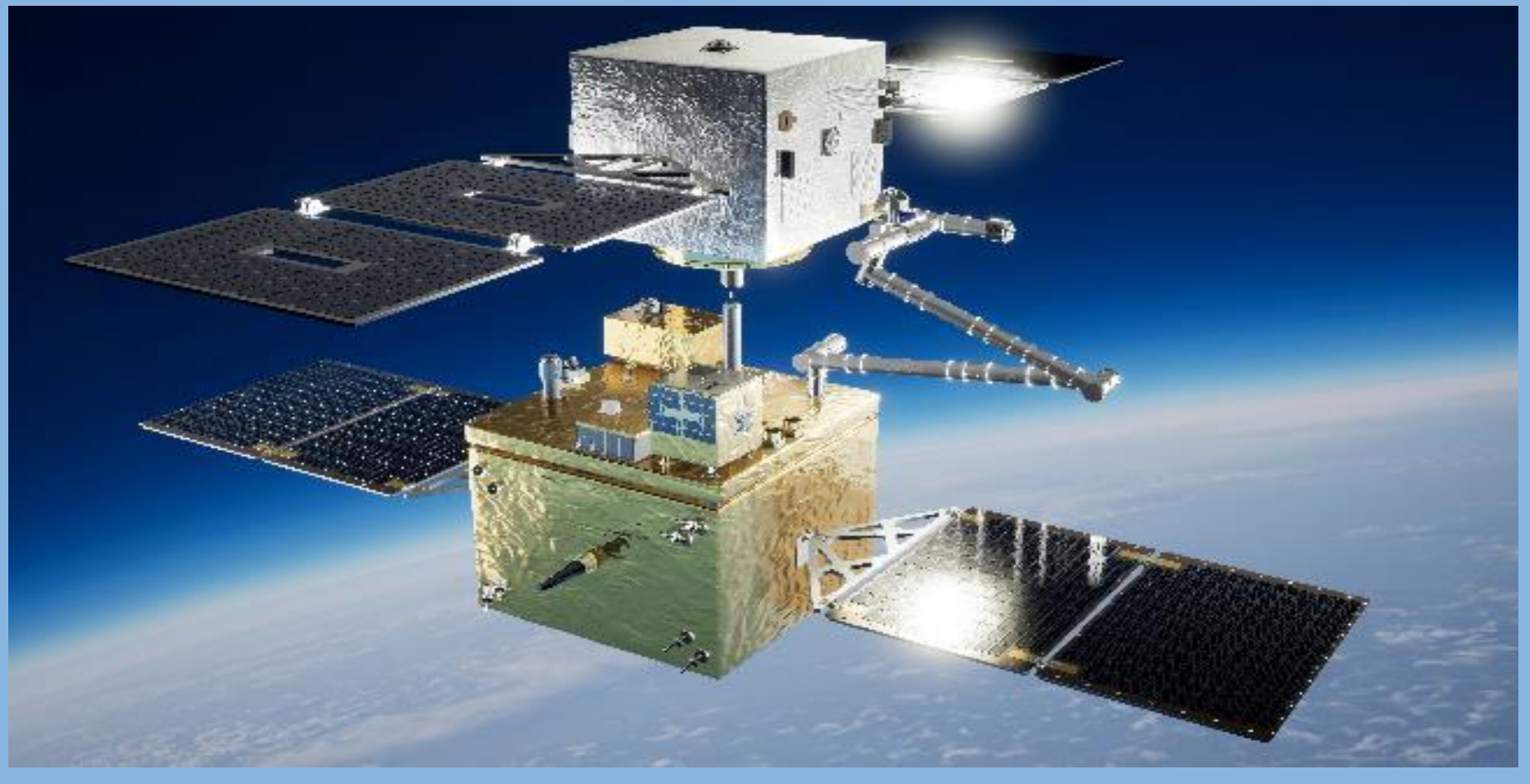
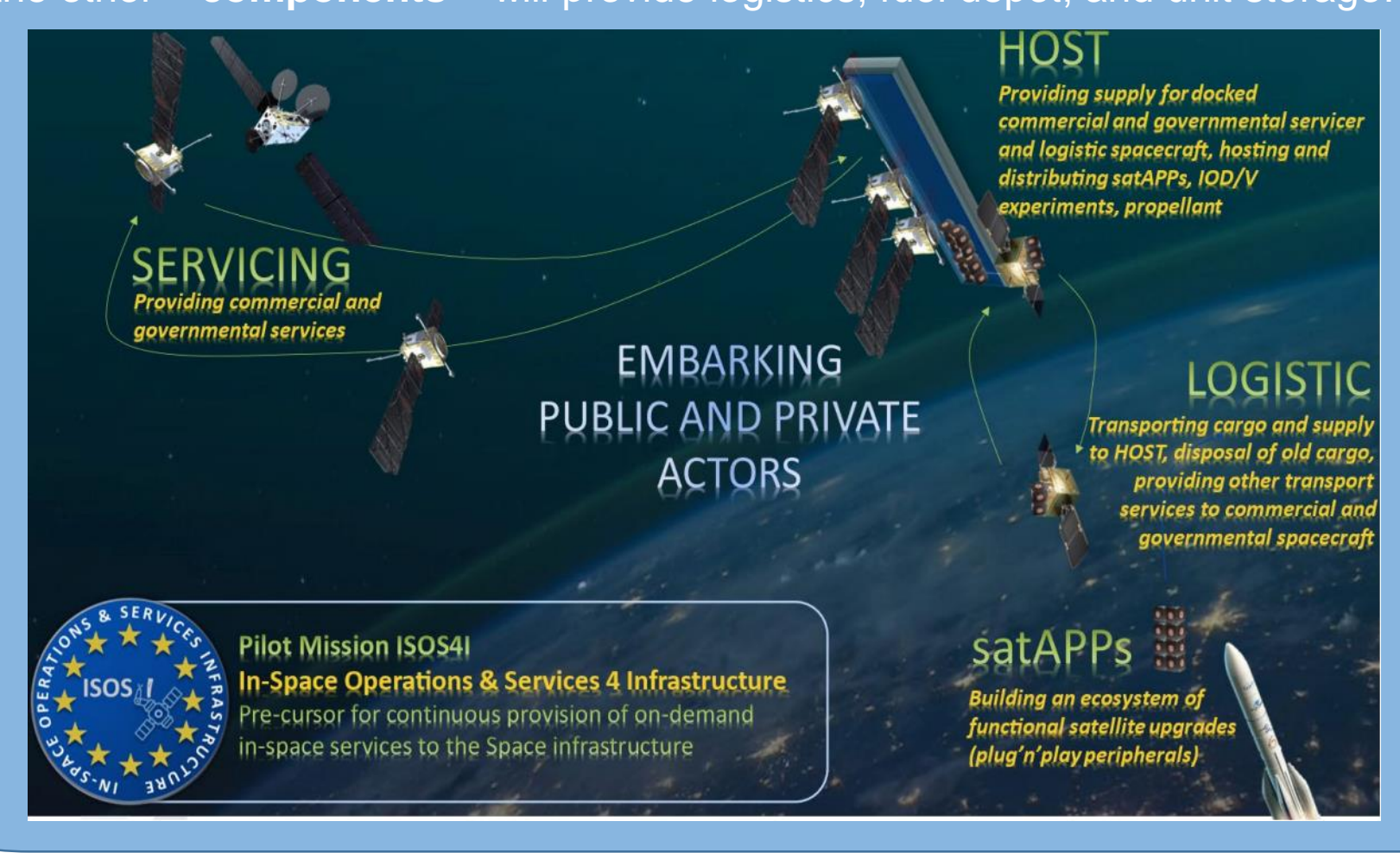


# "EROSS SC" Mission Context, Goals, and Current Achievements

## 1. INTRODUCTION

- Thales Alenia Space in France (TAS-F) is leading the EROSS program since 2023 with a flight demonstration initially foreseen by 2026 shifted to 2028.
- Based on the European Commission Framework, the previous H2020 projects heritage "3DS, EROSS, EROSS+" have covered until the Phase A/B1 with ground demonstrations over 2016 - 2023.
- Now focused on the In-Orbit Demonstration (IOD) and on commercial applications, the European Commission has developed the « In-Space Operations and Services » (ISOS) framework in which EROSS represents the « Servicing Component » (SC)
- EROSS SC program will provide a Servicer robotic vehicle capable of (active) rendezvous, inspection, capture, refuelling and manipulation/upgrade.
- While the other « components » will provide logistics, fuel depot, and unit storage...

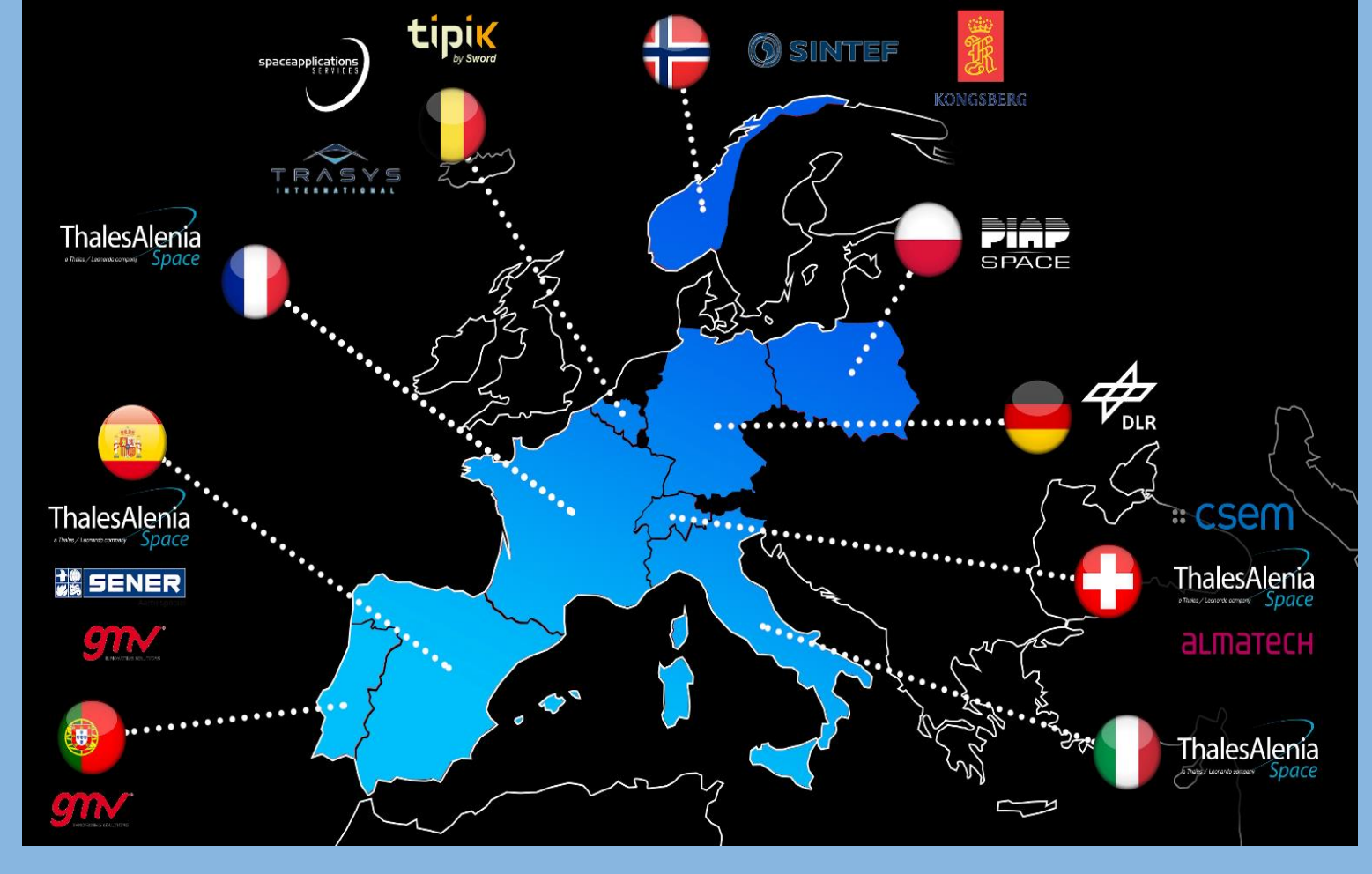


## 2. MISSION GOALS

- Demonstrate autonomous & safe rendezvous in orbit
- Demonstrate autonomous robotics for capture & servicing in orbit
  - Client capture and berthing with vision-in-the-loop
  - Client refuelling through mating interface
  - Assembly of Orbital Replaceable Units (ORUs)
  - Client repair / upgrade by mounting/dismounting ORU unit
- Demonstrate services for Prepared / Unprepared Client vehicles
- Provide services to operational Clients vehicles
  - Inspection, AOCs takeover, orbit relocation, end-of-life disposal...

## 3. CURRENT ACHIEVEMENTS

- Design Reviews completed for major subsystems
  - Guidance, Navigation and Control SW (GNC)
  - Servicer Vision System (SVS) for rendezvous sensing
  - Robotic Assembly System (RAS) for robotic operations
- Ground Demonstrations on-going for derisking key technologies
  - GNC SW validation on the Avionics Test Bench (ATB) - done Feb. 2025 FRANCE @TAS-F
  - SVS HW/SW validation on Optical & Robotic Benches - by April 2025 SPAIN @GMV
  - RAS HW/SW validation on CAESAR Robotic Bench - by December 2025 GERMANY @DLR

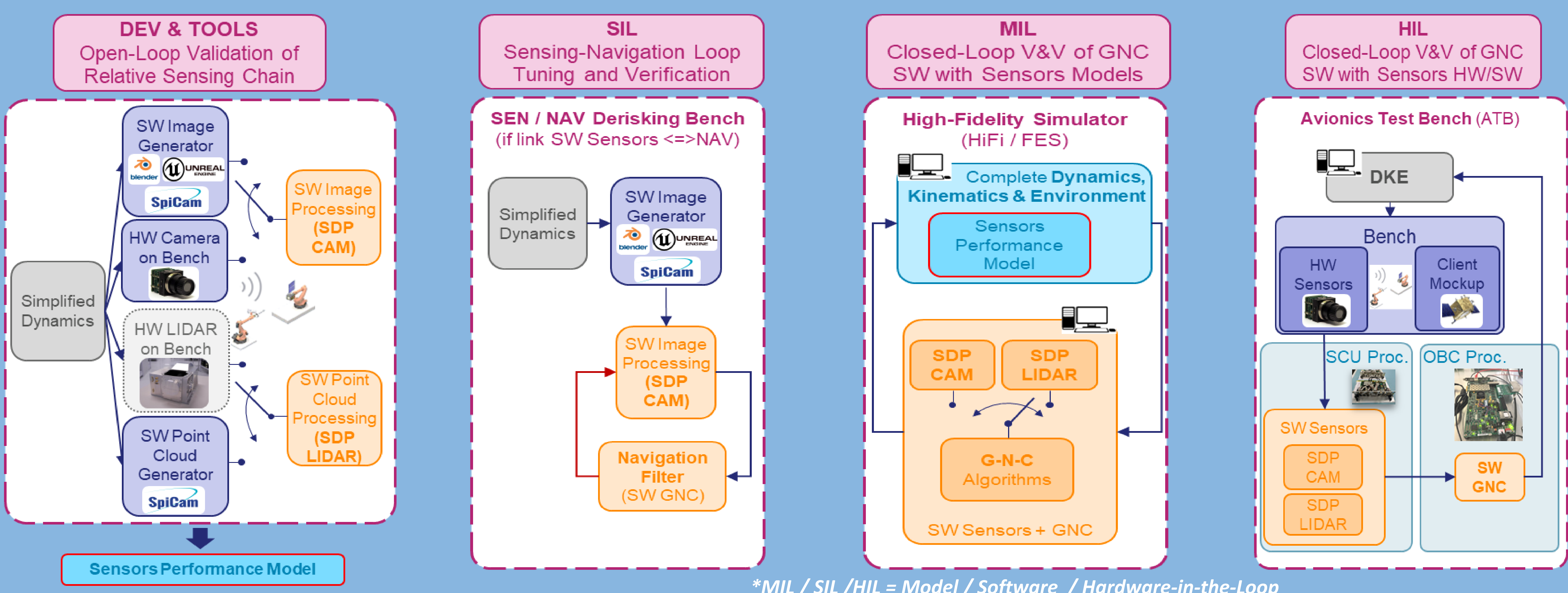


# VALIDATION APPROACH FOR A RENDEZVOUS GNC BI-COMPATIBLE WITH VISION AND LIDAR SENSING

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#Servicing #Rendezvous  
#V&V #TestBench  
Track: « Recent Real-World Space Mission GNC V&V Experiences »

## Integration, Verification, Validation (IVV) Approach



## IVV Preliminary Results

**DEV & TOOLS**  
Open-Loop Validation of Relative Sensing Chain  
DEV numerical test campaign successfully completed  
Test campaign on GMV robotic bench in progress

**SIL**  
Sensing-Navigation Loop Tuning and Verification  
Derisking coupling of SW Image Processing and SW NAV (from GNC) in progress  
"IP / NAV" simulator integrated  
Versatile architecture close to ATB with Camera Model (TCP)

**MIL**  
Closed-Loop V&V of GNC SW with Sensors Models  
Derisking Monte-Carlo campaign completed  
Robustness & Sensitivity  
Validation of GNC Algorithms & Safety  
Verification of Performances over the Rendezvous

**HIL**  
Closed-Loop V&V of GNC SW with Sensors HW/SW  
ATB integration completed  
OBC HW + OBSV (GNC) + SIMU  
No Sensor SW yet  
Demonstration of Rendezvous  
Phases SK + FM + HOP  
Non-regression MIL / HIL  
Performances & Results

