

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of	)	
	)	File Nos.
Space Sciences & Engineering LLC, d/b/a	)	SAT-LOA-20260219-00090
PlanetiQ	)	SAT-AMD-20260515-00202
	)	
Application to Amend License Application	)	Call Sign: S00821

AMENDMENT APPLICATION

Space Sciences & Engineering, LLC, d/b/a PlanetiQ (“PlanetiQ”) hereby amends its above-captioned license application to reflect updated launch deployment parameters for GNOMES-10 and GNOMES-11, as follows:

Satellite	Nominal Launch Deployment Parameters
GNOMES-10 ¹	Orbital altitude: 510 or 590 km (max. 625 km) ² Inclination: ~97.6 degrees LTDN/LTAN: TBD by launch provider (current estimate is LTDN 22:30)
GNOMES-11 ³	Orbital altitude: 590 km (max. 625 km) Inclination: ~53 degrees LTDN/LTAN: TBD by launch provider (no estimate available)

¹ In the initial application, PlanetiQ had identified deployment parameters for GNOMES-10 as follows: 510 +/- 20 km with an inclination of 97.6 +/- 0.5 degrees. *See* Space Sciences & Engineering LLC, d/b/a PlanetiQ, Application, SAT-LOA-20260219-00090, Narrative at 4 (filed March 5, 2026) (“PlanetiQ Application”).

² The launch provider will determine, in its discretion, whether to deploy satellites at a target orbital altitude of 510 km or 590 km. At the recommendation of the launch provider, PlanetiQ is requesting authority, in an abundance of caution, for a maximum deployment altitude of 625 km, even though such a deployment altitude is not likely.

³ In the initial application, PlanetiQ had identified deployment parameters for GNOMES-11 as follows: 500 km to 600 km +/- 20 km with an inclination of 53 +/- 0.1 degrees. *See* PlanetiQ Application, Narrative at 4-5.

Accordingly, PlanetiQ requests the Space Bureau (“Bureau”) grant authority for operation of the satellites from the revised orbital deployment parameters to the nominal operating parameters, which remain unchanged.⁴ PlanetiQ is not requesting any other changes to its license application.

Attached to this application is an interference analysis (*i.e.*, the PFD at the geostationary satellite orbit)⁵ and revised orbital debris mitigation plan,⁶ in both cases to reflect the revised worst-case analysis for the highest possible deployment orbits. Also attached is the proposed list of coordinated earth stations with federal spectrum managers for each GNOMES satellites.⁷ Expedient grant of this application will serve the public interest by ensuring that the licensed authority reflects updated launch parameters and permits timely launch of the GNOMES satellites, which will provide critical weather forecasting data and services.⁸

⁴ As stated in the license application, PlanetiQ intends to operate the satellites as follows: GNOMES-10 at a nominal operational orbit of 575 +/- 25 km with an inclination of approximately 97.6 degrees; and GNOMES-11 at a nominal operational orbit of 575 +/- 25 km with an inclination of approximately 53 degrees. *See* PlanetiQ Application, Narrative at 4-5.

⁵ *See* Attachment 1 (Interference Analysis).

⁶ *See* Attachment 2 (Orbital Debris Mitigation Plan). The orbital debris analysis has also been updated to the version 3.2.7 of the NASA Debris Assessment Software.

⁷ *See* Attachment 3 (List of Earth Stations Coordinated with Federal Spectrum Managers)

⁸ *See also* PlanetiQ Application, Narrative at 2-4.

Respectfully submitted,

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Dated: May 21, 2026

Technical Certification

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application, and that it is complete and accurate to the best of my knowledge and belief.

/s/ Micah Hemness

Micah Hemness

Systems Engineer

PlanetiQ

May 21, 2026

Attachment 1
Interference Analysis - PFD at the Geostationary Satellite Orbit

PFD at Geostationary Orbit in the 8025-8400 MHz Band

ITU Radio Regulation No. 22.5 specifies that in the 8025-8400 MHz frequency band, which the Earth Exploration Satellite Service (“EESS”) using non-geostationary satellites shares with the fixed-satellite service (Earth-to-space), the maximum PFD produced at the geostationary satellite orbit (“GSO”) by any EESS space station shall not exceed -174 dB(W/m²) in any 4 kHz band. The calculation below shows that the PFD produced by transmissions from the satellites does not exceed ITU limits even in a worst-case analysis at the highest possible operational altitude. The PFD at the GSO produced by a GNOMES satellite transmission is:

$$\text{PFD [dB(W/m}^2\text{/4 kHz)]} = \text{EIRP [dBW]} - 71 - 20\log_{10}(D) - 10\log_{10}(BW) - 24, \text{ where:}$$

- EIRP is the maximum EIRP of the transmission, in dBW;
- D is the distance between the satellite and the GSO, in km; and
- BW is the symbol bandwidth of the transmission, in MHz.

The minimum distance between a GNOMES system satellite and the GSO is:

$$35,786 - 625 = 35161 \text{ km.}$$

Under a hypothetical assumption that the satellite antenna is radiating at its peak EIRP directly towards the GSO, the PFD and the geosynchronous orbit is:

TCD1 and TCD2 beams:

$$-3 \text{ dBW} - 71 - 20\log_{10}(35,161) - 10\log_{10}(2.8) - 24 = -193.4 \text{ dB(W/m}^2\text{/4 kHz)}$$

Compliance Margin: 19 dB

HSD1 beam:

$$5 \text{ dBW} - 71 - 20\log_{10}(35,161) - 10\log_{10}(48) - 24 = -197.7 \text{ dB(W/m}^2\text{/4 kHz)}$$

Compliance Margin: 23.7 dB

At lower altitudes, the margins above will increase due to the increase in distance to the geostationary orbit.

Attachment 2

Orbital Debris Mitigation Plan

(revised May 2026)

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This report is presented in compliance with NASA-STD-8719.14 Revision C

DAS Software Version: v.3.2.7

I. General Description

PlanetiQ is the mission developer and owner and has contracted to Muon Space for a spacecraft with details as follows. The GNOMES system consists of 2 spacecraft compatible with a SpaceX Falcon 9 half-volume. GNOMES-10 is expected to launch on the SpaceX Transporter-18 rideshare mission currently scheduled NET 10/1/2026 and is planned to have a six-year total mission life (launch to demise). GNOMES-11 is expected to launch on the SpaceX Bandwagon-5 rideshare mission currently scheduled NET 10/1/2026 and is planned to have a six-year total mission life (launch to demise).

The GNOMES spacecraft has external dimensions of 0.78m x 1.16m x 0.91m in the stowed configuration, and 1.20m x 4.92m x 1.68m in the deployed configuration. The spacecraft mass at launch is estimated to be 155 kg, and a minimum of 150.6 kg at end of life.

II. Debris

PlanetiQ confirms that the GNOMES system will not undergo any planned release of debris during its normal operations. In addition, all separation and deployment mechanisms, and any other potential source of debris will be retained by the spacecraft or launch vehicle. PlanetiQ also has assessed the probability of the space station becoming a source of debris by collision with small debris or meteoroids of less than one centimeter in diameter that could cause loss of control and prevent post-mission disposal. PlanetiQ has taken steps to limit the effects of such collisions through shielding, the placement of components, and the use of redundant systems.

III. Probability Assessments

PlanetiQ has assessed and limited the probability of accidental explosions during and after completion of mission operations through a failure mode verification analysis. As part of the satellite manufacturing process, PlanetiQ has taken steps to ensure that debris generation will not result from the conversion of energy sources on board the satellites into energy that fragments the satellites. The GNOMES system includes eight custom battery packs, each with 2 parallel strings of 8 series cells per pack, for a total of 128 cells, with an average voltage per cell of 3.3V. The cells can vent in the event of high internal pressure, with a cell vent open pressure of 1.8 - 2.4 MPa, which prevents cell explosion. Even if cell rupture was possible, the batteries are mounted on a machined aluminum plate and surrounded by aluminum panels to prevent external release of debris. The propulsion system is a metal propellant Hall-effect thruster system that contains no pressurized vessels. The zinc propellant is leak-proof, non-reactive, and non-toxic. All sources of stored energy onboard the spacecraft will have been depleted or safely contained when no longer required for mission operations or post-mission disposal.

PlanetiQ has assessed and limited the probability of the space station becoming a source of debris by collisions with large debris or other operational spacecraft. PlanetiQ does not intend to place the GNOMES system in an orbit that is identical to or very similar to an orbit used by other space stations, and, in any event, will work closely with the GNOMES launch provider to ensure that the satellites are deployed in such a way as to minimize the potential for collision with any other spacecraft. This specifically includes minimizing the potential for collision with manned spacecraft. To PlanetiQ's understanding, only the International Space Station and China's Tiangong Space Station module are the only inhabited orbiting objects.⁹

⁹ The Tiangong Space Station is a manned space station that is currently under construction by China in LEO.

IV. Mitigation

PlanetiQ expects to maintain a 100 km minimum orbital separation between the GNOMES system and either the International Space Station (ISS) or the Tiangong Space Station. PlanetiQ also will be proactive to ensure that risk to inhabited orbiting objects is mitigated. This will include coordinating with NASA to ensure protection of the ISS on an ongoing basis, and taking all appropriate measures to coordinate and protect the Tiangong Space Station. PlanetiQ provides NASA with all requested information needed to assess risks and ensure safe flight profiles. NASA is also provided with a 24/7 contact line for PlanetiQ personnel.

Additionally, the GNOMES system is equipped with a propulsion system which will be used to perform collision avoidance maneuvers, as needed. With these measures, PlanetiQ will ensure reliable collision mitigation.¹⁰

V. Collision Probability

The Transporter-18 launch will drop off payloads at 510+/-20 km or 590 +/- 20 km in a Sun Synchronous Orbit. GNOMES-10 is expected to operate at 575km +/- 25km.

Using the NASA DAS 3.2.7 software, the GNOMES-10 Collision Probability at 575 km in a deployed configuration is found to be 7.2573E-05, meeting NASA-STD-8719.14C Requirement 4.5-1. Similarly, in a stowed configuration, the collision probability is found to be 4.0861E-05, meeting the requirement (*see* ActivityLog_G10_Req451).

A. Probability of Collision with Large Objects

GNOMES-10: Compliant

Deployed collision probability 7.2573E-05

Stowed collision probability 4.0861E-05

See ActivityLog_G10_Req451.

¹⁰ PlanetiQ will take identical proactive measures with respect to any other inhabited orbiting objects that may be introduced during the time when GNOMES spacecraft is in orbit.

B. Probability of Damage from Small Objects

GNOMES-10: Compliant

C. Probability of Failure 9.8369E-03

See ActivityLog_G10_Req452

The Bandwagon-5 launch will drop off payloads at 590+/-20 km in a 53-degree inclination orbit. GNOMES-11 is expected to operate at 575km +/- 25km.

Using the NASA DAS 3.2.7 software, the GNOMES-11 Collision Probability at 575 km in a deployed configuration is found to be 4.9847E-05, meeting NASA-STD-8719.14C Requirement 4.5-1. Similarly, in a stowed configuration, the collision probability is found to be 2.7972E-05, meeting the requirement (see ActivityLog_G11_Req451).

D. Probability of Collision with Large Objects

GNOMES-11:

Deployed collision probability 4.9847E-05

Stowed collision probability 2.7972E-05

See ActivityLog_G11_Req451

E. Probability of Damage from Small Objects

GNOMES-11: Compliant

Probability of Failure 7.494E-03

See ActivityLog_G11_Req452

VI. Tracking

PlanetiQ's disclosure of the above parameters can assist third parties in identifying potential problems that may be the result of proposed operations. This information also lends itself to coordination between PlanetiQ and other operators located in similar orbits. PlanetiQ certifies that upon receipt of a space situational awareness conjunction warning, the operator will review and take all possible steps to assess the collision risk and will mitigate the collision risk if necessary. The GNOMES system is considered trackable, as it is larger than 10cm in its smallest

dimension. Planned tracking of the spacecraft will be passive, via space-track.org. The spacecraft has external dimensions described in the General Description section above. Registration of the spacecraft with the 18th SPCS SpaceTrack will be completed prior to deployment.

VII. Proximity Operations

PlanetiQ notes that no proximity operations are planned during the lifetime of the GNOMES system.

A. Mission Related Debris Passing Through LEO

Compliant: There is no planned release of debris for the GNOMES system

B. Mission Related Debris Passing Through GEO

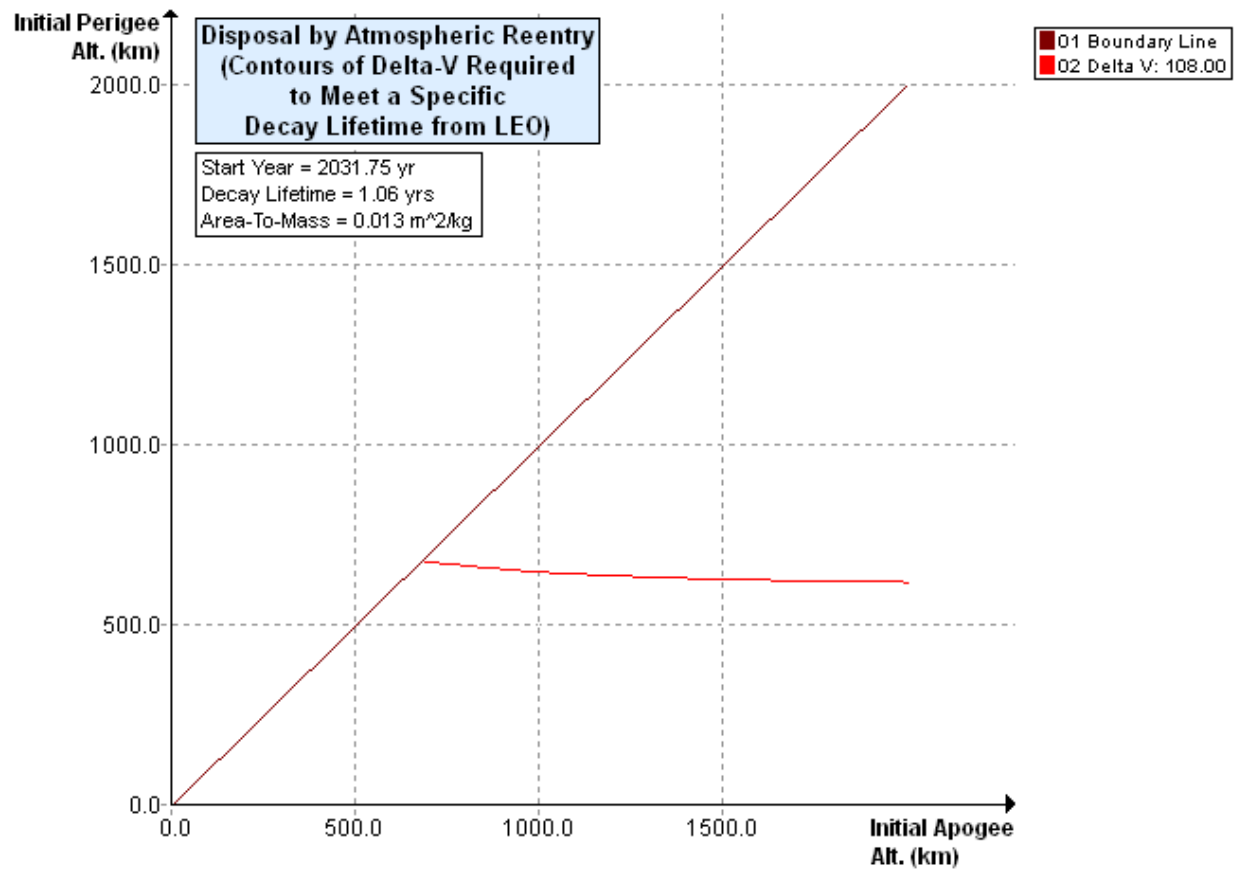
The GNOMES system will operate in LEO

VIII. Natural Reentry, Direct Reentry, or Direct Retrieval

The GNOMES system is equipped with a propulsion system providing a total Delta V capability of 351 m/s, of which 108 m/s is reserved for end-of-life (EOL) disposal. This allocation will be used to lower the spacecraft from its nominal operating altitude of 575 km to a disposal orbit at 380 km. From this altitude, GNOMES-10 is expected to naturally deorbit within approximately 1.06 years due to atmospheric drag for a total lifetime of six years, and GNOMES-11 is expected to naturally deorbit within approximately 1.08 years due to atmospheric drag for a total lifetime of six years.

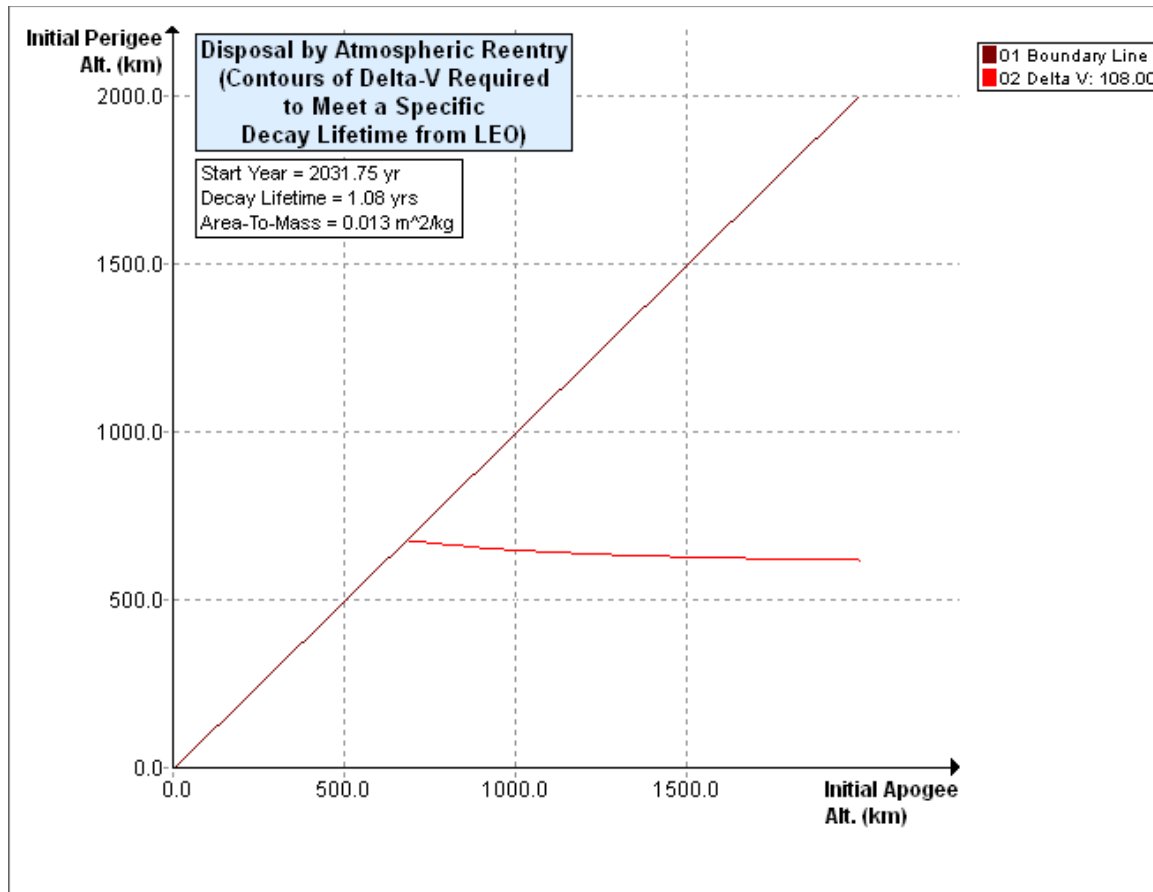
GNOMES-10: Compliant

After moving to 380 km by propulsive maneuvers, the vehicle deorbits in 1.06 years. *See* ActivityLog_G10_461.



GNOMES-11: Compliant

After moving to 380km by propulsive maneuvers, the vehicle deorbits in 1.08 years. *See* ActivityLog_G11_461.



IX. Deorbit Method Reliability

The GNOMES system will utilize its propulsion system to maintain the target mission altitude of 575 km. Prior to 4.94 years after launch, the propulsion system will be used to lower the spacecraft's orbit such that it reaches an altitude of 380 km at 4.94 years, ensuring deorbit occurs within the maximum six-year limit. The propulsion system has been designed to provide high reliability operation and has an extensive qualification and acceptance process. The maximum operational orbit for the GNOMES spacecraft is 600 km (575 ± 25 km). In the unlikely event of a propulsion system failure, the estimated natural deorbit time from 600 km for GNOMES-10 is 11.431 years in a deployed configuration, and 12.025 years for GNOMES-11 from 600 km in a deployed configuration. At the recommendation of the launch provider, PlanetiQ is including natural deorbit times for the GNOMES system at a maximum deployment

altitude of 625 km. In the event of a propulsion system failure, out of an abundance of caution, even though deployment at that altitude is not expected. The estimated natural deorbit from 625 km for GNOMES-10 is 19.216 years in a deployed configuration, and 19.687 years for GNOMES-11 in a deployed configuration.

If the propulsion system suffers a failure which would prevent orbit maintenance (and rapid de-orbit at end of life), methods for shortening the deorbit timeline are available. For example, the spacecraft operating in a maximum drag orientation reduces the time to deorbit by a factor of 4 or more.

X. Human Casualty Risk

NASA-STD-8719.14C Requirement 4.7-1 requires a limitation on the risk of potential human casualty in both controlled and uncontrolled reentry. Using NASA DAS 3.2.7 software, it is found that the GNOMES system meets this requirement in all cases. There are only two components that have a likelihood of reentry: Solar Cell Glass, and portions of an antenna. Both are expected to reenter with an energy below the 15-joule limit in all cases (e.g., 4.93 J for Solar Cell Glass and 0.96 J for the antenna). Therefore, the GNOMES system is found to be compliant with this requirement.

GNOMES-10: Compliant

See ActivityLog_G10_Req471

GNOMES-11: Compliant

See ActivityLog_G11_Req471

XI. Appendix

A. ActivityLog_G10_Req451

Run Data

=====

****INPUT****

Space Structure Name = GNOMES-10
Space Structure Type = Payload
Perigee Altitude = 575.000 (km)
Apogee Altitude = 575.000 (km)
Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0134 (m²/kg)
Start Year = 2026.750 (yr)
Initial Mass = 155.000 (kg)
Final Mass = 150.600 (kg)
Duration = 5.000 (yr)
Station-Kept = True
PMD Perigee Altitude = 90.000 (km)
PMD Apogee Altitude = 90.000 (km)
PMD Inclination = 98.000 (deg)
PMD RAAN = 0.000 (deg)
PMD Argument of Perigee = 0.000 (deg)
PMD Mean Anomaly = 0.000 (deg)
Long-Term Reentry = True

****OUTPUT****

Collision Probability = 7.2573E-05
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

===== End of Requirement 4.5-1 =====

=====

Run Data

=====

****INPUT****

Space Structure Name = GNOMES-10
Space Structure Type = Payload
Perigee Altitude = 575.000 (km)
Apogee Altitude = 575.000 (km)

Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0059 (m²/kg)
Start Year = 2026.750 (yr)
Initial Mass = 155.000 (kg)
Final Mass = 150.600 (kg)
Duration = 5.000 (yr)
Station-Kept = True
PMD Perigee Altitude = 90.000 (km)
PMD Apogee Altitude = 90.000 (km)
PMD Inclination = 98.000 (deg)
PMD RAAN = 0.000 (deg)
PMD Argument of Perigee = 0.000 (deg)
PMD Mean Anomaly = 0.000 (deg)
Long-Term Reentry = True

****OUTPUT****

Collision Probability = 4.0861E-05
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

=====

===== End of Requirement 4.5-1 =====

B. ActivityLog_G10_Req452

=====

Spacecraft = GNOMES-10
Critical Surface = PPU+X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)

Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0016 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.600 (g/cm²) Separation: 2.000 (cm)

****OUTPUT****

Probability of Penetration = 8.5358E-04 (8.5395E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = Thruster Head +X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 17.750 (g/cm²)
CS Surface Area = 0.0050 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No

****OUTPUT****

Probability of Penetration = 1.3454E-06 (1.3454E-06)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = EPS+X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0020 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.600 (g/cm²) Separation: 65.100 (cm)

****OUTPUT****

Probability of Penetration = 1.0344E-03 (1.0349E-03)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = ADCS+X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)

Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0050 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.600 (g/cm²) Separation: 36.000 (cm)

****OUTPUT****

Probability of Penetration = 2.5840E-03 (2.5873E-03)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = ADCS-X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.850 (g/cm²)
CS Surface Area = 0.0050 (m²)
Vector = (0.000000 (u), -1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 42.200 (cm)

****OUTPUT****

Probability of Penetration = 4.1727E-09 (4.1727E-09)
Returned Error Message: Normal Processing

Date Range Error Message: Normal Date Range

```
=====
Spacecraft = GNOMES-10
Critical Surface = PPU-X
=====
```

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.850 (g/cm²)
CS Surface Area = 0.0010 (m²)
Vector = (0.000000 (u), -1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 84.100 (cm)

****OUTPUT****

Probability of Penetration = 8.3453E-10 (8.3453E-10)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

```
=====
Spacecraft = GNOMES-10
Critical Surface = PPU+Y
=====
```

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)

Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0400 (m²)
Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 3.400 (cm)

****OUTPUT****

Probability of Penetration = 1.5693E-04 (1.5694E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = PPU-Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0400 (m²)
Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.500 (g/cm²) Separation: 3.500 (cm)

****OUTPUT****

Probability of Penetration = 2.0118E-04 (2.0120E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-10
Critical Surface = EPS-X

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.850 (g/cm²)
CS Surface Area = 0.0024 (m²)
Vector = (0.000000 (u), -1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 3.000 (cm)

****OUTPUT****

Probability of Penetration = 2.5029E-09 (2.5029E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-10
Critical Surface = PPU-Z

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)

Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.850 (g/cm²)
 CS Surface Area = 0.0026 (m²)
 Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.810 (g/cm²) Separation: 2.000 (cm)

****OUTPUT****

Probability of Penetration = 8.0896E-09 (8.0896E-09)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

```
=====
Spacecraft = GNOMES-10
Critical Surface = PPU+Z
=====
```

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 98.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.850 (g/cm²)
 CS Surface Area = 0.0026 (m²)
 Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.810 (g/cm²) Separation: 29.200 (cm)

****OUTPUT****

Probability of Penetration = 1.5584E-09 (1.5584E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = Thruster Head +Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 1.800 (g/cm²)
CS Surface Area = 0.0020 (m²)
Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
CS Pressurized = No

****OUTPUT****

Probability of Penetration = 1.6431E-03 (1.6444E-03)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = Thruster Head-Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)

RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 1.800 (g/cm²)
 CS Surface Area = 0.0020 (m²)
 Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
 CS Pressurized = No

****OUTPUT****

Probability of Penetration = 1.6431E-03 (1.6444E-03)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

```

=====
Spacecraft = GNOMES-10
Critical Surface = Thruster Head+Z
=====
  
```

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 98.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 1.800 (g/cm²)
 CS Surface Area = 0.0020 (m²)
 Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No

****OUTPUT****

Probability of Penetration = 1.4489E-06 (1.4489E-06)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-10
Critical Surface = Thruster Head-Z

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 1.800 (g/cm²)
CS Surface Area = 0.0028 (m²)
Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No

****OUTPUT****

Probability of Penetration = 2.0284E-06 (2.0284E-06)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-10
Critical Surface = EPS+Y

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)

Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.810 (g/cm²)
 CS Surface Area = 0.0333 (m²)
 Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.540 (g/cm²) Separation: 2.200 (cm)

****OUTPUT****

Probability of Penetration = 4.0924E-04 (4.0933E-04)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
 Critical Surface = EPS-Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 98.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.810 (g/cm²)
 CS Surface Area = 0.0333 (m²)
 Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.405 (g/cm²) Separation: 32.200 (cm)

****OUTPUT****

Probability of Penetration = 5.8026E-04 (5.8042E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-10
Critical Surface = EPS-Z

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0079 (m²)
Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.810 (g/cm²) Separation: 5.500 (cm)

****OUTPUT****

Probability of Penetration = 7.4232E-09 (7.4232E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-10
Critical Surface = EPS+Z

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)

Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.810 (g/cm²)
 CS Surface Area = 0.0079 (m²)
 Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.810 (g/cm²) Separation: 14.100 (cm)

****OUTPUT****

Probability of Penetration = 4.9781E-09 (4.9781E-09)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
 Critical Surface = ADCS+Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 98.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.810 (g/cm²)
 CS Surface Area = 0.0317 (m²)
 Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.540 (g/cm²) Separation: 30.700 (cm)

****OUTPUT****

Probability of Penetration = 2.1468E-04 (2.1471E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = ADCS-Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0317 (m²)
Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.405 (g/cm²) Separation: 6.500 (cm)

****OUTPUT****

Probability of Penetration = 5.5282E-04 (5.5297E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = ADCS+Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)

Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0095 (m²)
Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.810 (g/cm²) Separation: 10.900 (cm)

****OUTPUT****

Probability of Penetration = 6.4900E-09 (6.4900E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-10
Critical Surface = ADCS-Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 98.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0095 (m²)
Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No

Outer Wall 1 Density: 0.810 (g/cm²) Separation: 6.500 (cm)

****OUTPUT****

Probability of Penetration = 8.1208E-09 (8.1208E-09)

Returned Error Message: Normal Processing

Date Range Error Message: Normal Date Range

===== End of Requirement 4.5-2 =====

C. ActivityLog_G10_Req461

****INPUT****

Start Year = 2031.250000 (yr)

Perigee Altitude = 380.000000 (km)

Apogee Altitude = 380.000000 (km)

Inclination = 98.000000 (deg)

RAAN = 0.000000 (deg)

Argument of Perigee = 0.000000 (deg)

Area-To-Mass Ratio = 0.013400 (m²/kg)

****OUTPUT****

Orbital Lifetime from Startyr = 1.056832 (yr)

Time Spent in LEO during Lifetime = 1.056832 (yr)

Last year of Propagation = 2032 (yr)

Returned Error Message: Object reentered

****INPUT****

Start Year = 2031.250000 (yr)

Perigee Altitude = 380.000000 (km)

Apogee Altitude = 380.000000 (km)

Inclination = 98.000000 (deg)

RAAN = 0.000000 (deg)

Argument of Perigee = 0.000000 (deg)

Area-To-Mass Ratio = 0.005900 (m²/kg)

****OUTPUT****

Orbital Lifetime from Startyr = 1.771426 (yr)

Time Spent in LEO during Lifetime = 1.771426 (yr)

Last year of Propagation = 2033 (yr)

Returned Error Message: Object reentered

D. ActivityLog_G10_Req471

=====
Project Data
=====

****INPUT****

Space Structure Name = GNOMES-10
Space Structure Type = Payload
Perigee Altitude = 575.000000 (km)
Apogee Altitude = 575.000000 (km)
Inclination = 98.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.013400 (m²/kg)
Start Year = 2026.750000 (yr)
Initial Mass = 155.000000 (kg)
Final Mass = 150.600000 (kg)
Duration = 5.000000 (yr)
Station Kept = True
Abandoned = False
Long-Term Reentry = True

****OUTPUT****

Suggested Perigee Altitude = 100.000000 (km)
Suggested Apogee Altitude = 575.000000 (km)
Returned Error Message = Passes Long-term reentry orbit criteria
Released Year = 2031 (yr)
Requirement = 63
Compliance Status = Pass

=====

===== End of Requirement 4.6 =====

*******INPUT*******

Item Number = 1

name = GNOMES-10
quantity = 1
parent = 0
materialID = 8
type = Box

Aero Mass = 150.600006
Thermal Mass = 150.600006
Diameter/Width = 0.600000
Length = 1.100000
Height = 0.300000

name = Solar Face Sheet
quantity = 12
parent = 1
materialID = 27
type = Flat Plate
Aero Mass = 0.532000
Thermal Mass = 0.532000
Diameter/Width = 0.720000
Length = 1.120000

name = Solar Hinge
quantity = 12
parent = 1
materialID = 8
type = Box
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.039000
Length = 0.200000
Height = 0.010000

name = HDRM Inserts
quantity = 12
parent = 1
materialID = 65
type = Flat Plate
Aero Mass = 0.034000
Thermal Mass = 0.034000
Diameter/Width = 0.030000
Length = 0.074000

name = Solar Panel Core
quantity = 6
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.588000
Thermal Mass = 0.588000
Diameter/Width = 0.720000
Length = 1.120000

name = Film Adhesive
quantity = 12
parent = 1
materialID = 27
type = Flat Plate
Aero Mass = 0.128000
Thermal Mass = 0.128000
Diameter/Width = 0.720000
Length = 1.120000

name = Solar Cell Glass
quantity = 24
parent = 1
materialID = -1
type = Flat Plate
Aero Mass = 0.275000
Thermal Mass = 0.275000
Diameter/Width = 0.250000
Length = 0.550000

name = Reaction Wheel and Bracket
quantity = 4
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 1.800000
Thermal Mass = 1.800000
Diameter/Width = 0.090000
Length = 0.110000

name = Battery Pack
quantity = 8
parent = 1
materialID = 8
type = Box
Aero Mass = 1.100000
Thermal Mass = 1.100000
Diameter/Width = 0.075000
Length = 0.200000
Height = 0.060000

name = Torque Rod
quantity = 3
parent = 1
materialID = 38
type = Cylinder

Aero Mass = 0.250000
Thermal Mass = 0.250000
Diameter/Width = 0.020000
Length = 0.150000

name = Star Tracker
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.320000
Thermal Mass = 0.320000
Diameter/Width = 0.050000
Length = 0.119000
Height = 0.044000

name = ADCS
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.900000
Thermal Mass = 0.900000
Diameter/Width = 0.148000
Length = 0.224000
Height = 0.041000

name = EPS
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.140000
Length = 0.330000
Height = 0.023000

name = MFC
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.300000
Thermal Mass = 1.300000
Diameter/Width = 0.150000

Length = 0.337000
Height = 0.040000

name = TTCFE
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.113000
Length = 0.150000
Height = 0.040000

name = Zenith Antenna
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.100000
Length = 0.143000

name = GNSS Antenna
quantity = 2
parent = 1
materialID = 50
type = Flat Plate
Aero Mass = 0.050000
Thermal Mass = 0.050000
Diameter/Width = 0.050000
Length = 0.100000

name = RadioCore
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.440000
Thermal Mass = 1.440000
Diameter/Width = 0.170000
Length = 0.250000
Height = 0.023000

name = HSRFE
quantity = 1

parent = 1
materialID = 8
type = Box
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.111000
Length = 0.150000
Height = 0.040000

name = Nadir Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 4.570000
Thermal Mass = 4.570000
Diameter/Width = 0.414000
Length = 0.488000
Height = 0.025000

name = PayloadCore
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.000000
Thermal Mass = 1.000000
Diameter/Width = 0.150000
Length = 0.224000
Height = 0.041000

name = Z+ Panel
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 6.450000
Thermal Mass = 6.450000
Diameter/Width = 0.517000
Length = 1.100000

name = Z- Panel
quantity = 1
parent = 1
materialID = 8
type = Flat Plate

Aero Mass = 5.410000
Thermal Mass = 5.410000
Diameter/Width = 0.355000
Length = 1.100000

name = Y Panel
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 4.420000
Thermal Mass = 4.420000
Diameter/Width = 0.320000
Length = 1.020000

name = X Panel / Bulkhead
quantity = 4
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 1.400000
Thermal Mass = 1.400000
Diameter/Width = 0.300000
Length = 0.420000

name = Bus Cross Member
quantity = 4
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.380000
Thermal Mass = 0.380000
Diameter/Width = 0.075000
Length = 0.517000

name = Generic Fastener
quantity = 250
parent = 1
materialID = 57
type = Cylinder
Aero Mass = 0.007000
Thermal Mass = 0.007000
Diameter/Width = 0.007000
Length = 0.025000

name = Harness Wires
quantity = 3000

parent = 1
materialID = 19
type = Cylinder
Aero Mass = 0.001000
Thermal Mass = 0.001000
Diameter/Width = 0.001000
Length = 0.250000

name = HDRM
quantity = 4
parent = 1
materialID = 8
type = Box
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.065000
Length = 0.085000
Height = 0.036000

name = PPU Base Plate
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.500000
Thermal Mass = 0.500000
Diameter/Width = 0.160000
Length = 0.260000
Height = 0.006500

name = PPU Cover
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.413000
Thermal Mass = 0.413000
Diameter/Width = 0.160000
Length = 0.260000
Height = 0.030000

name = PPU Xformer
quantity = 1
parent = 1
materialID = -12
type = Box

Aero Mass = 0.251000
Thermal Mass = 0.251000
Diameter/Width = 0.038000
Length = 0.051000
Height = 0.030000

name = Feeder Stepper Motor
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.273000
Thermal Mass = 0.273000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.040000

name = Feeder Top Cap
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.035800
Thermal Mass = 0.035800
Diameter/Width = 0.062000
Length = 0.113000
Height = 0.015000

name = Feeder Outer Housing
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.074000
Thermal Mass = 0.074000
Diameter/Width = 0.081000
Length = 0.113700
Height = 0.031000

name = Feeder Housing Motor Side
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.074000
Thermal Mass = 0.074000

Diameter/Width = 0.082000
Length = 0.114000
Height = 0.034000

name = Feeder Motor Mount
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.038000
Thermal Mass = 0.038000
Diameter/Width = 0.064000
Length = 0.092000
Height = 0.020000

name = Thruster Outer Screen
quantity = 1
parent = 1
materialID = -8
type = Cylinder
Aero Mass = 0.209740
Thermal Mass = 0.209740
Diameter/Width = 0.083000
Length = 0.034000

name = Thruster Inner Pole
quantity = 1
parent = 1
materialID = -8
type = Cylinder
Aero Mass = 0.868430
Thermal Mass = 0.012660
Diameter/Width = 0.039000
Length = 0.020000

name = Inner Screen
quantity = 1
parent = 39
materialID = -9
type = Cylinder
Aero Mass = 0.091570
Thermal Mass = 0.091570
Diameter/Width = 0.041000
Length = 0.030000

name = Inner Mag
quantity = 1

parent = 39
materialID = -10
type = Cylinder
Aero Mass = 0.764200
Thermal Mass = 0.764200
Diameter/Width = 0.360000
Length = 0.200000

name = Thruster Outer Pole
quantity = 1
parent = 1
materialID = -8
type = Cylinder
Aero Mass = 0.035070
Thermal Mass = 0.035070
Diameter/Width = 0.084000
Length = 0.030000

name = Thruster Frame Connector Half
quantity = 1
parent = 1
materialID = 59
type = Flat Plate
Aero Mass = 0.135440
Thermal Mass = 0.135440
Diameter/Width = 0.070000
Length = 0.090000

name = Thruster Frame Bare Half
quantity = 1
parent = 1
materialID = 59
type = Flat Plate
Aero Mass = 0.135020
Thermal Mass = 0.135020
Diameter/Width = 0.070000
Length = 0.090000

name = Thruster Outer Pole Clamp
quantity = 1
parent = 1
materialID = 59
type = Cylinder
Aero Mass = 0.028630
Thermal Mass = 0.028630
Diameter/Width = 0.036000

Length = 0.020000

name = Outer Mag
quantity = 1
parent = 1
materialID = -10
type = Cylinder
Aero Mass = 0.707200
Thermal Mass = 0.707200
Diameter/Width = 0.072000
Length = 0.030000

name = Outer Mag Align
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.031220
Thermal Mass = 0.031220
Diameter/Width = 0.085000
Length = 0.030000

name = Inner Mag Align
quantity = 1
parent = 1
materialID = 66
type = Cylinder
Aero Mass = 0.021680
Thermal Mass = 0.021680
Diameter/Width = 0.025000
Length = 0.035000

name = Thruster Bottom Cover
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.018360
Thermal Mass = 0.018360
Diameter/Width = 0.085000
Length = 0.030000

name = Harness Strain Relief
quantity = 1
parent = 1
materialID = 8
type = Box

Aero Mass = 0.010530
Thermal Mass = 0.010530
Diameter/Width = 0.029000
Length = 0.029000
Height = 0.016000

name = Thruster Wedge Mount
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.350000
Thermal Mass = 0.350000
Diameter/Width = 0.150000
Length = 0.150000
Height = 0.030000

name = Pyxis Filters (Al)
quantity = 6
parent = 1
materialID = 5
type = Box
Aero Mass = 0.610000
Thermal Mass = 0.610000
Diameter/Width = 0.060000
Length = 0.084000
Height = 0.045000

name = Pyxis Filters (Cu)
quantity = 6
parent = 1
materialID = 19
type = Box
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.051000
Length = 0.084000
Height = 0.045000

name = Pyxis Enclosure (Al)
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 2.500000
Thermal Mass = 2.500000

Diameter/Width = 0.176000
Length = 0.185000
Height = 0.165000

name = Pyxis Enclosure (Cu)
quantity = 1
parent = 1
materialID = 19
type = Box
Aero Mass = 1.000000
Thermal Mass = 1.000000
Diameter/Width = 0.176000
Length = 0.185000
Height = 0.165000

name = Pyxis Enclosure (poly)
quantity = 1
parent = 1
materialID = 50
type = Box
Aero Mass = 1.000000
Thermal Mass = 1.000000
Diameter/Width = 0.176000
Length = 0.185000
Height = 0.165000

name = Pyxis Filter Plates
quantity = 2
parent = 1
materialID = 5
type = Box
Aero Mass = 0.350000
Thermal Mass = 0.350000
Diameter/Width = 0.120000
Length = 0.190000
Height = 0.010000

name = Pyxis RO Antennas (Al)
quantity = 2
parent = 1
materialID = 5
type = Box
Aero Mass = 1.670000
Thermal Mass = 1.670000
Diameter/Width = 0.256000
Length = 0.868000

Height = 0.023000

name = Pyxis RO Antennas (Ni)

quantity = 2

parent = 1

materialID = 46

type = Box

Aero Mass = 0.100000

Thermal Mass = 0.100000

Diameter/Width = 0.256000

Length = 0.868000

Height = 0.023000

name = Pyxis RO Antennas (Duriod)

quantity = 2

parent = 1

materialID = -13

type = Box

Aero Mass = 3.370000

Thermal Mass = 3.370000

Diameter/Width = 0.256000

Length = 0.868000

Height = 0.023000

*****OUTPUT*****

Item Number = 1

name = GNOMES-10

Demise Altitude = 77.996363

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Solar Face Sheet

Demise Altitude = 77.914235

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Solar Hinge

Demise Altitude = 77.623950

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = HDRM Inserts

Demise Altitude = 74.195240

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Solar Panel Core
Demise Altitude = 77.917661
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Film Adhesive
Demise Altitude = 77.977671
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Solar Cell Glass
Demise Altitude = 0.000000
Debris Casualty Area = 22.328029
Impact Kinetic Energy = 4.927941

name = Reaction Wheel and Bracket
Demise Altitude = 73.249603
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Battery Pack
Demise Altitude = 76.507130
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Torque Rod
Demise Altitude = 70.660970
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Star Tracker
Demise Altitude = 77.118816
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = ADCS

Demise Altitude = 77.014674
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = EPS
Demise Altitude = 76.613844
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = MFC
Demise Altitude = 76.977364
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = TTCFE
Demise Altitude = 77.157997
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Zenith Antenna
Demise Altitude = 76.635225
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = GNSS Antenna
Demise Altitude = 77.547934
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = RadioCore
Demise Altitude = 76.498505
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = HSRFE
Demise Altitude = 77.152626
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Nadir Antenna
Demise Altitude = 76.244932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = PayloadCore
Demise Altitude = 76.912606
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Z+ Panel
Demise Altitude = 76.829582
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Z- Panel
Demise Altitude = 76.735150
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Y Panel
Demise Altitude = 76.827113
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = X Panel / Bulkhead
Demise Altitude = 77.215703
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Bus Cross Member
Demise Altitude = 77.511828
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Generic Fastener
Demise Altitude = 76.392253
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Harness Wires
Demise Altitude = 77.915563
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = HDRM
Demise Altitude = 76.269020
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = PPU Base Plate
Demise Altitude = 76.452642
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = PPU Cover
Demise Altitude = 76.924487
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = PPU Xformer
Demise Altitude = 74.711572
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Feeder Stepper Motor
Demise Altitude = 73.936881
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Feeder Top Cap
Demise Altitude = 77.644033
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Feeder Outer Housing
Demise Altitude = 77.469432
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Feeder Housing Motor Side
Demise Altitude = 77.490053
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Feeder Motor Mount
Demise Altitude = 77.582539
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Outer Screen
Demise Altitude = 73.511668
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Inner Pole
Demise Altitude = 77.306117
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Inner Screen
Demise Altitude = 75.140778
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Inner Mag
Demise Altitude = 76.673652
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Outer Pole
Demise Altitude = 77.034877
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Frame Connector Half
Demise Altitude = 74.392184
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Frame Bare Half
Demise Altitude = 74.398640
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Outer Pole Clamp
Demise Altitude = 76.110329
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Outer Mag
Demise Altitude = 71.274858
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Outer Mag Align
Demise Altitude = 77.793719
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Inner Mag Align
Demise Altitude = 75.789644
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Bottom Cover
Demise Altitude = 77.880144
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Harness Strain Relief
Demise Altitude = 77.803289
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Wedge Mount
Demise Altitude = 76.434552
Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis Filters (Al)

Demise Altitude = 72.996807

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis Filters (Cu)

Demise Altitude = 77.261099

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis Enclosure (Al)

Demise Altitude = 73.482791

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis Enclosure (Cu)

Demise Altitude = 76.150649

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis Enclosure (poly)

Demise Altitude = 77.027959

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis Filter Plates

Demise Altitude = 76.377449

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis RO Antennas (Al)

Demise Altitude = 76.577964

Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

name = Pyxis RO Antennas (Ni)

Demise Altitude = 0.000000

Debris Casualty Area = 1.764371
 Impact Kinetic Energy = 0.961914

name = Pyxis RO Antennas (Duriod)
 Demise Altitude = 77.996363
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

===== End of Requirement 4.7-1 =====

E. ActivityLog_G11_Req451

=====

Run Data

=====

****INPUT****

Space Structure Name = GNOMES-11
 Space Structure Type = Payload
 Perigee Altitude = 575.000 (km)
 Apogee Altitude = 575.000 (km)
 Inclination = 53.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass Ratio = 0.0134 (m²/kg)
 Start Year = 2026.750 (yr)
 Initial Mass = 155.000 (kg)
 Final Mass = 150.600 (kg)
 Duration = 5.000 (yr)
 Station-Kept = True
 PMD Perigee Altitude = 90.000 (km)
 PMD Apogee Altitude = 90.000 (km)
 PMD Inclination = 53.000 (deg)
 PMD RAAN = 0.000 (deg)
 PMD Argument of Perigee = 0.000 (deg)
 PMD Mean Anomaly = 0.000 (deg)
 Long-Term Reentry = True

****OUTPUT****

Collision Probability = 4.9847E-05
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

=====

===== End of Requirement 4.5-1 =====

=====

Run Data

=====

****INPUT****

Space Structure Name = GNOMES-11
Space Structure Type = Payload
Perigee Altitude = 575.000 (km)
Apogee Altitude = 575.000 (km)
Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0059 (m²/kg)
Start Year = 2026.750 (yr)
Initial Mass = 155.000 (kg)
Final Mass = 150.600 (kg)
Duration = 5.000 (yr)
Station-Kept = True
PMD Perigee Altitude = 90.000 (km)
PMD Apogee Altitude = 90.000 (km)
PMD Inclination = 53.000 (deg)
PMD RAAN = 0.000 (deg)
PMD Argument of Perigee = 0.000 (deg)
PMD Mean Anomaly = 0.000 (deg)
Long-Term Reentry = True

****OUTPUT****

Collision Probability = 2.7972E-05
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

=====

===== End of Requirement 4.5-1 =====

F. ActivityLog_G11_Req452

```
=====
Spacecraft = GNOMES-11
Critical Surface = PPU+X
=====
```

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0016 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.600 (g/cm²) Separation: 2.000 (cm)

****OUTPUT****

Probability of Penetration = 2.7918E-04 (2.7921E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

```
=====
Spacecraft = GNOMES-11
Critical Surface = Thruster Head +X
=====
```

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)

Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 17.750 (g/cm²)
CS Surface Area = 0.0050 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No

****OUTPUT****

Probability of Penetration = 6.9234E-07 (6.9234E-07)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = EPS+X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0020 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.600 (g/cm²) Separation: 65.100 (cm)

****OUTPUT****

Probability of Penetration = 3.1890E-04 (3.1896E-04)

Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = ADCS+X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0050 (m²)
Vector = (0.000000 (u), 1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.600 (g/cm²) Separation: 36.000 (cm)

****OUTPUT****

Probability of Penetration = 7.9707E-04 (7.9739E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = ADCS-X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)

Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.850 (g/cm²)
CS Surface Area = 0.0050 (m²)
Vector = (0.000000 (u), -1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 42.200 (cm)

****OUTPUT****

Probability of Penetration = 1.0007E-08 (1.0007E-08)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = PPU-X

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.850 (g/cm²)
CS Surface Area = 0.0010 (m²)
Vector = (0.000000 (u), -1.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 84.100 (cm)

****OUTPUT****

Probability of Penetration = 2.0015E-09 (2.0015E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-11
Critical Surface = PPU+Y

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.900 (g/cm²)
CS Surface Area = 0.0400 (m²)
Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 3.400 (cm)

****OUTPUT****

Probability of Penetration = 1.7014E-04 (1.7015E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-11
Critical Surface = PPU-Y

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)

Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.900 (g/cm²)
 CS Surface Area = 0.0400 (m²)
 Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.500 (g/cm²) Separation: 3.500 (cm)

****OUTPUT****

Probability of Penetration = 2.1717E-04 (2.1719E-04)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

```

=====
Spacecraft = GNOMES-11
Critical Surface = EPS-X
=====
  
```

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 53.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.850 (g/cm²)
 CS Surface Area = 0.0024 (m²)
 Vector = (0.000000 (u), -1.000000 (v), 0.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.540 (g/cm²) Separation: 3.000 (cm)

****OUTPUT****

Probability of Penetration = 7.1574E-09 (7.1574E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = PPU-Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.850 (g/cm²)
CS Surface Area = 0.0026 (m²)
Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.810 (g/cm²) Separation: 2.000 (cm)

****OUTPUT****

Probability of Penetration = 7.8520E-09 (7.8520E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = PPU+Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)

Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.850 (g/cm²)
CS Surface Area = 0.0026 (m²)
Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.810 (g/cm²) Separation: 29.200 (cm)

****OUTPUT****

Probability of Penetration = 2.0326E-09 (2.0326E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = Thruster Head +Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 1.800 (g/cm²)
CS Surface Area = 0.0020 (m²)
Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
CS Pressurized = No

****OUTPUT****

Probability of Penetration = 1.9112E-03 (1.9131E-03)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = Thruster Head-Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 1.800 (g/cm²)
CS Surface Area = 0.0020 (m²)
Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
CS Pressurized = No

****OUTPUT****

Probability of Penetration = 1.9112E-03 (1.9131E-03)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = Thruster Head+Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)

RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 1.800 (g/cm²)
 CS Surface Area = 0.0020 (m²)
 Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No

****OUTPUT****

Probability of Penetration = 3.8365E-07 (3.8365E-07)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

=====
 Spacecraft = GNOMES-11
 Critical Surface = Thruster Head-Z
 =====

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 53.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 1.800 (g/cm²)
 CS Surface Area = 0.0028 (m²)
 Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No

****OUTPUT****

Probability of Penetration = 5.3711E-07 (5.3711E-07)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-11
Critical Surface = EPS+Y

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0333 (m²)
Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 2.200 (cm)

****OUTPUT****

Probability of Penetration = 4.7062E-04 (4.7073E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

Spacecraft = GNOMES-11
Critical Surface = EPS-Y

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)

Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.810 (g/cm²)
 CS Surface Area = 0.0333 (m²)
 Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.405 (g/cm²) Separation: 32.200 (cm)

****OUTPUT****

Probability of Penetration = 6.1896E-04 (6.1915E-04)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

=====
 Spacecraft = GNOMES-11
 Critical Surface = EPS-Z
 =====

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 53.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.810 (g/cm²)
 CS Surface Area = 0.0079 (m²)
 Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.810 (g/cm²) Separation: 5.500 (cm)

****OUTPUT****

Probability of Penetration = 9.5382E-09 (9.5382E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = EPS+Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0079 (m²)
Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.810 (g/cm²) Separation: 14.100 (cm)

****OUTPUT****

Probability of Penetration = 6.2800E-09 (6.2800E-09)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = ADCS+Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)

Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0317 (m²)
Vector = (0.000000 (u), 0.000000 (v), -1.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.540 (g/cm²) Separation: 30.700 (cm)

****OUTPUT****

Probability of Penetration = 2.3176E-04 (2.3179E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = ADCS-Y

=====

****INPUT****

Apogee Altitude = 575.000 (km)
Perigee Altitude = 575.000 (km)
Orbital Inclination = 53.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0134 (m²/kg)
Initial Mass = 150.600 (kg)
Final Mass = 150.600 (kg)
Station Kept = Yes
Start Year = 2026.750 (yr)
Duration = 5.000 (yr)
Orientation = Fixed Oriented
CS Areal Density = 0.810 (g/cm²)
CS Surface Area = 0.0317 (m²)
Vector = (0.000000 (u), 0.000000 (v), 1.000000 (w))
CS Pressurized = No

Outer Wall 1 Density: 0.405 (g/cm²) Separation: 6.500 (cm)

****OUTPUT****

Probability of Penetration = 5.8971E-04 (5.8988E-04)

Returned Error Message: Normal Processing

Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = ADCS+Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)

Perigee Altitude = 575.000 (km)

Orbital Inclination = 53.000 (deg)

RAAN = 0.000 (deg)

Argument of Perigee = 0.000 (deg)

Mean Anomaly = 0.000 (deg)

Final Area-To-Mass = 0.0134 (m²/kg)

Initial Mass = 150.600 (kg)

Final Mass = 150.600 (kg)

Station Kept = Yes

Start Year = 2026.750 (yr)

Duration = 5.000 (yr)

Orientation = Fixed Oriented

CS Areal Density = 0.810 (g/cm²)

CS Surface Area = 0.0095 (m²)

Vector = (-1.000000 (u), 0.000000 (v), 0.000000 (w))

CS Pressurized = No

Outer Wall 1 Density: 0.810 (g/cm²) Separation: 10.900 (cm)

****OUTPUT****

Probability of Penetration = 8.0185E-09 (8.0185E-09)

Returned Error Message: Normal Processing

Date Range Error Message: Normal Date Range

=====

Spacecraft = GNOMES-11
Critical Surface = ADCS-Z

=====

****INPUT****

Apogee Altitude = 575.000 (km)
 Perigee Altitude = 575.000 (km)
 Orbital Inclination = 53.000 (deg)
 RAAN = 0.000 (deg)
 Argument of Perigee = 0.000 (deg)
 Mean Anomaly = 0.000 (deg)
 Final Area-To-Mass = 0.0134 (m²/kg)
 Initial Mass = 150.600 (kg)
 Final Mass = 150.600 (kg)
 Station Kept = Yes
 Start Year = 2026.750 (yr)
 Duration = 5.000 (yr)
 Orientation = Fixed Oriented
 CS Areal Density = 0.810 (g/cm²)
 CS Surface Area = 0.0095 (m²)
 Vector = (1.000000 (u), 0.000000 (v), 0.000000 (w))
 CS Pressurized = No
 Outer Wall 1 Density: 0.810 (g/cm²) Separation: 6.500 (cm)

****OUTPUT****

Probability of Penetration = 1.0389E-08 (1.0389E-08)
 Returned Error Message: Normal Processing
 Date Range Error Message: Normal Date Range

===== End of Requirement 4.5-2 =====

G. ActivityLog_G11_Req461

=====
 Project Data
 =====

****INPUT****

Space Structure Name = GNOMES-11
 Space Structure Type = Payload
 Perigee Altitude = 575.000000 (km)
 Apogee Altitude = 575.000000 (km)
 Inclination = 53.000000 (deg)
 RAAN = 0.000000 (deg)
 Argument of Perigee = 0.000000 (deg)
 Mean Anomaly = 0.000000 (deg)
 Area-To-Mass Ratio = 0.005900 (m²/kg)
 Start Year = 2026.750000 (yr)
 Initial Mass = 155.000000 (kg)
 Final Mass = 150.600000 (kg)

Duration = 5.000000 (yr)
Station Kept = True
Abandoned = False
Long-Term Reentry = True

****OUTPUT****

Suggested Perigee Altitude = 100.000000 (km)
Suggested Apogee Altitude = 575.000000 (km)
Returned Error Message = Passes Long-term reentry orbit criteria
Released Year = 2031 (yr)
Requirement = 63
Compliance Status = Pass

=====

===== End of Requirement 4.6 =====

****INPUT****

Start Year = 2031.250000 (yr)
Perigee Altitude = 380.000000 (km)
Apogee Altitude = 380.000000 (km)
Inclination = 53.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Area-To-Mass Ratio = 0.013400 (m²/kg)

****OUTPUT****

Orbital Lifetime from Startyr = 1.075997 (yr)
Time Spent in LEO during Lifetime = 1.075997 (yr)
Last year of Propagation = 2032 (yr)
Returned Error Message: Object reentered

H. ActivityLog_G11_Req471

=====

Project Data

=====

****INPUT****

Space Structure Name = GNOMES-11
Space Structure Type = Payload
Perigee Altitude = 575.000000 (km)
Apogee Altitude = 575.000000 (km)

Inclination = 53.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.013400 (m²/kg)
Start Year = 2026.750000 (yr)
Initial Mass = 155.000000 (kg)
Final Mass = 150.600000 (kg)
Duration = 5.000000 (yr)
Station Kept = True
Abandoned = False
Long-Term Reentry = True

****OUTPUT****

Suggested Perigee Altitude = 100.000000 (km)
Suggested Apogee Altitude = 575.000000 (km)
Returned Error Message = Passes Long-term reentry orbit criteria
Released Year = 2031 (yr)
Requirement = 63
Compliance Status = Pass

=====

===== End of Requirement 4.6 =====

*******INPUT*******

Item Number = 1

name = GNOMES-11
quantity = 1
parent = 0
materialID = 8
type = Box
Aero Mass = 150.600006
Thermal Mass = 150.600006
Diameter/Width = 0.600000
Length = 1.100000
Height = 0.300000

name = Solar Face Sheet
quantity = 12
parent = 1
materialID = 27
type = Flat Plate
Aero Mass = 0.532000

Thermal Mass = 0.532000
Diameter/Width = 0.720000
Length = 1.120000

name = Solar Hinge
quantity = 12
parent = 1
materialID = 8
type = Box
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.039000
Length = 0.200000
Height = 0.010000

name = HDRM Inserts
quantity = 12
parent = 1
materialID = 65
type = Flat Plate
Aero Mass = 0.034000
Thermal Mass = 0.034000
Diameter/Width = 0.030000
Length = 0.074000

name = Solar Panel Core
quantity = 6
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.588000
Thermal Mass = 0.588000
Diameter/Width = 0.720000
Length = 1.120000

name = Film Adhesive
quantity = 12
parent = 1
materialID = 27
type = Flat Plate
Aero Mass = 0.128000
Thermal Mass = 0.128000
Diameter/Width = 0.720000
Length = 1.120000

name = Solar Cell Glass
quantity = 24

parent = 1
materialID = -1
type = Flat Plate
Aero Mass = 0.275000
Thermal Mass = 0.275000
Diameter/Width = 0.250000
Length = 0.550000

name = Reaction Wheel and Bracket
quantity = 4
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 1.800000
Thermal Mass = 1.800000
Diameter/Width = 0.090000
Length = 0.110000

name = Battery Pack
quantity = 8
parent = 1
materialID = 8
type = Box
Aero Mass = 1.100000
Thermal Mass = 1.100000
Diameter/Width = 0.075000
Length = 0.200000
Height = 0.060000

name = Torque Rod
quantity = 3
parent = 1
materialID = 38
type = Cylinder
Aero Mass = 0.250000
Thermal Mass = 0.250000
Diameter/Width = 0.020000
Length = 0.150000

name = Star Tracker
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.320000
Thermal Mass = 0.320000

Diameter/Width = 0.050000
Length = 0.119000
Height = 0.044000

name = ADCS
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.900000
Thermal Mass = 0.900000
Diameter/Width = 0.148000
Length = 0.224000
Height = 0.041000

name = EPS
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.140000
Length = 0.330000
Height = 0.023000

name = MFC
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.300000
Thermal Mass = 1.300000
Diameter/Width = 0.150000
Length = 0.337000
Height = 0.040000

name = TTCFE
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.113000
Length = 0.150000

Height = 0.040000

name = Zenith Antenna
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.100000
Length = 0.143000

name = GNSS Antenna
quantity = 2
parent = 1
materialID = 50
type = Flat Plate
Aero Mass = 0.050000
Thermal Mass = 0.050000
Diameter/Width = 0.050000
Length = 0.100000

name = RadioCore
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.440000
Thermal Mass = 1.440000
Diameter/Width = 0.170000
Length = 0.250000
Height = 0.023000

name = HSRFE
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.111000
Length = 0.150000
Height = 0.040000

name = Nadir Antenna
quantity = 1
parent = 1

materialID = 8
type = Box
Aero Mass = 4.570000
Thermal Mass = 4.570000
Diameter/Width = 0.414000
Length = 0.488000
Height = 0.025000

name = PayloadCore
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 1.000000
Thermal Mass = 1.000000
Diameter/Width = 0.150000
Length = 0.224000
Height = 0.041000

name = Z+ Panel
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 6.450000
Thermal Mass = 6.450000
Diameter/Width = 0.517000
Length = 1.100000

name = Z- Panel
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 5.410000
Thermal Mass = 5.410000
Diameter/Width = 0.355000
Length = 1.100000

name = Y Panel
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 4.420000
Thermal Mass = 4.420000

Diameter/Width = 0.320000
Length = 1.020000

name = X Panel / Bulkhead
quantity = 4
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 1.400000
Thermal Mass = 1.400000
Diameter/Width = 0.300000
Length = 0.420000

name = Bus Cross Member
quantity = 4
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.380000
Thermal Mass = 0.380000
Diameter/Width = 0.075000
Length = 0.517000

name = Generic Fastener
quantity = 250
parent = 1
materialID = 57
type = Cylinder
Aero Mass = 0.007000
Thermal Mass = 0.007000
Diameter/Width = 0.007000
Length = 0.025000

name = Harness Wires
quantity = 3000
parent = 1
materialID = 19
type = Cylinder
Aero Mass = 0.001000
Thermal Mass = 0.001000
Diameter/Width = 0.001000
Length = 0.250000

name = HDRM
quantity = 4
parent = 1
materialID = 8

type = Box
Aero Mass = 0.480000
Thermal Mass = 0.480000
Diameter/Width = 0.065000
Length = 0.085000
Height = 0.036000

name = PPU Base Plate
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.500000
Thermal Mass = 0.500000
Diameter/Width = 0.160000
Length = 0.260000
Height = 0.006500

name = PPU Cover
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.413000
Thermal Mass = 0.413000
Diameter/Width = 0.160000
Length = 0.260000
Height = 0.030000

name = PPU Xformer
quantity = 1
parent = 1
materialID = -12
type = Box
Aero Mass = 0.251000
Thermal Mass = 0.251000
Diameter/Width = 0.038000
Length = 0.051000
Height = 0.030000

name = Feeder Stepper Motor
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.273000

Thermal Mass = 0.273000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.040000

name = Feeder Top Cap
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.035800
Thermal Mass = 0.035800
Diameter/Width = 0.062000
Length = 0.113000
Height = 0.015000

name = Feeder Outer Housing
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.074000
Thermal Mass = 0.074000
Diameter/Width = 0.081000
Length = 0.113700
Height = 0.031000

name = Feeder Housing Motor Side
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.074000
Thermal Mass = 0.074000
Diameter/Width = 0.082000
Length = 0.114000
Height = 0.034000

name = Feeder Motor Mount
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.038000
Thermal Mass = 0.038000
Diameter/Width = 0.064000

Length = 0.092000
Height = 0.020000

name = Thruster Outer Screen
quantity = 1
parent = 1
materialID = -8
type = Cylinder
Aero Mass = 0.209740
Thermal Mass = 0.209740
Diameter/Width = 0.083000
Length = 0.034000

name = Thruster Inner Pole
quantity = 1
parent = 1
materialID = -8
type = Cylinder
Aero Mass = 0.868430
Thermal Mass = 0.012660
Diameter/Width = 0.039000
Length = 0.020000

name = Inner Screen
quantity = 1
parent = 39
materialID = -9
type = Cylinder
Aero Mass = 0.091570
Thermal Mass = 0.091570
Diameter/Width = 0.041000
Length = 0.030000

name = Inner Mag
quantity = 1
parent = 39
materialID = -10
type = Cylinder
Aero Mass = 0.764200
Thermal Mass = 0.764200
Diameter/Width = 0.360000
Length = 0.200000

name = Thruster Outer Pole
quantity = 1
parent = 1
materialID = -8

type = Cylinder
Aero Mass = 0.035070
Thermal Mass = 0.035070
Diameter/Width = 0.084000
Length = 0.030000

name = Thruster Frame Connector Half
quantity = 1
parent = 1
materialID = 59
type = Flat Plate
Aero Mass = 0.135440
Thermal Mass = 0.135440
Diameter/Width = 0.070000
Length = 0.090000

name = Thruster Frame Bare Half
quantity = 1
parent = 1
materialID = 59
type = Flat Plate
Aero Mass = 0.135020
Thermal Mass = 0.135020
Diameter/Width = 0.070000
Length = 0.090000

name = Thruster Outer Pole Clamp
quantity = 1
parent = 1
materialID = 59
type = Cylinder
Aero Mass = 0.028630
Thermal Mass = 0.028630
Diameter/Width = 0.036000
Length = 0.020000

name = Outer Mag
quantity = 1
parent = 1
materialID = -10
type = Cylinder
Aero Mass = 0.707200
Thermal Mass = 0.707200
Diameter/Width = 0.072000
Length = 0.030000

name = Outer Mag Align

quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.031220
Thermal Mass = 0.031220
Diameter/Width = 0.085000
Length = 0.030000

name = Inner Mag Align
quantity = 1
parent = 1
materialID = 66
type = Cylinder
Aero Mass = 0.021680
Thermal Mass = 0.021680
Diameter/Width = 0.025000
Length = 0.035000

name = Thruster Bottom Cover
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.018360
Thermal Mass = 0.018360
Diameter/Width = 0.085000
Length = 0.030000

name = Harness Strain Relief
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.010530
Thermal Mass = 0.010530
Diameter/Width = 0.029000
Length = 0.029000
Height = 0.016000

name = Thruster Wedge Mount
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.350000

Thermal Mass = 0.350000
Diameter/Width = 0.150000
Length = 0.150000
Height = 0.030000

name = Pyxis Filters (Al)
quantity = 6
parent = 1
materialID = 5
type = Box
Aero Mass = 0.610000
Thermal Mass = 0.610000
Diameter/Width = 0.060000
Length = 0.084000
Height = 0.045000

name = Pyxis Filters (Cu)
quantity = 6
parent = 1
materialID = 19
type = Box
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.051000
Length = 0.084000
Height = 0.045000

name = Pyxis Enclosure (Al)
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 2.500000
Thermal Mass = 2.500000
Diameter/Width = 0.176000
Length = 0.185000
Height = 0.165000

name = Pyxis Enclosure (Cu)
quantity = 1
parent = 1
materialID = 19
type = Box
Aero Mass = 1.000000
Thermal Mass = 1.000000
Diameter/Width = 0.176000

Length = 0.185000
Height = 0.165000

name = Pyxis Enclosure (poly)
quantity = 1
parent = 1
materialID = 50
type = Box
Aero Mass = 1.000000
Thermal Mass = 1.000000
Diameter/Width = 0.176000
Length = 0.185000
Height = 0.165000

name = Pyxis Filter Plates
quantity = 2
parent = 1
materialID = 5
type = Box
Aero Mass = 0.350000
Thermal Mass = 0.350000
Diameter/Width = 0.120000
Length = 0.190000
Height = 0.010000

name = Pyxis RO Antennas (Al)
quantity = 2
parent = 1
materialID = 5
type = Box
Aero Mass = 1.670000
Thermal Mass = 1.670000
Diameter/Width = 0.256000
Length = 0.868000
Height = 0.023000

name = Pyxis RO Antennas (Ni)
quantity = 2
parent = 1
materialID = 46
type = Box
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.256000
Length = 0.868000
Height = 0.023000

name = Pyxis RO Antennas (Duriod)
quantity = 2
parent = 1
materialID = -13
type = Box
Aero Mass = 3.370000
Thermal Mass = 3.370000
Diameter/Width = 0.256000
Length = 0.868000
Height = 0.023000

*****OUTPUT*****

Item Number = 1
name = GNOMES-11
Demise Altitude = 77.996363
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Solar Face Sheet
Demise Altitude = 77.914235
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Solar Hinge
Demise Altitude = 77.623950
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = HDRM Inserts
Demise Altitude = 74.195240
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Solar Panel Core
Demise Altitude = 77.917661
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Film Adhesive
Demise Altitude = 77.977671
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Solar Cell Glass
Demise Altitude = 0.000000

Debris Casualty Area = 22.328029
 Impact Kinetic Energy = 4.927941

 name = Reaction Wheel and Bracket
 Demise Altitude = 73.249603
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Battery Pack
 Demise Altitude = 76.507130
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Torque Rod
 Demise Altitude = 70.660970
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Star Tracker
 Demise Altitude = 77.118816
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = ADCS
 Demise Altitude = 77.014674
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = EPS
 Demise Altitude = 76.613844
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = MFC
 Demise Altitude = 76.977364
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = TTCFE
 Demise Altitude = 77.157997
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Zenith Antenna
 Demise Altitude = 76.635225
 Debris Casualty Area = 0.000000

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Impact Kinetic Energy = 0.000000
*****
name = GNSS Antenna
Demise Altitude = 77.547934
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = RadioCore
Demise Altitude = 76.498505
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = HSRFE
Demise Altitude = 77.152626
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Nadir Antenna
Demise Altitude = 76.244932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = PayloadCore
Demise Altitude = 76.912606
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Z+ Panel
Demise Altitude = 76.829582
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Z- Panel
Demise Altitude = 76.735150
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Y Panel
Demise Altitude = 76.827113
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = X Panel / Bulkhead
Demise Altitude = 77.215703
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

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*****
name = Bus Cross Member
Demise Altitude = 77.511828
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = Generic Fastener
Demise Altitude = 76.392253
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = Harness Wires
Demise Altitude = 77.915563
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = HDRM
Demise Altitude = 76.269020
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = PPU Base Plate
Demise Altitude = 76.452642
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = PPU Cover
Demise Altitude = 76.924487
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = PPU Xformer
Demise Altitude = 74.711572
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = Feeder Stepper Motor
Demise Altitude = 73.936881
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

name = Feeder Top Cap
Demise Altitude = 77.644033
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

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name = Feeder Outer Housing
Demise Altitude = 77.469432
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Feeder Housing Motor Side
Demise Altitude = 77.490053
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Feeder Motor Mount
Demise Altitude = 77.582539
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Outer Screen
Demise Altitude = 73.511668
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Inner Pole
Demise Altitude = 77.306117
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Inner Screen
Demise Altitude = 75.140778
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Inner Mag
Demise Altitude = 76.673652
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Outer Pole
Demise Altitude = 77.034877
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Frame Connector Half
Demise Altitude = 74.392184
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

name = Thruster Frame Bare Half

Demise Altitude = 74.398640
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Thruster Outer Pole Clamp
 Demise Altitude = 76.110329
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Outer Mag
 Demise Altitude = 71.274858
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Outer Mag Align
 Demise Altitude = 77.793719
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Inner Mag Align
 Demise Altitude = 75.789644
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Thruster Bottom Cover
 Demise Altitude = 77.880144
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Harness Strain Relief
 Demise Altitude = 77.803289
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Thruster Wedge Mount
 Demise Altitude = 76.434552
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Pyxis Filters (Al)
 Demise Altitude = 72.996807
 Debris Casualty Area = 0.000000
 Impact Kinetic Energy = 0.000000

 name = Pyxis Filters (Cu)
 Demise Altitude = 77.261099

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Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Pyxis Enclosure (Al)
Demise Altitude = 73.482791
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Pyxis Enclosure (Cu)
Demise Altitude = 76.150649
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Pyxis Enclosure (poly)
Demise Altitude = 77.027959
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Pyxis Filter Plates
Demise Altitude = 76.377449
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Pyxis RO Antennas (Al)
Demise Altitude = 76.577964
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****
name = Pyxis RO Antennas (Ni)
Demise Altitude = 0.000000
Debris Casualty Area = 1.764371
Impact Kinetic Energy = 0.961914
*****
name = Pyxis RO Antennas (Duriod)
Demise Altitude = 77.996363
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
*****

===== End of Requirement 4.7-1 =====

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Attachment 3

List of Earth Stations Coordinated with Federal Spectrum Managers

GNOMES-10

1. Fairbanks, Alaska, U.S.
2. Svalbard, Norway
3. Punta Arenas, Chile
4. Hartebeesthoek, South Africa
5. Maui, Hawaii, U.S.
6. Jeju, South Korea
7. Mingenew, Australia
8. Puertollano, Spain
9. Santa Maria, Azores
10. Awarua, New Zealand
11. Sofia, Bulgaria
12. Unst, U.K.
13. Anchorage, Alaska, U.S.
14. Peterborough, Australia
15. Nangetty, Australia
16. Blonduos, Iceland
17. Baku, Azerbaijan
18. Ripailles, Mauritius
19. Pretoria, South Africa
20. La Paz, Mexico
21. Longovilo, Chile
22. Las Cruces, New Mexico, U.S.

GNOMES-11

1. Punta Arenas, Chile
2. Hartebeesthoek, South Africa
3. Maui, Hawaii, U.S.
4. Jeju, South Korea
5. Mingenew, Australia
6. Puertollano, Spain
7. Santa Maria, Azores
8. Awarua, New Zealand
9. Sofia, Bulgaria
10. Peterborough, Australia
11. Nangetty, Australia
12. Baku, Azerbaijan
13. Ripailles, Mauritius
14. Pretoria, South Africa
15. La Paz, Mexico
16. Longovilo, Chile
17. Las Cruces, New Mexico, U.S.