Appendix to WVSAT ODAR - DAS Activity Log
R1 8/24/2021

Case 1 WVSAT A

```
07 24 2021; 09:31:09AM Activity Log Started
07 24 2021; 09:31:42AM Closed Project C:\Users\mille\Desktop\New folder
(2)\
08 11 2021; 11:43:48AM Activity Log Started
08 11 2021; 11:43:48AM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT A\
08 11 2021; 11:44:13AM Mission Editor Changes Applied
08 11 2021; 11:44:13AM Project Data Saved To File
08 11 2021; 11:45:45AM Processing Requirement 4.6   Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT A
      Space Structure Type = Payload

      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.006100 (m^2/kg)
      Start Year = 2021.000000 (yr)
      Initial Mass = 1.133000 (kg)
      Final Mass = 1.133000 (kg)
      Duration = 2.000000 (yr)
      Station Kept = False
      Abandoned = True
      PMD Perigee Altitude = 518.607388 (km)
      PMD Apogee Altitude = 524.612147 (km)
      PMD Inclination = 97.073586 (deg)
      PMD RAAN = 313.616693 (deg)
      PMD Argument of Perigee = 164.044186 (deg)
      PMD Mean Anomaly = 0.000000 (deg)

**OUTPUT**

      Suggested Perigee Altitude = 518.607388 (km)
      Suggested Apogee Altitude = 524.612147 (km)
      Returned Error Message = Passes LEO reentry orbit criteria.

      Released Year = 2033 (yr)
      Requirement = 61
```

```
      Compliance Status = Pass

==============

=============== End of Requirement 4.6 ===============
08 11 2021; 11:45:45AM *********Processing Requirement 4.7-1
      Return Status :  Passed

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

name = WVSAT A
quantity = 1
parent = 0
materialID = 9
type = Box
Aero Mass = 1.133000
Thermal Mass = 1.133000
Diameter/Width = 0.114000
Length = 0.682230
Height = 0.030700

name = External Structure
quantity = 1
parent = 1
materialID = 9
type = Box
Aero Mass = 0.116000
Thermal Mass = 0.116000
Diameter/Width = 0.111000
Length = 0.114000
Height = 0.012500

name = Tabs
quantity = 2
parent = 1
materialID = 9
type = Box
Aero Mass = 0.006000
Thermal Mass = 0.006000
Diameter/Width = 0.014000
Length = 0.051000
Height = 0.003000

name = Top Solar PCB
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.040000
Thermal Mass = 0.040000
Diameter/Width = 0.111000
Length = 0.114000
```

```
name = RX Antenna
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.016000
Length = 0.023000
Height = 0.004000

name = Sep Switches
quantity = 2
parent = 1
materialID = 54
type = Box
Aero Mass = 0.000300
Thermal Mass = 0.000300
Diameter/Width = 0.008200
Length = 0.009200
Height = 0.002700

name = Solar Fold Out
quantity = 1
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.015000
Thermal Mass = 0.015000
Diameter/Width = 0.050800
Length = 0.118000

name = Batteries
quantity = 6
parent = 1
materialID = 5
type = Box
Aero Mass = 0.027000
Thermal Mass = 0.027000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.008000

name = Main PCB
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.060000
Thermal Mass = 0.060000
Diameter/Width = 0.111000
Length = 0.114000

name = ADCS PCB
```

```
quantity = 2
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.010000
Thermal Mass = 0.010000
Diameter/Width = 0.052000
Length = 0.108000

name = RX PCB
quantity = 2
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.019000
Thermal Mass = 0.019000
Diameter/Width = 0.053000
Length = 0.071000

name = Torquer Coils
quantity = 3
parent = 1
materialID = 19
type = Cylinder
Aero Mass = 0.011000
Thermal Mass = 0.011000
Diameter/Width = 0.009000
Length = 0.020000

name = Reaction Wheel
quantity = 1
parent = 1
materialID = 19
type = Cylinder
Aero Mass = 0.022000
Thermal Mass = 0.022000
Diameter/Width = 0.014000
Length = 0.020000

name = IR Sensor
quantity = 1
parent = 1
materialID = 23
type = Cylinder
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.009000
Length = 0.017000

name = Fasteners / Spacers
quantity = 4
parent = 1
materialID = 54
type = Box
```

```
Aero Mass = 0.002250
Thermal Mass = 0.002250
Diameter/Width = 0.007000
Length = 0.010000
Height = 0.007000

name = Cabling
quantity = 1
parent = 1
materialID = 19
type = Box
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.010000
Length = 0.070000
Height = 0.001000

name = Damping
quantity = 1
parent = 1
materialID = 46
type = Box
Aero Mass = 0.010000
Thermal Mass = 0.010000
Diameter/Width = 0.010000
Length = 0.035000
Height = 0.005000

name = NSL-SB
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.026000
Thermal Mass = 0.026000
Diameter/Width = 0.051000
Length = 0.107000

name = External Structure a
quantity = 2
parent = 1
materialID = 9
type = Box
Aero Mass = 0.055000
Thermal Mass = 0.055000
Diameter/Width = 0.111000
Length = 0.114000
Height = 0.012500

name = Top Solar PCB a
quantity = 2
parent = 1
materialID = 23
type = Flat Plate
```

```
Aero Mass = 0.040000
Thermal Mass = 0.040000
Diameter/Width = 0.111000
Length = 0.114000

name = ISS Solar Cell a
quantity = 2
parent = 1
materialID = 25
type = Flat Plate
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.080000
Length = 0.080000

name = Sep Switches a
quantity = 4
parent = 1
materialID = 54
type = Box
Aero Mass = 0.000300
Thermal Mass = 0.000300
Diameter/Width = 0.008200
Length = 0.009200
Height = 0.002700

name = Solar Fold Out a
quantity = 2
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.015000
Thermal Mass = 0.015000
Diameter/Width = 0.050800
Length = 0.118000

name = Batteries a
quantity = 4
parent = 1
materialID = 5
type = Box
Aero Mass = 0.027000
Thermal Mass = 0.027000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.008000

name = Main PCB a
quantity = 2
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.060000
Thermal Mass = 0.060000
```

```
Diameter/Width = 0.111000
Length = 0.114000

name = Fasteners / Spacers a
quantity = 8
parent = 1
materialID = 54
type = Box
Aero Mass = 0.002250
Thermal Mass = 0.002250
Diameter/Width = 0.007000
Length = 0.010000
Height = 0.007000

name = Cabling a
quantity = 2
parent = 1
materialID = 19
type = Box
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.010000
Length = 0.070000
Height = 0.001000

name = Damping a
quantity = 2
parent = 1
materialID = 46
type = Box
Aero Mass = 0.010000
Thermal Mass = 0.010000
Diameter/Width = 0.010000
Length = 0.035000
Height = 0.005000

name = NSL-SB a
quantity = 2
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.026000
Thermal Mass = 0.026000
Diameter/Width = 0.051000
Length = 0.107000

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

name = WVSAT A
Demise Altitude = 77.996239
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
```

```
************************************
name = External Structure
Demise Altitude = 73.349754
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Tabs
Demise Altitude = 75.910980
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Top Solar PCB
Demise Altitude = 76.565361
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = RX Antenna
Demise Altitude = 77.085831
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Sep Switches
Demise Altitude = 0.000000
Debris Casualty Area = 0.737095
Impact Kinetic Energy = 0.016994

************************************
name = Solar Fold Out
Demise Altitude = 0.000000
Debris Casualty Area = 0.458903
Impact Kinetic Energy = 0.612318

************************************
name = Batteries
Demise Altitude = 73.854301
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Main PCB
Demise Altitude = 75.883324
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = ADCS PCB
Demise Altitude = 77.403061
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
```

```
************************************
name = RX PCB
Demise Altitude = 76.417763
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Torquer Coils
Demise Altitude = 72.289536
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Reaction Wheel
Demise Altitude = 70.532150
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = IR Sensor
Demise Altitude = 76.471146
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Fasteners / Spacers
Demise Altitude = 68.849083
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Cabling
Demise Altitude = 76.272217
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Damping
Demise Altitude = 0.000000
Debris Casualty Area = 0.379705
Impact Kinetic Energy = 5.165419

************************************
name = NSL-SB
Demise Altitude = 76.458450
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = External Structure a
Demise Altitude = 75.720787
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000
```

```
************************************
name = Top Solar PCB a
Demise Altitude = 76.565361
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = ISS Solar Cell a
Demise Altitude = 77.236656
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Sep Switches a
Demise Altitude = 0.000000
Debris Casualty Area = 1.474189
Impact Kinetic Energy = 0.016994

************************************
name = Solar Fold Out a
Demise Altitude = 0.000000
Debris Casualty Area = 0.917805
Impact Kinetic Energy = 0.612318

************************************
name = Batteries a
Demise Altitude = 73.854301
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Main PCB a
Demise Altitude = 75.883324
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Fasteners / Spacers a
Demise Altitude = 68.849083
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Cabling a
Demise Altitude = 76.272217
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Damping a
Demise Altitude = 0.000000
Debris Casualty Area = 0.759409
Impact Kinetic Energy = 5.165419
```

```
************************************
name = NSL-SB a
Demise Altitude = 76.458450
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************

=============== End of Requirement 4.7-1 ===============
08 11 2021; 11:45:45AM Project Data Saved To File
08 11 2021; 12:17:35PM Processing Requirement 4.5-1:     Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT A
      Space Structure Type = Payload
      Perigee Altitude = 525.000 (km)
      Apogee Altitude = 525.000 (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 = 0.0061 (m^2/kg)
      Start Year = 2021.000 (yr)
      Initial Mass = 1.133 (kg)
      Final Mass = 1.133 (kg)
      Duration = 2.000 (yr)
      Station-Kept = False
      Abandoned = True

**OUTPUT**

      Collision Probability = 1.6289E-07
      Returned Message: Normal Processing
      Date Range Message: Normal Date Range
      Status = Pass

==============

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

08 11 2021; 12:18:14PM Science and Engineering - Apogee/Perigee History
for a Given Orbit

**INPUT**

      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
```

```
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.006100 (m^2/kg)
      Start Year = 2021.000000 (yr)
      Integration Time = 10.000000 (yr)

**OUTPUT**

      Plot
08 11 2021; 12:18:24PM Science and Engineering - Apogee/Perigee History
for a Given Orbit

**INPUT**

      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.006100 (m^2/kg)
      Start Year = 2021.000000 (yr)
      Integration Time = 20.000000 (yr)

**OUTPUT**

      Plot
08 11 2021; 12:19:36PM Science and Engineering - Orbit Lifetime/Dwell
Time

**INPUT**

      Start Year = 2021.000000 (yr)
      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Area-To-Mass Ratio = 0.006100 (m^2/kg)

**OUTPUT**

      Orbital Lifetime from Startyr = 12.922656 (yr)
      Time Spent in LEO during Lifetime  = 12.922656 (yr)
      Last year of Propagation = 2033 (yr)
      Returned Error Message: Object reentered
08 11 2021; 12:21:28PM Project Data Saved To File
08 11 2021; 12:21:46PM Closed Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT A\
08 11 2021; 16:37:37PM Activity Log Started
08 11 2021; 16:37:37PM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT A\
```

08 11 2021; 16:37:45PM Saved Project As C:\Users\mille\Desktop\WVSAT DAS\WVSAT A2\
08 11 2021; 16:37:45PM Closed Project C:\Users\mille\Desktop\WVSAT DAS\WVSAT A\

Case 1 WVSAT B

08 11 2021; 12:36:46PM Opened Project C:\Users\mille\Desktop\WVSAT DAS\WVSAT B\
08 11 2021; 12:39:13PM Activity Log Started
08 11 2021; 12:39:13PM Opened Project C:\Users\mille\Desktop\WVSAT DAS\WVSAT B\
08 11 2021; 12:39:36PM Mission Editor Changes Applied
08 11 2021; 12:39:36PM Project Data Saved To File
08 11 2021; 12:39:49PM Processing Requirement 4.6 Return Status : Passed

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

INPUT

Space Structure Name = WVSAT B
Space Structure Type = Payload

Perigee Altitude = 525.000000 (km)
Apogee Altitude = 525.000000 (km)
Inclination = 97.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Mean Anomaly = 0.000000 (deg)
Area-To-Mass Ratio = 0.006100 (m^2/kg)
Start Year = 2021.000000 (yr)
Initial Mass = 0.840000 (kg)
Final Mass = 0.840000 (kg)
Duration = 2.000000 (yr)
Station Kept = False
Abandoned = True
PMD Perigee Altitude = 518.607388 (km)
PMD Apogee Altitude = 524.612147 (km)
PMD Inclination = 97.073586 (deg)
PMD RAAN = 313.616693 (deg)
PMD Argument of Perigee = 164.044186 (deg)
PMD Mean Anomaly = 0.000000 (deg)

OUTPUT

Suggested Perigee Altitude = 518.607388 (km)
Suggested Apogee Altitude = 524.612147 (km)
Returned Error Message = Passes LEO reentry orbit criteria.

Released Year = 2033 (yr)

```
      Requirement = 61
      Compliance Status = Pass

==============

=============== End of Requirement 4.6 ===============
08 11 2021; 12:39:49PM *********Processing Requirement 4.7-1
      Return Status :  Passed

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

name = WVSAT B
quantity = 1
parent = 0
materialID = 9
type = Box
Aero Mass = 0.840000
Thermal Mass = 0.840000
Diameter/Width = 0.114000
Length = 0.682230
Height = 0.012500

name = External Structure
quantity = 3
parent = 1
materialID = 9
type = Box
Aero Mass = 0.055000
Thermal Mass = 0.055000
Diameter/Width = 0.111000
Length = 0.114000
Height = 0.012500

name = Top Solar PCB
quantity = 3
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.040000
Thermal Mass = 0.040000
Diameter/Width = 0.111000
Length = 0.114000

name = ISS Solar Cell
quantity = 3
parent = 1
materialID = 25
type = Flat Plate
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.080000
Length = 0.080000
```

```
name = Sep Switches
quantity = 6
parent = 1
materialID = 54
type = Box
Aero Mass = 0.000300
Thermal Mass = 0.000300
Diameter/Width = 0.008200
Length = 0.009200
Height = 0.002700

name = Solar Fold Out
quantity = 3
parent = 1
materialID = 54
type = Flat Plate
Aero Mass = 0.015000
Thermal Mass = 0.015000
Diameter/Width = 0.050800
Length = 0.118000

name = Batteries
quantity = 6
parent = 1
materialID = 5
type = Box
Aero Mass = 0.027000
Thermal Mass = 0.027000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.008000

name = Main PCB
quantity = 3
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.060000
Thermal Mass = 0.060000
Diameter/Width = 0.111000
Length = 0.114000

name = Fasteners / Spacers
quantity = 12
parent = 1
materialID = 54
type = Box
Aero Mass = 0.002250
Thermal Mass = 0.002250
Diameter/Width = 0.007000
Length = 0.010000
Height = 0.007000

name = Cabling
```

```
quantity = 3
parent = 1
materialID = 19
type = Box
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.010000
Length = 0.070000
Height = 0.001000

name = Damping
quantity = 3
parent = 1
materialID = 46
type = Box
Aero Mass = 0.010000
Thermal Mass = 0.010000
Diameter/Width = 0.010000
Length = 0.035000
Height = 0.005000

name = NSL-SB
quantity = 3
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.026000
Thermal Mass = 0.026000
Diameter/Width = 0.051000
Length = 0.107000

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

name = WVSAT B
Demise Altitude = 77.993835
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = External Structure
Demise Altitude = 75.157394
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Top Solar PCB
Demise Altitude = 76.168373
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = ISS Solar Cell
Demise Altitude = 0.000000
```

```
Debris Casualty Area = 1.387200
Impact Kinetic Energy = 0.063712

************************************
name = Sep Switches
Demise Altitude = 0.000000
Debris Casualty Area = 2.211284
Impact Kinetic Energy = 0.016994

************************************
name = Solar Fold Out
Demise Altitude = 0.000000
Debris Casualty Area = 1.376708
Impact Kinetic Energy = 0.612343

************************************
name = Batteries
Demise Altitude = 72.929024
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Main PCB
Demise Altitude = 75.320847
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Fasteners / Spacers
Demise Altitude = 0.000000
Debris Casualty Area = 4.441319
Impact Kinetic Energy = 0.711664

************************************
name = Cabling
Demise Altitude = 75.768608
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Damping
Demise Altitude = 0.000000
Debris Casualty Area = 1.139114
Impact Kinetic Energy = 5.165323

************************************
name = NSL-SB
Demise Altitude = 76.088531
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************

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

08 11 2021; 12:39:49PM Project Data Saved To File
08 11 2021; 12:50:55PM Processing Requirement 4.5-1: Return Status : Passed

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

INPUT

Space Structure Name = WVSAT B
Space Structure Type = Payload
Perigee Altitude = 525.000 (km)
Apogee Altitude = 525.000 (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 = 0.0061 (m^2/kg)
Start Year = 2021.000 (yr)
Initial Mass = 0.840 (kg)
Final Mass = 0.840 (kg)
Duration = 2.000 (yr)
Station-Kept = False
Abandoned = True

OUTPUT

Collision Probability = 1.2077E-07
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

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

08 11 2021; 12:52:09PM Science and Engineering - Orbit Lifetime/Dwell Time

INPUT

Start Year = 2021.800000 (yr)
Perigee Altitude = 525.000000 (km)
Apogee Altitude = 525.000000 (km)
Inclination = 97.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Area-To-Mass Ratio = 0.006100 (m^2/kg)

OUTPUT

Orbital Lifetime from Startyr = 12.205339 (yr)
Time Spent in LEO during Lifetime = 12.205339 (yr)

```
      Last year of Propagation = 2034 (yr)
      Returned Error Message: Object reentered
08 11 2021; 12:52:46PM Science and Engineering - Apogee/Perigee History
for a Given Orbit

**INPUT**

      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.006100 (m^2/kg)
      Start Year = 2021.800000 (yr)
      Integration Time = 15.000000 (yr)

**OUTPUT**

      Plot
08 11 2021; 12:53:00PM Project Data Saved To File
08 11 2021; 12:53:11PM Activity Log Started
08 11 2021; 12:53:11PM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT B\
08 11 2021; 12:53:24PM Closed Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT B\
08 11 2021; 17:00:04PM Activity Log Started
08 11 2021; 17:00:04PM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT B\
08 11 2021; 17:00:14PM Saved Project As C:\Users\mille\Desktop\WVSAT
DAS\WVSAT B2\
08 11 2021; 17:00:14PM Closed Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT B\
```

Case 1 WVSAT C,D

```
07 24 2021; 11:50:24AM Activity Log Started
07 24 2021; 11:54:07AM Activity Log Started
07 24 2021; 11:54:07AM Opened Project C:\Users\mille\Desktop\New folder
(4)\
07 24 2021; 11:54:18AM Processing Requirement 4.6   Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT C/D
      Space Structure Type = Payload

      Perigee Altitude = 525.000000 (km)
```

```
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.008500 (m^2/kg)
      Start Year = 2021.000000 (yr)
      Initial Mass = 1.500000 (kg)
      Final Mass = 1.500000 (kg)
      Duration = 2.000000 (yr)
      Station Kept = False
      Abandoned = True
      PMD Perigee Altitude = 517.194132 (km)
      PMD Apogee Altitude = 523.241302 (km)
      PMD Inclination = 97.072511 (deg)
      PMD RAAN = 313.751234 (deg)
      PMD Argument of Perigee = 162.829475 (deg)
      PMD Mean Anomaly = 0.000000 (deg)

**OUTPUT**

      Suggested Perigee Altitude = 517.194132 (km)
      Suggested Apogee Altitude = 523.241302 (km)
      Returned Error Message = Passes LEO reentry orbit criteria.

      Released Year = 2028 (yr)
      Requirement = 61
      Compliance Status = Pass

==============

=============== End of Requirement 4.6 ===============
07 24 2021; 11:54:18AM *********Processing Requirement 4.7-1
      Return Status :  Passed

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

name = WVSAT C/D
quantity = 1
parent = 0
materialID = 8
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.100000

name = 1U CubeSat Chassis
quantity = 1
parent = 1
materialID = 8
type = Box
```

```
Aero Mass = 0.360000
Thermal Mass = 0.360000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.100000

name = Simplex TX Antenna
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.014000
Thermal Mass = 0.014000
Diameter/Width = 0.030000
Length = 0.030000
Height = 0.009000

name = Simplex RX Antenna
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.014000
Thermal Mass = 0.014000
Diameter/Width = 0.030000
Length = 0.030000
Height = 0.009000

name = 1U Solar Array
quantity = 4
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.028000
Thermal Mass = 0.028000
Diameter/Width = 0.080000
Length = 0.100000

name = Sep Switches
quantity = 2
parent = 1
materialID = 54
type = Box
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.010250
Length = 0.020000
Height = 0.006500

name = PIN Diode
quantity = 1
parent = 1
materialID = 19
type = Flat Plate
```

```
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.015000
Length = 0.025000

name = Spring Plungers
quantity = 2
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.004000
Length = 0.020000

name = Dual Lipo Battery Pack
quantity = 6
parent = 1
materialID = 5
type = Box
Aero Mass = 0.027000
Thermal Mass = 0.027000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.017000

name = NSL EPS + S3 + RX
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.214000
Thermal Mass = 0.214000
Diameter/Width = 0.075000
Length = 0.075000
Height = 0.020000

name = Fasteners / Spacers
quantity = 30
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.002500
Thermal Mass = 0.002500
Diameter/Width = 0.005000
Length = 0.025000

name = Cabling
quantity = 1
parent = 1
materialID = 19
type = Cylinder
Aero Mass = 0.100000
Thermal Mass = 0.100000
```

```
Diameter/Width = 0.020000
Length = 0.500000

name = Magnetorquer - Long
quantity = 2
parent = 1
materialID = 46
type = Box
Aero Mass = 0.122000
Thermal Mass = 0.122000
Diameter/Width = 0.020000
Length = 0.057000
Height = 0.018000

name = Magnetorquer - Short
quantity = 4
parent = 1
materialID = 46
type = Box
Aero Mass = 0.030000
Thermal Mass = 0.030000
Diameter/Width = 0.020000
Length = 0.120000
Height = 0.012000

name = ADCS PCB
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.024000
Thermal Mass = 0.024000
Diameter/Width = 0.051000
Length = 0.070000

name = RBF Switch Assembly
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.003000
Thermal Mass = 0.003000
Diameter/Width = 0.010000
Length = 0.012000
Height = 0.010000

name = Diag Assembly
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.003000
Thermal Mass = 0.003000
Diameter/Width = 0.012000
```

```
Length = 0.012000
Height = 0.012000

name = 1U Rail Tabs
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.016000
Thermal Mass = 0.016000
Diameter/Width = 0.015000
Length = 0.113000
Height = 0.004000

name = Extra Mass Added
quantity = 1
parent = 1
materialID = 19
type = Box
Aero Mass = 0.230000
Thermal Mass = 0.230000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.016000

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

name = WVSAT C/D
Demise Altitude = 77.993370
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U CubeSat Chassis
Demise Altitude = 74.579887
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Simplex TX Antenna
Demise Altitude = 76.887932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Simplex RX Antenna
Demise Altitude = 76.887932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U Solar Array
Demise Altitude = 77.500694
```

```
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Sep Switches
Demise Altitude = 76.374245
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = PIN Diode
Demise Altitude = 76.862518
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Spring Plungers
Demise Altitude = 76.107460
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Dual Lipo Battery Pack
Demise Altitude = 76.611984
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = NSL EPS + S3 + RX
Demise Altitude = 74.321121
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Fasteners / Spacers
Demise Altitude = 76.280540
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Cabling
Demise Altitude = 77.263580
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Magnetorquer - Long
Demise Altitude = 67.066696
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Magnetorquer - Short
Demise Altitude = 0.000000
```

```
Debris Casualty Area = 1.658006
Impact Kinetic Energy = 7.240037

************************************
name = ADCS PCB
Demise Altitude = 77.199356
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = RBF Switch Assembly
Demise Altitude = 76.732712
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Diag Assembly
Demise Altitude = 77.247299
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U Rail Tabs
Demise Altitude = 76.919083
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Extra Mass Added
Demise Altitude = 71.110817
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************

=============== End of Requirement 4.7-1 ===============
07 24 2021; 11:54:18AM Project Data Saved To File
07 24 2021; 11:54:34AM Closed Project C:\Users\mille\Desktop\New folder
(4)\
07 24 2021; 11:55:43AM Activity Log Started
07 24 2021; 11:55:43AM Opened Project C:\Users\mille\Desktop\New folder
(4)\
07 24 2021; 11:55:52AM Processing Requirement 4.6   Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT C/D
      Space Structure Type = Payload
```

```
      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.008500 (m^2/kg)
      Start Year = 2021.000000 (yr)
      Initial Mass = 1.500000 (kg)
      Final Mass = 1.500000 (kg)
      Duration = 2.000000 (yr)
      Station Kept = False
      Abandoned = True
      PMD Perigee Altitude = 517.094198 (km)
      PMD Apogee Altitude = 523.341924 (km)
      PMD Inclination = 97.072511 (deg)
      PMD RAAN = 313.751223 (deg)
      PMD Argument of Perigee = 163.607242 (deg)
      PMD Mean Anomaly = 0.000000 (deg)

**OUTPUT**

      Suggested Perigee Altitude = 517.094198 (km)
      Suggested Apogee Altitude = 523.341924 (km)
      Returned Error Message = Passes LEO reentry orbit criteria.

      Released Year = 2028 (yr)
      Requirement = 61
      Compliance Status = Pass

==============

=============== End of Requirement 4.6 ===============
07 24 2021; 11:55:52AM *********Processing Requirement 4.7-1
      Return Status :  Passed

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

name = WVSAT C/D
quantity = 1
parent = 0
materialID = 8
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.100000

name = 1U CubeSat Chassis
quantity = 1
parent = 1
materialID = 8
```

```
type = Box
Aero Mass = 0.360000
Thermal Mass = 0.360000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.100000

name = Simplex TX Antenna
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.014000
Thermal Mass = 0.014000
Diameter/Width = 0.030000
Length = 0.030000
Height = 0.009000

name = Simplex RX Antenna
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.014000
Thermal Mass = 0.014000
Diameter/Width = 0.030000
Length = 0.030000
Height = 0.009000

name = 1U Solar Array
quantity = 4
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.028000
Thermal Mass = 0.028000
Diameter/Width = 0.080000
Length = 0.100000

name = Sep Switches
quantity = 2
parent = 1
materialID = 54
type = Box
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.010250
Length = 0.020000
Height = 0.006500

name = PIN Diode
quantity = 1
parent = 1
materialID = 19
```

```
type = Flat Plate
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.015000
Length = 0.025000

name = Spring Plungers
quantity = 2
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.004000
Length = 0.020000

name = Dual Lipo Battery Pack
quantity = 6
parent = 1
materialID = 5
type = Box
Aero Mass = 0.027000
Thermal Mass = 0.027000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.017000

name = NSL EPS + S3 + RX
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.214000
Thermal Mass = 0.214000
Diameter/Width = 0.075000
Length = 0.075000
Height = 0.020000

name = Fasteners / Spacers
quantity = 30
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.002500
Thermal Mass = 0.002500
Diameter/Width = 0.005000
Length = 0.025000

name = Cabling
quantity = 1
parent = 1
materialID = 19
type = Cylinder
Aero Mass = 0.100000
```

```
Thermal Mass = 0.100000
Diameter/Width = 0.020000
Length = 0.500000

name = Magnetorquer - Long
quantity = 2
parent = 1
materialID = 46
type = Box
Aero Mass = 0.122000
Thermal Mass = 0.122000
Diameter/Width = 0.020000
Length = 0.057000
Height = 0.018000

name = Magnetorquer - Short
quantity = 4
parent = 1
materialID = 46
type = Box
Aero Mass = 0.030000
Thermal Mass = 0.030000
Diameter/Width = 0.020000
Length = 0.120000
Height = 0.012000

name = ADCS PCB
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.024000
Thermal Mass = 0.024000
Diameter/Width = 0.051000
Length = 0.070000

name = RBF Switch Assembly
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.003000
Thermal Mass = 0.003000
Diameter/Width = 0.010000
Length = 0.012000
Height = 0.010000

name = Diag Assembly
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.003000
Thermal Mass = 0.003000
```

```
Diameter/Width = 0.012000
Length = 0.012000
Height = 0.012000

name = 1U Rail Tabs
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.016000
Thermal Mass = 0.016000
Diameter/Width = 0.015000
Length = 0.113000
Height = 0.004000

name = Extra Mass Added
quantity = 1
parent = 1
materialID = 19
type = Box
Aero Mass = 0.230000
Thermal Mass = 0.230000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.016000

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

name = WVSAT C/D
Demise Altitude = 77.993370
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U CubeSat Chassis
Demise Altitude = 74.579887
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Simplex TX Antenna
Demise Altitude = 76.887932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Simplex RX Antenna
Demise Altitude = 76.887932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U Solar Array
```

```
Demise Altitude = 77.500694
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Sep Switches
Demise Altitude = 76.374245
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = PIN Diode
Demise Altitude = 76.862518
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Spring Plungers
Demise Altitude = 76.107460
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Dual Lipo Battery Pack
Demise Altitude = 76.611984
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = NSL EPS + S3 + RX
Demise Altitude = 74.321121
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Fasteners / Spacers
Demise Altitude = 76.280540
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Cabling
Demise Altitude = 77.263580
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Magnetorquer - Long
Demise Altitude = 67.066696
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Magnetorquer - Short
```

```
Demise Altitude = 0.000000
Debris Casualty Area = 1.658006
Impact Kinetic Energy = 7.240037

************************************
name = ADCS PCB
Demise Altitude = 77.199356
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = RBF Switch Assembly
Demise Altitude = 76.732712
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Diag Assembly
Demise Altitude = 77.247299
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U Rail Tabs
Demise Altitude = 76.919083
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Extra Mass Added
Demise Altitude = 71.110817
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************

=============== End of Requirement 4.7-1 ===============
07 24 2021; 11:55:52AM Project Data Saved To File
08 11 2021; 12:53:24PM Activity Log Started
08 11 2021; 12:53:24PM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT CD\
08 11 2021; 12:53:53PM Processing Requirement 4.6   Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT C/D
      Space Structure Type = Payload

      Perigee Altitude = 525.000000 (km)
```

```
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.008500 (m^2/kg)
      Start Year = 2021.000000 (yr)
      Initial Mass = 1.500000 (kg)
      Final Mass = 1.500000 (kg)
      Duration = 2.000000 (yr)
      Station Kept = False
      Abandoned = True
      PMD Perigee Altitude = 517.194132 (km)
      PMD Apogee Altitude = 523.241302 (km)
      PMD Inclination = 97.072511 (deg)
      PMD RAAN = 313.751234 (deg)
      PMD Argument of Perigee = 162.829475 (deg)
      PMD Mean Anomaly = 0.000000 (deg)

**OUTPUT**

      Suggested Perigee Altitude = 517.194132 (km)
      Suggested Apogee Altitude = 523.241302 (km)
      Returned Error Message = Passes LEO reentry orbit criteria.

      Released Year = 2028 (yr)
      Requirement = 61
      Compliance Status = Pass

==============

=============== End of Requirement 4.6 ===============
08 11 2021; 12:53:53PM *********Processing Requirement 4.7-1
      Return Status :  Passed

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

name = WVSAT C/D
quantity = 1
parent = 0
materialID = 8
type = Box
Aero Mass = 1.500000
Thermal Mass = 1.500000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.100000

name = 1U CubeSat Chassis
quantity = 1
parent = 1
materialID = 8
type = Box
```

```
Aero Mass = 0.360000
Thermal Mass = 0.360000
Diameter/Width = 0.100000
Length = 0.100000
Height = 0.100000

name = Simplex TX Antenna
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.014000
Thermal Mass = 0.014000
Diameter/Width = 0.030000
Length = 0.030000
Height = 0.009000

name = Simplex RX Antenna
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.014000
Thermal Mass = 0.014000
Diameter/Width = 0.030000
Length = 0.030000
Height = 0.009000

name = 1U Solar Array
quantity = 4
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.028000
Thermal Mass = 0.028000
Diameter/Width = 0.080000
Length = 0.100000

name = Sep Switches
quantity = 2
parent = 1
materialID = 54
type = Box
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.010250
Length = 0.020000
Height = 0.006500

name = PIN Diode
quantity = 1
parent = 1
materialID = 19
type = Flat Plate
```

```
Aero Mass = 0.005000
Thermal Mass = 0.005000
Diameter/Width = 0.015000
Length = 0.025000

name = Spring Plungers
quantity = 2
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.002000
Thermal Mass = 0.002000
Diameter/Width = 0.004000
Length = 0.020000

name = Dual Lipo Battery Pack
quantity = 6
parent = 1
materialID = 5
type = Box
Aero Mass = 0.027000
Thermal Mass = 0.027000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.017000

name = NSL EPS + S3 + RX
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.214000
Thermal Mass = 0.214000
Diameter/Width = 0.075000
Length = 0.075000
Height = 0.020000

name = Fasteners / Spacers
quantity = 30
parent = 1
materialID = 54
type = Cylinder
Aero Mass = 0.002500
Thermal Mass = 0.002500
Diameter/Width = 0.005000
Length = 0.025000

name = Cabling
quantity = 1
parent = 1
materialID = 19
type = Cylinder
Aero Mass = 0.100000
Thermal Mass = 0.100000
```

```
Diameter/Width = 0.020000
Length = 0.500000

name = Magnetorquer - Long
quantity = 2
parent = 1
materialID = 46
type = Box
Aero Mass = 0.122000
Thermal Mass = 0.122000
Diameter/Width = 0.020000
Length = 0.057000
Height = 0.018000

name = Magnetorquer - Short
quantity = 4
parent = 1
materialID = 46
type = Box
Aero Mass = 0.030000
Thermal Mass = 0.030000
Diameter/Width = 0.020000
Length = 0.120000
Height = 0.012000

name = ADCS PCB
quantity = 1
parent = 1
materialID = 23
type = Flat Plate
Aero Mass = 0.024000
Thermal Mass = 0.024000
Diameter/Width = 0.051000
Length = 0.070000

name = RBF Switch Assembly
quantity = 1
parent = 1
materialID = 8
type = Box
Aero Mass = 0.003000
Thermal Mass = 0.003000
Diameter/Width = 0.010000
Length = 0.012000
Height = 0.010000

name = Diag Assembly
quantity = 1
parent = 1
materialID = 23
type = Box
Aero Mass = 0.003000
Thermal Mass = 0.003000
Diameter/Width = 0.012000
```

```
Length = 0.012000
Height = 0.012000

name = 1U Rail Tabs
quantity = 2
parent = 1
materialID = 8
type = Box
Aero Mass = 0.016000
Thermal Mass = 0.016000
Diameter/Width = 0.015000
Length = 0.113000
Height = 0.004000

name = Extra Mass Added
quantity = 1
parent = 1
materialID = 19
type = Box
Aero Mass = 0.230000
Thermal Mass = 0.230000
Diameter/Width = 0.050000
Length = 0.050000
Height = 0.016000

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

name = WVSAT C/D
Demise Altitude = 77.993370
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U CubeSat Chassis
Demise Altitude = 74.579887
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Simplex TX Antenna
Demise Altitude = 76.887932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Simplex RX Antenna
Demise Altitude = 76.887932
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U Solar Array
Demise Altitude = 77.500694
```

```
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Sep Switches
Demise Altitude = 76.374245
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = PIN Diode
Demise Altitude = 76.862518
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Spring Plungers
Demise Altitude = 76.107460
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Dual Lipo Battery Pack
Demise Altitude = 76.611984
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = NSL EPS + S3 + RX
Demise Altitude = 74.321121
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Fasteners / Spacers
Demise Altitude = 76.280540
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Cabling
Demise Altitude = 77.263580
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Magnetorquer - Long
Demise Altitude = 67.066696
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Magnetorquer - Short
Demise Altitude = 0.000000
```

```
Debris Casualty Area = 1.658006
Impact Kinetic Energy = 7.240037

************************************
name = ADCS PCB
Demise Altitude = 77.199356
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = RBF Switch Assembly
Demise Altitude = 76.732712
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Diag Assembly
Demise Altitude = 77.247299
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = 1U Rail Tabs
Demise Altitude = 76.919083
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************
name = Extra Mass Added
Demise Altitude = 71.110817
Debris Casualty Area = 0.000000
Impact Kinetic Energy = 0.000000

************************************

=============== End of Requirement 4.7-1 ===============
08 11 2021; 12:53:53PM Project Data Saved To File
08 11 2021; 13:00:48PM Processing Requirement 4.5-1:     Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT C/D
      Space Structure Type = Payload
      Perigee Altitude = 525.000 (km)
      Apogee Altitude = 525.000 (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 = 0.0085 (m^2/kg)
      Start Year = 2021.000 (yr)
      Initial Mass = 1.500 (kg)
      Final Mass = 1.500 (kg)
      Duration = 2.000 (yr)
      Station-Kept = False
      Abandoned = True

**OUTPUT**

      Collision Probability = 1.9981E-07
      Returned Message: Normal Processing
      Date Range Message: Normal Date Range
      Status = Pass

==============

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

08 11 2021; 13:01:50PM Science and Engineering - Orbit Lifetime/Dwell
Time

**INPUT**

      Start Year = 2021.800000 (yr)
      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Area-To-Mass Ratio = 0.008500 (m^2/kg)

**OUTPUT**

      Orbital Lifetime from Startyr = 6.965092 (yr)
      Time Spent in LEO during Lifetime  = 6.965092 (yr)
      Last year of Propagation = 2028 (yr)
      Returned Error Message: Object reentered
08 11 2021; 13:02:42PM Science and Engineering - Apogee/Perigee History
for a Given Orbit

**INPUT**

      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.008500 (m^2/kg)
      Start Year = 2021.800000 (yr)
      Integration Time = 10.000000 (yr)

**OUTPUT**
```

```
      Plot
08 11 2021; 16:33:16PM Project Data Saved To File
08 11 2021; 16:37:12PM Activity Log Started
08 11 2021; 16:37:12PM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT CD\
08 11 2021; 16:37:37PM Closed Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT CD\
08 12 2021; 11:39:08AM Mission Editor Changes Applied
08 12 2021; 11:39:08AM Project Data Saved To File
08 12 2021; 11:46:21AM Processing Requirement 4.5-1:     Return Status :
Passed
==============
Run Data
==============
**INPUT**
      Space Structure Name = WVSAT C/D case2
      Space Structure Type = Payload
      Perigee Altitude = 525.000 (km)
      Apogee Altitude = 525.000 (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 = 0.0116 (m^2/kg)
      Start Year = 2021.000 (yr)
      Initial Mass = 1.500 (kg)
      Final Mass = 1.500 (kg)
      Duration = 2.000 (yr)
      Station-Kept = False
      Abandoned = True
**OUTPUT**
      Collision Probability = 2.2761E-07
      Returned Message: Normal Processing
      Date Range Message: Normal Date Range
      Status = Pass
==============
=============== End of Requirement 4.5-1 ===============

08 11 2021; 17:12:49PM Science and Engineering - Orbit Lifetime/Dwell
Time

**INPUT**

      Start Year = 2021.800000 (yr)
      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Area-To-Mass Ratio = 0.011600 (m^2/kg)

**OUTPUT**
```

```
      Orbital Lifetime from Startyr = 5.070500 (yr)
      Time Spent in LEO during Lifetime  = 5.070500 (yr)
      Last year of Propagation = 2026 (yr)
      Returned Error Message: Object reentered
08 11 2021; 17:13:44PM Saved Project As C:\Users\mille\Desktop\WVSAT
DAS\WVSAT CD2\
08 11 2021; 17:13:44PM Closed Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT CD\
```

Case 2 WVSAT A

```
08 11 2021; 16:37:45PM Activity Log Started
08 11 2021; 16:37:45PM Project Files copied from
C:\Users\mille\Desktop\WVSAT DAS\WVSAT A\
08 11 2021; 16:37:45PM Project Data Saved To File
08 11 2021; 16:38:07PM Mission Editor Changes Applied
08 11 2021; 16:38:07PM Project Data Saved To File
08 11 2021; 16:38:33PM Mission Editor Changes Applied
08 11 2021; 16:38:33PM Project Data Saved To File
08 11 2021; 16:38:51PM Processing Requirement 4.5-1:     Return Status :
Incomplete

==============
Run Data
==============
Assessment not run or incomplete

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

08 11 2021; 16:42:14PM Processing Requirement 4.5-1:     Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT A case2
      Space Structure Type = Payload
      Perigee Altitude = 525.000 (km)
      Apogee Altitude = 525.000 (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 = 0.0291 (m^2/kg)
      Start Year = 2021.000 (yr)
      Initial Mass = 1.133 (kg)
      Final Mass = 1.133 (kg)
      Duration = 2.000 (yr)
      Station-Kept = False
      Abandoned = True
```

```
**OUTPUT**

      Collision Probability = 2.7113E-07
      Returned Message: Normal Processing
      Date Range Message: Normal Date Range
      Status = Pass

==============

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

08 11 2021; 16:58:41PM Science and Engineering - Orbit Lifetime/Dwell
Time

**INPUT**

      Start Year = 2021.000000 (yr)
      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Area-To-Mass Ratio = 0.029100 (m^2/kg)

**OUTPUT**

      Orbital Lifetime from Startyr = 3.559206 (yr)
      Time Spent in LEO during Lifetime  = 3.559206 (yr)
      Last year of Propagation = 2024 (yr)
      Returned Error Message: Object reentered
08 11 2021; 16:59:54PM Project Data Saved To File
08 11 2021; 16:59:57PM Activity Log Started
08 11 2021; 16:59:57PM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT A2\
08 11 2021; 17:00:04PM Closed Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT A2\
```

Case 2 WVSAT B

```
08 11 2021; 17:00:14PM Activity Log Started
08 11 2021; 17:00:14PM Project Files copied from
C:\Users\mille\Desktop\WVSAT DAS\WVSAT B\
08 11 2021; 17:00:14PM Project Data Saved To File
08 11 2021; 17:00:46PM Mission Editor Changes Applied
08 11 2021; 17:00:46PM Project Data Saved To File
08 11 2021; 17:04:42PM Processing Requirement 4.5-1:     Return Status :
Passed

==============
Run Data
==============
```

INPUT

Space Structure Name = WVSAT B case2
Space Structure Type = Payload
Perigee Altitude = 525.000 (km)
Apogee Altitude = 525.000 (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 = 0.0371 (m^2/kg)
Start Year = 2021.000 (yr)
Initial Mass = 0.840 (kg)
Final Mass = 0.840 (kg)
Duration = 2.000 (yr)
Station-Kept = False
Abandoned = True

OUTPUT

Collision Probability = 2.4228E-07
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

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

08 11 2021; 17:05:14PM Science and Engineering - Orbit Lifetime/Dwell Time

INPUT

Start Year = 2021.800000 (yr)
Perigee Altitude = 525.000000 (km)
Apogee Altitude = 525.000000 (km)
Inclination = 97.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Area-To-Mass Ratio = 0.037100 (m^2/kg)

OUTPUT

Orbital Lifetime from Startyr = 2.518823 (yr)
Time Spent in LEO during Lifetime = 2.518823 (yr)
Last year of Propagation = 2024 (yr)
Returned Error Message: Object reentered
08 11 2021; 17:06:48PM Project Data Saved To File
08 11 2021; 17:06:51PM Activity Log Started
08 11 2021; 17:06:51PM Opened Project C:\Users\mille\Desktop\WVSAT DAS\WVSAT B2\
08 11 2021; 17:07:04PM Closed Project C:\Users\mille\Desktop\WVSAT DAS\WVSAT B2\

Case 2 WVSAT C,D

```
08 11 2021; 17:13:44PM Activity Log Started
08 11 2021; 17:13:44PM Project Files copied from
C:\Users\mille\Desktop\WVSAT DAS\WVSAT CD\
08 11 2021; 17:13:44PM Project Data Saved To File
08 11 2021; 17:13:50PM Activity Log Started
08 11 2021; 17:13:50PM Opened Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT CD2\
08 11 2021; 17:14:29PM Saved Project As C:\Users\mille\Desktop\WVSAT
DAS\WVSAT ABCD\
08 11 2021; 17:14:29PM Closed Project C:\Users\mille\Desktop\WVSAT
DAS\WVSAT CD2\
08 12 2021; 11:32:52AM Activity Log Started

08 12 2021; 11:39:08AM Mission Editor Changes Applied
08 12 2021; 11:39:08AM Project Data Saved To File
08 12 2021; 11:46:21AM Processing Requirement 4.5-1:     Return Status :
Passed

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

**INPUT**

      Space Structure Name = WVSAT C/D case2
      Space Structure Type = Payload
      Perigee Altitude = 525.000 (km)
      Apogee Altitude = 525.000 (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 = 0.0116 (m^2/kg)
      Start Year = 2021.000 (yr)
      Initial Mass = 1.500 (kg)
      Final Mass = 1.500 (kg)
      Duration = 2.000 (yr)
      Station-Kept = False
      Abandoned = True

**OUTPUT**

      Collision Probability = 2.2761E-07
      Returned Message: Normal Processing
      Date Range Message: Normal Date Range
      Status = Pass

==============
```

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

08 12 2021; 11:47:21AM Science and Engineering - Orbit Lifetime/Dwell
Time

**INPUT**

      Start Year = 2021.800000 (yr)
      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Area-To-Mass Ratio = 0.011600 (m^2/kg)

**OUTPUT**

      Orbital Lifetime from Startyr = 5.070500 (yr)
      Time Spent in LEO during Lifetime  = 5.070500 (yr)
      Last year of Propagation = 2026 (yr)
      Returned Error Message: Object reentered
08 12 2021; 11:47:46AM Science and Engineering - Apogee/Perigee History
for a Given Orbit

**INPUT**

      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Mean Anomaly = 0.000000 (deg)
      Area-To-Mass Ratio = 0.011600 (m^2/kg)
      Start Year = 2021.800000 (yr)
      Integration Time = 10.000000 (yr)

**OUTPUT**

      Plot
08 12 2021; 11:48:12AM Project Data Saved To File
```

Case 3 All

```
08 11 2021; 17:14:29PM Activity Log Started
08 11 2021; 17:14:29PM Project Files copied from
C:\Users\mille\Desktop\WVSAT DAS\WVSAT CD2\
08 11 2021; 17:14:29PM Project Data Saved To File
08 11 2021; 17:15:35PM Mission Editor Changes Applied
08 11 2021; 17:15:35PM Project Data Saved To File
08 11 2021; 17:35:50PM Processing Requirement 4.5-1:     Return Status :
Passed

==============
Run Data
```

==========

INPUT

Space Structure Name = WVSAT ABCD undeployed stack
Space Structure Type = Payload
Perigee Altitude = 525.000 (km)
Apogee Altitude = 525.000 (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 = 0.0026 (m^2/kg)
Start Year = 2021.000 (yr)
Initial Mass = 4.973 (kg)
Final Mass = 4.973 (kg)
Duration = 2.000 (yr)
Station-Kept = False
Abandoned = True

OUTPUT

Collision Probability = 5.6975E-07
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

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

08 11 2021; 17:36:07PM Science and Engineering - Orbit Lifetime/Dwell Time

INPUT

Start Year = 2021.800000 (yr)
Perigee Altitude = 525.000000 (km)
Apogee Altitude = 525.000000 (km)
Inclination = 97.000000 (deg)
RAAN = 0.000000 (deg)
Argument of Perigee = 0.000000 (deg)
Area-To-Mass Ratio = 0.002600 (m^2/kg)

OUTPUT

Orbital Lifetime from Startyr = 22.390144 (yr)
Time Spent in LEO during Lifetime = 22.390144 (yr)
Last year of Propagation = 2044 (yr)
Returned Error Message: Object reentered
08 11 2021; 17:36:45PM Project Data Saved To File
08 11 2021; 17:36:49PM Saved Project As C:\Users\mille\Desktop\WVSAT DAS\WVSAT ABCD4\

08 11 2021; 17:36:49PM Closed Project C:\Users\mille\Desktop\WVSAT DAS\WVSAT ABCD\

Case 4 All

08 11 2021; 17:36:49PM Activity Log Started
08 11 2021; 17:36:49PM Project Files copied from C:\Users\mille\Desktop\WVSAT DAS\WVSAT ABCD\
08 11 2021; 17:36:49PM Project Data Saved To File
08 11 2021; 17:37:29PM Mission Editor Changes Applied
08 11 2021; 17:37:29PM Project Data Saved To File
08 11 2021; 17:37:36PM Mission Editor Changes Applied
08 11 2021; 17:37:36PM Project Data Saved To File
08 11 2021; 17:43:45PM Processing Requirement 4.5-1: Return Status : Passed

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

INPUT

Space Structure Name = WVSAT ABCD undeployed stack tumbling
Space Structure Type = Payload
Perigee Altitude = 525.000 (km)
Apogee Altitude = 525.000 (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 = 0.0095 (m^2/kg)
Start Year = 2021.000 (yr)
Initial Mass = 4.973 (kg)
Final Mass = 4.973 (kg)
Duration = 2.000 (yr)
Station-Kept = False
Abandoned = True

OUTPUT

Collision Probability = 6.8907E-07
Returned Message: Normal Processing
Date Range Message: Normal Date Range
Status = Pass

==========

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

08 11 2021; 17:44:11PM Science and Engineering - Orbit Lifetime/Dwell Time

```
**INPUT**

      Start Year = 2021.800000 (yr)
      Perigee Altitude = 525.000000 (km)
      Apogee Altitude = 525.000000 (km)
      Inclination = 97.000000 (deg)
      RAAN = 0.000000 (deg)
      Argument of Perigee = 0.000000 (deg)
      Area-To-Mass Ratio = 0.009500 (m^2/kg)

**OUTPUT**

      Orbital Lifetime from Startyr = 6.072553 (yr)
      Time Spent in LEO during Lifetime  = 6.072553 (yr)
      Last year of Propagation = 2027 (yr)
      Returned Error Message: Object reentered
08 11 2021; 17:49:03PM Project Data Saved To File
```