

FUTURE SPACE TRANSPORTATION FLPP AUTUMN SESSION 2025



INSPOC-3

BLACKSWAN SPACE

Location: Lithuania (HQ), USA (subsidiary)

Founded: 2019

Employees: 16

Mission: Making satellites autonomous. On a mission to enable satellite autonomy, for integrators and operators to take the next step in in-orbit capabilities



ESA INSPOC-3 ACTIVITY

Project name: Pre-Phase A: System Study for In-Space Proof of Concept-3 (InSPoC-3): On-Board and Shared Intelligence

Objective: Analysis of challenges, disruption potentials and enabling technologies related to on-board and shared intelligence for the future in-space transportation ecosystem, with the production of a draft concept of InSPoC-3: demonstration objectives, mission, and technical content.

Applications

- Autonomy via more on-board processing capability allows real-time decision making by the spacecraft – this enables complex manoeuvres to be tackled more efficiently.
- Activities like in-orbit refilling and transferring payloads are enabled, allowing for a logistics network which underpins in-space services, assembly, and manufacturing [ISAM].

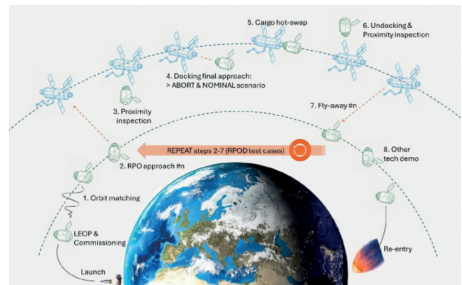


Figure 1 – InSPoC-3 Proposed ConOps: A focus on maturing the autonomous rendezvous and docking sequence through in-space robustness & sensitivity testing

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Contact: Tomas Malinauskas, CCO,
tomas@blackswanspace.com

Website and Socials:

www.blackswanspace.com

www.linkedin.com/company/blackswanspace/

KEY RESULTS

- An IoD was proposed which would focus on maturing autonomy in the critical area of rendezvous and docking for a vast variety of logistic and service-related in-orbit missions
- Key autonomy barriers identified: V&V maturity for AI/ML-based autonomy, constraining OBC hardware, markets understanding of autonomy, and regulatory challenges for the implementation.
- An updated autonomy classification framework was developed, which captures the nuances of IOS/logistics based use cases better and communicates the differences between 'autonomous' practices in an easier non-technical manner.
- Key technologies identified: AI-enabled autonomy, modular & SW-defined architecture, digital twins, improved OTA updates, advanced GNC and System V&V tooling.