ORBITAL DEBRIS MITIGATION PLAN

I. Background

This orbital debris mitigation plan[1] is for ICEYE's X83 spacecraft ("the satellite"). Table 1 and Table 2 provide the input parameters for the various calculations in this document.

Table 1 captures the spacecraft's mass and surface area information.

Table 1: Satellite Mass and Surface Area

Wet Mass (kg)	220
Dry Mass (kg)	215
Deployed Dimensions (m^2)	3.17
Nominal Area-to-Mass Ratio (m^2/kg)	0.0144[2]

Table 2 summarizes the spacecraft's altitude, inclination, plane, and timeline.

Table 2: Orbital Parameters

Satellite Name	X83
Launch Date	October 1, 2026
Launch Vehicle	SpaceX Transporter 18
Operational Perigee Altitude (km)	400-600
Operational Apogee Altitude (km)	400-600
Operational Inclination (deg)	97.7 ± 2

[1] This orbital debris mitigation plan uses National Aeronautics and Space Administration debris assessment software ("NASA DAS") version 3.2.7.

[2] The satellite's area-to-mass ratio (0.0144 m^2/kg) represents the nominal drag configuration.

II. 47 C.F.R. § 25.114(d)(14) Compliance Showing

(14) A description of the design and operational strategies that will be used to mitigate orbital debris, including the following information:

(i) A statement that the space station operator has assessed and limited the amount of debris released in a planned manner during normal operations. Where applicable, this statement must include an orbital debris mitigation disclosure for any separate deployment devices, distinct from the space station launch vehicle, that may become a source of orbital debris;

ICEYE has assessed and limited the amount of debris released in a planned manner during normal operations. The satellite does not have any separate deployment devices, distinct from the space station launch vehicle, that may become an orbital debris source.

(ii) A statement indicating whether the space station operator has assessed and limited the probability that the space station(s) will become a source of debris by collision with small debris or meteoroids that would cause loss of control and prevent disposal. The statement must indicate whether this probability for an individual space station is 0.01 (1 in 100) or less, as calculated using the NASA Debris Assessment Software or a higher fidelity assessment tool;

ICEYE has assessed and limited the probability that each satellite will become a debris source by collision with small debris or meteoroids that would cause loss of control and prevent disposal. This requirement is not applicable because it concerns only space objects using subsystems to deorbit. The X83 satellite will deorbit passively via atmospheric reentry, which does not require a subsystem for specific orientation or drag state. Therefore, this requirement does not apply to the X83 satellite.

(iii) A statement that the space station operator has assessed and limited the probability, during and after completion of mission operations, of accidental explosions or of release of liquids that will persist in droplet form. This statement must include a demonstration that debris generation will not result from the conversion of energy sources on board the spacecraft into energy that fragments the spacecraft. Energy sources include chemical, pressure, and kinetic energy. This demonstration should address whether stored energy will be removed at the spacecraft's end of life, by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy, or through other equivalent procedures specifically disclosed in the application;

ICEYE has assessed and limited the probability, during and after completion of mission operations, of accidental explosions or of release of liquids that will persist in droplet form. There are no credible causes of spacecraft breakup during nominal deployment and mission operations.

The satellite has no volatile chemical propellants or pressurants and does not contain any pyrotechnic devices or radioactive materials. Additionally, ICEYE has no plans for any intentional breakup of the satellite, leaving accidental explosions as the only remotely possible cause of satellite breakup.

ICEYE identified the onboard batteries as the only component in which stored energy could be released and cause an accidental explosion. Li-Ion battery cell failures are typically due to (1) overcharging the battery cells or (2) a short circuit external to the cells. ICEYE has conducted thorough assessments of each of these battery failure scenarios and has put rigorous mitigation strategies in place to minimize the probability of accidental explosion.

ICEYE has implemented solutions in compliance with NASA Technical Standard 8719.14C Requirement 4.4-1 that mitigate the risk of accidental breakup or explosion due to overcharging of the battery cells. First, the satellite includes battery charge management systems that ensure that the entire battery voltage is maintained at or below the maximum allowable voltage. The voltage charge limits can be set by command while the satellite is on-orbit to allow for tailoring as necessary. Second, each battery cell is also equipped with a Current Interrupt Device ("CID") that, when activated, results in a disconnect of current flow within the cell. The CID is activated when a maximum pressure level is reached and acts as a second check to prevent overcharging.

ICEYE has also implemented solutions to mitigate the risk of accidental breakup or explosion due to a short circuit external to the battery cell. Each cell is equipped with a Positive Temperature Coefficient ("PTC") Safety Device that protects the battery against short circuit conditions occurring outside the cell which can result in unsafe discharge currents and possible battery overheating. The PTC Safety Device is activated when a short is applied on a cell and the discharge current level increases, thereby causing the temperature of the PTC Safety Device to rise. When activated by these increased temperatures, the PTC Safety Device yields a resistance increase, effectuating a decrease in the discharge current. In this way, the PTC Safety Device mitigates the risk of unsafe discharge currents and potential battery overheating brought about by a short circuit. Therefore, ICEYE's design mitigates possible modes of failure that may result in the accidental explosion of the batteries.

The sub-section vii answer below covers how the satellite will handle energy passivation after mission completion.

(iv) A statement that the space station operator has assessed and limited the probability of the space station(s) becoming a source of debris by collisions with large debris or other operational space stations.

ICEYE has assessed and limited the probability of the satellite becoming a source of debris by collisions with large debris or other operational space stations. See the following responses.

(A) Where the application is for an NGSO space station or system, the following information must also be included:

(1) A demonstration that the space station operator has assessed and limited the probability of collision between any space station of the system and other large objects (10 cm or larger in diameter) during the total orbital lifetime of the space station, including any de-orbit phases, to less than 0.001 (1 in 1,000). The probability shall be calculated using the NASA Debris Assessment Software or a higher fidelity assessment tool. 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.

The probability is zero during operational life because the satellite would maneuver effectively to avoid collision with large objects. Should the propulsion system not function, however, the large object collision risk probabilities satisfy the permissible risk threshold. For the single satellite collision scenario, the collision probability is 1.4764E-04 and satisfies the permissible threshold.

(2) The statement must identify characteristics of the space station(s)' orbits that may present a collision risk, including any planned and/or operational space stations in those orbits, and indicate what steps, if any, have been taken to coordinate with the other spacecraft or system, or what other measures the operator plans to use to avoid collision.

In the unlikely event of a projected collision, ICEYE can command the satellite to undertake an avoidance maneuver utilizing the propulsion system, effectively eliminating any risk of on-orbit collisions. Furthermore, ICEYE will register the satellite with the 18th Space Defense Squadron, which provides monitoring in conjunction with the Combined Space Operations Center.

(3) If at any time during the space station(s)' mission or de-orbit phase the space station(s) will transit through the orbits used by any inhabitable spacecraft, including the International Space Station, the statement must describe the design and operational strategies, if any, that will be used to minimize the risk of collision and avoid posing any operational constraints to the inhabitable spacecraft.

ICEYE acknowledges that the space environment is continually evolving and is committed to being a responsible space community member. ICEYE will maintain detailed coordination dialogs with operators to minimize the probability of a collision occurring between respective spacecrafts. ICEYE will also provide human oversight over any such environment to offer an added measure of safety and management of the situation.

ICEYE has reviewed the orbital environment to assess the potential for collisions with inhabitable spacecraft. Two inhabitable space stations currently occupy orbits adjacent to ICEYE's: the International Space Station (ISS) and Tiangong Space Station. Given the low collision probabilities calculated above, coupled with the inclination separation between ICEYE and the habitats (ISS at ~51.6 deg; Tiangong at ~41.6 deg), ICEYE's probability of collision with the habitats is negligible. Additionally, ICEYE plans to stop TT&C activity at 250 km, which provides increased atmospheric drag and facilitates maneuverability, effectively eliminating collision risk. ICEYE will coordinate with the habitats' operators and the 18th Space Defense Squadron, including by sharing ephemeris data, to ensure continual protection.

(4) The statement must disclose the accuracy, if any, with which orbital parameters will be maintained, including apogee, perigee, inclination, and the right ascension of the ascending node(s). In the event that a system is not able to maintain orbital tolerances, **e.g.,** ***its propulsion system will not be used for orbital maintenance, that fact must be included in the debris mitigation disclosure. Such systems must also indicate the anticipated evolution over time of the orbit of the proposed satellite or satellites. All systems must describe the extent of satellite maneuverability, whether or not the space station design includes a propulsion system.***

ICEYE does not maintain fixed tolerances for apogee, perigee, inclination, or right ascension of the ascending node. The satellite will operate within the altitude and inclination ranges in Table

2, and the propulsion system is used only as needed to keep the satellite within that envelope, including occasional orbit raises or lowers driven by mission needs. ICEYE will monitor orbital parameters throughout the mission and will not raise the satellite to an altitude that would prevent it from reaching 400 km by the end of its operational life. Because the satellite does not hold precise setpoints, the orbit should naturally decay over the operational lifetime.

Maneuvering may be possible using propulsion or the attitude determination and control system (ADCS).

Propulsion. The satellite possesses a low thrust propulsion system (ThrustMe NPT30-I2-1U) that uses a solid iodine propellant. During normal propulsive operations, the solid iodine is heated and becomes the ion source. Then, ions are accelerated by an electric field to generate thrust. During de-orbiting, the propulsion system will be passivated. The following are the propulsion system characteristics.

Table 3: X83 System Propulsion Characteristics

Parameter	Value
Nominal to Maximum Power (watts)	75 to 108
Thrust (mN)	3.6
Total Impulse (Ns)	16,000
Delta-v (Total) (m/s)	109.09

ADCS. The satellite possesses an ADCS that can achieve a pointing accuracy of less than ± 0.1 degrees, and a GPS accuracy of better than 5 meters. During normal operations, the phased arrays will be Earth-facing, with look angles between 10 and 30 degrees relative to nadir. Phased arrays will be side looking with a 90-degree offset from the velocity vector. All ADCS will also be passivated during re-orbiting, pursuant to Mission Operation Center command.

(5) The space station operator must 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. As appropriate, steps to assess and mitigate the collision risk should include, but are not limited to: Contacting the operator of any active spacecraft involved in such a warning; sharing ephemeris data and other appropriate operational information with any such operator; and modifying space station attitude and/or operations.

Upon receipt of a space situational awareness conjunction warning, ICEYE certifies that it will attempt to contact the operator of any active spacecraft involved in such a warning and share ephemeris data and other appropriate operational information with any such operator.

(B) Where a space station requests the assignment of a geostationary orbit location, it must assess whether there are any known satellites located at, or reasonably expected to be located at, the requested orbital location, or assigned in the vicinity of that location, such that the station keeping volumes of the respective satellites might overlap or touch. If so, the statement must include a statement as to the identities of those satellites and the measures that will be taken to prevent collisions;

Not applicable. The spacecraft will operate in low-Earth orbit.

(v) A statement addressing the trackability of the space station(s). Space station(s) operating in low-Earth orbit will be presumed trackable if each individual space station is 10 cm or larger in its smallest dimension, excluding deployable components.

The satellite is presumed trackable given its smallest dimension (excluding deployable component measures) is 68.8 cm, which is greater than the 10 cm metric that the FCC has found trackable previously.

Where the application is for an NGSO space station or system, the statement shall also disclose the following:

(A) How the operator plans to identify the space station(s) following deployment and whether space station tracking will be active or passive;

The satellite will be passively tracked. For tracking, the following capabilities can be used: (1) GPS position/velocity collected by the satellite; (2) passive tracking; (3) unique keys; and (4) calibration of two-line element ("TLE") ephemeris using Doppler shift of received transmissions (not routinely used).

GPS. Typically, ICEYE tracks its satellites using GPS telemetry.

Passive tracking. It relies on passive tracking during periods where GPS cannot be relied upon (outages or satellite anomalies).

Unique keys. Each satellite will be uniquely identifiable using a combination of frequency and spectrum spreading modulation, as well as utilizing unique sets of keys within the communications stacks. Each satellite will have a key used in the communication stack, so that the protocol used for commanding and telemetry is unique. By configuring the ground communication terminal to a specific combination, identifying the specific satellite is guaranteed.

Doppler shift. During launch-and-early orbit phase, when neither GPS nor public TLEs are reliable, ICEYE has demonstrated calibration of low-accuracy TLEs using Doppler shift of received RF transmissions from the satellite.

(B) Whether, prior to deployment, the space station(s) will be registered with the 18th Space Control Squadron or successor entity; and

Prior to deployment, the spacecraft will be registered with the 18th Space Defense Squadron via its Satellite Registration Form and Space Situational Awareness Sharing Agreement.

(C) The extent to which the space station 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.

ICEYE registers all spacecraft with both the 18th SDS (or successor entity) and equivalent agencies and uses the tools mentioned above for orbit monitoring and ephemeris generation pre/post maneuvers. ICEYE will continue to routinely share deployment, ephemeris, and planned maneuver information with the 18th SDS (or successor entity) and other operators as available or as requested.

(vi) A statement disclosing planned proximity operations, if any, and addressing debris generation that will or may result from the proposed operations, including any planned release of debris, the risk of accidental explosions, the risk of accidental collision, and measures taken to mitigate those risks.

Not applicable. No proximity operations are planned.

(vii) A statement detailing the disposal plans for the space station, including the quantity of fuel—if any—that will be reserved for disposal maneuvers.

The satellite will be disposed of via uncontrolled atmospheric reentry. The operational altitude in low-Earth orbit lends to natural forces that will quickly lead to atmospheric reentry once the operations are ceased.[3] During de-orbiting, ICEYE, through its Mission Operation Center, will command the satellite to deplete all onboard sources of energy and energy storage devices. The satellite's propulsion system utilizes solid iodine propellants which require activation to become the ion source.

The following components will be passivated at end of mission (EOM):

- During de-orbiting, the MOC command will cause the propulsion system to be powered off, rendering it inert.
- The battery capacitor will be discharged and disconnected from the power source.
- ADCS will be passivated during re-orbiting, pursuant to MOC command.
- Magnetometers and reaction wheels will be powered off and spun down at EOM, thereby removing all stored energy.

In addition, the following specific provisions apply:

(A) For geostationary orbit space stations, the statement must disclose the altitude selected for a disposal orbit and the calculations that are used in deriving the disposal altitude.

Not applicable.

(B) For space stations terminating operations in an orbit in or passing through the low-Earth orbit region below 2,000 km altitude, the statement must disclose whether the spacecraft will be disposed of through atmospheric re-entry, specifying if direct retrieval of the spacecraft will be

[3] Although no fuel is necessary for post-mission disposal, ICEYE expects to reserve some fuel but does not yet know the quantity.

used. The statement must also disclose the expected time in orbit for the space station following the completion of the mission.

The spacecraft will be disposed of through atmospheric re-entry. The satellite's lifetimes are as follows:

Satellite	Launch Date	Approximate Operational Timeline (Years)	Approximate Deorbit Timeline (Years)
X83	October 1, 2026	8	0.23

(C) For space stations not covered by either [paragraph (d)(14)(vii)(A)]() or [(B)]() of this section, the statement must indicate whether disposal will involve use of a storage orbit or long-term atmospheric re-entry and rationale for the selected disposal plan.

Not applicable.

(D) For all space stations under [paragraph (d)(14)(vii)(B)]() or [(C)]() of this section, the following additional specific provisions apply:

(1) The statement must include a demonstration that the probability of success of the chosen disposal method will be 0.9 or greater for any individual space station. For space station systems consisting of multiple space stations, the demonstration should include additional information regarding efforts to achieve a higher probability of success, with a goal, for large systems, of a probability of success for any individual space station of 0.99 or better. For space stations under paragraph (d)(14)(vii)(B) of this section ending their mission in or passing through the low-Earth orbit region below 2000 km altitude, successful disposal is defined, for the purposes of this demonstration, as atmospheric re-entry of the spacecraft as soon as practicable, but no later than five years following completion of the mission. For all other space stations under paragraph (d)(14)(vii)(B) and paragraph (d)(14)(vii)(C) of this section, successful disposal will be assessed on a case-by-case basis.

The satellite will be successfully disposed through atmospheric re-entry no later than five years following the mission completion.

(2) If planned disposal is by atmospheric re-entry, the statement must also include:

(i) A disclosure indicating whether the atmospheric re-entry will be an uncontrolled re-entry or a controlled targeted reentry.

Atmospheric reentry will be uncontrolled.

(ii) An assessment as to whether portions of any individual spacecraft will survive atmospheric re-entry and impact the surface of the Earth with a kinetic energy in excess of 15 joules, and demonstration that the calculated casualty risk for an individual spacecraft using the NASA Debris Assessment Software or a higher fidelity assessment tool is less than 0.0001 (1 in 10,000).

The satellite meets the permissible casualty risk threshold. The human casualty risk is zero.

(E) Applicants for space stations to be used only for commercial remote sensing may, in lieu of submitting detailed post-mission disposal plans to the Commission, certify that they have submitted such plans to the National Oceanic and Atmospheric Administration for review.

ICEYE submits this orbital debris mitigation plan for FCC consideration.

(viii) For non-U.S.-licensed space stations, the requirement to describe the design and operational strategies to minimize orbital debris risk can be satisfied by demonstrating that debris mitigation plans for the space station(s) for which U.S. market access is requested are subject to direct and effective regulatory oversight by the national licensing authority.

Not applicable.

III. Related Physical and Optical Astronomy Coordination Considerations

ICEYE agrees to –

(1) report to the FCC semi-annually the number of conjunction events identified for the satellites during the reporting period, the number of events that resulted in an action (maneuver or coordination with another operator), the difficulties encountered in connection with the collision avoidance process and any measures taken to address those difficulties, and any loss of control of the satellite at altitudes above 400 km;

(2) coordinate with NASA regarding physical operations and offer a related update in the semi-annual report referenced in item (1); and

(3) coordinate with the National Science Foundation ("NSF") regarding optical astronomy protection and report by January 1 each year describing whether ICEYE has reached a coordination agreement with NSF and any steps ICEYE has taken to reduce the impact of its satellites on optical astronomy.[4]

ICEYE also aims to implement changes for its future satellites as technologies advance to further reduce conjunction risk, orbit dwell time, and human casualty risk, among other things, while ensuring a safe and sustainable environment.[5]

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[4] *See, e.g.*, *Space Exploration Holdings, LLC*, Order and Authorization, 37 FCC Rcd 14882 (2022); *Planet Labs PBC*, Order, 38 FCC Rcd 7897 (2023); *ICEYE US, Inc.*, Order, 38 FCC Rcd 7887 (2023).

[5] ICEYE recognizes design and operational changes may require further Commission review and modification of the company's FCC satellite authorization.

IV. Debris Assessment Software Activity Logs

A. Small Object Collision Risk

N/A

B. Large Object Collision Risk

INPUT

Space Structure Name = X83
Space Structure Type = Payload
Perigee Altitude = 510.000 (km)
Apogee Altitude = 510.000 (km)
Inclination = 97.700 (deg)
RAAN = 0.000 (deg)
Argument of Perigee = 0.000 (deg)
Mean Anomaly = 0.000 (deg)
Final Area-To-Mass Ratio = 0.0144 (m^2/kg)
Start Year = 2026.850 (yr)
Initial Mass = 220.000 (kg)
Final Mass = 220.000 (kg)
Duration = 8.230 (yr)
Station-Kept = True
Abandoned = True
Long-Term Reentry = False

OUTPUT

Collision Probability = 1.4764E-04
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

C. Orbital Lifetime

INPUT

Start Year = 2034.850000 (yr)
Perigee Altitude = 400.000000 (km)
Apogee Altitude = 400.000000 (km)
Inclination = 97.700000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Area-To-Mass Ratio = 0.014400 (m^2/kg)

OUTPUT

Orbital Lifetime from Startyr = 0.234389 (yr)
Time Spent in LEO during Lifetime = 0.234389 (yr)
Last year of Propagation = 2035 (yr)
Returned Error Message: Object reentered

D. Human Casualty Risk

Return Status : Passed

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

name = X83
quantity = 1
parent = 0
materialID = 9
type = Box
Aero Mass = 220.000000
Thermal Mass = 220.000000
Diameter/Width = 1.061000
Length = 3.317000
Height = 0.716000

name = Backplate
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 20.000000
Thermal Mass = 20.000000
Diameter/Width = 0.650000
Length = 1.010000
Height = 0.060000

name = Small Shelf Bus Panel
quantity = 1
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.292000
Length = 0.345000

name = Shelf Bus Panel
quantity = 2
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.292000
Length = 0.450000

name = ICU
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.206000
Length = 0.209000
Height = 0.081000

name = OBC
quantity = 2
parent = 1
materialID = 9
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.114000
Length = 0.156000
Height = 0.107000

name = Watchdog
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.600000
Thermal Mass = 0.600000
Diameter/Width = 0.143000
Length = 0.190000
Height = 0.025000

name = PCM
quantity = 1

parent = 1
materialID = 9
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.208000
Length = 0.351000
Height = 0.022000

name = CDR Lite
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.556000
Thermal Mass = 0.556000
Diameter/Width = 0.165000
Length = 0.198000
Height = 0.017000

name = Contactor
quantity = 1
parent = 1
materialID = 23
type = Cylinder
Aero Mass = 0.500000
Thermal Mass = 0.200000
Diameter/Width = 0.058000
Length = 0.072000

name = Coil
quantity = 1
parent = 10
materialID = 38
type = Cylinder
Aero Mass = 0.300000
Thermal Mass = 0.300000
Diameter/Width = 0.040000
Length = 0.040000

name = Battery
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 12.000000

Thermal Mass = 3.000000
Diameter/Width = 0.220000
Length = 0.390000
Height = 0.130000

name = Battery Pack
quantity = 20
parent = 12
materialID = 23
type = Box
Aero Mass = 0.450000
Thermal Mass = 0.090000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.050000

name = Battery Cell
quantity = 160
parent = 13
materialID = 54
type = Cylinder
Aero Mass = 0.045000
Thermal Mass = 0.045000
Diameter/Width = 0.018000
Length = 0.065000

name = Reaction Wheel
quantity = 4
parent = 1
materialID = 9
type = Box
Aero Mass = 1.100000
Thermal Mass = 1.100000
Diameter/Width = 0.110000
Length = 0.110000
Height = 0.053000

name = MTR
quantity = 3
parent = 1
materialID = 38
type = Cylinder
Aero Mass = 0.600000
Thermal Mass = 0.600000
Diameter/Width = 0.028000
Length = 0.193000

name = ADCS
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.800000
Thermal Mass = 0.800000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.050000

name = Oscillator
quantity = 2
parent = 1
materialID = 9
type = Box
Aero Mass = 0.101000
Thermal Mass = 0.101000
Diameter/Width = 0.057000
Length = 0.057000
Height = 0.015000

name = TRX
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.331000
Thermal Mass = 0.331000
Diameter/Width = 0.103000
Length = 0.103000
Height = 0.033000

name = X Band Primary
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.698000
Thermal Mass = 0.698000
Diameter/Width = 0.105000
Length = 0.110000
Height = 0.075000

name = X Band Secondary

quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.310000
Thermal Mass = 0.310000
Diameter/Width = 0.083000
Length = 0.112000
Height = 0.063000

name = Cleats
quantity = 109
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 0.060000
Thermal Mass = 0.060000
Diameter/Width = 0.060000
Length = 0.062000

name = +X/-X Bus Panel
quantity = 2
parent = 1
materialID = 3
type = Flat Plate
Aero Mass = 6.000000
Thermal Mass = 6.000000
Diameter/Width = 0.564000
Length = 0.967000

name = +Y/-Y Bus Panel
quantity = 2
parent = 1
materialID = 3
type = Flat Plate
Aero Mass = 5.000000
Thermal Mass = 5.000000
Diameter/Width = 0.585000
Length = 0.650000

name = Bus Centre Panel
quantity = 1
parent = 1
materialID = 3
type = Flat Plate
Aero Mass = 5.000000

Thermal Mass = 5.000000
Diameter/Width = 0.563000
Length = 0.966000

name = +Z Bus Panel
quantity = 1
parent = 1
materialID = 3
type = Flat Plate
Aero Mass = 5.000000
Thermal Mass = 5.000000
Diameter/Width = 0.650000
Length = 0.988000

name = Solar Panel
quantity = 5
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 1.860000
Thermal Mass = 1.860000
Diameter/Width = 0.635000
Length = 0.645000

name = Separation Ring
quantity = 1
parent = 1
materialID = 9
type = Flat Plate
Aero Mass = 0.700000
Thermal Mass = 0.700000
Diameter/Width = 0.400000
Length = 0.400000

name = SAR Outer Wing Panels
quantity = 2
parent = 1
materialID = 9
type = Box
Aero Mass = 20.000000
Thermal Mass = 20.000000
Diameter/Width = 0.663000
Length = 0.893000
Height = 0.032800

name = SAR Inner Wing Panels

quantity = 2
parent = 1
materialID = 9
type = Box
Aero Mass = 20.000000
Thermal Mass = 20.000000
Diameter/Width = 0.663000
Length = 0.893000
Height = 0.032800

name = SAR Centre Panel
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 20.000000
Thermal Mass = 20.000000
Diameter/Width = 0.663000
Length = 0.893000
Height = 0.032800

name = Thruster
quantity = 4
parent = 1
materialID = 9
type = Box
Aero Mass = 1.250000
Thermal Mass = 1.250000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.084000

name = Star Tracker
quantity = 2
parent = 1
materialID = 9
type = Box
Aero Mass = 0.333100
Thermal Mass = 0.333100
Diameter/Width = 0.080000
Length = 0.100000
Height = 0.050000

name = Gimbal Box
quantity = 1
parent = 1

materialID = 9
type = Box
Aero Mass = 0.138000
Thermal Mass = 0.138000
Diameter/Width = 0.105000
Length = 0.113500
Height = 0.016000

name = SOLP Strap
quantity = 4
parent = 1
materialID = 38
type = Box
Aero Mass = 0.022863
Thermal Mass = 0.022863
Diameter/Width = 0.015000
Length = 0.122000
Height = 0.001587

name = uXRTX
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.377000
Thermal Mass = 0.377000
Diameter/Width = 0.083700
Length = 0.112400
Height = 0.015500

name = Gimbal Base
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 1.670000
Thermal Mass = 1.670000
Diameter/Width = 0.086257
Length = 0.104103
Height = 0.066097

name = Gimbal Boom
quantity = 1
parent = 1
materialID = 23
type = Cylinder

Aero Mass = 0.120000
Thermal Mass = 0.120000
Diameter/Width = 0.049573
Length = 0.522144

name = Gimbal Motor Head
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 4.140000
Thermal Mass = 4.140000
Diameter/Width = 0.117334
Length = 0.129007
Height = 0.097237

name = Gimbal Antenna
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 2.100000
Thermal Mass = 2.100000
Diameter/Width = 0.090830
Length = 0.158451
Height = 0.052051

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

name = X83
Demise Altitude = 77.999999
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Backplate
Demise Altitude = 66.571762
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Small Shelf Bus Panel
Demise Altitude = 74.207277
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Shelf Bus Panel
Demise Altitude = 75.058118
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = ICU
Demise Altitude = 73.440729
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = OBC
Demise Altitude = 72.466822
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Watchdog
Demise Altitude = 74.903725
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = PCM
Demise Altitude = 74.164025
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = CDR Lite
Demise Altitude = 75.215847
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Contactor
Demise Altitude = 74.078224
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Coil
Demise Altitude = 59.894703

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Battery
Demise Altitude = 74.065491
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Battery Pack
Demise Altitude = 73.365814
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Battery Cell
Demise Altitude = 70.347749
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Reaction Wheel
Demise Altitude = 70.439614
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = MTR
Demise Altitude = 65.261034
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = ADCS
Demise Altitude = 71.597279
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Oscillator
Demise Altitude = 75.342102
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****

name = TRX
Demise Altitude = 74.833586
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = X Band Primary
Demise Altitude = 73.601687
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = X Band Secondary
Demise Altitude = 75.728051
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Cleats
Demise Altitude = 76.062361
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = +X/-X Bus Panel
Demise Altitude = 73.309623
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = +Y/-Y Bus Panel
Demise Altitude = 72.402934
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Bus Centre Panel
Demise Altitude = 74.081560
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = +Z Bus Panel
Demise Altitude = 74.395373
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Solar Panel
Demise Altitude = 76.058736
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Separation Ring
Demise Altitude = 76.632222
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = SAR Outer Wing Panels
Demise Altitude = 64.523311
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = SAR Inner Wing Panels
Demise Altitude = 64.523311
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = SAR Centre Panel
Demise Altitude = 64.523311
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Thruster
Demise Altitude = 70.398016
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Star Tracker
Demise Altitude = 74.999465
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Gimbal Box
Demise Altitude = 76.539954

Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = SOLP Strap
Demise Altitude = 75.726991
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = uXRTX
Demise Altitude = 73.764736
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Gimbal Base
Demise Altitude = 67.443428
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Gimbal Boom
Demise Altitude = 77.450267
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Gimbal Motor Head
Demise Altitude = 62.449134
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

****
name = Gimbal Antenna
Demise Altitude = 67.725163
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

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