



# Precision Formation Flying Sensor

## Problem Statement

- Precision formation flying needs development and will benefit future NASA missions, such as the New Worlds Observer
- The Janus system is a new method for high precision formation flying (PFF)
- Flights on a Masten sRLV will measure the precision control of the vehicle in 5 axes and provide position information with 1 cm accuracy in 2 axes

## Technology Development Team

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## Proposed Flight Experiment

### Experiment Readiness:

- Experiment can be flight-ready within 2 months

### Test Vehicles:

- Masten Space Systems' Xombie and Xaero sRLV

### Test Environment:

- Janus mounted in fixed position in payload fairing of sRLV, with windows for telescope
- Previously flew on a zeppelin operated by Airship Ventures out of NASA Ames Research Center.
- Port from airship to rocket-borne environment
- Altitude & separation between ground beacon and Janus will be incrementally increased until the space environment is reached

### Test Apparatus Description:



- Janus features a 150mm telescope (large black cylinder pictured here mounted on airship) with retroreflector that provides precise positioning information with respect to line of sight

## Technology Maturation

- Measure the stability of the sRLV with existing navigation
- Integrate Janus navigation data with existing navigation system
- Demonstrate ability to keep a ground beacon in Janus FOV
- Demonstrate ability to keep a star in Janus FOV
- Demonstrate ability to keep Janus aligned between ground beacon and a target star
- Increase distance between ground beacon and sRLV
- Final TRL of 7

## Objective of Proposed Experiment

- Demonstrate performance of Janus system for precision formation flying
- Demonstrate the Masten sRLV as an effective science platform
- Flight data will provide precision cross-track position information to generate an error signal for autonomous feedback and control