.00	0.35	56.00	0.18	28.00	0.70	112.00
	STFC-ASTeC	0.58	64.00	1.17	130.02	0.60	66.03	2.34	260.05
	Strathclyde Physics	0.15	20.50	0.30	41.00	0.15	20.50	0.60	82.00
	Swansea Physics	0.38	52.93	0.77	109.70	0.39	55.37	1.54	218.00
<b>3</b>	<b>Project management, outreach and engagement</b>								
	Imperial Physics	0.03	5.00	0.05	10.00	0.03	5.00	0.10	20.00
	STFC-ASTeC	0.23	23.02	0.50	49.25	0.22	22.16	0.96	94.44
	Strathclyde Physics	0.03	4.33	0.05	8.65	0.03	4.33	0.10	17.30
<b>Staff totals</b>		<b>3.19</b>	<b>401.26</b>	<b>6.43</b>	<b>811.47</b>	<b>3.21</b>	<b>404.89</b>	<b>12.83</b>	<b>1617.63</b>
<b>Non-staff cost summary</b>									
<b>1</b>	<b>Radiobiology programme</b>		60.50		113.00		53.50		227.00
<b>2</b>	<b>Risk management</b>		65.74		125.52		62.74		254.00
<b>3</b>	<b>Project management, outreach and engagement</b>		13.25		22.50		17.75		53.50
<b>Non-staff totals</b>			<b>139.49</b>		<b>261.02</b>		<b>133.99</b>		<b>534.50</b>
<b>Total staff and non-staff by work package</b>									
<b>1</b>	<b>Radiobiology programme</b>	1.13	163.13	2.18	313.47	1.11	156.49	4.41	633.08
<b>2</b>	<b>Risk management</b>	1.79	297.91	3.64	600.36	1.83	302.04	7.26	1200.31
<b>3</b>	<b>Project management, outreach and engagement</b>	0.28	45.60	0.60	90.40	0.28	49.24	1.16	185.24
<b>Grand totals</b>			<b>506.63</b>		<b>1004.23</b>		<b>507.76</b>		<b>2018.63</b>

Table 5: ITRF/LhARA bridging period allocations by institute and workpackage.

Report date: 24-Sep-24

	Year 1		Year 2		Year 3		Total	
	Fraction	£k	Fraction	£k	Fraction	£k	Fraction	£k
<b>Belfast Physics</b>								
<b>QUB-Phys-SF-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.03	4.25	0.05	8.50	0.03	4.25	0.10	17.00
Staff total	0.03	4.25	0.05	8.50	0.03	4.25	0.10	17.00
Travel		0.75		0.50		0.75		2.00
Grand total:		5.00		9.00		5.00		19.00
<b>Birmingham Biology</b>								
<b>Bhm-Bio-PDRA-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.50	32.13	1.00	64.25	0.50	32.13	2.00	128.50
ITRF/LhARA Bridging Period: Radiobiology programme	0.04	5.28	0.04	5.28	0.02	2.64	0.10	13.20
Staff total	0.54	37.41	1.04	69.53	0.52	34.77	2.10	141.70
Consumables		5.00		10.00		5.00		20.00
Travel		1.00		2.00		1.00		4.00
Grand total:		43.41		81.53		40.77		165.70
<b>Birmingham Physics</b>								
<b>Bhm-Phys-SF-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.04	6.32	0.08	12.64	0.04	6.32	0.16	25.28
Staff total	0.04	6.32	0.08	12.64	0.04	6.32	0.16	25.28
Consumables		5.00		5.00		2.00		12.00
Travel		1.50		3.00		1.50		6.00
Grand total:		12.82		20.64		9.82		43.28
<b>IC NHS HC Trust</b>								
<b>IC-NHS-HCT-SF-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.05	6.25	0.10	12.50	0.05	6.25	0.20	25.00
Staff total	0.05	6.25	0.10	12.50	0.05	6.25	0.20	25.00
Grand total:		6.25		12.50		6.25		25.00
<b>ICR, Radiotherapy and Imaging</b>								
<b>ICR-SF-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.01	2.00	0.01	2.50	0.01	2.00	0.03	6.50
Staff total	0.01	2.00	0.01	2.50	0.01	2.00	0.03	6.50
Consumables		1.50		1.50		1.50		6.00
Grand total:		3.50		5.50		3.50		12.50
<b>Imperial Medicine</b>								
<b>IC-Med-SF-1</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other non-staff		10.25		15.50		14.25		40.00
Grand total:		10.25		15.50		14.25		40.00
<b>Imperial Physics</b>								
<b>IC-Phys-SF-1</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.03	5.00	0.05	10.00	0.03	5.00	0.10	20.00
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.25	42.50	0.50	85.00	0.25	42.50	1.00	170.00
ITRF/LhARA Bridging Period: Risk management	0.15	26.69	0.32	55.13	0.18	27.13	0.62	108.94
Staff total	0.43	74.19	0.87	150.13	0.43	74.63	1.72	298.94
Equipment		8.50		13.00		8.50		30.00
Consumables		6.31		12.63		6.31		25.25
Travel		3.00		6.00		3.00		12.00
Grand total:		92.00		181.76		92.44		366.19
<b>Liverpool Physics</b>								
<b>Liv-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.25	34.75	0.50	69.50	0.25	34.75	1.00	139.00
Staff total	0.25	34.75	0.50	69.50	0.25	34.75	1.00	139.00
Travel		1.00		2.00		1.00		4.00
Grand total:		35.75		71.50		35.75		143.00
<b>Manchester Physics</b>								
<b>Man-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.10	13.39	0.22	29.45	0.10	13.39	0.42	56.23
ITRF/LhARA Bridging Period: Risk management	0.02	4.44	0.05	11.10	0.03	6.66	0.10	22.20
Staff total	0.12	17.83	0.27	40.55	0.13	20.05	0.52	78.43
Travel		1.00		2.00		1.00		4.00
Grand total:		18.83		42.55		21.05		82.43
<b>QMUL Physics</b>								
<b>QMUL-Phys-SF-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.02	0.00	0.02	0.00	0.02	0.00	0.06	0.00
Staff total	0.02	0.00	0.02	0.00	0.02	0.00	0.06	0.00
Consumables		3.00		3.00		1.50		7.50
Travel		1.50		2.00		1.50		5.00
Grand total:		4.50		5.00		3.00		12.50
<b>RHUL Physics</b>								
<b>RHUL-Phys-SF-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.18	28.00	0.35	56.00	0.18	28.00	0.70	112.00
Staff total	0.18	28.00	0.35	56.00	0.18	28.00	0.70	112.00
Travel		1.00		2.00		1.00		4.00
Grand total:		29.00		58.00		29.00		116.00
<b>STFC-ASTeC</b>								
<b>ASTeC Accelerator Physics</b>								
ITRF/LhARA Bridging Period: Risk management	0.03	2.46	0.05	4.93	0.03	2.46	0.10	9.85
ITRF/LhARA Bridging Period: Risk management	0.05	4.93	0.10	9.85	0.05	4.93	0.20	19.70
<b>ASTeC Technical Services</b>								
ITRF/LhARA Bridging Period: Risk management	0.00	0.00	0.02	2.03	0.02	2.03	0.04	4.06
<b>ASTeC Vacuum</b>								
ITRF/LhARA Bridging Period: Risk management	0.05	4.93	0.10	9.85	0.05	4.93	0.20	19.70
<b>ASTeC-Project-Manager</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.08	7.39	0.15	14.78	0.08	7.39	0.30	29.55
<b>ASTeC-Project-Scientist</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.08	8.25	0.20	19.70	0.08	7.39	0.36	35.34
<b>ISIS Magnet</b>								
ITRF/LhARA Bridging Period: Risk management	0.25	24.63	0.50	49.25	0.25	24.63	1.00	98.50
<b>TD Mechanical Engineering</b>								
ITRF/LhARA Bridging Period: Risk management	0.20	27.06	0.40	54.12	0.20	27.06	0.80	108.24
<b>TD-Project-Support</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.08	7.39	0.15	14.78	0.08	7.39	0.30	29.55
Staff total	0.81	87.02	1.67	179.27	0.82	88.19	3.30	354.48
Travel		1.00		2.00		1.50		5.50
Grand total:		88.02		182.27		89.69		359.98
<b>Strathclyde Physics</b>								
<b>Strathclyde-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.25	32.50	0.50	65.00	0.25	32.50	1.00	130.00
<b>Strathclyde-Phys-SF-1</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.03	4.33	0.05	8.65	0.03	4.33	0.10	17.30
<b>Strathclyde-Phys-SF-2</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.05	8.50	0.10	17.00	0.05	8.50	0.20	34.00
Staff total	0.33	45.33	0.65	90.65	0.33	45.33	1.30	181.30
Equipment		31.25		62.50		31.25		125.00
Consumables		9.31		24.63		10.81		44.75
Travel		2.50		5.00		2.50		10.00
Grand total:		88.39		182.78		89.89		351.05
<b>Swansea Physics</b>								
<b>Swms-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.25	33.50	0.50	67.00	0.25	33.50	1.00	134.00
<b>Swms-Phys-SF-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.08	13.18	0.20	34.00	0.08	15.62	0.37	62.80
<b>Swms-Phys-SF-2</b>								
ITRF/LhARA Bridging Period: Risk management	0.05	6.25	0.07	8.70	0.05	6.25	0.17	21.20
Staff total	0.38	52.93	0.77	109.70	0.38	55.37	1.54	218.00
Equipment		4.00		2.00		1.00		7.00
Consumables		4.00		10.00		4.00		18.00
Travel		1.00		2.00		1.00		4.00
Grand total:		61.93		123.70		61.37		247.00
<b>UCL Biomedical Engineering</b>								
<b>UCL-BioEng-SF-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
Staff total	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
Travel		1.00		1.00		0.50		2.50
Grand total:		3.50		6.00		3.00		12.50
<b>UCL Medical Physics</b>								
<b>UCL-MedPhys-SF-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
Staff total	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
Travel		1.00		1.00		0.50		2.50
Grand total:		3.50		6.00		3.00		12.50
<b>Overall grand total</b>	<b>3.19</b>	<b>506.63</b>	<b>6.43</b>	<b>1004.23</b>	<b>3.21</b>	<b>507.76</b>	<b>12.83</b>	<b>2018.63</b>

Table 6: ITRF/LhARA bridging period staff-effort summary by institute and workpackage.

ITRF/LhARA Bridging Period: staff effort by institute and workpackage

Report date: 18-Sep-24

Staff	Year 1		Year 2		Year 3		Total	
	Fraction	£k	Fraction	£k	Fraction	£k	Fraction	£k
<b>Belfast Physics</b>								
<b>QUB-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.03	4.25	0.05	8.50	0.03	4.25	0.10	17.00
<b>Total</b>	<b>0.03</b>	<b>4.25</b>	<b>0.05</b>	<b>8.50</b>	<b>0.03</b>	<b>4.25</b>	<b>0.10</b>	<b>17.00</b>
<b>Birmingham Biology</b>								
<b>Bhm-Bio-PDRA-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.50	32.13	1.00	64.25	0.50	32.13	2.00	128.50
<b>Bhm-Bio-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.04	5.28	0.04	5.28	0.02	2.64	0.10	13.20
<b>Total</b>	<b>0.54</b>	<b>37.41</b>	<b>1.04</b>	<b>69.53</b>	<b>0.52</b>	<b>34.77</b>	<b>2.10</b>	<b>141.70</b>
<b>Birmingham Physics</b>								
<b>Bhm-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.04	6.32	0.08	12.64	0.04	6.32	0.16	25.28
<b>Total</b>	<b>0.04</b>	<b>6.32</b>	<b>0.08</b>	<b>12.64</b>	<b>0.04</b>	<b>6.32</b>	<b>0.16</b>	<b>25.28</b>
<b>IC NHS HC Trust</b>								
<b>IC-NHS-HCT-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.05	6.25	0.10	12.50	0.05	6.25	0.20	25.00
<b>Total</b>	<b>0.05</b>	<b>6.25</b>	<b>0.10</b>	<b>12.50</b>	<b>0.05</b>	<b>6.25</b>	<b>0.20</b>	<b>25.00</b>
<b>ICR, Radiotherapy and Imaging</b>								
<b>ICR-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.01	2.00	0.01	2.50	0.01	2.00	0.03	6.50
<b>Total</b>	<b>0.01</b>	<b>2.00</b>	<b>0.01</b>	<b>2.50</b>	<b>0.01</b>	<b>2.00</b>	<b>0.03</b>	<b>6.50</b>
<b>Imperial Medicine</b>								
<b>IC-Med-Stf-1</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Imperial Physics</b>								
<b>IC-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.03	5.00	0.05	10.00	0.03	5.00	0.10	20.00
<b>IC-Phys-Stf-2</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.25	42.50	0.50	85.00	0.25	42.50	1.00	170.00
<b>IC-Phys-Stf-3</b>								
ITRF/LhARA Bridging Period: Risk management	0.15	26.69	0.32	55.13	0.16	27.13	0.62	108.94
<b>Total</b>	<b>0.43</b>	<b>74.19</b>	<b>0.87</b>	<b>150.13</b>	<b>0.43</b>	<b>74.63</b>	<b>1.72</b>	<b>298.94</b>
<b>Liverpool Physics</b>								
<b>Liv-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.25	34.75	0.50	69.50	0.25	34.75	1.00	139.00
<b>Total</b>	<b>0.25</b>	<b>34.75</b>	<b>0.50</b>	<b>69.50</b>	<b>0.25</b>	<b>34.75</b>	<b>1.00</b>	<b>139.00</b>
<b>Manchester Physics</b>								
<b>Man-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.10	13.39	0.22	29.45	0.10	13.39	0.42	56.23
<b>Man-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.02	4.44	0.05	11.10	0.03	6.66	0.10	22.20
<b>Total</b>	<b>0.12</b>	<b>17.83</b>	<b>0.27</b>	<b>40.55</b>	<b>0.13</b>	<b>20.05</b>	<b>0.52</b>	<b>78.43</b>
<b>QMUL Physics</b>								
<b>QMUL-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.02	0.00	0.02	0.00	0.02	0.00	0.06	0.00
<b>Total</b>	<b>0.02</b>	<b>0.00</b>	<b>0.02</b>	<b>0.00</b>	<b>0.02</b>	<b>0.00</b>	<b>0.06</b>	<b>0.00</b>
<b>RHUL Physics</b>								
<b>RHUL-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.18	28.00	0.35	56.00	0.18	28.00	0.70	112.00
<b>Total</b>	<b>0.18</b>	<b>28.00</b>	<b>0.35</b>	<b>56.00</b>	<b>0.18</b>	<b>28.00</b>	<b>0.70</b>	<b>112.00</b>
<b>STFC-ASTeC</b>								
<b>ASTeC Accelerator Physics</b>								
ITRF/LhARA Bridging Period: Risk management	0.03	2.46	0.05	4.93	0.03	2.46	0.10	9.85
<b>ASTeC Magnet</b>								
ITRF/LhARA Bridging Period: Risk management	0.05	4.93	0.10	9.85	0.05	4.93	0.20	19.70
<b>ASTeC Technical Services</b>								
ITRF/LhARA Bridging Period: Risk management	0.00	0.00	0.02	2.03	0.02	2.03	0.04	4.06
<b>ASTeC Vacuum</b>								
ITRF/LhARA Bridging Period: Risk management	0.05	4.93	0.10	9.85	0.05	4.93	0.20	19.70
<b>ASTeC-Project-Manager</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.08	7.39	0.15	14.77	0.08	7.39	0.30	29.55
<b>ASTeC-Project-Scientist</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.08	8.25	0.20	19.70	0.08	7.39	0.36	35.34
<b>ISIS Magnet</b>								
ITRF/LhARA Bridging Period: Risk management	0.25	24.63	0.50	49.25	0.25	24.63	1.00	98.50
<b>TD Mechanical Engineering</b>								
ITRF/LhARA Bridging Period: Risk management	0.20	27.06	0.40	54.12	0.20	27.06	0.80	108.24
<b>TD-Project-Support</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.08	7.39	0.15	14.77	0.08	7.39	0.30	29.55
<b>Total</b>	<b>0.81</b>	<b>87.02</b>	<b>1.67</b>	<b>179.27</b>	<b>0.82</b>	<b>88.19</b>	<b>3.30</b>	<b>354.48</b>
<b>Strathclyde Physics</b>								
<b>Strathclyde-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.25	32.50	0.50	65.00	0.25	32.50	1.00	130.00
<b>Strathclyde-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Project management, outreach and engagement	0.03	4.33	0.05	8.65	0.03	4.33	0.10	17.30
<b>Strathclyde-Phys-Stf-2</b>								
ITRF/LhARA Bridging Period: Radiobiology programme Risk management	0.05	8.50	0.10	17.00	0.05	8.50	0.20	34.00
<b>Total</b>	<b>0.33</b>	<b>45.33</b>	<b>0.65</b>	<b>90.65</b>	<b>0.33</b>	<b>45.33</b>	<b>1.30</b>	<b>181.30</b>
<b>Swansea Physics</b>								
<b>Swns-Phys-PDRA-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.25	33.50	0.50	67.00	0.25	33.50	1.00	134.00
<b>Swns-Phys-Stf-1</b>								
ITRF/LhARA Bridging Period: Risk management	0.08	13.18	0.20	34.00	0.09	15.62	0.37	62.80
<b>Swns-Phys-Stf-2</b>								
ITRF/LhARA Bridging Period: Risk management	0.05	6.25	0.07	8.70	0.05	6.25	0.17	21.20
<b>Total</b>	<b>0.38</b>	<b>52.93</b>	<b>0.77</b>	<b>109.70</b>	<b>0.39</b>	<b>55.37</b>	<b>1.54</b>	<b>218.00</b>
<b>UCL Biomedical Engineering</b>								
<b>UCL-BioEng-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
<b>Total</b>	<b>0.01</b>	<b>2.50</b>	<b>0.03</b>	<b>5.00</b>	<b>0.01</b>	<b>2.50</b>	<b>0.05</b>	<b>10.00</b>
<b>UCL Medical Physics</b>								
<b>UCL-MedPhys-Stf-1</b>								
ITRF/LhARA Bridging Period: Radiobiology programme	0.01	2.50	0.03	5.00	0.01	2.50	0.05	10.00
<b>Total</b>	<b>0.01</b>	<b>2.50</b>	<b>0.03</b>	<b>5.00</b>	<b>0.01</b>	<b>2.50</b>	<b>0.05</b>	<b>10.00</b>
<b>Grand total</b>	<b>3.19</b>	<b>401.26</b>	<b>6.43</b>	<b>811.47</b>	<b>3.21</b>	<b>404.89</b>	<b>12.83</b>	<b>1617.63</b>