Lessons to be learned from the ET design study

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3G concept evolution and ET

- The Einstein Telescope project born thanks to the fertile environment generated by the EU-FP6 project ILIAS (2004-2008)
  - Integration activity in Underground Physics
    - Networking Working Group WG3, chaired by a GEO (H.Lueck) and Virgo (M. Punturo) delegates, addressed to the future GW detectors:
      - First elaboration of a 3G detector concept
- Submission of the first EU FP6 proposal (2004) of the design of a 3G GW detector
  - Failed for “lack of focus”
- ESF explorative workshop in Perugia (2005)
  - Agreement on the focus on 3G interferometric detector

ET EINSTEIN TELESCOPE

Lesson #1: Networking

- It is crucial to have a well established and official networking structure where to discuss ideas and mediate interests
- This networking structure needs to be at the same time hierarchical (~~forum~~) and open to all the “souls”
- This creates the right environment where good ideas can pop-up.

ET design Study

- The Einstein gravitational wave Telescope (ET) design study has been submitted in 2007 to the Research Infrastructures EU-FP7 call and we won in 2008 a 3 years long grant of 3M€
- Constrains:
  - European Research Infrastructure conceptual design
- Effects of the constrains:
  - Simplified approach to the detector(s) and conservative approach to the technologies
  - Sophisticated approach to the infrastructure
  - Request to be capable to work alone

ET Research Infrastructure

- Key words:
  - Observatory
    - Beyond a “simple” detector, but focus on the physics and on the capability to estimate physical parameters
      - Capable to resolve (alone) the polarisations (are only 2?)
    - High duty cycle
      - Redundancy
    - Wide frequency range:
      - Excavate the seismic (and NN) wall at low frequency and keep a good sensitivity at high frequency
    - Several decades lifetime
  - European but International
    - Site seismic evaluation in Europe, but comparisons with USA and Japan underground sites
    - International science team (>200 scientists supported with ET funds)

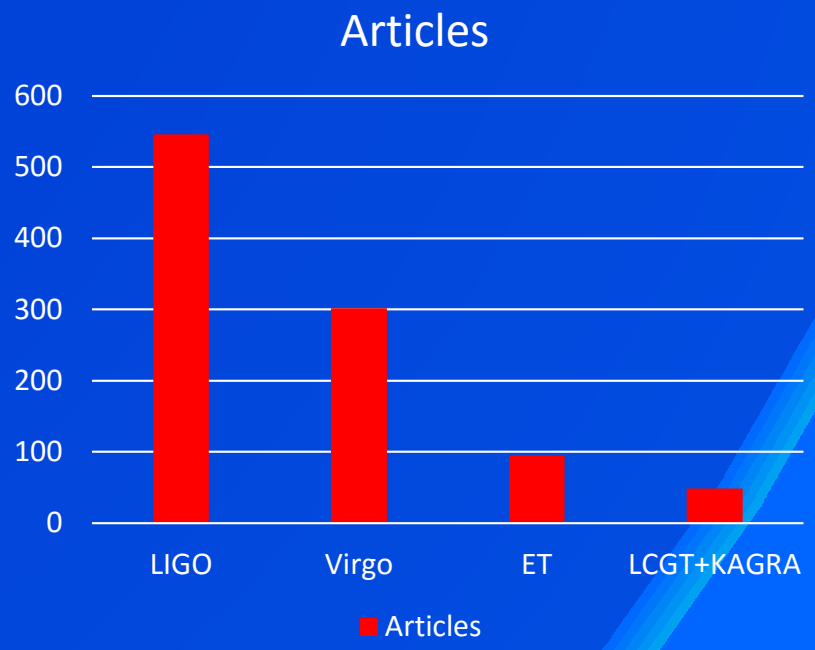
Lesson #2: clear mandate

- A team, in order to realise a good design, needs a strong and clear mandate
- Constrains should be as few as possible, but clear and well defined
- Strategic targets should be agreed since the beginning

Lesson #3: to be scientifically open

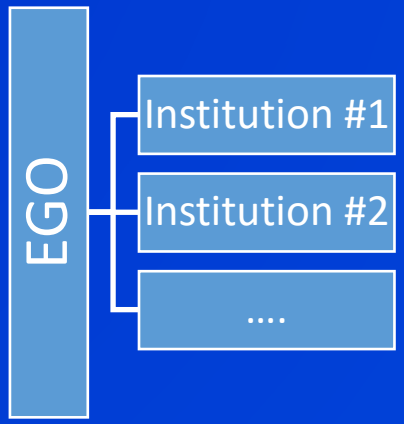
- The ET science team, despite the bureaucratic difficulties, has been a successful tool to spread the ET idea

Papers (ArXiv 2009-2015) with “Gravitational Wave” and LIGO/Virgo/Einstein Telescope/LCGT or KAGRA in the abstract

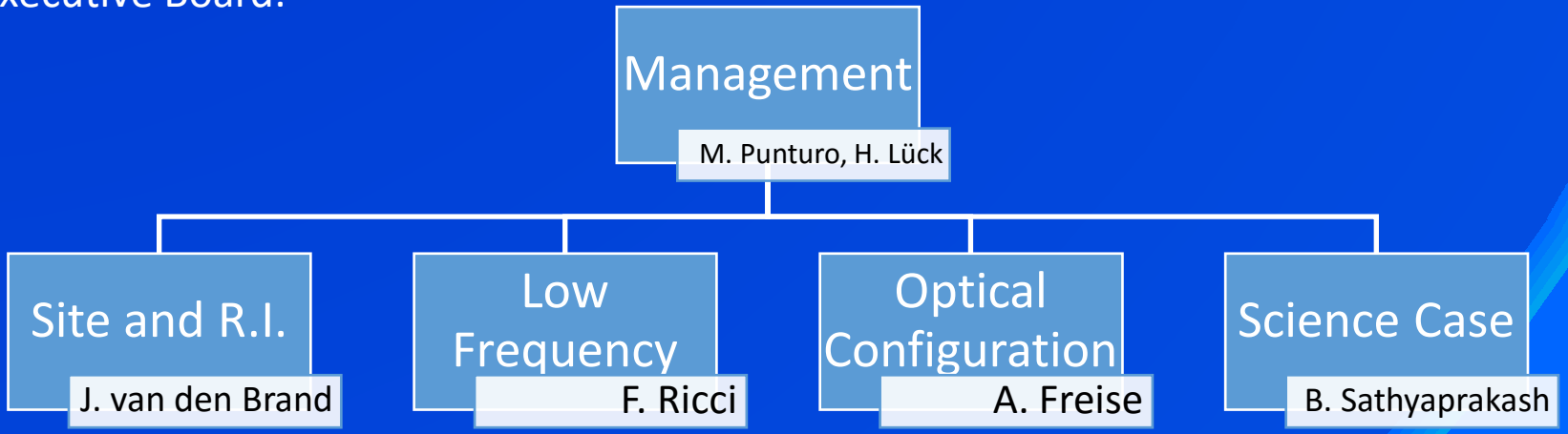


ET DS organisation

ET Governing council:



ET Executive Board:



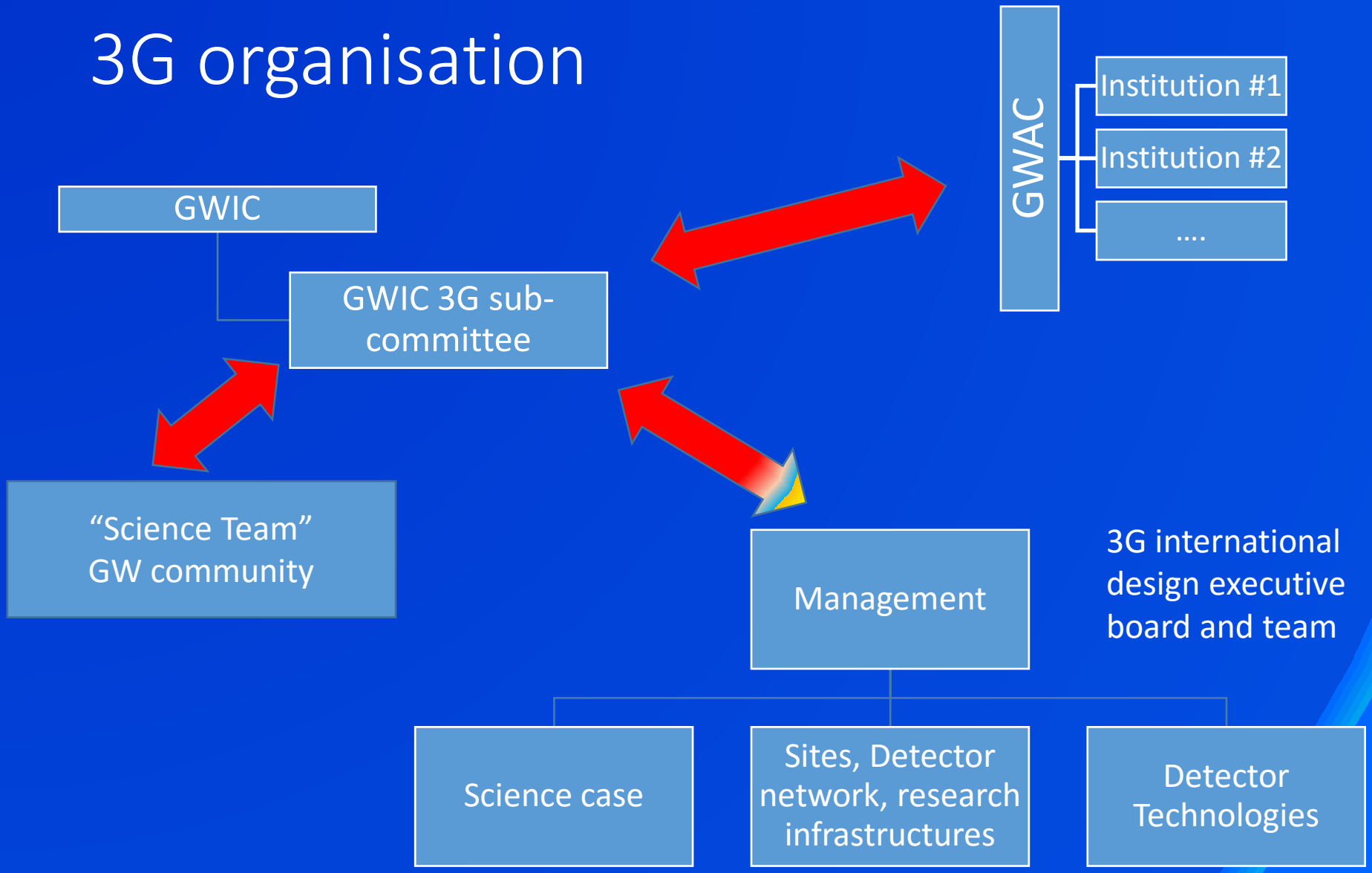
Lesson #4: Organization and links

- It is crucial to have a team well structured with clear tasks
- It is important to have an effective link with the institutions, in order to have a stronger mandate and a useful feedback

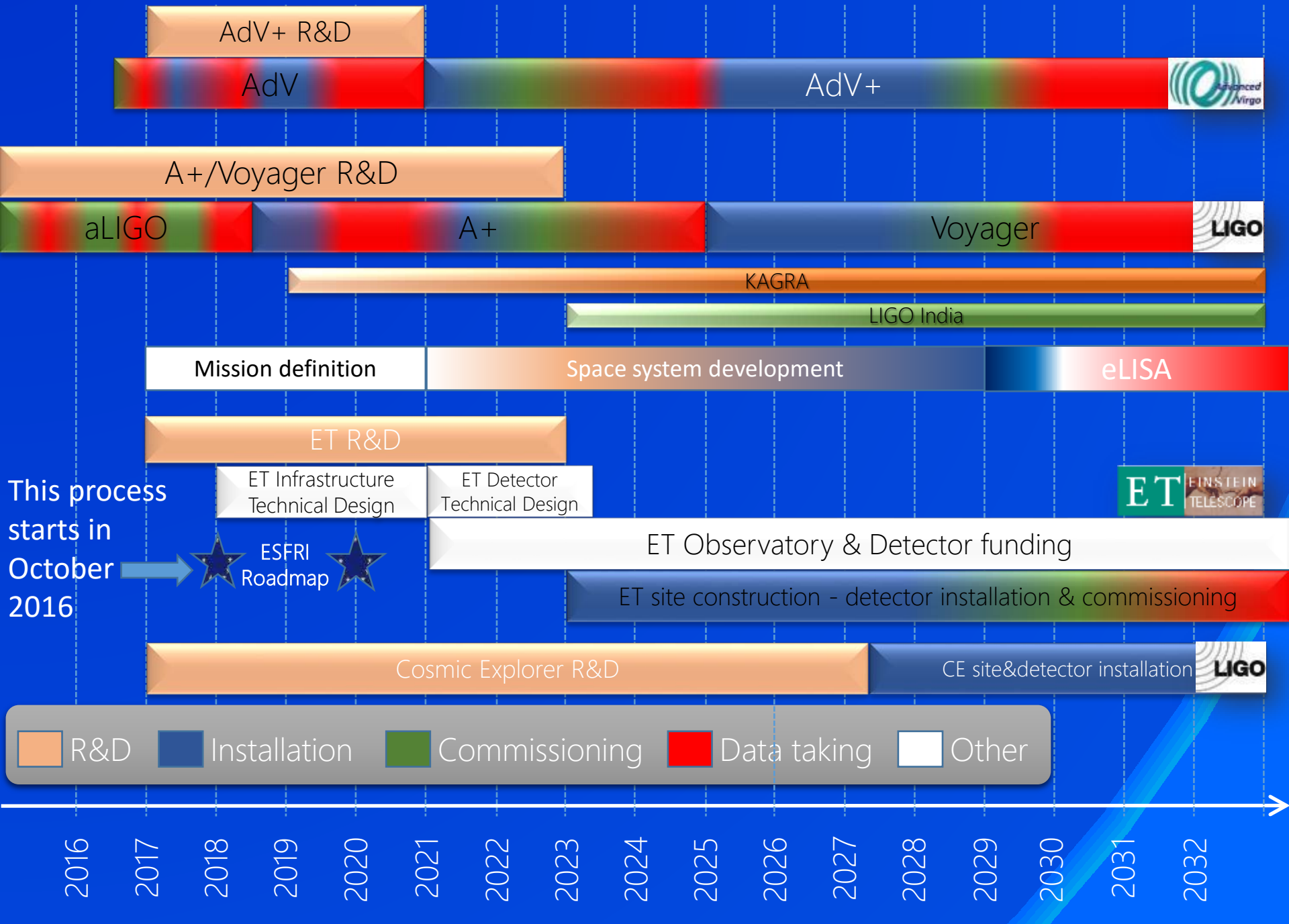
3G international collaboration

- How these “lessons” can be applied to a 3G international collaboration?
- Several are the possible schemes, but let try to identify a possible working configuration (personal vision):

3G organisation



Timing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ET Infrastructure Technical Design
ET Detector Technical Design
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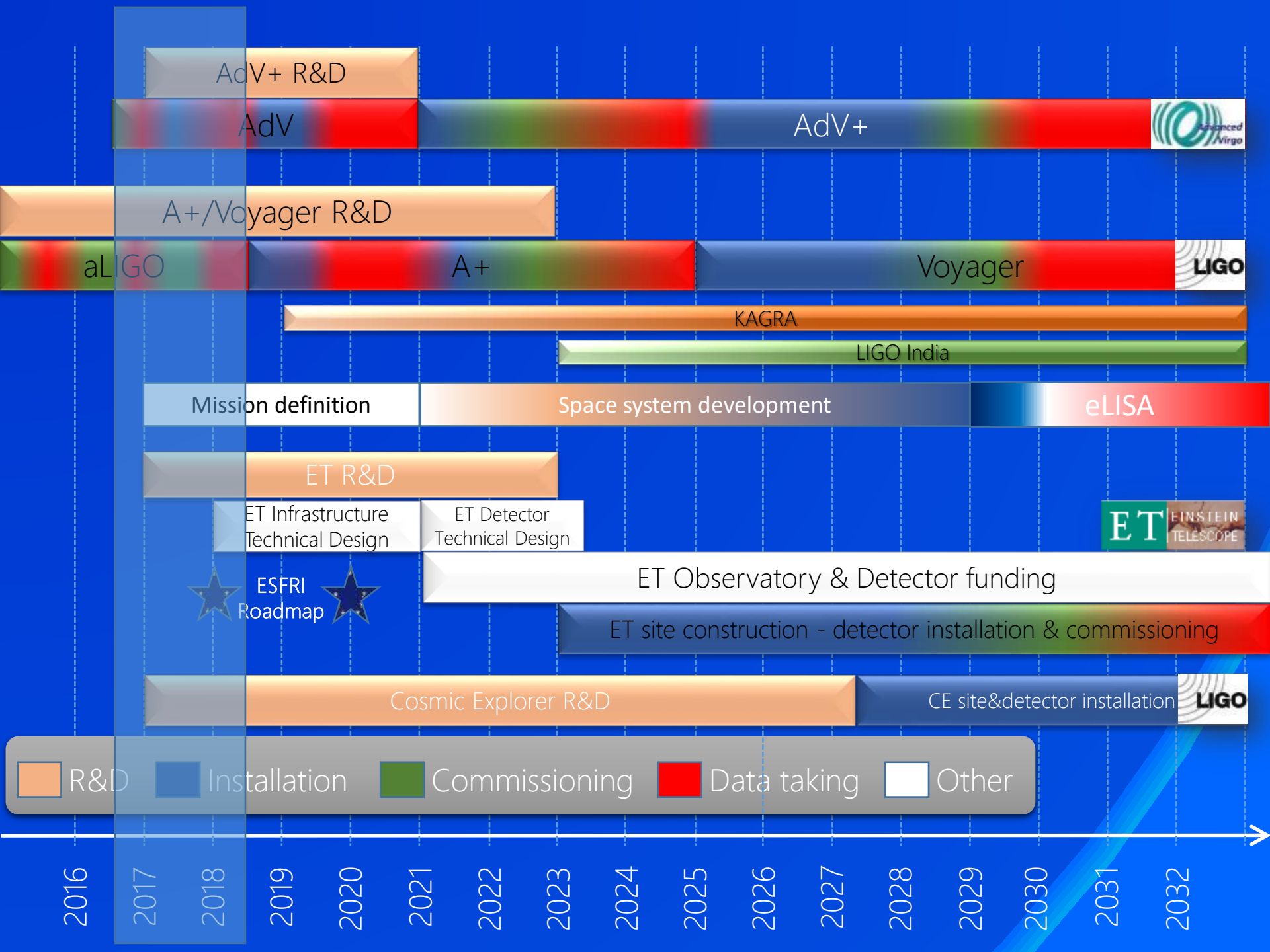
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