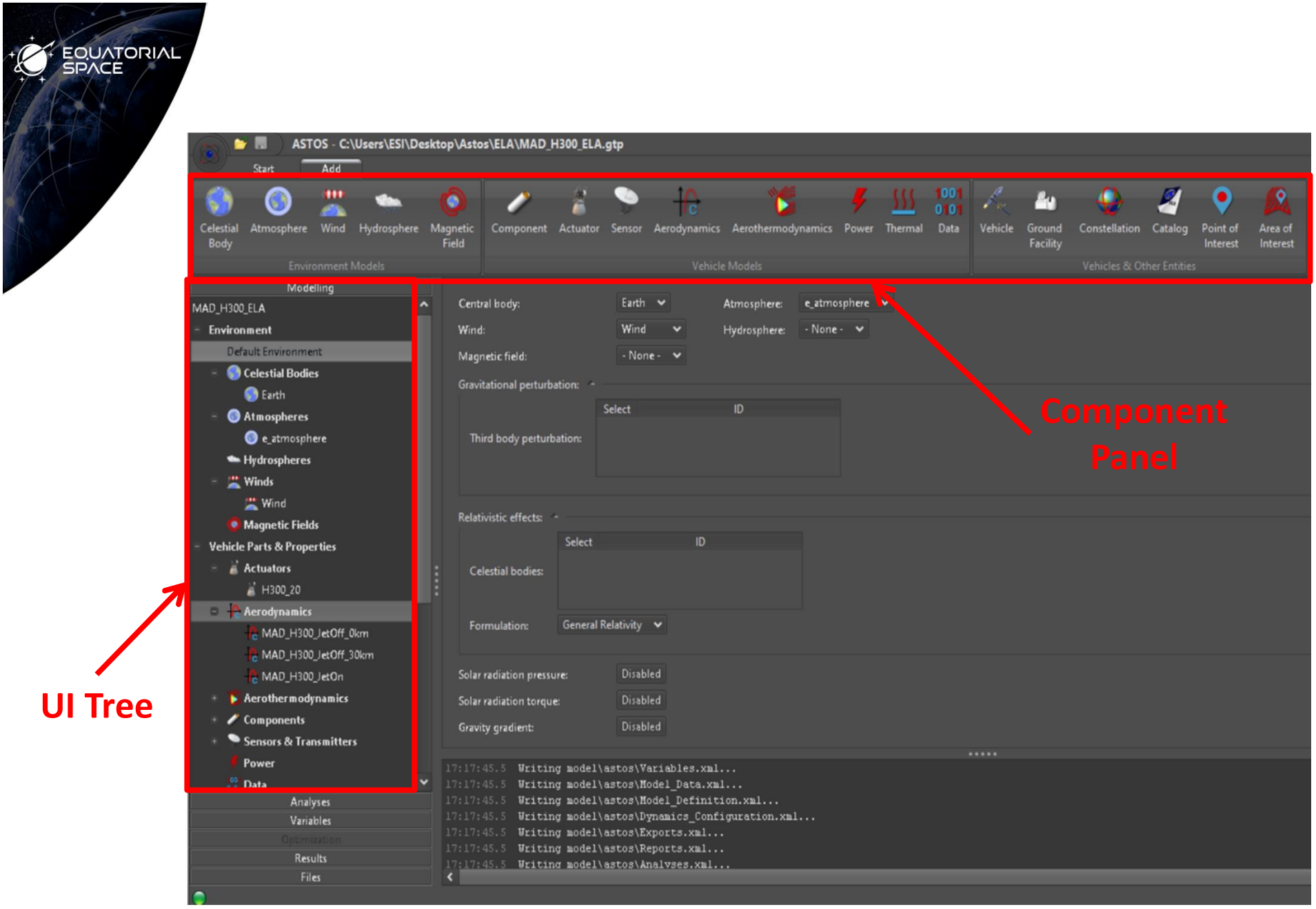
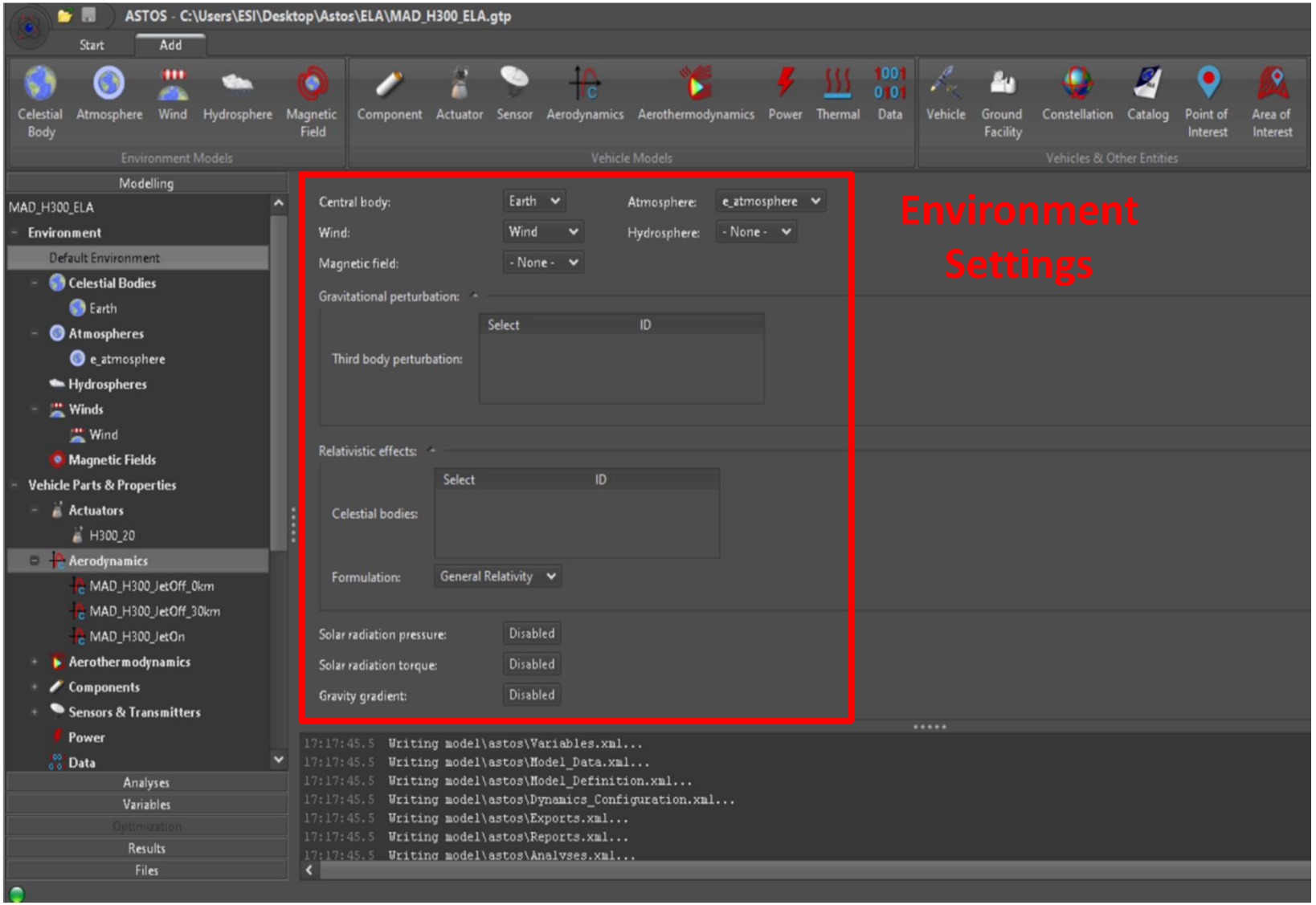
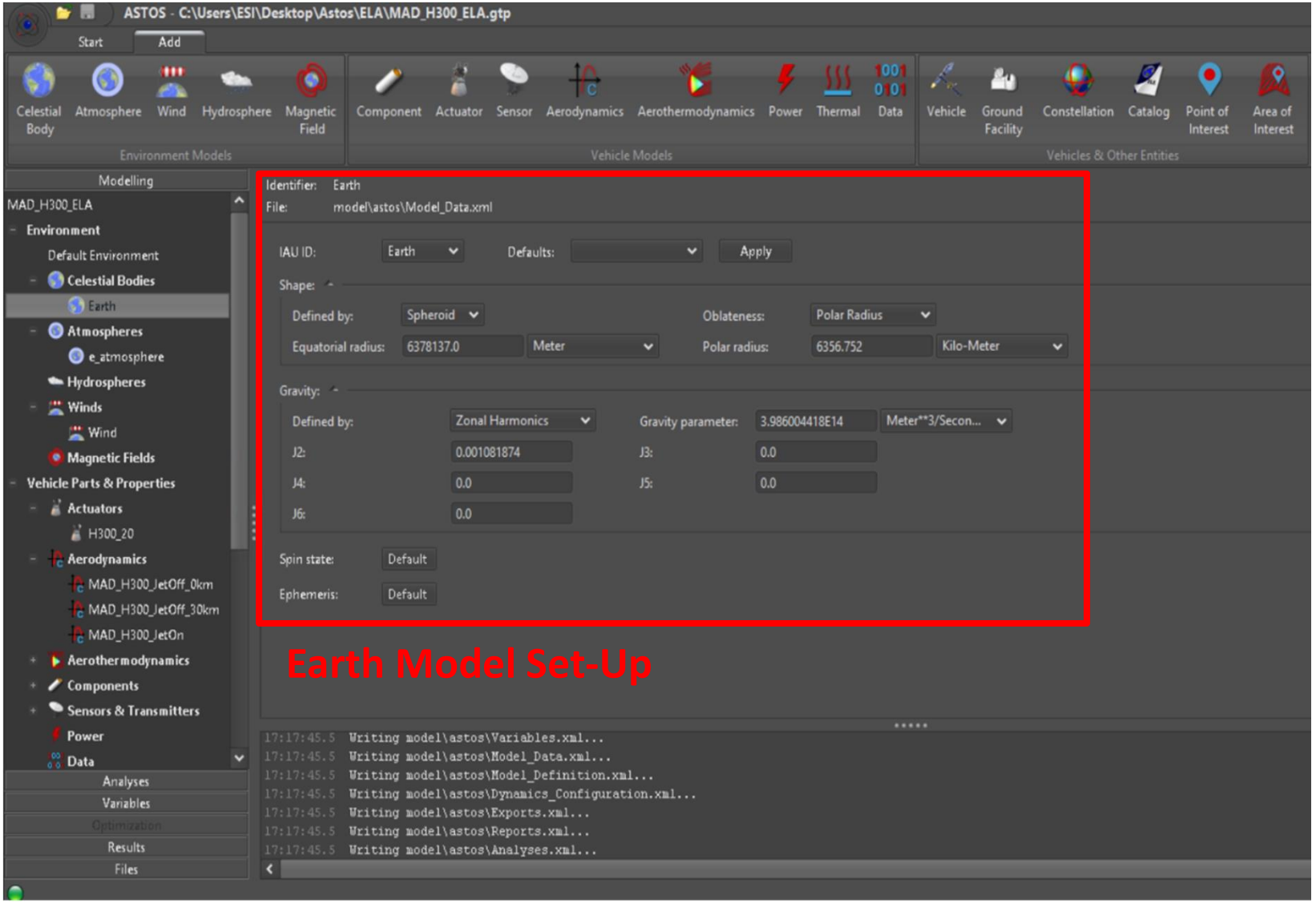
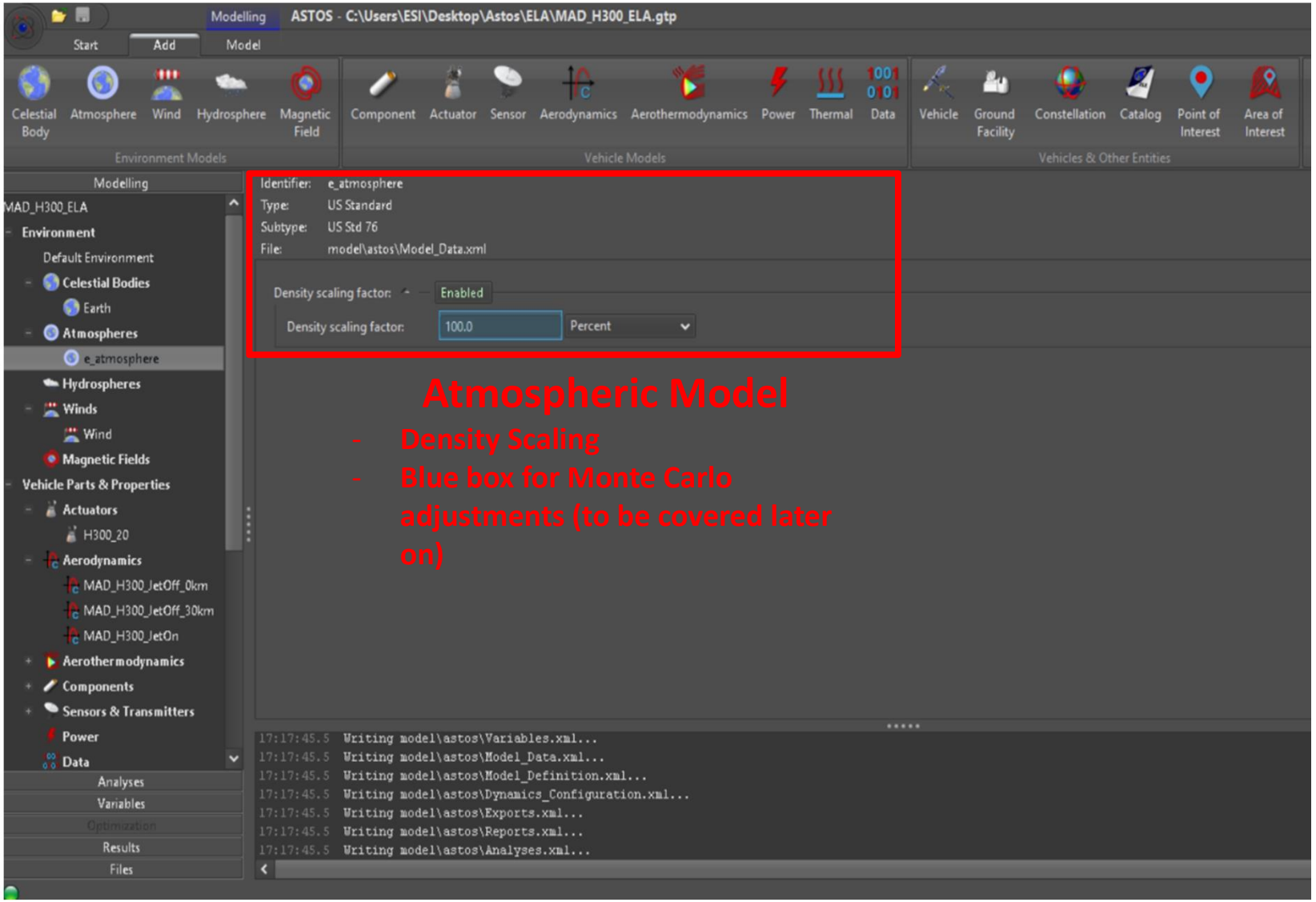
ASTOS UI Overview – Sub-Orbital Rocket Trajectory Modelling

Jason Ong


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Modelling
MAD_H300_ELA
Environment
Default Environment
Celestial Bodies
Earth
Atmospheres
e_atmosphere
Hydrospheres
Winds
Wind
Magnetic Fields
Vehicle Parts & Properties
Actuators
H300_20
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Components
Sensors & Transmitters
Power
Data
Analyses
Variables
Optimization
Results
Files
Central body:
Earth
Atmosphere:
e_atmosphere
Wind:
Wind
Hydrosphere:
- None -
Magnetic field:
- None -
Gravitational perturbation:
Select
ID
Third body perturbation:
Relativistic effects:
Select
ID
Celestial bodies:
Formulation:
General Relativity
Solar radiation pressure:
Disabled
Solar radiation torque:
Disabled
Gravity gradient:
Disabled
17:17:45.5 Writing model\astos\Variables.xml...
17:17:45.5 Writing model\astos\Model_Data.xml...
17:17:45.5 Writing model\astos\Model_Definition.xml...
17:17:45.5 Writing model\astos\Dynamics_Configuration.xml...
17:17:45.5 Writing model\astos\Exports.xml...
17:17:45.5 Writing model\astos\Reports.xml...
17:17:45.5 Writing model\astos\Analyses.xml...
Component Panel
UI Tree

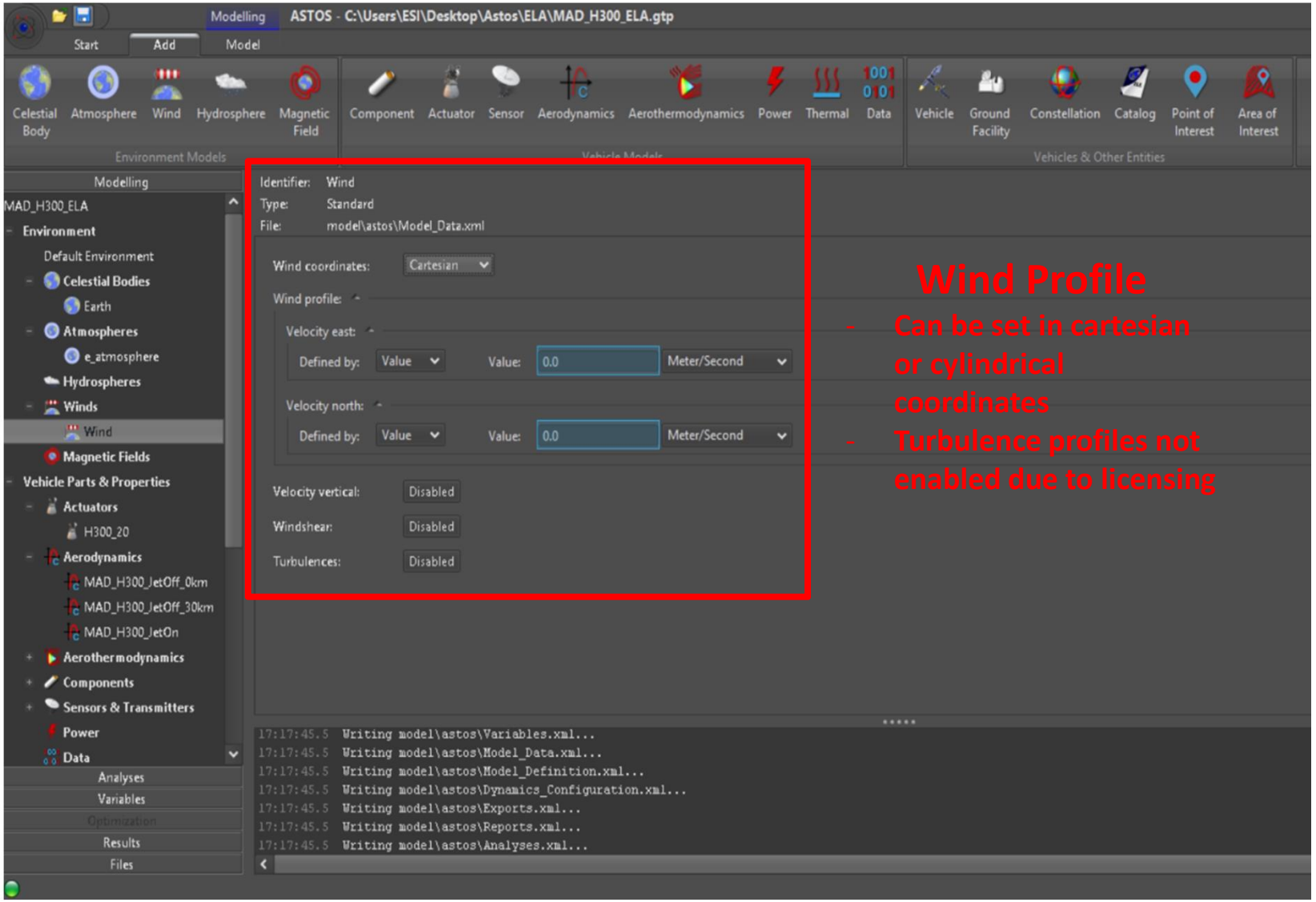

ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Modelling
MAD_H300_ELA
Environment
Default Environment
Celestial Bodies
Earth
Atmospheres
e_atmosphere
Hydrospheres
Winds
Wind
Magnetic Fields
Vehicle Parts & Properties
Actuators
H300_20
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Components
Sensors & Transmitters
Power
Data
Analyses
Variables
Optimization
Results
Files
Central body:
Earth
Atmosphere:
e_atmosphere
Wind:
Wind
Hydrosphere:
- None -
Magnetic field:
- None -
Gravitational perturbation:
Select
ID
Third body perturbation:
Relativistic effects:
Select
ID
Celestial bodies:
Formulation:
General Relativity
Solar radiation pressure:
Disabled
Solar radiation torque:
Disabled
Gravity gradient:
Disabled
Environment Settings
17:17:45.5 Writing model\astos\Variables.xml...
17:17:45.5 Writing model\astos\Model_Data.xml...
17:17:45.5 Writing model\astos\Model_Definition.xml...
17:17:45.5 Writing model\astos\Dynamics_Configuration.xml...
17:17:45.5 Writing model\astos\Exports.xml...
17:17:45.5 Writing model\astos\Reports.xml...
17:17:45.5 Writing model\astos\Analyses.xml...


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Modelling
MAD_H300_ELA
Environment
Default Environment
Celestial Bodies
Earth
Atmospheres
e_atmosphere
Hydrospheres
Winds
Wind
Magnetic Fields
Vehicle Parts & Properties
Actuators
H300_20
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Components
Sensors & Transmitters
Power
Data
Analyses
Variables
Optimization
Results
Files
Identifier: Earth
File: model\astos\Model_Data.xml
IAU ID: Earth
Defaults:
Apply
Shape:
Defined by: Spheroid
Oblateness: Polar Radius
Equatorial radius: 6378137.0
Meter
Polar radius: 6356.752
Kilo-Meter
Gravity:
Defined by: Zonal Harmonics
Gravity parameter: 3.986004418E14
Meter**3/Secon...
J2: 0.001081874
J3: 0.0
J4: 0.0
J5: 0.0
J6: 0.0
Spin state: Default
Ephemeris: Default
Earth Model Set-Up
17:17:45.5 Writing model\astos\Variables.xml...
17:17:45.5 Writing model\astos\Model_Data.xml...
17:17:45.5 Writing model\astos\Model_Definition.xml...
17:17:45.5 Writing model\astos\Dynamics_Configuration.xml...
17:17:45.5 Writing model\astos\Exports.xml...
17:17:45.5 Writing model\astos\Reports.xml...
17:17:45.5 Writing model\astos\Analyses.xml...



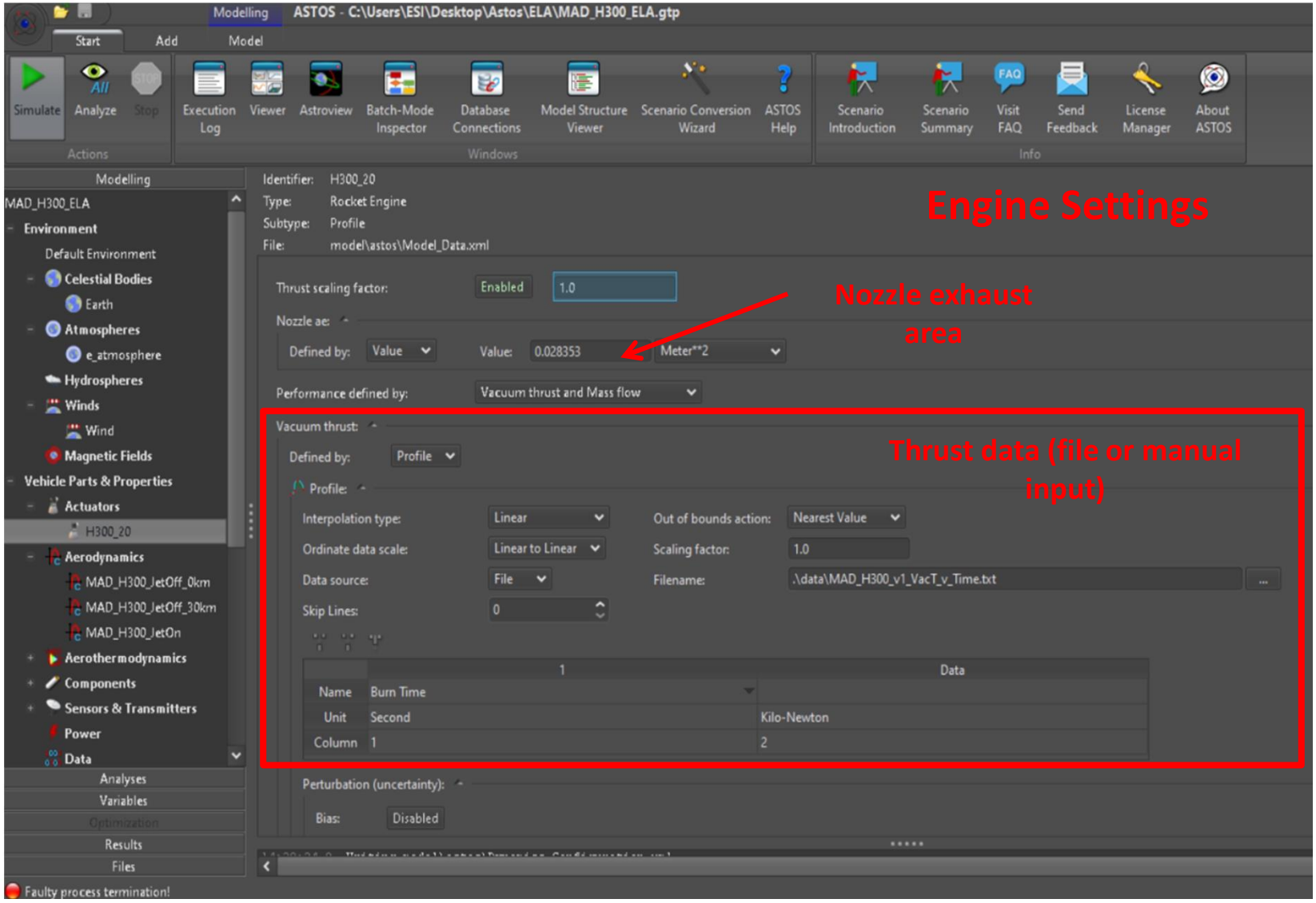
Atmospheric Model

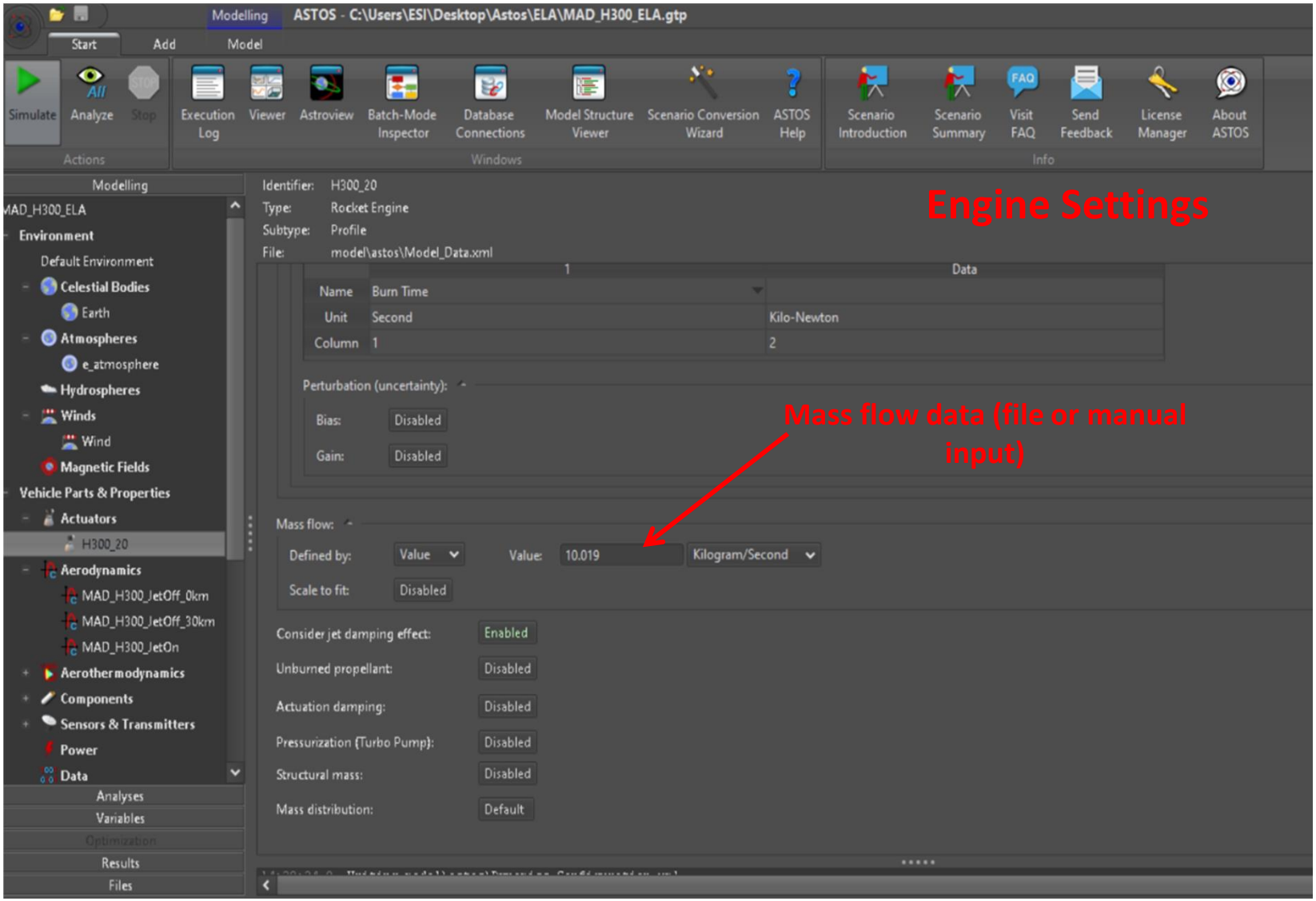
- Density Scaling
- Blue box for Monte Carlo adjustments (to be covered later on)

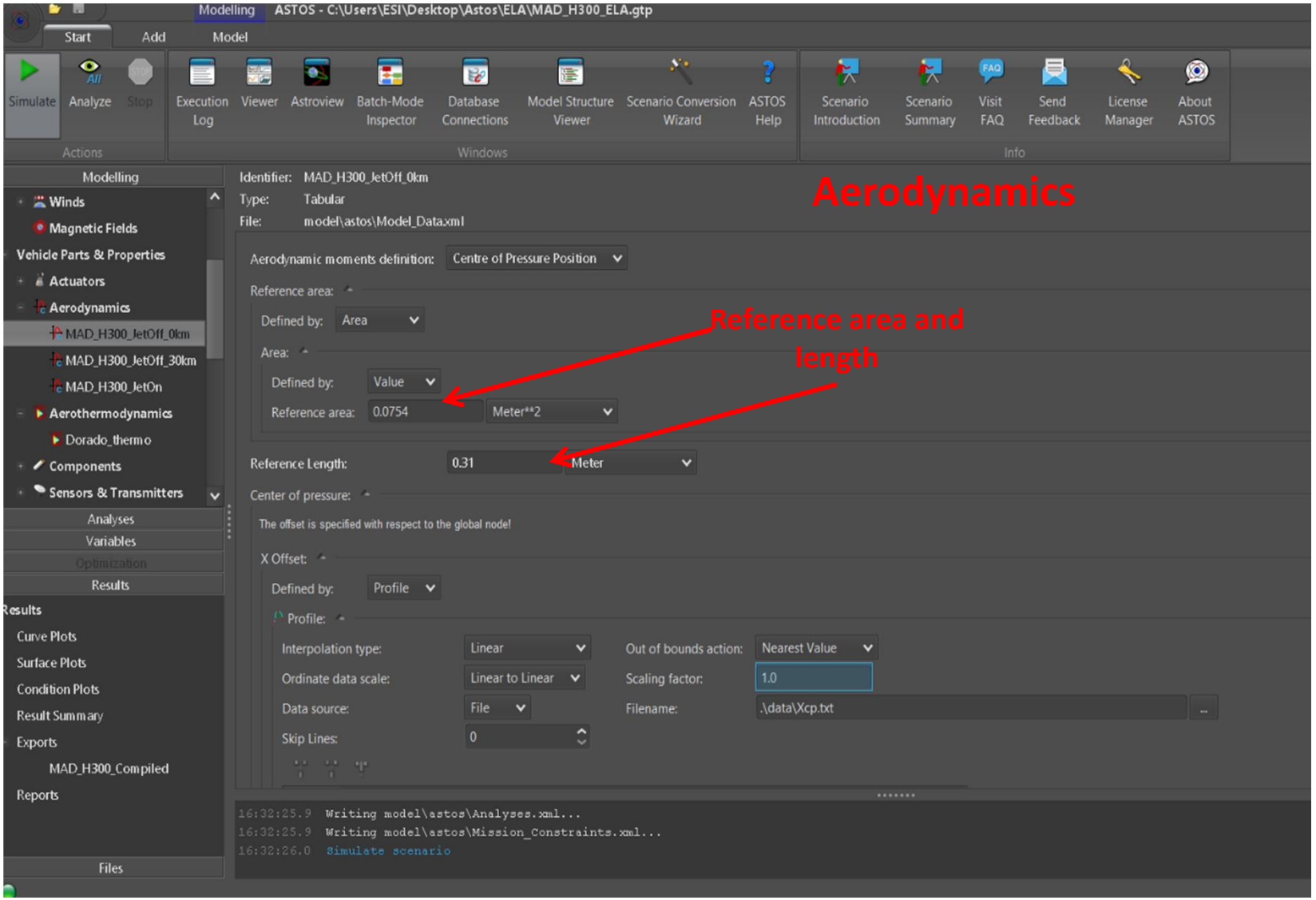


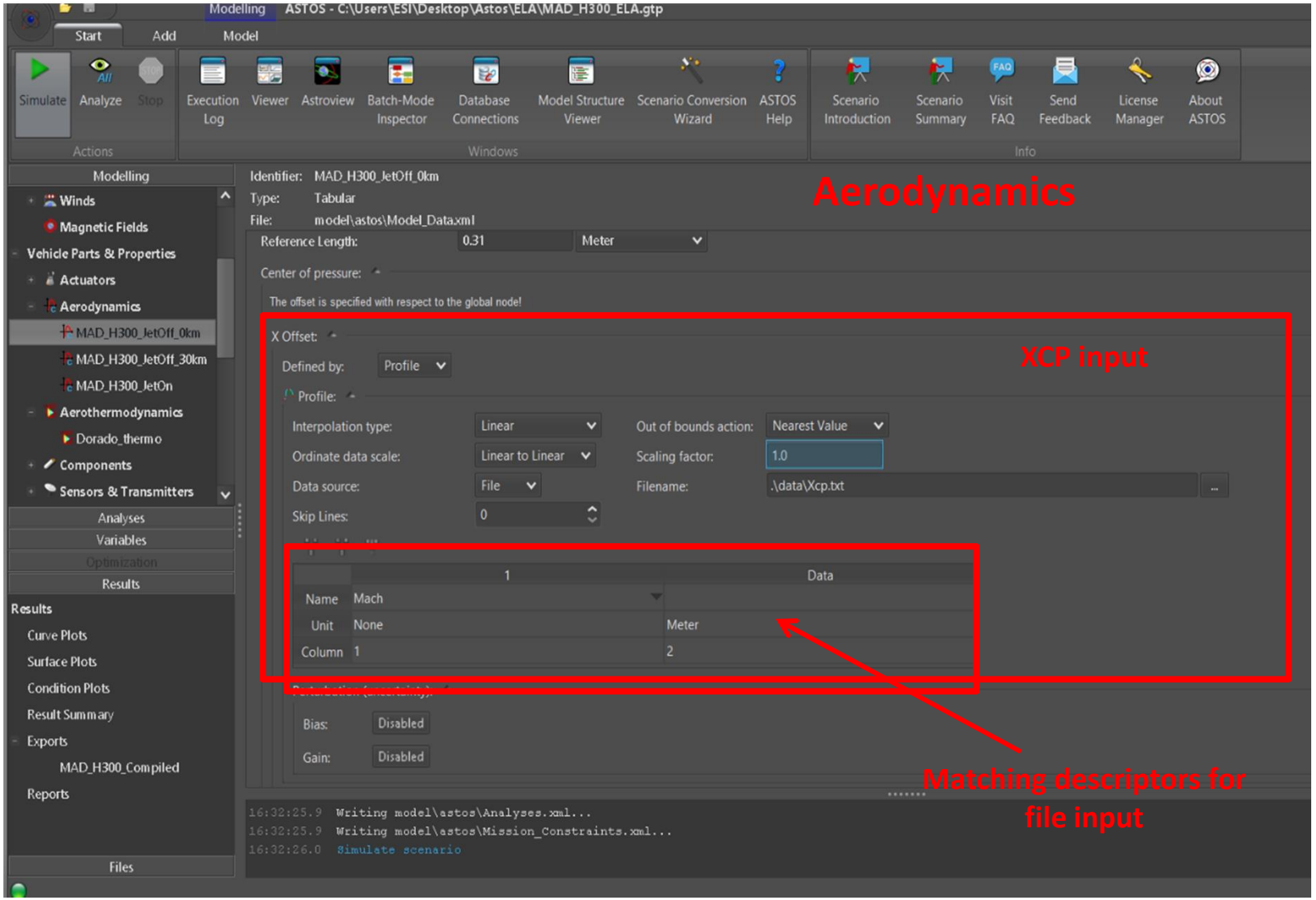
Wind Profile

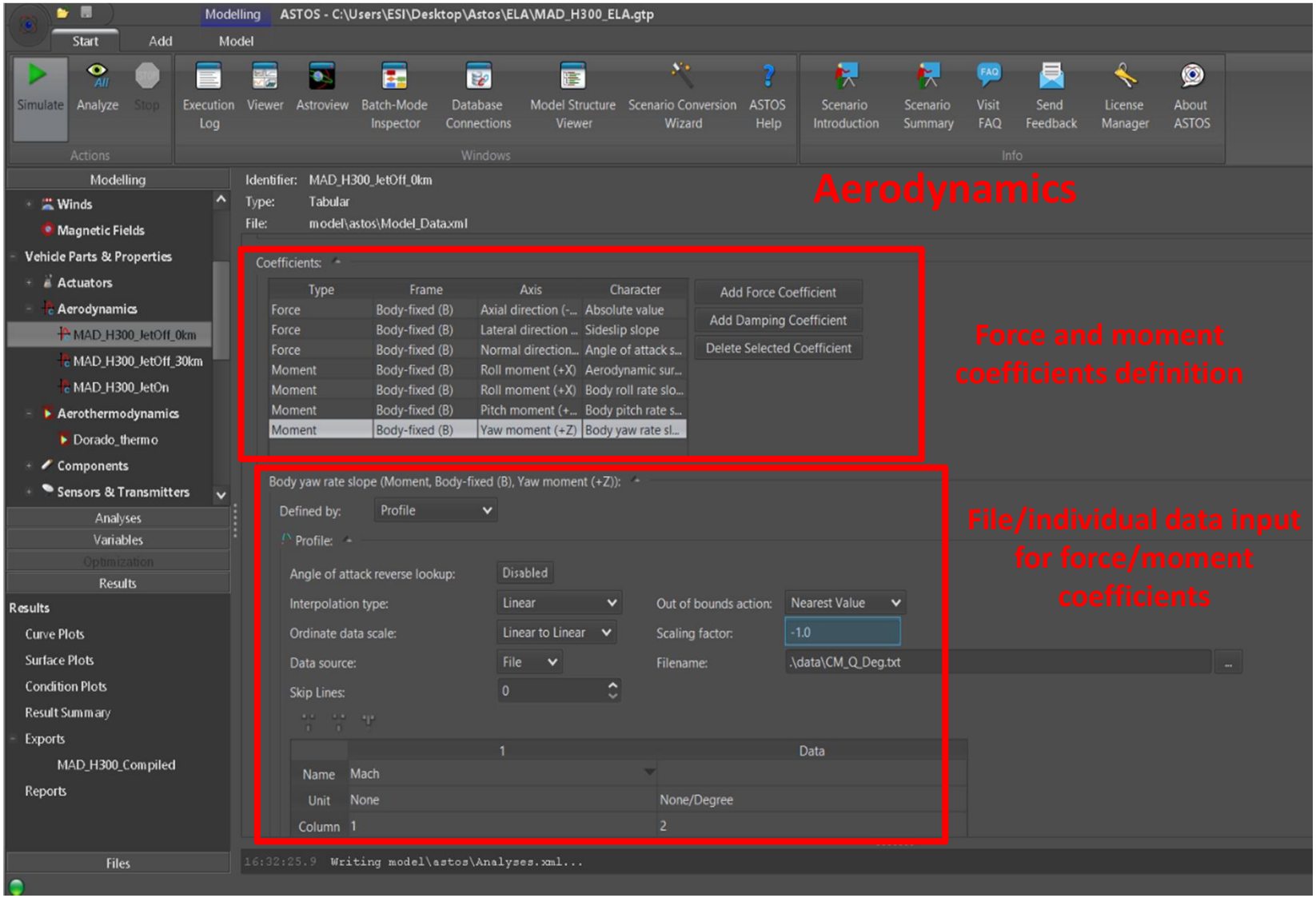
- Can be set in cartesian or cylindrical coordinates
- Turbulence profiles not enabled due to licensing

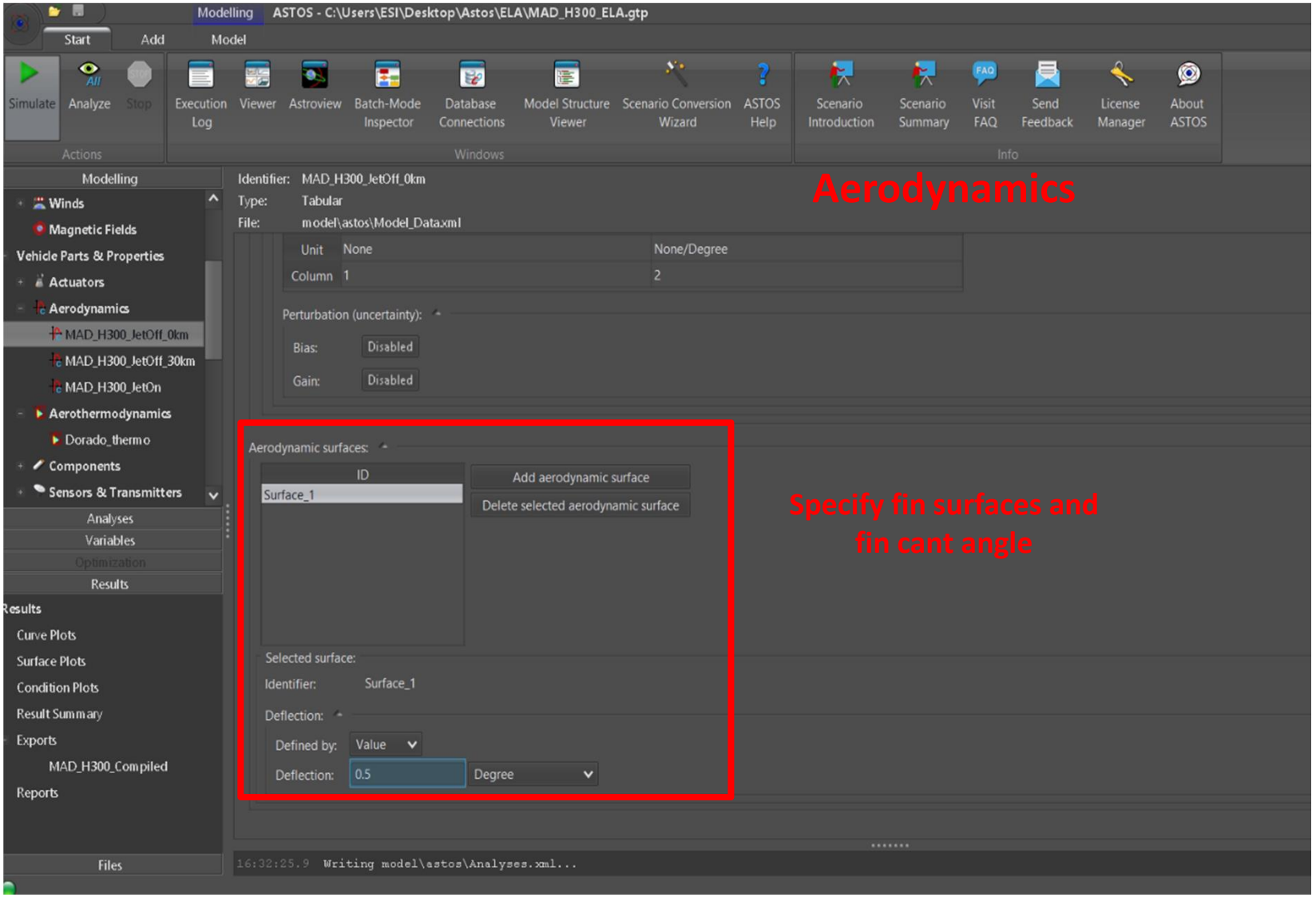

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Simulate
Analyze
Stop
Actions
Execution Log
Viewer
Astroview
Batch-Mode Inspector
Database Connections
Model Structure Viewer
Scenario Conversion Wizard
ASTOS Help
Windows
Scenario Introduction
Scenario Summary
Visit FAQ
Send Feedback
License Manager
About ASTOS
Info
Modelling
MAD_H300_ELA
Environment
Default Environment
Celestial Bodies
Earth
Atmospheres
e_atmosphere
Hydrospheres
Winds
Wind
Magnetic Fields
Vehicle Parts & Properties
Actuators
H300_20
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Components
Sensors & Transmitters
Power
Data
Analyses
Variables
Optimization
Results
Files
Identifier: H300_20
Type: Rocket Engine
Subtype: Profile
File: model\astos\Model_Data.xml
Engine Settings
Thrust scaling factor:
Enabled
1.0
Nozzle ae:
Nozzle exhaust area
Defined by:
Value
Value:
0.028353
Meter**2
Performance defined by:
Vacuum thrust and Mass flow
Vacuum thrust:
Thrust data (file or manual input)
Defined by:
Profile
Profile:
Interpolation type:
Linear
Out of bounds action:
Nearest Value
Ordinate data scale:
Linear to Linear
Scaling factor:
1.0
Data source:
File
Filename:
.\data\MAD_H300_v1_VacT_v_Time.txt
Skip Lines:
0
1
Data
Name
Burn Time
Unit
Second
Kilo-Newton
Column
1
2
Perturbation (uncertainty):
Bias:
Disabled
Faulty process termination!

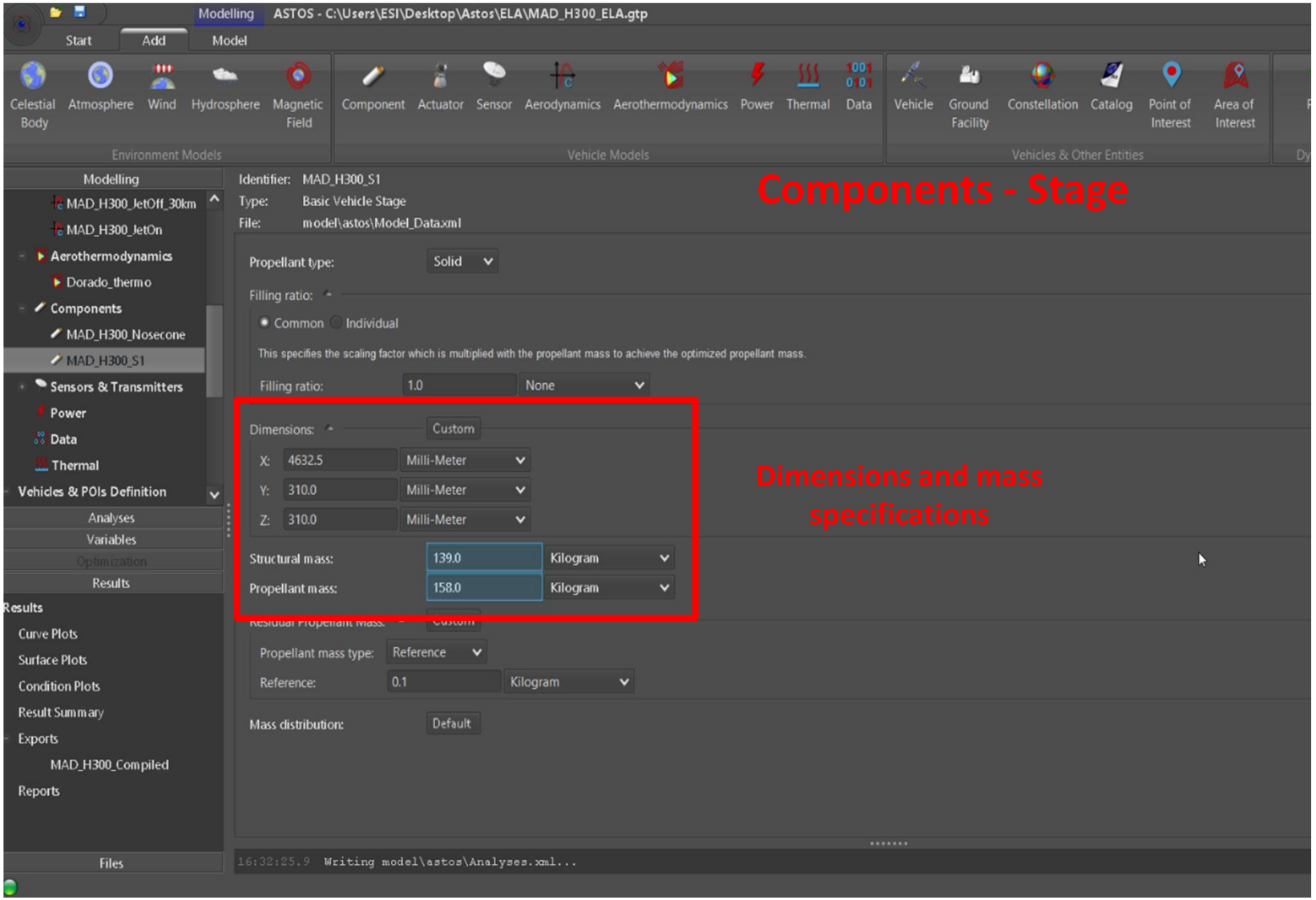

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Simulate
Analyze
Stop
Actions
Execution Log
Viewer
Astroview
Batch-Mode Inspector
Database Connections
Model Structure Viewer
Scenario Conversion Wizard
ASTOS Help
Windows
Scenario Introduction
Scenario Summary
Visit FAQ
Send Feedback
License Manager
About ASTOS
Info
Modelling
MAD_H300_ELA
Environment
Default Environment
Celestial Bodies
Earth
Atmospheres
e_atmosphere
Hydrospheres
Winds
Wind
Magnetic Fields
Vehicle Parts & Properties
Actuators
H300_20
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Components
Sensors & Transmitters
Power
Data
Analyses
Variables
Optimization
Results
Files
Identifier: H300_20
Type: Rocket Engine
Subtype: Profile
File: model\astos\Model_Data.xml
Engine Settings
1
Data
Name Burn Time
Unit Second
Kilo-Newton
Column 1
2
Perturbation (uncertainty):
Bias: Disabled
Gain: Disabled
Mass flow data (file or manual input)
Mass flow:
Defined by: Value
Value: 10.019
Kilogram/Second
Scale to fit: Disabled
Consider jet damping effect: Enabled
Unburned propellant: Disabled
Actuation damping: Disabled
Pressurization (Turbo Pump): Disabled
Structural mass: Disabled
Mass distribution: Default

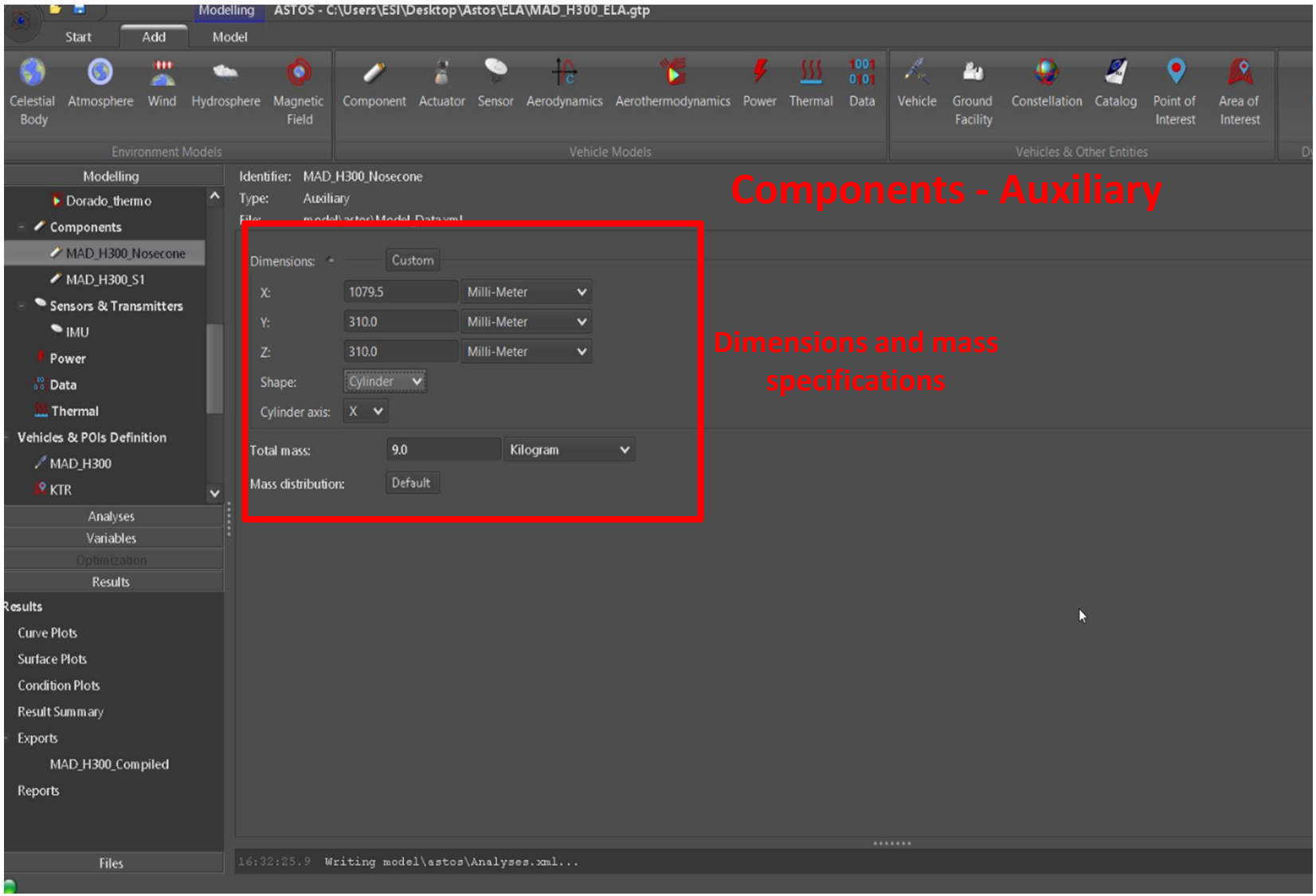

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Simulate
Analyze
Stop
Execution Log
Viewer
Astroview
Batch-Mode Inspector
Database Connections
Model Structure Viewer
Scenario Conversion Wizard
ASTOS Help
Scenario Introduction
Scenario Summary
Visit FAQ
Send Feedback
License Manager
About ASTOS
Actions
Windows
Info
Modelling
Winds
Magnetic Fields
Vehicle Parts & Properties
Actuators
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Dorado_thermo
Components
Sensors & Transmitters
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300_JetOff_0km
Type: Tabular
File: model\astos\Model_Data.xml
Aerodynamics
Aerodynamic moments definition: Centre of Pressure Position
Reference area:
Defined by: Area
Area:
Defined by: Value
Reference area: 0.0754
Meter**2
Reference area and length
Reference Length: 0.31
Meter
Center of pressure:
The offset is specified with respect to the global node!
X Offset:
Defined by: Profile
Profile:
Interpolation type: Linear
Out of bounds action: Nearest Value
Ordinate data scale: Linear to Linear
Scaling factor: 1.0
Data source: File
Filename: .\data\Xcp.txt
Skip Lines: 0
16:32:25.9 Writing model\astos\Analyses.xml...
16:32:25.9 Writing model\astos\Mission_Constraints.xml...
16:32:26.0 Simulate scenario

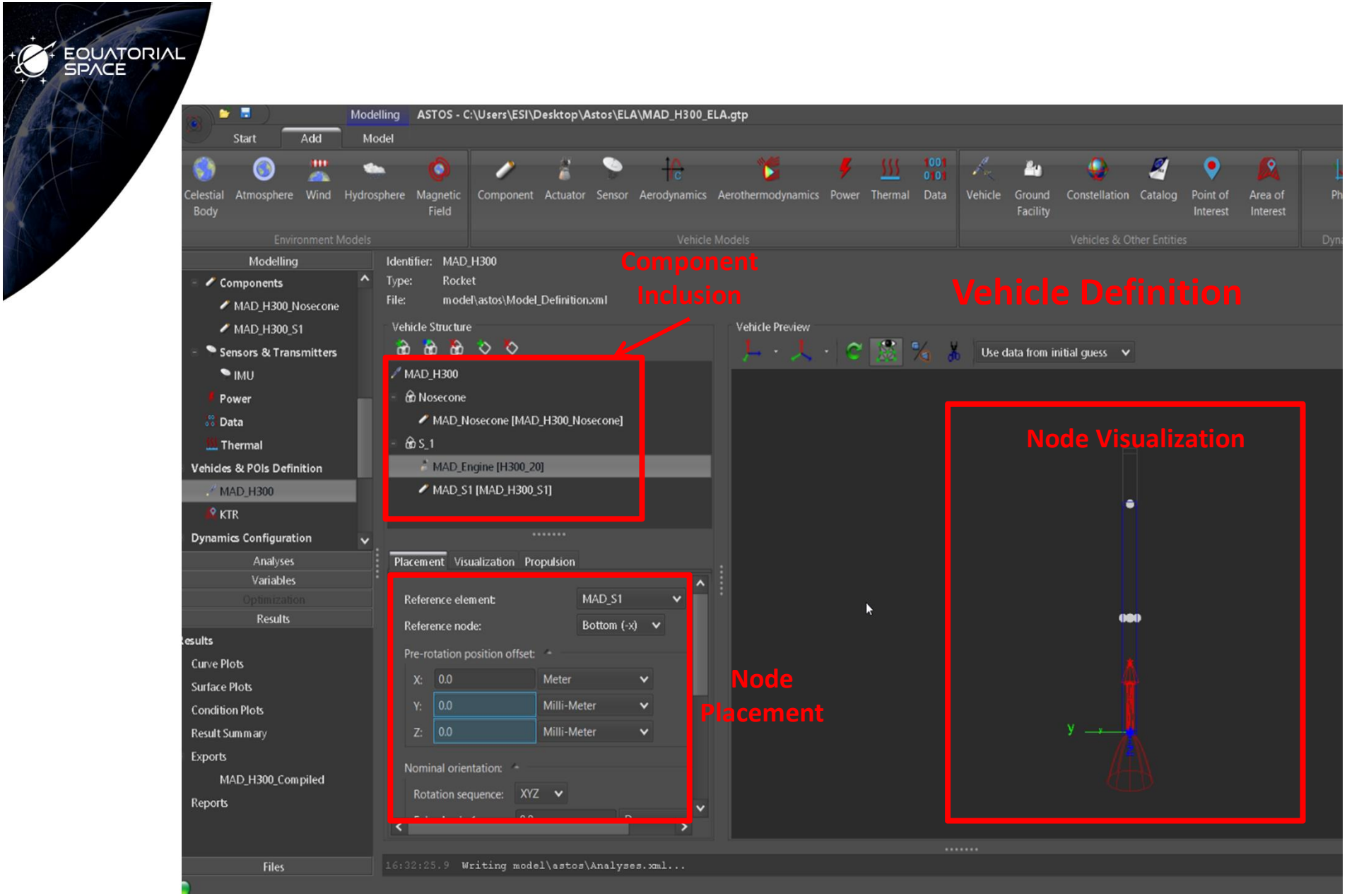

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Simulate
Analyze
Stop
Execution Log
Viewer
Astroview
Batch-Mode Inspector
Database Connections
Model Structure Viewer
Scenario Conversion Wizard
ASTOS Help
Scenario Introduction
Scenario Summary
Visit FAQ
Send Feedback
License Manager
About ASTOS
Actions
Windows
Info
Modelling
Winds
Magnetic Fields
Vehicle Parts & Properties
Actuators
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Dorado_thermo
Components
Sensors & Transmitters
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300_JetOff_0km
Type: Tabular
File: model\astos\Model_Data.xml
Aerodynamics
Reference Length: 0.31
Meter
Center of pressure:
The offset is specified with respect to the global node!
X Offset:
XCP input
Defined by: Profile
Profile:
Interpolation type: Linear
Out of bounds action: Nearest Value
Ordinate data scale: Linear to Linear
Scaling factor: 1.0
Data source: File
Filename: .\data\Xcp.txt
Skip Lines: 0
1
Data
Name Mach
Unit None
Meter
Column 1
2
Bias: Disabled
Gain: Disabled
Matching descriptors for file input
16:32:25.9 Writing model\astos\Analyses.xml...
16:32:25.9 Writing model\astos\Mission_Constraints.xml...
16:32:26.0 Simulate scenario

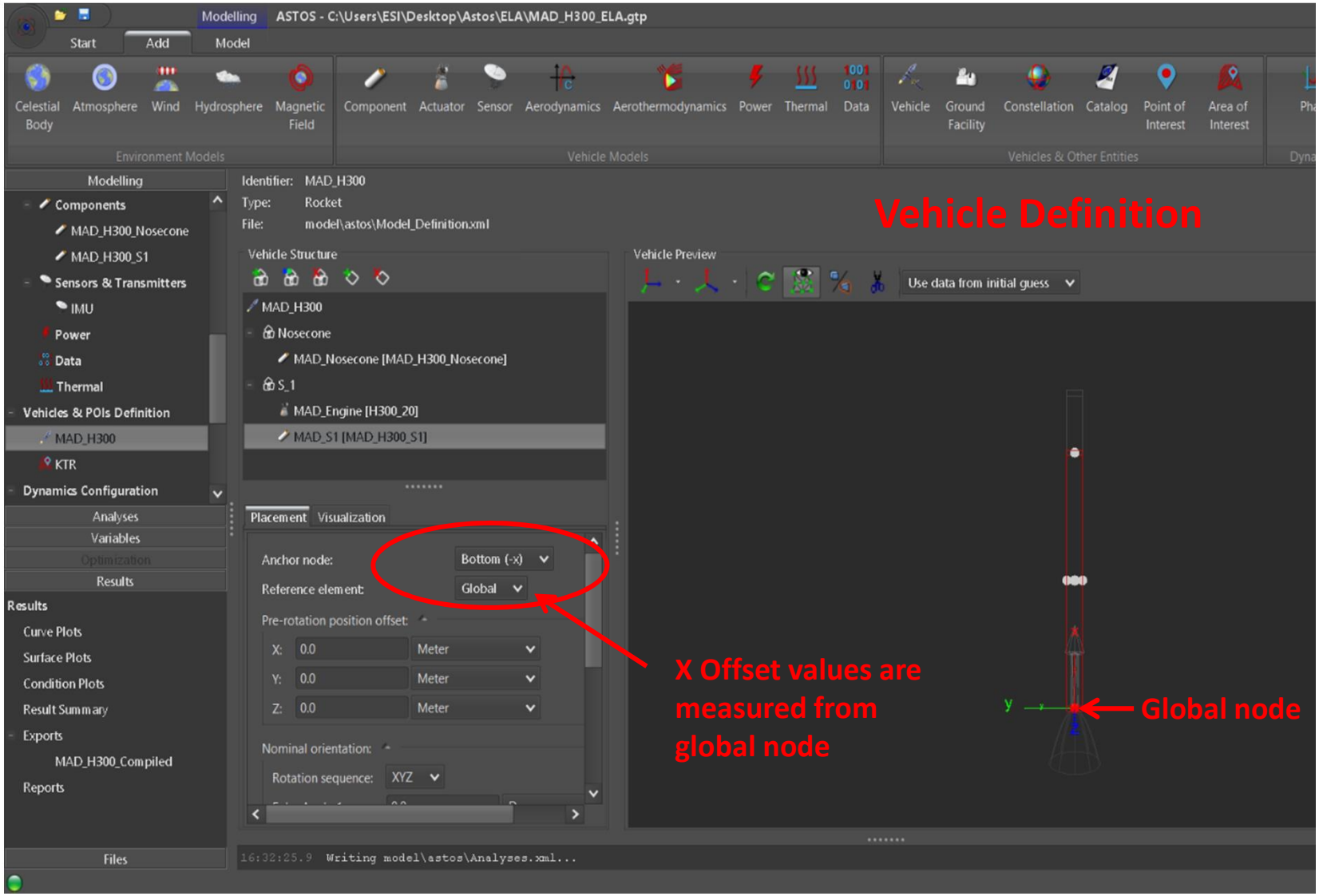

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Simulate
Analyze
Stop
Actions
Execution Log
Viewer
Astroview
Batch-Mode Inspector
Database Connections
Model Structure Viewer
Scenario Conversion Wizard
ASTOS Help
Windows
Scenario Introduction
Scenario Summary
Visit FAQ
Send Feedback
License Manager
About ASTOS
Info
Modelling
Winds
Magnetic Fields
Vehicle Parts & Properties
Actuators
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Dorado_thermo
Components
Sensors & Transmitters
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300_JetOff_0km
Type: Tabular
File: model\astos\Model_Data.xml
Aerodynamics
Coefficients:
Type Frame Axis Character
Force Body-fixed (B) Axial direction (-... Absolute value
Force Body-fixed (B) Lateral direction ... Sideslip slope
Force Body-fixed (B) Normal direction... Angle of attack s...
Moment Body-fixed (B) Roll moment (+X) Aerodynamic sur...
Moment Body-fixed (B) Roll moment (+X) Body roll rate slo...
Moment Body-fixed (B) Pitch moment (+... Body pitch rate s...
Moment Body-fixed (B) Yaw moment (+Z) Body yaw rate sl...
Add Force Coefficient
Add Damping Coefficient
Delete Selected Coefficient
Force and moment coefficients definition
Body yaw rate slope (Moment, Body-fixed (B), Yaw moment (+Z)):
Defined by: Profile
Profile:
Angle of attack reverse lookup: Disabled
Interpolation type: Linear
Out of bounds action: Nearest Value
Ordinate data scale: Linear to Linear
Scaling factor: -1.0
Data source: File
Filename: .\data\CM_Q_Deg.txt
Skip Lines: 0
1 Data
Name Mach
Unit None None/Degree
Column 1 2
File/individual data input for force/moment coefficients
16:32:25.9 Writing model\astos\Analyses.xml...

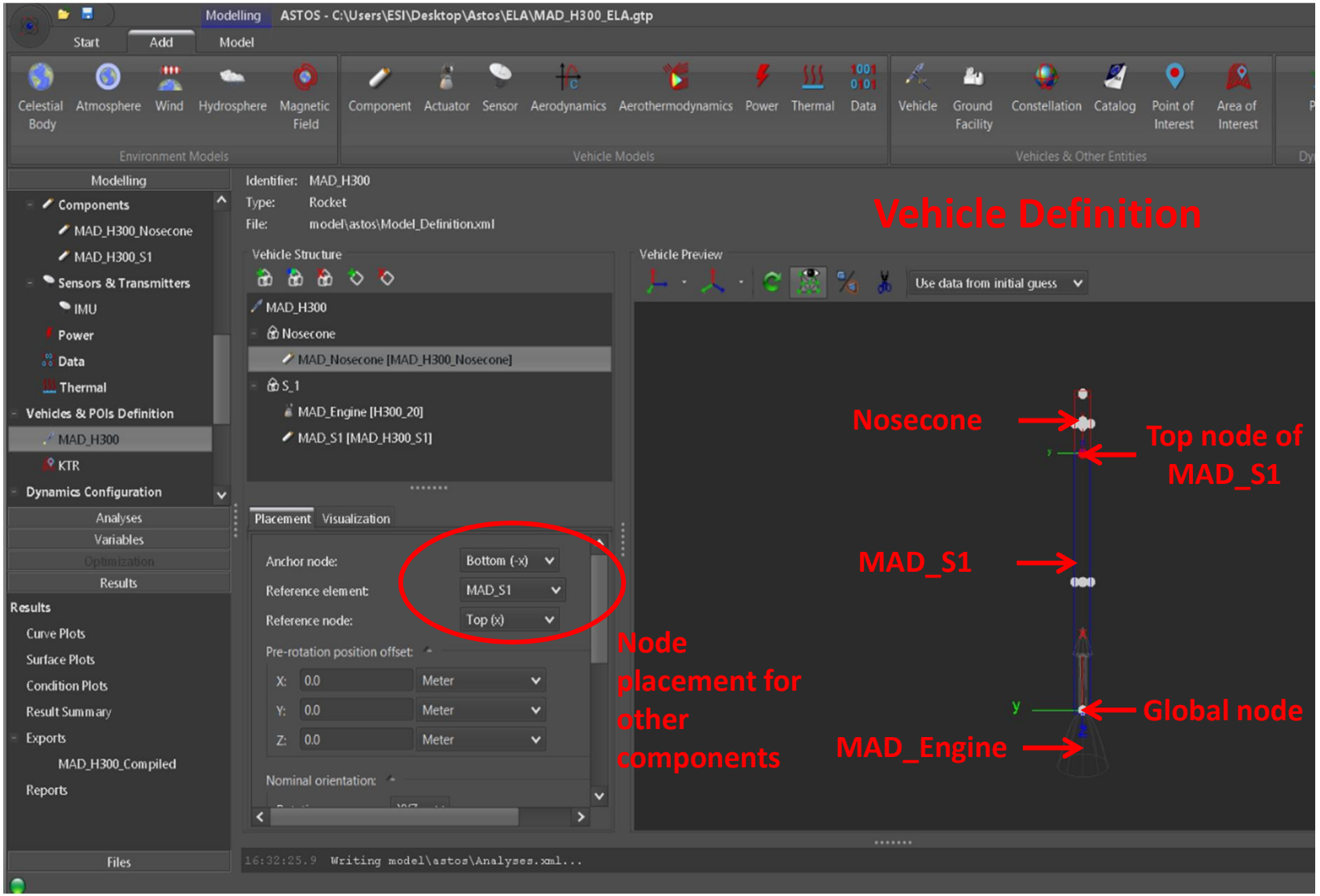

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Simulate
Analyze
Stop
Execution Log
Viewer
Astroview
Batch-Mode Inspector
Database Connections
Model Structure Viewer
Scenario Conversion Wizard
ASTOS Help
Scenario Introduction
Scenario Summary
Visit FAQ
Send Feedback
License Manager
About ASTOS
Actions
Windows
Info
Modelling
Winds
Magnetic Fields
Vehicle Parts & Properties
Actuators
Aerodynamics
MAD_H300_JetOff_0km
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Dorado_thermo
Components
Sensors & Transmitters
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300_JetOff_0km
Type: Tabular
File: model\astos\Model_Data.xml
Unit None None/Degree
Column 1 2
Perturbation (uncertainty):
Bias: Disabled
Gain: Disabled
Aerodynamic surfaces:
ID
Surface_1
Add aerodynamic surface
Delete selected aerodynamic surface
Selected surface:
Identifier: Surface_1
Deflection:
Defined by: Value
Deflection: 0.5
Degree
16:32:25.9 Writing model\astos\Analyses.xml...
Aerodynamics
Specify fin surfaces and fin cant angle

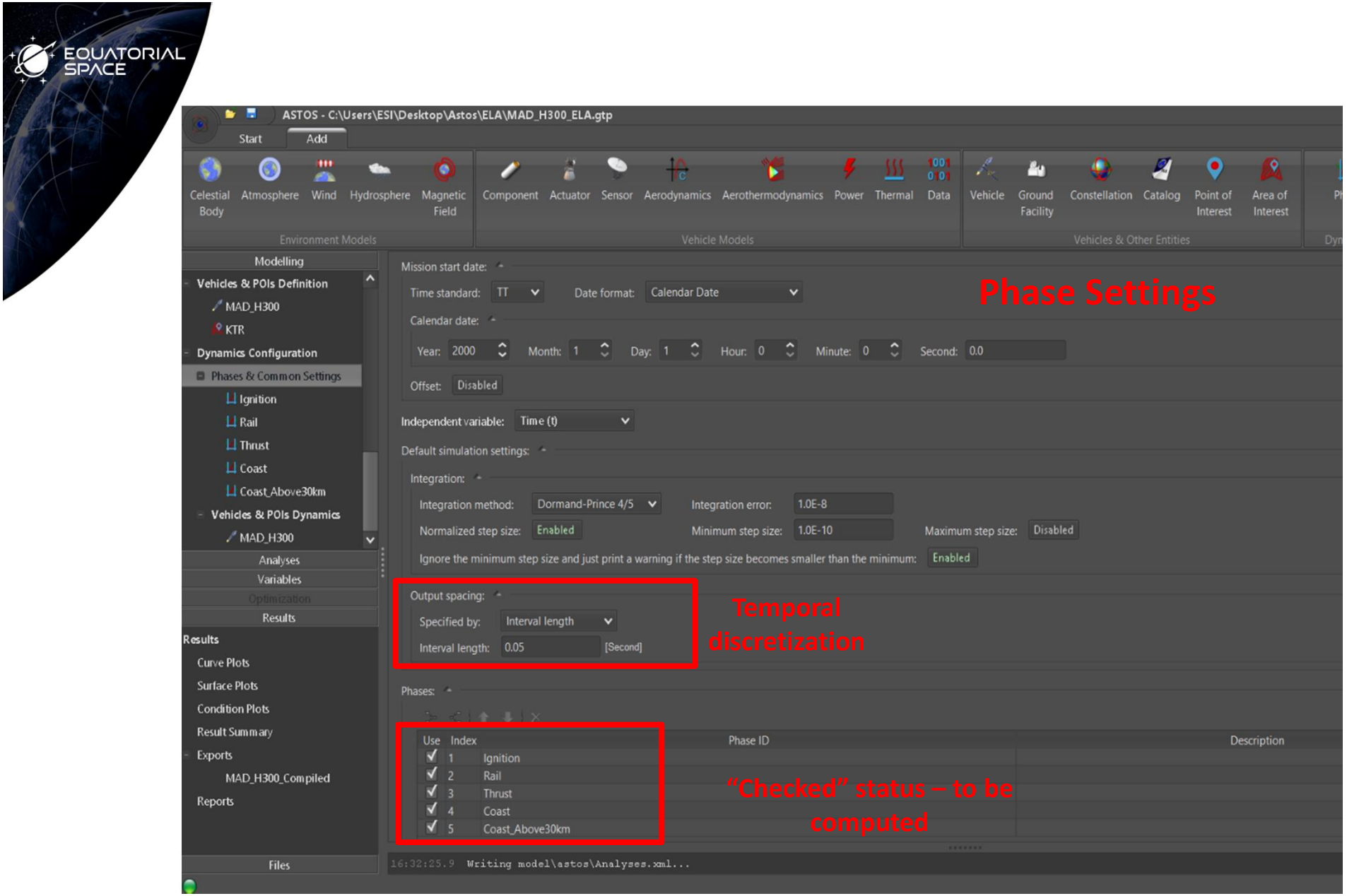

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Components - Stage
Modelling
MAD_H300_JetOff_30km
MAD_H300_JetOn
Aerothermodynamics
Dorado_thermo
Components
MAD_H300_Nosecone
MAD_H300_S1
Sensors & Transmitters
Power
Data
Thermal
Vehicles & POIs Definition
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300_S1
Type: Basic Vehicle Stage
File: model\astos\Model_Data.xml
Propellant type: Solid
Filling ratio:
Common
Individual
This specifies the scaling factor which is multiplied with the propellant mass to achieve the optimized propellant mass.
Filling ratio: 1.0 None
Dimensions: Custom
X: 4632.5 Milli-Meter
Y: 310.0 Milli-Meter
Z: 310.0 Milli-Meter
Dimensions and mass specifications
Structural mass: 139.0 Kilogram
Propellant mass: 158.0 Kilogram
Propellant mass type: Reference
Reference: 0.1 Kilogram
Mass distribution: Default
16:32:25.9 Writing model\astos\Analyses.xml...

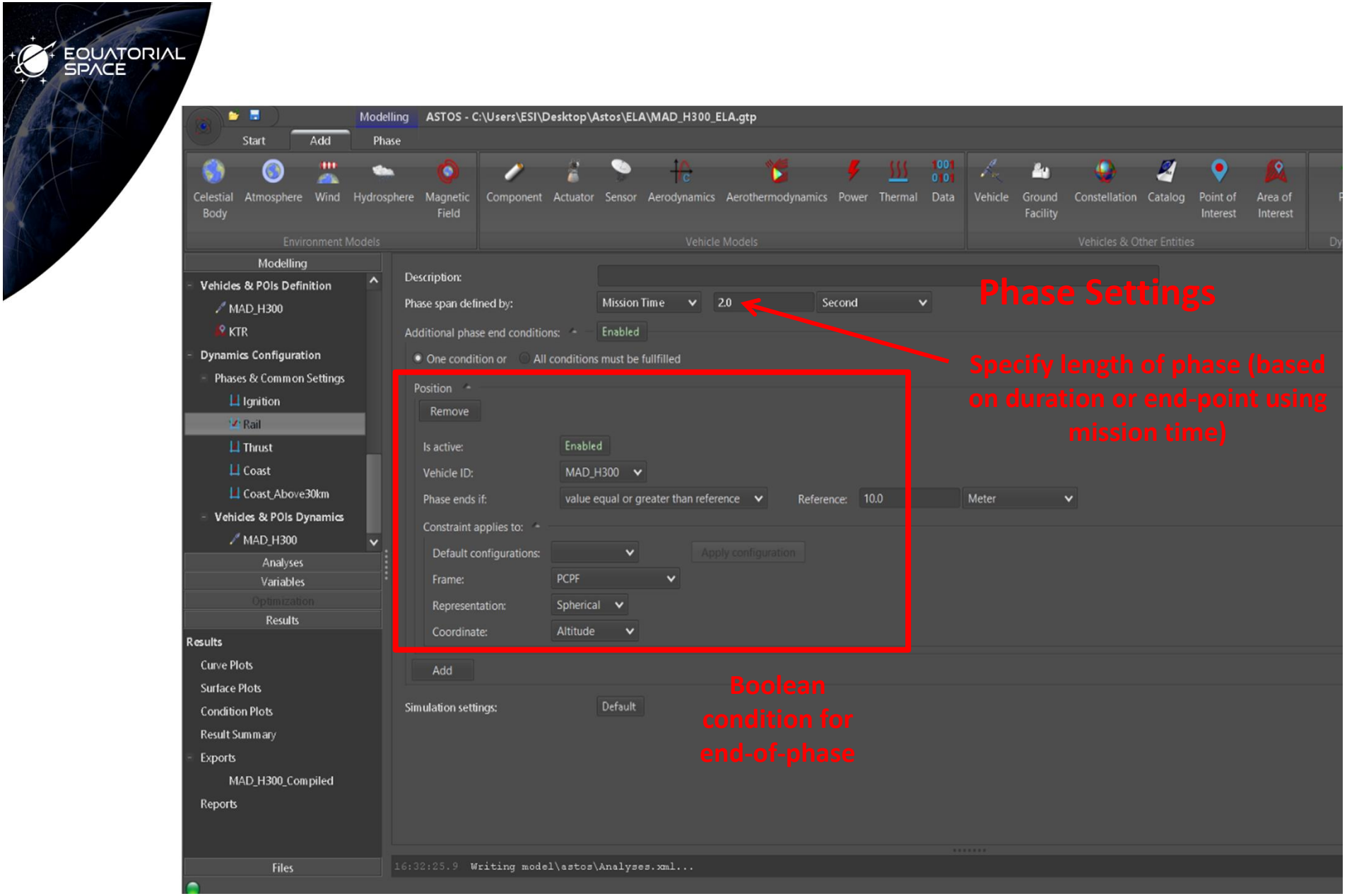

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Components - Auxiliary
Modelling
Dorado_thermo
Components
MAD_H300_Nosecone
MAD_H300_S1
Sensors & Transmitters
IMU
Power
Data
Thermal
Vehicles & POIs Definition
MAD_H300
KTR
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300_Nosecone
Type: Auxiliary
Dimensions: Custom
X: 1079.5 Milli-Meter
Y: 310.0 Milli-Meter
Z: 310.0 Milli-Meter
Shape: Cylinder
Cylinder axis: X
Total mass: 9.0 Kilogram
Mass distribution: Default
Dimensions and mass specifications
16:32:25.9 Writing model\astos\Analyses.xml...

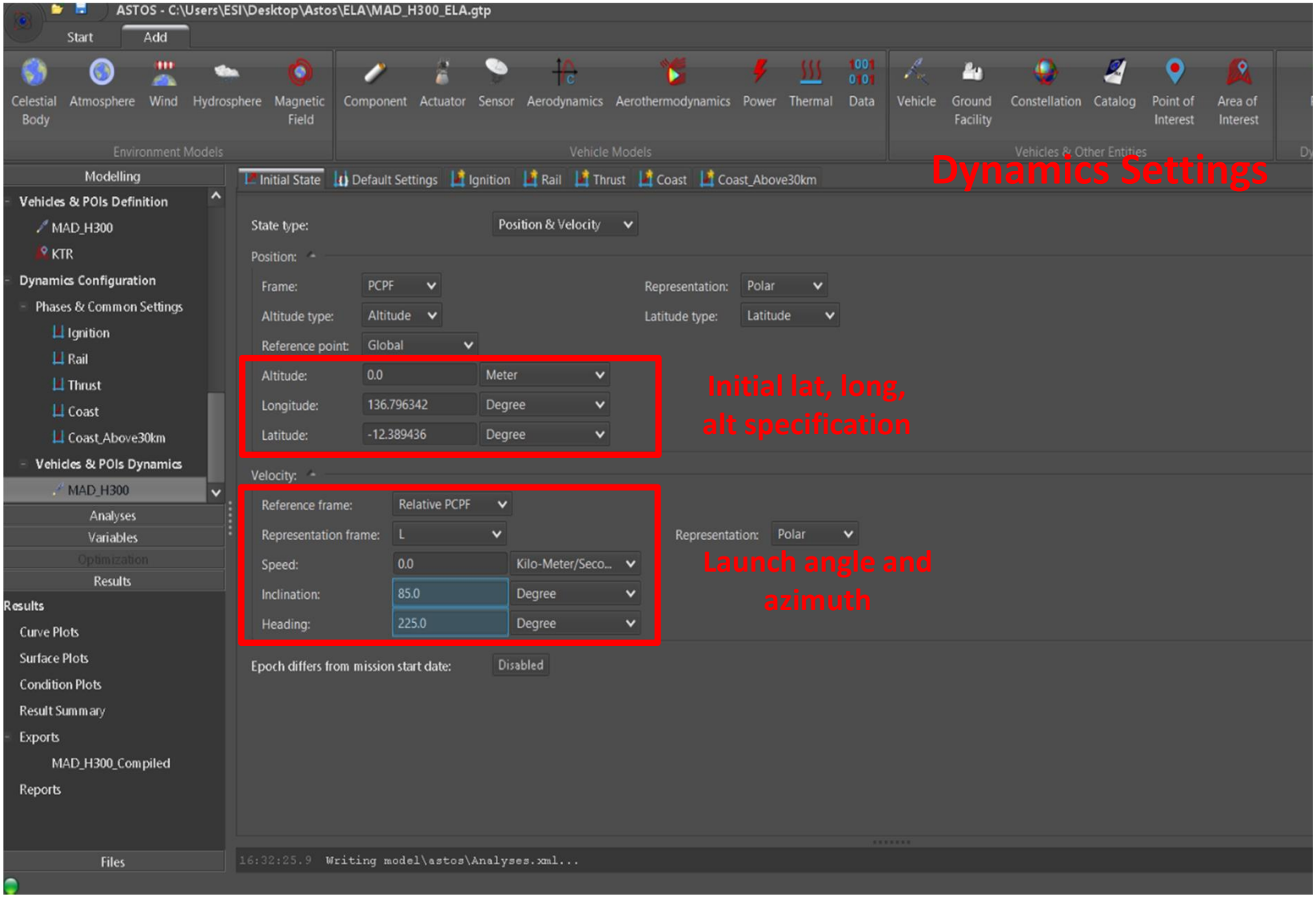

EQUATORIAL SPACE
Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Component Inclusion
Vehicle Definition
Identifier: MAD_H300
Type: Rocket
File: model\astos\Model_Definition.xml
Vehicle Structure
MAD_H300
Nosecone
MAD_Nosecone [MAD_H300_Nosecone]
S_1
MAD_Engine [H300_20]
MAD_S1 [MAD_H300_S1]
Vehicle Preview
Use data from initial guess
Node Visualization
Placement
Visualization
Propulsion
Reference element: MAD_S1
Reference node: Bottom (-x)
Pre-rotation position offset:
X: 0.0 Meter
Y: 0.0 Milli-Meter
Z: 0.0 Milli-Meter
Nominal orientation:
Rotation sequence: XYZ
Node Placement
Modelling
Components
MAD_H300_Nosecone
MAD_H300_S1
Sensors & Transmitters
IMU
Power
Data
Thermal
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
16:32:25.9 Writing model\astos\Analyses.xml...

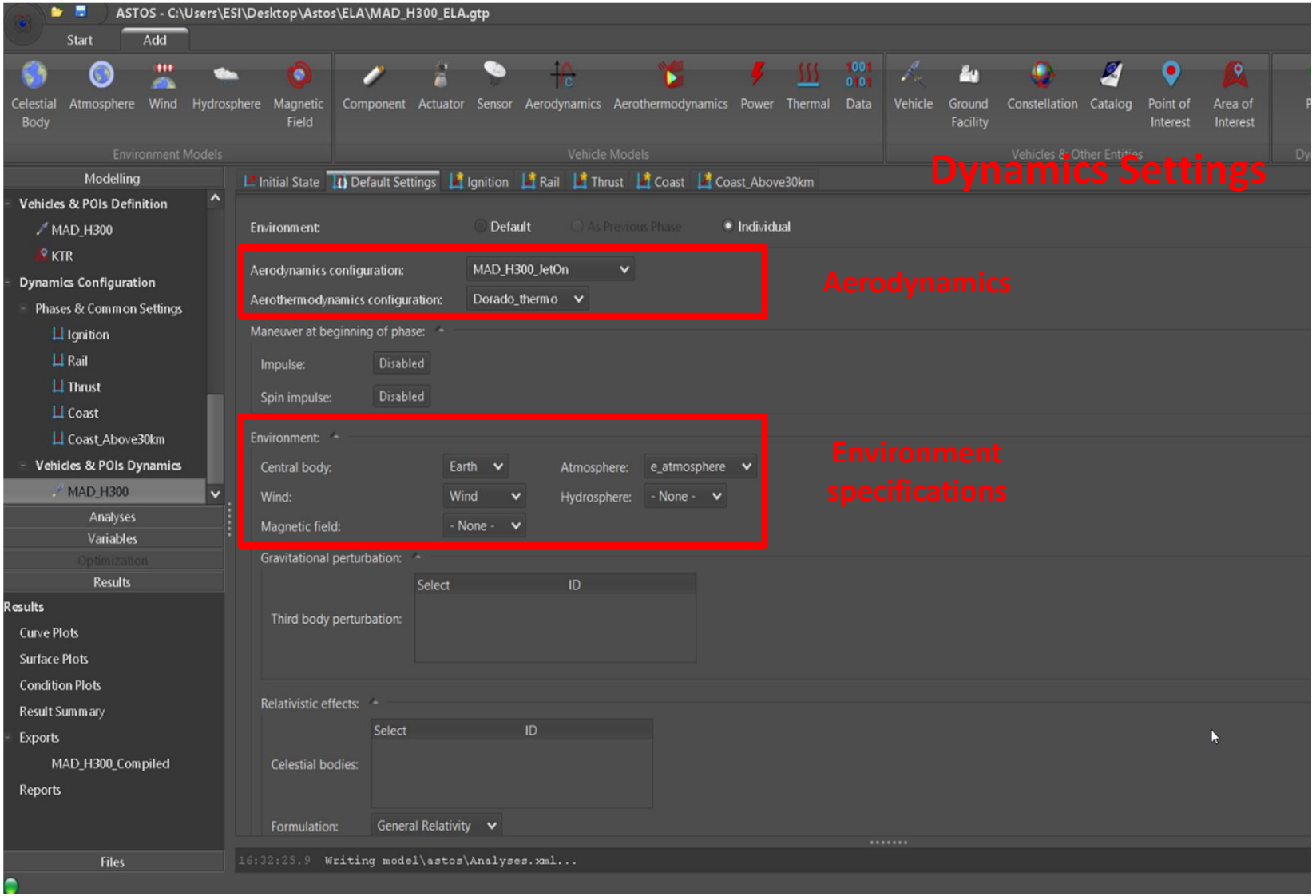

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Modelling
Components
MAD_H300_Nosecone
MAD_H300_S1
Sensors & Transmitters
IMU
Power
Data
Thermal
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300
Type: Rocket
File: model\astos\Model_Definition.xml
Vehicle Structure
MAD_H300
Nosecone
MAD_Nosecone [MAD_H300_Nosecone]
S_1
MAD_Engine [H300_20]
MAD_S1 [MAD_H300_S1]
Placement
Visualization
Anchor node:
Bottom (-x)
Reference element:
Global
Pre-rotation position offset:
X: 0.0
Meter
Y: 0.0
Meter
Z: 0.0
Meter
Nominal orientation:
Rotation sequence:
XYZ
Vehicle Preview
Use data from initial guess
16:32:25.9 Writing model\astos\Analyses.xml...
Vehicle Definition
X Offset values are measured from global node
Global node

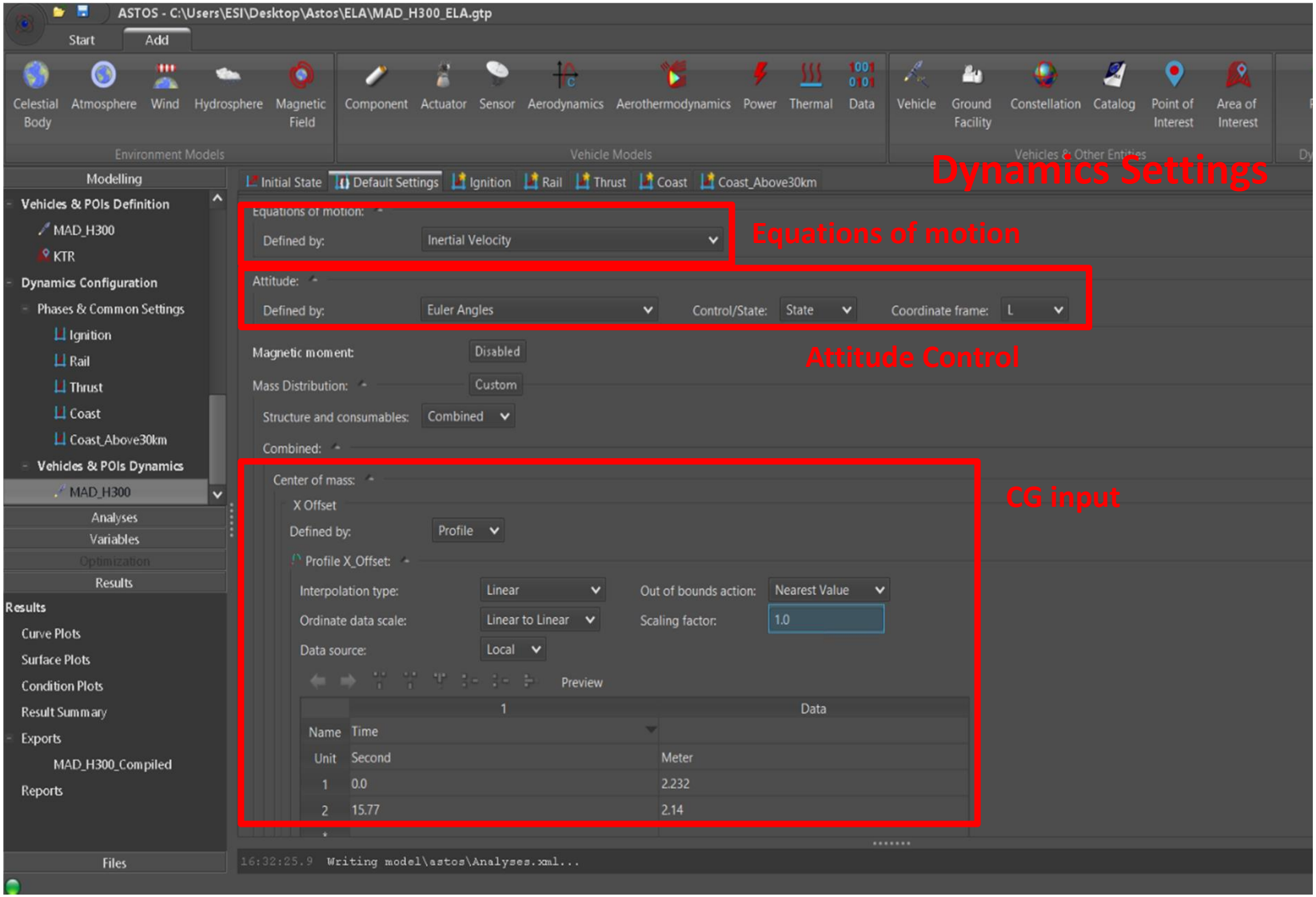

Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Model
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Modelling
Components
MAD_H300_Nosecone
MAD_H300_S1
Sensors & Transmitters
IMU
Power
Data
Thermal
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Identifier: MAD_H300
Type: Rocket
File: model\astos\Model_Definition.xml
Vehicle Definition
Vehicle Structure
MAD_H300
Nosecone
MAD_Nosecone [MAD_H300_Nosecone]
S_1
MAD_Engine [H300_20]
MAD_S1 [MAD_H300_S1]
Placement
Visualization
Anchor node:
Bottom (-x)
Reference element:
MAD_S1
Reference node:
Top (x)
Pre-rotation position offset:
X:
0.0
Meter
Y:
0.0
Meter
Z:
0.0
Meter
Nominal orientation:
Node placement for other components
Vehicle Preview
Use data from initial guess
Nosecone
Top node of MAD_S1
MAD_S1
Global node
MAD_Engine
16:32:25.9 Writing model\astos\Analyses.xml...

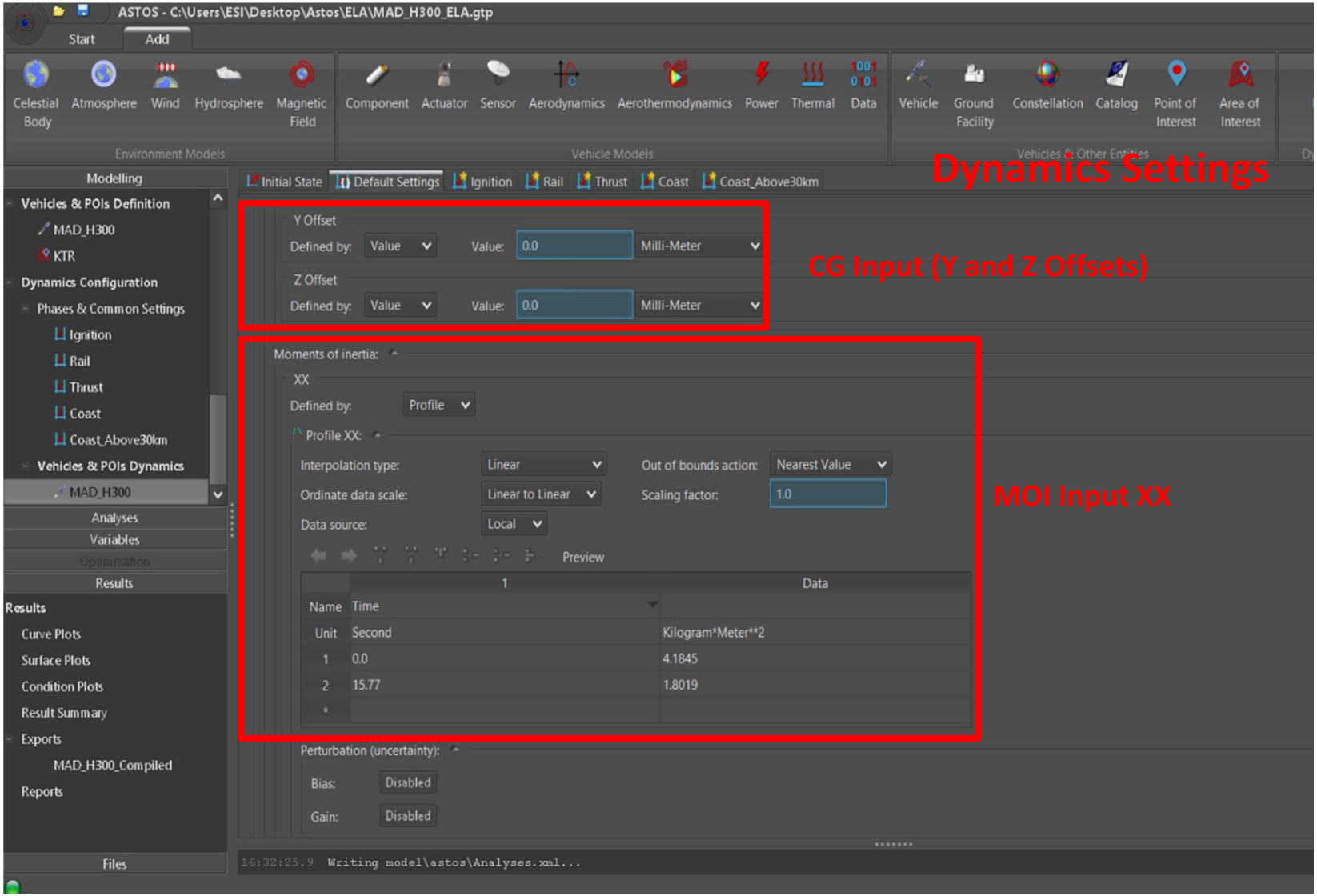

ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Mission start date:
Time standard: TT
Date format: Calendar Date
Calendar date:
Year: 2000
Month: 1
Day: 1
Hour: 0
Minute: 0
Second: 0.0
Offset: Disabled
Independent variable: Time (t)
Default simulation settings:
Integration:
Integration method: Dormand-Prince 4/5
Integration error: 1.0E-8
Normalized step size: Enabled
Minimum step size: 1.0E-10
Maximum step size: Disabled
Ignore the minimum step size and just print a warning if the step size becomes smaller than the minimum: Enabled
Output spacing:
Specified by: Interval length
Interval length: 0.05 [Second]
Phases:
Use
Index
Phase ID
Description
1 Ignition
2 Rail
3 Thrust
4 Coast
5 Coast_Above30km
16:32:25.9 Writing model\astos\Analyses.xml...
Phase Settings
Temporal discretization
"Checked" status – to be computed

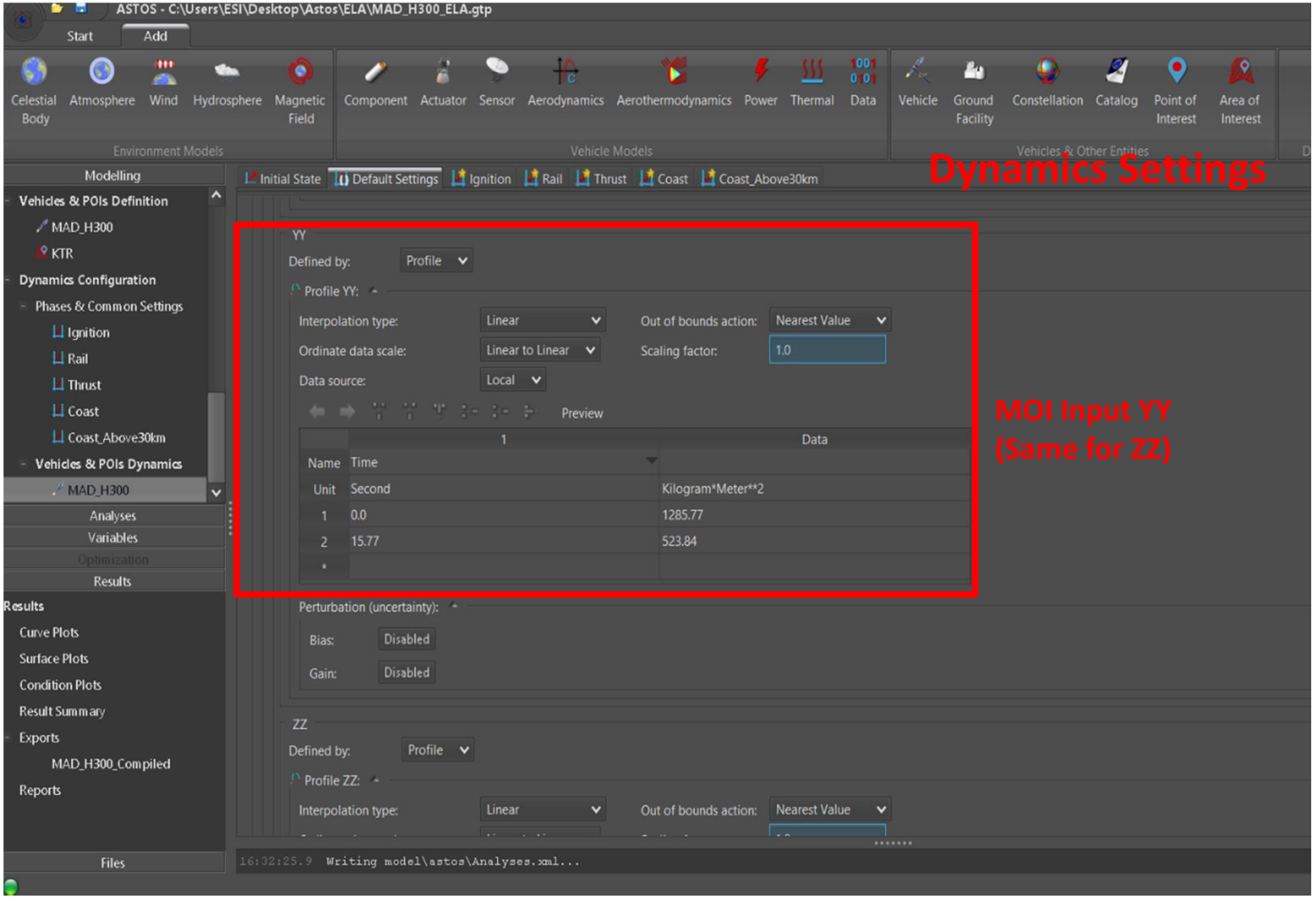

EQUATORIAL SPACE
Modelling
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Phase
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Description:
Phase span defined by:
Mission Time
2.0
Second
Additional phase end conditions:
Enabled
One condition or
All conditions must be fullfilled
Position
Remove
Is active:
Enabled
Vehicle ID:
MAD_H300
Phase ends if:
value equal or greater than reference
Reference:
10.0
Meter
Constraint applies to:
Default configurations:
Apply configuration
Frame:
PCPF
Representation:
Spherical
Coordinate:
Altitude
Add
Simulation settings:
Default
16:32:25.9 Writing model\astos\Analyses.xml...
Phase Settings
Specify length of phase (based on duration or end-point using mission time)
Boolean condition for end-of-phase

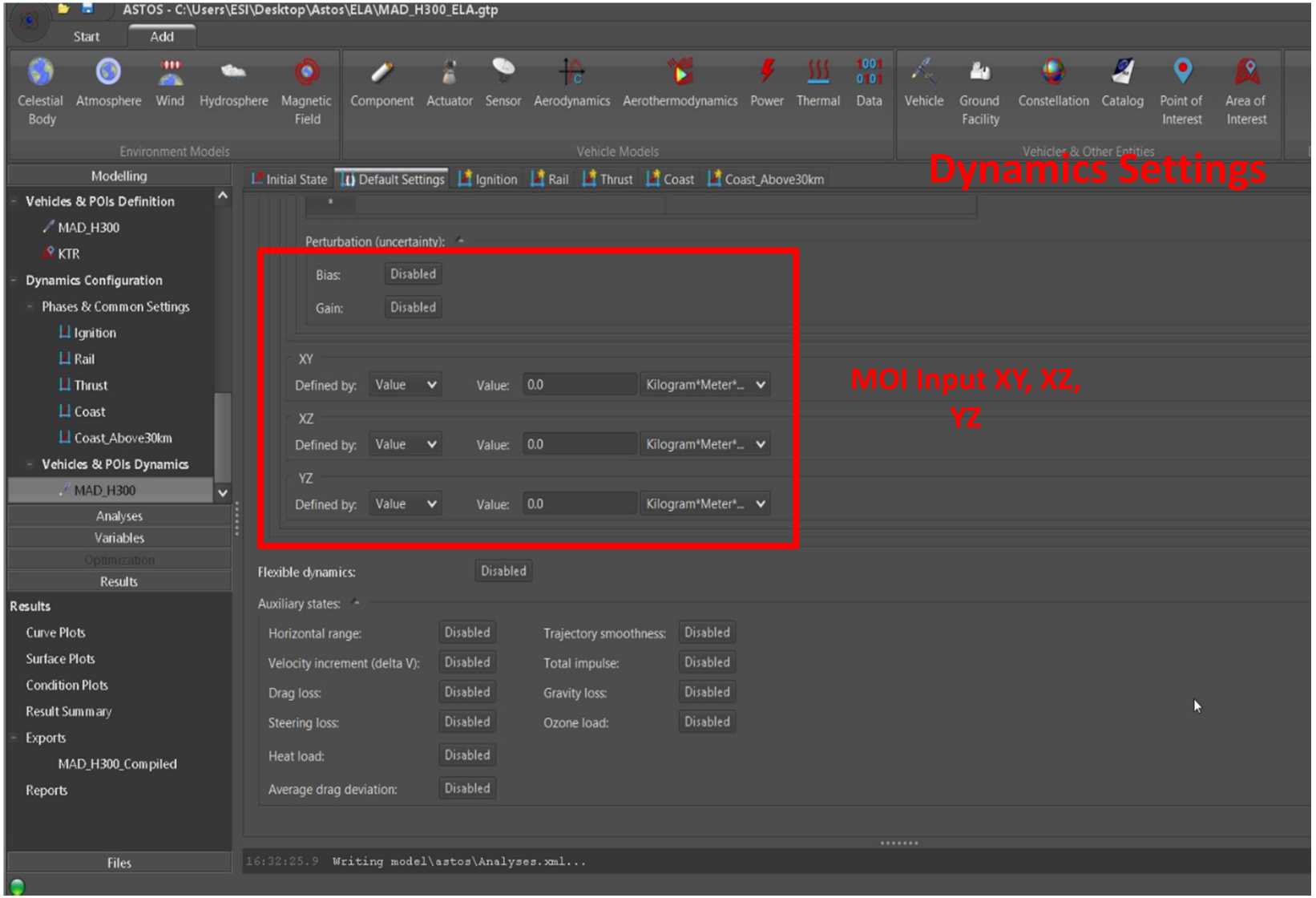

ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Dynamics Settings
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Initial State
Default Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
State type:
Position & Velocity
Position:
Frame:
PCPF
Representation:
Polar
Altitude type:
Altitude
Latitude type:
Latitude
Reference point:
Global
Altitude:
0.0
Meter
Longitude:
136.796342
Degree
Latitude:
-12.389436
Degree
Initial lat, long, alt specification
Velocity:
Reference frame:
Relative PCPF
Representation frame:
L
Representation:
Polar
Speed:
0.0
Kilo-Meter/Seco...
Inclination:
85.0
Degree
Heading:
225.0
Degree
Launch angle and azimuth
Epoch differs from mission start date:
Disabled
16:32:25.9 Writing model\astos\Analyses.xml...

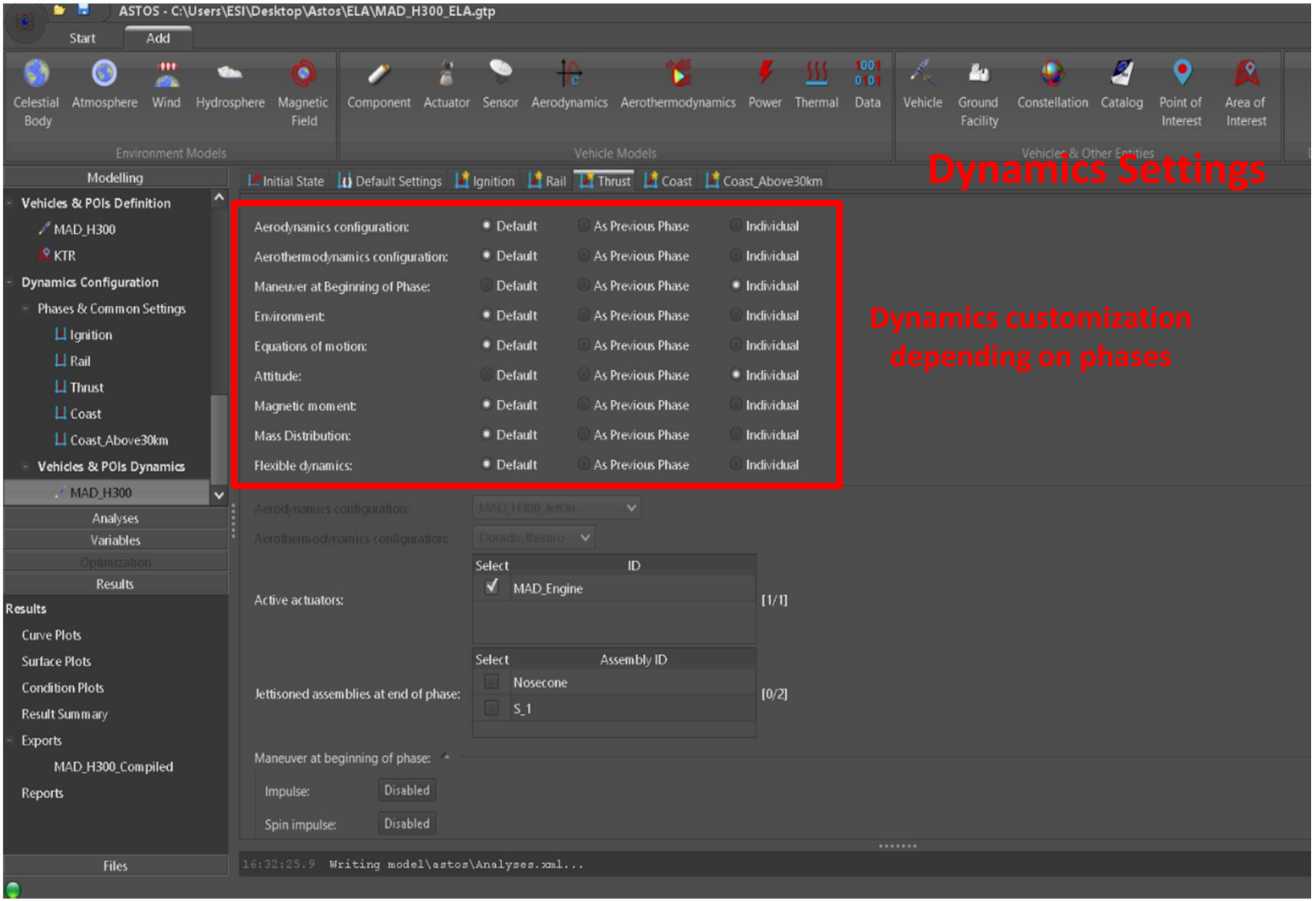

ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Dynamics Settings
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Initial State
Default Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Environment:
Default
As Previous Phase
Individual
Aerodynamics configuration:
MAD_H300_JetOn
Aerothermodynamics configuration:
Dorado_thermo
Aerodynamics
Maneuver at beginning of phase:
Impulse:
Disabled
Spin impulse:
Disabled
Environment:
Central body:
Earth
Atmosphere:
e_atmosphere
Wind:
Wind
Hydrosphere:
- None -
Magnetic field:
- None -
Environment specifications
Gravitational perturbation:
Select
ID
Third body perturbation:
Relativistic effects:
Select
ID
Celestial bodies:
Formulation:
General Relativity
16:32:25.9 Writing model\astos\Analyses.xml...


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Dynamics Settings
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Initial State
Default Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Equations of motion:
Defined by:
Inertial Velocity
Equations of motion
Attitude:
Defined by:
Euler Angles
Control/State:
State
Coordinate frame:
L
Attitude Control
Magnetic moment:
Disabled
Mass Distribution:
Custom
Structure and consumables:
Combined
Combined:
Center of mass:
X Offset
Defined by:
Profile
Profile X_Offset:
Interpolation type:
Linear
Out of bounds action:
Nearest Value
Ordinate data scale:
Linear to Linear
Scaling factor:
1.0
Data source:
Local
Preview
CG input
1
Data
Name
Time
Unit
Second
Meter
1
0.0
2.232
2
15.77
2.14
16:32:25.9
Writing model\astos\Analyses.xml...


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Dynamics Settings
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Initial State
Default Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Y Offset
Defined by: Value
Value: 0.0
Milli-Meter
Z Offset
Defined by: Value
Value: 0.0
Milli-Meter
CG Input (Y and Z Offsets)
Moments of inertia:
XX
Defined by: Profile
Profile XX:
Interpolation type: Linear
Out of bounds action: Nearest Value
Ordinate data scale: Linear to Linear
Scaling factor: 1.0
Data source: Local
Preview
1
Data
Name Time
Unit Second
Kilogram*Meter**2
1 0.0 4.1845
2 15.77 1.8019
*
MOI Input XX
Perturbation (uncertainty):
Bias: Disabled
Gain: Disabled
16:32:25.9 Writing model\astos\Analyses.xml...


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Dynamics Settings
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Initial State
Default Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
YY
Defined by:
Profile
Profile YY:
Interpolation type:
Linear
Out of bounds action:
Nearest Value
Ordinate data scale:
Linear to Linear
Scaling factor:
1.0
Data source:
Local
Preview
1
Data
Name
Time
Unit
Second
Kilogram*Meter**2
1
0.0
1285.77
2
15.77
523.84
*
Perturbation (uncertainty):
Bias:
Disabled
Gain:
Disabled
ZZ
Defined by:
Profile
Profile ZZ:
Interpolation type:
Linear
Out of bounds action:
Nearest Value
16:32:25.9
Writing model\astos\Analyses.xml...
MOI Input YY
(Same for ZZ)


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Dynamics Settings
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Initial State
Default Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Perturbation (uncertainty):
Bias:
Disabled
Gain:
Disabled
XY
Defined by:
Value
Value:
0.0
Kilogram*Meter*...
XZ
Defined by:
Value
Value:
0.0
Kilogram*Meter*...
YZ
Defined by:
Value
Value:
0.0
Kilogram*Meter*...
MOI Input XY, XZ, YZ
Flexible dynamics:
Disabled
Auxiliary states:
Horizontal range:
Disabled
Velocity increment (delta V):
Disabled
Drag loss:
Disabled
Steering loss:
Disabled
Heat load:
Disabled
Average drag deviation:
Disabled
Trajectory smoothness:
Disabled
Total impulse:
Disabled
Gravity loss:
Disabled
Ozone load:
Disabled
16:32:25.9 Writing model\astos\Analyses.xml...


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Celestial Body
Atmosphere
Wind
Hydrosphere
Magnetic Field
Environment Models
Component
Actuator
Sensor
Aerodynamics
Aerothermodynamics
Power
Thermal
Data
Vehicle Models
Vehicle
Ground Facility
Constellation
Catalog
Point of Interest
Area of Interest
Vehicles & Other Entities
Dynamics Settings
Modelling
Vehicles & POIs Definition
MAD_H300
KTR
Dynamics Configuration
Phases & Common Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Vehicles & POIs Dynamics
MAD_H300
Analyses
Variables
Optimization
Results
Results
Curve Plots
Surface Plots
Condition Plots
Result Summary
Exports
MAD_H300_Compiled
Reports
Files
Initial State
Default Settings
Ignition
Rail
Thrust
Coast
Coast_Above30km
Aerodynamics configuration: Default As Previous Phase Individual
Aerothermodynamics configuration: Default As Previous Phase Individual
Maneuver at Beginning of Phase: Default As Previous Phase Individual
Environment: Default As Previous Phase Individual
Equations of motion: Default As Previous Phase Individual
Attitude: Default As Previous Phase Individual
Magnetic moment: Default As Previous Phase Individual
Mass Distribution: Default As Previous Phase Individual
Flexible dynamics: Default As Previous Phase Individual
Dynamics customization depending on phases
Aerodynamics configuration: MAD_H300_JetOn
Aerothermodynamics configuration: Dorado_thermo
Active actuators:
Select ID
MAD_Engine
[1/1]
Jettisoned assemblies at end of phase:
Select Assembly ID
Nosecone
S_1
[0/2]
Maneuver at beginning of phase:
Impulse: Disabled
Spin impulse: Disabled
16:32:25.9 Writing model\astos\Analyses.xml...