

## Nimesh Sangani

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**From:** Jack Ackohen <Jack@astrodigital.com>  
**Sent:** Monday, January 20, 2025 9:54 AM  
**To:** Nimesh Sangani  
**Subject:** [EXTERNAL]: Re: 0703-EX-CN-2024 Additional Information Request

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Hi Nimesh,

Deploying the drag sail will not significantly impact the accuracy of our on-board state estimate. The spacecraft will continue to be able to receive consistent GPS measurements. The on-board ephemeris system propagates the spacecraft state using a proven, J4 propagator and incorporates GPS measurements at a nominal 1 Hz rate using a fixed gain filter. As part of standard operations of Astro Digital spacecraft, this ephemeris data is downloaded as real-time and back-orbit data every pass.

Monitoring the orbital state of this spacecraft becomes the primary mission once the drag sail is deployed. As such, the rate of real-time and back-orbit ephemeris and GPS downlinked will be increased to aid in more accurate characterization of the drag profile to improve prediction capabilities. If requested, this ephemeris telemetry will be provided to Space-Track for ingestion into their orbital estimation of the spacecraft. Astro Digital has engaged with the Space Force in this way and we already have tools for formatting and uploading ephemeris data to Space-Track.

The attitude of the spacecraft will continue to be 3-axis controlled following the deployment of drag sail leading to a consistent drag profile and decrease drag uncertainty as much as possible.

Based on our on-orbit experience with significant margin for higher drag variability once the drag sail is deployed, **we anticipate the standard deviation of our on-board ephemeris state to be <100 m in position and <10 m/s in velocity.**

I will post this in ELS for record purposes. I am pushing to receive concurrent from NOAA for 400.5MHz, the license is required by SpaceX on Friday.

Thank you,  
Jack



**Jack Ackohen**  
**Program and Mission Manager**

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**From:** Nimesh Sangani <Nimesh.Sangani@fcc.gov>  
**Sent:** Thursday, January 16, 2025 12:52 PM  
**To:** Jack Ackohen <Jack@astrodigital.com>  
**Subject:** 0703-EX-CN-2024 Additional Information Request

Hi,

Please submit a copy of this response to ELS for record purposes.

Please address the following question from the Space Bureau:

1) With the drag sail deployed, what is the expected covariance? Please describe any measures taken to enhance location certainty for the spacecraft, such as retaining the services of a commercial tracking service to provide supplemental tracking.

V/r,  
Nimesh Sangani  
Federal Communication Commission  
Office of Engineering & Technology