



Preparatory phase of new ESFRI research infrastructure projects

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

INFRA-DEV Horizon Preparatory Phase for ET

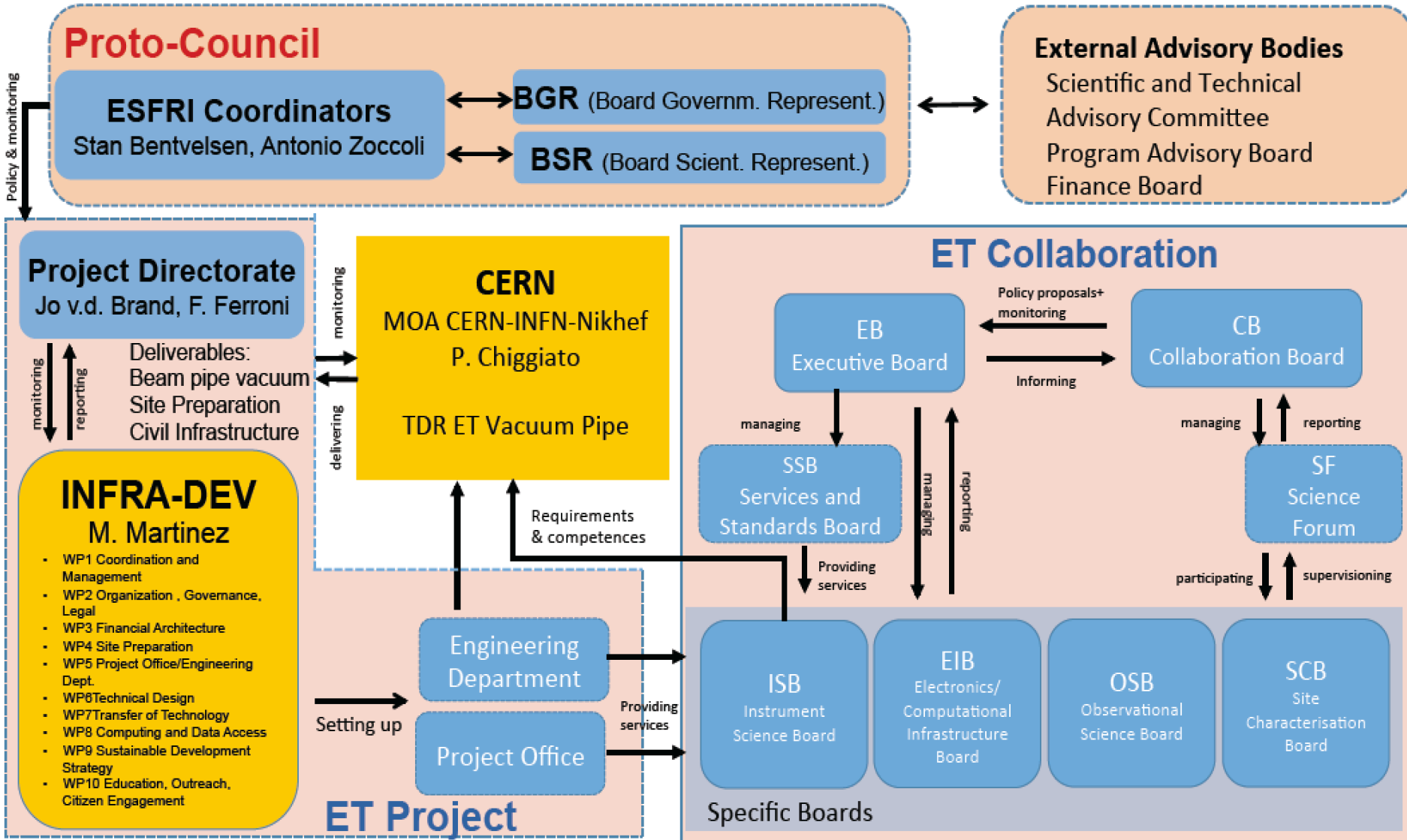
M. Martínez



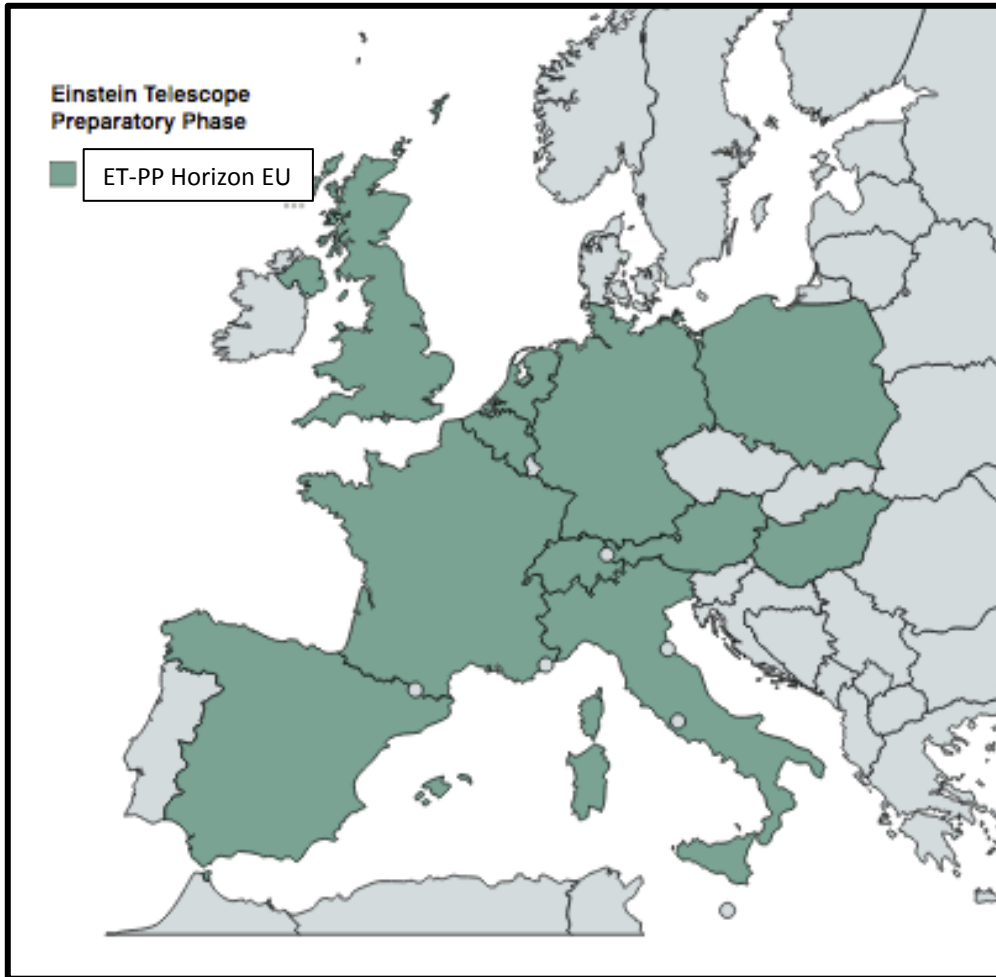
ET symposium
Budapest, 8th June 2022



ET-PP Preparatory Phase



List of Partners & Third Parties



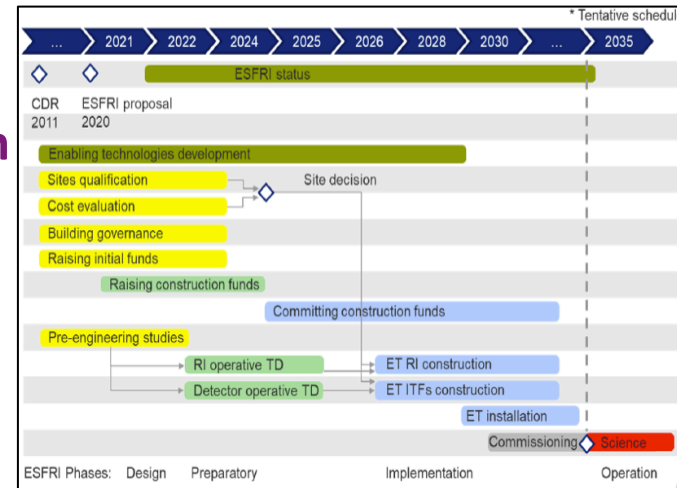
| COUNTRY | Partners |
|-------------------------------------|--|
| AUSTRIA | U. LEOBEN |
| BELGIUM | U. ANTWERPEN |
| BELGIUM | U. LOUVAIN |
| EGO | EGO |
| FRANCE | CNRS |
| GERMANY | DESY |
| HUNGARY | WIGNER RCP |
| ITALY | INFN |
| THE NETHERLANDS | NIKHEF |
| POLAND | U. WARSAW |
| SPAIN | IFAE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

| 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) |

(as submitted to Brussels)

ET INFRA-DEV mission

- A project of **3.45M€** with 4 years duration
- ET collaboration considers this is the most adequate time scale
 - **We aim for a site selection by 2025**
- The INFRA-DEV funding will be strategically used to (objectives)
 - Define the Governance and Financial Framework
 - ET legal entity
 - Revisited ET design and Cost Evaluation
 - **Geographic Enlargement of the ET consortium**
 - Define a strong Project Office
 - Pave the path towards a timely site decision
 - Environmental and sustainability aspects
 - Increase the social awareness on the project
 - Computing model and user services



- **Most of the work on refined TDRs for the RI in the following 4 years will rely on existing resources in the collaboration but also bringing new very special expertise on different aspects**

Work Packages (WPs)

- **WP1 Coordination and Management**
- **WP2 Organization, Governance and Legal Aspects**
- **WP3 Financial Architecture**
- **WP4 Site Characterization**
- **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

WP missions (1/3)

- **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

Coordinated by ET Project Directorate

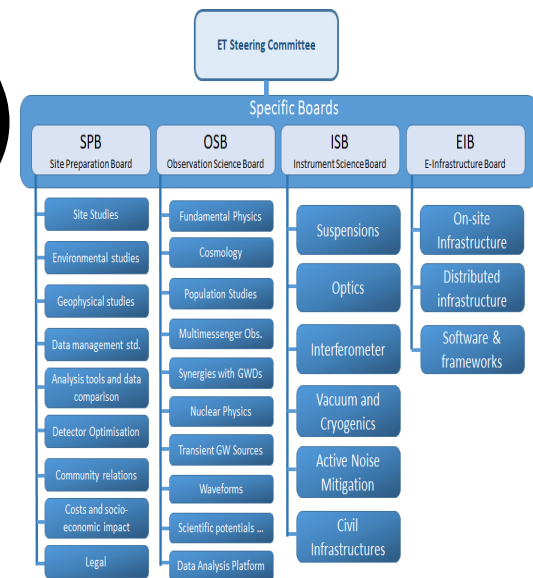
- **WP3 Financial Architecture**

1. Cost evaluation
2. Cost Sharing
3. In-kind Contributions

| Work Package | Coordinators | Institutions/ Countries |
|--|---------------------------------------|-----------------------------|
| WP1 Coordination and Management | M. Martinez M. Balza | Spain |
| WP2 Organization, Governance and Legal Aspects | F. Ferroni J. van den Brand | Italy Netherlands |
| WP3 Financial Architecture | A. Sequi T. Berghöfer Ch. Arina | Italy Germany Belgium |

WP missions (2/3)

- **WP4 Site Characterization**
 1. Site scientific evaluation
 2. Socio-economic impact
 3. Legal/Financial aspects of the RI implementation
 4. Mediation planning
- **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
- **WP6 Technical Design**
 1. Infrastructure Technical Design
 2. Experiment Technical Design
 3. Scientific impact
 4. Open Data Access and Services



| Work Package | Coordinators | Institutions/ Countries |
|-----------------------------|---|----------------------------|
| WP4 Site Selection | M. Carpinelli F. Linde | Italy Netherlands |
| WP5 Project Office | A. Freise R. Flaminio [R. Saban] | Netherlands France |
| WP6 Technical Design | M. Punturo H. Lueck [P. Chiggiato] | Italy Germany |

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 (3/3)

- **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

- **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**

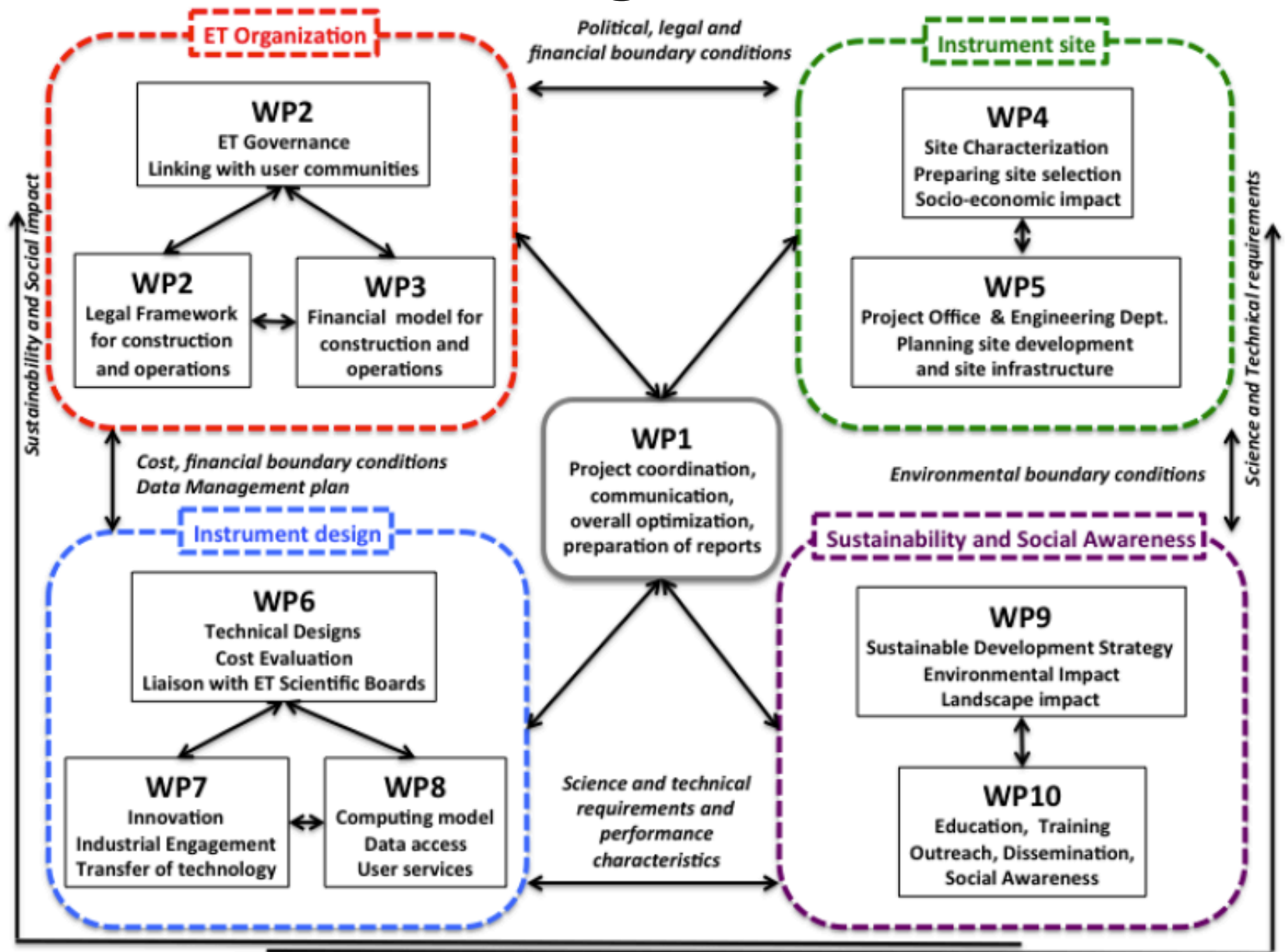
1. School Education Program
2. Dissemination and communication
3. Mentoring and Training
4. Diversity and Inclusion
5. Early Career Scientists

| Work Package | Coordinators | Institutions/ Countries |
|---|---|----------------------------|
| WP7 Transfer of Technology | M. Morandin R. van der Meer | Italy Netherlands |
| WP8 Computing and Data Access | S. Girona A. Stahl | Spain Germany |
| WP9 Sustainable Development Strategy | N. Arnaud S. Katsanevas [M. Marsella] | France EGO |
| WP10 Education, Outreach and Citizen Engagement | D. Rosinska M. Hendry | Poland UK |

Bringing some experts from outside ET to deal with some aspects

The process for defining the WP workforce brought new institutions interested in ET after it received the ESFRI recognition

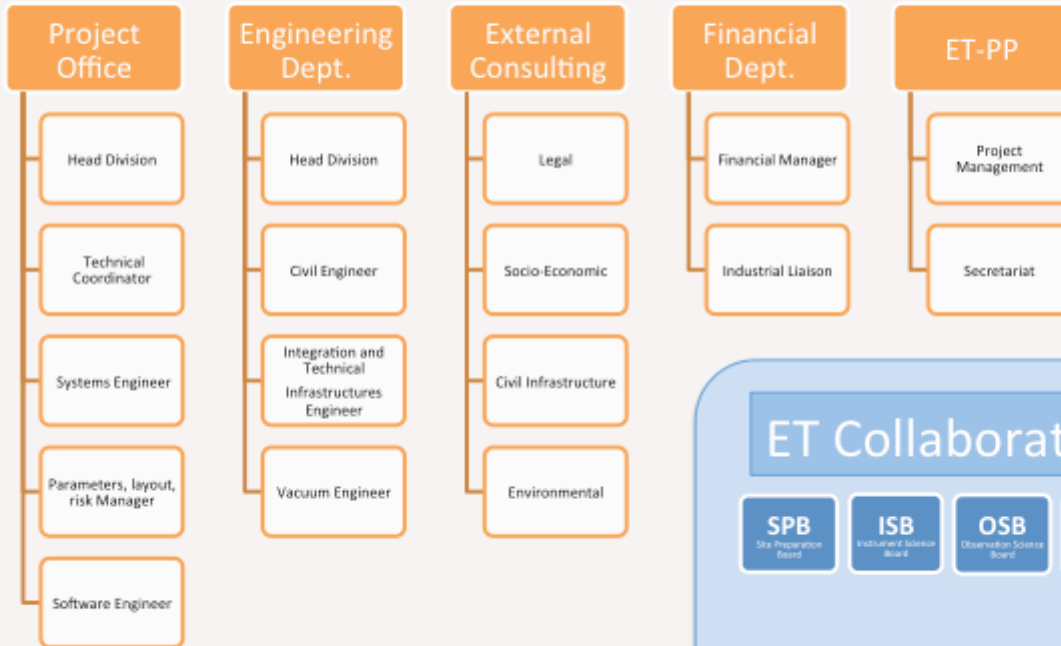
ET-PP Organization



Financial model

ET Council

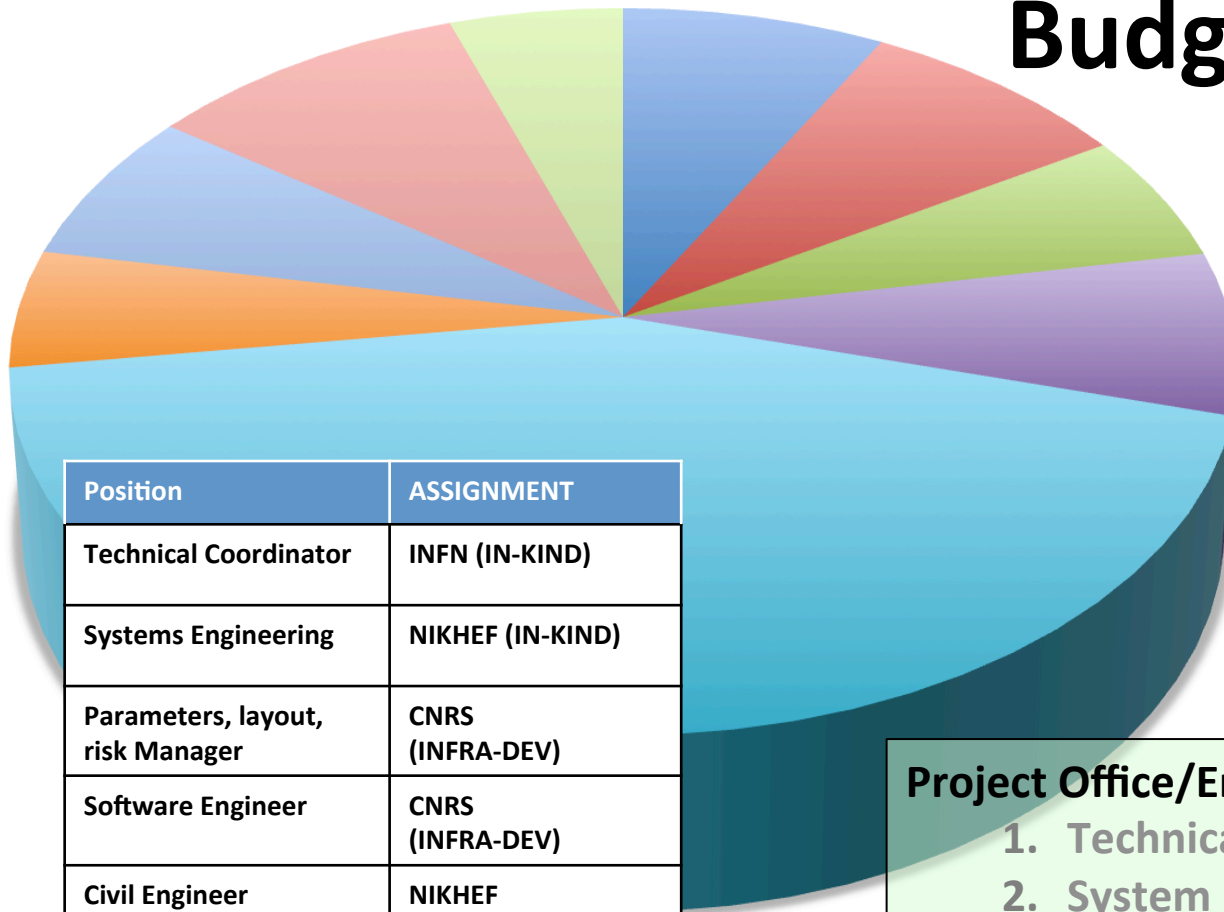
ET Project Directorate



| WP # | Funding allocation (k€) |
|--------------|-------------------------|
| 1 | 273,75 |
| 2 | 285,00 |
| 3 | 200,00 |
| 4 | 250,00 |
| 5 | 1515,00 |
| 6 | --- |
| 7 | 181,30 |
| 8 | 237,50 |
| 9 | 330,00 |
| 10 | 177,50 |
| TOTAL | 3450,00 |

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



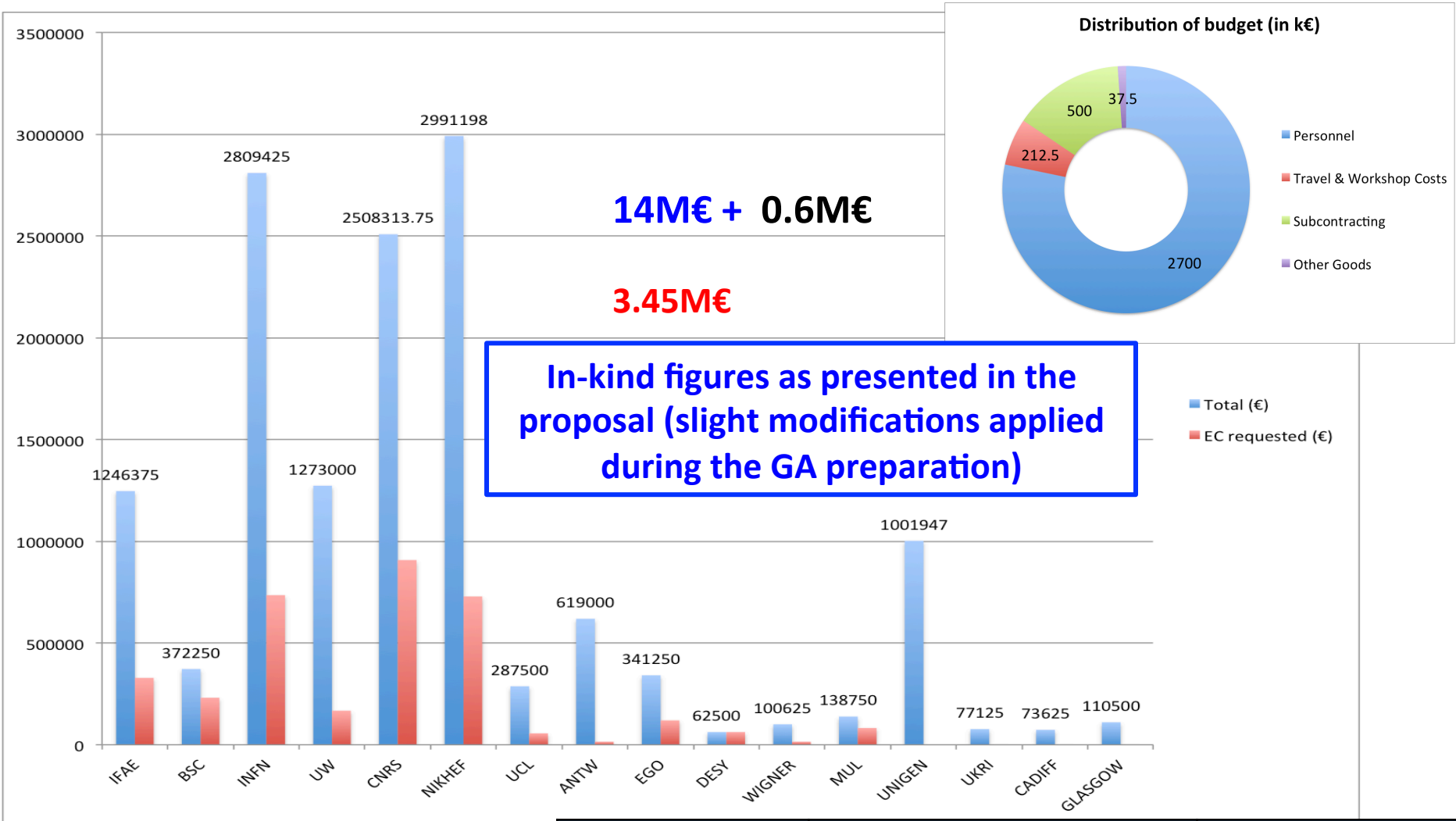
- MANAGEMENT/ADMINISTRATION
- LEGAL CONSULTER
- FINANCIAL MANAGER
- SITE SELECTION PREPARATION
- PROJECT OFFICE & ENGINEERING DEPT.
- INDUSTRIAL LIAISON
- COMPUTING
- SUSTAINABILITY
- OUTREACH/SOCIAL AWARENESS

| 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) |

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)



Only taking into account contributions related to coordination of tasks

| COUNTRY | Third parties | In-kind contribution (€) |
|-----------------|--|--------------------------|
| GERMANY | RWTH (Aachen), AEI (MPI), LUH (Hannover) | 110000 |
| THE NETHERLANDS | VU (AMSTERDAM), UM (MAASTRICHT) | 335000 |
| SPAIN | ICCUB (Barcelona), UV (Valencia), UIB (Mallorca) CDTI (Madrid) | 133000 |

Deliverables (I) 41 deliverables

Table 3.1c: List of Deliverables

| Deliverable (number) | Deliverable name | Work package number | Short name of lead participant | Type | Dissemination level | Delivery date (in months) |
|----------------------|--|---------------------|--------------------------------|------|---------------------|---------------------------|
| D1.1 | Report to EC | WP1 | IFAE | R | PU | M18 |
| D1.2 | Report to EC | WP1 | IFAE | R | PU | M36 |
| D1.3 | Report to EC | WP1 | IFAE | R | PU | M48 |
| D2.1 | Report providing options for legal entity | WP2 | NIKHEF | R | PU | M12 |
| D2.2 | Minutes of meetings with EC and involved ministries | WP2 | NIKHEF | R | PU | M12 |
| D2.3 | Legal entity statutes | WP2 | NIKHEF | R | PU | M36 |
| D2.4 | Roadmap to establish the legal entity and its implementation. | WP2 | NIKHEF | R | PU | M48 |
| D3.1 | Handbook for design and construction phase | WP3 | UCL | R | PU | M36 |
| D3.2 | Handbook for operating phase | WP3 | UCL | R | PU | M42 |
| D3.3 | Financial plan and Scenario analysis | WP3 | UCL | R, O | PU | M48 |
| D4.1 | Scan of legal procedures, permitting and land acquisitions i.e. the steps to be taken prior to starting excavations. | WP4 | NIKHEF | R | PU | M10 |
| D4.2 | Updated socio-economic impact studies | WP4 | INFN | R | PU | M15 |
| D4.3 | Complete quantification of all the aspects impacting the ET performance. | WP4 | UW | R | PU | M22 |
| D4.4 | 3D geology, hydrology, etc. model with detailed localisation of the ET infrastructure. | WP4 | INFN | R | PU | M27 |
| D4.5 | Updated cost and schedule estimates of the excavations | WP4 | NIKHEF | R | PU | M36 |
| D5.1 | Structure and mandate of the Project Office | WP5 | CNRS | R | PU | M25 |
| D5.2 | Functionalities required from the tools in support of the project management | WP5 | CNRS | R | PU | M25 |
| D5.3 | Structure and mandate of the Engineering Department | WP5 | CNRS | R | PU | M25 |
| D5.4 | Funcional Engineering Department | WP5 | NIKHEF | R | PU | M28 |
| D5.5 | Funcional Project Office | WP5 | INFN | R | PU | M28 |

Table as presented in the proposal (some minor modifications applied during the GA preparation)

← Legal entity statutes (M36)

← Financial plan (M48)

← Socio-economic Impact (M15)

← Impacts of ET perform. (M28)

← ET site characterization (M30)

← Cost Estimates (M42)

← Functional Project Office (M28)

← Functional Engineer Dept. (M28)

Deliverables (II)

41 deliverables

| | | | | | | |
|-------|--|------|--------|-----|--------|-----|
| D6.1 | Refined Science Case | WP6 | UNIGE | R | PU | M18 |
| D6.2 | Vacuum pipe Design | WP6 | ANTW | R | PU | M24 |
| D6.3 | Preliminary RI TDR | WP6 | INFN | R | PU | M24 |
| D6.4 | Preliminary DET TDR | WP6 | NIKHEF | R | PU | M24 |
| D6.5 | RI TDR | WP6 | INFN | R | PU | M40 |
| D6.6 | DMP and Data Access Policy | WP6 | DESY | R | PU | M46 |
| D7.1 | Innovation plan | WP7 | IFAE | R | PU | M12 |
| D7.2 | Report on industry engagement plan execution | WP7 | NIKHEF | R | PU | M42 |
| D7.3 | Model for pursuing in ET a balanced industrial return | WP7 | INFN | R | PU | M33 |
| D7.4 | Report on TT and Intellectual property management in ET | WP7 | INFN | R | PU | M44 |
| D8.1 | Computing and Data Requirements | WP8 | UNIGE | R | PU | M18 |
| D8.2 | Computing and Data Model | WP8 | UNIGE | R | PU | M42 |
| D8.3 | Data Access Implementation Guidelines | WP8 | BSC | R | PU | M48 |
| D9.1 | ET Sustainable Development Implementation Strategy | WP9 | CNRS | R | PU | 12 |
| D9.2 | ET Environmental impact assessment and mitigation strategy | WP9 | INFN | R | PU | 24 |
| D9.3 | ET CO2 footprint ET assessment and mitigation strategy | WP9 | EGO | R | PU | 36 |
| D10.1 | Initiate strategic media and communications plan | WP10 | UW | R | PU | 12 |
| D10.2 | Launch consortium website and social media accounts | WP10 | EGO | Web | Global | 24 |
| D10.3 | Formulate strategic media and communications plan | WP10 | NIKHEF | R | PU | 24 |
| D10.4 | Complete bank of graphics and multimedia resources | WP10 | IFAE | R | Global | 36 |
| D10.5 | Launch ECR mentorship and training programme | WP10 | UKRI | R | PU | 44 |



Science case (M18)



Detector TDR (M24)



RI TDR (M40)



Model for balanced Industrial returns (M33)



Computing model (M42)



Environmental impact and its mitigation (M24)



CO2 footprint (M36)



ET Web site (M24)



ECR mentorship and training Program (M44)

Milestones

Table as presented in the proposal
(some minor modifications applied
during the GA preparation)

25 Milestones

ET Collaboration in place (M12)
(actually it is month minus 3)

First Recourse Board Meeting (M33)

Table 3.1d: List of milestones

| Milestone number | Milestone name | Related work package(s) | Due date (in month) | Means of verification |
|------------------|--|-------------------------|---------------------|-----------------------|
| M1.1 | ET-PP first year internal review | WP1 | M12 | Workshop |
| M1.2 | ET-PP middle term internal review | WP1 | M24 | Workshop |
| M1.3 | ET-PP final internal review | WP1 | M45 | Workshop |
| M3.1 | Constitution / first meeting of the resource board | WP3 | M33 | Workshop |
| M4.1 | Document detailing the site-specific characteristics that impact ET sensitivity and its duty cycle. | WP4 | M3 | Report |
| M4.2 | Common methodology to estimate impact of site characteristics on ET sensitivity and operation and, if required, a scheme to compensate it. | WP4 | M10 | Report |
| M5.1 | The recruitment of the Project Office team is completed. | WP5 | M15 | Report |
| M5.2 | All three documents (WP5-D1, D2 and D3) are published. | WP5 | M25 | Report |
| M5.3 | The Engineering Department as a functional unit complete | WP5 | M27 | Report |
| M5.4 | The Project Office as a functional unit | WP5 | M27 | Report |

| | | | | |
|-------|--|---------------|-----|----------------------|
| | complete | | | |
| M6.1 | ET Collaboration in place | WP6 | M12 | ET Symposium |
| M7.1 | Analysis of promotion strategies accomplished | WP7 | M8 | Report |
| M7.2 | Engagement plan produced | WP7 | M10 | Report |
| M7.3 | Analysis of balanced industrial return strategies accomplished | | M15 | Report |
| M8.1 | Workflows Requirements collection and constraints: computing and data | WP8 | M12 | Workshop (+D8.1) |
| M8.2 | Computing Infrastructures availability for ET workflows, characteristics | WP8, WP9 | M24 | Workshop (+ D8.1) |
| M8.3 | On site infrastructure, computing and data model | WP8, WP6 | M36 | Workshop (+D8.2) |
| M8.4 | Low latency and offline workflows and computing model | WP8, WP6 | M40 | Workshop (+D8.2) |
| M8.5 | Data management, access, policy and implementation | WP8, WP6, WP2 | M46 | Workshop (+D8.3) |
| M9.1 | Preliminary sustainability plan | WP9 | M12 | Report |
| M9.2 | ET Sustainability Workshop | WP9 | M18 | Workshop+Report |
| M9.3 | Final sustainability plan | WP9 | M48 | Report |
| M10.1 | Appointment of Communications and Outreach Coordinator | WP10 | M8 | Appointment contract |
| M10.2 | ET Consortium website and social media launched | WP10 | M24 | Public launch |
| M10.3 | ECR Mentorship and Training programme established | WP10 | M44 | Report |

Common Methodology for site characterization (M10)

On site Computing model (M36)

Sustainability Workshop (M18)

ET-PP after submission

- ET-PP t0 will be most probably Sep. 1st
- ET-PP started already to work without waiting for the EC resolution
 - Running ET-PP monthly coordinating meetings
 - Common Document repository now in place @ EGO
 - **ET initial bylaws in place**
 - **ET Collaboration in place (today)**

The screenshot shows the 'ET-PP Organization' page on the INFRA_DEV web. It features a navigation menu, a 'Toolbox' with various utility links, and a 'Webs' section listing various EGO-related tools. The main content is a project organization chart with the following components:

- ET Organization (Red dashed box):** WP2 (ET Governance), WP2 (Legal Framework), WP3 (Financial model).
- Instrument site (Green dashed box):** WP4 (Site Characterization), WP5 (Project Office & Engineering Dept.).
- Instrument design (Blue dashed box):** WP6 (Technical Designs), WP7 (Innovation), WP8 (Computing model).
- Environmental boundary conditions (Purple dashed box):** WP9 (Sustainable Development Strategy), WP10 (Education, Training).
- Central Hub:** WP1 (Project coordination, communication, overall optimization, preparation of reports).

Interactions are shown with arrows between these work packages. The chart is surrounded by four boundary condition categories: Political, legal and financial; Sustainability and Social Impact; Cost, financial boundary conditions; and Science and technical requirements and performance characteristics.

- Ongoing WP and WP-WP interactions
 - Collecting information on governance and financial models from other organizations
 - Building the WP teams
 - Establishing regular meetings
 - SWOT analyses
 - Mapping Tasks with ET Divisions
 - ET Collaboration – ET Project relationship

| | T8.1 T0 Data center | T8.2 Computing and Data Model | T8.3 Resources | T8.4 Data Access Implementation | |
|---|--|---|---|---|--|
| D1 Software, frameworks, data challenges | | Computing frameworks computing domains data formats | Resources for frameworks execution and data storage availability | Data availability Data releases format | TTG Technology Tracking working Group |
| D2 Services and Collaboration Support | | | Resources and infrastructure for services and collaborative tools | Tools for monitoring, AAI (IAM), data access | |
| D3 Computing and data model, Resource Estimation | T0 storage and computing resources estimation | Computing model data model | Resources estimation | | |
| D4 Multimessenger alerts infrastructure | | | | Tools for multi messenger alerts | |

Example: WP8 Tasks and EIB Divisions

INFRA-DEV Kick-off meeting

July 19th – 20th @ Barcelona

- Grant Agreement now under preparation
- We will have 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
- Location: UAB Campus @ Barcelona
- Seed of INDICO already in place
→ Registration open (by invitation)

<https://indico.ifae.es/event/1393>

07/06/22

Hotel Campus UAB

SERHS CAMPUS hotel****

ET-PP INFRA-DEV kick-off Meeting

19 Jul 2022, 08:30 -> 20 Jul 2022, 20:00 Europe/Madrid

Main Conference Room (Hotel Campus UAB)

Mario Martinez (@CREA/IFAE)

ET EINSTEIN TELESCOPE

Description

The ET-PP INFRA-DEV Kick-off Meeting will be held from 19th to 20th July 2022 in Barcelona, hosted by the Institut de Física d'Altes Energies (IFAE). The venue is the Hotel Campus Barcelona, located on the UAB campus in Bellaterra, 25 km north of the Barcelona city centre.

► Registration:
Opening on 15th May 2022
Deadline for Early Registration: 20 July 2022

► Accommodation:
See instructions in Accommodation Section of the main menu

Sponsored by IFAE

IFAE Institut de Física d'Altes Energies

etppbcn@ifae.es

Random final notes

- **ET-PP INFRA-DEV Horizon EU project approved 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 2Bn € 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 endeavors
- **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 Characterization
 - Other important aspects include financial model, sustainability, industrial returns and social awareness....
 - Key presence of CERN in vacuum design and CERN spirit / 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