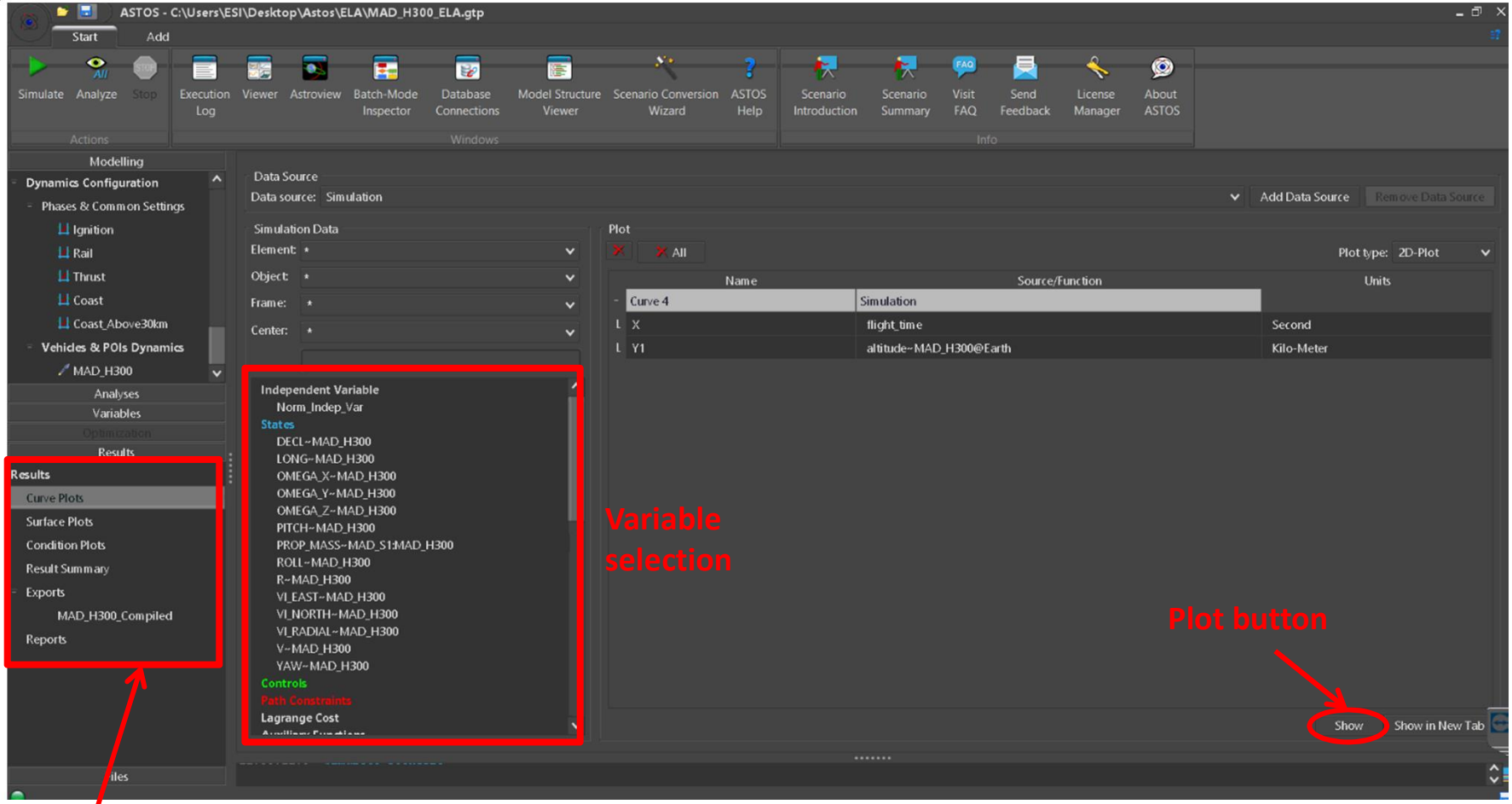
ASTOS Results Analysis and Post-Processing

Jason Ong


ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Simulate
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Actions
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Viewer
Astroview
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Model Structure Viewer
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Coast_Above30km
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Data source: Simulation
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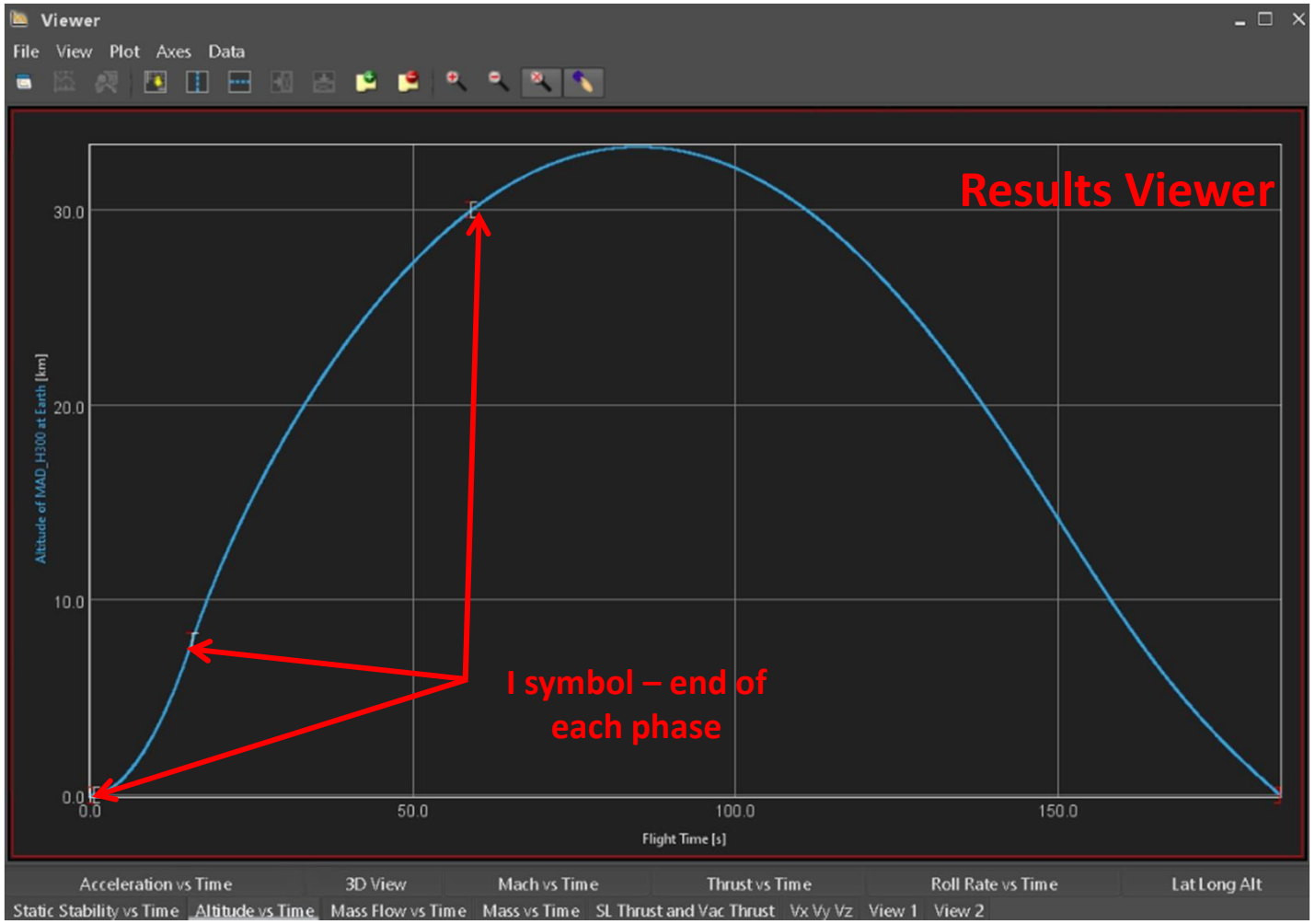
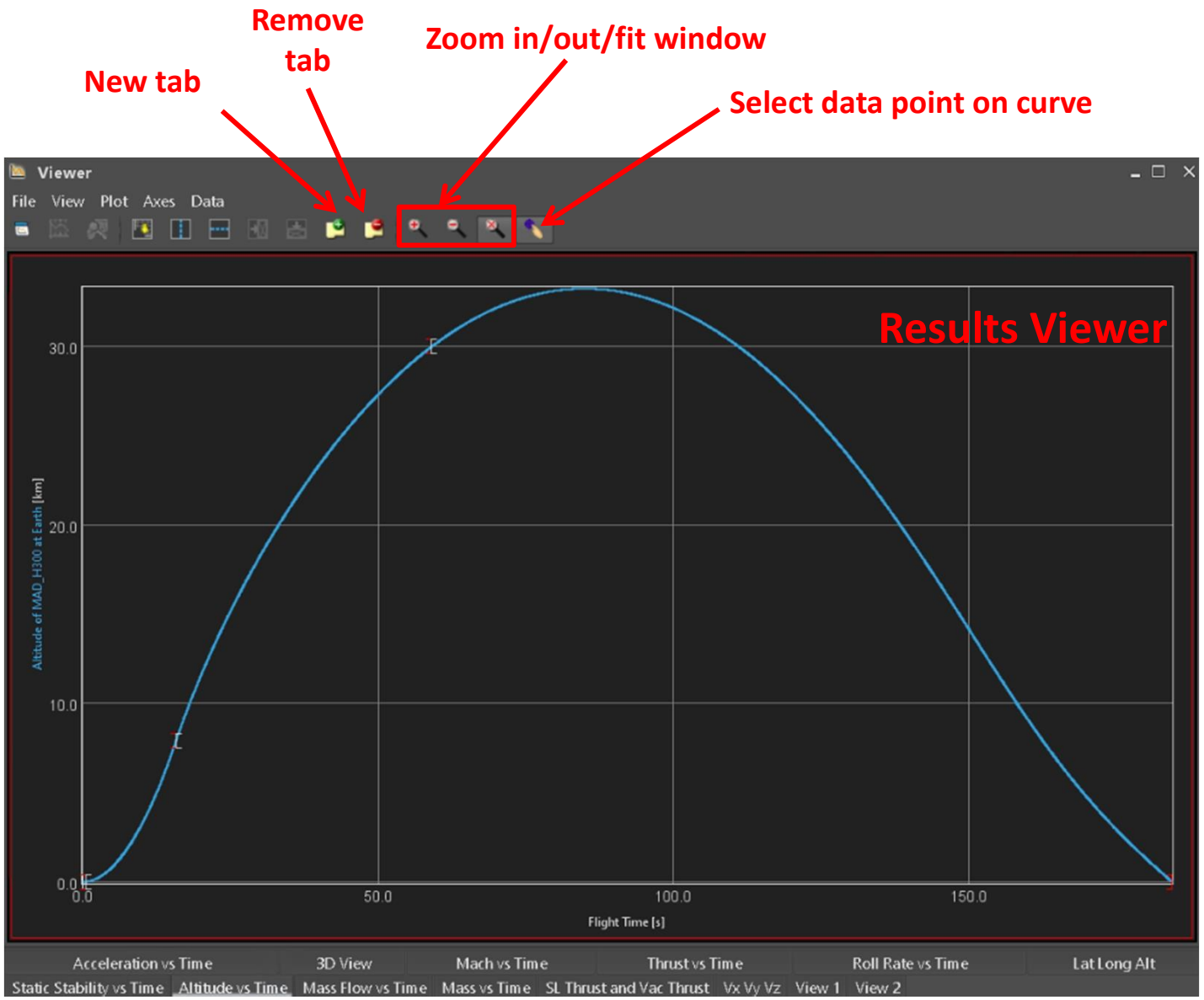
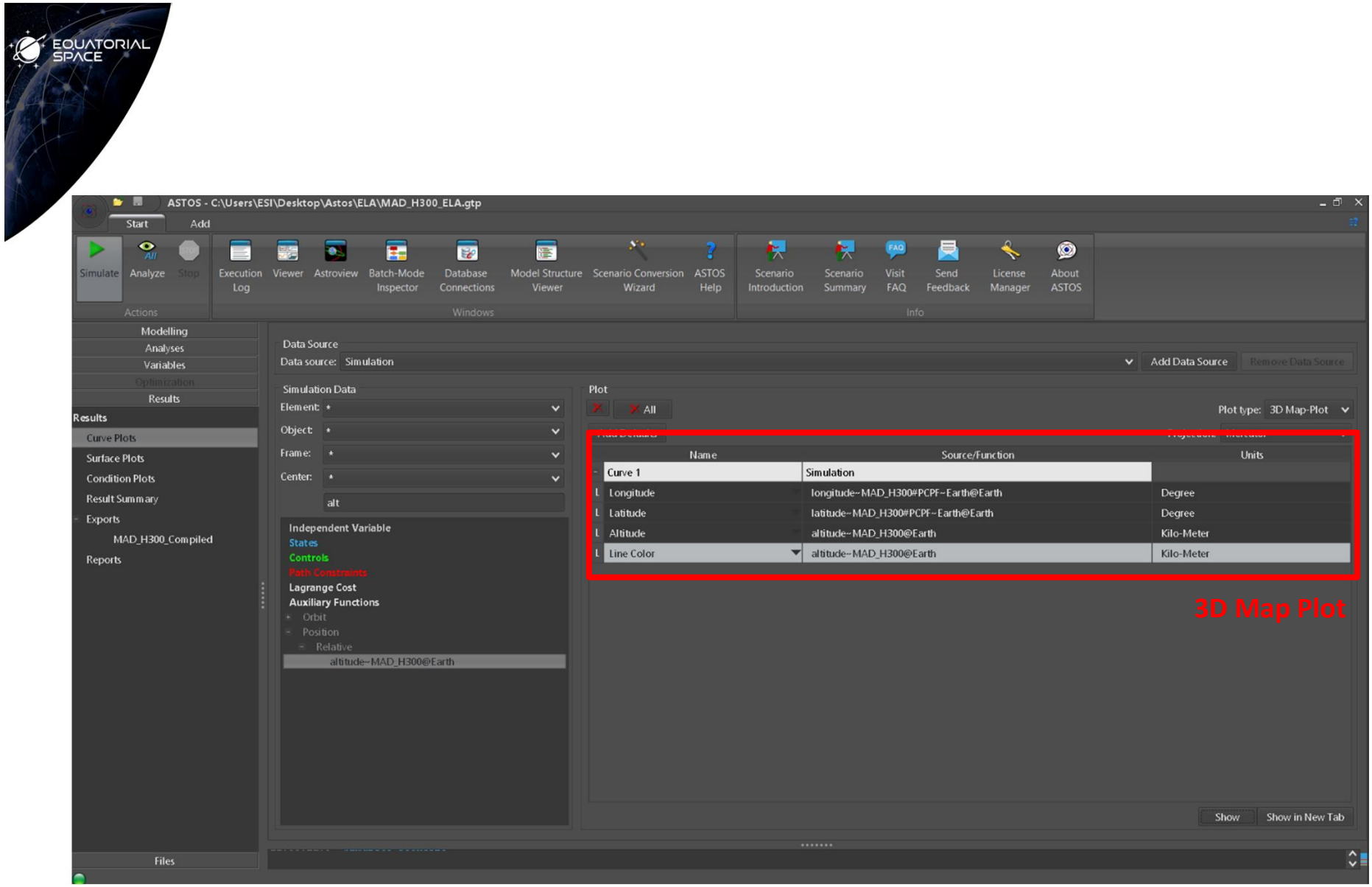
Simulation Data
Element: *
Object: *
Frame: *
Center: *
Independent Variable
Norm_Indep_Var
States
DECL~MAD_H300
LONG~MAD_H300
OMEGA_X~MAD_H300
OMEGA_Y~MAD_H300
OMEGA_Z~MAD_H300
PITCH~MAD_H300
PROP_MASS~MAD_S1:MAD_H300
ROLL~MAD_H300
R~MAD_H300
VI_EAST~MAD_H300
VI_NORTH~MAD_H300
VI_RADIAL~MAD_H300
V~MAD_H300
YAW~MAD_H300
Controls
Path Constraints
Lagrange Cost
Plot
All
Plot type: 2D-Plot
Name
Source/Function
Units
Curve 4
Simulation
X
flight_time
Second
Y1
altitude~MAD_H300@Earth
Kilo-Meter
Show
Show in New Tab
Variable selection
Plot button
Results panel


Viewer
File View Plot Axes Data
Results Viewer
I symbol – end of each phase
Altitude of MAD_H300 at Earth [km]
30.0
20.0
10.0
0.0
0.0
50.0
100.0
150.0
Flight Time [s]
Acceleration vs Time
3D View
Mach vs Time
Thrust vs Time
Roll Rate vs Time
Lat Long Alt
Static Stability vs Time
Altitude vs Time
Mass Flow vs Time
Mass vs Time
SL Thrust and Vac Thrust
Vx Vy Vz
View 1
View 2


New tab
Remove tab
Zoom in/out/fit window
Select data point on curve
Viewer
File View Plot Axes Data
Results Viewer
30.0
20.0
10.0
0.0
Altitude of MAD_H300 at Earth [km]
0.0
50.0
100.0
150.0
Flight Time [s]
Acceleration vs Time
3D View
Mach vs Time
Thrust vs Time
Roll Rate vs Time
Lat Long Alt
Static Stability vs Time
Altitude vs Time
Mass Flow vs Time
Mass vs Time
SL Thrust and Vac Thrust
Vx Vy Vz
View 1
View 2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Data source: Simulation
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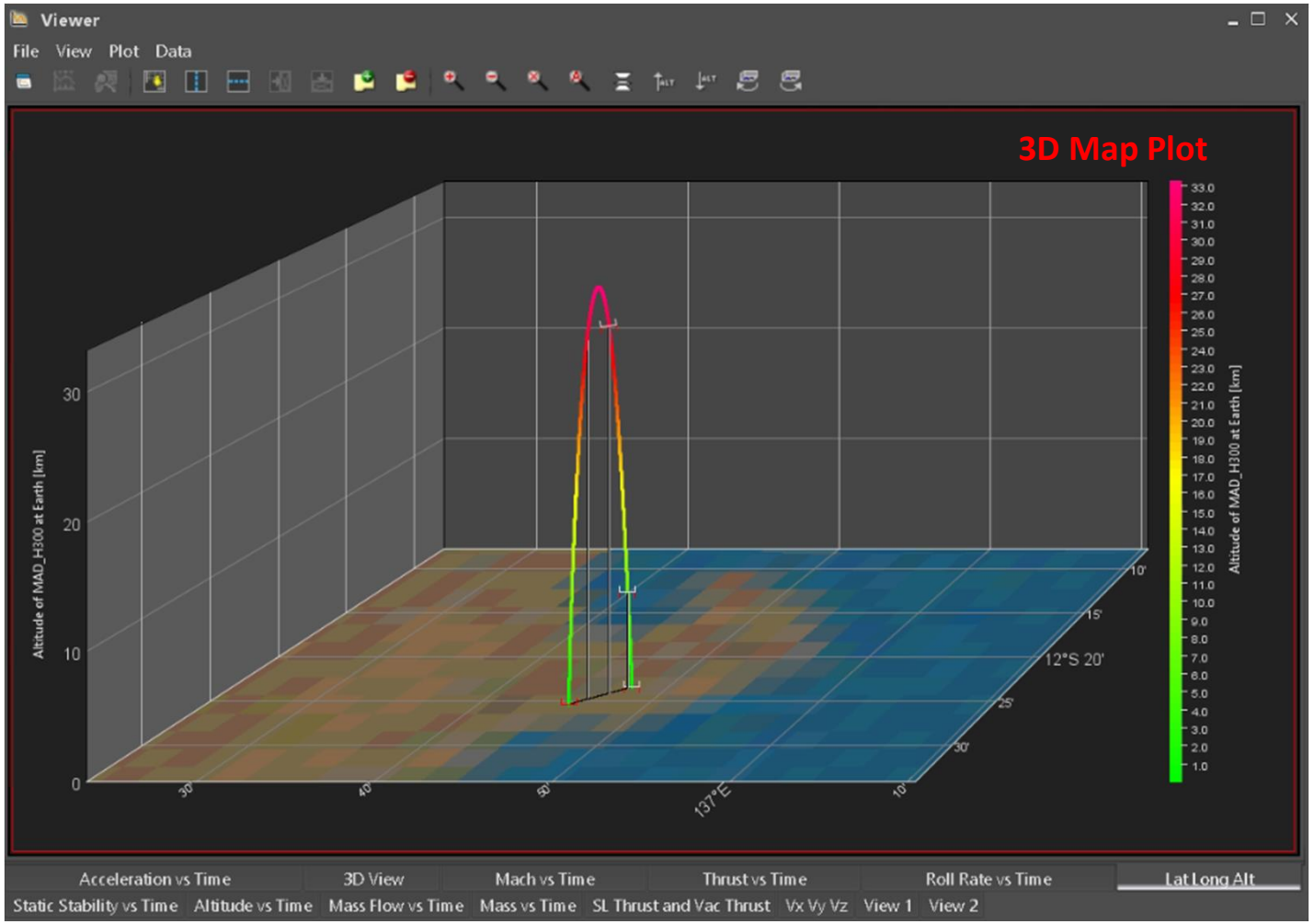
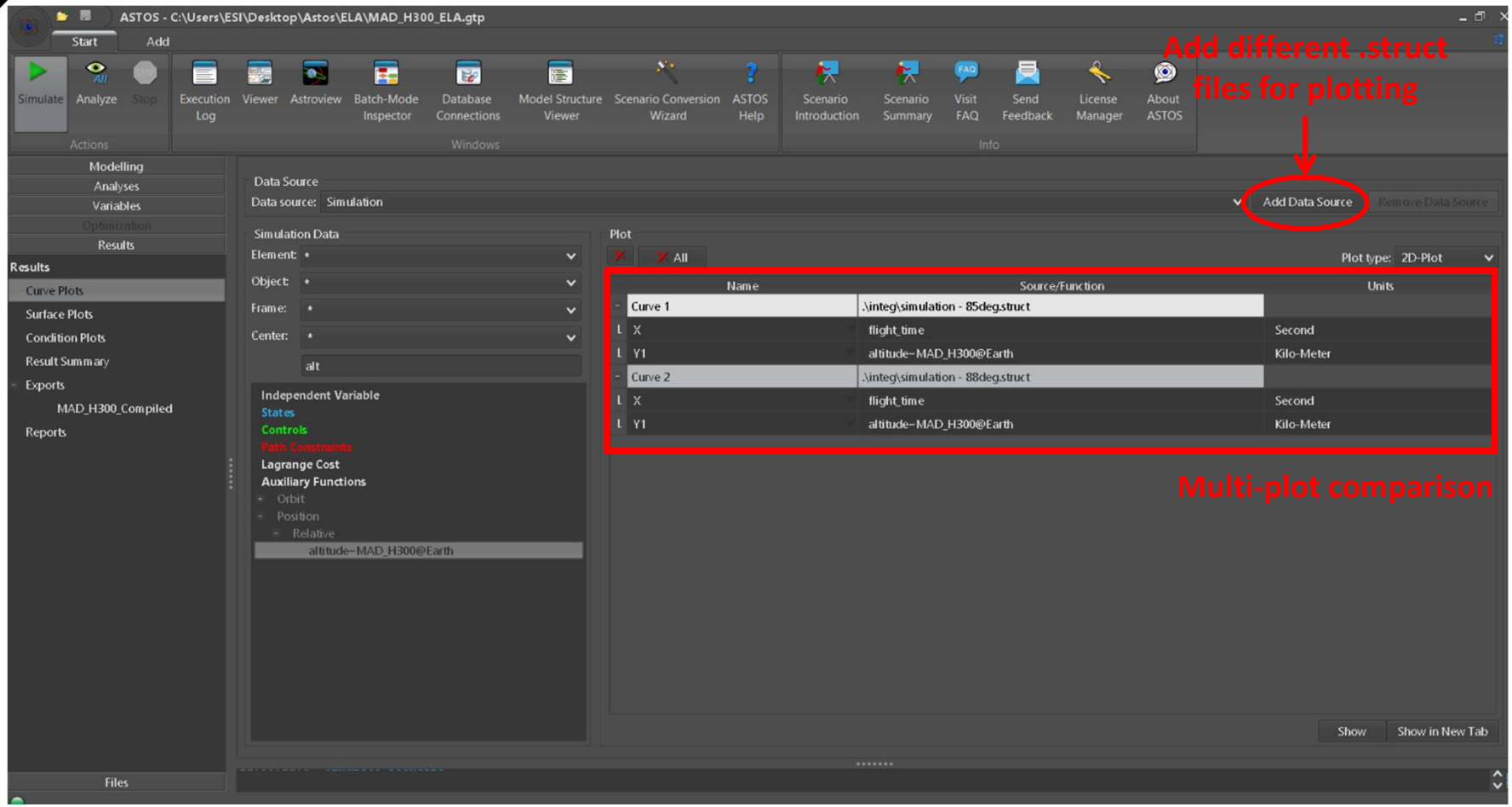
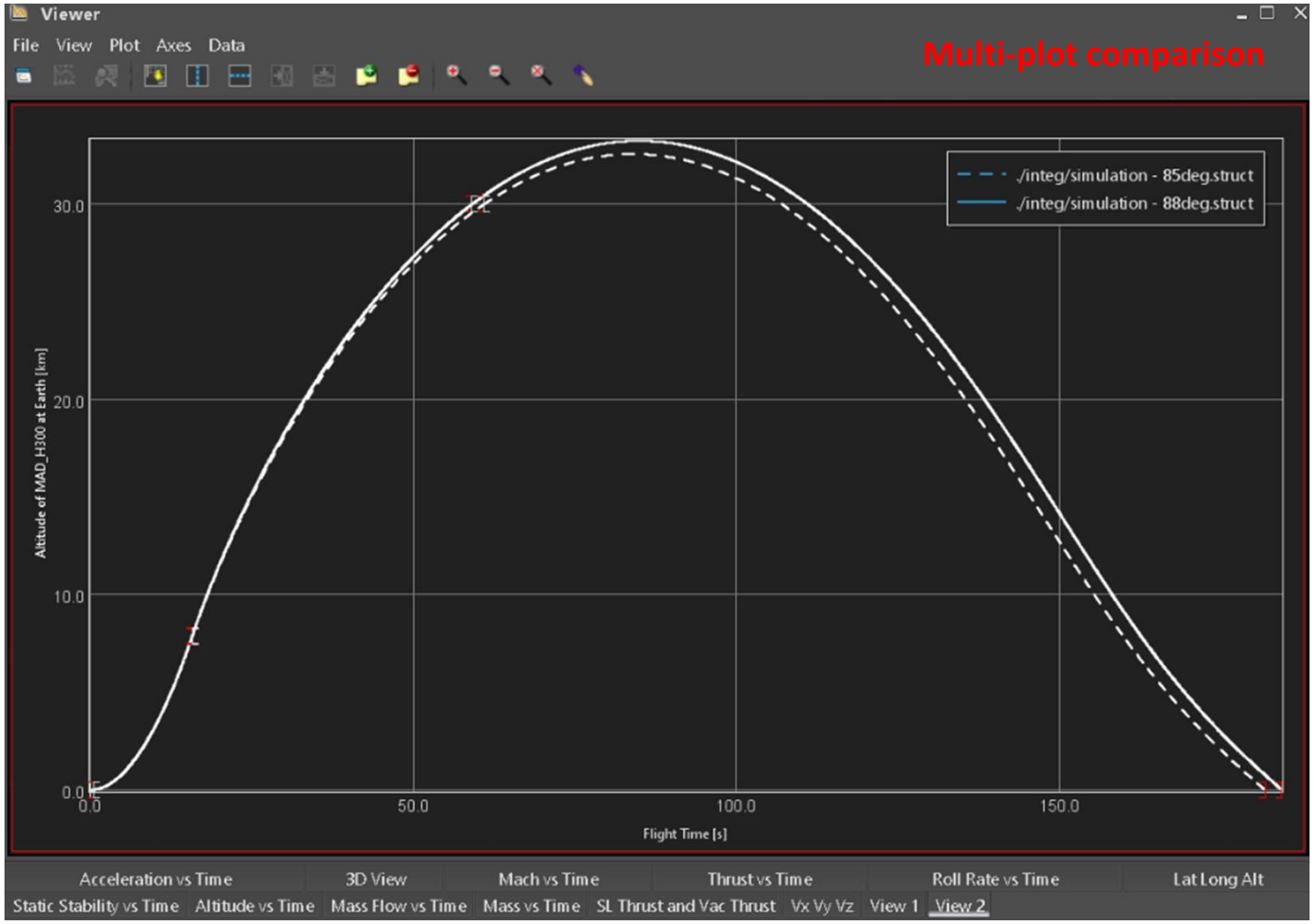
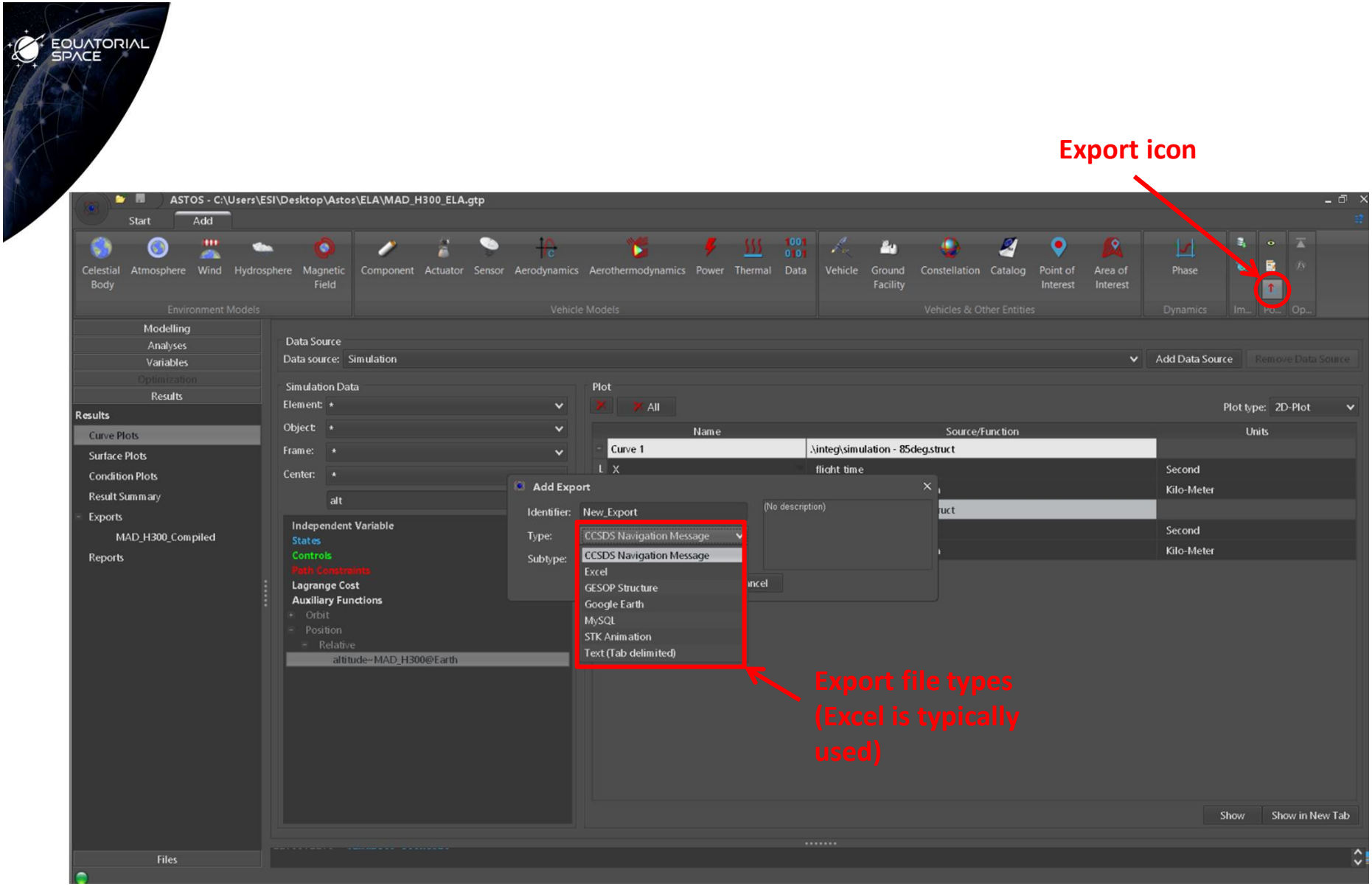
Object: *
Frame: *
Center: *
alt
Independent Variable
States
Controls
Path Constraints
Lagrange Cost
Auxiliary Functions
Orbit
Position
Relative
altitude~MAD_H300@Earth
Plot
All
Plot type: 3D Map-Plot
Name
Source/Function
Units
Curve 1
Simulation
Longitude
longitude~MAD_H300#PCPF~Earth@Earth
Degree
Latitude
latitude~MAD_H300#PCPF~Earth@Earth
Degree
Altitude
altitude~MAD_H300@Earth
Kilo-Meter
Line Color
altitude~MAD_H300@Earth
Kilo-Meter
3D Map Plot
Show
Show in New Tab


Viewer
File View Plot Data
3D Map Plot
Altitude of MAD_H300 at Earth [km]
0
10
20
30
30
40
50
137°E
10'
15'
12°S 20'
25'
30'
Altitude of MAD_H300 at Earth [km]
33.0
32.0
31.0
30.0
29.0
28.0
27.0
26.0
25.0
24.0
23.0
22.0
21.0
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
Acceleration vs Time
3D View
Mach vs Time
Thrust vs Time
Roll Rate vs Time
Lat Long Alt
Static Stability vs Time
Altitude vs Time
Mass Flow vs Time
Mass vs Time
SL Thrust and Vac Thrust
Vx Vy Vz
View 1
View 2



Note: Simulation.struct is always overwritten for every simulation run. Copy and rename to load it for plot comparisons/post-processing later on.


Viewer
File View Plot Axes Data
Multi-plot comparison
./integ/simulation - 85deg.struct
./integ/simulation - 88deg.struct
Altitude of MAD_H300 at Earth [km]
30.0
20.0
10.0
0.0
0.0
50.0
100.0
150.0
Flight Time [s]
Acceleration vs Time
3D View
Mach vs Time
Thrust vs Time
Roll Rate vs Time
Lat Long Alt
Static Stability vs Time
Altitude vs Time
Mass Flow vs Time
Mass vs Time
SL Thrust and Vac Thrust
Vx Vy Vz
View 1
View 2


Export icon
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
Phase
Dynamics
Modelling
Analyses
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Data source: Simulation
Add Data Source
Remove Data Source
Simulation Data
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Object: *
Frame: *
Center: *
alt
Independent Variable
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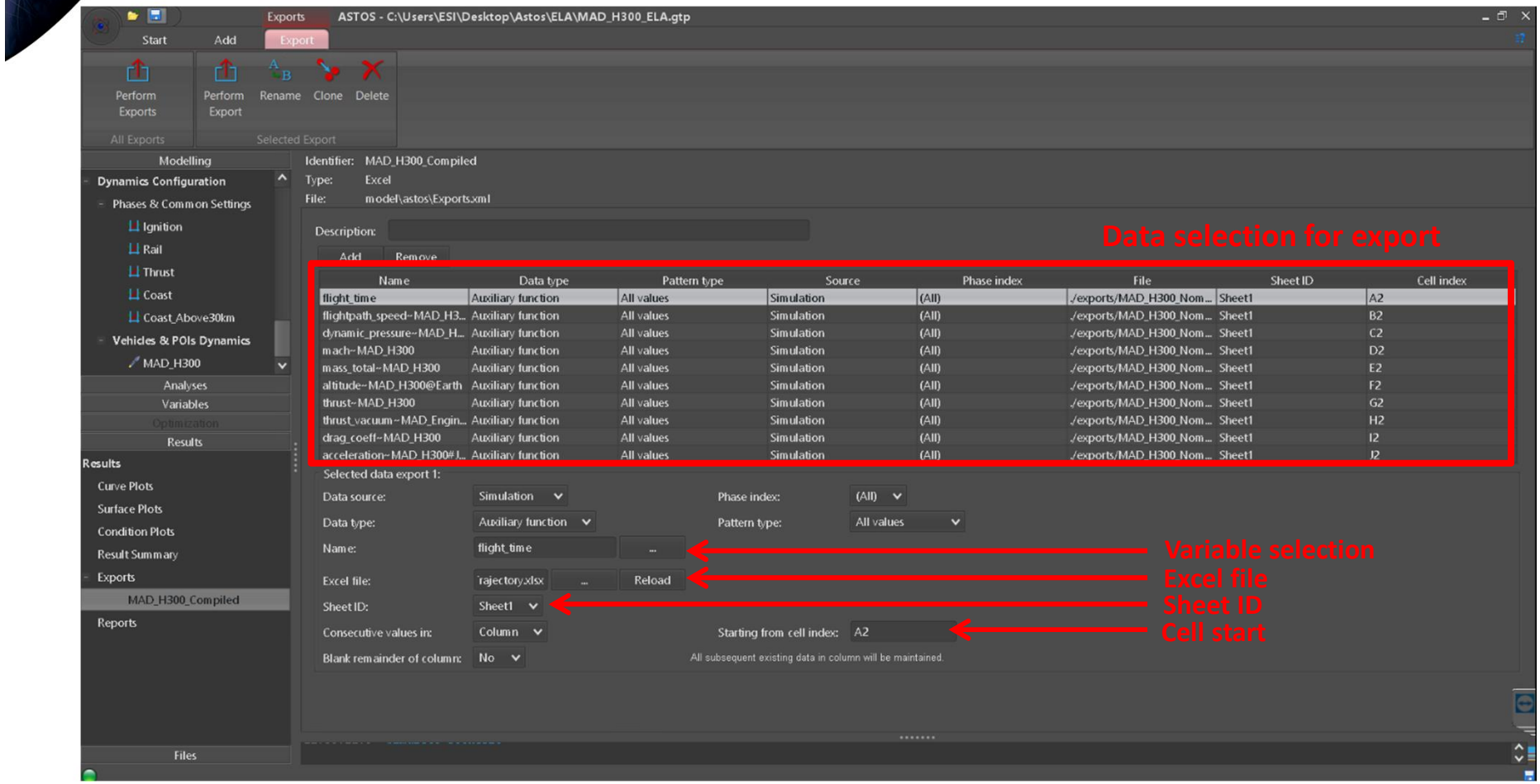
Lagrange Cost
Auxiliary Functions
Orbit
Position
Relative
altitude~MAD_H300@Earth
Plot
All
Plot type: 2D-Plot
Name
Source/Function
Units
Curve 1
\integ\simulation - 85deg.struct
X
flight time
Second
Kilo-Meter
Second
Kilo-Meter
Add Export
Identifier: New_Export
(No description)
Type: CCSDS Navigation Message
Subtype:
CCSDS Navigation Message
Excel
GESOP Structure
Google Earth
MySQL
STK Animation
Text (Tab delimited)
Export file types (Excel is typically used)
Show
Show in New Tab


Exports
ASTOS - C:\Users\ESI\Desktop\Astos\ELA\MAD_H300_ELA.gtp
Start
Add
Export
Perform Exports
Perform Export
Rename
Clone
Delete
All Exports
Selected Export
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Coast_Above30km
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Reports
Files
Identifier: MAD_H300_Compiled
Type: Excel
File: model\astos\Exports.xml
Description:
Add
Remove
Data selection for export
Name
Data type
Pattern type
Source
Phase index
File
Sheet ID
Cell index
flight_time | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | A2
flightpath_speed~MAD_H3... | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | B2
dynamic_pressure~MAD_H... | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | C2
mach~MAD_H300 | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | D2
mass_total~MAD_H300 | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | E2
altitude~MAD_H300@Earth | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | F2
thrust~MAD_H300 | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | G2
thrust_vacuum~MAD_Engin... | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | H2
drag_coeff~MAD_H300 | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | I2
acceleration~MAD_H300#I... | Auxiliary function | All values | Simulation | (All) | ./exports/MAD_H300_Nom... | Sheet1 | J2
Selected data export 1:
Data source: Simulation
Phase index: (All)
Data type: Auxiliary function
Pattern type: All values
Name: flight_time
Excel file: trajectory.xlsx
Reload
Sheet ID: Sheet1
Consecutive values in: Column
Starting from cell index: A2
Blank remainder of column: No
All subsequent existing data in column will be maintained.
Variable selection
Excel file
Sheet ID
Cell start