Prisma User Experiment
Short Facts & Description Document

The Swedish Space Corporation (SSC) has developed the Prisma system, Prototype Research Instruments and Space Mission technology Advancement, to demonstrate critical technologies for enabling various types of proximity operations: rendezvous, sustained formation flying, collision avoidance, and more. SSC is now actively seeking User Experiments with Prisma that involve both short term, commercial-based ventures, as well as longer-term commitments and cooperation based on a joint and mutual interest. This document provides a structured set of questions aimed at helping a potential customer to define their Prisma User Experiment.

To obtain important information on the background of Prisma, the spacecraft capabilities and the scope of the User Experiment process, please read the whitepaper – **"Stretching the Prisma Mission – an Invitation"**. The whitepaper is intended to give potential customers the initial information and guidelines necessary to determine whether the Prisma testbed is a good candidate for accomplishing their experiment objectives. It is available at: www.psatellite.com/prisma.php

Please return completed the completed form to the appropriate point of contact, listed below.

CONTACT INFORMATION

For non-US organisations:

Technical Point of Contact

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1 – Which Units are Needed? ☒Mango ☒Tango

2 – Will the Experiment Use Delta-V? ☐Yes ☒No

If "Yes", how much Delta-V is required?
Between and m/s

3 – Primary Sensor Systems

Please indicate all sensor systems required for the experiment.

☒GPS Absolute	☒GPS Relative
☒VBS Long Range	☒VBS Short Range
☒Star Cameras	☒Rate Sensors
☒Accelerometers	☐Outreach & PR Telescope / Camera

☒Artificial Degradation using combination of above sensors
☐Other Please describe:

4 – Experiment Timeline

Duration of total experiment: between 1 and 2 weeks.
Percentage of time performing orbital maneuvers: 0 %.
Is there a requirement on the ground-track of the orbit: ☐Yes ☒No

5 – Orbital Maneuvers

Shortest Inter-Spacecraft Distance: N/A meters
Longest Inter-Spacecraft Distance: N/A meters
Maximum Relative Velocity: N/A meters / second

Maneuver Types (check all that apply):
☐Passive relative motion
☐Sustained forced-motion
☐Coarse relative orbit control (1-10 m)
☐Fine relative orbit control (1-10 cm)

6 – GNC Software

Please check one of these 3 options for the GNC software to be used during the experiment:
☒ Original: Prisma GNC only
☐ Augmented: Prisma GNC + Custom GNC
☐ Replaced: Custom GNC only (Prisma GNC not used)

Software-in-the-loop:
Run ☐onboard or ☐on the ground
☐ Run in the control loop in real-time.
☐ Run in parallel with Prisma GNC.
☒ Run offline and perform post-processing on the ground.

Custom GNC Components:

- ☐ Attitude/Rate Estimation
- ☐ Attitude/Rate Shaping
- ☐ Attitude/Rate Control
- ☐ Relative Orbit Navigation
- ☐ Relative Orbit Guidance
- ☐ Relative Orbit Control
- ☐ Orbit Determination

7 – Success Criteria

Provide a brief definition of success at the end of the Experiment. Typically 2 to 5 sentences. What key results would you need in order to state that the Experiment has been successful or not?

The experiment will validate image processing algorithms that are used as inputs to an orbit and attitude estimator. The results will be deemed successful if the relative state estimates match the GPS states and atitude states measured by PRISMA.

8 – Narrative Description

Please describe in 1-3 pages the expected sequence of events and activities for the Experiment. Provide illustrations and diagrams in a separate attachment if necessary.

During normal operations video will be produced from the VBS. Each frame will be time-tagged. GPS and the attitude quaternion for the vehicles will also be collected.