

# ETpathfinder Workshop Intro

31<sup>st</sup> of January 2024



# Overview

- General project update
  - Interreg project completed!
  - New 'era' for ETpathfinder
- ETpathfinder environment and upcoming opportunities
  - E-TEST, ET2SME, ET-Technologies, ET4business, Etpathfinder Smart Skills lab
- Towards the 1<sup>st</sup> Benchtower
  - Organisation, timelines, reducing show stoppers
  - Annual review
  - More general discussion on next steps
- Science goals of ETpathfinder
  - Discussion of priorities
- A bit on this workshop



**January 2020**



**ALTMANN** - 2 x 2 to



**Summer 2021**

**ALTMANN - 2 x 2 to**

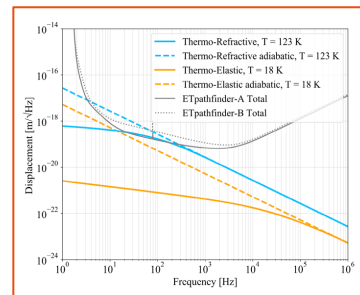
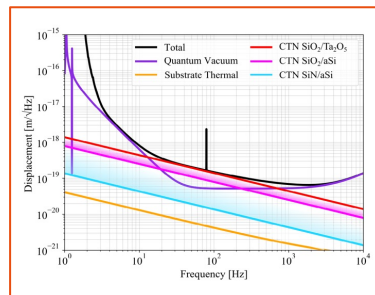
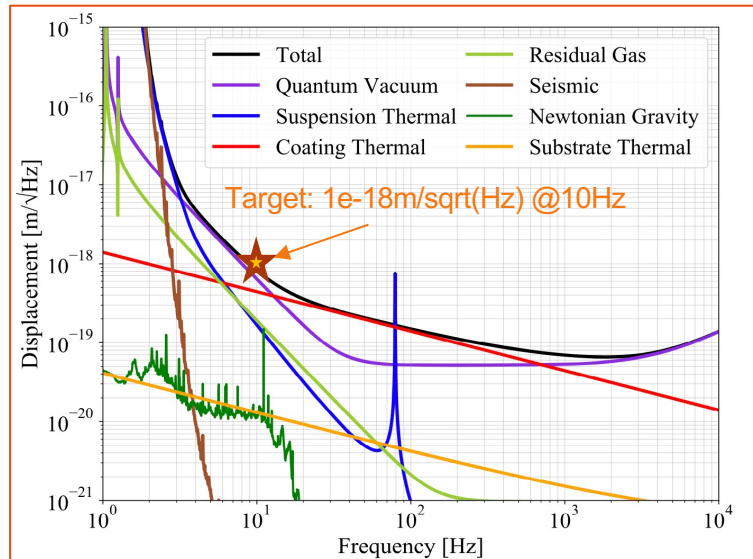
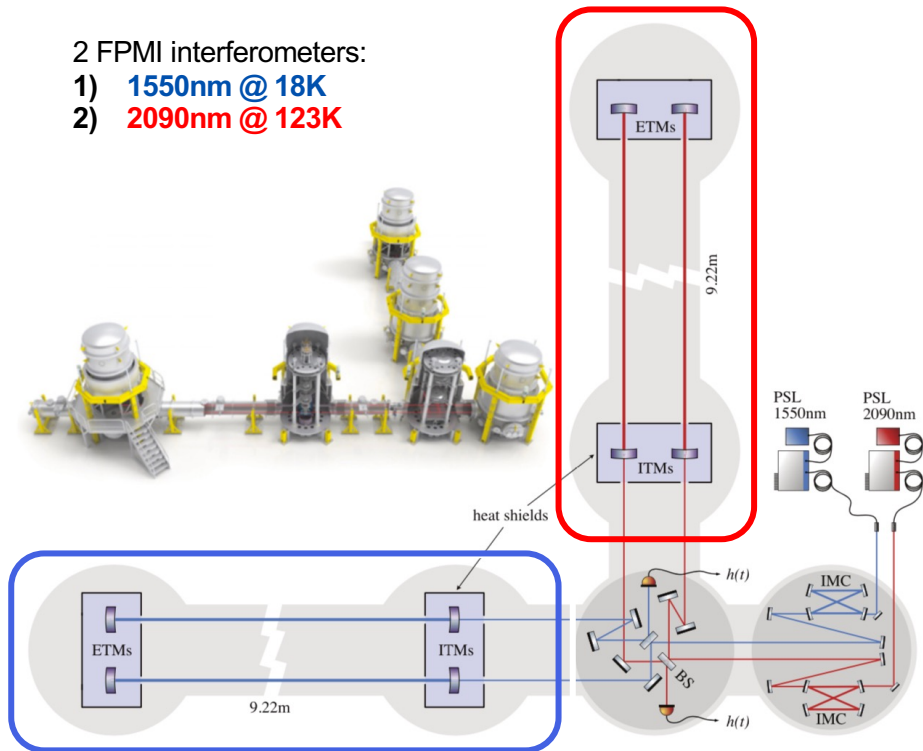
**Summer 2022**



# Top-Level layout

2 FPMI interferometers:

- 1) 1550nm @ 18K
- 2) 2090nm @ 123K

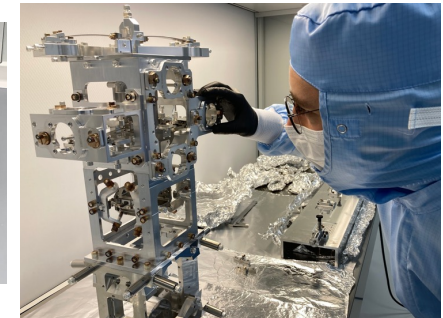
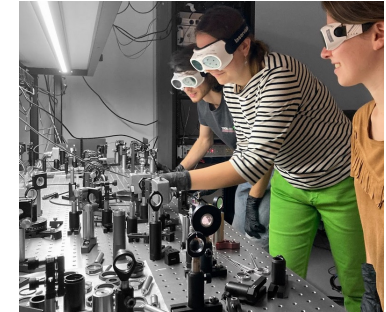
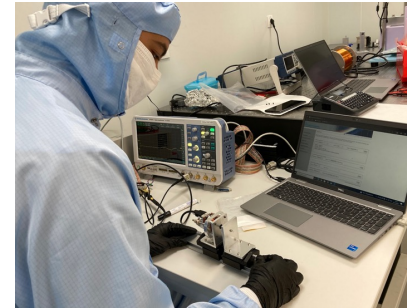




# General updates

- **Interreg project is over!**
  - We survived. 😊
  - **Time for celebration! – SUPER BIG THANKS to all the team and partners!**
  - Also time also to reflect and see which things we may want to do differently and how (not the topic of this call though ....).
- Final reporting and external check of cost claims etc still ongoing.
- ETpathfinder taking shape more and more and there is lots of happiness & enthusiasm of people working

Partner	Partner Logo	KostenZona	Budget	Vereniging na PC	Subcontractors	Forfait personeel	Forfait overheid	Forfait aan- en verbod/zwaargedrag	Forfait Overige kosten	Totaal projectkosten	Aanbested	Declaratie FHO	Gevoerd/vervoers kosten	Gevoerd/vervoers FHO	
Katholieke Universiteit Leuven		Personnelkosten	1.233.926,00	0,00	2.296.832,00	0,00	0,00	0,00	0,00	2.296.832,00	0,00	0,00	0,00	0,00	
		Project Inkomsten	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
		Uitvoering	1.233.926,00	0,00	2.296.832,00	0,00	0,00	0,00	0,00	0,00	2.296.832,00	0,00	0,00	0,00	0,00
Stichting Nederlandse Wetenschappelijk Onderzoek Instituut - Natuur		Externe expertise en diensten	2.045.582,00	0,00	2.005.494,81	0,00	0,00	0,00	0,00	2.005.494,81	1.524.524,22	253.615,14	188.481,40	27.002,53	
		Project Inkomsten	0,00	0,00	104.161,96	0,00	0,00	0,00	0,00	104.161,96	56.290,98	2.022,95	0,00	0,00	
		Uitvoering	2.045.582,00	0,00	2.051.332,85	0,00	0,00	0,00	0,00	0,00	2.051.332,85	1.478.432,24	251.142,18	188.481,40	27.002,53
Technische Universiteit Eindhoven		Project Inkomsten	198.000,00	0,00	198.007,65	0,00	0,00	0,00	0,00	198.007,65	96.520,00	0,00	0,00	0,00	
		Uitvoering	198.000,00	0,00	198.007,65	0,00	0,00	0,00	0,00	198.007,65	96.520,00	0,00	0,00	0,00	
		Uitvoering	198.000,00	0,00	198.007,65	0,00	0,00	0,00	0,00	0,00	198.007,65	96.520,00	0,00	0,00	0,00
Universiteit Antwerpen		Project Inkomsten	359.143,00	0,00	359.562,62	0,00	0,00	0,00	0,00	359.562,62	298.919,79	212.114,69	291.824,99	8.949,73	
		Uitvoering	359.143,00	0,00	359.562,62	0,00	0,00	0,00	0,00	359.562,62	298.919,79	212.114,69	291.824,99	8.949,73	
		Uitvoering	359.143,00	0,00	359.562,62	0,00	0,00	0,00	0,00	0,00	359.562,62	298.919,79	212.114,69	291.824,99	8.949,73
Universiteit Gent		Project Inkomsten	1.139.368,67	0,00	1.647.527,22	0,00	0,00	0,00	0,00	1.647.527,22	1.139.440,00	313.564,18	1.103.407,01	0,00	
		Uitvoering	1.139.368,67	0,00	1.647.527,22	0,00	0,00	0,00	0,00	0,00	1.647.527,22	1.139.440,00	313.564,18	1.103.407,01	0,00
		Uitvoering	1.139.368,67	0,00	1.647.527,22	0,00	0,00	0,00	0,00	0,00	1.647.527,22	1.139.440,00	313.564,18	1.103.407,01	0,00
Universiteit Hasselt		Project Inkomsten	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
		Uitvoering	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
		Uitvoering	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Universiteit Maastricht		Externe expertise en diensten	8.202.972,14	2.300,90	10.288.903,85	0,00	0,00	0,00	0,00	10.288.903,85	6.760.530,52	1.865.126,38	1.808.127,83	476.948,53	
		Project Inkomsten	0,00	0,00	1.212,48	0,00	0,00	0,00	0,00	1.212,48	1.212,48	334,53	0,00	0,00	
		Uitvoering	8.202.972,14	2.300,90	10.288.903,85	0,00	0,00	0,00	0,00	0,00	10.288.903,85	6.760.530,52	1.865.126,38	1.808.127,83	476.948,53
WVU Universiteit Brussel		Project Inkomsten	5.204.209,29	0,00	6.302.693,96	0,00	0,00	0,00	0,00	6.302.693,96	4.158.124,56	1.147.298,47	418.200,80	93.321,96	
		Uitvoering	5.204.209,29	0,00	6.302.693,96	0,00	0,00	0,00	0,00	0,00	6.302.693,96	4.158.124,56	1.147.298,47	418.200,80	93.321,96
		Uitvoering	5.204.209,29	0,00	6.302.693,96	0,00	0,00	0,00	0,00	0,00	6.302.693,96	4.158.124,56	1.147.298,47	418.200,80	93.321,96
TOTAL PROJECT		Project Inkomsten	14.496.992,81	2.300,90	18.746.990,70	0,00	0,00	0,00	0,00	18.746.990,70	10.819.913,38	2.763.325,95	3.597.587,29	515.860,59	
		Uitvoering	14.496.992,81	2.300,90	18.746.990,70	0,00	0,00	0,00	0,00	0,00	18.746.990,70	10.819.913,38	2.763.325,95	3.597.587,29	515.860,59
		Uitvoering	14.496.992,81	2.300,90	18.746.990,70	0,00	0,00	0,00	0,00	0,00	18.746.990,70	10.819.913,38	2.763.325,95	3.597.587,29	515.860,59







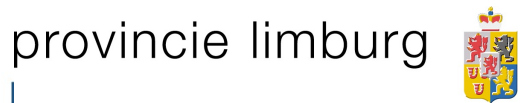
# General Updates

- Also a facility to show-case general ET ambition!



Date	Visitor	Preferred language	#persons
10-09-23	Dutch Consul General <a href="#">dusseldorf</a>	Dutch	10
15-09-23	Safety specialists AZ en universities <a href="#">NL</a>	Dutch	20
18-09-23	ET candidate company	Dutch	5
18-09-23	<a href="#">UQF Team?</a>	Dutch	32
21-09-23	University of Alabama	English	15
21-09-23	<a href="#">Brightlans com director</a>	Dutch	2
22-09-23	University of Technology Sydney	English	5
22-09-23	<a href="#">Sterrenkunde Zuid limburg</a>	Dutch/ English	32
26-09-23	UM CE Students	English	12
29-09-23	<a href="#">RWS</a>	Dutch/ English	t.b.d.
29-09-23	<a href="#">Antea Directors board</a>	English	t.b.d.
04-10-23	<a href="#">UM-F5</a>	Dutch	32
04-10-23	Society of Belgian Banks	Dutch	12
05-10-23	<a href="#">Infrastructuur en Waterschappen</a> <a href="#">Weekend van de Wetenschap (mostly kids)</a>	Dutch	n/a
07-10-23	<a href="#">Municipalities Welkenraedt, Aubel, Plombières en Dalhem</a>	English/ French	20
16-10-23	<a href="#">Aerospacelab + Janssen</a>	English	15
24-10-23	<a href="#">Karl Ditrich + Job Cohen</a>	Dutch	6
25-10-23	<a href="#">U Hasselt vice rector and professors</a>	English	5
26-10-23	<a href="#">UM-FPN</a>	English	32
27-10-23	<a href="#">Toneel academie UM</a>	Dutch	12
27-10-23	<a href="#">Arabic emirates ambassadors</a>	English	20
02-11-23	<a href="#">les garçons de reflection</a>	English	20
09-11-23	Tunnel builders	English	20
13-11-23	Real estate developers <a href="#">Limburg</a>	Dutch	20
14-11-23	<a href="#">Gerrit Kroessen TU Eindhoven</a>	English/ Dutch	2
21-11-23	<a href="#">IVN</a>	Dutch	t.b.d.
27-11-23	<a href="#">Simone van Trier</a>	Dutch	1
28-11-23	<a href="#">Ballast Nedam</a>	Dutch	t.b.d. + time tbd
30-11-23	<a href="#">UM-IDEE</a>	English	23
06-12-23	Municipality councils <a href="#">Limburg</a>	Dutch/ English	20
06-12-23	Borderland confrence <a href="#">Borderland confer</a> <a href="#">NGF council; • ASML • CERN • Demcon • PhotonDelta • S[&amp;]T • VDL Groep</a>	German	n/a
07-12-23	<a href="#">Fontys</a>	Dutch	15
08-12-23	<a href="#">UCLL BE student teaching education</a>	English	?
12-12-23	<a href="#">Raad van toezicht UM</a>	Dutch	15
14-12-23	<a href="#">TU Eindhoven</a>	English	6
20-12-23	<a href="#">Cilix</a>	Dutch	5
20-12-23	<a href="#">U Antwerp students</a> <a href="#">TU Eindhoven (system engineer students)</a>	English	30
21-12-23	<a href="#">Belgian Ambassadors</a>	English	6
41-12-23	<a href="#">Belgian Ambassadors</a>	English	8

# ETpathfinder Partners





# Current state of formal Etpathfinder collaboration

- New MOU was signed by the 7 full partners of the Interreg project: Maastricht, Ghent, Antwerp, Leuven, Brussels, Nikhef and Eindhoven.
- Satellites need to come on board (if they want) via Accession process: RWTH, Fraunhofer ILT, Twente, TNO, Hasselt, Louvain, Liege, VITO.
- Same is true for other partners who do not have any formal relation to Etpathfinder:
  - IFAE Barcelona
  - KIT
  - Max Planck
  - LAPP, Annecy
  - Birmingham
  - Glasgow
  - Polgrav

## MEMORANDUM OF UNDERSTANDING

REGARDING

the Etpathfinder R&D Infrastructure

with Effective Date 1 December 2022

Between:

- 1) **Maastricht University**, more specifically the Faculty of Science and Engineering (FSE), having its principal office at Minderbroedersberg 4-6, 6211 LK Maastricht, the Netherlands, on behalf of the Executive Board represented by Prof. Dr. T. Cleij, dean FSE, hereinafter referred as "**UM**" or "Host Institution"
- 2) **Katholiek Universiteit Leuven**, for the purposes of this Agreement represented by KU Leuven Research & Development, with its offices at Waaistraat 6, box 5105, 3000 Leuven, Belgium, acting on request of Prof. Dr. Koenraad Debackere, hereinafter referred as "**KU Leuven R&D**"
- 3) **GHENT UNIVERSITY**, public institution with legal personality, having its administrative offices in Belgium, B-9000 Gent, Sint-Pietersnieuwstraat 25; company registration number 0248.015.142; duly represented by prof. dr. Rik van de Walle, Rector, who entrusts the execution of the present Agreement to prof. dr. Dirk Ryckbosch, Department of Physics and Astronomy; hereinafter referred to as "**UGENT**"
- 4) **UNIVERSITEIT ANTWERPEN**, autonomous educational institution under public law, established by Flemish decree of April 4, 2003, having its registered offices at Prinsstraat 13, 2000 Antwerp, Belgium, duly represented by Prof. Dr. Ronny Blust, Vice-rector Research, who entrusts the execution of this agreement to Prof. Dr. Nick Van Remortel; hereinafter referred to as "**UAntwerp**";
- 5) **VRIJE UNIVERSITEIT BRUSSEL "VUB"**, having its principal office at Pleinlaan 2, 1050 Brussel, Belgium, represented by Prof. Dr. Jan Danckaert, rector, who entrusts the execution of this agreement to Prof. Dr. Alexandre Sevrin; hereinafter referred as "**VUB**";
- 6) **Nikhef**, having its principal office at Science Park 105, 1098 XG, Amsterdam, the Netherlands, represented by its institutional manager, Mr Arjen van Rijn, hereinafter referred as "**Nikhef**";
- 7) **Technische Universiteit Eindhoven "TU Eindhoven"**, more specifically the Faculty of Mechanical Engineering, having its principal office at Groene Loper 5, 5612 AE Eindhoven, Netherlands, on behalf of the Executive Board; Prof. Dr. Ir. P.D. Anderson, Dean Mechanical Engineering, hereinafter referred as "**TU Eindhoven**".



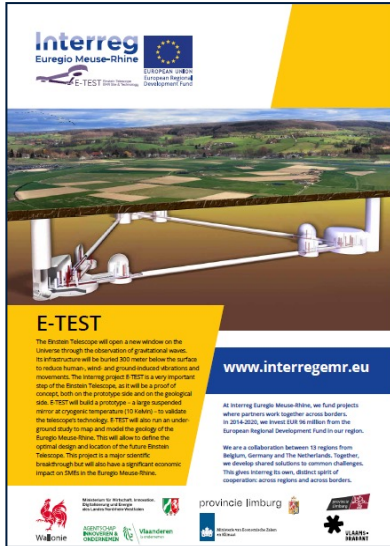
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- General project update
  - Interreg project completed!
  - New 'era' for ETpathfinder
- ETpathfinder environment and upcoming opportunities
  - E-TEST, ET2SME, ET-Technologies, ET4business, ETpathfinder Smart Skills lab
- Towards the 1<sup>st</sup> Benchtower
  - Organisation, timelines, reducing show stoppers
  - Annual review
  - More general discussion on next steps
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# ETpathfinder Eco-system

- 3 partner projects closing also end of this year.



[www.etest-emr.eu](http://www.etest-emr.eu)

Synergies with E-TEST prototype:  
Laser development, Seismic  
isolation etc



[www.et2smes.eu](http://www.et2smes.eu)

Particle deposition machine etc



ETTechnologies

[www.et-technologies.nl](http://www.et-technologies.nl)

Development of cold finger  
stabilization and low-vibration  
heat links etc



# Dutch NGF Valorisation

Einstein Telescope for business Apply →

FOR WHOM

Wanted: high-tech entrepreneurs to help build the Einstein Telescope

READ MORE →

## PARTICIPATE

## The technology domains

The construction and operation of ET will require many advances in research and development and new technological developments. Many of the innovations needed will build on research already conducted at LIGO (United States), VIRGO (Italy), KAGRA (Japan) and other similar facilities.

For the actual construction of the Einstein Telescope (in particular the instrumentation), five technology domains have been defined that will be further developed through research and innovation. The technology domains are:

- Vibration-Free Cooling:** development of vibration-free cooling of mirrors to a temperature of 10-20 K.
- Vacuum technology:** vacuum system cost savings and design of production facility and installation scenario.
- Vibration damping:** development of optimal combination of passive and active vibration damping.
- Optics:** development of large Si mirrors and coating for application at 10-20 K temperature.
- Thermal deformations:** development of technology to monitor and compensate for thermally induced deformations.



# STAATSCOURANT

Nr. 28781

23 oktober

2023

Officiële uitgave van het Koninkrijk der Nederlanden sinds 1814.

## Regeling van de Minister van Onderwijs, Cultuur en Wetenschap van 10 oktober 2023, nr. 41107325, houdende regels voor de subsidieverstrekking voor technologiedomeinen voor de Einstein Telescope (R&D regeling technologiedomeinen Einstein Telescope)

Gelet op artikel 1.2. van de Kaderregeling subsidies OCW, SZW en VWS;

Besluit:

### Artikel 1. Begripsbepalingen

In deze regeling wordt verstaan onder:



#### 4. Specifieke doelstelling voor deze openstelling

In deze openstelling kunnen partijen een aanvraag indienen voor R&D-projecten die bijdragen aan de oplossing voor deze bovenstaande uitdaging. Het beoogde project moet in ieder geval het volgende bevatten:

- Het ontwerp en productie van drie prototypes van koelunits op een niveau dat compatibel is met cryogene spiegel ruisverplaatsingen van gelijk of lager dan  $10^{-18} \text{m}/\sqrt{\text{Hz}}$  bij Hz.
- Elke koeleenheid moet in drie fasen koelvermogen kunnen leveren, waarbij in minder dan vier weken 10K, 20K en 50K (of lager) worden bereikt, waarna stabiele bedrijfsomstandigheden worden bereikt met de volgende koelvermogens:
  - Minimaal 50 mW bij een temperatuur onder 10K
  - Minimaal 0,5 W bij een temperatuur onder 20K
  - Minimaal 2,5 W bij een temperatuur onder 50K
- De thermische massa van de drie bovengenoemde fasen is respectievelijk:
  - 8 kg silicium, 20 kg koper en 40 kg aluminium
  - 40 kg aluminium
  - 130 kg aluminium
- Onder bedrijfsomstandigheden moeten de trillingen op het niveau van de cold finger (contactpunt met spiegelophanging) lager zijn dan  $2 \times 10^{-8} \text{m}/\sqrt{\text{Hz}}$  voor alle frequenties boven 1 Hz en onder  $5 \times 10^{-6} \text{m}$  rms. Tijdens de afkoelperiode gelden er geen strenge trillingseisen.
- De te ontwikkelen koeleenheid moet compatibel zijn met vloeibare stikstof als backend-koelbron.
- De koelunits dienen te kunnen functioneren in een geïntegreerd systeem. Als onderdeel van deze aanvraag dient de aanvrager deze geïntegreerde werking te kwalificeren en valideren.

#### 5. Context van het technologiedomein trillingsvrij koelen

Hieronder is de context weergegeven waarin de trillingsvrije koeleenheid gaat opereren.



# ETpathfinder Smart Skills Lab – next Interreg

## Why an ETpathfinder Smart Skills Lab Key Enabling Technologies



Key Enabling Technologies change the way we live, learn, innovate, work and produce. They are essential in taking on societal challenges and driving economic growth. High-tech industry leads in societal transitions and bringing economic growth with innovative products and services. Research institutes drive fundamental research and push boundaries, also having the potential to drive innovation and talent development. But only cooperation between research institutes, educational institutes and high tech industry delivers a strong innovation and talent development potential.



Long term economic growth and the shift towards a smart and clean economy relies on capitalizing the innovation potential, especially where innovation is based on Key Enabling Technologies such as manufacturing industry, advanced systems, materials, digital and photonics. It is essential for high-tech industry regions like the South of Netherlands and Flanders to keep a leading position in developing these technologies and the necessary competences. Fundamental research on Key Enabling Technologies is an important driving force to keep this leading position in the future.



# ETpathfinder Smart Skills Lab – next Interreg

## Why an ETpathfinder Smart Skills Lab

### Why work on the development of skills for smart specialization, industrial transition and entrepreneurship?

- Mismatch labor supply and labor demand in the Flanders/ South-Netherlands border region.
- Shortages of technically skilled personnel, economic growth and societal transitions. necessary to drive
- Increase of shortage within some sectors over the next 15 years, due to an ageing population.
- Demand for increasing the inflow of personnel and training existing personnel.

### Increasing the inflow and training existing personnel can be achieved by:

- Developing tools and methods and cross-border programs and facilities.

### The urgency is even bigger for the high-tech and materials (HTSM) sector considering:

- the internationally distinctive position, and thus the basis for future economic growth;
- the risk of a growing demand and the lack of human resources available.





## Target groups



### Postdocs; early career researchers



### Students of applied sciences



### Technical employees of SME'S



### Decision making units of SME's

- For industry, it is ultimately about innovation and orders, by getting into the ecosystem now, their people become 'fit' (knowledge, skills) to be able to join and stay with them (next decades) in development and tenders. This ecosystem is relevant also when ET comes elsewhere (GW Europe, wider big science and spinoff to other sectors). Art is to get 'the skills gap' sharp in the project with motivated companies and how to bridge it.
- Education partners can use the ETpathfinder as a lab and be the bridge between research institutions (driving technology forward) and industry (upgrading their own knowledge and skills); where the universities of applied sciences can mainly make the bridge to new intake, parties such as mikrocentre/T-campus can mainly organise a qualitative stroke among existing personnel (LLO).
- Research partners can use the applied knowledge and skills of companies and education partners in their research and development activities.



# ETpathfinder Smart Skills Lab – next Interreg

## Scope



For the actual construction of the Einstein Telescope (in particular the instrumentation) and valorisation, five technology domains have been defined that will be further developed through research and innovation.

These 5 technology domains are:

**Vibration-free cooling:** development of vibration-free cooling of mirrors to a temperature of 10-20 K.

**Vacuum technology:** cost savings of vacuum system and design of production facility and installation scenario.

**Vibration damping:** development of optimal combination of passive and active vibration damping.

**Optics:** development of large Si mirrors and coating for application at a temperature of 10-20 K.

**Thermal deformations:** development of technology to monitor and compensate for thermally induced deformations.



If companies want to be part of the ET ecosystem (innovation, orders, etc.), now is the time to connect them and make a leap in both technology and skills. Technology and skills that are needed in other branches. By identifying shared challenges (practice-education-research) this project connects the first layer of the Einstein Telescope to the second layer of operation, supply and logistics. EG:

**Smart Installation**

**Smart Operation**

**Smart Maintenance**

> *Robotics, Installation technology, Monitoring systems, Digital twins,...*



# ETpathfinder Smart Skills Lab – next Interreg

## Deliverables and activities



1. Mapping tools
  - > Skills required and gaps SME's
2. Methodology and proof, by knowledge transfer
  - > Design, testing and validation, by the involved training/ applied sciences institutes and postdocs
3. Implementation
  - > Adoption of methods, by the involved training/ applied sciences institutes

## Indicators?



Train 15 postdocs



30 SME employees participated, boosting smart skills



Train 5 students



# ETpathfinder Smart Skills Lab – next Interreg

## Key Players



**Project leader (writing phase)**

Maastricht University;  
Stefan Hild/ ERAC or PNO support



**Candidate partners (bold = steering group)**

Universities: Nikhef, **UM**, KUL, **UA**, **VUB**, GU,UH, RWTH, UL, Tue (?), OU (?)

Applied sciences institutes: **Fontys**, **Thomas Moore**, PXL, Zuyd (?)

SME intermediates: **POM Limburg**, LIOF/BOM(?), **Mikrocentrum**, **T2 Campus**  
(Syntra PXL), FME (?), WCM (?), TVVL (?), SIRRIS (?)

## Timeline

The next call of Interreg VL-NL is expected for Q1 2024: opening 11.2023; closing 03.2024 (there is a chance this will be pushed forward to May or June 2024); pre-selection by the summer of 2024.

Project duration 3 years

Writing phase start: 1.1.2024

Writing fee scheme Provincie Limburg: deadline 9.1.2024

Submission step 1, with 30 SME support letters: 14.3.2024

Pre-selection: 19.6.2024

Submission step 2: 15.11.2024

Selection/ project start: 5.3.2025 (earliest)

End-date: 4.3.2028 (earliest)



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- A bit on this workshop





# Towards the 1st Bench Tower

Group	Action/Items	Status	Health and Safety doc required?	Installation / assembly doc	Commissioning plan
<b>[A] Bench GAS Systems</b>	<a href="https://docs.google.com/document/d/1d7Vz_4Wxd8o11sXaypk3wYBe1pFQslHzWE4D3s-MPE/edit?usp=sharing">https://docs.google.com/document/d/1d7Vz_4Wxd8o11sXaypk3wYBe1pFQslHzWE4D3s-MPE/edit?usp=sharing</a>	Not specified	not specified	not specified	not specified
	[A-1] BS and INJ GAS Filter Assembly and Tuning	Not specified	not specified	not specified	not specified
	[A-2] GAS Transport Box Arrival	Completed	not specified	not specified	not specified
	[A-3] Bench GAS LVDT Arrival	Completed	not specified	not specified	not specified
<b>[B] Optical Table Systems BS</b>	<a href="https://docs.google.com/document/d/1E_nev9rpVnKAJOIXjW9noFpKvgPRT_ipMWy7tt-gx5k/edit?usp=sharing">https://docs.google.com/document/d/1E_nev9rpVnKAJOIXjW9noFpKvgPRT_ipMWy7tt-gx5k/edit?usp=sharing</a>	Not specified	not specified	not specified	not specified
	[B-1] Table Locking System Final Parts Procurement	Completed	not specified	not specified	not specified
	[B-2] Optical Table Assembly and Tuning Plan	Not specified	not specified	not specified	not specified
	[B-3] Optical Table #1 Assembly and Tuning	Not specified	not specified	not specified	not specified
<b>[C] Pre-Isolation Stage Systems #1</b>	<a href="https://docs.google.com/document/d/13M0yatVnWHcva-YR_Xv3l8KXxGFIU19MwzX834zIWcFA/edit?usp=sharing">https://docs.google.com/document/d/13M0yatVnWHcva-YR_Xv3l8KXxGFIU19MwzX834zIWcFA/edit?usp=sharing</a>	Not specified	not specified	not specified	not specified
	[C-1] Pre-Isol. Stage Assembly and Tuning Plan	Not specified	not specified	not specified	not specified
	[C-2] Pre-Isol. Stage Assembly and Tuning	Not specified	not specified	not specified	not specified
	[C-3] Trillium Sensors and Housing	Not specified	not specified	not specified	not specified
<b>[E] In-vacuum Cabling</b>	<a href="https://docs.google.com/document/d/1bLFOC_rbbaE1Hj8zO31x9qWawWZP32X2to9kTOsQBI/edit?usp=sharing">https://docs.google.com/document/d/1bLFOC_rbbaE1Hj8zO31x9qWawWZP32X2to9kTOsQBI/edit?usp=sharing</a>	Not specified	not specified	not specified	not specified
	[E-1] In-vacuum cable material procurement	Not specified	not specified	not specified	not specified
	[E-2] Feedthrough flanges	Not specified	not specified	not specified	not specified
	[E-3] In-vacuum cable guides	Not specified	not specified	not specified	not specified
	[E-4] In-vacuum cable assembly	Not specified	not specified	not specified	not specified
	[E-5] In-vacuum Cable Arrival	Not specified	not specified	not specified	not specified
<b>[W] Complete BS Tower</b>	<a href="https://docs.google.com/document/d/1qNWqBwCtawbyh80PyerOlbrOPwLPQn2E9c5Q_dcP53w/edit?usp=sharing">https://docs.google.com/document/d/1qNWqBwCtawbyh80PyerOlbrOPwLPQn2E9c5Q_dcP53w/edit?usp=sharing</a>	Not specified	not specified	not specified	not specified
	[W-1] Table Tower Integration Plan	Not specified	not specified	not specified	not specified
	[W-2] BS Tower in-vacuum cable installation	Not specified	not specified	not specified	not specified
	[W-3] BS Internal Mechanics Integration	Not specified	not specified	not specified	not specified

<https://docs.google.com/spreadsheets/d/1fBVClSPa4oTD0jcOiWVfeeXOcQgmIP9C3QhyooTwtc/edit#gid=0>



# Towards the 1st Bench Tower



**ETpathfinder**

Source of file:

[https://docs.google.com/document/d/1d7Vz\\_4Wxd8o11sXaypk3wYBe1pFQslHzWE4D3s-MPE/edit?usp=sharing](https://docs.google.com/document/d/1d7Vz_4Wxd8o11sXaypk3wYBe1pFQslHzWE4D3s-MPE/edit?usp=sharing)

## [A] Bench GAS Systems

Link to technical drawings:

List and readiness of required components:

Link to installation/integration plans:

Any Health and Safety relevant aspects:

Commissioning/testing plan:

Responsible + persons involved:

Open issues:

---

## [A-1] BS and INJ GAS Filter Assembly and Tuning

Link to technical drawings:





# Annual Light-Weight Review

ETpathfinder Annual Lightweight Review 2023/2024		
Institution	Link to report	Report Status
Maastricht	<a href="https://docs.google.com/document/d/16ooFAANP3l_3eIYe2ec2WGvkwL_GWPg8dkXWd1xrPCOs/edit?usp=sharing">https://docs.google.com/document/d/16ooFAANP3l_3eIYe2ec2WGvkwL_GWPg8dkXWd1xrPCOs/edit?usp=sharing</a>	Completed
Nikhef	<a href="https://docs.google.com/document/d/1npKpk_kQHzpBwac4htQEnd5XIPNYZRYDHLcrrbqAoc/edit?usp=sharing">https://docs.google.com/document/d/1npKpk_kQHzpBwac4htQEnd5XIPNYZRYDHLcrrbqAoc/edit?usp=sharing</a>	In Progress
Twente	<a href="https://docs.google.com/document/d/1t1hlpzajGnvQCkmNAARnWGcWBVIB3hEgcrEEw7pzlmY/edit?usp=sharing">https://docs.google.com/document/d/1t1hlpzajGnvQCkmNAARnWGcWBVIB3hEgcrEEw7pzlmY/edit?usp=sharing</a>	Completed
TUe	<a href="https://docs.google.com/document/d/1zuUsFUBoURQwkiss2mVmkgHSH1jxjdp_lkDhz7b2MEEg/edit?usp=sharing">https://docs.google.com/document/d/1zuUsFUBoURQwkiss2mVmkgHSH1jxjdp_lkDhz7b2MEEg/edit?usp=sharing</a>	Not Started
VU Amsterdam	<a href="https://docs.google.com/document/d/1pX41d8NpFv9wGHvFf0LbSjldXA51_jpgsQWpTtuVfl/edit?usp=sharing">https://docs.google.com/document/d/1pX41d8NpFv9wGHvFf0LbSjldXA51_jpgsQWpTtuVfl/edit?usp=sharing</a>	Completed
Antwerp	<a href="https://docs.google.com/document/d/1I9h71A7JADYVWPJMkeK2i1Qn61ZrPCKMtgNV_IVt6OE/edit?usp=sharing">https://docs.google.com/document/d/1I9h71A7JADYVWPJMkeK2i1Qn61ZrPCKMtgNV_IVt6OE/edit?usp=sharing</a>	Completed
Gent	<a href="https://docs.google.com/document/d/14ubmrhJDP7PCm1jNWL1gOtAzw5nFAOMWXMnMaAeyIkw/edit?usp=sharing">https://docs.google.com/document/d/14ubmrhJDP7PCm1jNWL1gOtAzw5nFAOMWXMnMaAeyIkw/edit?usp=sharing</a>	Completed
VU Brussels	<a href="https://docs.google.com/document/d/1WaQTK63dvQEIRpNHnEHtVB7ai6o6nIFjMxprRsEvEaqq/edit?usp=sharing">https://docs.google.com/document/d/1WaQTK63dvQEIRpNHnEHtVB7ai6o6nIFjMxprRsEvEaqq/edit?usp=sharing</a>	Completed
KU Leuven	<a href="https://docs.google.com/document/d/1Xm5xiFuoxGihzyCn6Pzqgw12l-3clpWEj1P8Kpv88Z8/edit?usp=sharing">https://docs.google.com/document/d/1Xm5xiFuoxGihzyCn6Pzqgw12l-3clpWEj1P8Kpv88Z8/edit?usp=sharing</a>	Completed
UC Louvain	<a href="https://docs.google.com/document/d/1llvsVYvZa-VVM_uQ7JaB8NfUXyG1cEFhZDiG2kAhY84/edit?usp=sharing">https://docs.google.com/document/d/1llvsVYvZa-VVM_uQ7JaB8NfUXyG1cEFhZDiG2kAhY84/edit?usp=sharing</a>	Not Started
Liege	<a href="https://docs.google.com/document/d/1XeSN1Ph15r9-uwF2WmCOAgdD5ABnI8pXjiU5VqxQnw8/edit?usp=sharing">https://docs.google.com/document/d/1XeSN1Ph15r9-uwF2WmCOAgdD5ABnI8pXjiU5VqxQnw8/edit?usp=sharing</a>	Not Started
RWTH	<a href="https://docs.google.com/document/d/1WbiOlglHvJU3y1YgBO0bersgABezwQWGyzGdD6QackU/edit?usp=sharing">https://docs.google.com/document/d/1WbiOlglHvJU3y1YgBO0bersgABezwQWGyzGdD6QackU/edit?usp=sharing</a>	In Progress
ILT	<a href="https://docs.google.com/document/d/1xAD_N1X8ISmXa35vuiUuJ2i97YeOQtgKv8mfjL-0l4/edit?usp=sharing">https://docs.google.com/document/d/1xAD_N1X8ISmXa35vuiUuJ2i97YeOQtgKv8mfjL-0l4/edit?usp=sharing</a>	Not Started
KIT	<a href="https://docs.google.com/document/d/1JmzrF-Vl_1cSs3KKNVq33ywwCFvbyMBAwUbYRmDhs/edit?usp=sharing">https://docs.google.com/document/d/1JmzrF-Vl_1cSs3KKNVq33ywwCFvbyMBAwUbYRmDhs/edit?usp=sharing</a>	In Progress
AEI	<a href="https://docs.google.com/document/d/1ZVXoEBb-JPO-x2CeR-qXQ780G7fVjWqU66jvATE4Y/edit?usp=sharing">https://docs.google.com/document/d/1ZVXoEBb-JPO-x2CeR-qXQ780G7fVjWqU66jvATE4Y/edit?usp=sharing</a>	Not Started
LAPP	<a href="https://docs.google.com/document/d/1giaUfMkhVM38NWdAYiG1WfXaceV_JXCNIjliX8kMv_0/edit?usp=sharing">https://docs.google.com/document/d/1giaUfMkhVM38NWdAYiG1WfXaceV_JXCNIjliX8kMv_0/edit?usp=sharing</a>	Not Started
IFAE	<a href="https://docs.google.com/document/d/1csFTJGOnRfkbKG0wTO62Nh1F2y9nldp0mWWWQkf1HY/edit?usp=sharing">https://docs.google.com/document/d/1csFTJGOnRfkbKG0wTO62Nh1F2y9nldp0mWWWQkf1HY/edit?usp=sharing</a>	Not Started
Glasgow	<a href="https://docs.google.com/document/d/1Bs8RrJSwyb_XAd6udFmAaIFHSnTZLuH6AReXe9wvRWl/edit?usp=sharing">https://docs.google.com/document/d/1Bs8RrJSwyb_XAd6udFmAaIFHSnTZLuH6AReXe9wvRWl/edit?usp=sharing</a>	Not Started
Birmingham	<a href="https://docs.google.com/document/d/1TW8k75phXV6tU8ZNNzaFad1qs3IB-vwKfMkRukbHG4/edit?usp=sharing">https://docs.google.com/document/d/1TW8k75phXV6tU8ZNNzaFad1qs3IB-vwKfMkRukbHG4/edit?usp=sharing</a>	Not Started
Polgrav	<a href="https://docs.google.com/document/d/1MKc0p9Ht33XQCiiZh3GsLpRz_GB7dkcGN5Gcv7HyUOA/edit?usp=sharing">https://docs.google.com/document/d/1MKc0p9Ht33XQCiiZh3GsLpRz_GB7dkcGN5Gcv7HyUOA/edit?usp=sharing</a>	Not Started
Hasselt	<a href="https://docs.google.com/document/d/11Ho9ahrEyLZmWozTR54a37GHJyypYoxwdT6VF4W4YCW/edit?usp=sharing">https://docs.google.com/document/d/11Ho9ahrEyLZmWozTR54a37GHJyypYoxwdT6VF4W4YCW/edit?usp=sharing</a>	Not Started
Hamburg?		
IKZ?		

<https://docs.google.com/spreadsheets/d/1cRsaFJ5mBwS62nTBX4FV27VuEShDSdrpmSGnRg2OCpM/edit#gid=0>



# Annual Light-Weight Review

## ETpathfinder — Lightweight Annual Review Process 2023/2024

### i) GENERAL SECTION

1. Name of Partner Institution: **Antwerp**
2. Scientific contact person: Nick Van Remortel
3. People involved

Name	Email	Function	Active 2023	Active 2024	On Authorlist
Nick Van Remortel	nick.vanremortel@uantwerpen.be	Scientist -	Yes -	Yes -	Yes -
Hans Van Haevermaet	hans.vanhaevermaet@uantwerpen.be	Scientist -	Yes -	Yes -	Yes -
Joris Cools	joris.cools@uantwerpen.be	Engineer -	No -	Yes -	Yes -
Wim Beaumont	wim.beaumont@uantwerpen.be	Engineer -	Yes -	Yes -	Yes -
Eric Roose	eric.roose@uantwerpen.be	Engineer -	Yes -	Yes -	Yes -
Sarah Van Mierlo	sarah.vanmierlo@uantwerpen.be	Adminin... -	Yes -	Yes -	No -
Pengbo Li	pengbo.li@uantwerpen.be	Scientist -	Yes -	Yes -	Yes -
Kumar Akhil Kukkadapu	KumarAkhil.Kukkadapu@uantwerpen.be	Scientist -	Yes -	Yes -	Yes -
Anoop Koushik	AnoopNagesh.Koushik@uantwerpen.be	Scientist -	Yes -	Yes -	Yes -
Karel Peetermans	/	Other -	Yes -	No -	No -
Michiel Yzewyn	/	Other -	Yes -	No -	No -
Jonas Jacobs	Jonas.Jacobs@student.uantwerpen.be	Other -	No -	Yes -	No -

The commitments for 2024 already exhaust already the available manpower except for Joris. Eric Roose will not be available for EtPf after June 2024.

- Providing helping hands (to support activities lead by someone else, e.g. the Nikhef MT). - no special skills required.

Name	Email	Frequency of availability (e.g 2 days per month)	Period of availability (e.g. April to June)	Comment
Joris Cools	joris.cools@uantwerpen.be	AVG 2 - 3 days per week	Throughout the year	

- Potentially available technical power (mechanics/electronics)

Name	Email	Frequency of availability (e.g 2 days per month)	Period of availability (e.g. April to June)	Comment
Joris Cools	joris.cools@uantwerpen.be	AVG 2 - 3 days per week	Throughout the year	

- Potentially available engineering power

Name	Email	Frequency of availability (e.g 2 days per month)	Period of availability (e.g. April to June)	Comment
Joris Cools	joris.cools@uantwerpen.be	AVG 2 - 3 days per week	Throughout the year	

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- Potentially available project management

Name	Email	Frequency of availability (e.g 2 days per month)	Period of availability (e.g. April to June)	Comment
Joris Cools	joris.cools@uantwerpen.be	AVG 2 - 3 days per week	Throughout the year	



# Annual Light-Weight Review

ETpathfinder Annual Lightweight Review 2023/2024		
Institution	Link to report	Report Status
Maastricht	<a href="https://docs.google.com/document/d/1Wgkvl_GWPg8dkXWd1xrPCOs/edit?usp=sharing">https://docs.google.com/document/d/1Wgkvl_GWPg8dkXWd1xrPCOs/edit?usp=sharing</a>	Completed
Nikhef	<a href="https://docs.google.com/document/d/1Fnd5XIPNYZRYDHLcrrbqA/edit?usp=sharing">https://docs.google.com/document/d/1Fnd5XIPNYZRYDHLcrrbqA/edit?usp=sharing</a>	In Progress
Twente	<a href="https://docs.google.com/document/d/1GCwBVI3hEgCf/edit?usp=sharing">https://docs.google.com/document/d/1GCwBVI3hEgCf/edit?usp=sharing</a>	Completed
TU/e	<a href="https://docs.google.com/document/d/1wmkHSHU/edit?usp=sharing">https://docs.google.com/document/d/1wmkHSHU/edit?usp=sharing</a>	Not Started
Utrecht	<a href="https://docs.google.com/document/d/1swwGHvF6/edit?usp=sharing">https://docs.google.com/document/d/1swwGHvF6/edit?usp=sharing</a>	Completed
UvA	<a href="https://docs.google.com/document/d/1AZJADY/edit?usp=sharing">https://docs.google.com/document/d/1AZJADY/edit?usp=sharing</a>	Completed
UzLeuven	<a href="https://docs.google.com/document/d/1WwXmNmAaey/kw/edit?usp=sharing">https://docs.google.com/document/d/1WwXmNmAaey/kw/edit?usp=sharing</a>	Completed
Vanderbilt	<a href="https://docs.google.com/document/d/1ai6o6nlFjMxpRseEvEaqq/edit?usp=sharing">https://docs.google.com/document/d/1ai6o6nlFjMxpRseEvEaqq/edit?usp=sharing</a>	Completed
Wageningen	<a href="https://docs.google.com/document/d/1zqgw12l-3clpWEj1P8Kpv88Z8/edit?usp=sharing">https://docs.google.com/document/d/1zqgw12l-3clpWEj1P8Kpv88Z8/edit?usp=sharing</a>	Completed
WZL	<a href="https://docs.google.com/document/d/1VVM_uQ7JaB8NfUXyG1cEFhZDiG2kAhY84/edit?usp=sharing">https://docs.google.com/document/d/1VVM_uQ7JaB8NfUXyG1cEFhZDiG2kAhY84/edit?usp=sharing</a>	Not Started
WZL	<a href="https://docs.google.com/document/d/1XeSN1Ph15r9-uwF2WmCOAgdD5ABnl8pXjiU5VqxQnw8/edit?usp=sharing">https://docs.google.com/document/d/1XeSN1Ph15r9-uwF2WmCOAgdD5ABnl8pXjiU5VqxQnw8/edit?usp=sharing</a>	Not Started
WZL	<a href="https://docs.google.com/document/d/1WbiOglHvJU3y1YgBO0bersgABezwQWGyzGdD6QackU/edit?usp=sharing">https://docs.google.com/document/d/1WbiOglHvJU3y1YgBO0bersgABezwQWGyzGdD6QackU/edit?usp=sharing</a>	In Progress
ILT	<a href="https://docs.google.com/document/d/1xAD_N1X8lSmXa35vuiUuDj2l97YeOQtgKv8mfjL-0l4/edit?usp=sharing">https://docs.google.com/document/d/1xAD_N1X8lSmXa35vuiUuDj2l97YeOQtgKv8mfjL-0l4/edit?usp=sharing</a>	Not Started
KIT	<a href="https://docs.google.com/document/d/1JmzrF-Vl_1cSs3KKNVgX33ywwCfvtbyMBAwUbYRmDhs/edit?usp=sharing">https://docs.google.com/document/d/1JmzrF-Vl_1cSs3KKNVgX33ywwCfvtbyMBAwUbYRmDhs/edit?usp=sharing</a>	In Progress
AEI	<a href="https://docs.google.com/document/d/1ZVXoEBb-JPO-x2CeR-qXQ780G7fvjWqU66jvATE4Y/edit?usp=sharing">https://docs.google.com/document/d/1ZVXoEBb-JPO-x2CeR-qXQ780G7fvjWqU66jvATE4Y/edit?usp=sharing</a>	Not Started
LAPP	<a href="https://docs.google.com/document/d/1giaUfMkhVM38NWdAYiG1WfXaceV_JXCnJbliX8kMv_0/edit?usp=sharing">https://docs.google.com/document/d/1giaUfMkhVM38NWdAYiG1WfXaceV_JXCnJbliX8kMv_0/edit?usp=sharing</a>	Not Started
IFAE	<a href="https://docs.google.com/document/d/1csFtJTGOnRfkbKG0wTO6Z1h1F2y9Nldp0mWwwQkf1HY/edit?usp=sharing">https://docs.google.com/document/d/1csFtJTGOnRfkbKG0wTO6Z1h1F2y9Nldp0mWwwQkf1HY/edit?usp=sharing</a>	Not Started
Glasgow	<a href="https://docs.google.com/document/d/1Bs8RrJSwyb_XA6dudFmAaIFHSnTZLuH6AReXe9wvRWl/edit?usp=sharing">https://docs.google.com/document/d/1Bs8RrJSwyb_XA6dudFmAaIFHSnTZLuH6AReXe9wvRWl/edit?usp=sharing</a>	Not Started
Birmingham	<a href="https://docs.google.com/document/d/1TW8k75phXV6tU8ZNNzaFad1qs3lB-vwKfMkRukbHG4/edit?usp=sharing">https://docs.google.com/document/d/1TW8k75phXV6tU8ZNNzaFad1qs3lB-vwKfMkRukbHG4/edit?usp=sharing</a>	Not Started
Polgrav	<a href="https://docs.google.com/document/d/1MKc0p9Ht33XQCiiZh3GsLpRz_GB7dkcGN5Gcv7HyUOA/edit?usp=sharing">https://docs.google.com/document/d/1MKc0p9Ht33XQCiiZh3GsLpRz_GB7dkcGN5Gcv7HyUOA/edit?usp=sharing</a>	Not Started
Hasselt	<a href="https://docs.google.com/document/d/11Ho9ahrEyLZmWozTR54a37GHJyppYoxwdT6VF4W4YCw/edit?usp=sharing">https://docs.google.com/document/d/11Ho9ahrEyLZmWozTR54a37GHJyppYoxwdT6VF4W4YCw/edit?usp=sharing</a>	Not Started
Hamburg?		
IKZ?		

Please all (in partical WP-leads etc) have a look at these files (not only of your own group, but beyond to see what resources we have available ... I guess there is some usefulness here )

White gloves vs laying foundation

According to the current Numbers we have can 80 authors.

Also have ca. 1.5FTE Accumulated on helping hands.  
+ 1 FTE engineering.

<https://docs.google.com/spreadsheets/d/1cRsaFJ5mBwS62nTBX4FV27VuEShDSdrpmSGnRg2OCpM/edit#gid=0>



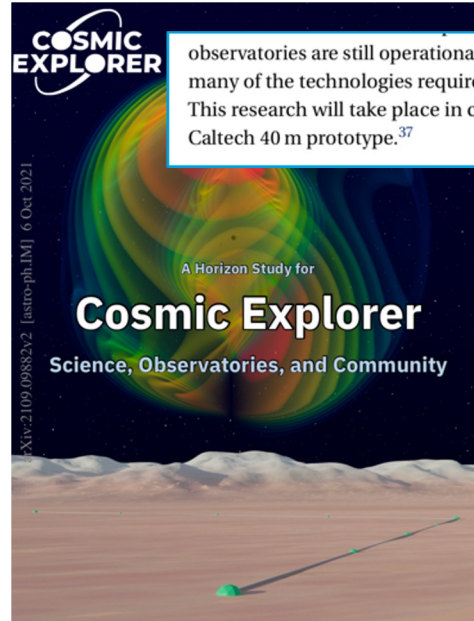
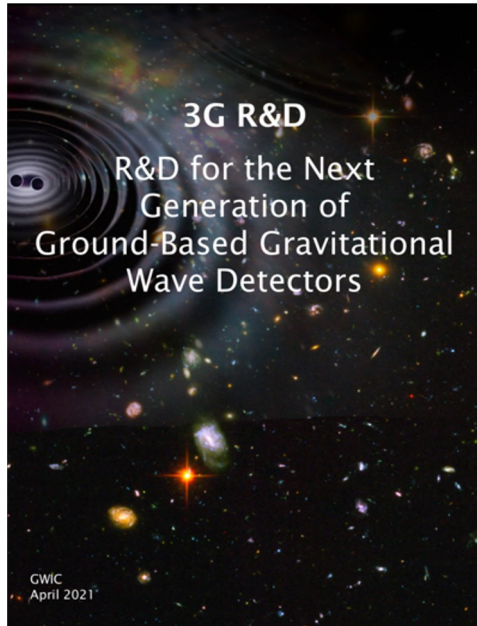


# Overview

- General project update
  - Interreg project completed!
  - New 'era' for ETpathfinder
- ETpathfinder environment and upcoming opportunities
  - E-TEST, ET2SME, ET-Technologies, ET4business, ETpathfinder Smart Skills lab
- Towards the 1<sup>st</sup> Benchtower
  - Organisation, timelines, reducing show stoppers
  - Annual review
  - More general discussion on next steps
- Science goals of ETpathfinder
  - Discussion of priorities
- A bit on this workshop



# ETpathfinder beyond ET



observatories are still operational. In addition to ensuring that CE will achieve its full potential, many of the technologies required for CE may also be used to enhance existing observatories. This research will take place in collaboration with other projects like ETpathfinder<sup>38</sup> and the Caltech 40 m prototype.<sup>37</sup>



# Science goals

## Ideas for future R & D:

- become a testbed for all new DAQ hardware and software for Virgo/ET:
- test upgrade of real-time operating system
- timing upgrade to White Rabbit: new hardware is being developed at Nikhef for Virgo, could be tested in Maastricht first later this year
- new version of DAQbox: components are obsolete, but need a many ADC/DAC channels for stable cavities @ Virgo in a few years
- any new sensors/actuators (e.g. Virgo tilt meters)
- test modern control algorithms

Laser stabilisation scheme  
1550nm/2090 onto IMC in vacuum

2 colour locking for silicon

Sorption cooler approach suitable for ET?

Ice build up, measurement methods and mitigation

Coldfinger active stabilisation. Also image on PT cooling option?

Infrasound in our cleanroom and what it means for ET cleanrooms/covers

QN reduction schemes, e.g. speedmeters

120K operation at low noise. Risk reduction for ET-LF?

Cross-check water simulations and qualify Epathfinder cryostat design for ET

Scattered light treatment within cryostats

Demonstration of absence of thermal effects in cryogenic silicon

Learning more generally: integration, cross-compatibility of different subsystems. Maintenance etc

Add your favourite topics/Interests!



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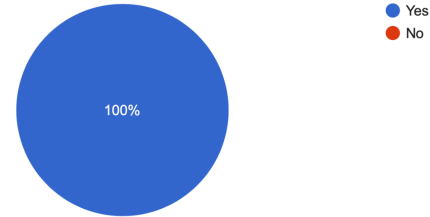




## Survey from last workshop

Is the right format for future workshops; one day of review and one day of discussion?

14 antwoorden



For a better format, what would you suggest?

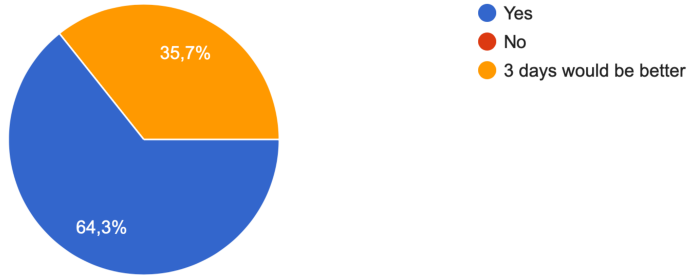
- Maybe a panel with hands on experience (hackaton for simulation people, tinkering with equipment for optics/suspension/cryo crew)
- An additional day or a big chunk of the day where there is enough time for discussion for more finer details for the project than just the outlines and deadlines.
- More time for discussions. Due to some important last minute discussions I missed chatting to some students in the coffee break. For the official program, we had time to list open issues, but not to decide who does what. Either leave explicit time in the schedule or add a 3rd day.
- Yes, maybe even more days?



# Survey from last workshop

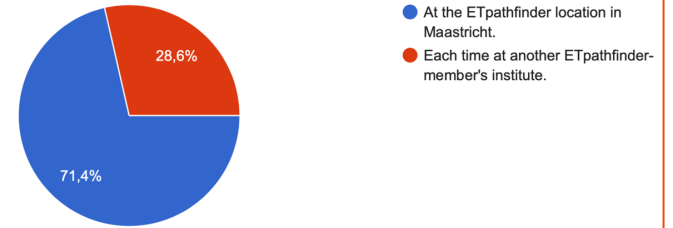
Assuming traveling on the same days, are two days enough for the workshop?

14 antwoorden



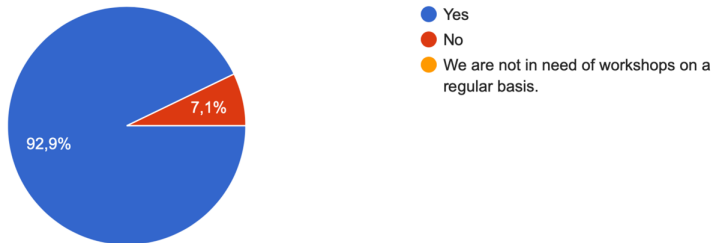
Where would you prefer to experience the ETPathfinder workshop?

14 antwoorden



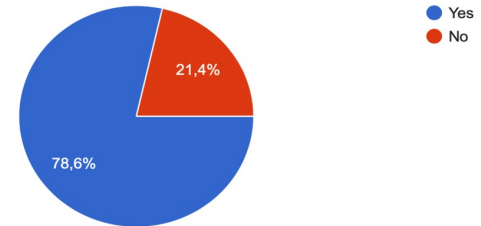
Is it enough to have two in-person topical workshops a year?

14 antwoorden



Would you be willing to assist in the organization of such a workshop (non-binding)?

14 antwoorden





# Survey from last workshop

## What topic(s) would you suggest for the next workshop?

1. commissioning plan for the first tower.
2. Future experiments / layout and what needs to happen for that
3. Concrete and publishable short to mid term results
4. Deadlines (of course), analysis of whether a group can keep up deadlines otherwise support them; having a sheet with wanted people-power, separate session to organize smaller meeting sessions post workshop.
5. Commissioning plans. Make sure that all students get their own task without too much interference (but this might need a supervisor only meeting).
6. More on mirror coatings
7. Various topics in addition to planning come to mind, like for instance having one WS on 5 year research ambition, one on how to improve knowledge transfer with other relevant projects, KAGRA/Voyager/CE etc
8. Not sure if there should be only be specific topics, it is good to have the opportunity for everyone to be able to discuss their topics in parallel sessions. But for that more days would be needed, to allow the most wanted experts join all sessions.
9. Discussing the different workpackages is very useful.
10. e.g. Guest speaker, status ET, where pathfinder could help ET
11. Optics or Cryogenics




## Survey from last workshop

What other ideas or comments would you like to share??

1. Was good to have it in the middle of the week ,so if needed you can come one day earlier / stay .
2. Pies that were served during the recesses are incredibly good. Keep up with this amazing catering
3. A lot of people were not available after the organized sessions. It would have been nice to have more time with them. One way to solve this is to have a long gap as breaks (mid-day, between sessions) and a session at the end to have all of them around till the end.
4. Was good to see many people in person.
5. The dinner was very nice!
6. For now 2 days are fine, but in the future I can imagine that 3 days would be better.



# Overview of the Program: Today

13:00	<b>ETpathfinder; Top level overview</b> <i>B0.014, Maastricht University, PHS1</i>	<i>Stefan Hild</i> 13:00 - 14:00
14:00	<b>First Bench Tower; planning installation and commissioning</b> <i>B0.014, Maastricht University, PHS1</i>	<i>Guido Visser et al.</i> 14:00 - 15:00
15:00	<b>Break</b> <i>B.014, Maastricht University, PHS1</i>	15:00 - 15:30
	<b>update on WP4</b> <i>B0.014, Maastricht University, PHS1</i>	<i>Henk Jan Bulten</i>  15:30 - 16:00
16:00	<b>WP3 status and preview of 2024</b> <i>B0.014, Maastricht University, PHS1</i>	<i>Paul Kuijter</i> 16:00 - 16:15
	<b>WP3 Q&amp;A</b> <i>B0.014, Maastricht University, PHS1</i>	<i>Paul Kuijter</i> 16:15 - 16:30
	<b>Assembly and test of GAS filters for the Bench towers</b> <i>B0.014, Maastricht University, PHS1</i>	<i>Mathijs Baars</i> 16:30 - 16:50
17:00	<b>Updates on WPs: WP6</b> <i>B0.014, Maastricht University, PHS1</i>	17:00 - 17:30
	<b>Updates on WPs: WP7</b> <i>B0.014, Maastricht University, PHS1</i>	17:30 - 18:00
18:00		



# Overview of the Program: Tomorrow

09:00	<b>Introduction Workshops</b> Atrium, Maastricht University DUB30 09:00 - 09:30			
	<b>PLC control</b> Thomas Thuemmler	<b>WP 5 Seismic Isolation: B</b>	<b>WP6 Optics: C</b>	<b>WP 7 Controls: D</b>
	(workshop) time for discu... Thomas Thu...			
10:00	Status of the vibrationally.... Luise Kranz...			
	(workshop) design and di... Rafael Garcia			
	design and discussion thermal shields and cryogenic lines Rafael Garcia et al.			
11:00	plans for measurements/upgrades LN2 system in Twente Cris Vermeer et al.			
12:00		1.047, Meetingroom GWFP, Maastricht University DUB30 09:30 - 12:30	Atrium, Maastricht University DUB30 09:30 - 12:30	0.223 E7pf Controlroom, Maastricht University DUB30 09:30 - 12:30
	<b>Lunch</b> Atrium, Maastricht University DUB30 12:30 - 14:00			

	<b>Lunch</b> Atrium, Maastricht University DUB30 12:30 - 14:00	
13:00		
14:00	the potential of liquid Nitrogen as fall-back solution for 3rd-generation GW detectors Atrium, Maastricht University DUB30	Stefan Hild 14:00 - 14:15
	research activities with LN2 in Twente and Maastricht Atrium, Maastricht University DUB30	Cris Vermeer et al. 14:15 - 14:30
	project organization 10K cooling project Atrium, Maastricht University DUB30	Romaine Kunst 14:30 - 14:45
	Concepts for the 10K cooling Atrium, Maastricht University DUB30	Michiel van Limbeek 14:45 - 15:00
15:00	10K Sorption cooler Atrium, Maastricht University DUB30	Arvi Khahi 15:00 - 15:15
	planning and realization 10K cryogenics Atrium, Maastricht University DUB30	Michiel van Limbeek et al. 15:15 - 15:30
	Q&A 10K cryogenics Atrium, Maastricht University DUB30	 15:30 - 15:45
	overview design of thermal shields and cryogenic lines Atrium, Maastricht University DUB30	Rafael Garcia 15:45 - 16:00
16:00	<b>Break</b> Atrium, Maastricht University DUB30 16:00 - 16:30	
	E-Test Seismic Isolation Atrium, Maastricht University DUB30	Anthony Amorosi 16:30 - 17:00
17:00	<b>Mile stones: planning/ pooling</b> Atrium, Maastricht University DUB30 17:00 - 18:00	



# Overview of the Program: Friday

09:00	<b>Collaboration housekeeping as practiced in KATRIN</b> <i>Atrium, Maastricht University DUB30</i>		<i>Joachim Wolf</i> 09:00 - 09:15
	<b>Collaboration housekeeping discussion</b> <i>Atrium, Maastricht University DUB30</i>		<i>all</i> 09:15 - 09:30
10:00	<b>WP3 Cleanroom: H or other WP t.b.d.</b>	<b>WP4 Vacuum and Cryogenics: I or other WP t.b.d.</b>	<b>WP 5 Seismic Isolation: J or other WP t.b.d.</b>
11:00	<i>0.223, ETPf Controlroom, Maastricht University DUB30</i> 09:30 - 11:30	<i>Atrium, Maastricht University DUB30</i> 09:30 - 11:30	<i>1.047, Meetingroom GWFP, Maastricht University DUB30</i> 09:30 - 11:30
12:00	<b>Conclusion; next steps</b> <i>Atrium, Maastricht University DUB30</i> 11:30 - 12:30		



## Overview

- General project update
  - Interreg project completed!
  - New 'era' for ETpathfinder
- ETpathfinder environment and upcoming activities
  - E-TEST, ET2SME, ET-Technologies
- Towards the 1<sup>st</sup> Benchmark
  - Organisation
  - Annual
  - More
- Science goals
  - Discussion
- A bit on the

**Anything missing? Anything else that we should discuss or people would like to learn more about during this workshop?**





**Thanks for your attention!**

... and I wish us all a **productive**, **inspirational** and **enjoyable** workshop.



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**ETpathfinder should be FUN**