# WP4: Updates

September 19th, 2022

### **WP4 Milestones**



#### **Milestone name – Date (in months)/Lead Institution**

➤ M4.1 - M3/UW : Document detailing the site-specific characteristics that impact ET sensitivity and its duty cycle => REPORT

M4.2 – M10/UW : Common methodology to estimate impact of site characteristics on ET sensitivity and operation and, if required, a scheme to compensate it => REPORT

### **WP4 Deliverables**



#### **Deliverable name – Date (in months)/Lead Institution**

- D4.1- M10/Nikhef: Scan of legal procedures, permitting and land acquisitions, i.e. the steps to be taken prior to starting excavations
- D4.2 M15/INFN: Updated socio-economic impact studies. Scan of accessibility, quality of life etc.
- D4.3 M28/UW: Complete quantification of all the aspects impacting the ET performance for each site
- D4.4 M30/INFN: Report on 3D geology, hydrology, etc. model with localisation of the ET infrastructure
- D4.5 M42/Nikhef: Updated cost and schedule estimates of the excavations, including, if necessary: instrumentation for Newtonian Noise cancellation; costs of debris removal; costs of land acquisition,

permitting, etc.

(months from ET-PP start date, Sept. 1st)

### Issues to be addressed soon



- Timeline review (on going)
- Discussions with ISB/OSB on relevant parameters/requirements (Jan Harms workshop July 11<sup>th</sup> a very good start)
- $\succ$  ET basic geometry definition i.e.  $\Delta$  versus  $\perp$  (urgent, next  $F^{T}$ ET-PP INFRADEV kick-off Meeting – Barcelona 19-20 July 2022 Symposium will be devoted to that)
- Approach to update notably civil engine with or without the involvement
- Bidbook approach

### **SPB Re-Organization and Timeline review**



Next SPB meeting (Sept 21<sup>st</sup>) devoted to discuss plan and future activities of WD1 (Physical variables and characterization) and WD2 (Geology)

## **SPB-ISB**



Sept. 19<sup>th</sup> : preliminary call SPB-ISB
 Update of physical variables to be measured
 Common methodology to estimate impact of site characteristics on ET sensitivity

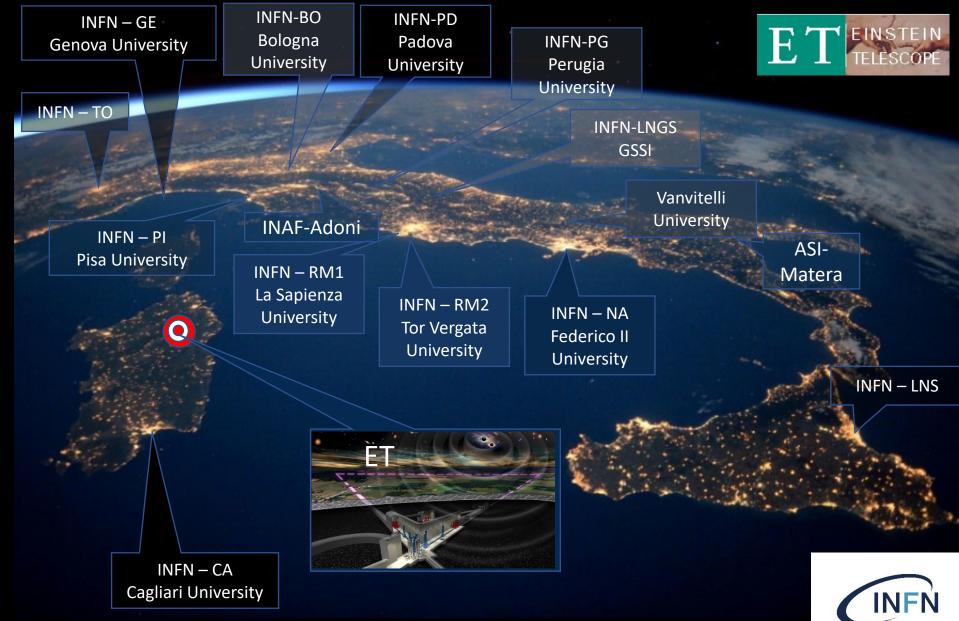
➢ Talk and meeting on Site characterization @ ISB workshop

Next Generation EU Investment focused on ET enabling technology and Sardinian site candidature support

Leaded by INFN Partners: 11 Universities, INAF and ASI (Italian Space Agency)

Budget 50M€ approved

### ETIC – Einstein Telescope Infrastructure Consortium

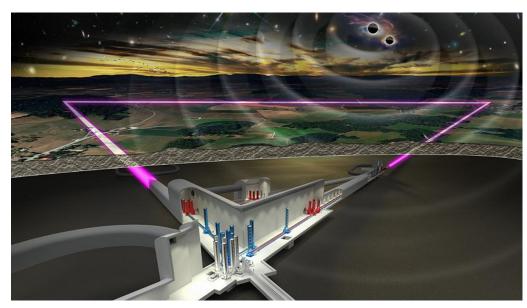


### **News from Sos Enattos Site**



 ➢ ETIC (Einstein Telescope Infrastructure Consortium) project approved. Budget 50M€
 □ Preliminary Design of ET infrastructure

□Network of Laboratories for R&D dedicated to ET





### ET-PP/INFRADEV Progress report SPB Euregio Meuse-Rhine Site

D4.1 – M10 Scan of legal affairs

Contract (~50 k€) awarded to Amberg & Tractebel-Engie to make inventory of legal/planological/environmental hurdles related to the realisation of ET in the EMR.

- Kick-off meeting 31-August-2022
- Report expected early 2023

#### D4.2 – M15/INFN Socio-economic impact

(this is the main motivation of our governments to support ET, I fear)

4 studies performed of which 2 public (ESFRI annex)

Industrial collaboration

2,2 M€

+ 16 M€ Dutch NGF



3,6 M€

### Site preservation: Windturbines





Very popular, even more so with present electricity prices

Netherlands:- ban on new windturbines

 ban on other activities (like excavations) that risk to impact ET adversely

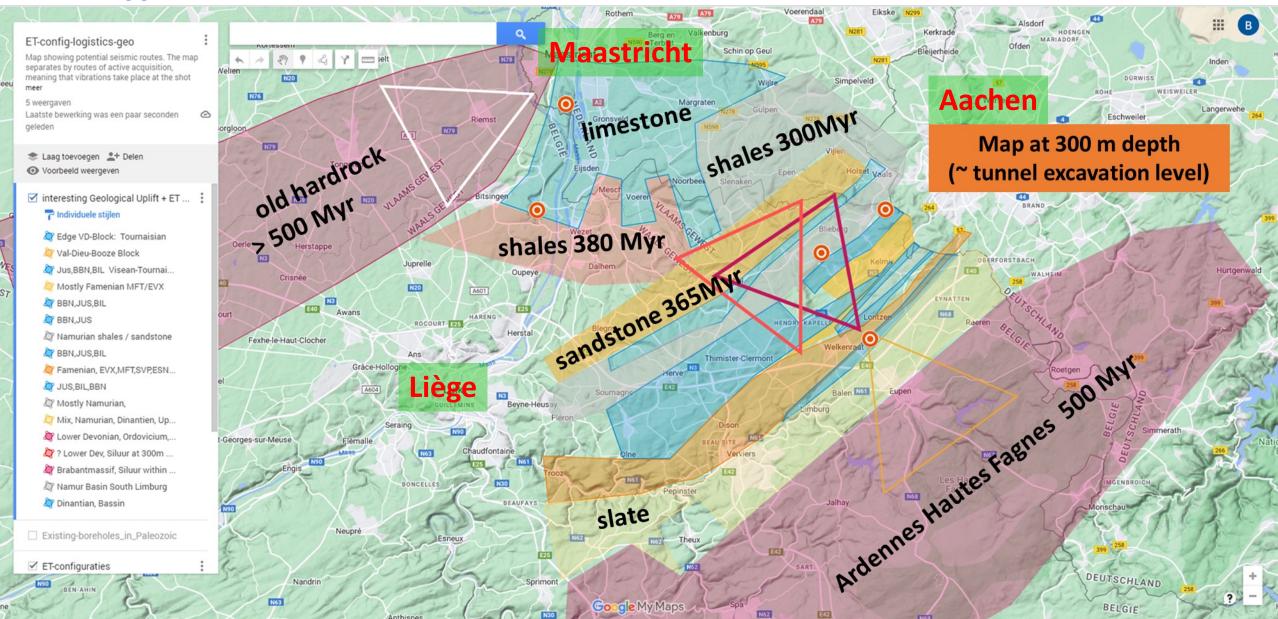
Belgium: - discussions ongoing with notably Engie (large windturbine supplier) regarding new initiatives.

Germany: - ?

More measurement campaigns in preparation (with Engie)

### Main issue: Cost-effective location to build ET in EMR?





### Answer: requires lots of geology studies

Funding: • about 7,5 M€ E-TEST (Interreg-EMR, capital+personpower, 2020-2023) (boreholes, active seismic, •••)

- 18 M€ (Dutch NGF geology, mosty capital, 2022/2023-2025) (more boreholes, lots of active seismic, •••)
- ? M€ from a to be submitted Interreg-NWE application focused on sustainability (2023-2025)

#### NGF: 2 full-day workshops, June 20 & September 1

<u>Participants</u>: TU/Delft, Liège university, RWTH-Aachen, KNMI, TNO, Antea, Implenia, Limburg province, geological survey Belgium, Royal Observatory Belgium, Nikhef, Bonn university, •••

#### **Objectives:**

- > Update on recent and upcoming activities
- Discussion on Urgent/Critical Activities
  - **Construction of hydrogeological model (critical)**
  - Establish baseline geological model (keep it up-to-date!), including universal data access – shared drive, etc.
  - Geophysical mapping of subsurface: seismic, EM, gravity, •• •
  - Establish critical/minimum subsurface requirements/characteristics in view of excavations
- Activity planning & resourcing collaboration towards aligned goal(s)

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### **Geophysical measurements**

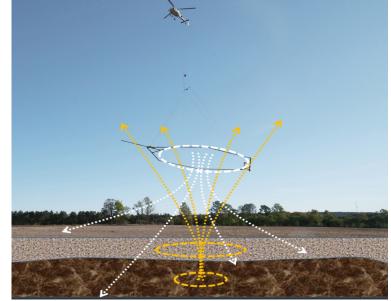


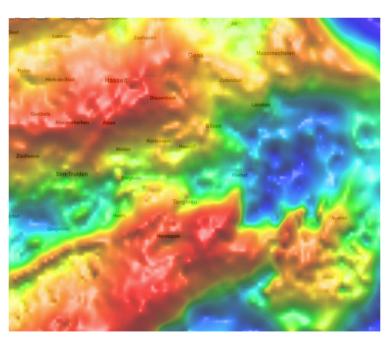
#### 2D & possibly 3D active seismic

#### Electro-magnetic (resistivity)

#### Gravimetric







Small area: 2019 in Terziet Large area: Sep/2022 ~40 km (E-TEST project)

Anticipated: 2023 ~ 400 km (NGF project)

Discussed since 2021 with Emerald Geomodelling (Sardegna & EMR) Considered

*First tests Aug/2022* 

Large air-borne campaign in future?

### **Electro-magnetic test campaign** August 2022





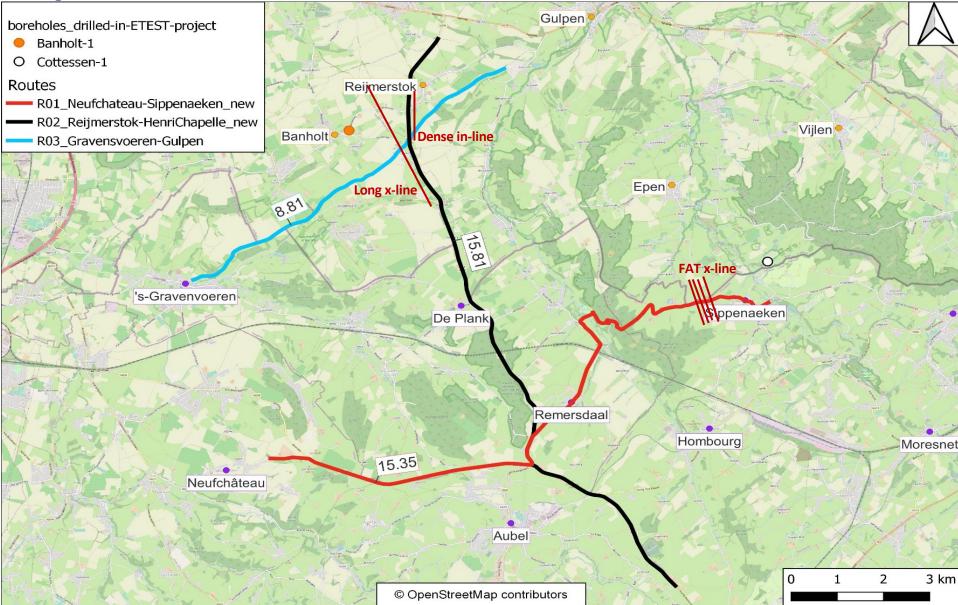
Measurements at two locations each about few 100 × few 100 meters and at one smaller area location:

- Moving setup (EM pulses every few meter) as shown in photo
- Stationary setup with a very large (about 40×40 m<sup>2</sup>) source coil 'WalkTEM'
- Report (Emerald Geomodelling) expected by the end of September. Hope to reach few 100 m depth

### Active seismic campaign September 2022

3 lines, ~ 40 km total length Shots every 20 m (3 vibes) Receivers every 10 m





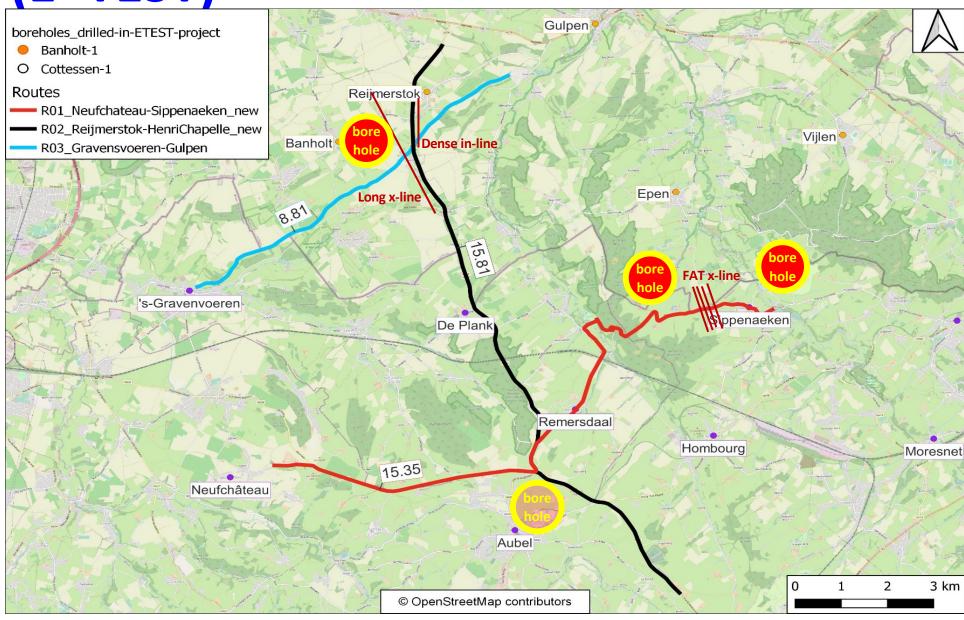
#### Extra tests:

- Study 3D potential: by adding 'cross' lines
- Best receiver separation:
  400 m line 1 m spacing

### Boreholes: 3 done, 1 planned (E=TEST)

3 lines, ~ 40 km total length Shots every 20 m (3 vibes) Receivers every 10 m







**Extra tests:** 

- Study 3D potential: by adding 'cross' lines
- Best receiver separation:
  400 m line 1 m spacing

### Next SPB workshop: January 2023, Maastricht?





3 days with optional excursion to experience the Euregio Meuse-Rhine and to visit ETpathfinder

### **Active seismic campaign – September 2022**



