ASTRONET: a strategic planning and coordination mechanism for all of European astronomy

Saskia Matheussen (NWO), ASTRONET deputy-chair

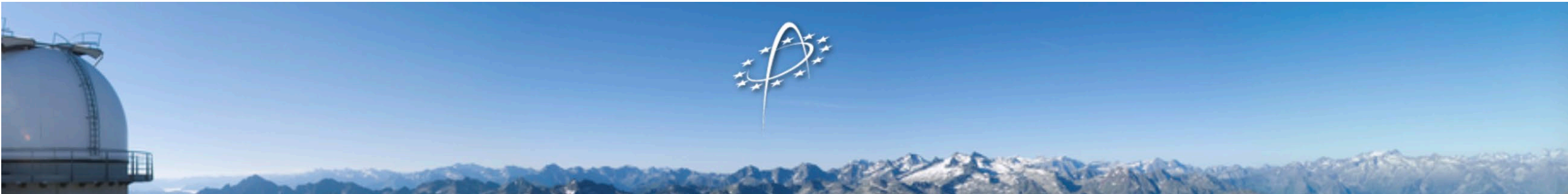
Meeting: Recovery plan for Ukrainian astronomy, Leiden, 10-11 June 2025

About ASTRONET

- **Network of European funding agencies and associated bodies**
  - 2005 – 2015: ERA-Net, supported by the EU Framework Programmes
  - 2015 – present: self-sustained group of funding agencies and associated bodies

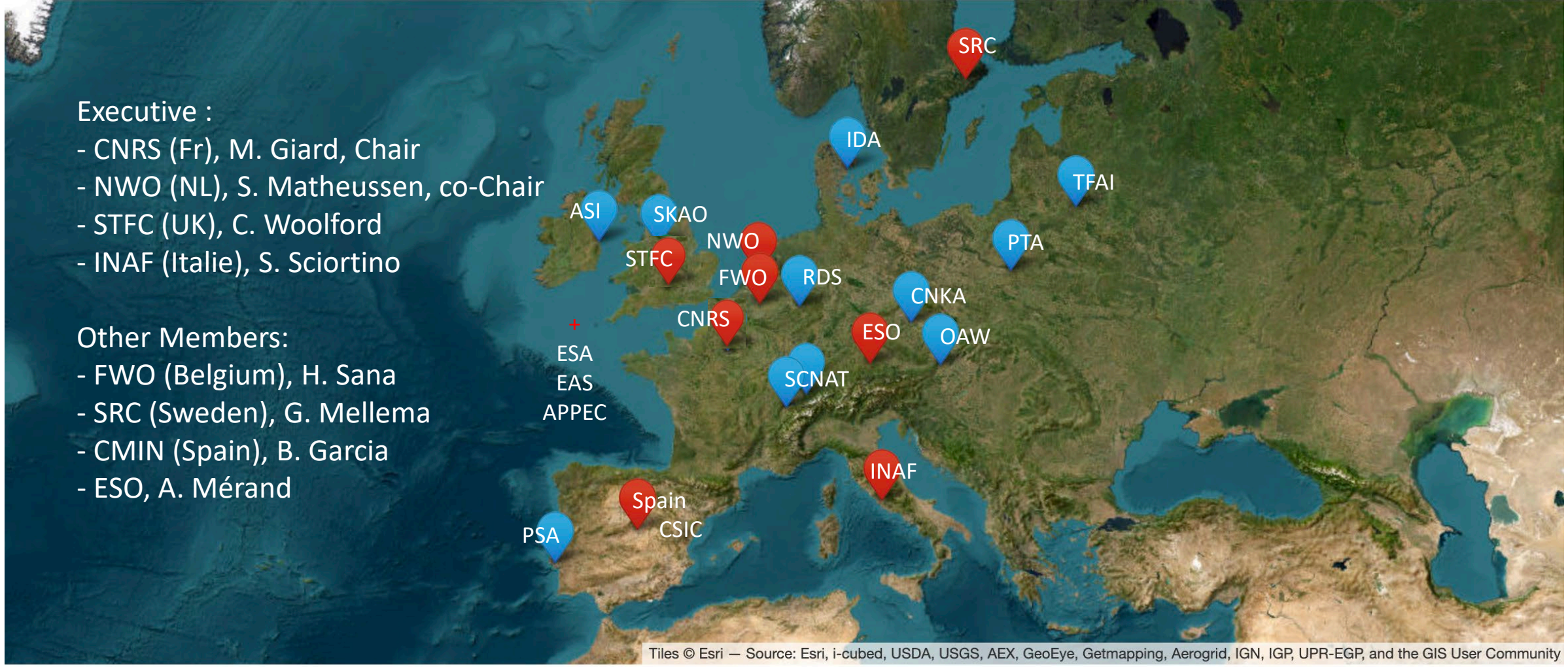
- **Science Vision and Infrastructure Roadmap for all of European Astronomy**

- **Providing a forum for improving European coordination for Astronomy**
  - Enhance communication and coordination between planned and existing research infrastructures

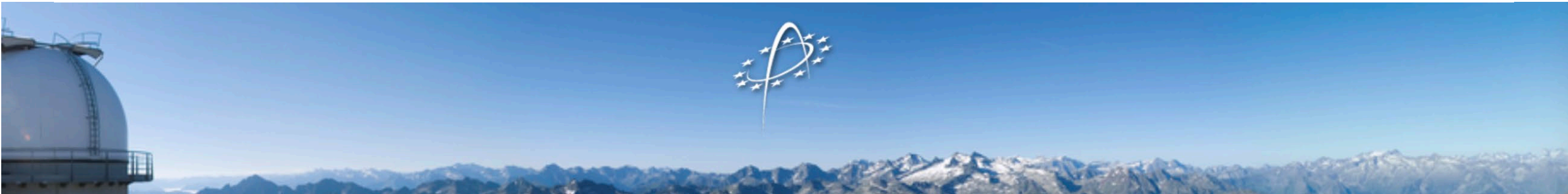


Executive :
- CNRS (Fr), M. Giard, Chair
- NWO (NL), S. Matheussen, co-Chair
- STFC (UK), C. Woolford
- INAF (Italie), S. Sciortino

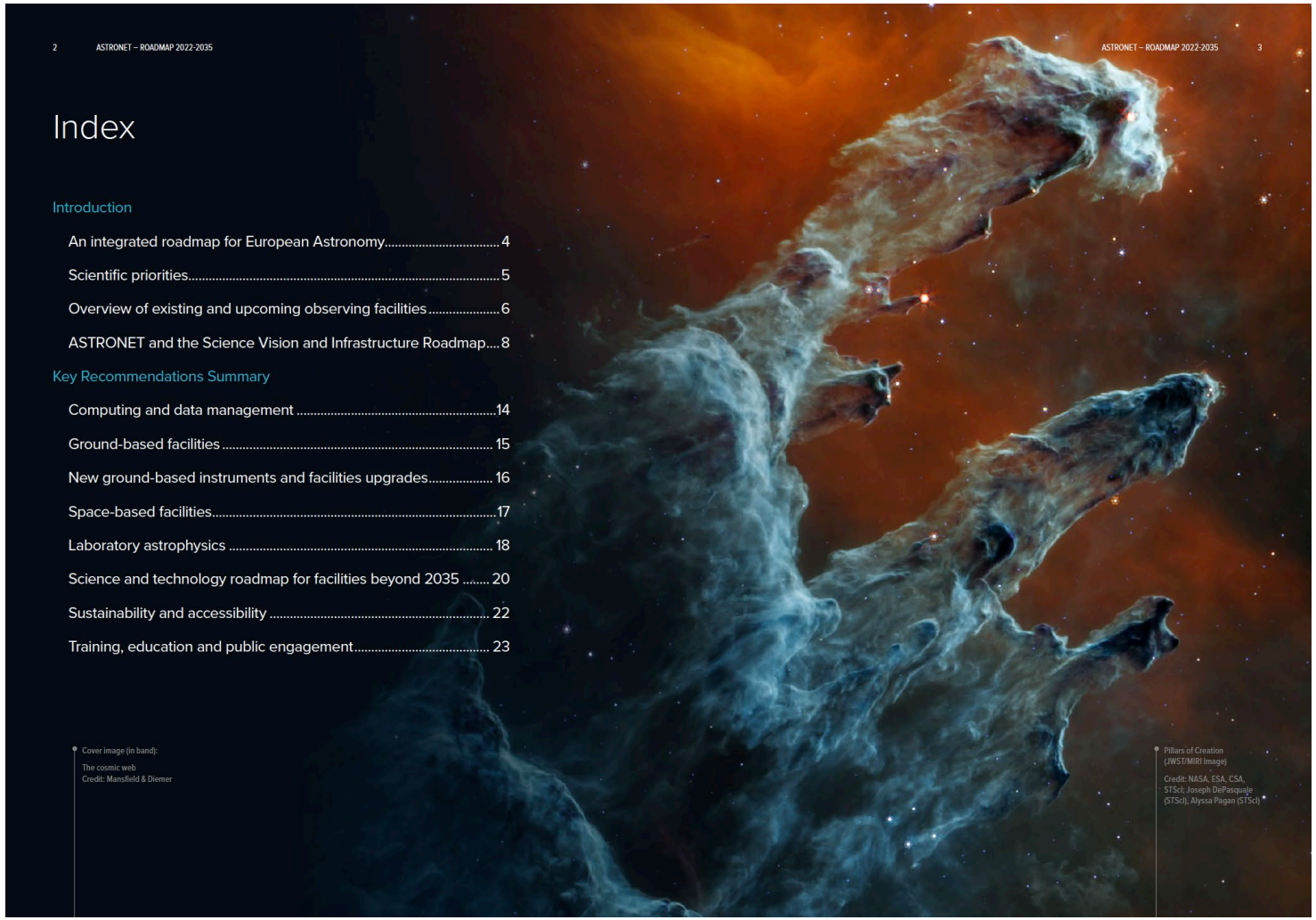
Other Members:
- FWO (Belgium), H. Sana
- SRC (Sweden), G. Mellema
- CMIN (Spain), B. Garcia
- ESO, A. Mérand



: Team members : Observers : Invitees



Astronet Science Vision & Infrastructure Roadmap 2023-2035

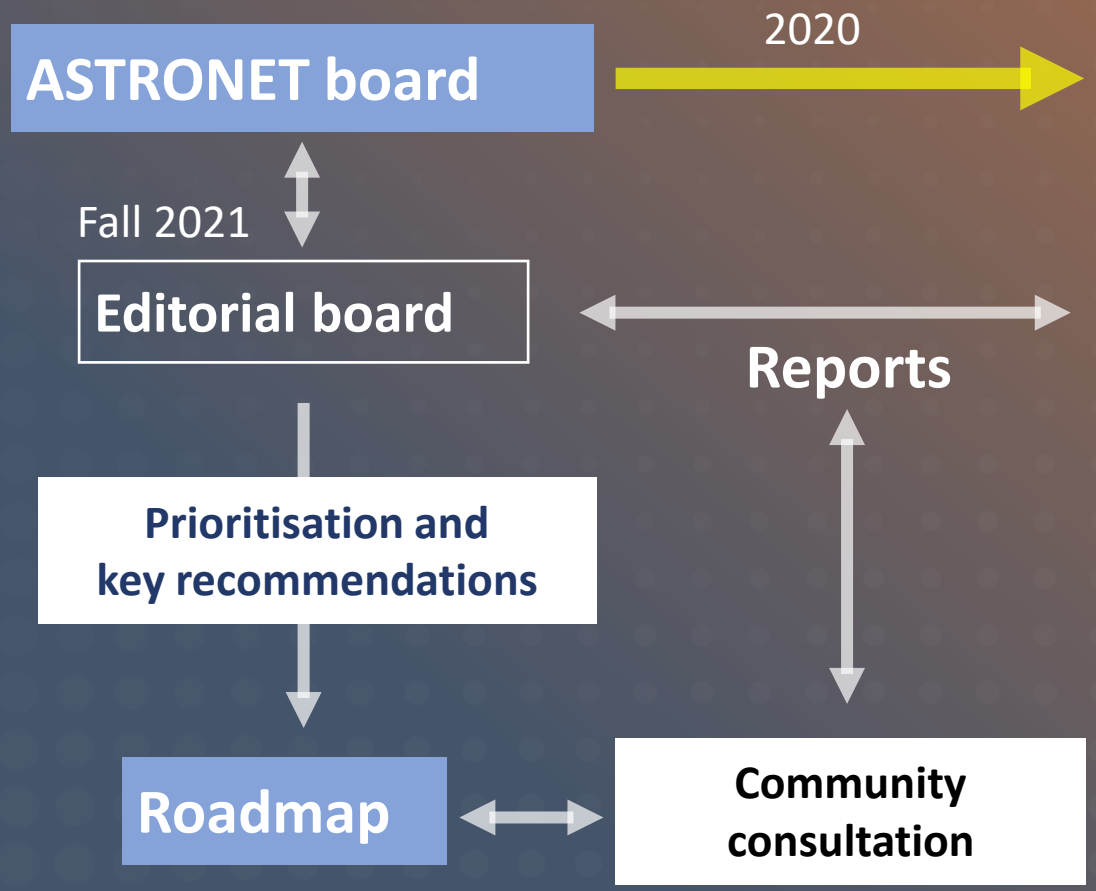


Index

Cover image (in band):
The cosmic web
Credit: Mansfield & Diemer

Pillars of Creation (JWST/MIRI Image)
Credit: NASA, ESA, CSA, STScI; Joseph DePasquale (STScI), Alyssa Pagan (STScI)

Organisation



Science panels (~100 scientists involved)

A- Computing; big data, HPC and data infrastructure

B- Origin and evolution of the Universe

C- Formation and evolution of galaxies

D- Formation and evolution of stars

E- Formation and evolution of planetary systems

F- Solar system and the conditions for life

G- Extreme Astrophysics

H- Astronomy and society

New ground-based facilities

→ Reminder: completion and commissioning of
ELT + 1st generation instruments
SKA-1 + SKA regional centres
→ Major importance for European astronomy

→ Three other facilities emerge from the current exercise, already among priorities of the 2008 roadmap

- As the first true large-scale observatory dedicated to the study of high energy gamma rays, the **Cherenkov Telescope Array** (CTA) is expected to lead to breakthrough in our understanding of extreme astrophysical phenomena. Bringing CTA to completion (by 2028) is a high priority

- The **European Solar Telescope** (EST), will significantly increase our understanding of the solar magnetic field and its relations with the heliosphere and the Earth. Its completion and scientific exploitation in synergy with the US-based DKIST is a priority

- A general-purpose, **wide-field, high multiplex optical spectroscopic facility**, behind a 8-10m class telescope is a priority across many science areas. Will enable a broad range of science investigations and provide follow-up capabilities for facilities such as JWST, LSST and Euclid

Summary of recommendations

New ground-based facilities: ELT + 1st gen instruments; SKA-1; CTA; EST; Wide-field/High multiplex spectrograph

Upgrades and new instruments: ALMA; VLT (BlueMuse, High contrast/High angular res); ELT 2nd gen instruments

Space-based facilities: Athena + LISA; Exomars (re-examine European strategy for Mars exploration)

Laboratory astrophysics: Data on atoms, molecules, solids + investigations of meteorites and space samples

Technology developments toward: radio-astronomy; space FIR space; ELT-PCS; UV-to-IR space telescope; optical/IR interferometry

Computing, data, theory: science-ready data products and analysis tools; data infrastructure; professional skills base; collaborative, open and synergistic view of the computing ecosystem

Sustainability, accessibility: carbon-neutrality, climate science, diversity/inclusion, dark and radio-quiet skies

Education, training, society: training programmes, transferable skills, career paths for instrumentation, computing and data science, public engagement, big science, big data, AI, R&D, equal/respectful engagement with communities

Future beyond 2035: set-up pan-European working groups for

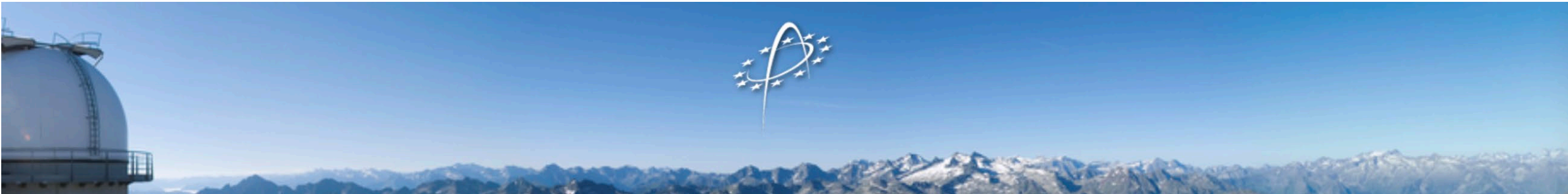
- Defining roadmap towards ELT-PCS
- Defining European participation in CMB-S4
- Defining European contribution to HWO
- Launching detailed design study for SKA-2
- Defining roadmap towards European CMB space mission
- Defining European contribution to NASA far-IR space mission

ASTRONET and the implementation of the Roadmap recommendations

Many European players have a role in implementing the Roadmap

ASTRONET activities focus on the level of funding agencies (policies, coordination / independent position)

- WG1 : Link with APPEC and elaboration of common strategies
- WG2 : Future strategies for science with small telescopes : a concerted European exercise
- WG3 : Building strategies to materialize the roadmap (EST, SKA-SRC, data science, etc.)
- WG4 : Connections and joint policies with the EC and with key stakeholders (participation to EAS 2025)
- WG5 : Sustainability and societal issues



Geopolitical situation …

… the need for a unified Europe

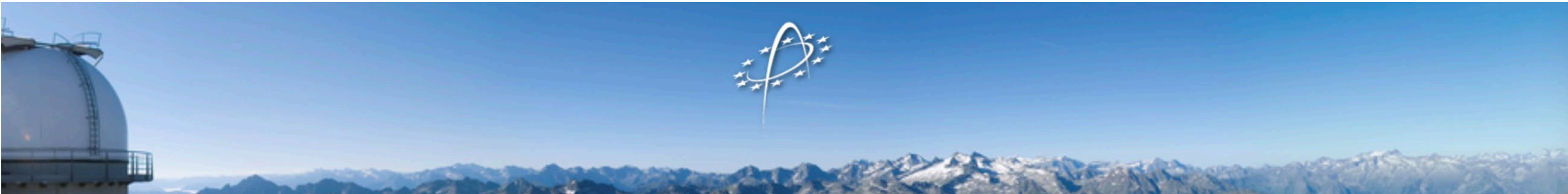
US decisions and impact on global and European astronomy

=> Space missions

=> Ground based observatories and infrastructures

….

Europe has to adapt and, more than ever, build its place at the forefront of fundamental and sustainable research



THANK YOU !