PA/QA AT SCALE

MEETING THE CHALLENGES OF LISA – ONE OF ESA'S LARGEST SPACE MISSIONS

BRIGITTE HUYNH - CNES

CO-AUTHORS

ANA CARAMETE, LAURENTIU CARAMETE – ISS

JULIO GALLEGOS – SERCO FOR ESA

SW PA CONFERENCE - ESTEC

22-25 09 2025

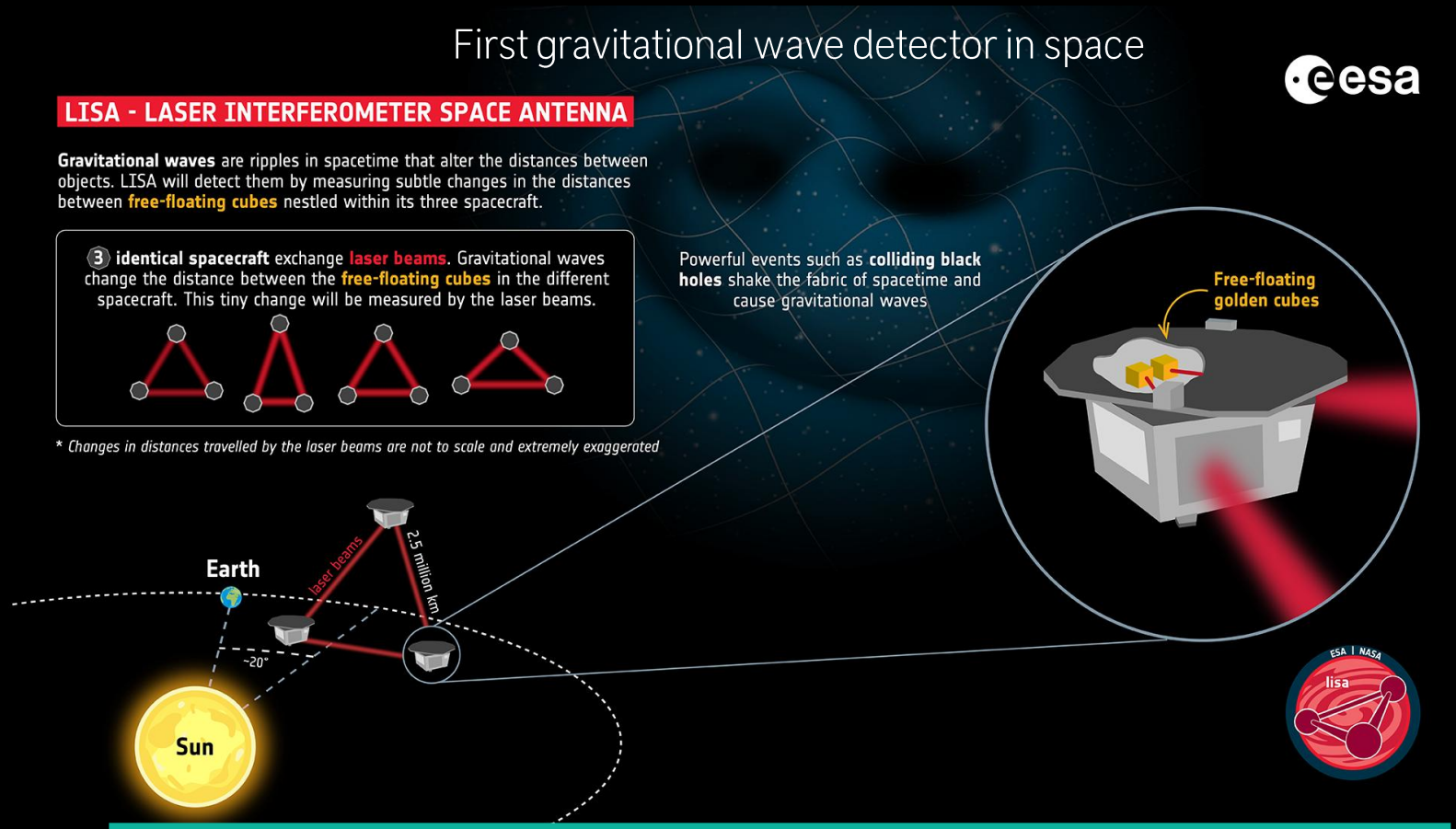
CONTENTS

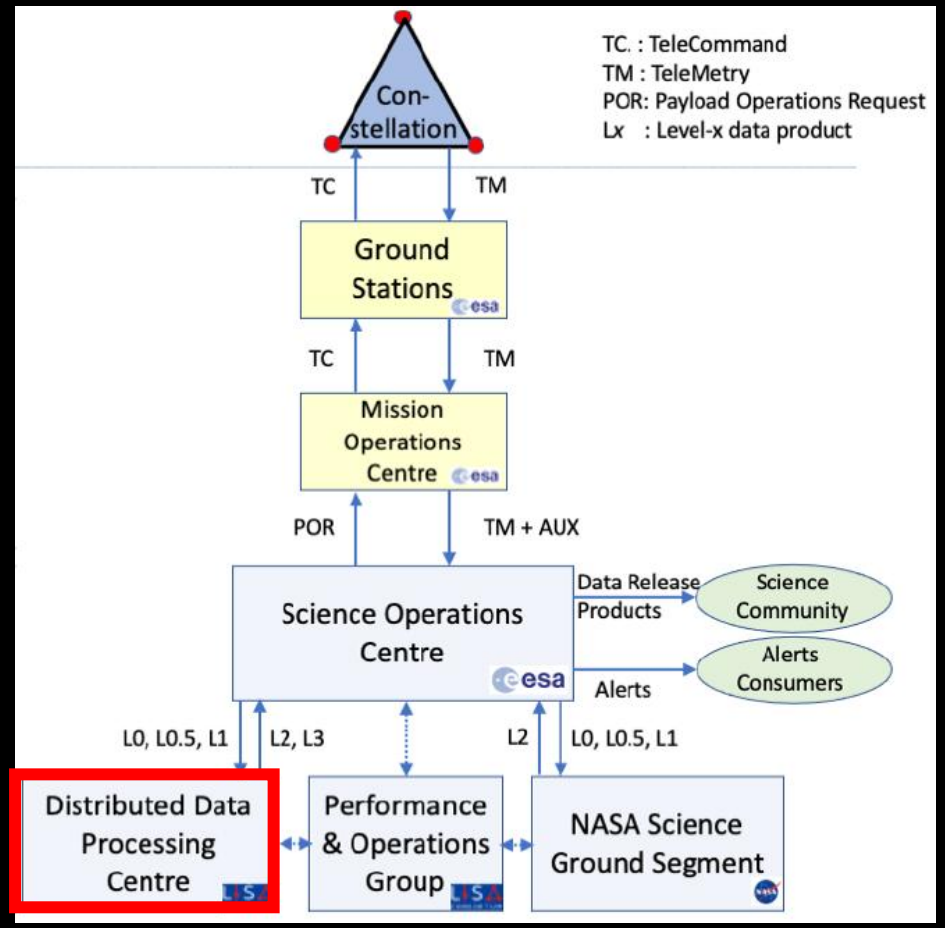
DDPC = Distributed Data Processing Center

01

AN OVERVIEW OF THE LISA PROJECT

AN OVERVIEW OF THE LISA PROJECT





A project of epic proportions, with great scientific expectations:

- black holes
- the expansion of the Universe
- the fundamental nature of gravity
- much more

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

cnes

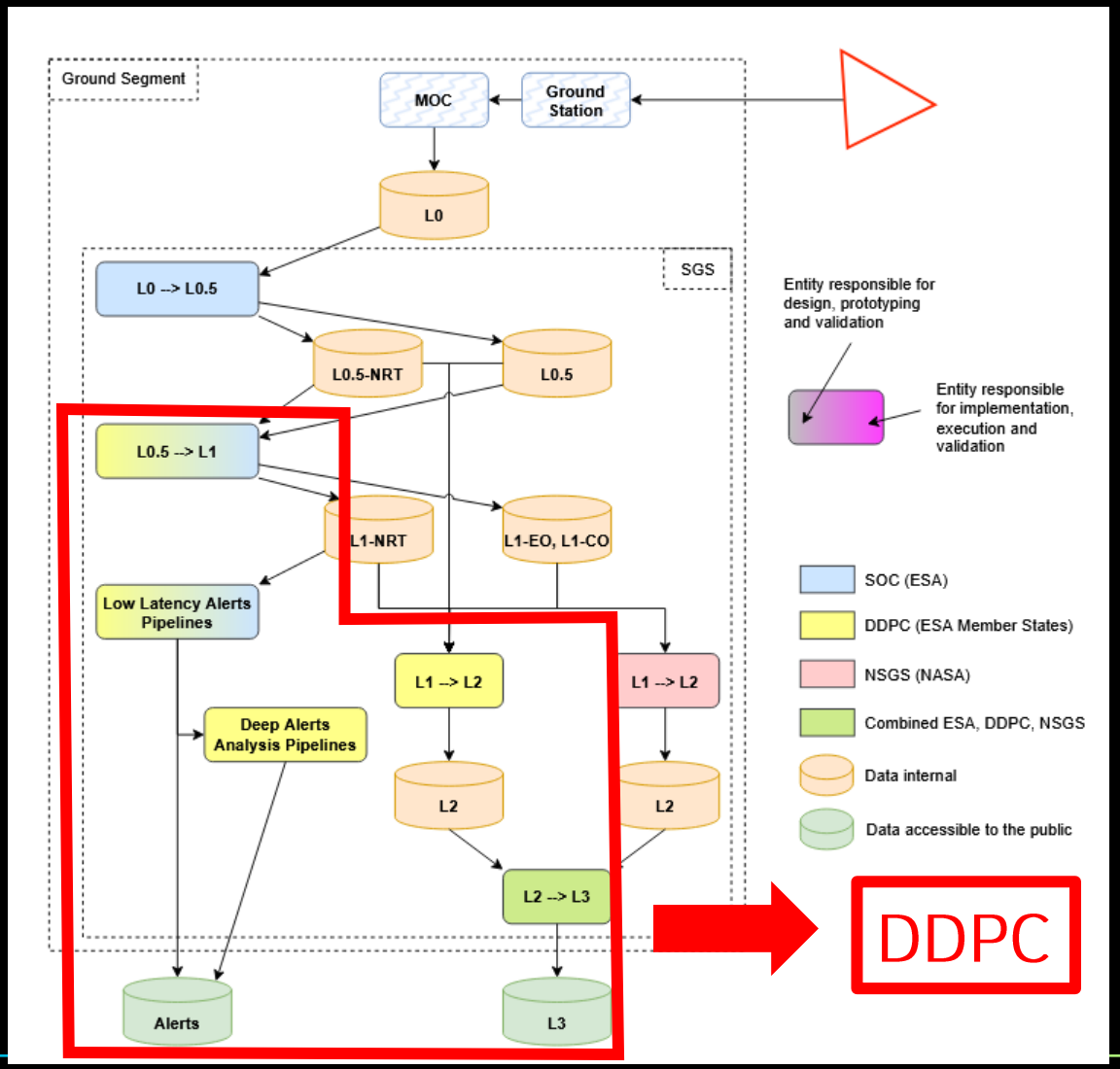
INSTITUTE OF SPACE SCIENCE INFLPR SUBSIDIARY

ESA | NASA lisa

LISA DDPC

Left image: Credit ESA/ATG Medialab – ESA Standard licence

THE LISA PROJECT DATA PROCESSING

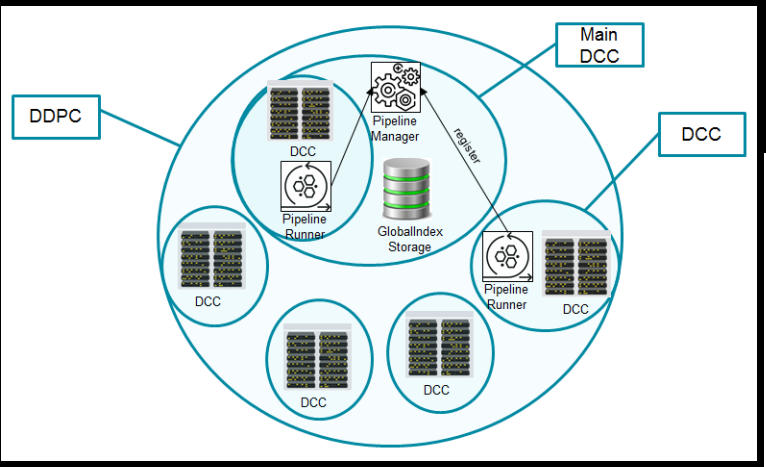


02

THE LISA DDPC AND ITS ORGANISATION

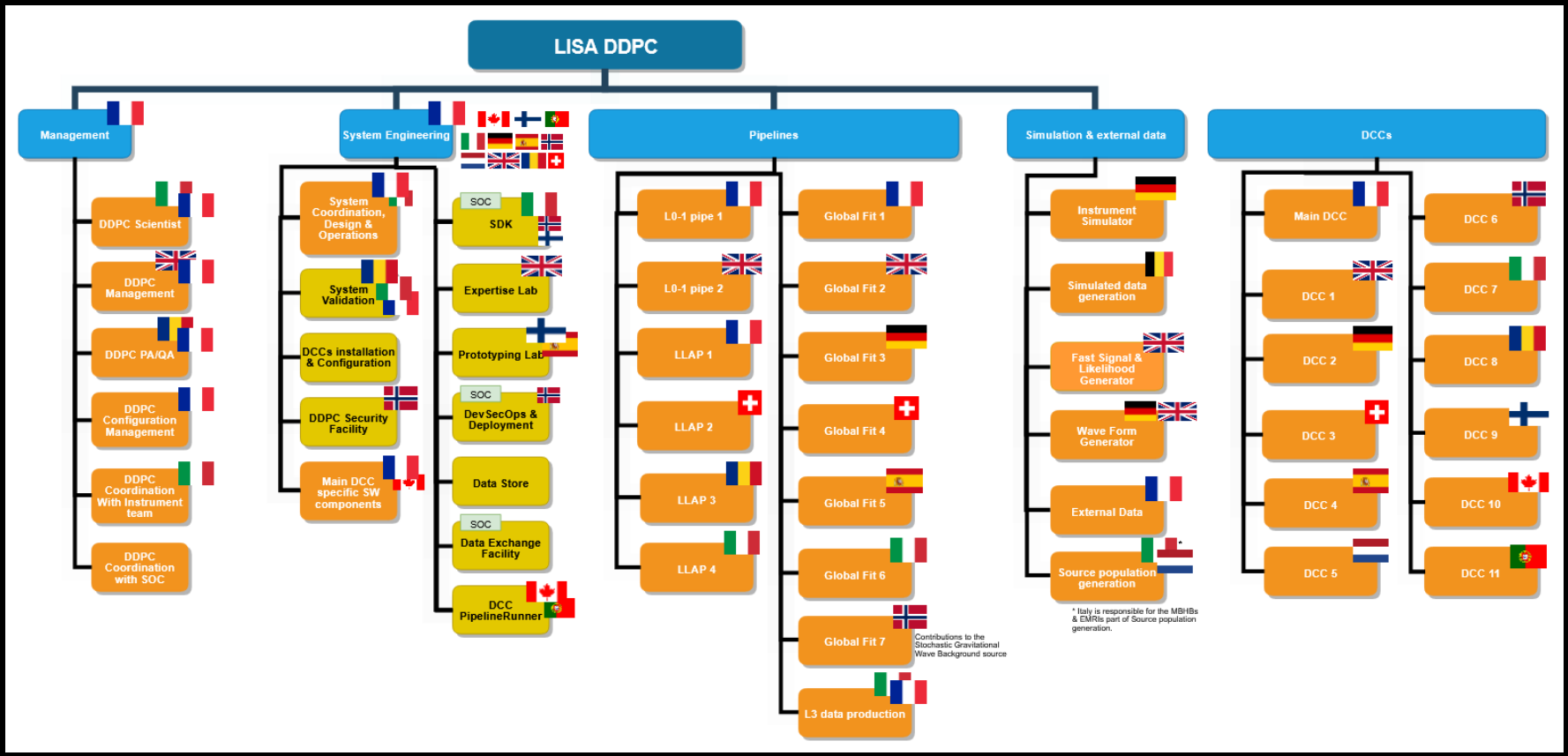
(Distributed Data Processing Center)

THE DISTRIBUTED DATA PROCESSING CENTER



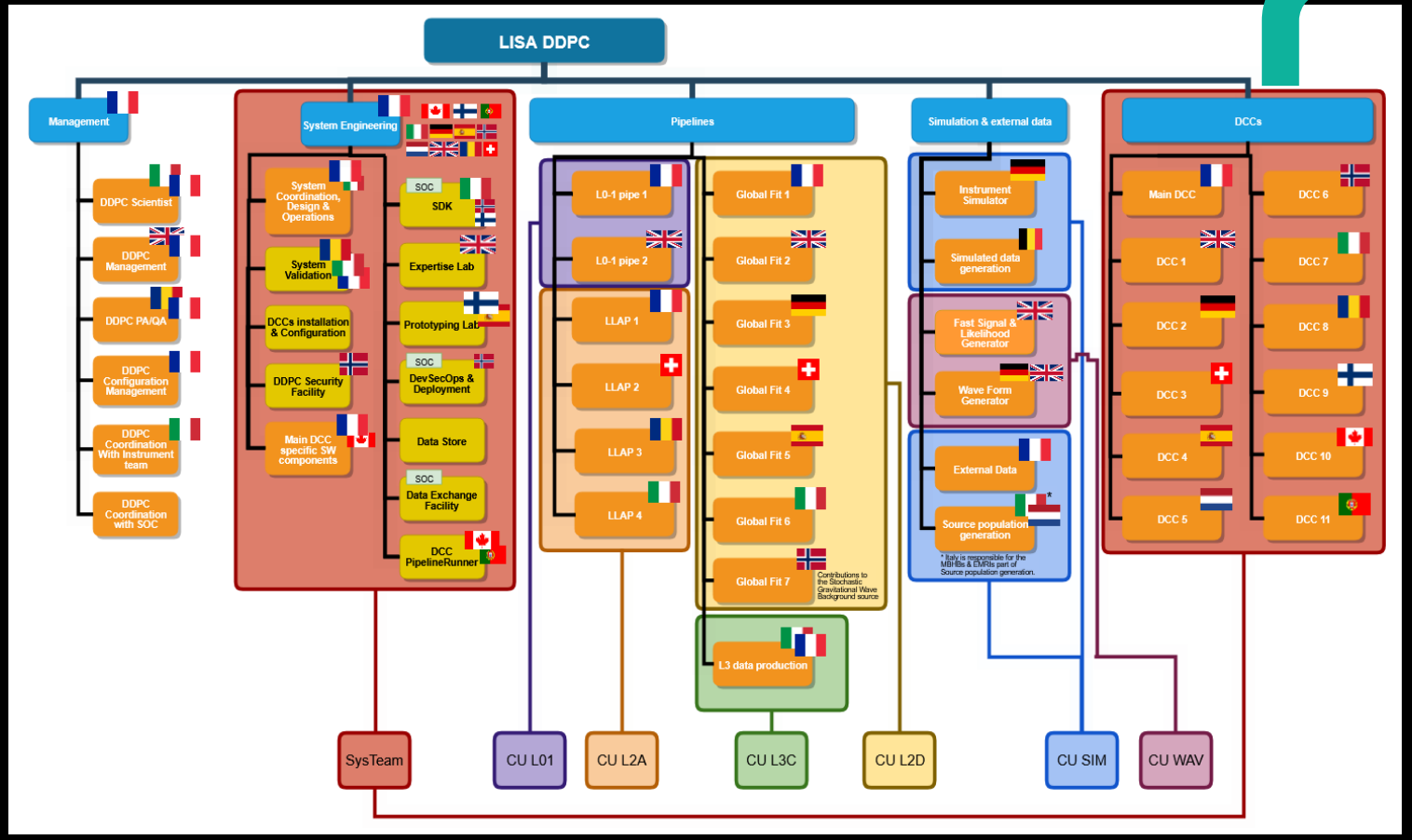
12 DCCs
250 members
13 countries
Part of a scientific consortium of over 1500 members

The DDPC Workpackages

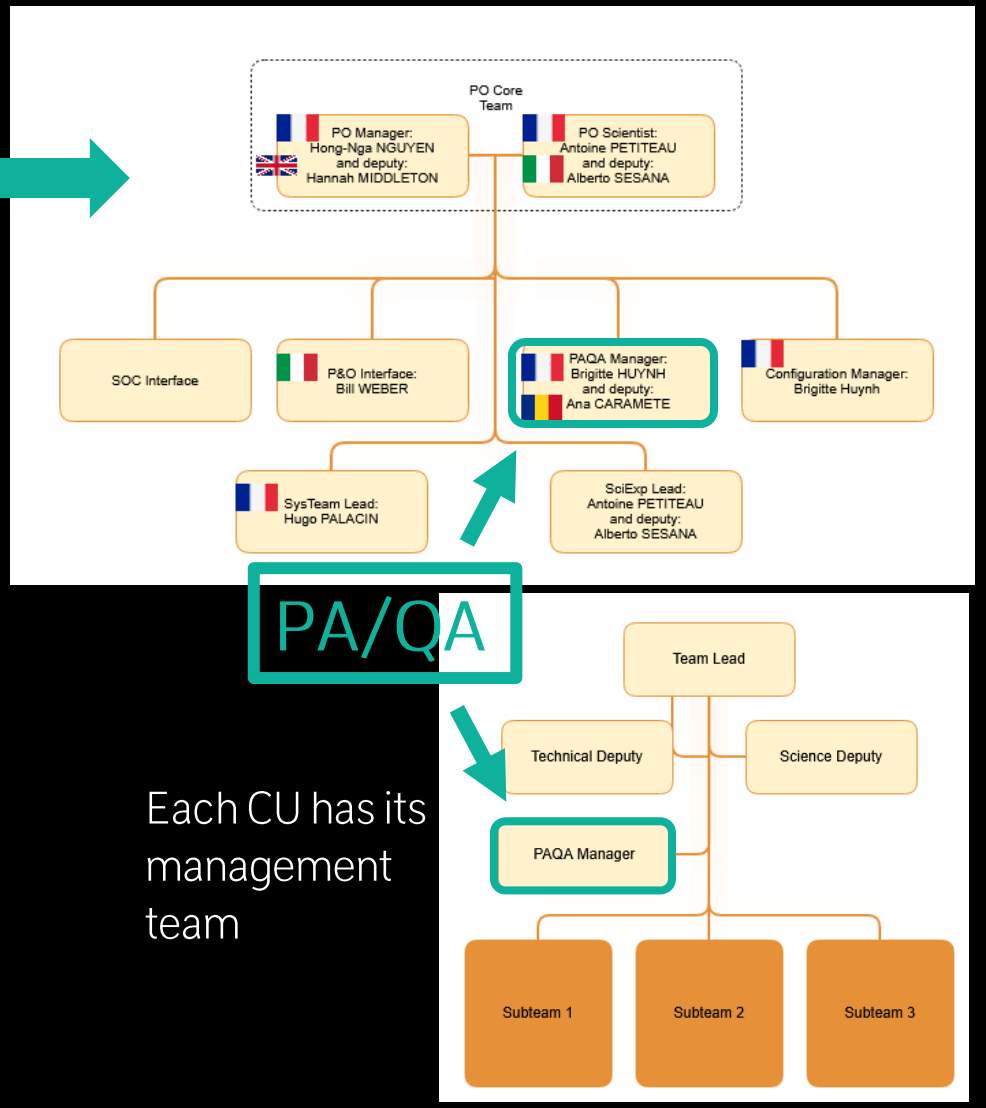


THE DDPC ORGANISATION

The DDPC is organised in Coordination Units (CUs)



Managed by a Project Office



Each CU has its management team

CU: Coordination Unit

03

THE LISA DDPC SPECIFICITIES AND CHALLENGES

THE LISA DDPC PA/QA SPECIFICITIES AND CHALLENGES

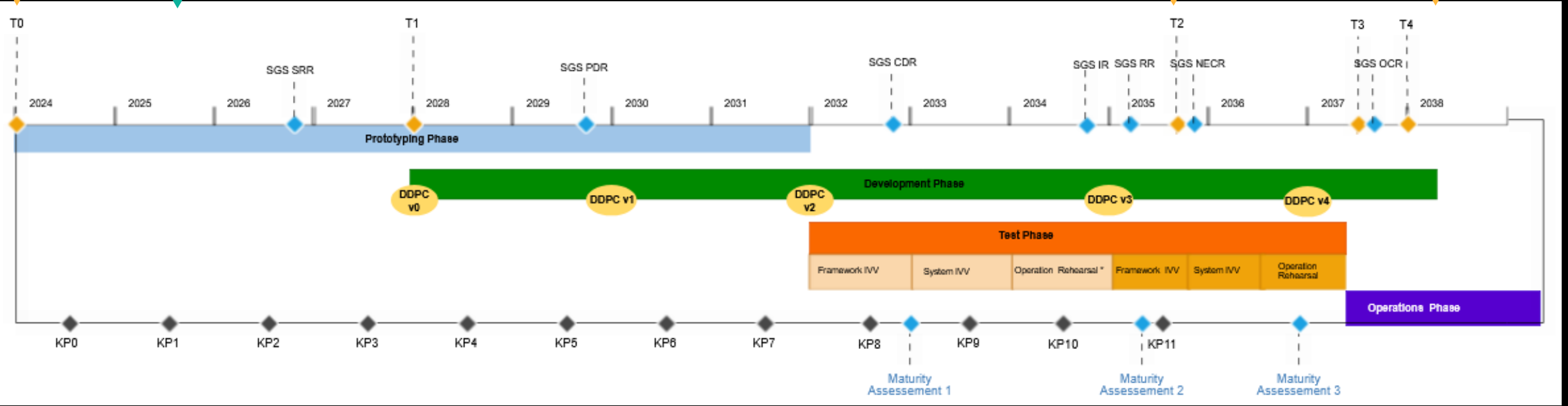
- Complexity and scale: organization, number of people, countries and duration

Mission adoption: 2024

We are here!

Spacecraft launch: 2035

End of development phase: 2038



THE LISA DDPC PA/QA SPECIFICITIES/CHALLENGES

- Partners -> collaborative way of working
- Most members are scientists, with other activities, not specialised in software development nor quality
- The PA/QA leads are also scientists
- The development started before PA/QA was set up
  - Scientific algorithms started to be worked on
  - Incremental development approach
  - Some code needed early on (simulation)
- Legacy code from other projects (Ligo, Virgo)
- Different time zones

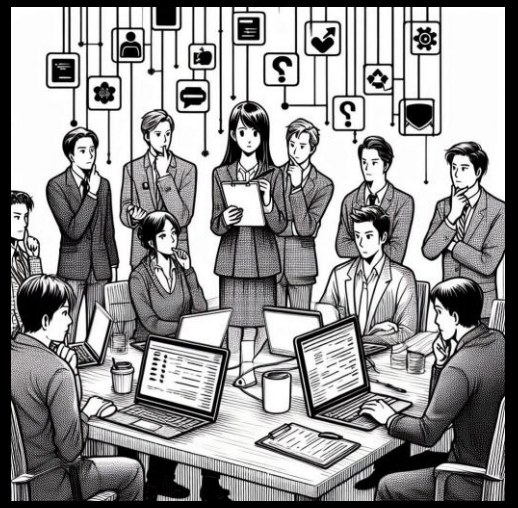
04

HOW WE ARE DOING PA/QA IN THE LISA DDPC

THE LISA DDPC PA/QA APPROACH

Try and do everything?

Do one thing at a time, thourougly?



Decide everything in the PA/QA team and enforce the rules?

… at the risk of them not being well received nor applied

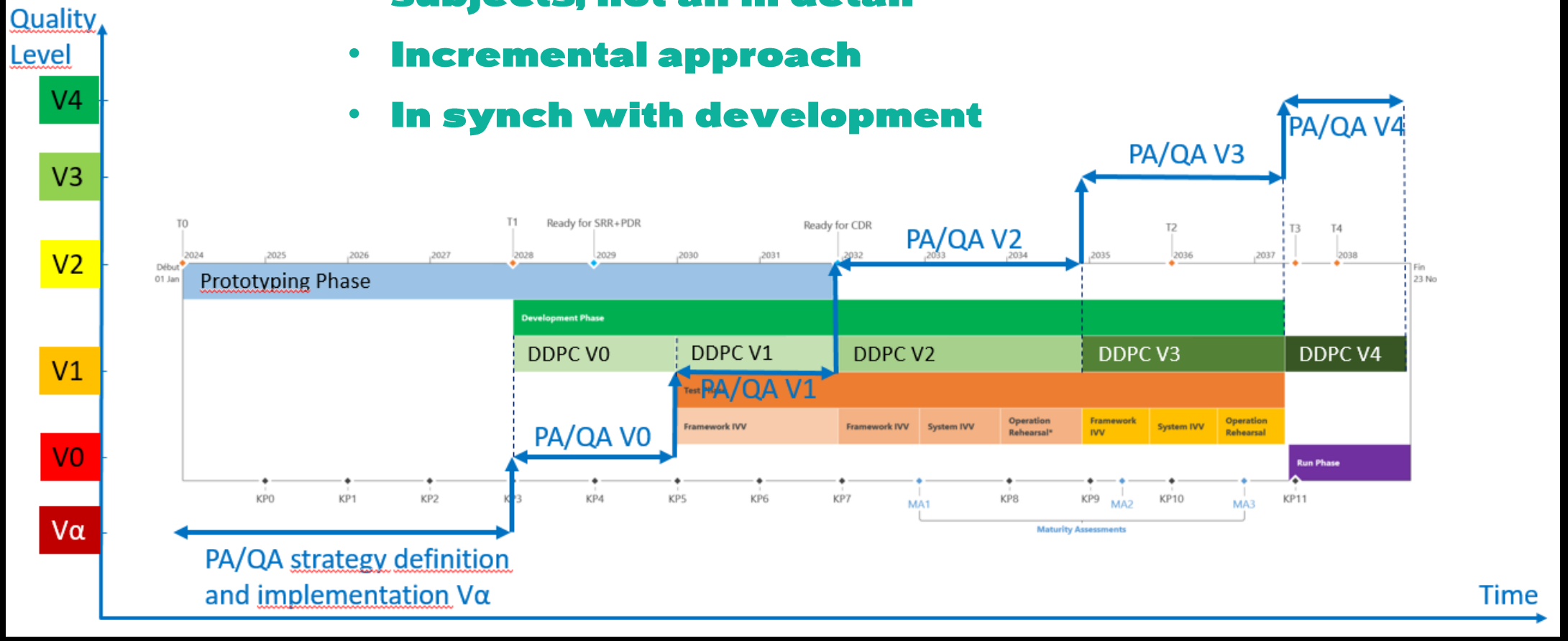
Horizontal incremental approach
Look into all topics and refine

Participative approach
Work with the system team and the developers

AI generated images

THE LISA DDPC PA/QA APPROACH

- **Horizontal strategy: more subjects, not all in detail**
- **Incremental approach**
- **In synch with development**



THE LISA DDPC PA/QA APPROACH

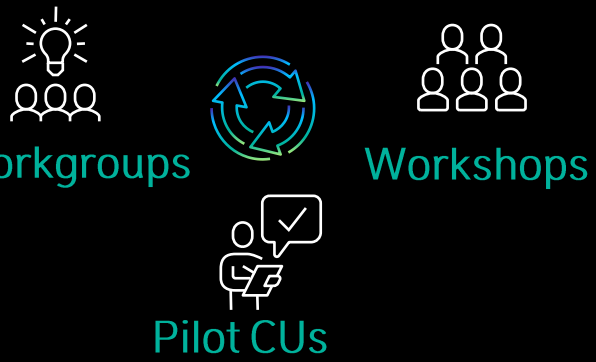
- The importance of working together (System Team, developers, PO, ESA)

Top down and Bottom up

ECSS requirements

Developer's work habits

Work with the System Team and developers



Help to better understand, be ready to listen

- Using collaborative tools to set up processes and ensure requirements are met

ATLASSIAN Confluence

ATLASSIAN Jira

GitLab

sonarqube

klaxoon a Wrike company

Disclaimer: not promoting any products

THE DDPC PA/QA APPROACH

- Being “agile”:

  Making sure that important issues are being addressed

  - Risk management
  - Well written requirements
  - Processes

  Following the CUs where their focus is

  - GitLab setup
  - Code quality questions

- Being pragmatic:
  - Using sonar way rather than set in stone coding rules
  - Using a linter rather than using this linter
  - A list of unclassified risks will become a Risk Registry with all fields

WHAT HAS BEEN HELPFUL

Synchronising with the Project Office and ESA

- Shared incremental mindset with PO
- A well structured DDPC
- Regular meetings
- PO
  CUs
  PA/QA leads
  ESA
- Sharing our vision and tools

Having goals and accepting not knowing exactly how we will get there

Structuring, moving forward and remaining patient: it's a long project!

Working with a lot of enthusiastic people, in a bubbling project

05

CONCLUSION

TO CONCLUDE

- LISA is a big scale, ambitious and very exciting project
- Setting up PA/QA in the LISA DDPC has lead us to build a strategy to address the challenges of such a project where key factors are
  - Working with all the actors,
  - Building up in increments,
  - Being pragmatic and flexible,
  - Using shared tools to structure the processes
- We are still at the beginning of the project, with a lot to think about and to do!


THANK YOU
QUESTIONS