

# COMET-ORB VISION OF SPACE-WEATHER AND ORBITOGRAPHY

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TOULOUSE

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... cnes ...



## COMET-ORB topics

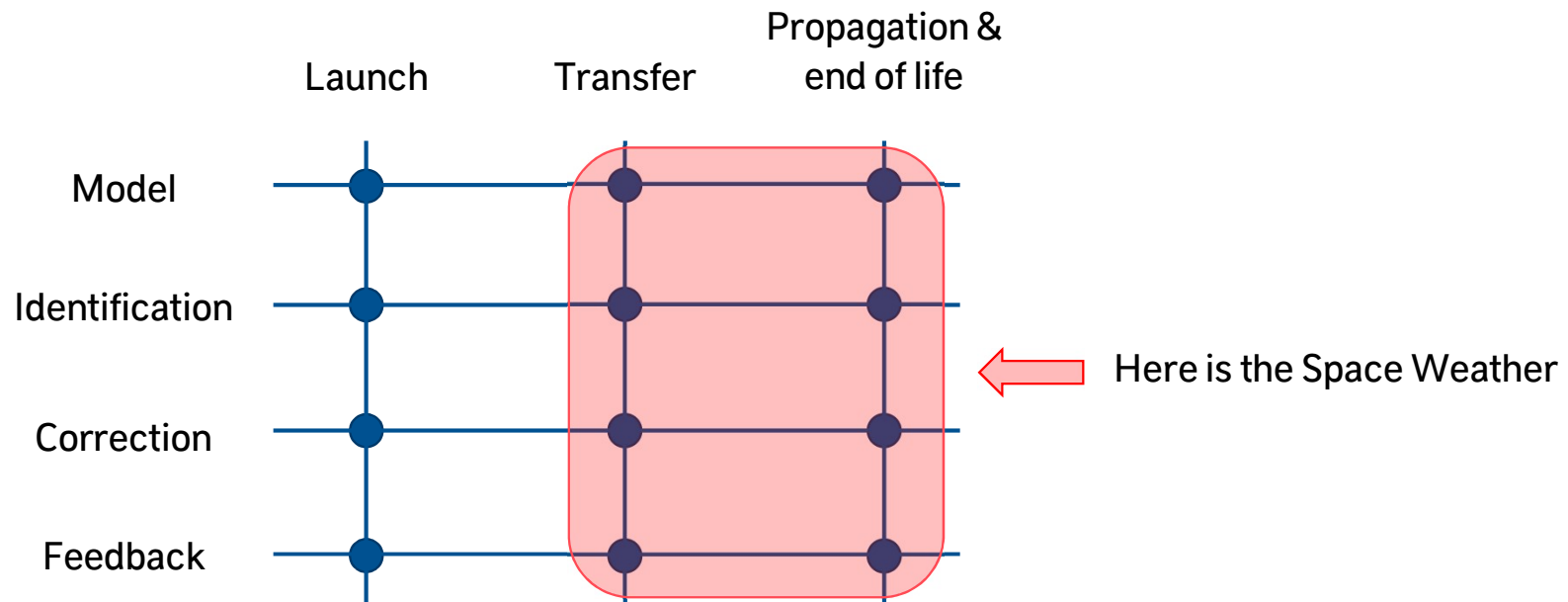
The COMMunity of ExperTs in ORBital mechanics deals with all subjects relating to space vehicle **trajectories**.

This community aims to lead and prompt discussions on all aspects of the life of these vehicles (from **launch** to **end of life**), from the most **theoretical** aspects to the most **practical** aspects.

The scientific fields involved in this theme are numerous and extensive in scope:

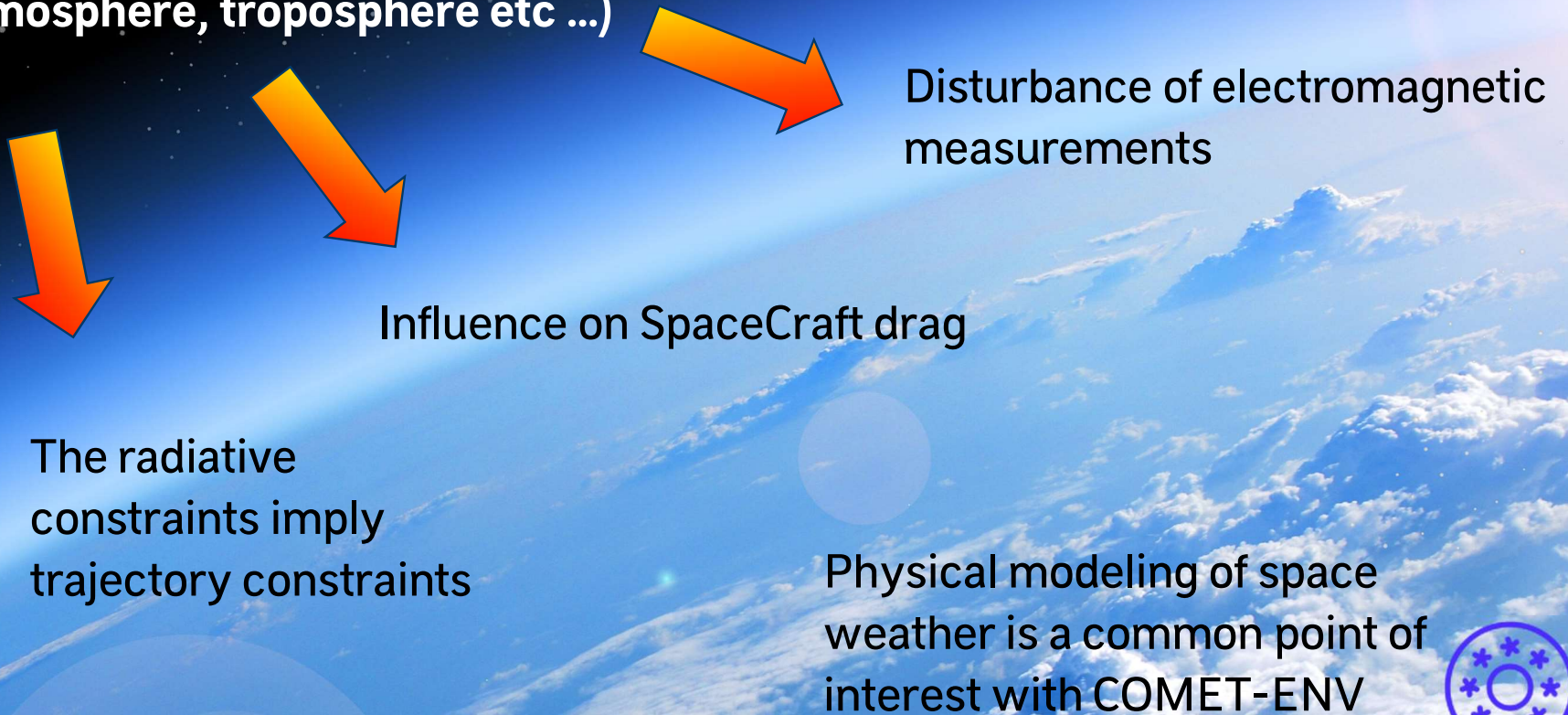
- Astronomy,
- Geodesy,
- Geophysics,
- Celestial mechanics,
- Orbitography,
- Navigation and Guidance,
- Applied mathematics (including optimal control, integration, etc.)
- Propulsion (chemical, electrical, solar sail, etc.)

## COMET-ORB topics

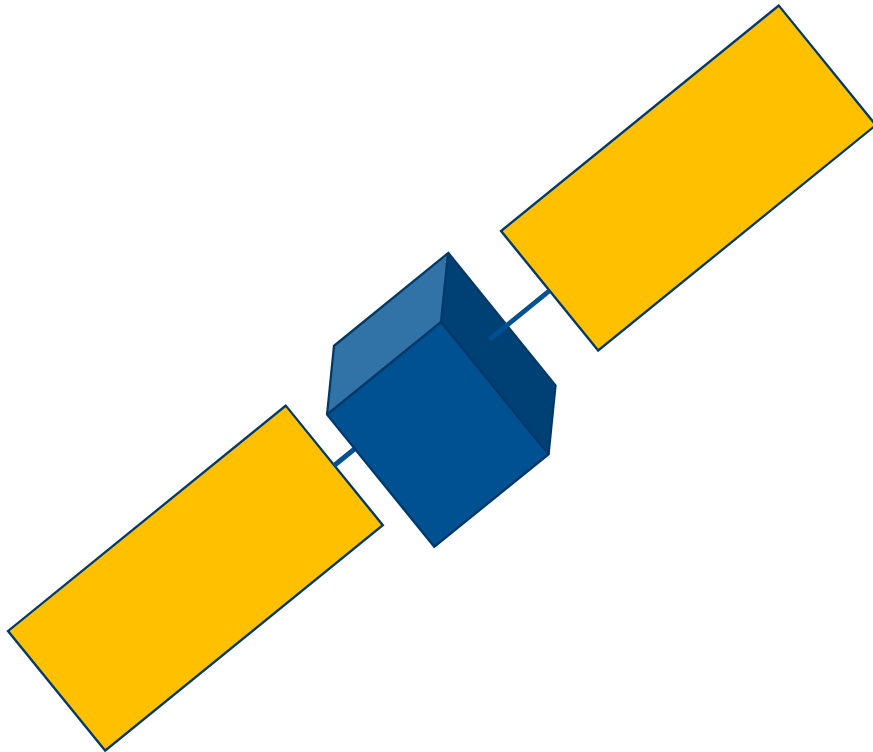


## Mechanical impact of Space Weather

Influence of the sun on the atmosphere  
(ionosphere, thermosphere, troposphere etc ...)



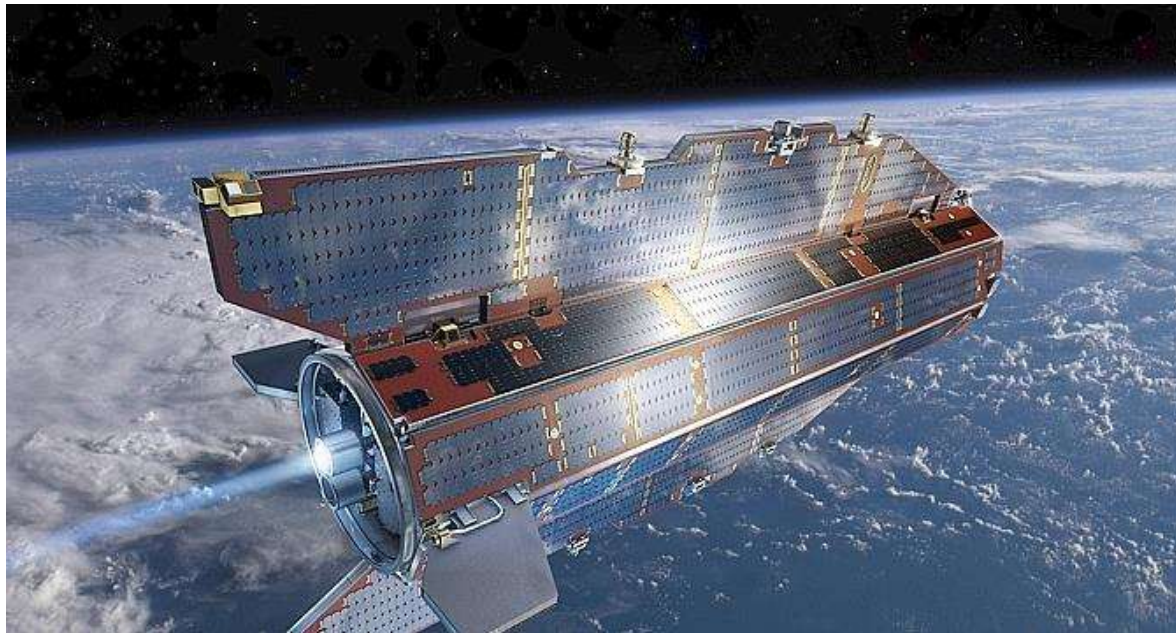
## Impact on SpaceCraft preliminary design (mission analysis)



During **phase 0**, the sizing of the propellant masse budget to cover the evolutions of the atmosphere can be crucial.

## Impact on SpaceCraft in orbit (flight dynamics)

The definition of the low limit of altitude to keep a margin of orbital controllability must take into account the space weather prediction during operation. This was done in particular for the GOCE mission.



The need for space weather prediction for orbit control is a common point with COMET-OPS





## Feedback



A solar flare led to the loss of 40 STARLINK satellites (out of 49) in February.

There are many speculations about the real cause of the loss of control of the satellites, because in the past solar flares of the same magnitude have not caused any loss.

In any case, space weather is something to consider.

## Round table

Theme	Animator
What innovation for short term prediction ?	Sean BRUINSMA
Use of official European ESA services, should we change the current methods ?	Gerard GALET
New mission typology lead to new needs. Is density prediction a relevant topic for future missions ? Formation flight / attitude etc ...	Nicolas TCHINTCHARADZE