

From: Daniel Smith

To: Doug Young

Date: September 29, 2020

Subject: Request for Info - File # 0504-EX-CN-2020

Message:

Dear Mr. Young,

In reply to your correspondence dated September 1, 2020, more detailed information is provided in the following files were uploaded to the OET Exhibits List:

1. Official letter (with appendices) provide responses to the request for information for file # 0504-EX-CN-2020, NG 242014 in your email dated September 1, 2020. (.pdf)
2. Updated Exhibit A ODAR GNOMES-2 V2 (.pdf)
3. SpaceCap file

Please reference the high-level information (without appendices) below:

Item 1: Correct the 3 fatal errors in the Spacecap file.

PlanetiQ Response:

The initial Spacecap filed was run under ITU software version 8. The errors noted seem to be a result of the release of ITU software version 9 verification code, not the SpaceCap file. The Spacecap was re-run using ITU version 9 and has been uploaded to the FCC license portal. Note from ITU 9/25/20:

“There is a bug in Validation if the hour is less than 10. I did the correction and the release will be available probably in one week. If you need to submit the filing before then you can send it with the fatal error mentioning that it is a bug in validation.”

Item 2: Provide an EMC analysis.

PlanetiQ Response:

An updated analysis was coordinated with John Kennedy via phone discussions and email exchange.

The official response was sent directly to Mr. Kennedy via email dated September 17, 2020 (letter attachment shown in Appendix A) and forwarded to the USAF.

Item 3: Complete the attached additional data form for ITU submission

PlanetiQ Response:

The initial Spacecap filed was run under ITU software version 8. The errors noted seem to be a result of the release of ITU software version 9 verification code, not the Spacecap file. The Spacecap was re-run using ITU version 9 and has been uploaded to the FCC license portal. Note from ITU 9/25/20:

“There is a bug in Validation if the hour is less than 10. I did the correction and the release will be available probably in one week. If you need to submit the filing before then you can send it with the fatal error mentioning that it is a bug in validation.”

ODAR-related questions:

Item 1: The launch mass is stated to be 40kg with a dry mass of 39.58kg. The reentry mass used for all DAS-related calculations is 36kg. Please provide additional information for these mass numbers.

PlanetiQ Response:

Launch Mass:	40 kg (includes 8” motorized light band deploy mechanism 3.58 kg)
Post-Sep Mass:	36.42 kg
Indium (Thrusters):	.42 kg (.21 kg ea. x 2) Station-keeping
Dry Mass:	36 kg (40 - 3.58 - .42)
Re-Entry:	36 kg

This information is also updated in the ODAR (V2), page 7, section 2; uploaded to the FCC license portal.

Item 2: Provide the station-keeping tolerances for the spacecraft.

PlanetiQ Response:

Clarification on orbit and station-keeping tolerances was coordinated with John Kennedy via phone discussions and email exchange. The official response was sent directly to Mr. Kennedy via email dated September 16, 2020 and forwarded to NASA. Please reference:

LTAN / LTDN 9:00 am / 9:00 pm (+/-15 mins)

Parking/transfer orbit range: Apogee: 525 km; Perigee: 525 km (+/- 20km)

Inclination: Sun-synchronous inclination: 97.5 degrees at launch, 98.0 degrees operational;

Nominal operational case: Apogee: 650 km; Perigee: 650 km (+/- 20km)

All GNOMES have an on-board propulsion system for station-keeping;

Note on 750 km orbit reference – not for this license submission or the GNOMES-2 satellite

This information is also updated in the ODAR (V2), page 6, section 1; FCC license portal.

Item 3: There are no collision risk calculations provided for post operational decay of the satellite. Please provide collision risk calculations for the timeframes consisting of the planned orbit-lowering (EOL maneuvers) and the worst-case EOL scenario (no EOL maneuvers.)

PlanetiQ Response:

The collision risk probability for GNOMES-2:

Injection orbit: 525 km SSO for 18 months (station keeping maneuvers): 1.75E-06

Operational orbit:650 km SSO for 7 years and de-orbit (planned EOL maneuvers): 1.59E-05

Worst-case EOL scenario: 650 km SSO de-orbit, natural decay, 25 yrs. (no EOL maneuvers.): 4.64E-05

This information is also updated in the ODAR (V2), page 13, section 5; uploaded to the FCC license portal.

Item 4: The DAS logs indicate all calculations were performed using 2021 as the start date, including the timeframe after the initial 18-month checkout period when the spacecraft raises its orbit to 650km. Please redo any calculations that used an incorrect start date, including the period after the 18-month checkout period and once the spacecraft is no longer performing station-keeping.

PlanetiQ Response:

The calculations were re-run using 2020 as the start date. The DAS logs are included in Appendix B.

This information is also updated in the ODAR (V2), pages 18-23, section 9; uploaded to the FCC license portal.

Best Regards,
Dan Smith