Exhibit 5
FCC Form 312
Orbital Debris Analysis Report for Cluster 15 and Later
HawkEye 360, Inc.

This report is presented in compliance with
NASA-STD-8719.14C, APPENDIX A.

Document Data is Not Restricted.
This document contains no proprietary, ITAR, or export controlled information.
DAS Software Version Used in Analysis: v3.2.6

Change Log

ODAR Version	Date	DAS Version Used
Cluster 15+	November 17, 2025	v3.2.6
Cluster 12+	July 17, 2024	v3.2.6

INTRODUCTION

HawkEye 360, Inc. ("HE360"), a U.S. company headquartered in Herndon, Virginia, plans to launch a commercial constellation of up to 60 simultaneously operating microsatellites. The satellites will fly in groups of 3 in proximate formation and work together to form a single observation platform ("cluster").

The HE360 satellites will deploy from the launch vehicle into a low Earth orbit at altitudes between 400 km and 600 km, with representative deployment altitudes of 525 and 575 km and nominal inclinations between 5 and 97 degrees. The HE360 constellation is composed of two classes of satellite form factors:[1]

- Hawk: Microsatellite size
- Kestrel: 8U Cubesat form-factor

The satellites are calculated to re-enter the Earth's atmosphere and burn up completely in 5 years or less after a nominal 5-year mission life for the Hawk spacecraft and a nominal 3-year mission life for the Kestrel spacecraft. To meet the post-mission deorbit requirement, some Hawk/Kestrel spacecraft may conduct a beginning-of-mission orbit lowering maneuver if the spacecraft is inserted into an orbit higher than the orbit altitude predicted to allow for passive deorbit during mission operations plus a 5-year post-mission deorbit period. As a result of the 11-year solar cycle, this orbit altitude changes for each launch and also differs for the Hawk vs. the Kestrel form factor. Examples of these orbit altitudes from 2026 through 2037 are provided, for context.

The NASA Debris Assessment Software confirmed that the HE360 satellites satisfy all the Requirements for Limiting Orbital Debris including:

a. Mission-Related Debris Passing Through LEO

b. Mission-Related Debris Passing Near GEO

c. Long-Term Risk from Planned Breakups

d. Probability of Collision with Large Objects

e. Probability of Damage from Small Objects

[1] As discussed in the narrative, to the extent necessary, HE360 would be willing to provide notice to the Bureau identifying the form factor used for each satellite as part of its launch notification, consistent with prior Bureau practice.

f. Post-mission Disposal

g. Casualty Risk from Reentry Debris

HE360 confirms that the satellites will not undergo any planned release of debris during their 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. HE360 has also assessed the probability of the space stations becoming sources 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. HE360 has taken steps to limit the effects of such collisions through shielding, the placement of components, and the use of redundant systems.

HE360 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, HE360 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. 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.

HE360 has assessed and limited the probability of the space stations becoming a source of debris by collisions with large debris or other operational spacecraft. HE360 does not intend to place any satellites 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 cluster launch providers to ensure that the satellites are deployed in such a way as to mitigate the potential for collision with any other spacecraft. This specifically includes minimizing the potential for collision with manned spacecraft.

The HE360 satellites will perform station-keeping maneuvers to maintain separation between the satellites within a cluster and sustain the desired geometry. Typical inter-satellite distances between the satellites will be approximately 75-125 km and maintenance maneuvers will be conducted relatively infrequently – approximately once a week. However, the cluster will not maintain the satellites' inclination angles, apogees, perigees, and right ascension of the ascending node to any specified degrees of accuracy beyond the goals of maintaining the cluster geometry.

HE360's disclosure of the above parameters, as well as the number of space stations, the number and inclination of orbital planes, and the orbital period to be used, can assist third parties in identifying potential problems. This information also lends itself to physical coordination between HE360 and other operators.

The instant ODAR applies to Clusters 15+. The ODARs associated with prior clusters appear in previously approved HE360 applications. *See, e.g.,* Application of HE360, ICFS File No. SAT-MOD-20240812-00180 (granted May 30, 2025; reissued June 18, 2025) (providing the ODAR for Clusters 12+); Application of HE360, ICFS File No. SAT-MOD-20240619-00139 (granted Nov. 15, 2024) (providing the ODAR for Kestrel-0A);Application of HE360, ICFS File No. SAT-MOD-20220906-00099, at Exhibit 7, ODAR (granted in part Mar. 3, 2023; granted in part Nov. 15, 2024) (providing the ODAR for Clusters 7-11); Application of HE360, ICFS File No.

SAT-MOD-20210114-00010, at Exhibit 2, ODAR (Granted May 25, 2021) (providing the ODAR for Clusters 3-6); Letter from Tony Lin, Counsel to HE360, to Marlene H. Dortch, Secretary, FCC, ICFS File No. SAT-AMD-20200728-00090 (filed Sept. 23, 2020) (providing the ODAR for Cluster 2); Application of HE360, ELS File No. 0024-EX-CN-2017, at Exhibit 3, ODAR (filed Mar. 10, 2017) (providing the ODAR for Cluster 1).

1. Self Assessment of the ODAR using the format in Appendix A.2 of NASA-STD-8719.14 Revision A with Change 1

A self-assessment is provided below in accordance with the assessment format provided in Appendix A.2 of NASA-STD-8719.14C.

Table 1: Orbital Debris Self-Assessment Report Evaluation for the HE360 Commercial Constellation

Req		Spacecraft			Comments
#	Description	Compliant or N/A	Not Compliant	Incomplete	
4.3-1a	Debris-LEO	x			No debris released in LEO.
4.3-1b	Debris-LEO	x			No debris released in LEO.
4.3-2	Debris-GEO	x			No debris released near GEO.
4.4-1	Explosions	x			
4.4-2	Passivation	x			
4.4-3	Long-term risk	x			No planned breakups.
4.4-4	Short-term risk	x			No planned breakups.
4.5-1	Debris from collisions-large obj	x			
4.5-2	Debris from collisions-small obj	x			
4.6-1a	Disposal by re-entry	x			
4.6-1b	Disposal by maneuvers	x			
4.6-1c	Disposal by retrieval	x			No planned retrieval.
4.6-2	Disposal near GEO	x			LEO orbits only.
4.6-3	Disposal between LEO,GEO	x			LEO orbits only.
4.6-4	Reliability of disposal	x			No planned disposal operations.
4.7-1	Risk of human casualty	x			
4.8-1	Special Classes of Space Missions	x			

2. Assessment Report Format

ODAR Technical Sections Format Requirements:

This ODAR follows the format recommended in NASA-STD-8719.14 Revision C, Appendix A.1 and includes the content indicated at a minimum in each section 2 through 8 below for the

satellites in the constellation. Sections 9 through 14 apply to the launch platform and are not covered here.

3. ODAR Section 1: Program Management and Mission Overview

Project Manager: HE360

Foreign government or space agency participation: No foreign government or space agency participation is anticipated.

Schedule of upcoming mission milestones:
Launch: No earlier than June 2026.

Mission Overview:
The satellites comprising each cluster will be launched and rapidly deployed from their restraint mechanisms and commissioned. Depending upon the insertion orbit, the spacecraft orbit altitude may be reduced during the first 11 weeks on orbit to ensure a 5-year deorbit following the completion of mission operations. The cluster will then begin payload operations that will continue for an estimated 5 years for Hawk clusters or 3 years for Kestrel clusters.

ODAR Summary: No debris released in normal operations; no credible scenario for breakups; the collision probability with other objects is compliant with NASA standards; and the estimated nominal post-mission de-orbit lifetime is less than 5 years, as calculated by DAS.

Launch vehicle and launch site: Launch vehicle and site are to be determined for each HE360 cluster. One or more clusters of 3 satellites will be launched together on one launch vehicle in order to obtain the desired cluster formation. There are several launch vehicle options that are capable of launching the Hawk/Kestrel clusters of 3 satellites into the desired orbits. HE360 will select launch vehicles for each cluster based on vehicle and site availability, as well as cost and reliability.

Proposed launch date: No earlier than June 2026.

Mission duration: Nominal mission lifetime is 5 years for Hawk and 3 years for Kestrel, following 11 weeks of spacecraft checkout and beginning-of-mission orbit lowering. The estimated nominal post-mission de-orbit lifetime is less than 5 years.

Launch and deployment profile, including all parking, transfer, and operational orbits with apogee, perigee, and inclination: The HE360 satellites will deploy from the launch vehicle into a low Earth orbit at altitudes between 400 km and 610 km, with representative deployment altitude of 556 km.

Nominal Upper Insertion Case:	Apogee: 556 km; Perigee: 556 km
Nominal Inclination:	5 degrees, 46.5 degrees, or 97 degrees

The HE360 satellites have propulsion for station-keeping, cluster formation establishment, collision avoidance, and orbit lowering. There is no parking or transfer orbit.

Reason for selection of operational orbit(s): Orbits were chosen to maximize global coverage and ground station communication opportunities.

Identification of any interaction or potential physical interference with other operational spacecraft: The HE360 satellites are not expected to interact or physically interfere with other operational spacecraft.

4. ODAR Section 2: Spacecraft Description

Physical description of the spacecraft:

Hawk:

The Hawk satellites are microsatellites, each with a launch mass of less than 33 kg. To perform the intended mission, the HE360 spacecraft have a variety of antennas mounted externally to the spacecraft. The specific antennas included on any individual cluster of spacecraft may vary, but the inclusive set of all possible antennas at this time have been included in this ODAR for analysis.

Hawk basic physical outside dimensions are illustrated in the diagrams below.

Hawk power storage is provided by nine prismatic Lithium-Ion cells. The batteries will be recharged by solar cells mounted on both deployed arrays and on the body of the satellite.

Kestrel:

The Kestrel satellites are 8U cubesats, each with a launch mass of less than 18.0 kg.

Kestrel basic physical outside dimensions are illustrated in the diagrams below.

Kestrel spacecraft are composed of an aluminum structure with deployable solar arrays.

Kestrel power storage is provided by one battery pack with nine Lithium-Ion cells. The batteries will be recharged by solar cells mounted on both deployed arrays and on the body of the spacecraft.

Detailed illustration of the entire spacecraft in the mission operation configuration with clear overall dimensional markings:

Hawk:

Figures 1-2 show the external layout of the Hawk spacecraft with dimensional markings.

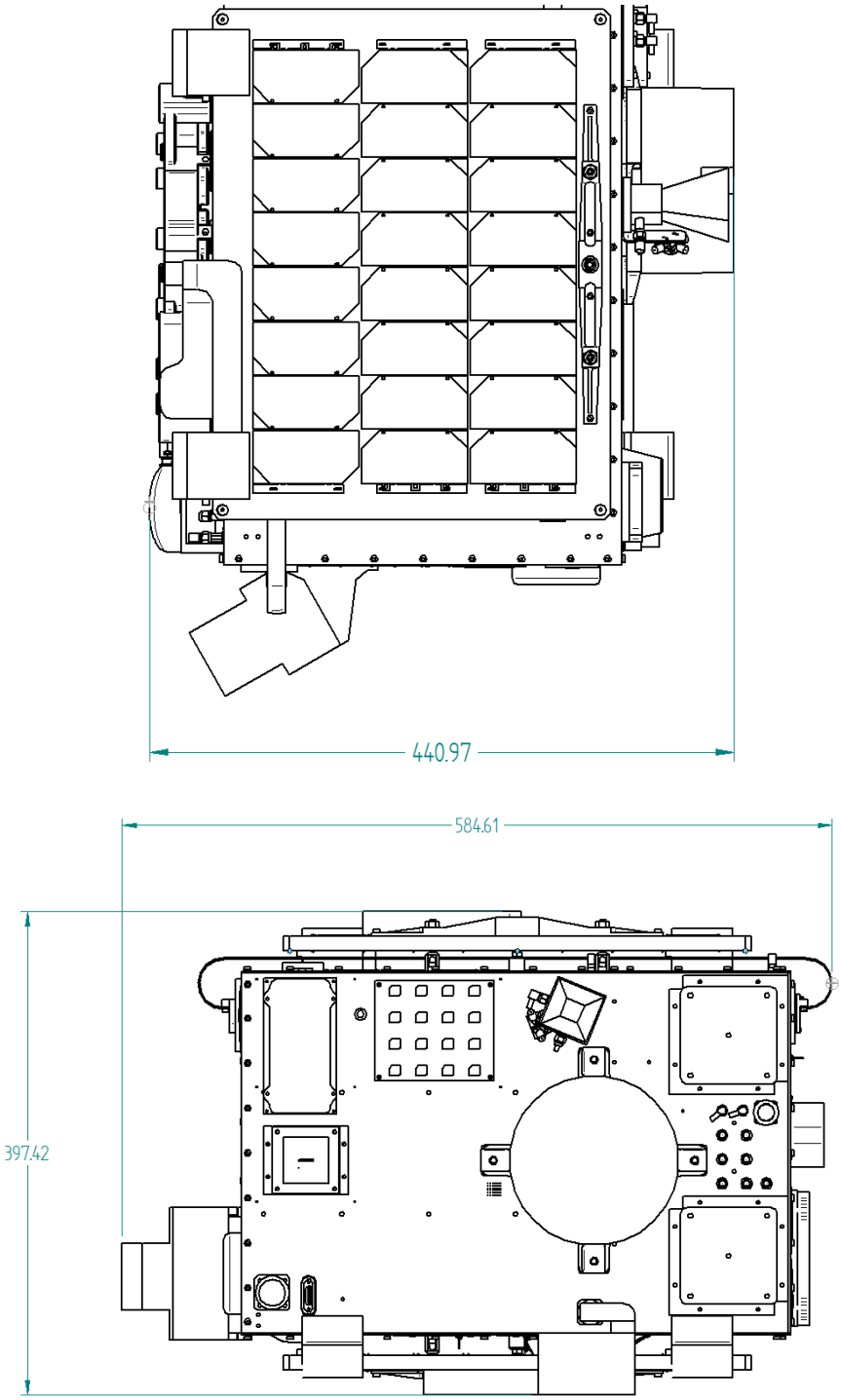

Figure 1: Hawk Spacecraft in Stowed Configuration

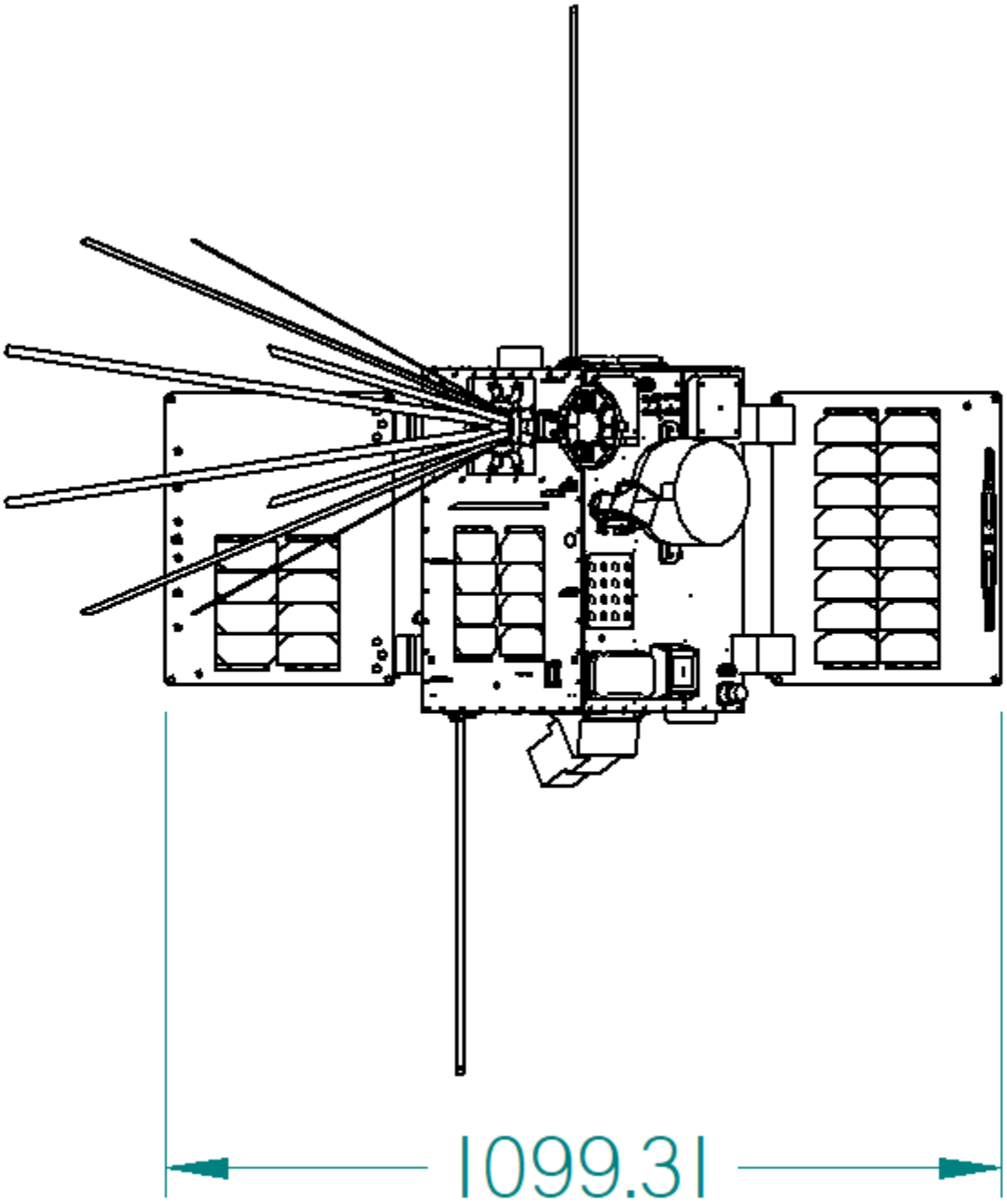

Figure 2: Hawk Spacecraft in Deployed Configuration

Kestrel:

Figure 3 shows the external layout of the Kestrel spacecraft with dimensional markings.

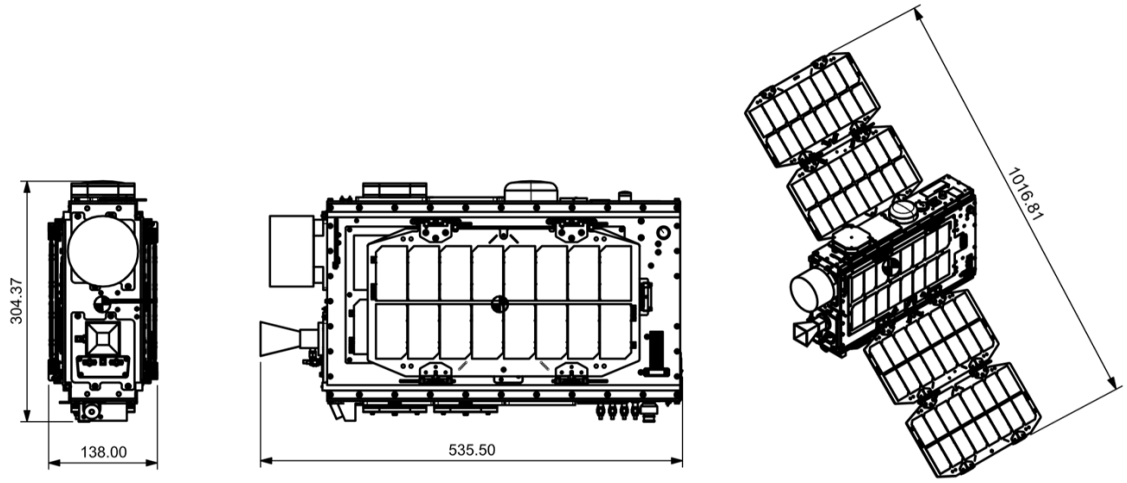

Figure 3: Kestrel Spacecraft in Stowed and Deployed Configurations

Total satellite mass at launch, including all propellants and fluids:

Hawk:

Maximum of 33.0 kg including separation system

Kestrel:

Maximum of 18.0 kg

Dry mass of satellites at launch, excluding propellant:

Hawk:

Water-based Propulsion Option**:** Maximum of 32.26 kg including separation system

Kestrel:

Bi-prop Propulsion Option: Maximum of ~17.8 kg including separation system

Water-based Propulsion Option**:** Maximum of ~17.7 kg including separation system

Description of all propulsion systems (cold gas, mono-propellant, bi-propellant, electric, nuclear):
Hawk spacecraft will employ a water-based propulsion system on its satellites.

Kestrel spacecraft will employ either a water-based propulsion system or a chemical bi-prop propulsion system.[2]

Identification, including mass and pressure, of all fluids (liquids and gases) planned to be on board and a description of the fluid loading plan or strategies, excluding fluids in sealed heat pipes:

Hawk:

Distilled water and methanol[3] (700 g) and FE-36 pressurant (40 g) at a maximum pressure of 3.7 barA. Fluid will be loaded into the propulsion system by the manufacturer and will be installed in a flight-ready configuration with no additional pressurization operations required.

Kestrel:

Distilled water (324 g) and air pressurant at a maximum pressure of 1.0 barA. Fluid will be loaded into the propulsion system by the manufacturer and will be installed in a flight-ready configuration with no additional pressurization operations required.

OR

Nitrous oxide oxidizer (169.0 g) at a maximum pressure of 50.5 bar and propene propellant (29.7 g) at a maximum pressure of 10.2 bar. Fluid will be loaded into the propulsion system by the manufacturer prior to installation to the spacecraft or by HE360 at launch site prior to integration with the launch vehicle.

Fluids in Pressurized Batteries:

Hawk:

None. The satellites use heritage, unpressurized, standard COTS Lithium-Ion battery cells.

Kestrel:

None. The spacecraft use heritage, unpressurized, standard COTS Lithium-Ion batteries.

Description of attitude control system and indication of the normal attitude of the spacecraft with respect to the velocity vector:
Satellite attitude is controlled by magnetorquers and reaction wheels. The nominal attitude is an align/constrain sun-tracking mode where a particular fixed body-frame vector, chosen to maximize power generation, is aligned with the sun, and rotation about the sun vector is

[2] As discussed in the narrative, HE360 would be willing to provide notice to the Bureau identifying the propulsion system used for each Kestrel satellite as part of its launch notification, consistent with prior Bureau practice.
[3] Methenol lowers the freezing point of the distilled water.

constrained to point a second fixed body-frame axis to nadir. Other possible attitude modes include: nadir-pointing, target-tracking, tumble/de-tumble and low/high drag profiles.

Description of any range safety or other pyrotechnic devices: No pyrotechnic devices are used.

Description of the electrical generation and storage system: Standard COTS Lithium-Ion battery cells are charged before payload integration and provide electrical energy during the mission. The cells are recharged by triple-junction GaAs solar cells. A battery protection circuit protects against over and undercharge conditions.

Identification of any other sources of stored energy not noted above: None.

Identification of any radioactive materials on board: None.

Address the trackability of the spacecraft. Spacecraft operating in low-Earth orbit will be presumed trackable if each individual spacecraft is 10 cm or larger in its smallest dimension, excluding deployable components:
The spacecraft are in low-Earth orbit, and the smallest dimension of the spacecraft measures at least 10 cm. Thus, they are trackable.

The statement shall also disclose the following:

How the operator plans to identify the spacecraft following deployment and whether spacecraft tracking will be active or passive:
Spacecraft tracking will be active. Prior to deployment, an initial ephemeris is produced by the launch service that will be used to schedule a contact time window with the ground station. The accuracy of the ephemeris will depend on the launch vehicle's performance, delays, and deployment times. A more accurate ephemeris will be made available shortly after deployment. After deployment when the satellite establishes contact, active satellite tracking will be employed to enhance and maintain satellite ephemeris data. The collected data will be used to identify the spacecraft from two-line element sets once they become available by the 18th Space Defense Squadron.

Whether, prior to deployment, the spacecraft will be registered with the 18th Space Control Squadron or successor entity:
Prior to deployment, the spacecraft will be registered with the 18th Space Defense Squadron via their Satellite Registration Form and Space Situational Awareness (SSA) Sharing Agreement.

The extent to which the spacecraft operator plans to share information regarding initial deployment, ephemeris, and/or planned maneuvers with the 18th Space Control Squadron or successor entity, other entities that engage in space situational awareness or space traffic management functions, and/or other operators:
HE360 will provide the 18th Space Defense Squadron information regarding initial deployment, owner/operator (O/O) ephemeris, and planned maneuvers. This is intended to provide better space situational awareness and improve the accuracy of conjunction analysis (CA). The higher

accuracy O/O ephemeris will improve the quality of the CA and reduce the frequency of Conjunction Data Messages (CDMs). HE360 intends to publish its ephemeris online three times daily, via Space-Track.org, and coordinate with LeoLabs, Inc., to publish HE360-generated ephemeris.

Planned Proximity Operations
The satellite clusters fly in formation in groups of 3 and work together to form a single observation platform. Spacing will be maintained with propulsion and differential drag to ensure approximately 75-125 km minimum separation.

5. ODAR Section 3: Assessment of Spacecraft Debris Released during Normal Operation

Identification of any object (>1 mm) expected to be released from the spacecraft any time after launch, including object dimensions, mass, and material: There are no intentional releases.

Rationale/necessity for release of each object: N/A.

Time of release of each object, relative to launch time: N/A.

Release velocity of each object with respect to spacecraft: N/A.

Expected orbital parameters (apogee, perigee, and inclination) of each object after release: N/A.

Calculated orbital lifetime of each object, including time spent in Low Earth Orbit (LEO): N/A.

Assessment of spacecraft compliance with Requirements 4.3-1 and 4.3-2 (per DAS):

Requirement 4.3-1: Mission Related Debris Passing Through LEO. a. Requirement 4.3-1a: All debris released during the deployment, operation, and disposal phases shall be limited to a maximum orbital lifetime of 25 years from date of release (Requirement 56398). b. Requirement 4.3-1b: The total object-time product shall be no larger than 100 object-years per mission (Requirement 56399). The object-time product is the sum of all debris of the total time spent below 2,000 km altitude during the orbital lifetime of each object. (See section 4.3.4.2 for methods to calculate the object-time product.)
Compliance Statement: COMPLIANT There are no intentional releases.

Requirement 4.3-2: Mission Related Debris Passing Near GEO.

For missions leaving debris in orbits with the potential of traversing GEO (GEO altitude +/- 200 km and +/- 15 degrees latitude), released debris with diameters of 5 cm or greater shall be left in orbits which will ensure that within 25 years after release the apogee will no longer exceed GEO - 200 km (Requirement 56400).
Compliance Statement: COMPLIANT No released debris.

6. ODAR Section 4: Assessment of Spacecraft Intentional Breakups and Potential for Explosions

Potential causes of spacecraft breakup during deployment and mission operations: There is no credible scenario that would result in spacecraft breakup during normal deployment and operations.

Summary of failure modes and effects analyses of all credible failure modes which may lead to an accidental explosion: In-mission failure of a battery cell protection circuit could lead to a short circuit resulting in overheating and a very remote possibility of battery cell explosive rupture. The battery safety systems discussed in the FMEA (see requirement 4.4-1 below) describe the combined faults that must occur for any of seven (7) independent, mutually exclusive failure modes to lead to explosive rupture. The batteries include vent-before-burst features to minimize the chances of explosive rupture.

Detailed plan for any designed spacecraft breakup, including explosions and intentional collisions: There are no planned breakups.

List of components which shall be passivated at End of Mission (EOM) including method of passivation and amount which cannot be passivated: None. At end of mission, under nominal situations, any remaining propellant will be used to decay orbit as much as possible, therefore depleting propellant. The batteries will not be passivated at End of Mission due to the low risk and low impact of explosive rupturing, and the extremely short lifetime at mission conclusion. The maximum total chemical energy stored in the battery is approximately 626.4 kJ for Hawk spacecraft and 406.8kJ for Kestrel spacecraft.

Rationale for all items which are required to be passivated, but cannot be due to their design: The battery charge circuits include overcharge protection to limit the risk of battery failure. However, in the unlikely event that a battery cell does explosively rupture, the small size, mass, and potential energy, of these small batteries is such that while the spacecraft could be expected to vent gases, most debris from the battery rupture should be contained within the vessel due to the lack of penetration energy.

Hawk: This electrical power system has already been flight qualified and has since been flown on multiple HE360 missions.

Kestrel: The electrical power system and batteries are both COTS components with flight heritage.

Assessment of spacecraft compliance with Requirements 4.4-1 through 4.4-4:

Requirement 4.4-1: Limiting the risk to other space systems from accidental explosions during deployment and mission operations while in orbit about Earth or the Moon. For each spacecraft and launch vehicle orbital stage employed for a mission, the program or project shall demonstrate, via failure mode and effects analyses or equivalent analyses, that the integrated probability of explosion for all credible failure modes of each spacecraft and launch vehicle is less than 0.001 (excluding small particle impacts) (Requirement 56449).
Compliance Statement: COMPLIANT Expected probability: 0.000

Supporting Rationale and FMEA details (Hawk):
Battery explosion:

Effect: All failure modes below might theoretically result in battery explosive rupture with the possibility of orbital debris generation. However, in the unlikely event that a battery cell does explosively rupture, the small size, mass, and potential energy, of the selected COTS batteries is such that while the spacecraft could be expected to vent gases, most debris from the battery rupture should be contained within the vessel due to the lack of penetration energy. Furthermore, each battery has a pressure relief burst disc that prevents catastrophic battery enclosure failure.
Probability: Extremely low. It is believed to be much less than 0.1% probability that multiple independent (not common mode) faults occur for each failure mode to cause the ultimate effect (explosion).

Failure mode 1: Internal short circuit.
Mitigation 1: Qualification and acceptance shock, vibration, thermal cycling, and vacuum tests followed by maximum system rate-limited charge and discharge to prove that no internal short circuit sensitivity exists.
Combined faults required for realized failure: Environmental testing AND functional charge/discharge tests must both fail for this failure mode to occur.

Failure Mode 2: Internal thermal rise due to high load discharge rate.
Mitigation 2: Cells were tested in lab for high load discharge rates in a variety of flight-like configurations to determine likelihood and impact of an out of control thermal rise in the cell. Cells were also tested in a hot environment to test the upper limit of the cells capability. No failures were seen.
Combined faults required for realized failure: Spacecraft thermal design must be incorrect AND external over-current detection and disconnect function must fail for this failure mode to occur.

Failure Mode 3: Excessive discharge rate or short circuit due to external device

failure or terminal contact with conductors not at battery voltage levels (due to abrasion or inadequate proximity separation).
Mitigation 3: This failure mode is negated by a) qualification-tested short circuit protection on each external circuit, b) design of battery packs and insulators such that no contact with nearby board traces is possible without being caused by some other mechanical failure, c) obviation of such other mechanical failures by proto-qualification and acceptance environmental tests (shock, vibration, thermal cycling, and thermal-vacuum tests).
Combined faults required for realized failure: An external load must fail/short-circuit AND external over-current detection and disconnect function must fail for this failure mode to occur.

Failure Mode 4: Inoperable vents.
Mitigation 4: Battery vents are not inhibited by the battery holder design or the spacecraft.
Combined effects required for realized failure: The final assembler must fail to install proper venting for this failure mode to occur.

Failure Mode 5: Crushing.
Mitigation 5: This mode is negated by spacecraft design. There are no moving parts in the proximity of the batteries.
Combined faults required for realized failure: A catastrophic failure must occur in an external system AND the failure must cause a collision sufficient to crush the batteries leading to an internal short circuit AND the satellite must be in a naturally sustained orbit at the time the crushing occurs for this failure mode to occur.

Failure Mode 6: Low level current leakage or short-circuit through battery pack case or due to moisture-based degradation of insulators.
Mitigation 6: These modes are negated by a) battery holder/case design made of non-conductive plastic, and b) operation in vacuum such that no moisture can affect insulators.
Combined faults required for realized failure: Abrasion or piercing failure of circuit board coating or wire insulators AND dislocation of battery packs AND failure of battery terminal insulators AND failure to detect such failure modes in environmental tests must occur for this failure mode to occur.

Failure Mode 7: Excess temperatures due to orbital environment and high discharge combined.
Mitigation 7: The spacecraft thermal design will negate this possibility. Thermal rise has been analyzed in combination with space environment temperatures showing that batteries do not exceed normal allowable operating temperatures which are well below temperatures of concern for explosions. This design has been verified through the GHGSat-D and other SFL missions.
Combined faults required for realized failure: Thermal analysis AND thermal design AND mission simulations in thermal-vacuum chamber testing AND over-current monitoring and control must all fail for this failure mode to occur.

Supporting Rationale and FMEA details (Kestrel):
Battery explosion:

Effect: All failure modes below might theoretically result in battery explosive rupture with the possibility of orbital debris generation. However, in the unlikely event that a battery cell does explosively rupture, the small size, mass, and potential energy, of the selected COTS batteries is such that while the spacecraft could be expected to vent gases, most debris from the battery rupture should be contained within the vessel due to the lack of penetration energy. Furthermore, each battery has a pressure relief burst disc that prevents catastrophic battery enclosure failure.
Probability: Extremely low. It is believed to be much less than 0.1% probability that multiple independent (not common mode) faults occur for each failure mode to cause the ultimate effect (explosion). The spacecraft uses battery cells which have extensive flight heritage. Each battery cell is UN/UL certified and battery packaging includes over-voltage and over-current protection.

Failure mode 1: Internal short circuit.
Mitigation 1: Qualification and acceptance shock, vibration, thermal cycling, and vacuum tests followed by maximum system rate-limited charge and discharge to prove that no internal short circuit sensitivity exists.
Combined faults required for realized failure: Environmental testing AND functional charge/discharge tests must both fail for this failure mode to occur..

Failure Mode 2: Internal thermal rise due to high load discharge rate.
Mitigation 2: Battery packs include over-charge and over-discharge protection circuits that limit temperature rise.
Combined faults required for realized failure: Spacecraft thermal design must be incorrect AND external over-current detection and disconnect function must fail for this failure mode to occur.

Failure Mode 3: Excessive discharge rate or short circuit due to external device failure or terminal contact with conductors not at battery voltage levels (due to abrasion or inadequate proximity separation).
Mitigation 3: This failure mode is negated by a) qualification-tested short circuit protection on each external circuit, b) design of battery packs and insulators such that no contact with nearby board traces is possible without being caused by some other mechanical failure, c) obviation of such other mechanical failures by proto-qualification and acceptance environmental tests (shock, vibration, thermal cycling, and thermal-vacuum tests).
Combined faults required for realized failure: An external load must fail/short-circuit AND external over-current detection and disconnect function must fail for this failure mode to occur.

Failure Mode 4: Inoperable vents.

Mitigation 4: Battery vents are not inhibited by the battery holder design or the spacecraft.
Combined effects required for realized failure: The cell manufacturer and the spacecraft integrator must fail to install proper venting for this failure mode to occur.

Failure Mode 5: Crushing.
Mitigation 5: This mode is negated by spacecraft design. There are no moving parts in the proximity of the batteries. Further, qualification vibration testing is conducted for the battery packs.
Combined faults required for realized failure: A catastrophic failure must occur in an external system AND the failure must cause a collision sufficient to crush the batteries leading to an internal short circuit AND the spacecraft must be in a naturally sustained orbit at the time the crushing occurs for this failure mode to occur.

Failure Mode 6: Low level current leakage or short-circuit through battery pack case or due to moisture-based degradation of insulators.
Mitigation 6: These modes are negated by a) battery holder/case design made of non-conductive plastic, and b) operation in vacuum such that no moisture can affect insulators.
Combined faults required for realized failure: Abrasion or piercing failure of circuit board coating or wire insulators AND dislocation of battery packs AND failure of battery terminal insulators AND failure to detect such failure modes in environmental tests must occur for this failure mode to occur.

Failure Mode 7: Excess battery cell temperature due to orbital environment and high discharge combined.
Mitigation 7: The spacecraft thermal design will negate this possibility. Thermal rise has been analyzed in combination with space environment temperatures showing that batteries do not exceed normal allowable operating temperatures which are well below temperatures of concern for explosions.
Combined faults required for realized failure: Thermal analysis AND thermal design AND mission simulations in thermal-vacuum chamber testing AND over-current monitoring and control must all fail for this failure mode to occur.

Requirement 4.4-2: Design for passivation after completion of mission operations while in orbit about Earth or the Moon. Design of all spacecraft and launch vehicle orbital stages shall include the ability to deplete all onboard sources of stored energy and disconnect all energy generation sources when they are no longer required for mission operations or post-mission disposal or control to a level which cannot cause an explosion or deflagration large enough to release orbital debris or break up the spacecraft (Requirement 56450).
Compliance statement: COMPLIANT

At end of mission, all remaining propellant will be used to lower orbit altitude or vented, if possible.[4] Onboard sources of energy include onboard batteries for energy storage. The battery charge circuits include overcharge protection to limit the risk of battery failure. As previously mentioned, the integrated burst disc should prevent any explosion altogether. However, in the unlikely event that a battery cell does explosively rupture, the small size, mass, and potential energy, of these small batteries is such that while the spacecraft could be expected to vent gases, most debris from the battery rupture should be contained within the vessel due to the lack of penetration energy. There is no expectation of producing orbital debris or spacecraft breakup from an unlikely battery explosion.

Requirement 4.4-3. Limiting the long-term risk to other space systems from planned breakups.
Planned explosions or intentional collisions shall:
a. Be conducted at an altitude such that for orbital debris fragments larger than 10 cm the object-time product does not exceed 100 object-years (Requirement 56453). For example, if the debris fragments greater than 10 cm decay in the maximum allowed 1 year, a maximum of 100 such fragments can be generated by the breakup.
b. Not generate debris larger than 1 mm that remains in Earth orbit longer than one year (Requirement 56454).

Compliance statement: Not applicable; there are no planned breakups.

Requirement 4.4-4: Limiting the short-term risk to other space systems from planned breakups.
Immediately before a planned explosion or intentional collision, the probability of debris, orbital or ballistic, larger than 1 mm colliding with any operating spacecraft within 24 hours of the breakup shall be verified to not exceed 10^-6 (Requirement 56455).

Compliance statement: N/A; There are no planned breakups.

7. ODAR Section 5: Assessment of Spacecraft Potential for On-Orbit Collisions

Assessment of spacecraft compliance with Requirements 4.5-1 and 4.5-2 (per DAS, and calculation methods provided in NASA-STD-8719.14 Revision A with Change 1, section 4.5.4):

Requirement 4.5-1: Limiting debris generated by collisions with large objects when operating in Earth orbit.
For each spacecraft and launch vehicle orbital stage in or passing through LEO, the program or project shall demonstrate that, during the orbital lifetime of each spacecraft

[4] Propulsion will not be used to actively lower the orbit altitude through the ISS orbit.

and orbital stage, the probability of accidental collision with space objects larger than 10 cm in diameter is less than 0.001 (Requirement 56506).
Compliance Statement: COMPLIANT **Large Object Impact and Debris Generation Probability:** Collision Probability: < 0.00001009072

Supporting Deployment and Collision Risk Analysis
The above collision probability is a product of NASA's DAS software.

The HE360 constellation, fully deployed, will consist of 60 operational satellites in 20 clusters of 3 satellites, distributed as follows (from an inclination perspective):

- 60% (12 clusters or 36 spacecraft) in near-polar orbits (97 – 98 degrees)
- 40% (7 clusters or 21 spacecraft) in mid-inclination orbits (35-50 degrees)
- 05% (1 cluster or 3 spacecraft) in low-inclination orbits (0-28.5 degrees)

Over the operational life of the constellation, HE360 plans to launch and operate a maximum of 58 clusters (of 3 satellites per cluster) or 174 satellites, following the general distribution described above. Each cluster will be composed of a Hawk or a Kestrel form factor satellite.

For the purpose of computing the probability of collision with large objects, HE360 has analyzed a single target orbital altitude (556 km) and three distinct representative inclinations (97, 46.5 and 5 degrees). The table below illustrates the probabilities of collision with large objects, computed using DAS, in each of the three representative cases, for both of the spacecraft form-factors (Hawk and Kestrel).

	Collision Risk					
	Hawk Spacecraft			Kestrel Spacecraft		
Deployment Year	97-degree inclination	46.5-degree inclination	5-degree inclination	97-degree inclination	46.5-degree inclination	5-degree inclination
2026.5	8.9332E-06	5.9603E-06	5.1815E-06	6.4180E-06	4.2202E-06	3.6908E-06
2027.5	1.0157E-05	6.7996E-06	5.9343E-06	7.2736E-06	4.5983E-06	4.0165E-06
2028.5	9.3042E-06	6.3008E-06	5.4678E-06	6.8635E-06	4.5754E-06	4.0105E-06
2029.5	8.1548E-06	5.5437E-06	4.8293E-06	5.9564E-06	4.0143E-06	3.5116E-06
2030.5	6.8504E-06	4.6906E-06	4.0727E-06	4.9609E-06	3.2018E-06	2.9295E-06
2031.5	5.4807E-06	3.5969E-06	3.2662E-06	4.3074E-06	2.5409E-06	2.1718E-06
2032.5	4.5038E-06	2.7639E-06	2.7540E-06	2.6633E-06	1.9977E-06	1.6663E-06
2033.5	3.2825E-06	2.5039E-06	2.0731E-06	2.6078E-06	1.9186E-06	1.5989E-06
2034.5	3.5607E-06	2.1105E-06	1.7610E-06	3.0529E-06	1.1797E-06	1.8626E-06
2035.5	3.8506E-06	2.6942E-06	2.0892E-06	2.9065E-06	1.3664E-06	1.0906E-06
2036.5	9.5530E-06	6.9734E-06	5.9134E-06	2.8733E-06	2.1568E-06	1.8788E-06

In each case, the satellite meets the 0.001 requirement by nearly two orders of magnitude. Furthermore, aggregating the collision probability for all 174 spacecraft over the life of the constellation, with the orbital inclination distribution described above and averaging over a solar

cycle, results in a total probability of collision with large objects of 0.001009072. This calculation was conducted assuming the worst-case scenario that all spacecraft were the Hawk configuration. Since the collision with large objects is lower in all cases for the Kestrel spacecraft, any clusters of Kestrel spacecraft help to reduce this aggregate value.

The HE360 spacecraft have propulsion systems and will, if possible, conduct collision avoidance maneuvers when warranted. Indeed, the FCC has stated that the large object collision probability should be treated as zero when satellites are capable of propulsive maneuvers.[5] Furthermore, under nominal situations, the remaining propellant at end of mission will be employed to reduce the orbit altitude and orbital life of spacecraft, which will also reduce the probability of collision with large objects due to reduced orbital lifetime. To be clear, no such action is necessary to meet regulatory requirements.

Detailed description and assessment of efficacy of any planned debris avoidance capability intended to help in meeting requirement 4.5-1

There is no significant risk of collision based on orbital parameters and propulsion capability. Furthermore, HE360 will register all HE360 spacecraft with the US Space Force's 18th Space Defense Squadron, which provides active monitoring in conjunction with the Combined Space Operations Center.

HE360 will also work with other spacecraft operators to avoid potential collisions with HE360 satellites, as necessary.

If at any time during the spacecraft's mission or de-orbit phase the spacecraft will operate in or transit through the orbits used by any planned or inhabitable spacecraft, including the International Space Station, describe the design and operational strategies, such as coordination, that will be used to minimize the risk of collision and avoid posing any operational constraints to the spacecraft

With respect to the operational strategies to minimize risk to the ISS or any other inhabitable spacecraft in low Earth orbit, such as Tiangong, HE360 intends to monitor the location of its satellites and work closely with organizations, such as the 18th Space Defense Squadron, NASA, and CMSA (operator of the Tiangong space station), as appropriate.

Certify 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

[5] *See* 47 C.F.R. § 25.114(d)(14)(iv)(A)(1)("The collision risk may be assumed zero for a space station during any period in which the space station will be maneuvered effectively to avoid colliding with large objects."); *Mitigation of Orbital Debris in the New Space Age,* Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 18-313, 35 FCC Rcd 4156, at ¶ 35 (2020)("[F]or purposes of conducting the analysis, and absent evidence to the contrary, the collision risk with large objects should be assumed zero or near zero during the period of the time when the space station is able to conduct collision avoidance maneuvers."); *Space Exploration Holdings, LLC,* Request for Modification of the Authorization for the SpaceX NGSO Satellite System, Memorandum Opinion and Order, 35 FCC Rcd 5649, at ¶ 20 (2020) ("[I]t is the Commission's established licensing practice to consider satellites equipped with propulsion capability to have a collision risk of zero or near zero, absent specific information to the contrary.").

Upon receipt of a space situational awareness conjunction warning, HE360 certifies that it will attempt to contact the operator of any active spacecraft involved in such a warning, share ephemeris data and other appropriate operational information with any such operator, and modify the spacecraft's attitude, orbit, and/or operations in order to avoid a collision. If the operator of the other spacecraft does not have maneuvering capabilities or is not expedient in response, HE360 will upload potential maneuvers via API to the 18th Space Defense Squadron in order to avoid a collision. High risk events will be mitigated to at least one and a half orders of magnitude below the collision probability mitigated action threshold of 1E-5.

Requirement 4.5-2: Limiting debris generated by collisions with small objects when operating in Earth or lunar orbit. For each spacecraft, the program or project shall demonstrate that, during the mission of the spacecraft, the probability of accidental collision with orbital debris and meteoroids sufficient to prevent compliance with the applicable post-mission disposal requirements is less than 0.01 (Requirement 56507).
Compliance Statement: COMPLIANT **DAS Analysis for Small Object Impact and Debris Generation Probability:** COMPLIANT. In order to meet the 5-year deorbit requirement, HE360 will lower the orbit altitude (as necessary) during the first 3-month of operation to a circular orbit altitude that enables passive deorbit within 5 years following the 5-year operational mission (Hawk) or 3-year operational mission (Kestrel). Based upon this approach, the probability of collision with small objects has been conducted based upon an operational duration of only 3 months. Given such a short time period, we were able to make extremely conservative assumptions. The critical surface was defined as the largest surface of the spacecraft body. Solar panels were not included due to the inherently parallel nature of solar power generation. Even with the extremely conservative assumption described above, the probability of collision with small objects is still only 1.0363E-04 which is compliant. Details of the DAS analysis of collision with small objects are illustrated in Annex B below.

Because HE360 may engage in a beginning-of-mission propulsive maneuver to ensure compliance with the 5-year post-mission deorbit rule, HE360 is required to demonstrate a 90% reliability of completing this maneuver.. The Hawk satellites using the water-based propulsion system has more than 600 spacecraft-months of operation without a failure, suggesting a mean time between failures (MTBF) of more than 600 months, which is approximately a 99.5% reliability for the first three months of operation. An MTBF of ~300 months translates into a 99% reliability for a three-month period, per equations below.

$$R(t) = EXP(-\frac{t}{MTBF})$$

$$R(3\ months) = EXP(-3\frac{months}{300\ months})$$

$$R(3\ months) = 0.99$$

The Kestrel spacecraft is a new design and does not have the same level of operational history. Given that the propulsion maneuver is planned during the first three months of operation, a 90% reliability translates to an MTBF of ~30 months, requiring a mission reliability after 36 months of only 33%. This is a very low reliability threshold to achieve.[6] The Kestrel spacecraft component selection was based upon flight-proven hardware with some redundancy of subsystems and functions. Also, the Kestrel spacecraft will undergo rigorous testing and environmental stress screening at subsystem and system levels. Furthermore, HE360 currently operates a constellation of 30 spacecraft and has extensive experience managing and conducting integration and environmental stress screening (ESS) testing and conducting flight operations, monitoring telemetry and identifying/predicting component anomalies and degradation. Based on these factors, HE360 submits that the Kestrel spacecraft meets the reliability requirement.

8. ODAR Section 6: Assessment of Spacecraft Post-mission Disposal Plans and Procedures

Description of spacecraft disposal option selected: The HE360 satellites will be disposed of by atmospheric re-entry.

Identification of all systems or components required to accomplish any post-mission disposal operation, including passivation and maneuvering:
Nothing is required for post-mission disposal to meet the 5-year deorbit requirement. However, to meet the post-mission deorbit requirement, the HE360 spacecraft will conduct a beginning-of-mission orbit lowering maneuver if the spacecraft are inserted into an orbit greater than an orbit altitude which enables passive deorbit within 5-years following the operational mission. In order to achieve this orbit lowering maneuver, all primary bus functionality will be required, including: TT&C, flight, AODC, EPS, and propulsion.

Plan for any spacecraft maneuvers required to accomplish post-mission disposal:
Under nominal situations, any remaining propellant at EOM may be used to further decrease the orbit altitude and significantly reduce the post-operations lifetime. To be clear, no such action is necessary to meet regulatory requirements.

Calculation of area-to-mass ratio after post-mission disposal, if the controlled reentry option is not selected:

The area-to-mass ratio calculations presented below are worst-case with additional mass margin to provide a buffer to address modest changes to satellite design over the life of the constellation

[6] A study of 178 launched CubeSats launched by 2014 demonstrates a 36-month mission reliability of greater than 50% with 95% confidence interval. Since this study, the availability of cubesat components with significant flight heritage has increased dramatically.

which might increase satellite mass. By selecting a worst-case mass, HE360 is over-estimating the orbital lifetime. The cross-sectional areas were computed using the HE360 spacecraft solid model. The operational drag area was estimated using both the spacecraft solid model and an estimate of time distribution of spacecraft orientations based upon downloaded telemetry data from a representative Cluster.

Hawk:

Spacecraft mass: 33 kg
Cross-sectional area:

Maximum Drag Area:	0.48 m^2 (drag area)
Operational Drag Area:	0.417 m^2 (drag area)
Tumbling Drag Area:	0.338 m^2 (drag area)
Minimum Drag Area:	0.155 m^2 (drag area)

Operational area to mass ratio:	0.012652 m^2/kg
Tumbling area to mass ratio:	0.010243

Kestrel:

Spacecraft Mass: 18 kg
Cross-sectional Area:

Maximum Drag Area:	0.4125 m^2 (drag area)
Average Drag Area:	0.2833 m^2 (drag area)
Minimum Drag Area:	0.034 m^2 (drag area)

Average area to mass ratio:	0.0157382 m^2/kg

Assessment of spacecraft compliance with Requirements 4.6-1 through 4.6-5 (per DAS and NASA-STD-8719.14 Revision C):

Table 2 below shows results from DAS using the Orbit Lifetime/Dwell Time Science and Engineering Tool. These results use the following common inputs:
Start Year = 2026 through 2037
RAAN = 0
Arg of Perigee = 0

Form Factor	Hawk			Kestrel		
Orbit	SSO	MID	EQ	SSO	MID	EQ
Inclination	97	46.5	5	97	46.5	5
Operatational Years	5	5	5	3	3	3
Deorbit Years	5	5	5	5	5	5
Total Years	10	10	10	8	8	8
Start Year	Max Altitude (km) to support 5-year Post-Mission Deorbit					
2026	555	555	555	545	540	545
2027	565	560	560	545	545	545
2028	570	570	570	565	565	565
2029	575	575	575	585	580	585
2030	580	575	580	600	595	595
2031	580	580	580	605	600	605
2032	580	580	580	610	605	605
2033	580	580	580	610	605	605
2034	575	575	575	605	600	600
2035	570	565	570	590	585	590
2036	565	560	565	570	565	570
2037	560	560	560	550	550	550

Table 2: DAS Results for Orbit Lifetime

Each cluster will be launched into an orbit and lowered during the first three months of operation (if necessary) to ensure that after 5-years of operation (Hawk) or 3 years of operation (Kestrel) that the cluster is capable of passively deorbiting within 5 years. Table 2 above analyzes the maximum orbit altitude for each year of the next solar cycle, for each form factor, and for each orbit inclination. Prior to each planned launch, a DAS analysis will be conducted for the planned launch parameters to determine if maximum orbit altitude is allowable. This information will be employed to determine:

- Is a launch option viable
- Which drop off orbit options are viable/optimal
- How much beginning of mission orbit lowering must be accomplished in order to assure passive deorbit in less than 5 years following completion of mission

Solar flux data changes regularly and is updated by NASA for the DAS tool roughly every six months. For this reason, Table 2 above is provided as an example, but the proposed process would be to verify these values with each cluster launch using then-current solar flux data.

The HE360 clusters do not station keep but passively deorbit during operation. At the end of the planned operational mission, HE360 will assess the state of the cluster and decide to either deorbit or continue operations if the cluster is still healthy and providing good operational data.

Requirement 4.6-1: Disposal for space structures passing through LEO: A spacecraft or orbital stage with a perigee altitude below 2000 km shall be disposed of by one of three methods: (Requirement 56557) a) Atmospheric reentry option: □ Leave the space structure in an orbit in which natural forces will lead to atmospheric reentry within 25 years after the completion of mission but no more than 30 years after launch; or □ Maneuver the space structure into a controlled de-orbit trajectory as soon as practical after completion of mission. b) Storage orbit option: Maneuver the space structure into an orbit with perigee altitude greater than 2000 km and apogee less than GEO - 500 km. c) Direct retrieval: Retrieve the space structure and remove it from orbit within 10 years after completion of mission
Compliance Statement: COMPLIANT **DAS Analysis:** The HE360 satellite disposal plan is COMPLIANT using the atmospheric re-entry option. Launch orbit selection and beginning-of-mission orbit lowering operations will be selected for each launch to ensure compliance.

Requirement 4.6-2: Disposal for space structures near GEO. A spacecraft or orbital stage in an orbit near GEO shall be maneuvered at EOM to a disposal orbit above GEO with a predicted minimum perigee of GEO +200 km (35,986 km) or below GEO with an apogee of GEO – 200 km (35,586 km) for a period of at least 100 years after disposal (Requirement 56563).
Compliance Statement: Not applicable; no orbits planned near GEO.

Requirement 4.6-3: Disposal for space structures between LEO and GEO. a. A spacecraft or orbital stage shall be left in an orbit with a perigee greater than 2000 km above the Earth's surface and apogee less than 500 km below GEO (Requirement 56565). b. A spacecraft or orbital stage shall not use nearly circular disposal orbits near regions of high value operational space structures, such as between 19,200 km and 20,700 km (Requirement 56566).
Compliance Statement: Not applicable; no orbits planned between LEO and GEO.

Requirement 4.6-4: Reliability of Post-mission Disposal Operations in Earth orbit. NASA space programs and projects shall ensure that all post mission disposal operations to meet Requirements 4.6-1, 4.6-2, and/or 4.6-3 are designed for a probability of success as follows: (Requirement 56567)

a. Be no less than 0.90 at EOM. b. For controlled reentry, the probability of success at the time of reentry burn must be sufficiently high so as not to cause a violation of Requirement 4.7-1 pertaining to limiting the risk of human casualty.
Compliance Statement: N/A; No plans for post-mission disposal operations. However, to meet the post-mission deorbit requirement, the HE360 spacecraft may conduct a beginning-of-mission orbit altitude lowering maneuver if the spacecraft is inserted into an orbit greater than what is predicted to allow passive deorbit within 5 years following planned mission lifetime.

9. ODAR Section 7: Assessment of Spacecraft Reentry Hazards

HE360 has analyzed the demise analysis for the following spacecraft configuration: Cluster 15+.

Results from DAS show that, in both configurations, no components are expected to survive re-entry with an impacting kinetic energy in excess of 15 joules from any of the planned orbits. Details of the DAS analysis are illustrated in Annex A below.

Assessment of spacecraft compliance with Requirement 4.7-1:

Requirement 4.7-1a: Limit the risk of human casualty. The potential for human casualty is assumed for any object with an impacting kinetic energy in excess of 15 joules: a) For uncontrolled reentry, the risk of human casualty from surviving debris shall not exceed 0.0001 (1:10,000) (Requirement 56626).
Compliance Statement: COMPLIANT. Analysis performed using DAS shows that no part of the satellite is expected to have an impacting kinetic energy in excess of 15 joules, and that the risk of human casualty is zero (0) for all planned orbits and inclinations for both the Hawk and the Kestrel form factors.

Requirement 4.7-1b: For controlled reentry, the selected trajectory shall ensure that no surviving debris impact with a kinetic energy greater than 15 joules is closer than 370 km from foreign landmasses, or is within 50 km from the continental U.S., territories of the U.S., and the permanent ice pack of Antarctica (Requirement 56627).
Compliance Statement: Not Applicable; no plans to use controlled re-entry.

Requirement 4.7-1c: For controlled reentries, the product of the probability of failure of the reentry burn (from Requirement 4.6-4.b) and the risk of human casualty assuming uncontrolled reentry shall not exceed 0.0001 (1:10,000) (Requirement 56628).
Compliance Statement: Not Applicable; no plans to use controlled re-entry.

10. ODAR Section 7A: Assessment of Spacecraft Hazardous Materials

HE360 spacecraft do not contain any hazardous materials.

11. ODAR Section 8: Special Classes of Space Missions

Requirement 4.8-1: Mitigate the collision hazards of space tethers in Earth or Lunar orbits. Intact and remnants of severed tether systems in Earth and lunar orbit shall meet the requirements limiting the generation of orbital debris from on-orbit collisions (Requirements 4.5-1 and 4.5-2) and the requirements governing post-mission disposal (Requirements 4.6-1 through 4.6-4) to the limits specified in those paragraphs (Requirement 56652).
Compliance Statement: Not Applicable; there are no tethers in the HE360 mission.

Annex A – DAS Log Results

11 10 2025; 08:41:53AM Processing Requirement 4.3-1: Return Status : Not Run

==========
No Project Data Available
==========

========== End of Requirement 4.3-1 ==========
11 10 2025; 08:41:56AM Processing Requirement 4.3-2: Return Status : Passed

==========
No Project Data Available
==========

========== End of Requirement 4.3-2 ==========
11 10 2025; 09:34:32AM Processing Requirement 4.5-1: Return Status : Passed

==========
Run Data
==========

INPUT

Space Structure Name = HE360-MID
Space Structure Type = Payload
Perigee Altitude = 556.000 (km)
Apogee Altitude = 556.000 (km)
Inclination = 46.500 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0103 (m^2/kg)
Start Year = 2026.500 (yr)
Initial Mass = 33.000 (kg)
Final Mass = 32.260 (kg)
Duration = 5.000 (yr)
Station-Kept = False
Abandoned = True
Long-Term Reentry = False

OUTPUT

Collision Probability = 5.9603E-06
Returned Message: Normal Processing

Date Range Message: Normal Date Range
Status = Pass

==========

INPUT

Space Structure Name = HE360-SSO
Space Structure Type = Payload
Perigee Altitude = 556.000 (km)
Apogee Altitude = 556.000 (km)
Inclination = 97.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0103 (m^2/kg)
Start Year = 2026.500 (yr)
Initial Mass = 33.000 (kg)
Final Mass = 32.260 (kg)
Duration = 5.000 (yr)
Station-Kept = False
Abandoned = True
Long-Term Reentry = False

OUTPUT

Collision Probability = 8.9332E-06
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

INPUT

Space Structure Name = HE360-EQ
Space Structure Type = Payload
Perigee Altitude = 556.000 (km)
Apogee Altitude = 556.000 (km)
Inclination = 5.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0103 (m^2/kg)
Start Year = 2026.500 (yr)
Initial Mass = 33.000 (kg)

Final Mass = 32.260 (kg)
Duration = 5.000 (yr)
Station-Kept = False
Abandoned = True
Long-Term Reentry = False

OUTPUT

Collision Probability = 5.1815E-06
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

INPUT

Space Structure Name = Kestrel-MID
Space Structure Type = Payload
Perigee Altitude = 556.000 (km)
Apogee Altitude = 556.000 (km)
Inclination = 45.500 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0157 (m^2/kg)
Start Year = 2026.500 (yr)
Initial Mass = 18.000 (kg)
Final Mass = 17.500 (kg)
Duration = 3.000 (yr)
Station-Kept = False
Abandoned = True
Long-Term Reentry = False

OUTPUT

Collision Probability = 4.2202E-06
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

INPUT

Space Structure Name = Kestrel-SSO

Space Structure Type = Payload
Perigee Altitude = 556.000 (km)
Apogee Altitude = 556.000 (km)
Inclination = 97.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0157 (m^2/kg)
Start Year = 2026.500 (yr)
Initial Mass = 18.000 (kg)
Final Mass = 17.500 (kg)
Duration = 3.000 (yr)
Station-Kept = False
Abandoned = True
Long-Term Reentry = False

OUTPUT

Collision Probability = 6.4180E-06
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

INPUT

Space Structure Name = Kestrel-EQ
Space Structure Type = Payload
Perigee Altitude = 556.000 (km)
Apogee Altitude = 556.000 (km)
Inclination = 5.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0157 (m^2/kg)
Start Year = 2026.500 (yr)
Initial Mass = 18.000 (kg)
Final Mass = 17.500 (kg)
Duration = 3.000 (yr)
Station-Kept = False
Abandoned = True
Long-Term Reentry = False

OUTPUT

Collision Probability = 3.6908E-06
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

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

11 10 2025; 09:51:34AM Requirement 4.5-2: Compliant

==========
Spacecraft = HE360-MID-SmallObj
Critical Surface = Critical Surface
==========

INPUT

Apogee Altitude = 556.000 (km)
Perigee Altitude = 556.000 (km)
Orbital Inclination = 46.500 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0103 (m^2/kg)
Initial Mass = 32.260 (kg)
Final Mass = 32.260 (kg)
Station Kept = No
Start Year = 2026.500 (yr)
Duration = 0.250 (yr)
Orientation = Random Tumbling
CS Areal Density = 0.550 (g/cm^2)
CS Surface Area = 0.1610 (m^2)
Vector = (0.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.550 (g/cm^2) Separation: 10.000 (cm)
Outer Wall 2 Density: 0.550 (g/cm^2) Separation: 2.000 (cm)

OUTPUT

Probability of Penetration = 3.2395E-05 (3.2395E-05)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

==========
Spacecraft = HE360-SSO-SmallObj

Critical Surface = Critical Surface
==========

INPUT

Apogee Altitude = 556.000 (km)
Perigee Altitude = 556.000 (km)
Orbital Inclination = 97.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0103 (m^2/kg)
Initial Mass = 32.260 (kg)
Final Mass = 32.260 (kg)
Station Kept = No
Start Year = 2026.500 (yr)
Duration = 0.250 (yr)
Orientation = Random Tumbling
CS Areal Density = 0.550 (g/cm^2)
CS Surface Area = 0.1610 (m^2)
Vector = (0.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.550 (g/cm^2) Separation: 10.000 (cm)
Outer Wall 2 Density: 0.550 (g/cm^2) Separation: 2.000 (cm)

OUTPUT

Probability of Penetration = 1.0363E-04 (1.0363E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

==========
Spacecraft = HE360-EQ-SmallObj
Critical Surface = Critical Surface
==========

INPUT

Apogee Altitude = 556.000 (km)
Perigee Altitude = 556.000 (km)
Orbital Inclination = 5.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0103 (m^2/kg)
Initial Mass = 32.260 (kg)

Final Mass = 32.260 (kg)
Station Kept = No
Start Year = 2026.500 (yr)
Duration = 0.250 (yr)
Orientation = Random Tumbling
CS Areal Density = 0.550 (g/cm^2)
CS Surface Area = 0.1610 (m^2)
Vector = (0.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.550 (g/cm^2) Separation: 10.000 (cm)
Outer Wall 2 Density: 0.550 (g/cm^2) Separation: 2.000 (cm)

OUTPUT

Probability of Penetration = 1.2458E-05 (1.2458E-05)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

==========

Spacecraft = Kestrel-MID-SmallObj
Critical Surface = Critical Surface

==========

INPUT

Apogee Altitude = 556.000 (km)
Perigee Altitude = 556.000 (km)
Orbital Inclination = 46.500 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0157 (m^2/kg)
Initial Mass = 17.500 (kg)
Final Mass = 17.500 (kg)
Station Kept = No
Start Year = 2026.500 (yr)
Duration = 0.250 (yr)
Orientation = Random Tumbling
CS Areal Density = 0.550 (g/cm^2)
CS Surface Area = 0.1610 (m^2)
Vector = (0.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.550 (g/cm^2) Separation: 10.000 (cm)
Outer Wall 2 Density: 0.550 (g/cm^2) Separation: 2.000 (cm)

OUTPUT

Probability of Penetration = 3.2395E-05 (3.2395E-05)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

==========

Spacecraft = Kestrel-SSO-SmallObj
Critical Surface = Critical Surface

==========

INPUT

Apogee Altitude = 556.000 (km)
Perigee Altitude = 556.000 (km)
Orbital Inclination = 97.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0157 (m^2/kg)
Initial Mass = 17.500 (kg)
Final Mass = 17.500 (kg)
Station Kept = No
Start Year = 2026.500 (yr)
Duration = 0.250 (yr)
Orientation = Random Tumbling
CS Areal Density = 0.550 (g/cm^2)
CS Surface Area = 0.1610 (m^2)
Vector = (0.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.550 (g/cm^2) Separation: 10.000 (cm)
Outer Wall 2 Density: 0.550 (g/cm^2) Separation: 2.000 (cm)

OUTPUT

Probability of Penetration = 1.0363E-04 (1.0363E-04)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

==========

Spacecraft = Kestrel-EQ-SmallObj
Critical Surface = Critical Surface

==========

INPUT

Apogee Altitude = 556.000 (km)

Perigee Altitude = 556.000 (km)
Orbital Inclination = 5.000 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass = 0.0157 (m^2/kg)
Initial Mass = 17.500 (kg)
Final Mass = 17.500 (kg)
Station Kept = No
Start Year = 2026.500 (yr)
Duration = 0.250 (yr)
Orientation = Random Tumbling
CS Areal Density = 0.550 (g/cm^2)
CS Surface Area = 0.1610 (m^2)
Vector = (0.000000 (u), 0.000000 (v), 0.000000 (w))
CS Pressurized = No
Outer Wall 1 Density: 0.550 (g/cm^2) Separation: 10.000 (cm)
Outer Wall 2 Density: 0.550 (g/cm^2) Separation: 2.000 (cm)

OUTPUT

Probability of Penetration = 1.2458E-05 (1.2458E-05)
Returned Error Message: Normal Processing
Date Range Error Message: Normal Date Range

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

11 10 2025; 09:37:04AM Processing Requirement 4.6 Return Status : Passed

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

INPUT

Space Structure Name = HE360-MID
Space Structure Type = Payload

Perigee Altitude = 556.000000 (km)
Apogee Altitude = 556.000000 (km)
Inclination = 46.500000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.010267 (m^2/kg)
Start Year = 2026.500000 (yr)

Initial Mass = 33.000000 (kg)
Final Mass = 32.260000 (kg)
Duration = 5.000000 (yr)
Station Kept = False
Abandoned = True
PMD Perigee Altitude = 538.830333 (km)
PMD Apogee Altitude = 539.309096 (km)
PMD Inclination = 46.497610 (deg)
PMD RAAN = 295.850608 (deg)
PMD Argument of Perigee = 214.294757 (deg)
PMD Mean Anomaly = 0.000000 (deg)
Long-Term Reentry = False

OUTPUT

Suggested Perigee Altitude = 538.830333 (km)
Suggested Apogee Altitude = 539.309096 (km)
Returned Error Message = Passes LEO reentry orbit criteria.

Released Year = 2036 (yr)
Requirement = 61
Compliance Status = Pass

==========

INPUT

Space Structure Name = HE360-SSO
Space Structure Type = Payload

Perigee Altitude = 556.000000 (km)
Apogee Altitude = 556.000000 (km)
Inclination = 97.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.010267 (m^2/kg)
Start Year = 2026.500000 (yr)
Initial Mass = 33.000000 (kg)
Final Mass = 32.260000 (kg)
Duration = 5.000000 (yr)
Station Kept = False
Abandoned = True
PMD Perigee Altitude = 537.676119 (km)
PMD Apogee Altitude = 538.687491 (km)
PMD Inclination = 97.035362 (deg)

PMD RAAN = 233.231455 (deg)
PMD Argument of Perigee = 168.770760 (deg)
PMD Mean Anomaly = 0.000000 (deg)
Long-Term Reentry = False

OUTPUT

Suggested Perigee Altitude = 537.676119 (km)
Suggested Apogee Altitude = 538.687491 (km)
Returned Error Message = Passes LEO reentry orbit criteria.

Released Year = 2036 (yr)
Requirement = 61
Compliance Status = Pass

==========

INPUT

Space Structure Name = HE360-EQ
Space Structure Type = Payload

Perigee Altitude = 556.000000 (km)
Apogee Altitude = 556.000000 (km)
Inclination = 5.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.010267 (m^2/kg)
Start Year = 2026.500000 (yr)
Initial Mass = 33.000000 (kg)
Final Mass = 32.260000 (kg)
Duration = 5.000000 (yr)
Station Kept = False
Abandoned = True
PMD Perigee Altitude = 538.287198 (km)
PMD Apogee Altitude = 538.474804 (km)
PMD Inclination = 4.998917 (deg)
PMD RAAN = 313.931469 (deg)
PMD Argument of Perigee = 32.007260 (deg)
PMD Mean Anomaly = 0.000000 (deg)
Long-Term Reentry = False

OUTPUT

Suggested Perigee Altitude = 538.287198 (km)

Suggested Apogee Altitude = 538.474804 (km)
Returned Error Message = Passes LEO reentry orbit criteria.

Released Year = 2036 (yr)
Requirement = 61
Compliance Status = Pass

==========

INPUT

Space Structure Name = Kestrel-MID
Space Structure Type = Payload

Perigee Altitude = 556.000000 (km)
Apogee Altitude = 556.000000 (km)
Inclination = 45.500000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.015738 (m^2/kg)
Start Year = 2026.500000 (yr)
Initial Mass = 18.000000 (kg)
Final Mass = 17.500000 (kg)
Duration = 3.000000 (yr)
Station Kept = False
Abandoned = True
PMD Perigee Altitude = 530.946630 (km)
PMD Apogee Altitude = 532.207033 (km)
PMD Inclination = 45.497263 (deg)
PMD RAAN = 350.558200 (deg)
PMD Argument of Perigee = 78.933784 (deg)
PMD Mean Anomaly = 0.000000 (deg)
Long-Term Reentry = False

OUTPUT

Suggested Perigee Altitude = 530.946630 (km)
Suggested Apogee Altitude = 532.207033 (km)
Returned Error Message = Passes LEO reentry orbit criteria.

Released Year = 2035 (yr)
Requirement = 61
Compliance Status = Pass

==========

INPUT

Space Structure Name = Kestrel-SSO
Space Structure Type = Payload

Perigee Altitude = 556.000000 (km)
Apogee Altitude = 556.000000 (km)
Inclination = 97.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.015738 (m^2/kg)
Start Year = 2026.500000 (yr)
Initial Mass = 18.000000 (kg)
Final Mass = 17.500000 (kg)
Duration = 3.000000 (yr)
Station Kept = False
Abandoned = True
PMD Perigee Altitude = 529.663526 (km)
PMD Apogee Altitude = 530.768151 (km)
PMD Inclination = 97.089004 (deg)
PMD RAAN = 284.520393 (deg)
PMD Argument of Perigee = 165.393698 (deg)
PMD Mean Anomaly = 0.000000 (deg)
Long-Term Reentry = False

OUTPUT

Suggested Perigee Altitude = 529.663526 (km)
Suggested Apogee Altitude = 530.768151 (km)
Returned Error Message = Passes LEO reentry orbit criteria.

Released Year = 2034 (yr)
Requirement = 61
Compliance Status = Pass

==========

INPUT

Space Structure Name = Kestrel-EQ
Space Structure Type = Payload

Perigee Altitude = 556.000000 (km)
Apogee Altitude = 556.000000 (km)

Inclination = 5.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.015738 (m^2/kg)
Start Year = 2026.500000 (yr)
Initial Mass = 18.000000 (kg)
Final Mass = 17.500000 (kg)
Duration = 3.000000 (yr)
Station Kept = False
Abandoned = True
PMD Perigee Altitude = 530.398667 (km)
PMD Apogee Altitude = 530.694486 (km)
PMD Inclination = 4.998853 (deg)
PMD RAAN = 28.568713 (deg)
PMD Argument of Perigee = 344.636524 (deg)
PMD Mean Anomaly = 0.000000 (deg)
Long-Term Reentry = False

OUTPUT

Suggested Perigee Altitude = 530.398667 (km)
Suggested Apogee Altitude = 530.694486 (km)
Returned Error Message = Passes LEO reentry orbit criteria.

Released Year = 2034 (yr)
Requirement = 61
Compliance Status = Pass

==========

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

12 09 2025; 08:14:42AM *********Processing Requirement 4.7-1
Return Status : Passed

**********INPUT****
Item Number = 1

name = HE360-MID
quantity = 1
parent = 0
materialID = 5
type = Box
Aero Mass = 32.259998
Thermal Mass = 32.259998

Diameter/Width = 0.300000
Length = 0.450000
Height = 0.300000

name = HE360-MID-GPS Antenna 1
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.187000
Thermal Mass = 0.187000
Diameter/Width = 0.068000
Length = 0.070000
Height = 0.053000

name = HE360-MID-GPS Antenna 2
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.126000
Thermal Mass = 0.126000
Diameter/Width = 0.070000
Length = 0.022000

name = HE360-MID-GPS Filter
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.040000
Thermal Mass = 0.040000
Diameter/Width = 0.050000
Length = 0.068000
Height = 0.008500

name = HE360-MID-Solar Wings
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.906000
Thermal Mass = 0.906000
Diameter/Width = 0.330000
Length = 0.360000
Height = 0.060000

name = HE360-MID-Z panels
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 7.727500
Thermal Mass = 0.871000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-MID-Radio Enclosures
quantity = 2
parent = 6
materialID = 8
type = Box
Aero Mass = 0.538000
Thermal Mass = 0.538000
Diameter/Width = 0.120000
Length = 0.160000
Height = 0.067000

name = HE360-MID-Wheel Assembly
quantity = 1
parent = 6
materialID = 54
type = Box
Aero Mass = 1.261000
Thermal Mass = 1.261000
Diameter/Width = 0.140000
Length = 0.170000
Height = 0.077000

name = HE360-MID-Battery
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.775000
Thermal Mass = 1.775000
Diameter/Width = 0.083000
Length = 0.181000
Height = 0.080000

name = HE360-MID-Power Supply
quantity = 1

parent = 6
materialID = 8
type = Box
Aero Mass = 0.928000
Thermal Mass = 0.928000
Diameter/Width = 0.082000
Length = 0.240000
Height = 0.071000

name = HE360-MID-GPS Receiver
quantity = 2
parent = 6
materialID = 8
type = Flat Plate
Aero Mass = 0.125000
Thermal Mass = 0.125000
Diameter/Width = 0.072000
Length = 0.120000

name = HE360-MID-Propulsion Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 2.051000
Thermal Mass = 2.051000
Diameter/Width = 0.130000
Length = 0.260000
Height = 0.094000

name = HE360-MID-Rate Sensor Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.134000
Thermal Mass = 0.134000
Diameter/Width = 0.098000
Length = 0.110000
Height = 0.041000

name = HE360-MID-Computer Assembly
quantity = 1
parent = 6
materialID = 8
type = Box

Aero Mass = 0.384000
Thermal Mass = 0.384000
Diameter/Width = 0.090000
Length = 0.200000
Height = 0.080000

name = HE360-MID-Ka-S_Transceiver
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.250000
Thermal Mass = 1.250000
Diameter/Width = 0.112200
Length = 0.115000
Height = 0.083000

name = HE360-MID-Transmitter
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.400000
Thermal Mass = 0.400000
Diameter/Width = 0.090000
Length = 0.095000
Height = 0.029000

name = HE360-MID-LNA Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.934000
Thermal Mass = 0.934000
Diameter/Width = 0.125000
Length = 0.140000
Height = 0.058000

name = HE360-MID-MUX Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.570000
Thermal Mass = 1.570000

Diameter/Width = 0.125000
Length = 0.150000
Height = 0.080000

name = HE360-MID-SDR1 Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.335000
Thermal Mass = 0.335000
Diameter/Width = 0.094000
Length = 0.110000
Height = 0.044000

name = HE360-MID-SDR2 Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.030000
Thermal Mass = 1.030000
Diameter/Width = 0.108000
Length = 0.166000
Height = 0.079000

name = HE360-MID-LNB Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.335000
Thermal Mass = 0.335000
Diameter/Width = 0.097000
Length = 0.110000
Height = 0.046000

name = HE360-MID-Wing Deployer
quantity = 2
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.325000
Thermal Mass = 0.325000
Diameter/Width = 0.350000
Length = 0.200000

name = HE360-MID-X Panels
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 1.093000
Thermal Mass = 1.093000
Diameter/Width = 0.300000
Length = 0.450000

name = HE360-MID-Y Panels
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 1.609500
Thermal Mass = 1.609500
Diameter/Width = 0.300000
Length = 0.450000
Height = 0.062000

name = HE360-MID-Tray-X
quantity = 2
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 0.836000
Thermal Mass = 0.836000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-MID-Tray-Z
quantity = 1
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 0.970000
Thermal Mass = 0.970000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-MID-Startracker
quantity = 1
parent = 1
materialID = 8

type = Box
Aero Mass = 0.447000
Thermal Mass = 0.447000
Diameter/Width = 0.104000
Length = 0.128000
Height = 0.030000

name = HE360-MID-GNSS Antenna
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.255000
Thermal Mass = 0.255000
Diameter/Width = 0.078000
Length = 0.030000

name = HE360-MID-Horn Antenna
quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.120000
Thermal Mass = 0.120000
Diameter/Width = 0.070000
Length = 0.081000

name = HE360-MID-CBS Antenna
quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.714000
Thermal Mass = 0.714000
Diameter/Width = 0.140000
Length = 0.070000

name = HE360-MID-Discone Antenna
quantity = 8
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.013000
Length = 0.715000

name = HE360-MID-Discone Bracket
quantity = 1
parent = 1
materialID = -1
type = Cylinder
Aero Mass = 0.034000
Thermal Mass = 0.034000
Diameter/Width = 0.112000
Length = 0.065000

name = HE360-MID-Sband Antenna
quantity = 1
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.098000
Length = 0.098000

name = HE360-MID-S_Ka-band Antenna
quantity = 1
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.235000
Thermal Mass = 0.235000
Diameter/Width = 0.120000
Length = 0.195500

name = HE360-MID-UHF Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.021000
Thermal Mass = 0.021000
Diameter/Width = 0.013000
Length = 0.177000

name = HE360-MID-VHF Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate

Aero Mass = 0.054000
Thermal Mass = 0.054000
Diameter/Width = 0.013000
Length = 0.460000

name = HE360-MID-Whip Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.029000
Thermal Mass = 0.029000
Diameter/Width = 0.013000
Length = 0.250000

name = HE360-MID-S-Band Uplink Antenna
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.030000
Thermal Mass = 0.030000
Diameter/Width = 0.055000
Length = 0.055000

name = HE360-MID-X-Band Antenna
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.080000
Thermal Mass = 0.080000
Diameter/Width = 0.060000
Length = 0.120000

name = HE360-MID-Self-imager
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.200000
Thermal Mass = 0.200000
Diameter/Width = 0.080000
Length = 0.080000
Height = 0.040000

name = HE360-MID-Separation Ring
quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.444000
Thermal Mass = 0.444000
Diameter/Width = 0.252000
Length = 0.100000

name = HE360-MID-X-band-2-Antenna
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.025000
Thermal Mass = 0.025000
Diameter/Width = 0.040000
Length = 0.070000
Height = 0.006000

name = HE360-MID-RF-Switch
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.184000
Thermal Mass = 0.184000
Diameter/Width = 0.044000
Length = 0.089000
Height = 0.022000

name = HE360-MID S-band Uplink Antenna Bracket
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.035000
Thermal Mass = 0.035000
Diameter/Width = 0.057000
Length = 0.070000
Height = 0.030000

**********OUTPUT****
Item Number = 1

name = HE360-MID
Demise Altitude = 77.996915
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-GPS Antenna 1
Demise Altitude = 77.210163
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-GPS Antenna 2
Demise Altitude = 76.572468
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-GPS Filter
Demise Altitude = 77.645375
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Solar Wings
Demise Altitude = 77.477320
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Z panels
Demise Altitude = 77.258574
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Radio Enclosures
Demise Altitude = 76.438658
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Wheel Assembly
Demise Altitude = 70.536408
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Battery
Demise Altitude = 74.852894
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Power Supply
Demise Altitude = 76.141747
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-GPS Receiver
Demise Altitude = 76.668766
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Propulsion Assembly
Demise Altitude = 75.519086
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Rate Sensor Assembly
Demise Altitude = 76.889408
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Computer Assembly
Demise Altitude = 76.769342
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Ka-S_Transceiver
Demise Altitude = 74.953438
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Transmitter
Demise Altitude = 75.824742

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-LNA Subassembly
Demise Altitude = 75.590537
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-MUX Subassembly
Demise Altitude = 74.979910
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-SDR1 Subassembly
Demise Altitude = 76.352853
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-SDR2 Subassembly
Demise Altitude = 75.830225
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-LNB Subassembly
Demise Altitude = 76.377432
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Wing Deployer
Demise Altitude = 0.000000
Debris Casualty Area = 1.430400
Impact Kinetic Energy = 12.125870

****
name = HE360-MID-X Panels
Demise Altitude = 77.338924
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = HE360-MID-Y Panels
Demise Altitude = 77.232899
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Tray-X
Demise Altitude = 76.113942
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Tray-Z
Demise Altitude = 75.806373
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Startracker
Demise Altitude = 76.831299
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-GNSS Antenna
Demise Altitude = 76.022583
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Horn Antenna
Demise Altitude = 76.413061
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-CBS Antenna
Demise Altitude = 72.947022
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Discone Antenna
Demise Altitude = 77.948182
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Discone Bracket
Demise Altitude = 77.806992
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Sband Antenna
Demise Altitude = 76.725464
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-S_Ka-band Antenna
Demise Altitude = 76.642666
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-UHF Antenna
Demise Altitude = 77.024295
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-VHF Antenna
Demise Altitude = 77.036046
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Whip Antenna
Demise Altitude = 77.047817
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-S-Band Uplink Antenna
Demise Altitude = 77.033072
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-X-Band Antenna
Demise Altitude = 76.843672

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Self-imager
Demise Altitude = 75.948290
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-Separation Ring
Demise Altitude = 76.534215
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-X-band-2-Antenna
Demise Altitude = 77.736768
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID-RF-Switch
Demise Altitude = 76.948870
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-MID S-band Uplink Antenna Bracket
Demise Altitude = 77.799244
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

**********INPUT****
 Item Number = 2

name = HE360-SSO
quantity = 1
parent = 0
materialID = 5
type = Box
Aero Mass = 32.259998
Thermal Mass = 32.259998
Diameter/Width = 0.300000

Length = 0.450000
Height = 0.300000

name = HE360-SSO-GPS Antenna 1
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.187000
Thermal Mass = 0.187000
Diameter/Width = 0.068000
Length = 0.070000
Height = 0.053000

name = HE360-SSO-GPS Antenna 2
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.126000
Thermal Mass = 0.126000
Diameter/Width = 0.070000
Length = 0.022000

name = HE360-SSO-GPS Filter
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.040000
Thermal Mass = 0.040000
Diameter/Width = 0.050000
Length = 0.068000
Height = 0.008500

name = HE360-SSO-Solar Wings
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.906000
Thermal Mass = 0.906000
Diameter/Width = 0.330000
Length = 0.360000
Height = 0.060000

name = HE360-SSO-Z panels
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 7.727500
Thermal Mass = 0.871000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-SSO-Radio Enclosures
quantity = 2
parent = 6
materialID = 8
type = Box
Aero Mass = 0.538000
Thermal Mass = 0.538000
Diameter/Width = 0.120000
Length = 0.160000
Height = 0.067000

name = HE360-SSO-Wheel Assembly
quantity = 1
parent = 6
materialID = 54
type = Box
Aero Mass = 1.261000
Thermal Mass = 1.261000
Diameter/Width = 0.140000
Length = 0.170000
Height = 0.077000

name = HE360-SSO-Battery
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.775000
Thermal Mass = 1.775000
Diameter/Width = 0.083000
Length = 0.181000
Height = 0.080000

name = HE360-SSO-Power Supply
quantity = 1
parent = 6

materialID = 8
type = Box
Aero Mass = 0.928000
Thermal Mass = 0.928000
Diameter/Width = 0.082000
Length = 0.240000
Height = 0.071000

name = HE360-SSO-GPS Receiver
quantity = 2
parent = 6
materialID = 8
type = Flat Plate
Aero Mass = 0.125000
Thermal Mass = 0.125000
Diameter/Width = 0.072000
Length = 0.120000

name = HE360-SSO-Propulsion Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 2.051000
Thermal Mass = 2.051000
Diameter/Width = 0.130000
Length = 0.260000
Height = 0.094000

name = HE360-SSO-Rate Sensor Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.134000
Thermal Mass = 0.134000
Diameter/Width = 0.098000
Length = 0.110000
Height = 0.041000

name = HE360-SSO-Computer Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.384000

Thermal Mass = 0.384000
Diameter/Width = 0.090000
Length = 0.200000
Height = 0.080000

name = HE360-SSO-Ka-S_Transceiver
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.250000
Thermal Mass = 1.250000
Diameter/Width = 0.112200
Length = 0.115000
Height = 0.083000

name = HE360-SSO-Transmitter
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.400000
Thermal Mass = 0.400000
Diameter/Width = 0.090000
Length = 0.095000
Height = 0.029000

name = HE360-SSO-LNA Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.934000
Thermal Mass = 0.934000
Diameter/Width = 0.125000
Length = 0.140000
Height = 0.058000

name = HE360-SSO-MUX Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.570000
Thermal Mass = 1.570000
Diameter/Width = 0.125000

Length = 0.150000
Height = 0.080000

name = HE360-SSO-SDR1 Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.335000
Thermal Mass = 0.335000
Diameter/Width = 0.094000
Length = 0.110000
Height = 0.044000

name = HE360-SSO-SDR2 Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.030000
Thermal Mass = 1.030000
Diameter/Width = 0.108000
Length = 0.166000
Height = 0.079000

name = HE360-SSO-LNB Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.335000
Thermal Mass = 0.335000
Diameter/Width = 0.097000
Length = 0.110000
Height = 0.046000

name = HE360-SSO-Wing Deployer
quantity = 2
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.325000
Thermal Mass = 0.325000
Diameter/Width = 0.350000
Length = 0.200000

name = HE360-SSO-X Panels
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 1.093000
Thermal Mass = 1.093000
Diameter/Width = 0.300000
Length = 0.450000

name = HE360-SSO-Y Panels
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 1.609500
Thermal Mass = 1.609500
Diameter/Width = 0.300000
Length = 0.450000
Height = 0.062000

name = HE360-SSO-Tray-X
quantity = 2
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 0.836000
Thermal Mass = 0.836000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-SSO-Tray-Z
quantity = 1
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 0.970000
Thermal Mass = 0.970000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-SSO-Startracker
quantity = 1
parent = 1
materialID = 8
type = Box

Aero Mass = 0.447000
Thermal Mass = 0.447000
Diameter/Width = 0.104000
Length = 0.128000
Height = 0.030000

name = HE360-SSO-GNSS Antenna
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.255000
Thermal Mass = 0.255000
Diameter/Width = 0.078000
Length = 0.030000

name = HE360-SSO-Horn Antenna
quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.120000
Thermal Mass = 0.120000
Diameter/Width = 0.070000
Length = 0.081000

name = HE360-SSO-CBS Antenna
quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.714000
Thermal Mass = 0.714000
Diameter/Width = 0.140000
Length = 0.070000

name = HE360-SSO-Discone Antenna
quantity = 8
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.013000
Length = 0.715000

name = HE360-SSO-Discone Bracket
quantity = 1
parent = 1
materialID = -1
type = Cylinder
Aero Mass = 0.034000
Thermal Mass = 0.034000
Diameter/Width = 0.112000
Length = 0.065000

name = HE360-SSO-Sband Antenna
quantity = 1
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.098000
Length = 0.098000

name = HE360-SSO-S_Ka-band Antenna
quantity = 1
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.235000
Thermal Mass = 0.235000
Diameter/Width = 0.120000
Length = 0.195500

name = HE360-SSO-UHF Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.021000
Thermal Mass = 0.021000
Diameter/Width = 0.013000
Length = 0.177000

name = HE360-SSO-VHF Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.054000

Thermal Mass = 0.054000
Diameter/Width = 0.013000
Length = 0.460000

name = HE360-SSO-Whip Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.029000
Thermal Mass = 0.029000
Diameter/Width = 0.013000
Length = 0.250000

name = HE360-SSO-S-Band Uplink Antenna
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.030000
Thermal Mass = 0.030000
Diameter/Width = 0.055000
Length = 0.055000

name = HE360-SSO-X-Band Antenna
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.080000
Thermal Mass = 0.080000
Diameter/Width = 0.060000
Length = 0.120000

name = HE360-SSO-Self-imager
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.200000
Thermal Mass = 0.200000
Diameter/Width = 0.080000
Length = 0.080000
Height = 0.040000

name = HE360-SSO-Separation Ring

quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.444000
Thermal Mass = 0.444000
Diameter/Width = 0.252000
Length = 0.100000

name = HE360-SSO-X-band-2-Antenna
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.025000
Thermal Mass = 0.025000
Diameter/Width = 0.040000
Length = 0.070000
Height = 0.006000

name = HE360-SSO-RF-Switch
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.184000
Thermal Mass = 0.184000
Diameter/Width = 0.044000
Length = 0.089000
Height = 0.022000

name = HE360-SSO S-band Uplink Antenna Bracket
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.035000
Thermal Mass = 0.035000
Diameter/Width = 0.057000
Length = 0.070000
Height = 0.030000

**********OUTPUT****
Item Number = 2

name = HE360-SSO

Demise Altitude = 77.999975
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-GPS Antenna 1
Demise Altitude = 77.315793
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-GPS Antenna 2
Demise Altitude = 76.744071
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-GPS Filter
Demise Altitude = 77.690671
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Solar Wings
Demise Altitude = 77.558244
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Z panels
Demise Altitude = 77.354223
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Radio Enclosures
Demise Altitude = 76.638141
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Wheel Assembly
Demise Altitude = 71.952856
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Battery
Demise Altitude = 75.240531
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Power Supply
Demise Altitude = 76.380560
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-GPS Receiver
Demise Altitude = 76.835524
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Propulsion Assembly
Demise Altitude = 75.839525
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Rate Sensor Assembly
Demise Altitude = 77.030298
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Computer Assembly
Demise Altitude = 76.926149
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Ka-S_Transceiver
Demise Altitude = 75.341852
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Transmitter
Demise Altitude = 76.103407
Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-LNA Subassembly
Demise Altitude = 75.898660
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-MUX Subassembly
Demise Altitude = 75.361848
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-SDR1 Subassembly
Demise Altitude = 76.563372
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-SDR2 Subassembly
Demise Altitude = 76.102709
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-LNB Subassembly
Demise Altitude = 76.582140
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Wing Deployer
Demise Altitude = 77.096446
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-X Panels
Demise Altitude = 77.434232
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Y Panels

Demise Altitude = 77.343877
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Tray-X
Demise Altitude = 76.391170
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Tray-Z
Demise Altitude = 76.134391
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Startracker
Demise Altitude = 76.983199
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-GNSS Antenna
Demise Altitude = 76.254247
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Horn Antenna
Demise Altitude = 76.612204
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-CBS Antenna
Demise Altitude = 73.578504
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Discone Antenna
Demise Altitude = 77.958144
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Discone Bracket
Demise Altitude = 77.832957
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Sband Antenna
Demise Altitude = 76.891786
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-S_Ka-band Antenna
Demise Altitude = 76.825800
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-UHF Antenna
Demise Altitude = 77.181604
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-VHF Antenna
Demise Altitude = 77.193510
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Whip Antenna
Demise Altitude = 77.199596
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-S-Band Uplink Antenna
Demise Altitude = 77.156875
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-X-Band Antenna
Demise Altitude = 76.993976
Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Self-imager
Demise Altitude = 76.211568
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-Separation Ring
Demise Altitude = 76.721447
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-X-band-2-Antenna
Demise Altitude = 77.772860
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO-RF-Switch
Demise Altitude = 77.079144
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-SSO S-band Uplink Antenna Bracket
Demise Altitude = 77.825467
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

**********INPUT****
Item Number = 3

name = HE360-EQ
quantity = 1
parent = 0
materialID = 5
type = Box
Aero Mass = 32.259998
Thermal Mass = 32.259998
Diameter/Width = 0.300000
Length = 0.450000

Height = 0.300000

name = HE360-EQ-GPS Antenna 1
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.187000
Thermal Mass = 0.187000
Diameter/Width = 0.068000
Length = 0.070000
Height = 0.053000

name = HE360-EQ-GPS Antenna 2
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.126000
Thermal Mass = 0.126000
Diameter/Width = 0.070000
Length = 0.022000

name = HE360-EQ-GPS Filter
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.040000
Thermal Mass = 0.040000
Diameter/Width = 0.050000
Length = 0.068000
Height = 0.008500

name = HE360-EQ-Solar Wings
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.906000
Thermal Mass = 0.906000
Diameter/Width = 0.330000
Length = 0.360000
Height = 0.060000

name = HE360-EQ-Z panels

quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 9.048500
Thermal Mass = 0.871000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-EQ-Radio Enclosures
quantity = 2
parent = 6
materialID = 8
type = Box
Aero Mass = 0.538000
Thermal Mass = 0.538000
Diameter/Width = 0.120000
Length = 0.160000
Height = 0.067000

name = HE360-EQ-Tray-X
quantity = 2
parent = 6
materialID = 9
type = Flat Plate
Aero Mass = 0.836000
Thermal Mass = 0.836000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-EQ-Tray-Z
quantity = 1
parent = 6
materialID = 9
type = Flat Plate
Aero Mass = 0.970000
Thermal Mass = 0.970000
Diameter/Width = 0.300000
Length = 0.300000

name = HE360-EQ-Wheel Assembly
quantity = 1
parent = 6
materialID = 54
type = Box
Aero Mass = 1.261000

Thermal Mass = 1.261000
Diameter/Width = 0.140000
Length = 0.170000
Height = 0.077000

name = HE360-EQ-Battery
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.775000
Thermal Mass = 1.775000
Diameter/Width = 0.083000
Length = 0.181000
Height = 0.080000

name = HE360-EQ-Power Supply
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.928000
Thermal Mass = 0.928000
Diameter/Width = 0.082000
Length = 0.240000
Height = 0.071000

name = HE360-EQ-GPS Receiver
quantity = 2
parent = 6
materialID = 8
type = Flat Plate
Aero Mass = 0.125000
Thermal Mass = 0.125000
Diameter/Width = 0.072000
Length = 0.120000

name = HE360-EQ-Propulsion Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 2.051000
Thermal Mass = 2.051000
Diameter/Width = 0.130000
Length = 0.260000

Height = 0.094000

name = HE360-EQ-Rate Sensor Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.134000
Thermal Mass = 0.134000
Diameter/Width = 0.098000
Length = 0.110000
Height = 0.041000

name = HE360-EQ-Computer Assembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.384000
Thermal Mass = 0.384000
Diameter/Width = 0.090000
Length = 0.200000
Height = 0.080000

name = HE360-EQ-Ka-S_Transceiver
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.250000
Thermal Mass = 1.250000
Diameter/Width = 0.112200
Length = 0.115000
Height = 0.083000

name = HE360-EQ-Transmitter
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.400000
Thermal Mass = 0.400000
Diameter/Width = 0.090000
Length = 0.095000
Height = 0.029000

name = HE360-EQ-LNA Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.934000
Thermal Mass = 0.934000
Diameter/Width = 0.125000
Length = 0.140000
Height = 0.058000

name = HE360-EQ-MUX Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.570000
Thermal Mass = 1.570000
Diameter/Width = 0.125000
Length = 0.150000
Height = 0.080000

name = HE360-EQ-SDR1 Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 0.335000
Thermal Mass = 0.335000
Diameter/Width = 0.094000
Length = 0.110000
Height = 0.044000

name = HE360-EQ-SDR2 Subassembly
quantity = 1
parent = 6
materialID = 8
type = Box
Aero Mass = 1.030000
Thermal Mass = 1.030000
Diameter/Width = 0.108000
Length = 0.166000
Height = 0.079000

name = HE360-EQ-LNB Subassembly
quantity = 1

parent = 6
materialID = 8
type = Box
Aero Mass = 0.335000
Thermal Mass = 0.335000
Diameter/Width = 0.097000
Length = 0.110000
Height = 0.046000

name = HE360-EQ-Wing Deployer
quantity = 2
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.325000
Thermal Mass = 0.325000
Diameter/Width = 0.350000
Length = 0.200000

name = HE360-EQ-X Panels
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 1.093000
Thermal Mass = 1.093000
Diameter/Width = 0.300000
Length = 0.450000

name = HE360-EQ-Y Panels
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 1.609500
Thermal Mass = 1.609500
Diameter/Width = 0.300000
Length = 0.450000
Height = 0.062000

name = HE360-EQ-Startracker
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.447000

Thermal Mass = 0.447000
Diameter/Width = 0.104000
Length = 0.128000
Height = 0.030000

name = HE360-EQ-GNSS Antenna
quantity = 1
parent = 1
materialID = 8
type = Cylinder
Aero Mass = 0.255000
Thermal Mass = 0.255000
Diameter/Width = 0.078000
Length = 0.030000

name = HE360-EQ-Horn Antenna
quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.120000
Thermal Mass = 0.120000
Diameter/Width = 0.070000
Length = 0.081000

name = HE360-EQ-CBS Antenna
quantity = 1
parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.714000
Thermal Mass = 0.714000
Diameter/Width = 0.140000
Length = 0.070000

name = HE360-EQ-Discone Antenna
quantity = 8
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.013000
Length = 0.715000

name = HE360-EQ-Discone Bracket

quantity = 1
parent = 1
materialID = -1
type = Cylinder
Aero Mass = 0.034000
Thermal Mass = 0.034000
Diameter/Width = 0.112000
Length = 0.065000

name = HE360-EQ-Sband Antenna
quantity = 1
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.100000
Thermal Mass = 0.100000
Diameter/Width = 0.098000
Length = 0.098000

name = HE360-EQ-S_Ka-band Antenna
quantity = 1
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.235000
Thermal Mass = 0.235000
Diameter/Width = 0.120000
Length = 0.195500

name = HE360-EQ-UHF Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.021000
Thermal Mass = 0.021000
Diameter/Width = 0.013000
Length = 0.177000

name = HE360-EQ-VHF Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.054000
Thermal Mass = 0.054000

Diameter/Width = 0.013000
Length = 0.460000

name = HE360-EQ-Whip Antenna
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.029000
Thermal Mass = 0.029000
Diameter/Width = 0.013000
Length = 0.250000

name = HE360-EQ-S-Band Uplink Antenna
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.030000
Thermal Mass = 0.030000
Diameter/Width = 0.055000
Length = 0.055000

name = HE360-EQ-X-Band Antenna
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.080000
Thermal Mass = 0.080000
Diameter/Width = 0.060000
Length = 0.120000

name = HE360-EQ-Self-imager
quantity = 1
parent = 1
materialID = 5
type = Box
Aero Mass = 0.200000
Thermal Mass = 0.200000
Diameter/Width = 0.080000
Length = 0.080000
Height = 0.040000

name = HE360-EQ-Separation Ring
quantity = 1

parent = 1
materialID = 5
type = Cylinder
Aero Mass = 0.444000
Thermal Mass = 0.444000
Diameter/Width = 0.252000
Length = 0.100000

name = HE360-EQ-X-band-2-Antenna
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.025000
Thermal Mass = 0.025000
Diameter/Width = 0.040000
Length = 0.070000
Height = 0.006000

name = HE360-EQ-RF-Switch
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.184000
Thermal Mass = 0.184000
Diameter/Width = 0.044000
Length = 0.089000
Height = 0.022000

name = HE360-IQ S-band Uplink Antenna Bracket
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.035000
Thermal Mass = 0.035000
Diameter/Width = 0.057000
Length = 0.070000
Height = 0.030000

**********OUTPUT****
Item Number = 3

name = HE360-EQ
Demise Altitude = 77.996991

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-GPS Antenna 1
Demise Altitude = 77.174567
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-GPS Antenna 2
Demise Altitude = 76.505074
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-GPS Filter
Demise Altitude = 77.624882
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Solar Wings
Demise Altitude = 77.449120
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Z panels
Demise Altitude = 77.221636
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Radio Enclosures
Demise Altitude = 76.361218
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Tray-X
Demise Altitude = 75.214014
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = HE360-EQ-Tray-Z
Demise Altitude = 74.889307
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Wheel Assembly
Demise Altitude = 69.814783
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Battery
Demise Altitude = 74.695334
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Power Supply
Demise Altitude = 76.049469
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-GPS Receiver
Demise Altitude = 76.600296
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Propulsion Assembly
Demise Altitude = 75.395494
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Rate Sensor Assembly
Demise Altitude = 76.835363
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Computer Assembly
Demise Altitude = 76.711099
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Ka-S_Transceiver
Demise Altitude = 74.808138
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Transmitter
Demise Altitude = 75.717305
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-LNA Subassembly
Demise Altitude = 75.466376
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-MUX Subassembly
Demise Altitude = 74.827896
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-SDR1 Subassembly
Demise Altitude = 76.270418
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-SDR2 Subassembly
Demise Altitude = 75.722709
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-LNB Subassembly
Demise Altitude = 76.294721
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Wing Deployer
Demise Altitude = 0.000000

Debris Casualty Area = 1.430400
Impact Kinetic Energy = 12.125902

****
name = HE360-EQ-X Panels
Demise Altitude = 77.301812
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Y Panels
Demise Altitude = 77.191657
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Startracker
Demise Altitude = 76.772376
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-GNSS Antenna
Demise Altitude = 75.930981
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Horn Antenna
Demise Altitude = 76.335411
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-CBS Antenna
Demise Altitude = 72.682626
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Discone Antenna
Demise Altitude = 77.946341
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = HE360-EQ-Discone Bracket
Demise Altitude = 77.800185
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Sband Antenna
Demise Altitude = 76.662541
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-S_Ka-band Antenna
Demise Altitude = 76.568882
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-UHF Antenna
Demise Altitude = 76.958567
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-VHF Antenna
Demise Altitude = 76.970197
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Whip Antenna
Demise Altitude = 76.981849
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-S-Band Uplink Antenna
Demise Altitude = 76.983684
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-X-Band Antenna
Demise Altitude = 76.790969
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Self-imager
Demise Altitude = 75.843917
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-Separation Ring
Demise Altitude = 76.455603
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-X-band-2-Antenna
Demise Altitude = 77.725645
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-EQ-RF-Switch
Demise Altitude = 76.894048
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = HE360-IQ S-band Uplink Antenna Bracket
Demise Altitude = 77.786896
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

**********INPUT****
Item Number = 4

name = Kestrel-MID
quantity = 1
parent = 0
materialID = 8
type = Box
Aero Mass = 17.500000
Thermal Mass = 17.500000
Diameter/Width = 0.301100
Length = 0.535500
Height = 0.136000

name = Kestrel-MID-Xp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.220558
Thermal Mass = 0.215088
Diameter/Width = 0.109000
Length = 0.247000
Height = 0.008000

name = Kestrel-MID-Compact Magnetometer
quantity = 1
parent = 2
materialID = 8
type = Box
Aero Mass = 0.005470
Thermal Mass = 0.005470
Diameter/Width = 0.024000
Length = 0.024000
Height = 0.007280

name = Kestrel-MID-Xm Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.332285
Thermal Mass = 0.332285
Diameter/Width = 0.109000
Length = 0.247000
Height = 0.008000

name = Kestrel-MID-Yp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 8.674983
Thermal Mass = 1.255979
Diameter/Width = 0.247000
Length = 0.454000
Height = 0.045000

name = Kestrel-MID-TTAC

quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.471514
Thermal Mass = 0.471514
Diameter/Width = 0.096000
Length = 0.129000
Height = 0.039420

name = Kestrel-MID-Propulsion Unit-A
quantity = 1
parent = 5
materialID = 37
type = Box
Aero Mass = 1.692078
Thermal Mass = 1.692078
Diameter/Width = 0.109000
Length = 0.114900
Height = 0.105000

name = Kestrel-MID-Propulsion Unit-B
quantity = 1
parent = 5
materialID = 37
type = Box
Aero Mass = 1.420853
Thermal Mass = 1.420853
Diameter/Width = 0.109000
Length = 0.114900
Height = 0.105000

name = Kestrel-MID-Battery Unit
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.375061
Thermal Mass = 0.375061
Diameter/Width = 0.084300
Length = 0.094500
Height = 0.023000

name = Kestrel-MID-OBC
quantity = 1
parent = 5

materialID = 8
type = Box
Aero Mass = 0.357157
Thermal Mass = 0.357157
Diameter/Width = 0.090900
Length = 0.111000
Height = 0.023700

name = Kestrel-MID-SDR Payload
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.544965
Thermal Mass = 0.544965
Diameter/Width = 0.096400
Length = 0.111600
Height = 0.052400

name = Kestrel-MID-RF MUX
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.326509
Thermal Mass = 0.326509
Diameter/Width = 0.088807
Length = 0.129000
Height = 0.023924

name = Kestrel-MID-EPS
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.235545
Thermal Mass = 0.235545
Diameter/Width = 0.088812
Length = 0.129000
Height = 0.019152

name = Kestrel-MID-DSN Filter
quantity = 1
parent = 5
materialID = 23
type = Box

Aero Mass = 0.062842
Thermal Mass = 0.062842
Diameter/Width = 0.059000
Length = 0.076500
Height = 0.015000

name = Kestrel-MID-Backplane
quantity = 1
parent = 5
materialID = 8
type = Flat Plate
Aero Mass = 0.313653
Thermal Mass = 0.313653
Diameter/Width = 0.220300
Length = 0.365999

name = Kestrel-MID-Reaction Wheel Pyramid
quantity = 1
parent = 5
materialID = 38
type = Box
Aero Mass = 0.840247
Thermal Mass = 0.840247
Diameter/Width = 0.090560
Length = 0.096800
Height = 0.059176

name = Kestrel-MID-X-band Transmitter
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.473748
Thermal Mass = 0.473748
Diameter/Width = 0.090420
Length = 0.134250
Height = 0.033550

name = Kestrel-MID-ADCC
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.304832
Thermal Mass = 0.304832
Diameter/Width = 0.098000

Length = 0.132000
Height = 0.032583

name = Kestrel-MID-Ym Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.906780
Thermal Mass = 0.906780
Diameter/Width = 0.247000
Length = 0.454000
Height = 0.015400

name = Kestrel-MID-Zp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.508240
Thermal Mass = 0.451041
Diameter/Width = 0.086200
Length = 0.448000
Height = 0.026300

name = Kestrel-MID-Earth Sensor
quantity = 1
parent = 20
materialID = 38
type = Box
Aero Mass = 0.057198
Thermal Mass = 0.057198
Diameter/Width = 0.038600
Length = 0.080000
Height = 0.037500

name = Kestrel-MID-Zm Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.656755
Thermal Mass = 0.522628
Diameter/Width = 0.086200
Length = 0.448000
Height = 0.053500

name = Kestrel-MID-Magnetorquer
quantity = 3
parent = 22
materialID = 8
type = Box
Aero Mass = 0.031000
Thermal Mass = 0.031000
Diameter/Width = 0.010500
Length = 0.100000
Height = 0.010500

name = Kestrel-MID-Sun Sensor
quantity = 2
parent = 22
materialID = 38
type = Box
Aero Mass = 0.014660
Thermal Mass = 0.014660
Diameter/Width = 0.024000
Length = 0.035000
Height = 0.021680

name = Kestrel-MID-Bracketry
quantity = 1
parent = 22
materialID = 8
type = Box
Aero Mass = 0.011807
Thermal Mass = 0.011807
Diameter/Width = 0.015000
Length = 0.100000
Height = 0.003000

name = Kestrel-MID-GPS antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.278014
Thermal Mass = 0.278014
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.035376

name = Kestrel-MID-NegZ Bus SRX Antenna

quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.226218
Thermal Mass = 0.226218
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.025716

name = Kestrel-MID-PosZ Bus SRX Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.204324
Thermal Mass = 0.204324
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.025700

name = Kestrel-MID-NegZ L-Band Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.380272
Thermal Mass = 0.380272
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.051921

name = Kestrel-MID-PosZ S-Band Antnenna
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.311402
Thermal Mass = 0.311402
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.044400

name = Kestrel-MID-CBS Antenna
quantity = 1
parent = 1

materialID = 8
type = Box
Aero Mass = 0.490795
Thermal Mass = 0.490795
Diameter/Width = 0.098000
Length = 0.104800
Height = 0.080000

name = Kestrel-MID-Horn Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.399176
Thermal Mass = 0.399176
Diameter/Width = 0.098000
Length = 0.106000
Height = 0.080000

name = Kestrel-MID-X-Band Array Antenna (2x2)
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.022911
Thermal Mass = 0.022911
Diameter/Width = 0.060004
Length = 0.060004

name = Kestrel-MID-X-band Array Antenna (Singal)
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.002294
Thermal Mass = 0.002294
Diameter/Width = 0.025000
Length = 0.025000

name = Kestrel-MID-Deployable Magnetometer
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.016310
Thermal Mass = 0.016310

Diameter/Width = 0.017000
Length = 0.082000
Height = 0.009600

name = Kestrel-MID-Fixed Solar Panel
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.608260
Thermal Mass = 0.608260
Diameter/Width = 0.194316
Length = 0.399499

name = Kestrel-MID-Solar Panel Wing
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.879944
Thermal Mass = 0.879944
Diameter/Width = 0.187450
Length = 0.390000

name = Kestrel-MID-StarTracker
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.100916
Thermal Mass = 0.100916
Diameter/Width = 0.056695
Length = 0.061300
Height = 0.045000

name = Kestrel-MID-Deployable Whip Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.024341
Thermal Mass = 0.024341
Diameter/Width = 0.022800
Length = 0.419914
Height = 0.022000

**********OUTPUT****
Item Number = 4

name = Kestrel-MID
Demise Altitude = 77.999600
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Xp Panel
Demise Altitude = 77.523323
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Compact Magnetometer
Demise Altitude = 77.261634
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Xm Panel
Demise Altitude = 77.263157
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Yp Panel
Demise Altitude = 77.179317
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-TTAC
Demise Altitude = 75.777852
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Propulsion Unit-A
Demise Altitude = 64.176596
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Propulsion Unit-B

Demise Altitude = 65.417283
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Battery Unit
Demise Altitude = 75.357650
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-OBC
Demise Altitude = 75.733663
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-SDR Payload
Demise Altitude = 75.523677
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-RF MUX
Demise Altitude = 76.021514
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-EPS
Demise Altitude = 76.291197
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-DSN Filter
Demise Altitude = 75.933324
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Backplane
Demise Altitude = 76.842083
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Reaction Wheel Pyramid
Demise Altitude = 62.911141
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-X-band Transmitter
Demise Altitude = 75.725483
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-ADCC
Demise Altitude = 76.233284
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Ym Panel
Demise Altitude = 77.287548
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Zp Panel
Demise Altitude = 77.337984
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Earth Sensor
Demise Altitude = 74.498160
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Zm Panel
Demise Altitude = 77.391266
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Magnetorquer
Demise Altitude = 76.881634
Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Sun Sensor
Demise Altitude = 75.516725
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Bracketry
Demise Altitude = 77.139807
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-GPS antenna
Demise Altitude = 76.792135
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-NegZ Bus SRX Antenna
Demise Altitude = 76.905498
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-PosZ Bus SRX Antenna
Demise Altitude = 77.010886
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-NegZ L-Band Antenna
Demise Altitude = 76.592252
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-PosZ S-Band Antnenna
Demise Altitude = 76.763534
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-CBS Antenna

Demise Altitude = 76.671605
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-MID-Horn Antenna
Demise Altitude = 76.926617
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-MID-X-Band Array Antenna (2x2)
Demise Altitude = 77.692025
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-MID-X-band Array Antenna (Singal)
Demise Altitude = 77.866392
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-MID-Deployable Magnetometer
Demise Altitude = 77.711389
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-MID-Fixed Solar Panel
Demise Altitude = 76.183858
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-MID-Solar Panel Wing
Demise Altitude = 75.364807
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-MID-StarTracker
Demise Altitude = 77.322829
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-MID-Deployable Whip Antenna
Demise Altitude = 77.946208
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

**********INPUT****
Item Number = 5

name = Kestrel-SSO
quantity = 1
parent = 0
materialID = 8
type = Box
Aero Mass = 17.500000
Thermal Mass = 17.500000
Diameter/Width = 0.301100
Length = 0.535500
Height = 0.136000

name = Kestrel-SSO-Xp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.220558
Thermal Mass = 0.215088
Diameter/Width = 0.109000
Length = 0.247000
Height = 0.008000

name = Kestrel-SSO-Compact Magnetometer
quantity = 1
parent = 2
materialID = 8
type = Box
Aero Mass = 0.005470
Thermal Mass = 0.005470
Diameter/Width = 0.024000
Length = 0.024000
Height = 0.007280

name = Kestrel-SSO-Xm Panel
quantity = 1

parent = 1
materialID = 8
type = Box
Aero Mass = 0.332285
Thermal Mass = 0.332285
Diameter/Width = 0.109000
Length = 0.247000
Height = 0.008000

name = Kestrel-SSO-Yp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 8.674983
Thermal Mass = 1.255979
Diameter/Width = 0.247000
Length = 0.454000
Height = 0.045000

name = Kestrel-SSO-TTAC
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.471514
Thermal Mass = 0.471514
Diameter/Width = 0.096000
Length = 0.129000
Height = 0.039420

name = Kestrel-SSO-Propulsion Unit-A
quantity = 1
parent = 5
materialID = 37
type = Box
Aero Mass = 1.692078
Thermal Mass = 1.692078
Diameter/Width = 0.109000
Length = 0.114900
Height = 0.105000

name = Kestrel-SSO-Propulsion Unit-B
quantity = 1
parent = 5
materialID = 37

type = Box
Aero Mass = 1.420853
Thermal Mass = 1.420853
Diameter/Width = 0.109000
Length = 0.114900
Height = 0.105000

name = Kestrel-SSO-Battery Unit
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.375061
Thermal Mass = 0.375061
Diameter/Width = 0.084300
Length = 0.094500
Height = 0.023000

name = Kestrel-SSO-OBC
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.357157
Thermal Mass = 0.357157
Diameter/Width = 0.090900
Length = 0.111000
Height = 0.023700

name = Kestrel-SSO-SDR Payload
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.544965
Thermal Mass = 0.544965
Diameter/Width = 0.096400
Length = 0.111600
Height = 0.052400

name = Kestrel-SSO-RF MUX
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.326509

Thermal Mass = 0.326509
Diameter/Width = 0.088807
Length = 0.129000
Height = 0.023924

name = Kestrel-SSO-EPS
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.235545
Thermal Mass = 0.235545
Diameter/Width = 0.088812
Length = 0.129000
Height = 0.019152

name = Kestrel-SSO-DSN Filter
quantity = 1
parent = 5
materialID = 23
type = Box
Aero Mass = 0.062842
Thermal Mass = 0.062842
Diameter/Width = 0.059000
Length = 0.076500
Height = 0.015000

name = Kestrel-SSO-Backplane
quantity = 1
parent = 5
materialID = 8
type = Flat Plate
Aero Mass = 0.313653
Thermal Mass = 0.313653
Diameter/Width = 0.220300
Length = 0.365999

name = Kestrel-SSO-Reaction Wheel Pyramid
quantity = 1
parent = 5
materialID = 38
type = Box
Aero Mass = 0.840247
Thermal Mass = 0.840247
Diameter/Width = 0.090560
Length = 0.096800

Height = 0.059176

name = Kestrel-SSO-X-band Transmitter
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.473748
Thermal Mass = 0.473748
Diameter/Width = 0.090420
Length = 0.134250
Height = 0.033550

name = Kestrel-SSO-ADCC
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.304832
Thermal Mass = 0.304832
Diameter/Width = 0.098000
Length = 0.132000
Height = 0.032583

name = Kestrel-SSO-Ym Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.906780
Thermal Mass = 0.906780
Diameter/Width = 0.247000
Length = 0.454000
Height = 0.015400

name = Kestrel-SSO-Zp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.508240
Thermal Mass = 0.451041
Diameter/Width = 0.086200
Length = 0.448000
Height = 0.026300

name = Kestrel-SSO-Earth Sensor
quantity = 1
parent = 20
materialID = 38
type = Box
Aero Mass = 0.057198
Thermal Mass = 0.057198
Diameter/Width = 0.038600
Length = 0.080000
Height = 0.037500

name = Kestrel-SSO-Zm Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.656755
Thermal Mass = 0.522628
Diameter/Width = 0.086200
Length = 0.448000
Height = 0.053500

name = Kestrel-SSO-Magnetorquer
quantity = 3
parent = 22
materialID = 8
type = Box
Aero Mass = 0.031000
Thermal Mass = 0.031000
Diameter/Width = 0.010500
Length = 0.100000
Height = 0.010500

name = Kestrel-SSO-Sun Sensor
quantity = 2
parent = 22
materialID = 38
type = Box
Aero Mass = 0.014660
Thermal Mass = 0.014660
Diameter/Width = 0.024000
Length = 0.035000
Height = 0.021680

name = Kestrel-SSO-Bracketry
quantity = 1

parent = 22
materialID = 8
type = Box
Aero Mass = 0.011807
Thermal Mass = 0.011807
Diameter/Width = 0.015000
Length = 0.100000
Height = 0.003000

name = Kestrel-SSO-GPS antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.278014
Thermal Mass = 0.278014
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.035376

name = Kestrel-SSO-NegZ Bus SRX Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.226218
Thermal Mass = 0.226218
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.025716

name = Kestrel-SSO-PosZ Bus SRX Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.204324
Thermal Mass = 0.204324
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.025700

name = Kestrel-SSO-NegZ L-Band Antenna
quantity = 1
parent = 1
materialID = 8

type = Box
Aero Mass = 0.380272
Thermal Mass = 0.380272
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.051921

name = Kestrel-SSO-PosZ S-Band Antnenna
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.311402
Thermal Mass = 0.311402
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.044400

name = Kestrel-SSO-CBS Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.490795
Thermal Mass = 0.490795
Diameter/Width = 0.098000
Length = 0.104800
Height = 0.080000

name = Kestrel-SSO-Horn Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.399176
Thermal Mass = 0.399176
Diameter/Width = 0.098000
Length = 0.106000
Height = 0.080000

name = Kestrel-SSO-X-Band Array Antenna (2x2)
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.022911

Thermal Mass = 0.022911
Diameter/Width = 0.060004
Length = 0.060004

name = Kestrel-SSO-X-band Array Antenna (Singal)
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.002294
Thermal Mass = 0.002294
Diameter/Width = 0.025000
Length = 0.025000

name = Kestrel-SSO-Deployable Magnetometer
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.016310
Thermal Mass = 0.016310
Diameter/Width = 0.017000
Length = 0.082000
Height = 0.009600

name = Kestrel-SSO-Fixed Solar Panel
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.608260
Thermal Mass = 0.608260
Diameter/Width = 0.194316
Length = 0.399499

name = Kestrel-SSO-Solar Panel Wing
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.879944
Thermal Mass = 0.879944
Diameter/Width = 0.187450
Length = 0.390000

name = Kestrel-SSO-StarTracker

quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.100916
Thermal Mass = 0.100916
Diameter/Width = 0.056695
Length = 0.061300
Height = 0.045000

name = Kestrel-SSO-Deployable Whip Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.024341
Thermal Mass = 0.024341
Diameter/Width = 0.022800
Length = 0.419914
Height = 0.022000

**********OUTPUT****
Item Number = 5

name = Kestrel-SSO
Demise Altitude = 77.995926
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Xp Panel
Demise Altitude = 77.579430
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Compact Magnetometer
Demise Altitude = 77.350726
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Xm Panel
Demise Altitude = 77.353494
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Yp Panel
Demise Altitude = 77.275990
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-TTAC
Demise Altitude = 76.045026
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Propulsion Unit-A
Demise Altitude = 66.803093
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Propulsion Unit-B
Demise Altitude = 67.972562
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Battery Unit
Demise Altitude = 75.678599
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-OBC
Demise Altitude = 76.007499
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-SDR Payload
Demise Altitude = 75.824327
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-RF MUX
Demise Altitude = 76.255911

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-EPS
Demise Altitude = 76.501565
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-DSN Filter
Demise Altitude = 76.185467
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Backplane
Demise Altitude = 76.985213
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Reaction Wheel Pyramid
Demise Altitude = 66.379297
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-X-band Transmitter
Demise Altitude = 75.999311
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-ADCC
Demise Altitude = 76.449763
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Ym Panel
Demise Altitude = 77.384675
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = Kestrel-SSO-Zp Panel
Demise Altitude = 77.416631
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Earth Sensor
Demise Altitude = 75.576311
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Zm Panel
Demise Altitude = 77.464847
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Magnetorquer
Demise Altitude = 77.018213
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Sun Sensor
Demise Altitude = 76.102223
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Bracketry
Demise Altitude = 77.240543
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-GPS antenna
Demise Altitude = 76.941760
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-NegZ Bus SRX Antenna
Demise Altitude = 77.043516
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-PosZ Bus SRX Antenna
Demise Altitude = 77.130168
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-NegZ L-Band Antenna
Demise Altitude = 76.766145
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-PosZ S-Band Antnenna
Demise Altitude = 76.912493
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-CBS Antenna
Demise Altitude = 76.832700
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Horn Antenna
Demise Altitude = 77.058002
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-X-Band Array Antenna (2x2)
Demise Altitude = 77.725905
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-X-band Array Antenna (Singal)
Demise Altitude = 77.878602
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Deployable Magnetometer
Demise Altitude = 77.746118

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Fixed Solar Panel
Demise Altitude = 76.459831
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Solar Panel Wing
Demise Altitude = 75.724045
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-StarTracker
Demise Altitude = 77.401338
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-SSO-Deployable Whip Antenna
Demise Altitude = 77.947529
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

**********INPUT****
Item Number = 6

name = Kestrel-EQ
quantity = 1
parent = 0
materialID = 8
type = Box
Aero Mass = 17.500000
Thermal Mass = 17.500000
Diameter/Width = 0.301100
Length = 0.535500
Height = 0.136000

name = Kestrel-EQ-Xp Panel
quantity = 1
parent = 1

materialID = 8
type = Box
Aero Mass = 0.220558
Thermal Mass = 0.215088
Diameter/Width = 0.109000
Length = 0.247000
Height = 0.008000

name = Kestrel-EQ-Compact Magnetometer
quantity = 1
parent = 2
materialID = 8
type = Box
Aero Mass = 0.005470
Thermal Mass = 0.005470
Diameter/Width = 0.024000
Length = 0.024000
Height = 0.007280

name = Kestrel-EQ-Xm Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.332285
Thermal Mass = 0.332285
Diameter/Width = 0.109000
Length = 0.247000
Height = 0.008000

name = Kestrel-EQ-Yp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 8.674983
Thermal Mass = 1.255979
Diameter/Width = 0.247000
Length = 0.454000
Height = 0.045000

name = Kestrel-EQ-TTAC
quantity = 1
parent = 5
materialID = 8
type = Box

Aero Mass = 0.471514
Thermal Mass = 0.471514
Diameter/Width = 0.096000
Length = 0.129000
Height = 0.039420

name = Kestrel-EQ-Propulsion Unit-A
quantity = 1
parent = 5
materialID = 37
type = Box
Aero Mass = 1.692078
Thermal Mass = 1.692078
Diameter/Width = 0.109000
Length = 0.114900
Height = 0.105000

name = Kestrel-EQ-Propulsion Unit-B
quantity = 1
parent = 5
materialID = 37
type = Box
Aero Mass = 1.420853
Thermal Mass = 1.420853
Diameter/Width = 0.109000
Length = 0.114900
Height = 0.105000

name = Kestrel-EQ-Battery Unit
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.375061
Thermal Mass = 0.375061
Diameter/Width = 0.084300
Length = 0.094500
Height = 0.023000

name = Kestrel-EQ-OBC
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.357157
Thermal Mass = 0.357157

Diameter/Width = 0.090900
Length = 0.111000
Height = 0.023700

name = Kestrel-EQ-SDR Payload
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.544965
Thermal Mass = 0.544965
Diameter/Width = 0.096400
Length = 0.111600
Height = 0.052400

name = Kestrel-EQ-RF MUX
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.326509
Thermal Mass = 0.326509
Diameter/Width = 0.088807
Length = 0.129000
Height = 0.023924

name = Kestrel-EQ-EPS
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.235545
Thermal Mass = 0.235545
Diameter/Width = 0.088812
Length = 0.129000
Height = 0.019152

name = Kestrel-EQ-DSN Filter
quantity = 1
parent = 5
materialID = 23
type = Box
Aero Mass = 0.062842
Thermal Mass = 0.062842
Diameter/Width = 0.059000
Length = 0.076500

Height = 0.015000

name = Kestrel-EQ-Backplane
quantity = 1
parent = 5
materialID = 8
type = Flat Plate
Aero Mass = 0.313653
Thermal Mass = 0.313653
Diameter/Width = 0.220300
Length = 0.365999

name = Kestrel-EQ-Reaction Wheel Pyramid
quantity = 1
parent = 5
materialID = 38
type = Box
Aero Mass = 0.840247
Thermal Mass = 0.840247
Diameter/Width = 0.090560
Length = 0.096800
Height = 0.059176

name = Kestrel-EQ-X-band Transmitter
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.473748
Thermal Mass = 0.473748
Diameter/Width = 0.090420
Length = 0.134250
Height = 0.033550

name = Kestrel-EQ-ADCC
quantity = 1
parent = 5
materialID = 8
type = Box
Aero Mass = 0.304832
Thermal Mass = 0.304832
Diameter/Width = 0.098000
Length = 0.132000
Height = 0.032583

name = Kestrel-EQ-Ym Panel

quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.906780
Thermal Mass = 0.906780
Diameter/Width = 0.247000
Length = 0.454000
Height = 0.015400

name = Kestrel-EQ-Zp Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.508240
Thermal Mass = 0.451041
Diameter/Width = 0.086200
Length = 0.448000
Height = 0.026300

name = Kestrel-EQ-Earth Sensor
quantity = 1
parent = 20
materialID = 38
type = Box
Aero Mass = 0.057198
Thermal Mass = 0.057198
Diameter/Width = 0.038600
Length = 0.080000
Height = 0.037500

name = Kestrel-EQ-Zm Panel
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.656755
Thermal Mass = 0.522628
Diameter/Width = 0.086200
Length = 0.448000
Height = 0.053500

name = Kestrel-EQ-Magnetorquer
quantity = 3
parent = 22

materialID = 8
type = Box
Aero Mass = 0.031000
Thermal Mass = 0.031000
Diameter/Width = 0.010500
Length = 0.100000
Height = 0.010500

name = Kestrel-EQ-Sun Sensor
quantity = 2
parent = 22
materialID = 38
type = Box
Aero Mass = 0.014660
Thermal Mass = 0.014660
Diameter/Width = 0.024000
Length = 0.035000
Height = 0.021680

name = Kestrel-EQ-Bracketry
quantity = 1
parent = 22
materialID = 8
type = Box
Aero Mass = 0.011807
Thermal Mass = 0.011807
Diameter/Width = 0.015000
Length = 0.100000
Height = 0.003000

name = Kestrel-EQ-GPS antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.278014
Thermal Mass = 0.278014
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.035376

name = Kestrel-EQ-NegZ Bus SRX Antenna
quantity = 1
parent = 1
materialID = 8
type = Box

Aero Mass = 0.226218
Thermal Mass = 0.226218
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.025716

name = Kestrel-EQ-PosZ Bus SRX Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.204324
Thermal Mass = 0.204324
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.025700

name = Kestrel-EQ-NegZ L-Band Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.380272
Thermal Mass = 0.380272
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.051921

name = Kestrel-EQ-PosZ S-Band Antnenna
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.311402
Thermal Mass = 0.311402
Diameter/Width = 0.080000
Length = 0.098000
Height = 0.044400

name = Kestrel-EQ-CBS Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.490795
Thermal Mass = 0.490795

Diameter/Width = 0.098000
Length = 0.104800
Height = 0.080000

name = Kestrel-EQ-Horn Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.399176
Thermal Mass = 0.399176
Diameter/Width = 0.098000
Length = 0.106000
Height = 0.080000

name = Kestrel-EQ-X-Band Array Antenna (2x2)
quantity = 1
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.022911
Thermal Mass = 0.022911
Diameter/Width = 0.060004
Length = 0.060004

name = Kestrel-EQ-X-band Array Antenna (Singal)
quantity = 2
parent = 1
materialID = 8
type = Flat Plate
Aero Mass = 0.002294
Thermal Mass = 0.002294
Diameter/Width = 0.025000
Length = 0.025000

name = Kestrel-EQ-Deployable Magnetometer
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.016310
Thermal Mass = 0.016310
Diameter/Width = 0.017000
Length = 0.082000
Height = 0.009600

name = Kestrel-EQ-Fixed Solar Panel
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.608260
Thermal Mass = 0.608260
Diameter/Width = 0.194316
Length = 0.399499

name = Kestrel-EQ-Solar Panel Wing
quantity = 2
parent = 1
materialID = 5
type = Flat Plate
Aero Mass = 0.879944
Thermal Mass = 0.879944
Diameter/Width = 0.187450
Length = 0.390000

name = Kestrel-EQ-StarTracker
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.100916
Thermal Mass = 0.100916
Diameter/Width = 0.056695
Length = 0.061300
Height = 0.045000

name = Kestrel-EQ-Deployable Whip Antenna
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.024341
Thermal Mass = 0.024341
Diameter/Width = 0.022800
Length = 0.419914
Height = 0.022000

**********OUTPUT****
Item Number = 6

name = Kestrel-EQ

Demise Altitude = 77.996797
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Xp Panel
Demise Altitude = 77.498080
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Compact Magnetometer
Demise Altitude = 77.228525
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Xm Panel
Demise Altitude = 77.222885
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Yp Panel
Demise Altitude = 77.139855
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-TTAC
Demise Altitude = 75.675852
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Propulsion Unit-A
Demise Altitude = 62.805401
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Propulsion Unit-B
Demise Altitude = 64.041859
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Battery Unit
Demise Altitude = 75.238187
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-OBC
Demise Altitude = 75.624919
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-SDR Payload
Demise Altitude = 75.409883
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-RF MUX
Demise Altitude = 75.923797
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-EPS
Demise Altitude = 76.211287
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-DSN Filter
Demise Altitude = 75.830705
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Backplane
Demise Altitude = 76.788658
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Reaction Wheel Pyramid
Demise Altitude = 60.461375
Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-X-band Transmitter
Demise Altitude = 75.616779
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-ADCC
Demise Altitude = 76.154179
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Ym Panel
Demise Altitude = 77.253852
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Zp Panel
Demise Altitude = 77.302936
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Earth Sensor
Demise Altitude = 72.767224
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Zm Panel
Demise Altitude = 77.361724
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Magnetorquer
Demise Altitude = 76.827682
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Sun Sensor

Demise Altitude = 75.121105
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Bracketry
Demise Altitude = 77.095188
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-GPS antenna
Demise Altitude = 76.739316
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-NegZ Bus SRX Antenna
Demise Altitude = 76.857705
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-PosZ Bus SRX Antenna
Demise Altitude = 76.968133
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-NegZ L-Band Antenna
Demise Altitude = 76.528674
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-PosZ S-Band Antnenna
Demise Altitude = 76.704240
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-CBS Antenna
Demise Altitude = 76.606850
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Horn Antenna
Demise Altitude = 76.871611
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-X-Band Array Antenna (2x2)
Demise Altitude = 77.676440
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-X-band Array Antenna (Singal)
Demise Altitude = 77.860084
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Deployable Magnetometer
Demise Altitude = 77.695310
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Fixed Solar Panel
Demise Altitude = 76.064163
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Solar Panel Wing
Demise Altitude = 75.228545
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-StarTracker
Demise Altitude = 77.287923
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Kestrel-EQ-Deployable Whip Antenna
Demise Altitude = 77.944599
Debris Casualty Area = 0.000000

Impact Kinetic Energy = 0.000000

****

========== End of Requirement 4.7-1 ==========
12 09 2025; 08:14:42AM Project Data Saved To File

END of ODAR for HawkEye 360