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SUPPORT ▼

Preparatory phase of new ESFRI research infrastructure projects

TOPIC ID: HORIZON-INFRA-2021-DEV-02-01

# INFRA-DEV Horizon Preparatory Phase for ET

M. Martínez



ICREA

IFAE



SPB meeting

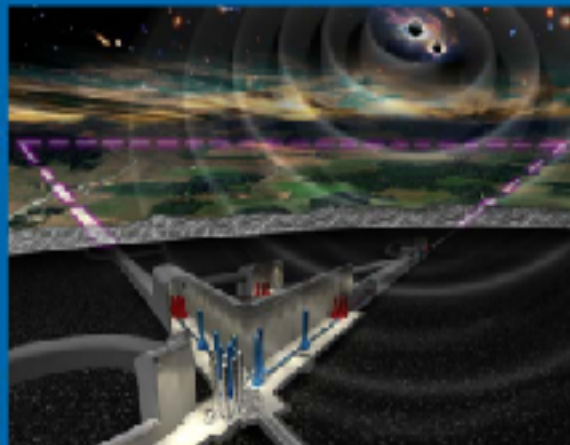
Maastricht, 23<sup>rd</sup> Feb 2023





Strategy Document on European Research Infrastructures  
**ROADMAP 2021**

<https://www.et-gw.eu/>



Project submitted by:

- **Italy** (Lead Country)
- Netherlands
- Belgium
- Spain
- Poland

30/06/2021:

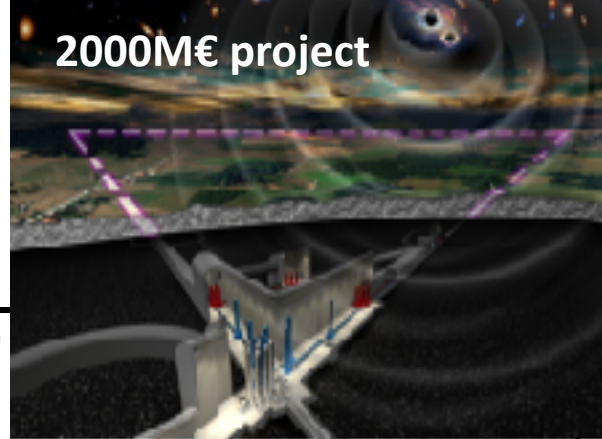
**ET is on the  
ESFRI roadmap!**

## ET Consortium

- ET CA signed by 41 institutions
- INFN and Nikhef are the coordinators of the consortium
- Funding expected in the next months by the governments in the frontline
- EU funding for the Preparatory Phase in 2022



# Einstein Telescope as ESFRI



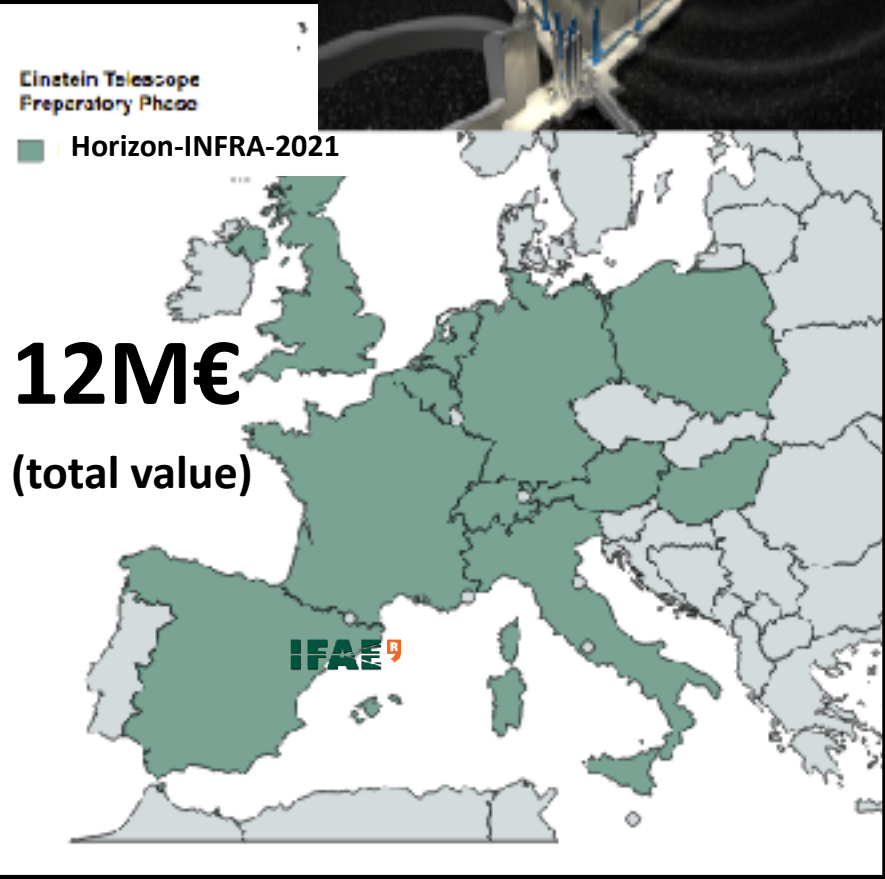
SEARCH FUNDING & TENDERS ▾ HOW TO PARTICIPATE ▾ PROJECTS & R

Preparatory phase of new ESFRI research infras

## Goals for ET Preparatory Phase

- Governance
- Financial architecture/plan/framework
- ET legal entity
- Final ET design and cost evaluation
- Site or sites selection
- Construction funding
- User services
- Computing model
- Sustainability

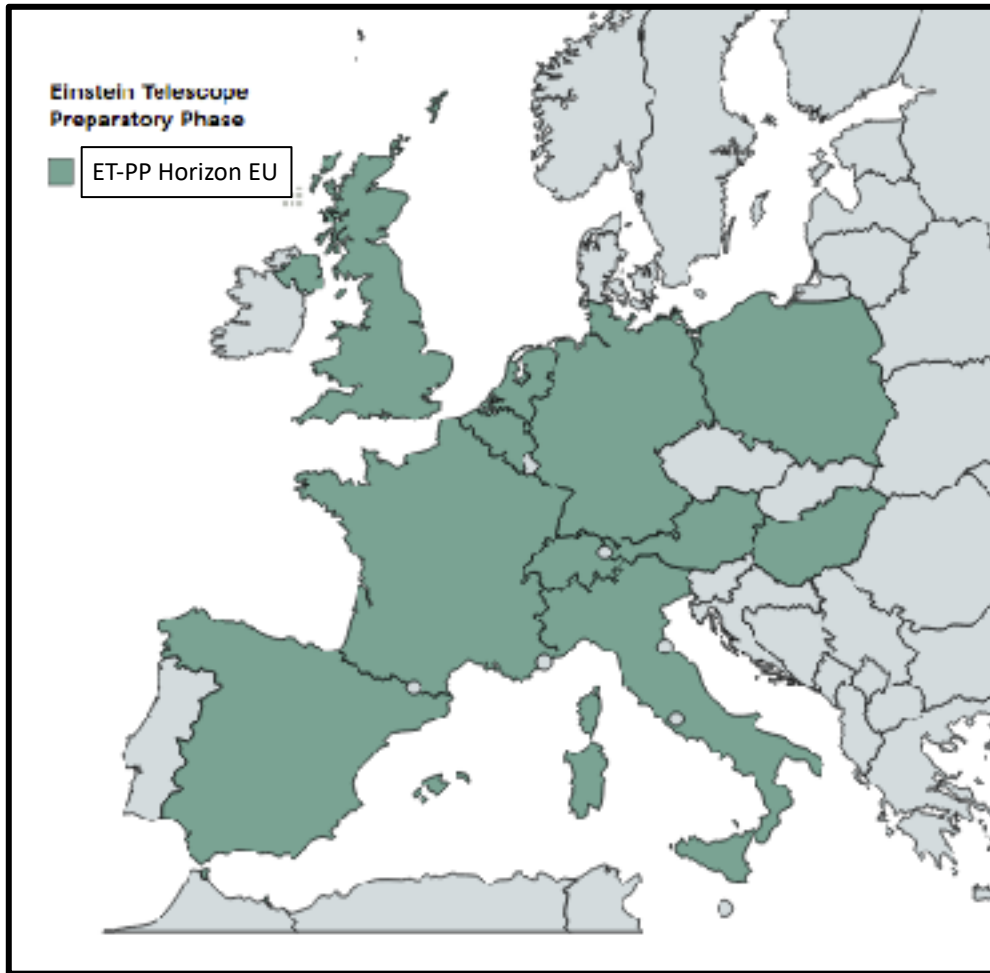
**3.45M€**  
(approved)



**Einstein Telescope Preparatory Phase (ET-PP) in 2022 – 2026**  
**HORIZON-INFRA-DEV EU Project coordinated by IFAE**

→ **Project started 1<sup>st</sup> September 2022 (<https://etpp.ifae.es>)**

# List of Partners & Third Parties



COUNTRY	Third parties
GERMANY	RWTH (Aachen), AEI (MPI), LUH (Hannover)
THE NETHERLANDS	VU (AMSTERDAM), UM (MAASTRICHT)
SPAIN	ICCUB (Barcelona), UV (Valencia), UIB (Mallorca) CDTI (Madrid)

COUNTRY	Partners
AUSTRIA	U. LEOBEN
BELGIUM	U. ANTWERPEN
BELGIUM	U. LOUVAIN
EGO	EGO
FRANCE	CNRS
GERMANY	DESY
HUNGARY	WIGNER RCP
ITALY	INFN
THE NETHERLANDS	NIKHEF
POLAND	U. WARSAW
SPAIN	IFAE BSC-CNS (affiliated)
SWITZERLAND (associated partner)	U. GENEVA
UK	UKRI CARDIFF (affiliated) GLASGOW (affiliated)

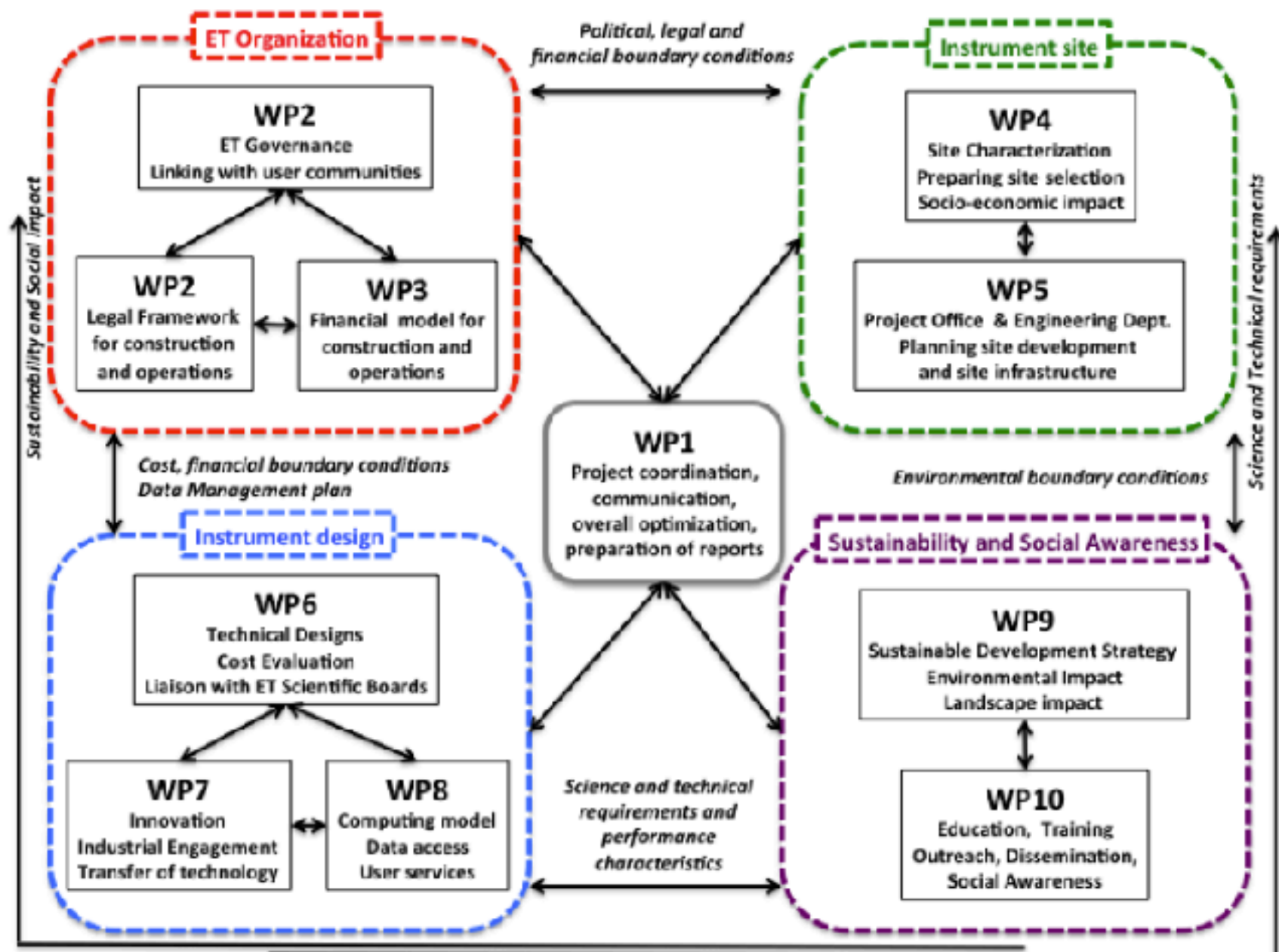
(as submitted to Brussels)



# Work Packages (WPs)

- **WP1 Coordination and Management**
- **WP2 Organization, Governance and Legal Aspects**
- **WP3 Financial Architecture**
- **WP4 Site Preparation**
- **WP5 Project Office / Engineering Dept.**
- **WP6 Technical Design**
- **WP7 Transfer of Technology**
- **WP8 Computing and Data Access**
- **WP9 Sustainable Development Strategy**
- **WP10 Education, Outreach and Citizen Engagement**

WPs were defined to cover the main INFRA-DEV missions and to address explicitly ESFRI recommendations



# ET-PP web online

<https://etpp.iafe.es>

## ET-PP Work Package Leaders



**Maria Klammer**  
Associate Professor, University of Zurich, Switzerland



**Fernando Feroni**  
Associate Professor, University of Valencia, Spain



**Justin G. Ryan**  
Associate Professor, University of Cambridge, UK



**Miklos E. Mele**  
Associate Professor, University of Cambridge, UK



**Emma Lindner**  
Associate Professor, University of Cambridge, UK



**Emilio Ruiz**  
Associate Professor, University of Valencia, Spain



**Giovanni Tosti**  
Associate Professor, University of Valencia, Spain



**Willem de Graaf**  
Associate Professor, University of Cambridge, UK



**Raffaele Ruffini**  
Associate Professor, University of Cambridge, UK



**Roberto Salas**  
Associate Professor, University of Cambridge, UK



**Andreas Freise**  
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**Harald Lodde**  
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**Paolo Chiggiato**  
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**Michael Punturo**  
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**Mauro Mancini**  
Associate Professor, University of Cambridge, UK



**Robert van der Meer**  
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**Stefano Ruffini**  
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**Sergei Chirva**  
Associate Professor, University of Cambridge, UK



**Antoni Sisti**  
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**Thomas Bieganski**  
Associate Professor, University of Cambridge, UK



**Chiara Arzuffi**  
Associate Professor, University of Cambridge, UK



**Maria Antonella Marzulli**  
Associate Professor, University of Cambridge, UK



**Nicolas Arnold**  
Associate Professor, University of Cambridge, UK



**Martin Hübner**  
Associate Professor, University of Cambridge, UK



**Robert Cullen**  
Associate Professor, University of Cambridge, UK

Will be portal for all the ET-PP information

## ET-PP

### Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory



Einstein Telescope will be the European Third-Generation Gravitational Wave Observatory, designed to observe the Universe by covering the whole spectrum observable from Earth with interferometric GW detectors.

The ET preparatory phase (ET-PP) will address a number of fundamental prerequisites for the approval, construction and operation of the

## ET-PP News

### XII Einstein Telescope Symposium

The XII symposium of the Einstein Telescope (ET) Sciences, on the 7th - 8th of June. The ET Sciences Telescope joined the formal establishment of the

June 13, 2022

- WP 1: Management and Coordination
- WP 2: Organization, Governance and Legal Aspects
- WP 3: Technical Architecture
- WP 4: Site Preparation
- WP 5: Project Office & Engineering Department
- WP 6: Technical Design
- WP 7: Innovation and Industrial Engagement
- WP 8: Computing and Data Access
- WP 9: Sustainable Development Strategy
- WP 10: Communication & Outreach



## WP 5: Project Office and Engineering Department

Work package led by CNRS

### Objectives

WP5 - Project Office and Engineering Department (led by CNRS) has the mission to establish the ET-PP Project Office and the corresponding Engineering Department. The role of this WP is to set-up a project management environment for the ET construction project.

This environment will be supported by consultative and executive bodies equipped with means to monitor, control, coordinate and report on the technical design, the engineering, the technical specifications, the risks, the budget and the schedule.

These activities are project-wide and make use of methodologies and tools which are the same across the whole of the ET construction project.

R. Flaminio (CNRS), A. Freise (NICHEP), and R. Salas (INFN) act as co-coordinators of WP5 in this proposal.

### Deliverables

- DS.1 Structure and the mandate of the Project Office. (M25)
- DS.2 Functionalities required from the tools in support of the project management. (M25)

# WP missions (1/5)

- **WP1 Coordination and Management**

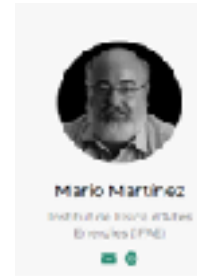
1. Management
2. Coordination

- **WP2 Organization, Governance and Legal Aspects**

1. ET Internal Organization
2. Legal Framework
3. Enlargement of the ET Consortium
4. Political convergence
5. Connection to other observatories and communities
6. RI layout, Strategic issues and international networking

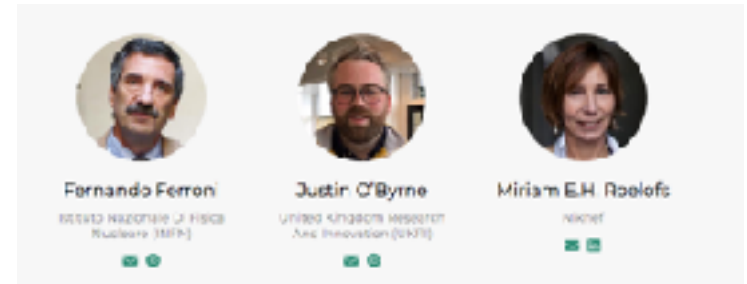
- **WP3 Financial Architecture**

1. Cost evaluation
2. Cost Sharing
3. In-kind Contributions
4. Define immediate financial tools



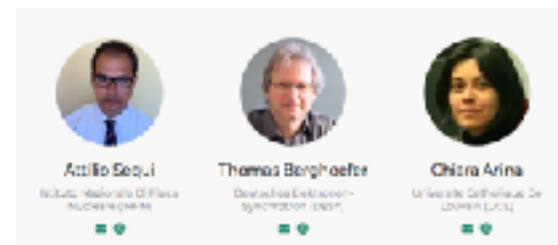
## Deliverables

- D1.1 Dissemination & Exploitation (D&E) Plan (M6)
- D1.2 Data Management (D&M) Plan (M6)



## Deliverables

- D2.1 Report providing options for legal entity (M11);
- D2.2 Minutes of meetings with EU and involved ministries (M11);
- D2.3 Legal entity statutes (M06);
- D2.4 Handover to establish the legal entity and its implementation ready for approval by (joint Council) and/or ministries (M07)



## Deliverables

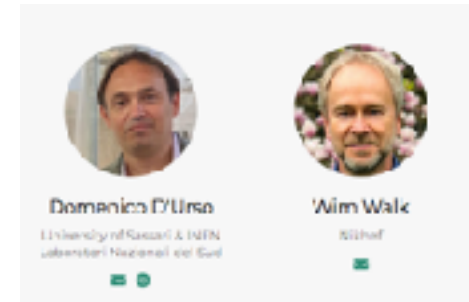
- D3.1 Handbook for design and construction phase (M36);
- D3.2 Handbook for operation phase (M42);
- D3.3 Financial plan and Scenario analysis (M47)



# WP missions (2/5)

- **WP4 Site Preparation**

1. Site scientific evaluation
2. Socio-economic impact
3. Legal/Financial aspects of the RI implementation
4. Mediation planning

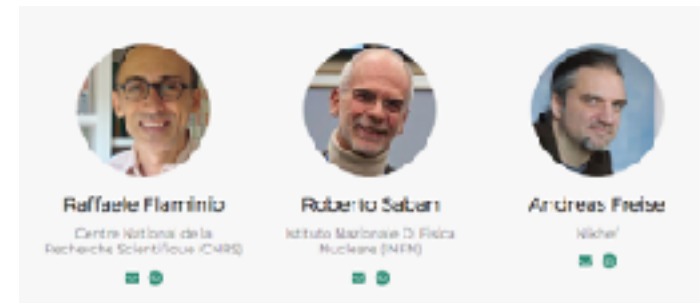


## Deliverables

- D4.1 Scan of legal procedures, permitting and land acquisitions. (M16)
- D4.2 Updated socio-economic impact studies. (M18)
- D4.3 Complete quantification of all the aspects impacting the ET performance. (M28)
- D4.4 3D geology, hydrology, etc. model with detailed localisation of the ET infrastructure. (M29)
- D4.5 Updated cost and schedule estimates of the excavations (D42)

- **WP5 Project Office / Engineering Dept.**

1. Technical Coordination of the Project
2. Human resources qualification
3. Strategic decisions making process
4. Planning
5. Preparation for Production
6. Industrial Partnerships
7. Risk Management

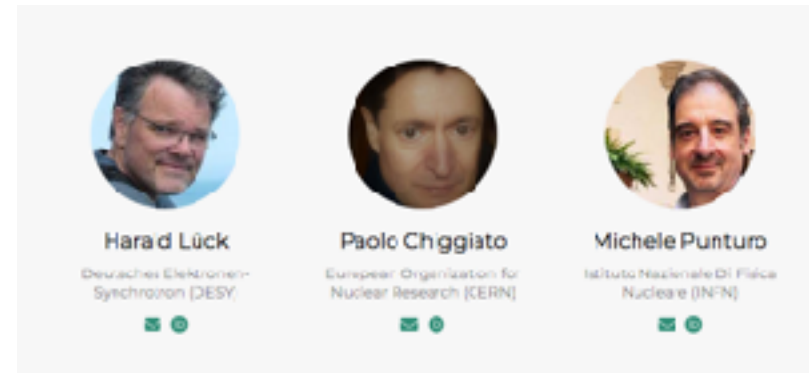


## Deliverables

- D5.1 Structure and the mandate of the Project Office. (M25)
- D5.2 Functionalities required from the tools in support of the project management. (M25)
- D5.3 Structure and the mandate of the Engineering Department. (M25)
- D5.4 Functional Engineering Department. (M28)
- D5.5 Functional Project Office. (M28)

# WP missions (3/5)

- WP6 Technical Design
  1. Infrastructure Technical Design
  2. Experiment Technical Design
  3. Scientific impact
  4. Open Data Access and Services



## Deliverables

- D6.1 Refined Science Case (M18)
- D6.2 Vacuum pipe Design (M24);
- D6.3 Preliminary RI TDR (M24);
- D6.4 Preliminary DET TDR (M24);
- D6.5 RI TDR (M40);
- D6.6 DMP and Data Access Policy (M46).

As expected there is a strong synergy with existing ET internal organization  
→ Seeking for the best coordination !  
We also involved external experts with huge experience from CERN



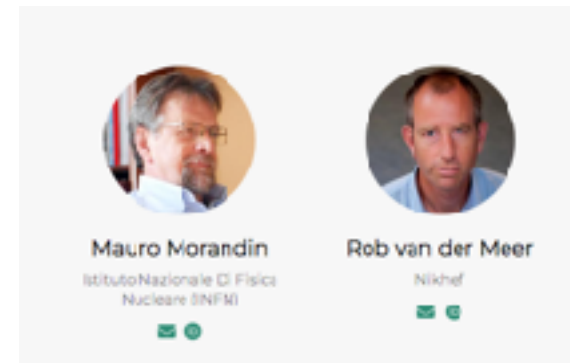
# WP missions (4/5)

- **WP7 Transfer of Technology**

1. Promotion of Innovative technologies
2. Liaison with industries, industrial returns
3. Intellectual Property

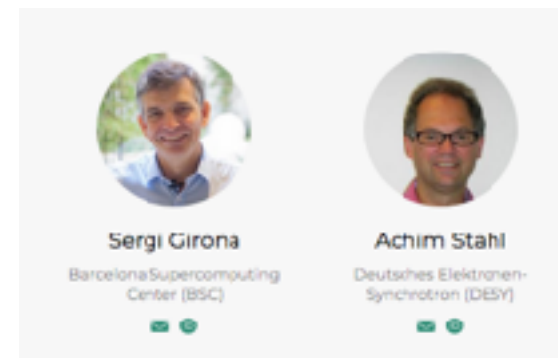
- **WP8 Computing and Data Access**

1. Computing model
2. Computing Resources
3. T0 Data Center
4. Data Preservation



## Deliverables

- D7.1 Innovation Plan (M12)
- D7.2 Report on industry engagement plan execution (M42)
- D7.3 Model for pursuing in ET a balanced industrial return (M33)
- D7.4 Report on TT and Intellectual property management in ET (M44)



## Deliverables

- D8.1: Computing and Data Requirements (M18)
- D8.2: Computing and Data Model (M42)
- D8.3: Data Access Implementation Guidelines (M47)

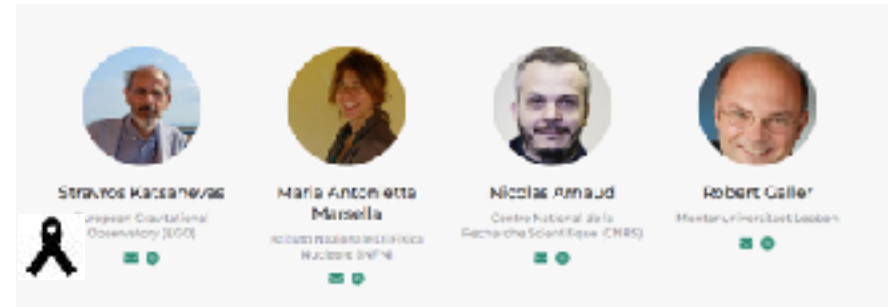
# WP missions (5/5)

- **WP9 Sustainable Development Strategy**

1. Low Carbon footprint
2. Liaison with Climate Change and Geoscience
3. Landscape and Environmental impact
4. Transportation

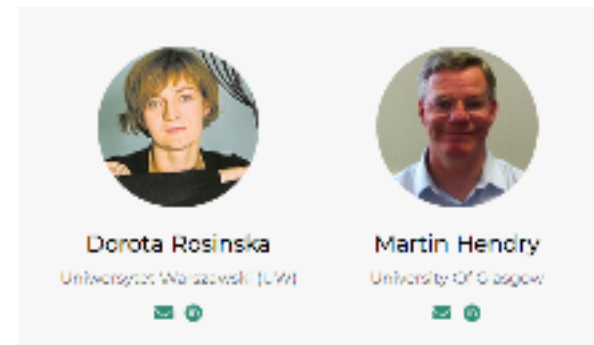
- **WP10 Education, Outreach and Citizen Engagement**

1. School Education Program
2. Dissemination and communication
3. Mentoring and Training
4. Diversity and Inclusion
5. Early Career Scientists



## Deliverables

- D9.1 ET Sustainable Development Implementation Strategy (M12)
- D9.2 ET Environmental impact assessment and mitigation strategy (M24)
- D9.3 ET CO2 footprint ET assessment and mitigation strategy (M36)



## Deliverables

- D10.1 Initiate strategic media and communications plan (M11)
- D10.2 Launch consortium website and social media accounts (M24)
- D10.3 Formulate strategic media and communications plan (M24)
- D10.4 Complete bank of graphics, multimedia resources (M36)
- D10.5 Launch ECR mentorship and training programme (M44)



**A large fraction devoted to the creating of the Project Office/ Engineering Department (44%)**  
**Significant funding for expert consulting on legal and financial aspects, socio-economic impacts, and site selection related studies**  
**Significant funding for sustainability studies**  
**Funding for ET-PP management, KTT, Computing model, and Outreach/Communication**

# Budget allocation

Position	ASSIGNMENT
Technical Coordinator	INFN (IN-KIND)
Systems Engineering	NIKHEF (IN-KIND)
Parameters, layout, risk Manager	CNRS (INFRA-DEV)
Software Engineer	CNRS (INFRA-DEV)
Civil Engineer	NIKHEF (INFRA-DEV)
Vacuum Engineer	CNRS (INFRA-DEV)
Integration and Technical Infrastructures Engineer	INFN (INFRA-DEV)
Head Project Office	INFN (IN-KIND)
Head Engineering Department	NIKHEF (IN-KIND)

- LEGAL CONSULTER
- FINANCIAL MANAGER
- SITE SELECTION PREPARATION
- PROJECT OFFICE & ENGINEERING DEPT.
- INDUSTRIAL LIAISON
- COMPUTING
- SUSTAINABILITY
- OUTREACH/SOCIAL AWARENESS

- Project Office/Engineering Dept.**
1. Technical Coordinator (in-kind)
  2. System Engineering (in-kind)
  3. Parameters, Layout, Risk Manager
  4. Software Engineer
  5. Civil Engineering
  6. Vacuum Engineer
  7. Integration and Technical Infrastructures Engineer
- Design of the vacuum system by CERN (in-kind funding included for first year)**

# ET-PP Open positions

## Open Position: Instrument Development Expert

The APC laboratory in Paris is recruiting a instrument system engineer for a 30 months temporary position to support the activities of the Einstein Telescope (ET) project

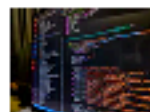
Nov 10, 2022



## Open Position: software engineer at IP2I-Lyon

IP2I-Lyon is recruiting a software engineer for a 3 year temporary position to participate to the support work of the Project Office in the framework of the ET project 'Einstein Telescope Preparatory Phase' (ET-PP)

Nov 3, 2022



## Open Position: Senior IT/Computing Architect position at the Department of Astronomy and the Gravitational-Wave Science Center of the University of Geneva

The Department of Astronomy and the Gravitational Wave Science Center (GWSC) of the University of Geneva is looking for a Senior Information Technology (IT) / Computing Architect (Assistant) (Scientifique II\*) to support the activities of the Einstein Telescope (ET) project in the design of the computing model and infrastructure of the next generation gravitational wave observatory.

Oct 20, 2022



## Open Position: System engineer for Project Support and Coordination at BSC

The Barcelona Supercomputing Center is offering a position for a system engineer who will become part of the Operations Department of the Center and participate in the activities of support and coordination for the Einstein Telescope Preparation Phase project (ET-PP).

Jul 11, 2022



## Open Position: Technology Transfer Technician at IFAE

The Institute for High Energy Physics (IFAE) in Barcelona is looking for a Technology Transfer Technician to support the Knowledge and Technology Transfer (KTT) Unit. The main work will be the execution of Innovation consultancy activities in the framework of an EU project ET-PP.

Jun 14, 2022



## Open Position: Project Manager Assistant at IFAE

The Institute for High Energy Physics (IFAE) in Barcelona is looking for a Project Manager Assistant to support the administrative/scientific coordination of the Gravitational Wave Group and the Research Projects Office.



Project: 101079696 — ET-PP — Horizon-ETPPA-2021-DEY-02

Contract with: [IP2I](#), [MRS-Lyon](#), [APC](#)



EUROPEAN RESEARCH EXECUTIVE AGENCY (REA)

RDAC - Future Society  
D4 - Refining European R&D and Research Infrastructure

### GRANT AGREEMENT

Project 101079696 — ET-PP

### PREAMBLE

This Agreement ('the Agreement') is between the following parties:

on the one hand,

the European Research Executive Agency (REA) ('EU executive agency' or 'granting authority'), under the powers delegated by the European Commission ('European Commission'),

and

on the other part,

1. 'the coordinator':

INSTITUTO DE FISICA DE ALTA ENERGIA (IFAE), PIC 95603507, established in CAMPUS DE BELLETERRA - UNIVERSITAT AUTÒNOMA DE BARCELONA, CERCANYES DEL NALLER DE 194, Spain,

and the following other beneficiaries, if they sign their 'accession form' (see Annex 3 and Article 42):

Grant Agreement finally signed with EC by middle August 2022

Concluding now the Collaborative Agreement among partners

Budget being now executed

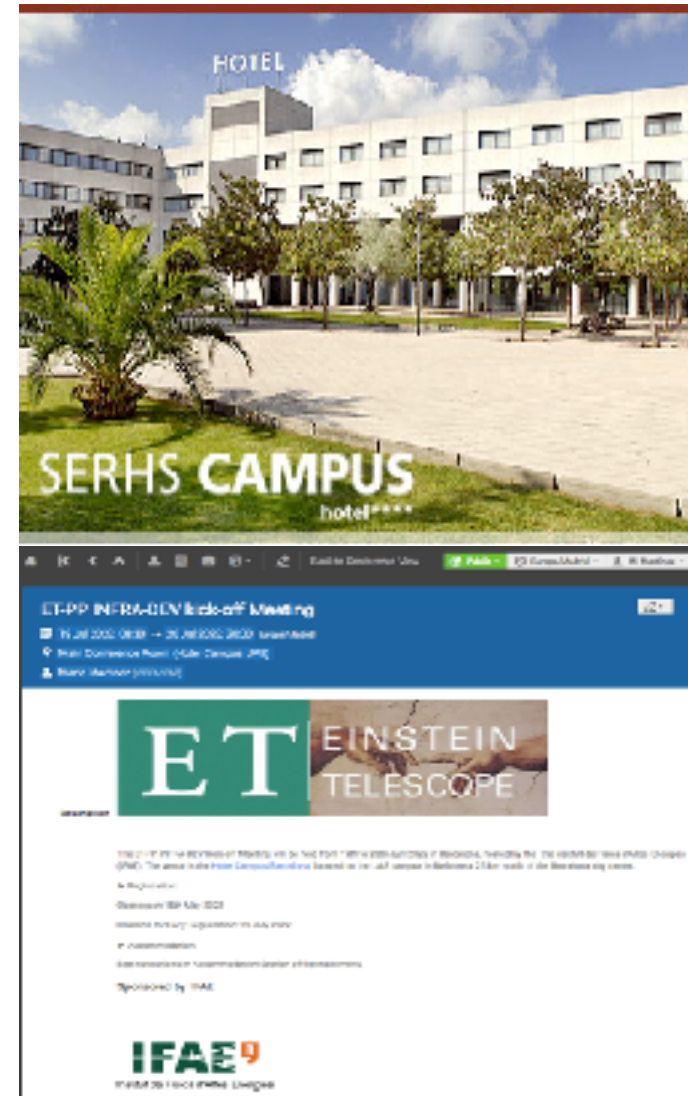
→ A number of open positions are advertised in ET-PP page

→ More to come

# INFRA-DEV Kick-off meeting

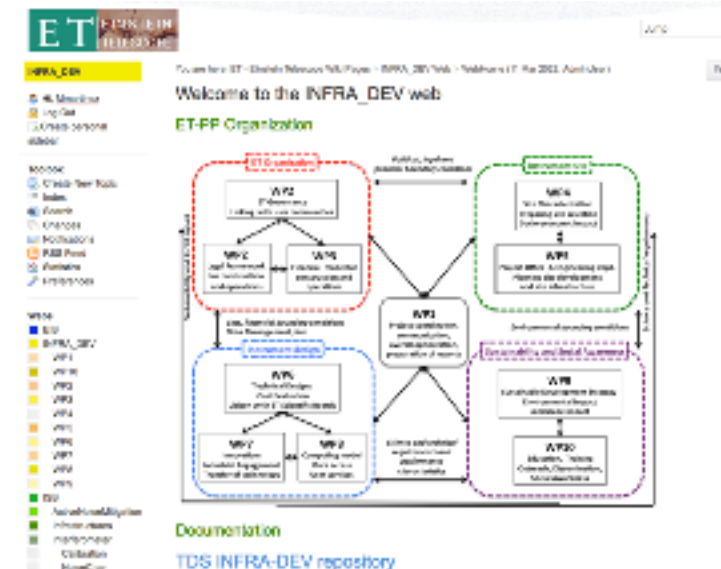
## July 19<sup>th</sup> – 20<sup>th</sup> 2022 @ Barcelona

- We had an **in-person 2 days** meeting of ET management & INFRA-DEV WP coordinators
- WP-WP discussions taking place during first day followed by plenary reports and plan drawing/discussions the second day
- Dedicated slot for BSR and presence of BGR
- Dedicated slot on ET-PP Collaborative Agreement & EC Reporting details
- <https://indico.ifae.es/event/1393>
- Running biweekly zoom meetings since then
- **All hands in-person meeting @ BCN foreseen for early summer 2023 (covered by ET-PP funds)**



# ET-PP after submission

- ET-PP started already to work without waiting for the EC resolution
  - Running ET-PP coordinating meetings
  - First Common Document repository in place @ EGO (TDS + Wiki)
  - Exploring CERN management tools actively**
    - At the moment being evaluated in WP5/7**
  - ET bylaws in place
  - ET Collaboration in place
- Ongoing WP and WP-WP interactions
  - Collecting information on governance and financial models from other organizations (CERN, SKA, ESS,...)
  - Building the WP teams
  - Establishing regular meetings
  - SWOT analyses
  - Mapping Tasks with ET Divisions
  - ET Collaboration – ET Observatory relationship**



	T&I TO Data center	TE2 Generating and Data Model	TS3 Resources	TS4 Data Access Implementation
01 Software, Hardware, data challenges		Computing resources, computing domains data format	Resources for processing execution and data storage availability	Data availability Data releases format
02 Services and Collaborative Support			Resources and infrastructure for services and collaborative tools	Tools for processing, API (IAM), data access
03 Computing and data model, Resource management	TO domain and computing resources estimator	Computing model data model	Resources estimation	
04 Multimessenger alerts infrastructure				Tools for multi messenger alerts

Example: WP8 Tasks and EIB Divisions



# Few recent examples

## CONCLUSIONS KICK OFF 6-7 OCTOBER 22

## WP2

### Current governance: offer recommendation WP2

- Analysis current governance → need to flesh out current project organization
- Invite **ET directorate** to present a project organization plan, including the necessary steps for implementation
- - Study, discuss and provide feedback to ET directorate in next WP2 meeting
- Offer recommendations to the actors to further develop and strengthen the current governance

### NON-INFRADIV dependencies

**BGR:** informal interactions with BGR; governance requirements, input for discussions in BGR

**BSR:** no dependency at the moment, to be discussed after the adoption of the ESR ToR

**APPC/ARIP:** no dependencies

**ET project and Collaboration** are sufficiently represented in the INFRACON workpackages

**EGG/VRGO and LIGO dynamics**, at the moment not relevant for WP2

Gather best practices from IGO (SKA, CERN) and ERIC (E-E) on operational matters and maturity process.

Contact persons via network.

John Wommersley (SKA, FSS, FSRF), Richard Schilz (SKA), Simon Berry (SKA and other RE), Reetha Vierboom (FSS, SKA, CERN), Lars Björnsen (E-E, SKA).

Click to add title

Nik[thof

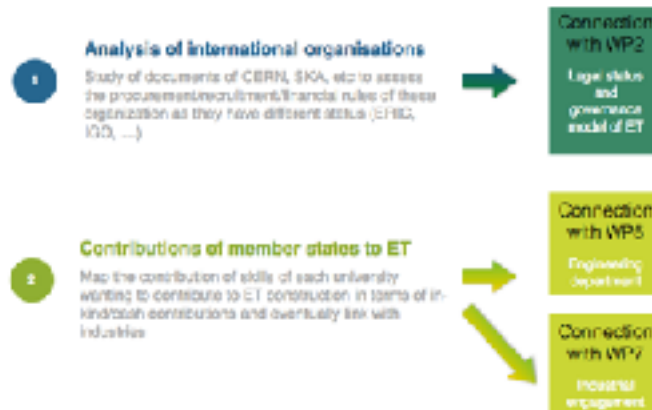
This is to give you the flavour  
lots of work is on going in  
the exploration of Governance  
and Financial Models

Also in the area of ET Project and  
Site preparation WP

## WP3

### WP3 ongoing activities

We are currently working along two directions



## Next Urgent Steps

ET

> Windmills measurements

> SPB organizational chart completion (urgent)

> Docs in preparation:

□ General Strategy (ET-PP):

- ✓ Concerns, challenges and requirements
- ✓ Site descriptions
- ✓ Characterization to measurements description
- ✓ standards

□ Site-specific characteristics that impact ET sensitivity and its duty cycle (ET-PP)  
(draft will be uploaded by Jan 13\*)

□ physical variables needed for the site characterization (SPB-WD1)

□ measurements recommendations and standards (SPB-WD1)

## WP4

# ET-PP Deliverables for 2023

## WP1

- ET-PP Dissemination and Exploitation plan (Feb 2023)
- ET-PP Data Management Plan (Feb 2023)

## WP2

- Report providing options for legal entity (July 2023)
- Minutes of meeting with EC and involved ministres (July 2023)

## WP3

- Financial model for immediate needs (NEW 2023)

## WP4

- Scan of legal procedures, permitting and land acquisitions (June 2023)
- Updated socio-economic impact studies (November 2023)

## WP5

## WP6

## WP7

- Innovation Plan (July 2023)

## WP8

## WP9

## WP10

- Initiate strategic media and communication plan (July 2023)

# Random final notes

- **ET-PP INFRA-DEV Horizon EU project on the run with 3.45M€**
  - Mission to facilitate the definition of a well organized and well functioning ET Project and timely decisions (lots of work ahead of us)
  - Putting together a Governance structure heavily inspired by the (successful) CERN model → adequate for a 2B€ project.
  - Defining the required tools / repositories adequate for a 2B€ project.
  - Funding Agencies recommend to learn from other ESFRI lessons and avoid known/old mistakes
  - Funding Agencies very sensitivity to delays as (too often) happens in other ESFRI endeavours
- **Four years ahead of us to define many important aspects of the ET project and to take important decisions**
  - Within ET-PP, most emphasis in defining a functional Project Office and Engineering Department, Governance, Legalities and Site Preparation
  - Other important aspects include financial model, sustainability, industrial returns and social awareness....
  - Key presence of CERN experience
  - Crucial to marry ET-PP WPs and ET Boards realities, deliverables, milestones
  - ET site characterization / cost estimates needed soon
  - Delivery of a preliminary “TDR” in 2 years is main mission of ET Collaboration

# Thanks for your attention

