Horizon Europe
H2020 RIA : Plasma Jet Pack Project

17/06/2021

CHIFFRES CLES

Toulouse

Siège social (Flourens, 31130)

105 salariés

Dédiés à l'industrie spatiale

10 M€

Chiffre d'affaires en 2019

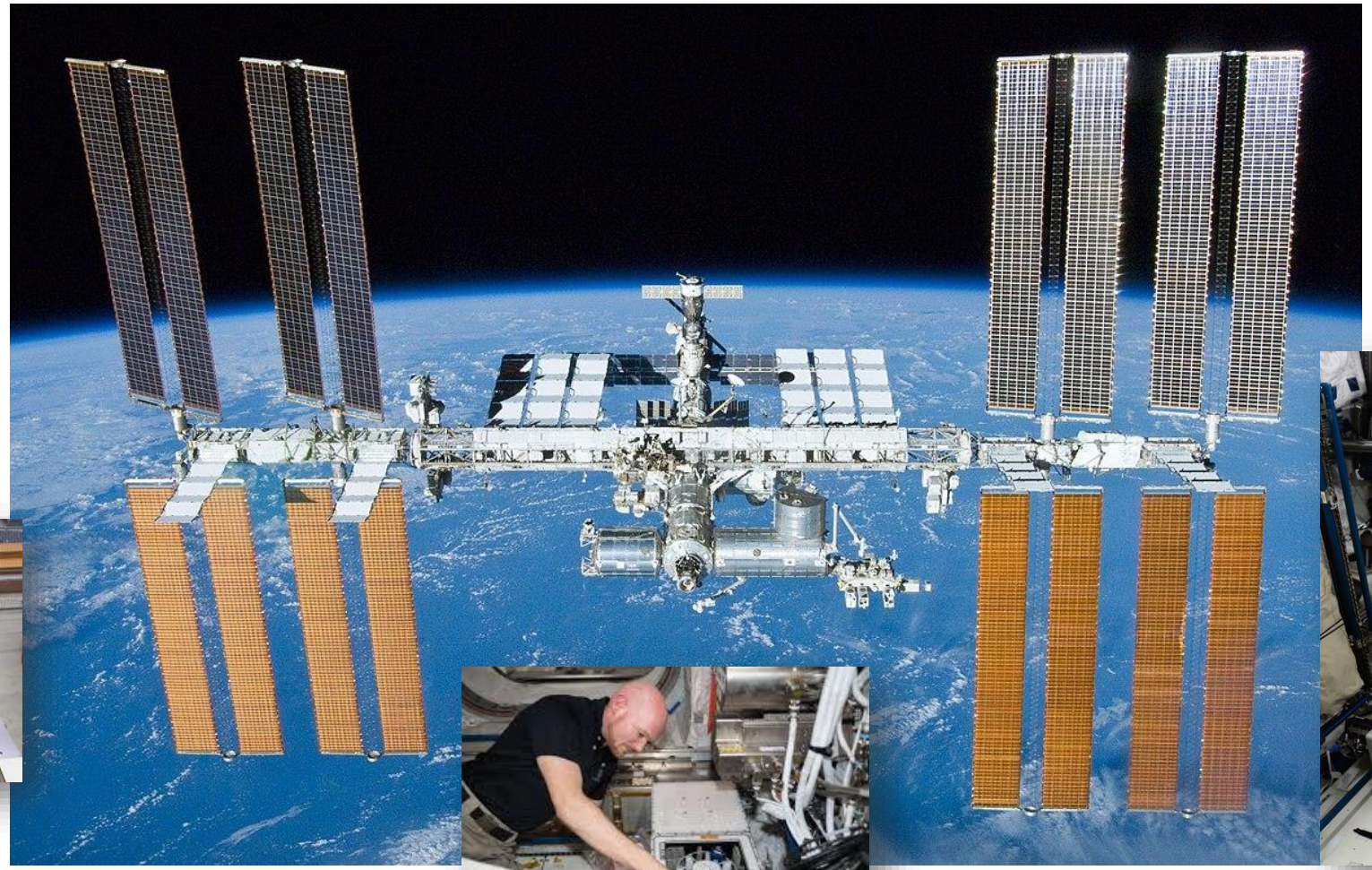
1M€

Investissement R&D annuel

EN 9100:2018

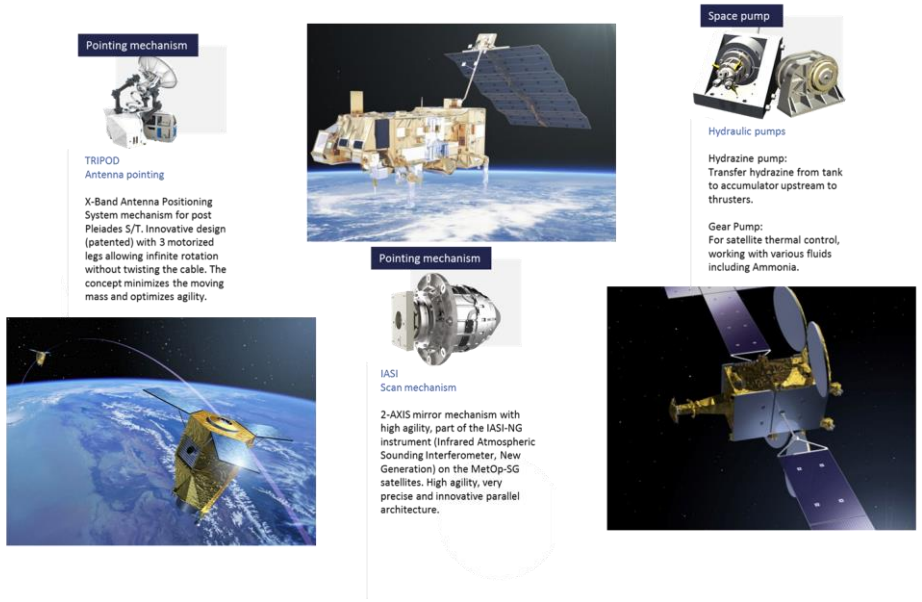
Habilitation confidentiel défense

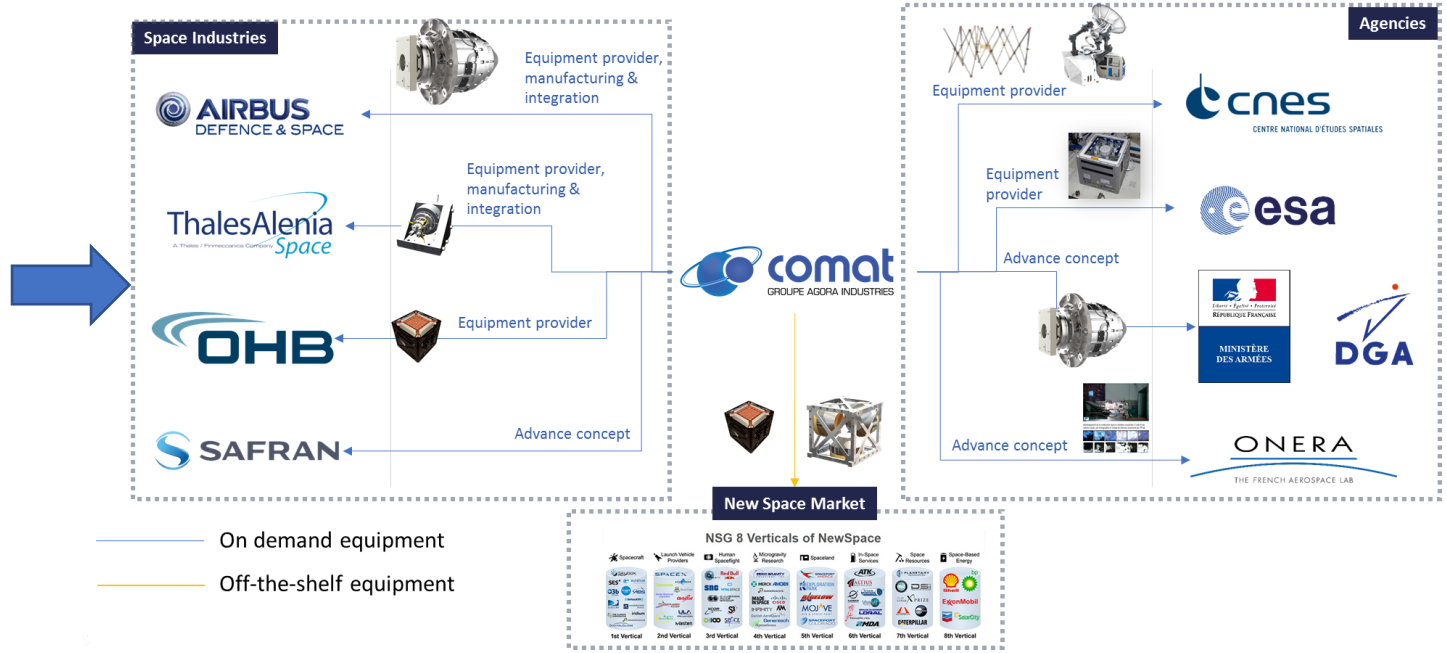
À partir des expériences de vol habité de l'ISS …



… jusqu'au « New Space »

…en passant par le spatial traditionnel (« Legacy Space ») …





Equipement « Off the Shelf »

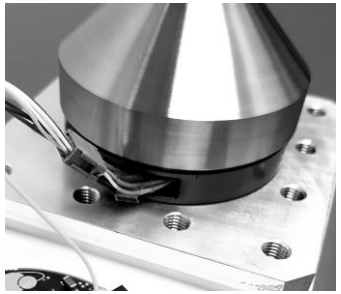
New Space Market

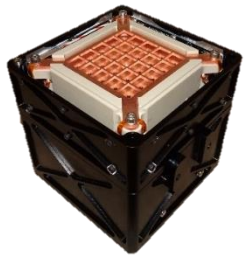
Small satellites
- Roues de réaction
  - RW20
  - RW40
  - RW60
  - RW90

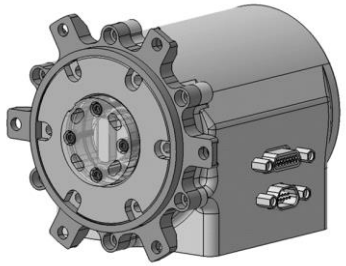
Small satellites
- Plasma Jet Pack
  - PJP30 (Station keeping & Orbit rising)
  - PJP80

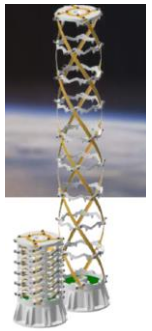
Small satellites
- Actuateur rotatif
  - SADM (200W)
  - High torque mechanism

Small satellites
- Appendices déployables
  - Antennas
  - Boom
  - Radiators









Summary

- ✓ Project overview
  - > Call
  - > Objectives
- ✓ Consortium
  - > Experts from Europe
- ✓ European project management
  - > Process
  - > Development plan
  - > Work plan
- ✓ Conclusions

H2020 Plasma Jet Pack

Project overview- Call

✓ Research and Innovation In Actions : SPACE-13-TEC-2019: SRC – In-Space electrical propulsion and station keeping

> Dedicated to our kind of technology

SRC – In-Space electrical propulsion and station keeping

A disruptive electric propulsion technology is a technology that disrupts a status quo in the space sector. It could replace the dominant technology by providing radical improvements in performance or costs which are perceived as valuable by a customer or part of the market, or it opens up new opportunities not possible with the incumbent technology. Emerging technologies that are potentially 'disruptive' often underperform compared to the dominant technology in early development phases – the underlying physics may not be fully understood for example and more R&D is required to properly ascertain performance attributes. Examples can be: disruptive improvement of performances, enabling of new operational scenarios, reducing costs of the full system etc.

Proposals shall cover one of the following two subtopics:

- **Thruster concepts or technologies** for disruptive electric propulsion systems such as Helicon Plasma Thrusters (HPT), Electron Cyclotron Resonance plasma thrusters (ECR), Magneto Plasma Dynamic thrusters (MPD), Pulsed Plasma Thrusters (PPT), micro-propulsion electric thrusters, or any other innovative electric thruster concepts and relevant technologies for disruptive electric propulsion systems.
- **Transversal concepts and technologies** for disruptive electric propulsion systems, such as power condition electronics, direct drive, magnetic nozzles, alternative propellants, testing techniques, materials.

Proposals may target any part of the technology readiness levels (TRL) scale, in particular:

- Breakthrough technologies starting at low or very low TRL (<4), aiming to promote promising and potentially disruptive thrusters concepts in the field of Electric Propulsion. This should allow increasing of the current TRL, which in the long term could change the Electric Propulsion landscape.
- Promising technologies starting at higher TRL (≥4) in the field of Electric Propulsion, enabling significant improvements of Electric Propulsion system performances, cost and fit to the market. The objective here is to allow to efficiently and effectively increase the TRL. Proposal for higher TRL should include the best possible combination of a market analysis and an application impact analysis.

Space technologies science and exploration

SPACE-13-TEC-2019
SRC In Space electrical propulsion and station keeping / Disruptive Technologies

The **Disruptive Technologies**, are very promising EP thruster concepts or transversal EP technologies which could disrupt the propulsion sector by providing a radical improvement in performance and/or cost reduction, leading to become the preferred technology for certain applications; or enable new markets.

Promising EP thrusters are for example: Helicon Plasma Thrusters (HPT), Electron Cyclotron Resonance Thrusters (ECRT), Magneto Plasma Dynamic Thrusters (MPDT), Pulsed Plasma Thrusters (PPT), Field Emission Electric Propulsion thrusters (FEEP), etc.

Transversal EP technologies are for example radical innovations in Power Processing Units (PPU), magnetic nozzles, alternative propellants, etc.

Recommended project size
Indicative budget

Type of action

1 M€
For activities starting from TRL < 4

1 to 2 M€
for activities starting from TRL ≥ 4
10 M€

Research and Innovation Actions
Participation of industry, including SMEs, is encouraged

H2020 Plasma Jet Pack

Project overview- Objectives

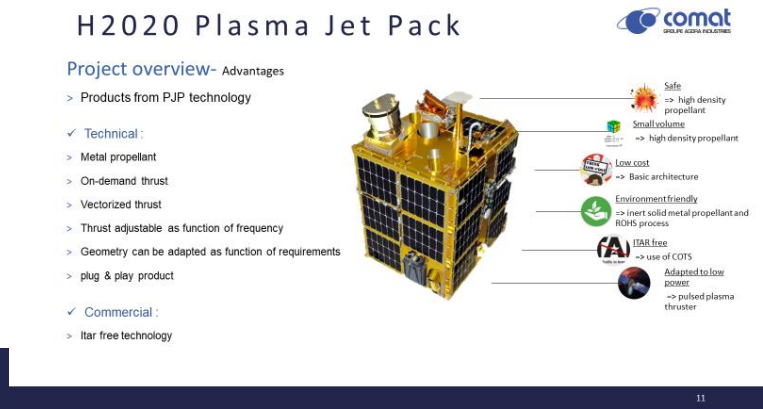
✓ **PJP global objective :** The Plasma Jet Pack project will develop and validate up to qualification level all the building blocks of the technology. The PJP0-30 will be qualified and an IOD/IOV will be performed.

> Objective 1: Consolidation of the propulsion specific performance characteristics (specific impulse, thrust-to-power ratio, impulse bit, efficiency…) of vacuum arc thruster physics.

> Objective 2: Improve Plasma Jet Pack's thrust duration.

> Objective 3: Development and test of a fully representative propulsion module: the PJP 0-30.

> Objective 4: Analysis of market needs and mission & satellite integration.



H2020 Plasma Jet Pack

Project overview- Objectives

- ✓ **Ambition 1:** provide a radical improvement for low-power space propulsion modules using vacuum arc physics
- ✓ **Ambition 2:** enable new markets and applications

Topic	Current limitations	Progress proposed by the project
Ambition 1	Under 150W, the current limitations of electric propulsion are: • Low total impulse • Low specific impulse • Only one operating point • Complex and unsafe integration • Not scalable	Under 150W, the progress purposed by the PJP is to purpose: • High total impulse • High specific impulse • Infinity of operating point between 0 and the maximum power • Scalable impulse bit for accuracy attitude control.
Ambition 2	Mission dedicated to electric propulsion module are: • Orbit rising • Station keeping • Drag compensation • Deorbitation	New missions achievable by Plasma Jet Pack are: • Accurate orbit injection • Continuous altitude control • Accurate attitude control

H2020 Plasma Jet Pack

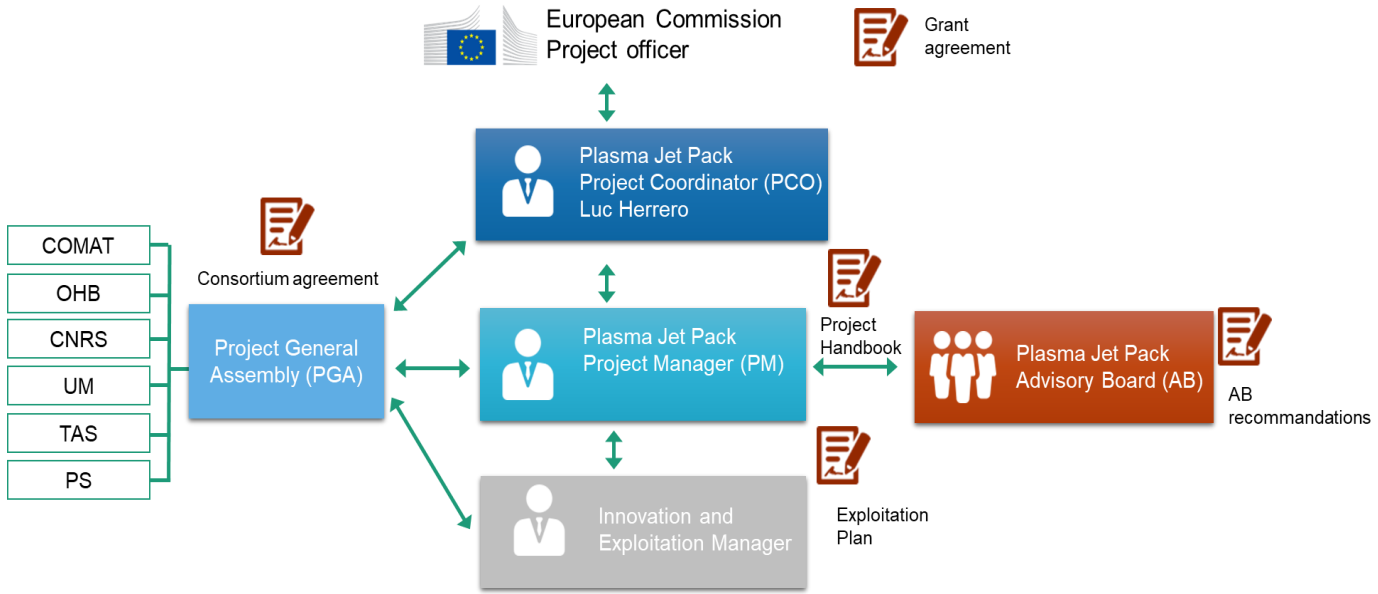
Consortium- overview

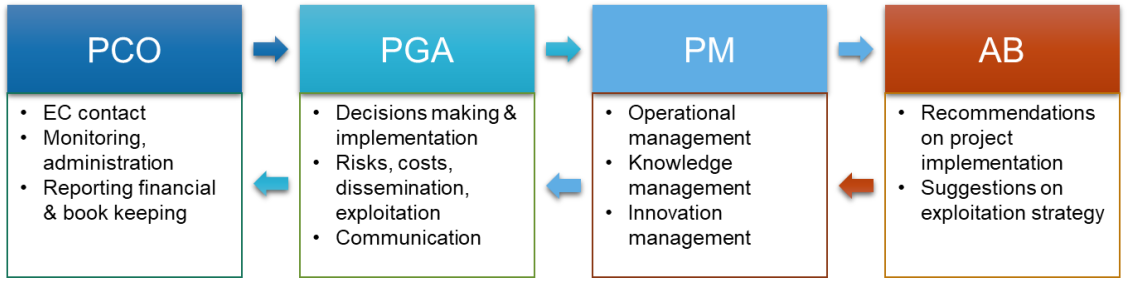
- Experts & researchers from Europe
- Knowledge from fundamental science & industry

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 870444

H2020 Plasma Jet Pack

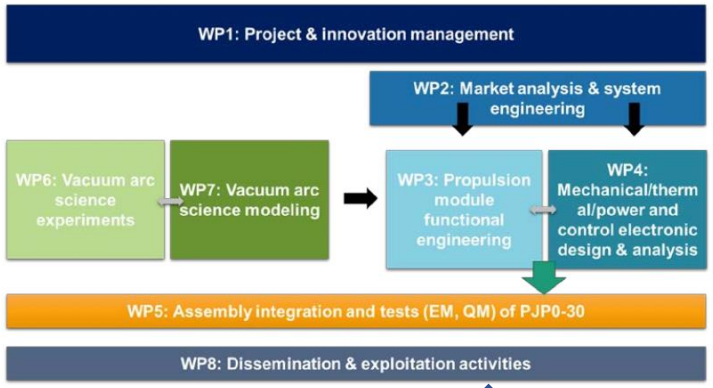
European Project Management- Process

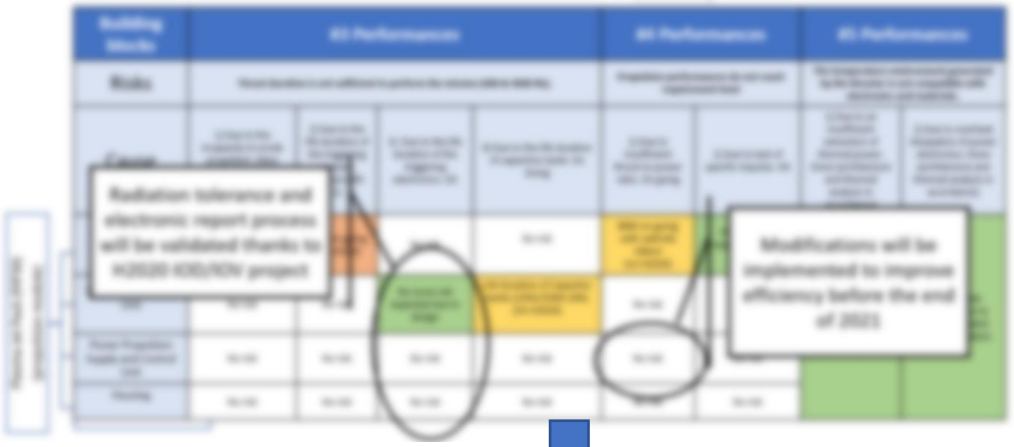


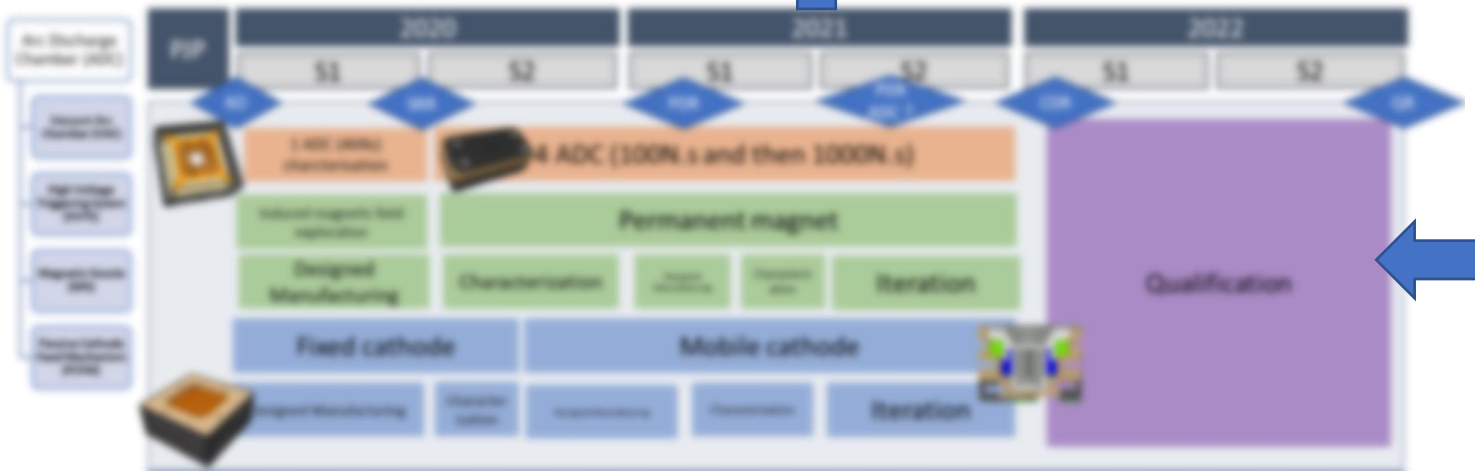


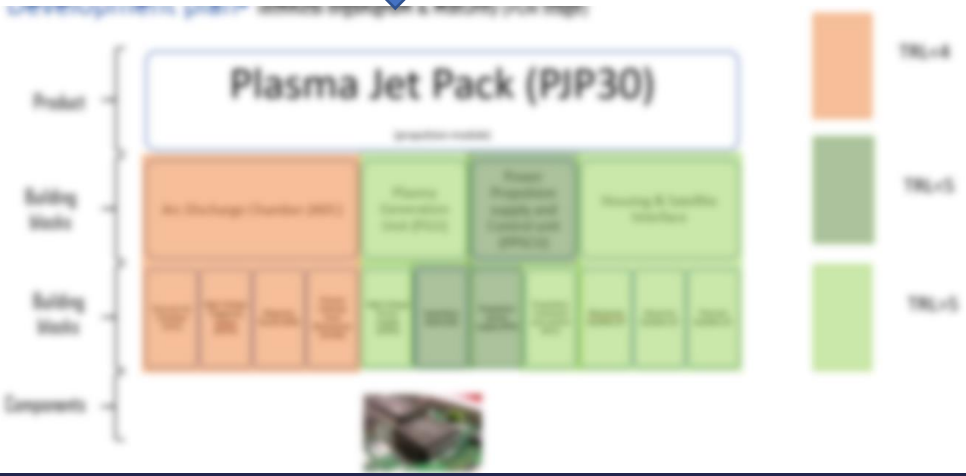
H2020 Plasma Jet Pack

European Project Management- Development plan





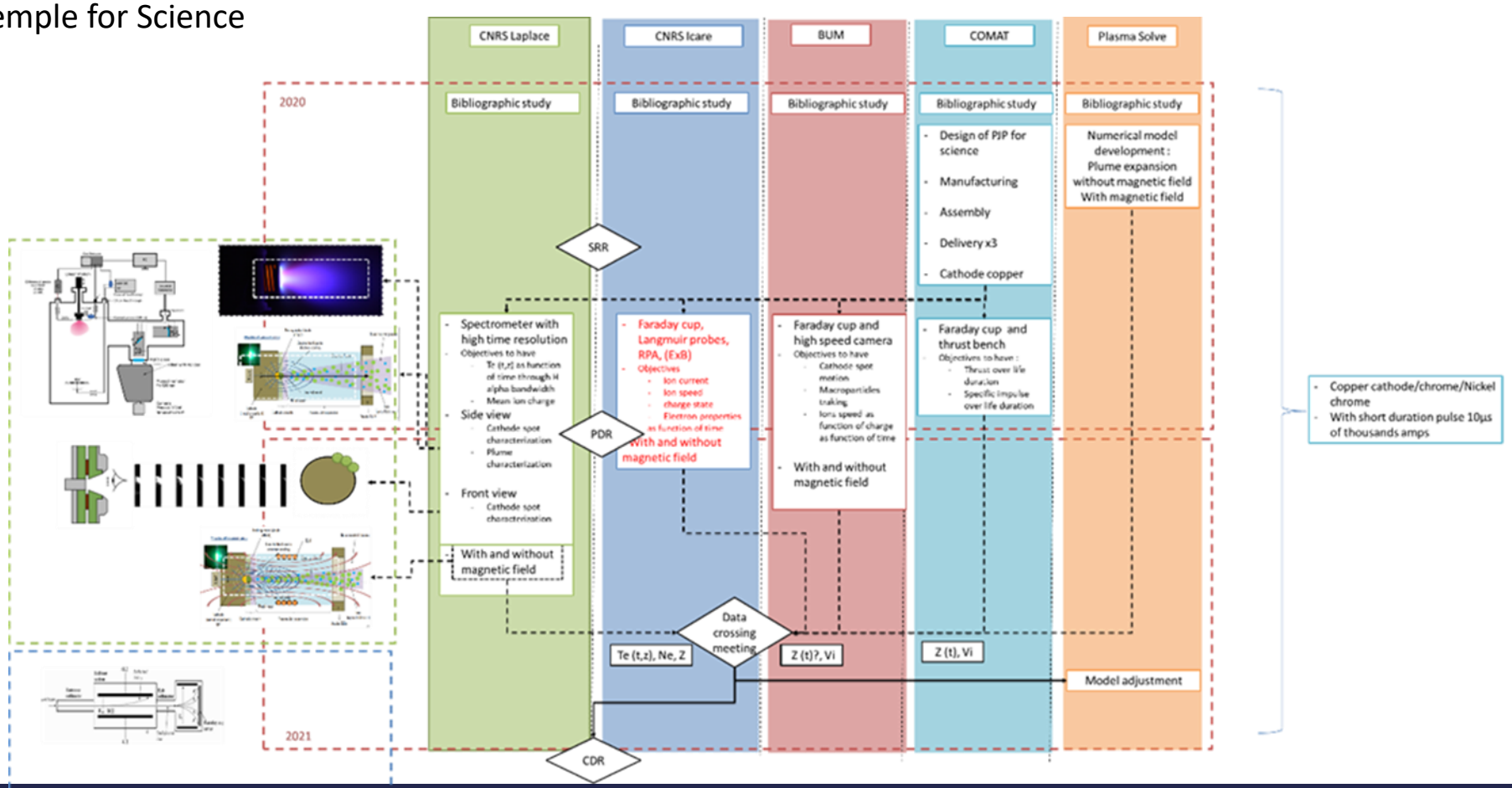




H2020 Plasma Jet Pack

European Project Management- Work Plan

> Work Plan: exemple for Science



H2020 Plasma Jet Pack

Conclusions - Synthesis

✓ What do you need?

> An innovation for a service or product (disruptive)

> A good knowledge of the market

> The best matching call

> Ambitions for the technology (market & applications)

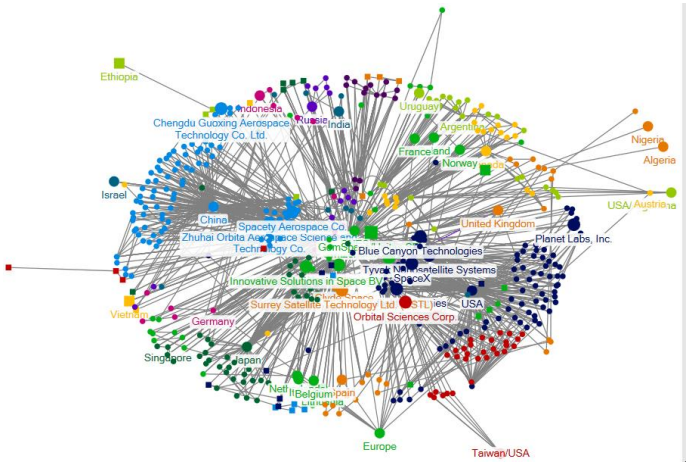
> A consulting expert for H2020/Horizon Europe projects

✓ Why do it?

> To develop innovative technology

> To be in touch with European experts & researchers

> To work into a multi-cultural environment



Thanks for your attention !

Nicolas DOLIN
Business Developer

n.dolin@comat-agora.com

Ludovic DAUDOIS
CEO

l.daudois@comat-agora.com

Luc Herrero
Innovation Manager

l.herrero@comat-agora.com