

Projet M2Tech

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INFRATECH call

M2TECH is a proposal to answer the [HORIZON-INFRA-2022-TECH-01-01](#) call on “R&D for the next generation of scientific instrumentation, tools and methods”

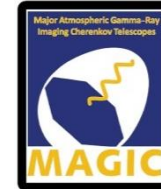
- Total budget: 110MEuros - ~10 projects will be funded
- Expected Outcome:
 - **enhanced scientific competitiveness** of European research infrastructures
 - foundations for the **development of innovative companies**
 - **increase of the technological level of industries** through the **co-development of advanced technologies** for research infrastructures and creation of potential new markets
- Scope:
 - The aim of this topic is to deliver **innovative scientific instrumentation, tools and methods**, which advance the state-of-art of European RIs, and show transformative potential in RIs operation. The related developments, which underpin the provision of improved and advanced services, should lead research infrastructures to **support new areas of research and/or a wider community of users, including industrial users**.
 - **Cutting-edge technologies** will also enhance the potential of RIs to contribute addressing EU policy objectives and socio-economic challenges.
- Consortia must be built around a leading core of at least 3 world-class research infrastructures.

M2TECH proposal

M2TECH : Technologies for Multi-Messenger Astrophysics

- A joint proposal between

- CTAO/MAGIC (gamma-ray astronomy)



- ET /Virgo



- KM3NeT (neutrino astronomy)

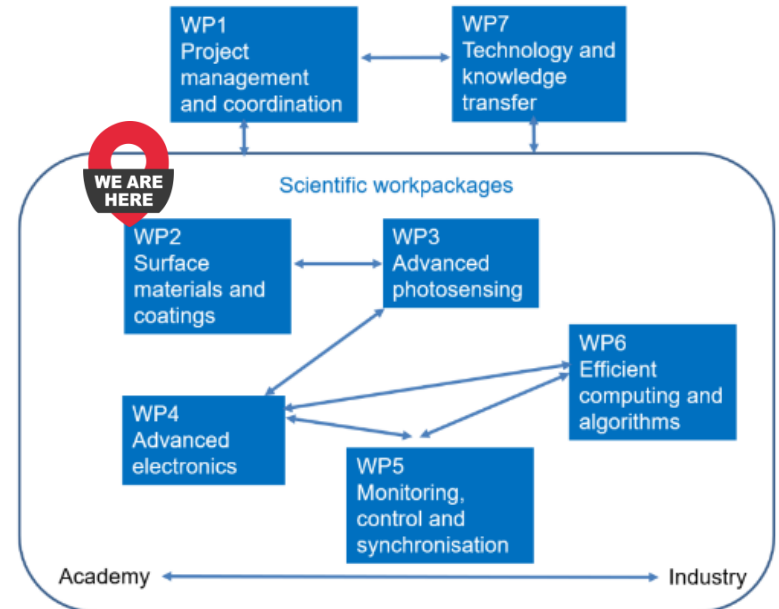
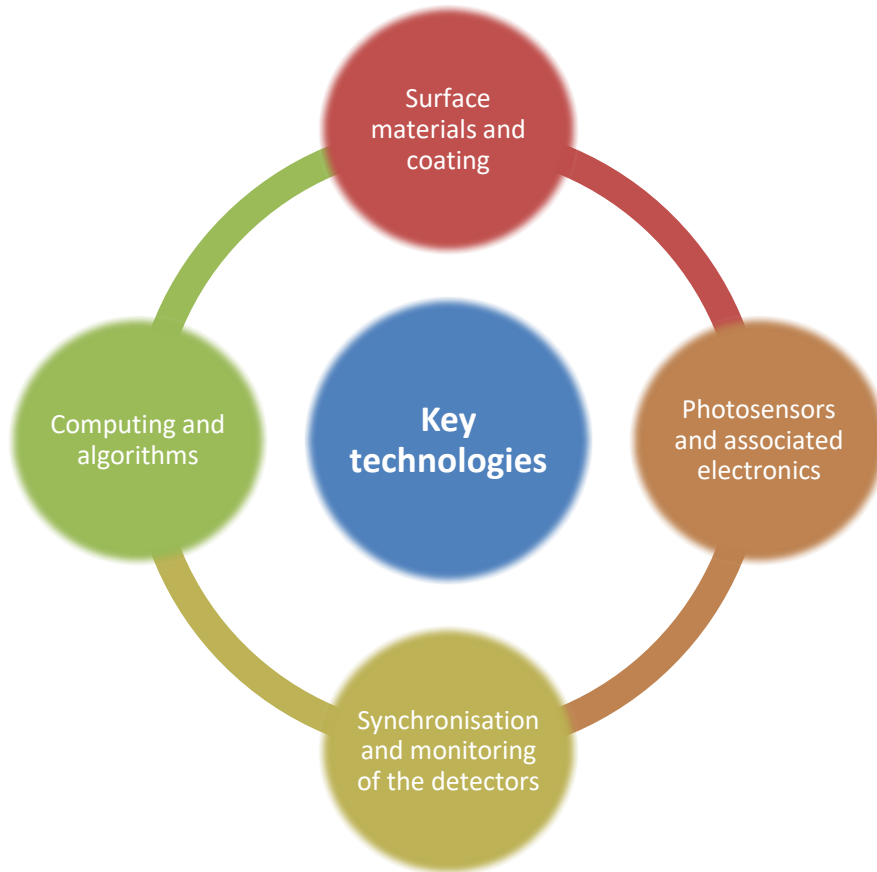


- ELI (laser-based research)



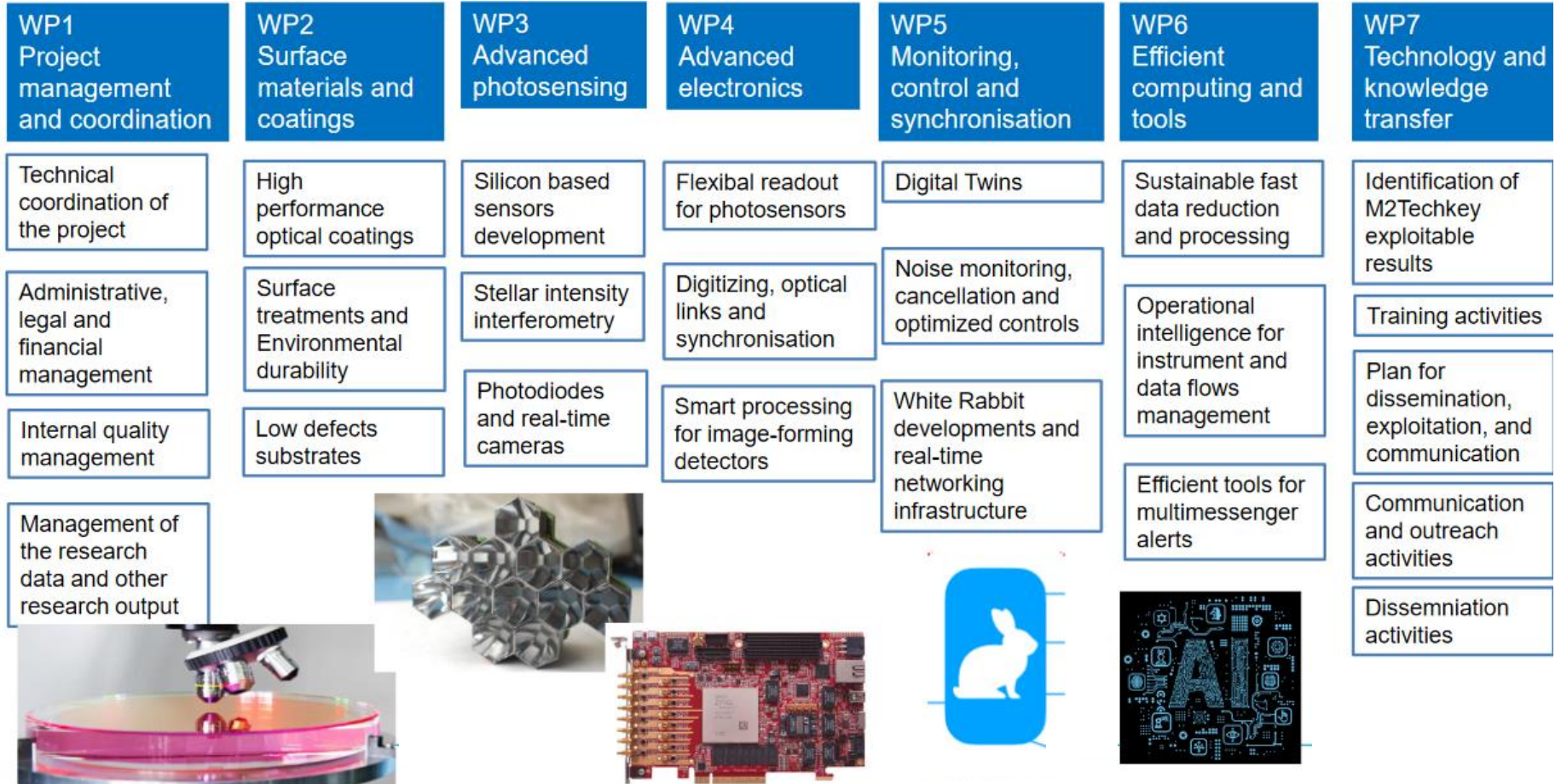
- Diversity of *messengers* means a high heterogeneity of the technologies used in the observatories
- Objectives :
 - **develop innovative technologies** for the current and the next generation of detectors
 - **enable technology and develop prototypes** of detectors
 - **transfer knowledge** from existing infrastructures to future ones

M2TECH proposal



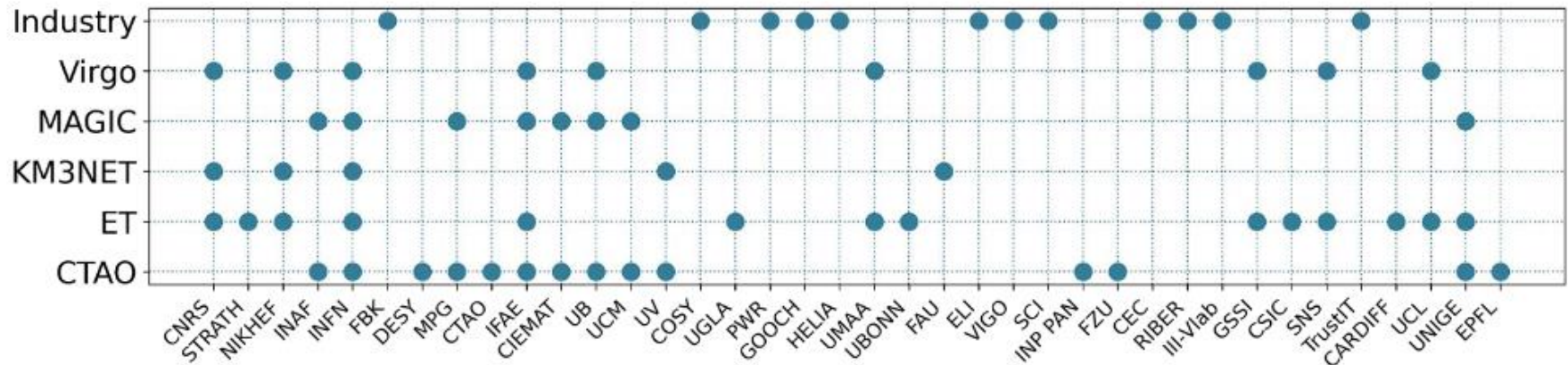
Excerpt from M2Tech proposal

Workpackages



Credits: E. Tournefier LAPP

Consortium



- **39 beneficiaries** (14 from ET and 12 companies)
- Beneficiaries \neq Research units
e.g. IP2I, LAPP, CPPM, APC are a single beneficiary => CNRS
- Total cost **11.8M€**
- Duration **48 months**
- **Decision in fall 2022** ... and start in Feb 2023

It looks like a big project with a large funding ... but

- High number of participants so there will not be that much money
- The R&D topics relevant to ET will not be fully handled
- Onyl a step not the « grail »

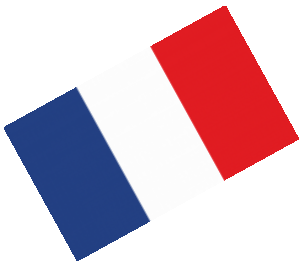
Other R&D project are needed and people are welcome to join this effort !

SPARE SLIDES

WP2: Surface materials and coatings

- High quality coatings: enhanced optical performances, low thermal noise
- Methods for high quality surfaces immune to environmental conditions
- Low defects substrates

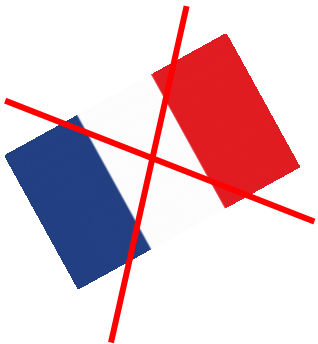
Partnership with RIBER, III-Vlab, Helia, GoochHousego, CEC, Powerphotonic



WP3 : Advanced photosensors

- A plug-and-play modular universal tile of SiPM sensors for large photosensing areas
- A digital photon counter 3D sensor for stellar interferometry
- UHV compatible photosensors for scattered light monitoring
- Pixelated phase camera for mapping the laser field

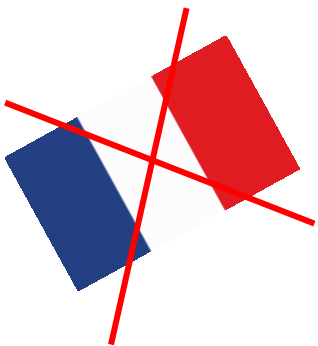
Partnership with companies FBK, VIGO, Bright Photonics



WP4 : Advanced electronics

- Flexible readout for SiPM modules
- Low noise, low power digitization and optical links and transceivers
- Accurate timing distribution system / local timing generation system
- Smart image processing (triggering)

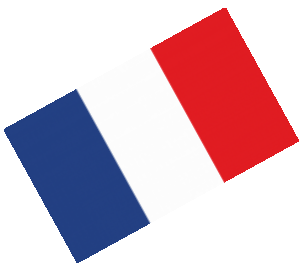
Partnership with Scientifica International S.L.U



WP5 : Detector monitoring, control and synchronisation

- Digital twins for better detector understanding: coupling of noises, detector behaviour, control system design
- Sensors for noise monitoring, new control methods
- Anomaly detection DNN based
- Real time infrastructure based on White rabbit technology (switches, low phase noise, clock repeater, connectors,...)

Partnership with Cosylab laboratorij za kontrolne sisteme DD



WP6 : Efficient computing and tools

- Sustainable fast data reduction and online processing methods (ML based)
- Experiment-diagnostic ML based and human-machine interface tools for instrument and data flow management
- Tools and interfaces for multimessenger alerts (communication, common infrastructure)

Partnership with Trust-IT

