GMAT Fields Reference Table (DRAFT for R2013a)

Resource Type	Field	Description	Range	Default Value	Units
Barycenter	BodyNames	The list of celestial bodies included in the barycenter. A Celestial Body can only appear once in the BodyNames list.	Celestial Body. You cannot add bodies to the built-in SolarySystemBarycenter object.	Earth, Luna	N/A
CelestialBody	CentralBody	The central body of the celestial body. The central body field is used primarily by the GUI.	Celestial Body.	For Comet, Planet, Asteroid, the default is Sun. For Moon, the default is Earth.	N/A
CelestialBody	EquatorialRadius	The body's equatorial radius.	Real > 0.	6378.1363	km
CelestialBody	Flattening	The body's polar flattening.	Real >= 0	0.0033527	N/A
CelestialBody	Mu	The body's gravitational parameter.	Real > 0.	398600.4415	km^3/s^2
CelestialBody	NAIFId	NAIF Integer ID for body.	Integer	-123456789	N/A
CelestialBody	NutationUpdateInterval	The interval between updates for Earth nutation matrix. If NutationUpdateInterval = 3600, then GMAT only updated nutation on an hourly basis.	Real >=0	60	sec.
CelestialBody	OrbitSpiceKernelName	List of SPK kernels.	Valid SPK kernel	N/A	N/A
CelestialBody	OrientationEpoch	The reference epoch for orientation data	6116.0 <= Epoch <= 58127.5	21545.0	A1 Mod Julian Epoch
CelestialBody	PosVelSource	The model for the bodies orbit ephemeredes.	'SPICE'	'"DE405' for build in bodies. 'SPICE' for user defined bodies.	N/A
CelestialBody	RotationConstant	The body's spin angle at the orientation epoch.	Real	190.147	deg

Resource Type	Field	Description	Range	Default Value	Units
CelestialBody	RotationDataSource	The model for the body's time dependent orientation.	''IAUSimplified', 'DE405' 'FK5IAU1980', 'IAU2000'	For Earth default is 'FK5IAU1980', for Luna default is DE405, for selected build it bodies IAU2000, and for selected built in bodies and all user defined bodies, default is IAUSimplified.	N/A
CelestialBody	RotationRate	The body's spin rate.	Real	360.9856235	deg/day
CelestialBody	SpinAxisDECConstant	The declination of the body's spin axis at the orientation epoch.	Real	90	deg
CelestialBody	SpinAxisDECRate	The rate of change of the body's declination.	Real	-0.5570	deg/day
CelestialBody	SpinAxisRAConstant	The right ascension of the body's spin axis at the orientation epoch.	Real	-0.641	deg
CelestialBody	SpinAxisRARate	The rate of change of the body's right ascension.	Real	-0.641	deg/day
CelestialBody	TextureMapFileName	Texture map used in OrbitView graphics.	Valid file of type	'../data/graphics/texture/GenericCelestialBody.jpg'	N/A
CoordinateSystem	Axes	The axes of the coordinate system.	MJ2000Eq, MJ2000Ec, ICRF, ITRF, MODEq, MODEc, TODEq, TODEc, MOEEq, MOEEc, TOEEq, TOEEc, ObjectReferenced, Equator, BodyFixed, BodyInertial, GSE, GSM, Topocentric	MJ2000Eq	N/A

Resource Type	Field	Description	Range	Default Value	Units
CoordinateSystem	Epoch	The reference epoch for the coordinate system. This field is only used for TOE amd MOE axis types.	See Epoch??	21545	Modified Julian Date
CoordinateSystem	Origin	The origin of the coordinate system.	CelestialBody, Spacecraft, LibrationPoint, Barycenter, SolarSystemBarycenter, GroundStation	Earth	N/A
CoordinateSystem	Primary	The primary body for an ObjectReferenced axis system. This field is only use if Axes = ObjectReferenced.	CelestialBody, Spacecraft, LibrationPoint, Barycenter, SolarSystemBarycenter, GroundStation	Earth	N/A
CoordinateSystem	Secondary	The secondary body for an ObjectReferenced axis system. This field is only use if Axes = ObjectReferenced.	CelestialBody, Spacecraft, LibrationPoint, Barycenter, SolarSystemBarycenter, GroundStation	Luna	N/A
CoordinateSystem	XAxis	The x-axis definition for an ObjectReferenced axis system. This field is only use if Axes = ObjectReferenced.	R,V, N, -R, -V, -N, or empty	R	N/A
CoordinateSystem	YAxis	The y-axis definition for an ObjectReferenced axis system. This field is only use if Axes = ObjectReferenced.	R,V, N, -R, -V, -N, or empty	No Default	N/A
CoordinateSystem	Zaxis	The z-axis for an ObjectReferenced axis system. This field is only use if Axes = ObjectReferenced.	R,V, N, -R, -V, -N, or empty	N	N/A
DifferentialCorrector	DerivativeMethod	The DerivativeMethod field allows the user to choose between one-sided and central differencing for numerically determining the derivative.	ForwardDifference, BackwardDifference, CentralDifference	ForwardDifference	N/A

Resource Type	Field	Description	Range	Default Value	Units
DifferentialCorrector	MaximumIterations	The MaximumIterations field allows the user to set the maximum number of nominal passes the differential corrector is allowed to take during the attempt to find a solution. If the maximum iterations is reached, GMAT exits the target loop and continues to the next command in the mission sequence. In this case, the objects retain their states as of the last nominal pass through the targeting loop.	Integer >= 1	25	N/A
DifferentialCorrector	ReportFile	The ReportFile field allows the user to specify the path and file name for the differential correction report. The report is only generated if ShowProgress is set to true.	Filename consistent with OS	DifferentialCorrectorDCName.data, where DCname is the name of the differential corrector	N/A
DifferentialCorrector	ReportStyle	The ReportStyle field allows the user to control the amount and type of information written to the file defined in the ReportFile field. Currently, the Normal and Concise options contain the same information: the Jacobian, the inverse of the Jacobian, the current values of the control variables, and achieved and desired values of the constraints. Verbose contains values of the perturbation variables in addition to the data for Normal and Concise. Debug contains detailed script snippets at each iteration for objects that have control variables.	Normal, Concise, Verbose, Debug	Normal	N/A

Resource Type	Field	Description	Range	Default Value	Units
DifferentialCorrector	ShowProgress	When the ShowProgress field is set to true, then data illustrating the progress of the differential correction process are written to the message window and the ReportFile. The message window is updated with information on the current control variable values and the contraint variances. When the ShowProgress field is set to false, no information on the progress of the differential correction process is displayed to the message window or written to the ReportFile.	true, false	true	N/A
EphemerisFile	CoordinateSystem	CoordinateSystem field allows the user to generate ephemeris data in the coordinate system that is selected from CoordinateSystem field. The user can choose to also generate ephemeris data in user-defined coordinate system.	Any default or user defined coordinate system	EarthMJ2000Eq	N/A
EphemerisFile	EpochFormat	The EpochFormat field allows the user to select format of the epoch.	UTCGregorian, UTCModJulian, TAIGregorian, TAIModJulian, TTGregorian, TTModJulian A1Gregorian, A1ModJulian, TDBGregorian, TDBModJulian	UTCGregorian	N/A
EphemerisFile	FileFormat	The FileFormat field allows the user to generate ephemeris file in two available file formats: CCSDS-OEM or SPK,	CCSDS-OEM, SPK	CCSDS-OEM	N/A

Resource Type	Field	Description	Range	Default Value	Units
EphemerisFile	FileName	The FileName field allows the user to name the generated ephemeris file and save it in user-specified location.	Valid File Path and Name	EphemerisFile1.eph	N/A
EphemerisFile	FinalEpoch	The FinalEpoch field allows the user to specify the time span of an ephemeris file. Ephemeris file is generated up to final epoch that is specified in FinalEpoch field.	user-defined final epoch or 'FinalSpacecraftEpoch'	FinalSpacecraftEpoch	N/A
EphemerisFile	InitialEpoch	The InitialEpoch field allows the user to specify the starting epoch of the ephemeris file. Ephemeris file is generated starting from the epoch that is defined in InitialEpoch field.	user-defined initial epoch or 'InitialSpacecraftEpoch'	InitialSpacecraftEpoch	N/A
EphemerisFile	InterpolationOrder	The InterpolationOrder field allows you to set the interpolation order for the available interpolator methods (Lagrange or Hermite) for either CCSDS-OEM or SPK file formats.	1 <= Integer Number <= 10	7	N/A
EphemerisFile	Interpolator	The Interpolator field defines the available interpolator method that was used to generate ephemeris file. Available Interpolators are Lagrange or Hermite.	Lagrange for CCSDS file, Hermite for SPK file	Lagrange	N/A
EphemerisFile	Maximized	The Maximized field allows the user to maximize the generated ephemeris file window.	true,false	false	N/A

Resource Type	Field	Description	Range	Default Value	Units
EphemerisFile	RelativeZOrder	RelativeZOrder field allows the user to select which generated ephemeris file display window is to displayed first on the screen. The EphemerisFile object with lowest RelativeZOrder value will be displayed last while EphemerisFile object with highest RelativeZOrder value will be displayed first.	Any Real number	0	N/A
EphemerisFile	Size	The Size field allows the user to control the display size of generated ephemeris file panel. First value in [0 0] matrix controls horizonal size and second value controls vertical size of ephemeris file display window.	Any Real number	[0 0]	N/A
EphemerisFile	Spacecraft	The Spacecraft field allows the user to generate ephemeris data of spacecraft(s) that are defined in Spacecraft field.	Default spacecraft or any number of user-defined spacecrafts or formations	DefaultSC	N/A
EphemerisFile	StepSize	The ephemeris file is generated at the step size that is specified for StepSize field. The user can generate ephemeris file at default Integration step size (using raw integrator steps) or by defining a Fixed step size provided by user.	Real Number > 0.0 or equals 'IntegratorSteps'	IntegratorSteps	N/A

Resource Type	Field	Description	Range	Default Value	Units
EphemerisFile	UpperLeft	The UpperLeft field allows the user to pan the generated ephemeris file display window in any direction. First value in [0 0] matrix helps to pan the window horizontally and second value helps to pan the window vertically.	Any Real number	[0 0]	N/A
EphemerisFile	WriteEphemeris	WriteEphemeris field allows the user to optionally calculate/write or not calculate/write an ephemeris that has been created and configured.	true,false	true	N/A
FiniteBurn	Thruster	The Thruster field allows the selection of which thruster, from a list of previously created thrusters, to use when applying a finite burn. Currently, the user can only select one thruster to attach to a finite burn.	Any thruster created by user	No Default	N/A
FminconOptimizer	DiffMaxChange	The DiffMaxChange parameter is the upper limit on the perturbation used in MATLAB's finite differencing algorithm. For fmincon, you don't specify a single perturbation value, but rather give MATLAB a range, and it uses an adaptive algorithm that attempts to find the optimal perturbation.	Real Number > 0	0.1	N/A

Resource Type	Field	Description	Range	Default Value	Units
FminconOptimizer	DiffMinChange	The DiffMinChange parameter is the lower limit on the perturbation used in MATLAB's finite differencing algorithm. For fmincon, you don't specify a single perturbation value, but rather give MATLAB a range, and it uses an adaptive algorithm that attempts to find the optimal perturbation.	Real Number > 0	1e-8	N/A
FminconOptimizer	MaxFunEvals	The MaxFunEvals parameter allows the user to set the maximum number of cost function evaluations in an attempt to find an optimal solution. This is equivalent to setting the maximum number of passes through an optimization loop in a GMAT script. If a solution is not found before the maximum function evaluations, fmincon outputs an ExitFlag of zero, and GMAT continues.	Integer > 0	1000	N/A
FminconOptimizer	MaximumIterations	The MaximumIterations field allows the user to set the maximum allowable number of nominal passes through the optimizer. Note that this is not the same as the number of optimizer iterations that is shown for the VF13AD optimzer.	Integer > 0	25	N/A
FminconOptimizer	ReportFile	The ReportFile field contains the path and file name of the report file.	Any user-defined file name	FminconOptimizer SQP1.data	N/A

Resource Type	Field	Description	Range	Default Value	Units
FminconOptimizer	ReportStyle	The ReportStyle field determines the amount and type of data written to the message window and to the report specified by field ReportFile for each iteration of the solver (when ShowProgress is true). Currently, the Normal, debug, and Concise options contain the same information: the values for the control variables, the constraints, and the objective function. In addition to this information, the Verbose option also contains values of the optimizer-scaled control variables.	Normal, Concise, Verbose, Debug	Normal	N/A
FminconOptimizer	ShowProgress	The ShowProgress field determines whether data pertaining to iterations of the solver is both displayed in the message window and written to the report specified by the ReportFile field. When ShowProgress is true, the amount of information contained in the message window and written in the report is controlled by the ReportStyle field.	true, false	TRUE	N/A
FminconOptimizer	TolCon	The TolCon parameter is the convergence tolerance on the constraint functions.	Real Number > 0	1e-4	N/A
FminconOptimizer	TolFun	The TolFun parameter is the convergence tolerance on the cost function value.	Real Number > 0	1e-4	N/A

Resource Type	Field	Description	Range	Default Value	Units
FminconOptimizer	TolX	The TolX parameter is the termination tolerance on the vector of independent variables, and is used only if the user sets a value for this field.	Real Number > 0	1e-4	N/A
ForceModel	CentralBody	The central body of propagation. CentralBody must be a celestial body and cannot be a LibrationPoint, Barycenter, Spacecraft, or other special point.	Celestial Body	Earth	N/A
ForceModel	Drag (Deprecated)	See AtmosphereModel.	See AtmosphereModel	See AtmosphereModel	N/A
ForceModel	Drag.AtmosphereModel	Specifies the atmosphere model used in the drag force. This field is only active if there is a PrimaryBody.	None, JacchiaRoberts, MSISE86, MSISE90, NRLMSISE00	"None'	N/A
ForceModel	Drag.F107	The instantaneous value of solar flux at wavelength of 10.7 cm. This field is only active if there is a PrimaryBody.	50 <= Drag.F107 <= 400	150	W/m^2/Hz
ForceModel	Drag.F107A	The average (monthly) value of solar flux at wavelength of 10.7 cm. This field is only active in the script if there is a PrimaryBody. This field is only active if there is a PrimaryBody.	50 <= Draft.F107A <= 400	150	W/m^2/Hz
ForceModel	Drag.MagneticIndex	The geomagnetic index (Kp) used in density calculations. Kp is a planetary 3-hour-average, geomagnetic index that measures magnetic effects of solar radiation. This field is only active if there is a PrimaryBody.	0 <= Real Number <= 9	3	N/A

Resource Type	Field	Description	Range	Default Value	Units
ForceModel	ErrorControl	integration step is estimated. The error in the current step is computed by the selection of ErrorControl and compared to the value set in the Accuracy field to determine if the step has an acceptable error or needs to be improved. All error measurements are relative error, however, the reference for the relative error changes depending upon the selection of ErrorControl. RSSStep is the Root Sum Square (RSS) relative error measured with respect to the current step. RSSState is the (RSS) relative error measured with respect to the current state. LargestStep is the state vector component with the largest relative error measured with respect to the current step. LargestState is the state vector component with the largest relative error measured with respect to the current state. For a more detailed discussion see the GMAT Mathematical Specification. Setting ErrorControl to None turns off error control and the integrator takes constant steps at the value	None, RSSStep, RSSState, LargestState, LargestStep	RSSStep	N/A
ForceModel	GravityField .Earth .EarthTideModel	Flag for type of Earth tide model. This field is always active but only used in the dynamics when there is a harmonic gravity model for Earth.	None, SolidAndPole	''None'	N/A

Resource Type	Field	Description	Range	Default Value	Units
ForceModel	GravityField .PrimaryBodyName .Degree	The degree of the harmonic gravity field. This field is only active if there is a PrimaryBody.	0<Degree<Max Degree On File	4	N/A
ForceModel	GravityField .PrimaryBodyName .Order	The order of the harmonic gravity field. This field is only active if there is a PrimaryBody.	0<Order<Max Degree On File AND Degree <= Order	4	N/A
ForceModel	GravityField .PrimaryBodyName .PotentialFile	The gravity potential file. This field is only active if there is a PrimaryBody.	path and name of .cof OR .grv file	"JGM2.cof'	N/A
ForceModel	Model	A GUI list of "configured' gravity files defined in the file gmat_startup_file.txt. Model allows you to quickly choose between gravity files distributed with GMAT. For example, if PrimaryBody is Earth, you can select among Earth gravity models provided with GMAT such as JGM-2 and EGM-96. If you select Other, you can provide the path and filename for a custom gravity file.	JGM-2, JGM-3, EGM-96, Mars-50C, MGNP-180U	"JGM-2'	N/A
ForceModel	PointMasses	A list of celestial bodies to be treated as point masses in the force model. A body cannot be both the PrimaryBody and in the PointMass list.	Celestial Body	Empty List	N/A
ForceModel	PrimaryBodies	A body modelled with a "complex" force model. A PrimaryBody can have an atmosphere and harmonic gravity model. A PrimaryBody can be any celestial body not included in the PointMasses field. Currently GMAT only supports one PrimaryBody per force model.	Celestial Body	Earth	N/A

Resource Type	Field	Description	Range	Default Value	Units
ForceModel	RelativisticCorrection	Sets relativistic correction on or off.	On, Off	Off	N/A
ForceModel	SRP	Sets SRP force on or off.	On, Off	Off	N/A
ForceModel	SRP.Flux	The value of SRP flux at 1 AU. This field is only active in the script if SRP is on.	1300 < Flux < 1450	1367	W/m^2
ForceModel	SRP.Flux_Pressure	The solar flux at 1 AU divided by the speed of light. This field is only active in the script if SRP is on.	4.33e-6 < Flux_Pressure < 4.84e-6	4.55982118135874e-006	W *s/m^3
ForceModel	SRP.Nominal_Sun	The value of one Astronomical Unit in AU used in scaling SRP.Flux, which is flux at 1 AU, to the flux at spacecraft distance from sun. This field is only active in the script if SRP is on.	135e6<Nominal_Sun <165e6	149597870.691	km
ForceModel	UserDefined				
Formation	Add				
FuelTank	AllowNegativeFuelMass	This field allows the fuel tank to have negative fuel mass which can be useful in optimization and targeting sequences before convergence has occurred.	true, false	FALSE	N/A
FuelTank	FuelDensity	The density of the fuel.	Real > 0	1260	kg/m^3
FuelTank	FuelMass	The mass of fuel in the tank.	Real > 0	756	kg
FuelTank	Pressure	The pressure in the tank.	Real > 0	1500	kPa
FuelTank	PressureModel	The pressure model describes how pressure in the tank changes as fuel is depleted.	PressureRegulated, BlowDown	PressureRegulated	N/A
FuelTank	RefTemperature	The temperature of the tank when fuel was loaded.	Real > -273.15, |Real| > 0.01	20	C
FuelTank	Temperature	The temperature of the fuel and ullage in the tank. GMAT currently assumes ullage and fuel are always at the same temperature.	Real > -273.15	20	C

Resource Type	Field	Description	Range	Default Value	Units
FuelTank	Volume	The volume of the tank. GMAT checks to ensure that the input volume of the tank is larger than the calculated volume of fuel loaded in the tank and throws an exception in the case that the calculated fuel volume is larger than the input tank volume.	Real > 0 such that calculated fuel volume is < input tank Volume.	0.75	m^3
GroundTrackPlot	Add	The Add field allows the user to pick selected objects such as Spacecraft(s) or GroundStation(s) whose ground track is drawn in GroundTrackPlot. To select multiple Spacecrafts or GroundStations, seperate the list by comma and enclose the list in curly brackets. For Example: DefaultGroundTrackPlot.Add = {aSat, bSat, aGroundStaton, bGroundStation};	Selected Objects like Spacecraft(s) or GroundStation(s)	DefaultSC	N/A
GroundTrackPlot	CentralBody	The central body of the Ground track plot	Sun, Mercury, Venus, Earth, Luna, Mars,Jupiter, Saturn, Uranus, Neptune, Pluto	Earth	N/A
GroundTrackPlot	DataCollectFrequency	The number of integration steps to skip between plot point	integer >= 1	1	N/A
GroundTrackPlot	Maximized	The Maximized field allows the user to maximize the GroundTrackPlot window.	true,false	false	N/A
GroundTrackPlot	NumPointsToRedraw	The number of plot points to retain and redraw during propagation and animation. 0 indicates to redraw all.	integer >= 0	0	N/A

Resource Type	Field	Description	Range	Default Value	Units
GroundTrackPlot	RelativeZOrder	RelativeZOrder field allows the user to select which GroundTrackPlot window to display first on the screen. The GroundTrackPlot with lowest RelativeZOrder value will be displayed last while GroundTrackPlot with highest RelativeZOrder value will be displayed first.	Any Real number	0	N/A
GroundTrackPlot	ShowPlot	The ShowPlot field specifies whether to show ground track plot during a mission run.	True,False	True	N/A
GroundTrackPlot	Size	The Size field allows the user to control the display size of GroundTrackPlot window. First value in [0 0] matrix controls horizonal size and second value controls vertical size of GroundTrackPlot display window.	Any Real number	[0 0]	N/A
GroundTrackPlot	SolverIterations	The SolverIterations field determines whether or not ground track data associated with perturbed trajectories during a solver (Targeter, Optimize) sequence is displayed in the GroundTrackPlot. When SolverIterations is set to All, all perturbations/iterations are plotted in the GroundTrackPlot. When SolverIterations is set to Current, only the current solution or perturbation is plotted in GroundTrackPlot. When SolverIterations is set to None, only the final nominal run is plotted on the GroundTrackPlot.	All, Current,None	Current	N/A

Resource Type	Field	Description	Range	Default Value	Units
GroundTrackPlot	TextureMap	The TextureMap field allows you to enter or select any user-defined texture map image for the central body	Valid File Path and Name	../data/graphics/texture/ModifiedBlueMarble.jpg	N/A
GroundTrackPlot	UpdatePlotFrequency	The number of plot points to collect before updating a ground track plot.	integer > 1	50	N/A
GroundTrackPlot	UpperLeft	The UpperLeft field allows the user to pan the GroundTrackPlot display window in any direction. First value in [0 0] matrix helps to pan the GroundTrackPlot window horizontally and second value helps to pan the window vertically.	Any Real number	[0 0]	N/A
ImpulsiveBurn	Axes	The Axes field allows the user to define a spacecraft centered set of axes for the impulsive burn.	VNB, LVLH, MJ2000Eq, SpacecraftBody	VNB	N/A
ImpulsiveBurn	CoordinateSystem	The CoordinateSystem field for an impulsive burn determines what coordinate system the orientation parameters, Element1, Element2, and Element3 refer to.	Local, EarthMJ2000Eq, EarthMJ2000Ec, EarthFixed, or any user defined system	Local	N/A
ImpulsiveBurn	DecrementMass	Flag which determines if the FuelMass is to be decremented as it used.	true, false	FALSE	N/A
ImpulsiveBurn	Element1	X-component of the applied impulsive burn (Delta-V)	Real	1	km/s
ImpulsiveBurn	Element2	Y-component of the applied impulsive burn (Delta-V)	Real	0	km/s
ImpulsiveBurn	Element3	Z-component of the applied impulsive burn (Delta-V)	Real	0	km/s
ImpulsiveBurn	GravitationalAccel	Value of the gravitational acceleration used to calculate fuel depletion.	Real > 0	9.81	m/s^2
ImpulsiveBurn	Isp	Value of the specific impulse of the fuel	Real	300	s

Resource Type	Field	Description	Range	Default Value	Units
ImpulsiveBurn	Origin	The Origin field, used in conjunction with the Axes field, allows the user to define a spacecraft centered set of axes for the impulsive burn.	Sun, Mercury, Venus, Earth, Luna, Mars,Jupiter, Saturn, Uranus, Neptune, Pluto	Earth	N/A
ImpulsiveBurn	Tank	Tank from which the thruster draws propellant from.	User defined list of FuelTanks	N/A	N/A
LibrationPoint	Point	The libration point index.	L1, L2, L3, L4, L5	L1	N/A
LibrationPoint	Primary	The primary body or barycenter.	CelestialBody or Barycenter. Primary cannot be SolarSystemBarycenter and Primary cannot be the same as Secondary.	Sun	N/A
LibrationPoint	Secondary	The secondary body or barycenter.	CelestialBody or Barycenter. Secondary cannot be SolarSystemBarycenter and Primary cannot be the same as Secondary.	Earth	N/A
MatlabFunction	FunctionPath	The location in a file system that contains MATLAB function.	Valid file path	MATLAB_FUNCTION_PATH from the gmat_startup_file	

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	Add	The Add subfield adds a spacecraft,celestial body, libration point,or barycenter to a plot. When creating a plot the Earth is added as a default body and may be removed by the user. The user can add a spacecraft, celestial body, libration point, or barycenter to a plot by using the name used to create the object. The GUI's Selected field is the equivalent of the script's Add field. In the event of no Add command or no objects in the Selected field, GMAT should run without the OrbitView plot and a warning message displayed in the message window. The following warning message is sufficient: The OrbitView named "DefaultOrbitView" will be turned off. No SpacePoints were added to plot.	SpacecraftName CelestialBodyName LibrationPointName BarycenterName	DefaultSC, Earth	N/A
OrbitView	Axes	The Axis flag allows the user to tell GMAT to draw the Cartesian axis system associated with the coordinate system selected under the CoordinateSystem field of an OrbitView plot.	On, Off	On	N/A
OrbitView	CelestialPlane	The CelestialPlane field allows the user to tell GMAT to draw a grid representing the ecliptic plane in an OrbitView plot.	On, Off	Off	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	CoordinateSystem	The CoordinateSystem field on an OrbitView plot allows the user to select which coordinate system to use to draw the plot data. A coordinate system is defined as an origin and an axis system, and the CoordinateSystem field allows the user to determine the origin and axis system of an OrbitView plot. See the CoordinateSystem object fields for information of defining different types of coordinate systems.	Any default or user defined coordinate system	EarthMJ2000Eq	N/A
OrbitView	DataCollectFrequency	The DataCollectFrequency field allows the user to define how data is collected for plotting. It is often inefficient to draw every ephemeris point associated with a trajectory. Often, drawing a smaller subset of the data still results in smooth trajectory plots, while executing more quickly. The DataCollectFrequency is an integer that represents how often to collect data and store for plotting. If DataCollectFrequency is set to 10, then Data is collected every 10 integration steps.	Integer ≥ 1	1	Integration Steps
OrbitView	DrawObject	The DrawObject field allows the user to option of displaying Spacecraft or Celestial objects on the OrbitView plot.	true, false	[true true]	N/A
OrbitView	EnableConstellations	The EnableConstellations field allows the user the option of displaying star constellations on the OrbitView Plot.	On,Off	On	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	EnableStars	The EnableStars field allows the user the option of displaying stars on the OrbitView Plot. When the EnableStars field is turned off, then EnableConstellations field is automatically diabled.	On,Off	On	N/A
OrbitView	Grid	The Grid flag allows the user to tell GMAT to draw a grid representing the longitude and latitude lines celestial bodies added to an OrbitView plot.	On,Off	Off	N/A
OrbitView	Maximized	The Maximized field allows the user to maximize the OrbitView Plot window.	True, False	false	N/A
OrbitView	NumPointsToRedraw	When NumPointsToRedraw is set to zero, all ephemeris points are drawn. When NumPointsToRedraw is set to a positive integer, say 10 for example, only the last 10 collected data points are drawn. See DataCollectFrequency for explanation of how data is collected for an OrbitView plot.	Integer ≥ 1	0	N/A
OrbitView	OrbitColor	The OrbitColor field allows the user to be able to select colors for both spacecraft and celestial body trajectories.	Any color available from the Orbit Color selectbox	[255 32768]	N/A
OrbitView	RelativeZOrder	RelativeZOrder field allows the user to select which OrbitView window to display first on the screen. The OrbitViewPlot with lowest RelativeZOrder value will be displayed last while OrbitViewPlot with highest RelativeZOrder value will be displayed first.	Any real number	0	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	ShowPlot	The ShowPlot field allows the user to turn off a plot for a particular run, without deleting the plot object, or removing it from the script. If you select true, then the plot will be shown. If you select false, then the plot will not be shown.	True,False	True	N/A
OrbitView	Size	The Size field allows the user to control the display size of OrbitViewPlot window. First value in [0 0] matrix controls horizonal size and second value controls vertical size of OrbitViewPlot display window.	Any Real number	[0 0]	N/A
OrbitView	SolverIterations	The SolverIterations field determines whether or not data associated with perturbed trajectories during a solver (Targeter, Optimize) sequence is plotted to OrbitView. When SolverIterations is set to All, all perturbations/iterations are plotted to an OrbitView plot. When SolverIterations is set to Current, only current solution is plotted to an OrbitView. When lverIterations is set to None, this shows only final solution after the end of an iterative process and draws only final trajectory to an OrbitView plot.	All,Current,None	Current	N/A
OrbitView	StarCount	The StarCount field allows the user to enter the number of stars that need to be displayed in an OrbitView plot.	Integer ≥ 1	7000	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	SunLine	The SunLines allows the user to tell GMAT to draw a line that starts at the center of central body and points towards the Sun.	Off,On	Off	N/A
OrbitView	TargetColor	The TargetColor field allows the user to select any available color for perturbing trajectories during iterative processes such as Differential Correction or Optimization.	Any color available from Target Color select box	[8421440 0]	N/A
OrbitView	UpdatePlotFrequency	The UpdatePlotFrequency field allows the user to specify how often to update an OpenGL plot is updated with new data collected during the process of propagating spacecraft and running a mission. Data is collected for a plot according the value defined by DataCollectFrequency. An OpenGL plot is updated with the new data, according to the value set in UpdatePlotFrequency. If UpdatePlotFrequency is set to 10 and DataCollectFrequency is set to 2, then the plot is updated with new data every 20 (10*2) integration steps.	Integer ≥ 1	50	N/A
OrbitView	UpperLeft	The UpperLeft field allows the user to pan the OrbitViewPlot display window in any direction. First value in [0 0] matrix helps to pan the OrbitView window horizontally and second value helps to pan the window vertically.	Any Real number	[0 0]	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	UseInitialView	The UseInitialView field allows the user to control the view of an OrbitView plot between multiple runs of a mission sequence. The first time a specific OrbitView plot is created, GMAT will automatically use the view as defined by the fields associated with View Definition, View Up Direction, and Field of View. However, if the user changes the view using the mouse, GMAT will retain this view upon rerunning the mission if UseInitialView is set to false. If UseInitialView is set to true, the view for an OrbitView plot will be returned to the view defined by the initial settings.	On,Off	On	N/A
OrbitView	ViewDirection	The ViewDirection field allows the user to select the direction of view in an OrbitView plot. The user can specify the view direction by choosing an object to point at such as a spacecraft,celestial body, libration point,or barycenter. Alternatively, the user can specify a vector of the form [x y z]. If the user specification of ViewDirection, ViewPointReference, and ViewPointVector, results in a zero vector, GMAT uses [0 0 10000] for ViewDirection.	SpacecraftName, CelestialBodyName, LibrationPointName, BarycenterName, or a 3-vector of numerical values	Earth	km or N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	ViewPointReference	The ViewPointReference field is an optional field that allows the user to change the reference point from which ViewPointVector is measured. ViewPointReference} defaults to the origin of the coordinate system for the plot. A ViewPointReference can be any spacecraft, celestial body, libration point, or barycenter.	SpacecraftName, CelestialBodyName, LibrationPointName, BarycenterName, or a 3-vector of numerical values	Earth	km or N/A
OrbitView	ViewPointVector	The product of ViewScaleFactor and ViewPointVector field determines the view point location with respect to ViewPointReference. ViewPointVector can be a vector, or any of the following objects: spacecraft,celestial body, libration point,or barycenter. The location of the Viewpoint in three-space is defined as the vector addition of ViewPointReference, and the vector defined by product of ViewScaleFactor and ViewPointVector in the coordinate system chosen by the user.	SpacecraftName, CelestialBodyName, LibrationPointName, BarycenterName, or a 3-vector of numerical values	[30000 0 0]	km or N/A
OrbitView	ViewScaleFactor	The ViewScaleFactor field scales ViewPointVector before adding it to ViewPointReference. The ViewScaleFactor allows the user to back away from an object to fit in the field of view.	Real Number ≥ 0	1	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	ViewUpAxis	The ViewUpAxis allows the user to define which axis of the ViewUpCoordinateSystem that will appear as the up direction in an Orbitview plot. See the comments under ViewUpCoordinateSystem for more details of fields used to determine the up direction in an Orbitview plot.	X , -X , Y , -Y , Z , -Z	Z	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	ViewUpCoordinateSystem	The ViewUpCoordinateSystem and ViewUpAxis fields are used to determine which direction appears as up in an Orbitview plot and together with the fields associated the the View Direction, uniquely define the view. The fields associated with the View Definition allow the user to define the point of view in 3-space, and the direction of the line of sight. However, this information alone is not enough to uniquely define the view. We also must provide how the view is oriented about the line of sight. This is accomplished by defining what direction should appear as the up direction in the plot and is configured using the ViewUpCoordinateSystem field and the ViewUpAxis field. The ViewUpCoordinateSystem allows the user to select a coordinate system to define the up direction. Most of the time this system will be the same as the coordinate system chosen under the CoordinateSystem field.	Any default or user defined coordinate system	EarthMJ2000Eq	N/A
OrbitView	WireFrame	When the WireFrame field is set to On, celestial bodies are drawn using a wireframe model. When the WireFrame field is set to Off, then celestial bodies are drawn using a full map	Off,On	Off	N/A

Resource Type	Field	Description	Range	Default Value	Units
OrbitView	XYPlane	The XYPlane flag allows the user to tell GMAT to draw a grid representing the XY-plane of the coordinate system selected under the CoordinateSystem field of the OrbitView plot.	On,Off	On	N/A
Propagator	Accuracy	The desired accuracy for an integration step. GMAT uses the method selected in the ErrorControl field on the Force Model to determine a metric of the integration accuracy. For each step, the integrator ensures that the error in accuracy is smaller than the value defined by the ErrorControl metric.	Real > 0, < 1	1e-11 except for ABM integrator which is 1e-10	N/A
Propagator	CentralBody	The central body of propagation.	Valid Celestial body.	Earth	N/A
Propagator	EpochFormat	The format of the epoch contained in the StartEpoch field.	A1ModJulian, TAIModJulian, UTCModJulian, TTModJulian, TDBModJulian, A1Gregorian, TAIGregorian, TTGregorian, UTCGregorian, TDBGregorian	A1ModJulian	N/A
Propagator	FM	Identifies the force model used by an integrator. If no force model is provided, GMAT uses an Earth centered 4x4 gravity model only.	Valid force model.	N/A	N/A
Propagator	InitialStepSize	The size of the first step attempted by the integrator.	Real > 0.0001	60	sec

Resource Type	Field	Description	Range	Default Value	Units
Propagator	LowerError	The lower bound on integration error, used to determine when to make step size larger. Applies only to AdamsBashforthMoultonIntegrator	Real > 0 AND 0 < LowerError < TargetError < Accuracy	1e-13	N/A
Propagator	MaximumReduction	Largest factor by which the step size will be reduced, such that the new step H_new = (MaximumReduction * H_old). Applies only to BulirshStoer Integrator.	Real > 0.0 AND 0.0 < MaximumReduction < MinimumReduction	1e-005	N/A
Propagator	MaxStep	The maximum allowable step size.	Real > 0 AND MinStep <= MaxStep	2700	sec
Propagator	MaxStepAttempts	The number of attempts the integrator takes to meet the tolerance defined by the Accuracy field.	Integer > 1	50	N/A
Propagator	MinimumReduction	Smallest factor by which the step size will be reduced, such that the new step H_new = (MinimumReduction * H_old). Applies only to BulirshStoer Integrator.	Real > 0.0 AND 0.0 < MaximumReduction < MinimumReduction	0.7	N/A
Propagator	MinimumTolerance	deprecated	deprecated	deprecated	N/A
Propagator	MinStep	The minimum allowable step size.	Real >= 0 AND MinStep <= MaxStep	0.001	sec
Propagator	Start Epoch	Only used for an SPK propagator. The initial epoch of propagation. When an epoch is provided that epoch is used as the initial epoch. When the keyword "FromSpacecraft" is provided, the start epoch is inherited from the spacecraft.	Gregorian: 04 Oct 1957 12:00:00.000 <= Epoch <= 28 Feb 2100 00:00:00.000 Modified Julian: 6116.0 <= Epoch <= 58127.5 or "FromSpacecraft"	21545	See Description.

Resource Type	Field	Description	Range	Default Value	Units
Propagator	StepSize	The step size for an SPK Propagator	Real > 0	300	sec
Propagator	StopIfAccuracyIsViolated	Flag to stop propagation if integration error value defined by Accuracy is not satisfied.	true, false	true	N/A
Propagator	TargetError	The nominal bound on integration error, used to set the target integration accuracy when adjusting step size. Applies only to AdamsBashforthMoultonIntegrator	Real > 0 AND 0 < LowerError < TargetError < Accuracy	1e-11	N/A
Propagator	Type	Specifies the integrator or analytic propagator used to model time evolution of spacecraft motion.	PrinceDormand78, PrinceDormand45, RungeKutta89,RungeKutta68, RungeKutta56, BulirschStoer, AdamsBashforthMoulton, SPK	RungeKutta89	N/A
ReportFile	Add	The {Add} field allows a user to add user-defined variables to a report file. To add multiple user-defined variables, enclose the variables with curly brackets.Ex. MyReportName.Add ={Sat.X, Sat.Y, Var1, Array(1,1)}; TheGUI's Selected field is the equivalent of the script's Add field.In the event of no Add command or no objects in the Selected field, GMATshould run without the Report output and a warning message displayed in the message window. Thefollowing warning message is sufficient: Report plot will be turned off. No object has beenselected for reporting.	Any user-defined parameter. Ex.Variables, Arrays, S/C parameters	{DefaultSC.A1Mod Julian, DefaultSC.EarthMJ 2000Eq.X}	None

Resource Type	Field	Description	Range	Default Value	Units
ReportFile	ColumnWidth	The ColumnWidth field is used to define the width of the datacolumns in a report file. The value for ColumnWidth is appliedto all columns of data. For example, if ColumnWidth is set to20, then each data column will be 20 white-spaces wide.	integer > 1	20	Characters
ReportFile	Filename	The FileName field allows the user to define the file path and file name for a report.	Valid File Path and Name	ReportFile1.txt	N/A
ReportFile	LeftJustify	When the LeftJustify field is set to On, then the data isleft justified and appears at the left most side of the column. Ifthe LeftJustify field is set to Off, then the data iscentered in the column.	On, Off	On	N/A
ReportFile	Maximized	The Maximized field allows the user to maximize the ReportFile window.	true,false	false	N/A
ReportFile	Precision	The Precision field allows the user to set the number of digits of the data written to a report.	integer > 1	16	Same as variable being reported.
ReportFile	RelativeZOrder	RelativeZOrder field allows the user to select which ReportFile to display first on the screen. The ReportFile with lowest RelativeZOrder value will be displayed last while ReportFile with highest RelativeZOrder value will be displayed first.	Any Real number	0	N/A

Resource Type	Field	Description	Range	Default Value	Units
ReportFile	Size	The Size field allows the user to control the display size of generated ReportFile. First value in [0 0] matrix controls horizonal size and second value controls vertical size of ReportFile window.	Any Real number	[0 0]	N/A
ReportFile	SolverIterations	The SolverIterations field determines whether or not data associated with perturbed trajectories during a solver (Targeter, Optimize) sequence is written to a report file. When SolverIterations is set to All, all perturbations/iterations are written to a reportfile. When SolverIterations is set to Current, only current solution is written to a reportfile. When SolverIterations is set to None, this shows only final solution after the end of an iterative process and reports only final solution to a report file.	All, Current, None	Current	N/A
ReportFile	UpperLeft	The UpperLeft field allows the user to pan the generated ReportFile display window in any direction. First value in [0 0] matrix helps to pan the ReportFile window horizontally and second value helps to pan the window vertically.	Any Real number	[0 0]	N/A
ReportFile	WriteHeaders	The WriteHeaders field specifies whether to includeheaders that describe the variables in a report.	True,False	True	N/A
ReportFile	WriteReport	The WriteReport field specifies whether to write data to the report FileName.	True,False	True	N/A

Resource Type	Field	Description	Range	Default Value	Units
ReportFile	ZeroFill	The ZeroFill allows zeros to be placed in data written to a report to match set precision	On,Off	Off	N/A
SolarSystem	DEFilename	The path and name of the DE file.	Valid DE file	../data/planetary_ephem/de/leDE1941.405	N/A
SolarSystem	EphemerisSource	The ephemeris model for built-in celestial bodies.	DE405, DE421, DE424, or SPICE	DE405	N/A
SolarSystem	EphemerisUpdateInterval	The time between updates for celetial body ephemeris. For example, if EphemerisUpdateInterval = 60, if an ephemeris call is made at time t = 1200, and a subsequent call is made at time t = 1210, the same ephemeris will be returned for the second call. This option is for high speed, low fidelity modelling or for use when modelling orbits far from third body perturbation sources.	Real >= 0	0	s
SolarSystem	LSKFilename	The path and name of the SPK leap second kernel.	Valid SPK leapsecond kernel	../data/time/naif0010.tls	N/A
SolarSystem	SPKFilename	The path and name of the SPK orbit ephemeris kernel.	Valis SPK ephemeris kernel (.bsp)	../data/planetary_ephem/spk/DE421AllPlanets.bsp	N/A
SolarSystem	UseTTForEphemeris	Flag to use TerrestrialTime as input to the orbital ephemeris routines. When set to False TDB is used.	true,false	false	N/A
Spacecraft	A1Gregorian	The spacecraft orbit epoch in the A.1 system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:00.034	N/A
Spacecraft	A1ModJulian	The spacecraft orbit epoch in the A.1 system and the Modified Julian format.	See Epoch	21545.000000397 94	Days

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	AngularVelocityX	The x-component of spacecraft body angular velocity expressed in the inertial frame. AngularVelocityX is used for the following Attitude models: Spinner.	Real number	0	deg./s
Spacecraft	AngularVelocityY	The y-component of spacecraft body angular velocity expressed in the inertial frame. AngularVelocityY is used for the following Attitude models: Spinner.	Real number	0	deg./s
Spacecraft	AngularVelocityZ	The z-component of spacecraft body angular velocity expressed in the inertial frame. AngularVelocityZ is used for the following Attitude models: Spinner.	Real number	0	deg./s
Spacecraft	AOP	The orbital argument of periapsis expressed in the coordinate system chosen in the CoordinateSystem field.	-Inf<AOP<Inf where Inf is defined by compiler's definition of a real.	314.1905515359921	deg.
Spacecraft	Attitude	The attitude mode for the spacecraft.	CoordinateSystemFixed, Spinner, SpiceAttitude	CoordinateSystemFixed	N/A
Spacecraft	AttitudeCoordinateSystem	The CoordinateSystem used in attitude computations. CoordinateSystem field is only used for the following attitude models: CoordinateSystemFixed.	Valid CoordinateSystem Resource.	EarthMJ2000Eq	N/A
Spacecraft	AttitudeDisplayType	The attitude representation to display in the GUI and script file. AttitudeDisplayType is used for the following Attitude models: Spinner.	Quaternion, EulerAngles, DirectionCosineMatrix,MRPs	Quaternion	N/A

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	AttitudeRateDisplayStateType	The attitude rate representation to display in the GUI and script file. AttitudeRateDisplayType is used for the following Attitude models: Spinner.	AngularVelocity, EulerAngleRates	AngularVelocity	N/A
Spacecraft	AttitudeSpiceKernelName	SPK Kernels for spacecraft attitude. SPK atttitude kernels have extension ".BC".	List of path and filenames.	No Default. The field is emtpy.	N/A
Spacecraft	AZI	The orbital velocity azimuth expressed in the coordinate system chosen in the CoordinateSystem field.	-Inf<AZI<Inf where Inf is defined by compiler's definition of a real.	82.3774216815504 3	
Spacecraft	Cd	The coefficent of drag used to compute the acceleration due to drag.	Cd >= 0	2.2	N/A
Spacecraft	CoordinateSystem	The coordinate system with respect to which the orbital state is defined. The CoordinateSystem field is dependent upon the StateType field. If the coordinate system chosen by the user does not have a gravitational body at the origin, then the state types Keplerian, ModifiedKeplerian, and Equinoctial are not permitted.	CoordinateSystem	EarthMJ2000Eq	N/A
Spacecraft	Cr	The coefficent of reflectivity used to compute the acceleration due toSRP.	0 <= CR <= 2.0	1.8	N/A
Spacecraft	CurrA1MJD	[Deprecated] The current epoch in the A1ModJulian format.	See Epoch	21545.0000003979 4	Days

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	DateFormat	The time system and format of the Epoch field. In the GUI, this field is called Epoch Format.	A1ModJulian, TAIModJulian, UTCModJulian, TTModJulian, TDBModJulian, A1Gregorian, TAIGregorian, TTGregorian, UTCGregorian, TDBGregorian	TAIModJulian	N/A
Spacecraft	DCM11	Component (1,1) of the Direction Cosine Matrix. DCM11 is used for the following Attitude models: Spinner.	-1 <= DCM11 <=1	1	N/A
Spacecraft	DCM12	Component (1,2) of the Direction Cosine Matrix. DCM12 is used for the following Attitude models: Spinner.	-1 <= DCM12 <=1	0	N/A
Spacecraft	DCM13	Component (1,3) of the Direction Cosine Matrix. DCM13 is used for the following Attitude models: Spinner.	-1 <= DCM13 <=1	0	N/A
Spacecraft	DCM21	Component (2,1) of the Direction Cosine Matrix. DCM21 is used for the following Attitude models: Spinner.	-1 <= DCM21 <=1	0	N/A
Spacecraft	DCM22	Component (2,2) of the Direction Cosine Matrix. DCM22 is used for the following Attitude models: Spinner.	-1 <= DCM22 <=1	1	N/A
Spacecraft	DCM23	Component (2,3) of the Direction Cosine Matrix. DCM23 is used for the following Attitude models: Spinner.	-1 <= DCM23 <=1	0	N/A
Spacecraft	DCM31	Component (3,1) of the Direction Cosine Matrix. DCM31 is used for the following Attitude models: Spinner.	-1 <= DCM31 <=1	0	N/A

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	DCM32	Component (3,2) of the Direction Cosine Matrix. DCM32 is used for the following Attitude models: Spinner.	-1 <= DCM32 <=1	0	N/A
Spacecraft	DCM33	Component (3,3) of the Direction Cosine Matrix. DCM33 is used for the following Attitude models: Spinner.	-1 <= DCM33 <=1	1	N/A
Spacecraft	DEC	The declination of the orbital position expressed in the coordinate system chosen in the CoordinateSystem field.	-90 <= DEC <= 90	10.3758449200510 5	deg.
Spacecraft	DECV	The declination of orbital velocity expressed in the coordinate system chosen in the CoordinateSystem field.	-90 <= DECV <= 90	7.74777203610811 8	deg.
Spacecraft	DisplayStateType	The orbital state type displayed in the GUI. Allowed state types are dependent upon the selection of CoordinateSystem. For example, if the coordinate system does not have a celestial body at the origin, Keplerian, ModifiedKeplerian, and Equinoctial are not allowed options for StateType.	'Cartesian', 'Keplerian', 'ModifiedKeplerian', 'SphericalAZFPA', 'SphericalRADEC', 'Equinoctial'	Cartesian	N/A
Spacecraft	DragArea	The area used to compute acceleration due to atmospheric drag.	DragArea > = 0	15	m^2
Spacecraft	DryMass	The dry mass of the spacecraft, which does not include fuel mass.	DryMass >=0	850	Kg
Spacecraft	ECC	The orbital eccentricity expressed in the coordinate system chosen in the CoordinateSystem field.	ECC < 0.9999999 or ECC > 1.0000001. If ECC > 1, SMA must be < 0	0.02454974900598 137	N/A

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	Epoch	The time and date corresponding to the specified orbit state. It defines the start time for propagation using the Propagate command.	Gregorian: 04 Oct 1957 12:00:00.000 <= Epoch <= 28 Feb 2100 00:00:00.000 Modified Julian: 6116.0 <= Epoch <= 58127.5	21545	N/A (Gregorian) Days (ModJulian)
Spacecraft	Epoch.A1Gregorian	The spacecraft orbit epoch in the A.1 system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:00.034	N/A
Spacecraft	Epoch.A1ModJulian	The spacecraft orbit epoch in the A.1 system and the Modified Julian format.	See Epoch	21545.000000397 94	Days
Spacecraft	Epoch.TAIGregorian	The spacecraft orbit epoch in the TAI system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:00.000	See Epoch.A1G regorian
Spacecraft	Epoch.TAIModJulian	The spacecraft orbit epoch in the TAI system and the Modified Julian format.	See Epoch	21545	See Epoch.A1M odJulian
Spacecraft	Epoch.TDBGregorian	The spacecraft orbit epoch in the TDB system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:32.184	See Epoch.A1G regorian
Spacecraft	Epoch.TDBModJulian	The spacecraft orbit epoch in the TDB system and the Modified Julian format.	See Epoch	21545.000372499 16	See Epoch.A1M odJulian
Spacecraft	Epoch.TTGregorian	The spacecraft orbit epoch in the TT system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:32.184	See Epoch.A1G regorian
Spacecraft	Epoch.TTModJulian	The spacecraft orbit epoch in the TT system and the Modified Julian format.	See Epoch	21545.0003725	See Epoch.A1M odJulian
Spacecraft	Epoch.UTCGregorian	The spacecraft orbit epoch in the UTC system and the Gregorian format.	See Epoch	01 Jan 2000 11:59:28.000	See Epoch.A1G regorian
Spacecraft	Epoch.UTCModJulian	The spacecraft orbit epoch in the UTC system and the Modified Julian format.	See Epoch	21544.999629629 63	See Epoch.A1M odJulian

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	EquinoctialH	A measure of the orbital eccentricity and argument of periapsis. EquinoctialH and EquinoctialK together govern how eliiptic an orbit is and where the periapsis is located. EquinotialH = ECC * sin(AOP)	-0.99999 < EquinoctialH < 0.99999, AND sqrt(EquinoctialH^2 + EquinoctialK^2) < 0.99999	-0.024234314193370 62	N/A
Spacecraft	EquinoctialK	A measure of the orbital eccentricity and argument of periapsis. EquinoctialH and EquinoctialK together govern how elliptic an orbit is and where the periapsis is located. EquinotialK = ECC * cos(AOP)	-0.99999 < EquinoctialK < 0.99999, AND sqrt(EquinoctialH^2 + EquinoctialK^2) < 0.99999	-0.003922778585859663	N/A
Spacecraft	EquinoctialP	A measure of the orientation of the orbit. EquinoctialP and EquinoctialQ together govern how an orbit is oriented. EquinotialP = tan(INC/2)*sin(RAAN).	-Inf <= EquinoctialP <= Inf	-0.09038834725719359	N/A
Spacecraft	EquinoctialQ	A measure of the orientation of the orbit. EquinoctialP and EquinoctialQ together govern how an orbit is oriented. EquinotialQ = tan(INC/2)*cos(RAAN).	-Inf <= EquinoctialQ <= Inf	0.06716454898232072	N/A
Spacecraft	EulerAngle1	The value of the first Euler angle. EulerAngle1 is used for the following Attitude models: Spinner.	-Inf <= EulerAngle1 <= Inf	0	Deg.
Spacecraft	EulerAngle2	The value of the second Euler angle. EulerAngle2 is used for the following Attitude models: Spinner.	-Inf <= EulerAngle2 <= Inf	0	Deg.
Spacecraft	EulerAngle3	The value of the third Euler angle. EulerAngle3 is used for the following Attitude models: Spinner.	-Inf <= EulerAngle3 <= Inf	0	Deg.

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	EulerAngleRate1	The value of the first Euler angle rate. EulerAngleRate1 is used for the following Attitude models: Spinner.	-Inf <= EulerAngleRate1 <= Inf	0	Deg./s
Spacecraft	EulerAngleRate2	The value of the second Euler angle rate. EulerAngleRate2 is used for the following Attitude models: Spinner.	-Inf <= EulerAngleRate2 <= Inf	0	Deg./s
Spacecraft	EulerAngleRate3	The value of the third Euler angle rate. EulerAngleRate3 is used for the following Attitude models: Spinner.	-Inf <= EulerAngleRate3 <= Inf	0	Deg./s
Spacecraft	EulerAngleSequence	The EulerAngleSequence used for EulerAngle input and output..	123,231,312,132,321,213,121,232,313,131,323,212	321	N/A
Spacecraft	FPA	The orbital flight path angle expressed in the coordinate system chosen in the CoordinateSystem field.	0<= INC <= 180	88.6087036537044 8	Deg.
Spacecraft	FrameSpiceKernelName	SPK Kernels for spacecraft body frame. SPK Frame kernels have extension ".TF".	List of path and filenames.	No Default. The field is emtpy.	N/A
Spacecraft	Id	The spacecraft Id used in tracking data files. This field is only used for EstimationPlugin protype functionality.	String	SatId	N/A
Spacecraft	INC	The orbital inclination expressed in the coordinate system chosen in the CoordinateSystem field.	0<= INC <= 180	12.8500800565809 7	deg.
Spacecraft	MLONG	A measure of the location of the spacecraft in it's orbit. MLONG = AOP + RAAN + MA.	-360 <= MLONG <=360	357.913180370710 5	deg.
Spacecraft	ModelFile	The ModelFile field allows you to upload spacecraft models that are either in 3DS or POV format.	3DS or POV model formats	../data/vehicle/models/aura.3ds	N/A
Spacecraft	ModelFile	The ModelFile field allows you to upload any spacecraft model that is in 3DS or POV model format.	3DS or POV model formats	../data/vehicle/models/aura.3ds	N/A

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	ModelOffsetX	The ModelOffsetX field lets you translate Spacecraft in +X or -X axis of central body's coordinate system.	-3.5 <= Real <= 3.5	0.000000	N/A
Spacecraft	ModelOffsetY	The ModelOffsetY field lets you translate Spacecraft in +Y or -Y axis of central body's coordinate system.	-3.5 <= Real <= 3.5	0.000000	N/A
Spacecraft	ModelOffsetZ	The ModelOffsetZ field lets you translate Spacecraft in +Z or -Z axis of central body's coordinate system.	-3.5 <= Real <= 3.5	0.000000	N/A
Spacecraft	ModelRotationX	The ModelRotationX field lets you do a fixed rotation of spacecraft's attitude w.r.t X-axis of central body's coordinate system.	-180 <= Real <= 180	0.000000	Deg.
Spacecraft	ModelRotationY	The ModelRotationY field lets you do a fixed rotation of spacecraft's attitude w.r.t Y-axis of central body's coordinate system.	-180 <= Real <= 180	0.000000	Deg.
Spacecraft	ModelRotationZ	The ModelRotationZ field lets you do a fixed rotation of spacecraft's attitude w.r.t Z-axis of central body's coordinate system.	-180 <= Real <= 180	0.000000	Deg.
Spacecraft	ModelScale	The ModelScale field lets you apply a scale factor to the spacecraft model's size.	0.001 <= Real <= 1000	3.000000	N/A
Spacecraft	MRP1	The value of the first modified Rodrigues parameter. MRP1 is used for the following Attitude models: Spinner.	-Inf <= MRP1 <= Inf	0	N/A
Spacecraft	MRP2	The value of the second modified Rodrigues parameter. MRP2 is used for the following Attitude models: Spinner.	-Inf <= MRP2 <= Inf	0	N/A

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	MRP3	The value of the third modified Rodrigues parameter. MRP3 is used for the following Attitude models: Spinner.	-Inf <= MRP3 <= Inf	0	N/A
Spacecraft	NAIFId	The spacecraft Id used in SPICE kernels.	Integer	-123456789	N/A
Spacecraft	NAIFIdReferenceFrame	The id of the spacecraft body frame used in SPICE kernels.	Integer	-123456789	N/A
Spacecraft	OrbitSpiceKernelName	SPK Kernels for spacecraft orbit. SPK orbit kernels have extension ".BSP".	List of path and filenames.	No Default. The field is emtpy.	N/A
Spacecraft	Q1	First component of quaternion. GMAT's quaternion representation includes the three "vector" components as the first three elements in the quaternion and the "rotation" component as the last element in the quaternion. Q1 is used for the following Attitude models: Spinner.	-Inf <= Q1 <= Inf	0	N/A
Spacecraft	Q2	Second component of quaternion. GMAT's quaternion representation includes the three "vector" components as the first three elements in the quaternion and the "rotation" component as the last element in the quaternion. Q2 is used for the following Attitude models: Spinner.	-Inf <= Q2 <= Inf	0	N/A

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	Q3	Third component of quaternion. GMAT's quaternion representation includes the three "vector" components as the first three elements in the quaternion and the "rotation" component as the last element in the quaternion. Q3 is used for the following Attitude models: Spinner.	-Inf <= Q3 <= Inf	0	N/A
Spacecraft	Q4	Fourth component of quaternion. GMAT's quaternion representation includes the three "vector" components as the first three elements in the quaternion and the "rotation" component as the last element in the quaternion. Q4 is used for the following Attitude models: Spinner.	-Inf <= Q4 <= Inf	1	N/A
Spacecraft	Quaternion	The quaternion vector. GMAT's quaternion representation includes the three "vector" components as the first three elements in the quaternion and the "rotation" component as the last element in the quaternion. Quaternion is used for the following Attitude models: Spinner.	Four Vector.	[0 0 0 1];	N/A
Spacecraft	RA	The right ascension of the orbital position expressed in the coordinate system chosen in the CoordinateSystem field.	Input: -Inf<= RA <= Inf Output -180<= RA <= 180	0	deg.
Spacecraft	RAAN	The orbital right ascension of the ascending node expressed in the coordinate system chosen in the CoordinateSystem field.	-Inf<RAAN<Inf where Inf is defined by compiler's definition of a real.	306.6148021947984	deg.

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	RadApo	The orbital radius of apoapsisexpressed in the coordinate system chosen in the CoordinateSystem field. The radius of apoapsis is the maximum distance (osculating) between the spacecraft and celestial body at the origin of CoordinateSystem.	abs(RadApo) >= 1 meter.	7368.49911046818	km
Spacecraft	RadPer	The orbital radius of periapsis expressed in the coordinate system chosen in the CoordinateSystem field. The radius of periapsis is the minimum distance (osculating) between the spacecraft and celestial body at the origin of CoordinateSystem.	abs(RadPer) >= 1 meter.	7015.378524789846	km
Spacecraft	RAV	The right ascension of orbital velocity expressed in the coordinate system chosen in the CoordinateSystem field.	Input: -Inf<= RA <= Inf Output -180<= RA <= 180	90	deg.
Spacecraft	RMAG	The magnitude of the orbital position vector expressed in the coordinate system chosen in the CoordinateSystem field.	RMAG >= 1e-10	7218.032973047435	km
Spacecraft	SCClockSpiceKernelName	SPK Kernels for spacecraft clock. SPK clock kernels have extension ".TSC".	List of path and filenames.	No Default. The field is emtpy.	N/A
Spacecraft	SMA	The orbital semi-major axis expressed in the coordinate system chosen in the CoordinateSystem field.	SMA < -0.001 m or SMA > 0.001 meter. If SMA < 0, then ECC must be > 1	7191.938817629013	km
Spacecraft	SRPArea	The area used to compute acceleration due to solar radiation pressure.	SRPArea >= 0	1	m/s^2

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	TA	The orbital true anomaly expressed in the coordinate system chosen in the CoordinateSystem field.	-Inf<TA<Inf where Inf is defined by compiler's definition of a real.	99.8877493320488	deg.
Spacecraft	TAIGregorian	The spacecraft orbit epoch in the TAI system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:00.000	See A1Gregorian
Spacecraft	TAIModJulian	The spacecraft orbit epoch in the TAI system and the Modified Julian format.	See Epoch	21545	See A1ModJulian
Spacecraft	TDBGregorian	The spacecraft orbit epoch in the TDB system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:32.184	See A1Gregorian
Spacecraft	TDBModJulian	The spacecraft orbit epoch in the TDB system and the Modified Julian format.	See Epoch	21545.000372499116	See A1ModJulian
Spacecraft	TTGregorian	The spacecraft orbit epoch in the TT system and the Gregorian format.	See Epoch	01 Jan 2000 12:00:32.184	See A1Gregorian
Spacecraft	TTModJulian	The spacecraft orbit epoch in the TT system and the Modified Julian format.	See Epoch	21545.0003725	See A1ModJulian
Spacecraft	UTCGregorian	The spacecraft orbit epoch in the UTC system and the Gregorian format.	See Epoch	01 Jan 2000 11:59:28.000	See A1Gregorian
Spacecraft	UTCModJulian	The spacecraft orbit epoch in the UTC system and the Modified Julian format.	See Epoch	21544.999629629633	See A1ModJulian
Spacecraft	VMAG	The magnitude of the orbital velocity vector expressed in the coordinate system chosen in the CoordinateSystem field.	VMAG >= 1e-10	7.417715281675348	km/s
Spacecraft	VX	The x-component of the spacecraft velocity with respect to the coordinate system chosen in the spacecraft's CoordinateSystem field.	-Inf<Y<Inf where Inf is defined by compiler's definition of a real.	0	km/s

Resource Type	Field	Description	Range	Default Value	Units
Spacecraft	VY	The y-component of the spacecraft velocity with respect to the coordinate system chosen in the spacecraft's CoordinateSystem field.	-Inf<Y<Inf where Inf is defined by compiler's definition of a real.	7.35	km/s
Spacecraft	VZ	The z-component of the spacecraft velocity with respect to the coordinate system chosen in the spacecraft's CoordinateSystem field.	-Inf<Y<Inf where Inf is defined by compiler's definition of a real.	1	km/s
Spacecraft	X	The x-component of the spacecraft position with respect to the coordinate system chosen in the spacecraft's CoordinateSystem field.	-Inf<X<Inf where Inf is defined by compiler's definition of a real.	7100	km
Spacecraft	Y	The y-component of the spacecraft position with respect to the coordinate system chosen in the spacecraft's CoordinateSystem field.	-Inf<Y<Inf where Inf is defined by compiler's definition of a real.	0	km
Spacecraft	Z	The z-component of the spacecraft position with respect to the coordinate system chosen in the spacecraft's CoordinateSystem field.	-Inf<X<Inf where Inf is defined by compiler's definition of a real.	1300	km
Thruster	Axes	The Axes field allows the user to define a spacecraft centered set of axes for the thruster.	VNB, LVLH, MJ2000Eq, SpacecraftBody	VNB	N/A
Thruster	C1	Thrust coefficient.	Real	10	N
Thruster	C10	Thrust coefficient.	Real	0	N/kPa^C11
Thruster	C11	Thrust coefficient.	Real	0	N/A
Thruster	C12	Thrust coefficient.	Real	0	N
Thruster	C13	Thrust coefficient.	Real	0	N/A
Thruster	C14	Thrust coefficient.	Real	0	1/kPa
Thruster	C15	Thrust coefficient.	Real	0	N/A
Thruster	C16	Thrust coefficient.	Real	0	1/kPa
Thruster	C2	Thrust coefficient.	Real	0	N/kPa
Thruster	C3	Thrust coefficient.	Real	0	N

Resource Type	Field	Description	Range	Default Value	Units
Thruster	C4	Thrust coefficient.	Real	0	N/kPa
Thruster	C5	Thrust coefficient.	Real	0	N/kPa^2
Thruster	C6	Thrust coefficient.	Real	0	N/kPa^C7
Thruster	C7	Thrust coefficient.	Real	0	N/A
Thruster	C8	Thrust coefficient.	Real	0	N/kPa^C9
Thruster	C9	Thrust coefficient.	Real	0	N/A
Thruster	CoordinateSystem	The CoordinateSystem field for a thruster determines what coordinate system the orientation parameters, ThrustDirection1, ThrustDirection2, and ThrustDirection3 refer to.	Local, EarthMJ2000Eq, EarthMJ2000Ec, EarthFixed, or any user defined system	Local	N/A
Thruster	DecrementMass	Flag which determines if the FuelMass is to be decremented as it used.	true, false	FALSE	N/A
Thruster	DutyCycle	Fraction of time that the thrusters are on during a maneuver. The thrust applied to the spacecraft is scaled by this amount. Note that this scale factor also affects mass flow rate.	0 <= Real <= 1	1	N/A
Thruster	GravitationalAccel	Value of the gravitational acceleration used for the FuelTank/Thruster calculations.	Real > 0	9.81	m/s^2
Thruster	K1	Isp coefficient	Real	300	s
Thruster	K10	Isp coefficient	Real	0	s/kPa^C11
Thruster	K11	Isp coefficient	Real	0	N/A
Thruster	K12	Isp coefficient	Real	0	s
Thruster	K13	Isp coefficient	Real	0	N/A
Thruster	K14	Isp coefficient	Real	0	1/kPa
Thruster	K15	Isp coefficient	Real	0	N/A
Thruster	K16	Isp coefficient	Real	0	1/kPa
Thruster	K2	Isp coefficient	Real	0	s/kPa
Thruster	K3	Isp coefficient	Real	0	s
Thruster	K4	Isp coefficient	Real	0	s/kPa
Thruster	K5	Isp coefficient	Real	0	s/kPa^2
Thruster	K6	Isp coefficient	Real	0	s/kPa^C7

Resource Type	Field	Description	Range	Default Value	Units
Thruster	K7	Isp coefficient	Real	0	N/A
Thruster	K8	Isp coefficient	Real	0	s/kPa^C9
Thruster	K9	Isp coefficient	Real	0	N/A
Thruster	Origin	The Origin field, used in conjunction with the Axes field, allows the user to define a spacecraft centered set of axes for the thruster. Origin has no affect when a Local coordinate system is used and the Axes are set to MJ2000Eq or SpacecraftBody.	Sun, Mercury, Venus, Earth, Luna, Mars,Jupiter, Saturn, Uranus, Neptune, Pluto	Earth	N/A
Thruster	Tank	Tank from which the thruster draws propellant from.	User defined list of FuelTanks.	N/A	N/A
Thruster	ThrustDirection1	ThrustDirection1, divided by the RSS of the three direction components, forms the x component of the spacecraft thrust vector direction.	Real	1	N/A
Thruster	ThrustDirection2	ThrustDirection2, divided by the RSS of the three direction components, forms the y component of the spacecraft thrust vector direction.	Real	0	N/A
Thruster	ThrustDirection3	ThrustDirection3, divided by the RSS of the three direction components, forms the z component of the spacecraft thrust vector direction.	Real	0	N/A
Thruster	ThrustScaleFactor	ThrustScaleFactor is a scale factor that is multiplied by the thrust vector, for a given thruster, before the thrust vector is added into the total acceleration. Note that the value of this scale factor does not affect the mass flow rate.	Real >= 0	1	N/A

Resource Type	Field	Description	Range	Default Value	Units
VF13ad	FeasibilityTolerance	The FeasibilityTolerance field specifies the accuracy with which the user desires a constraint to be satisfied.	Real > 0	1e-3	N/A
VF13ad	MaximumIterations	The MaximumIterations field allows the user to set the maximum allowable number of nominal passes through the Solver Control Sequence.	Integer > 0	200	N/A
VF13ad	ReportFile	The ReportFile field contains the path and file name of the report file.		Any user-defined file name	N/A
VF13ad	ReportStyle	The ReportStyle field determines the amount and type of data written to the message window and to the report specified by field ReportFile for each iteration of the solver (When ShowProgress is true). Currently, the Normal, debug, and Concise options contain the same information: the values for the control variables, the constraints, and the objective function. In addition to this information, the Verbose option also contains values of the optimizer-scaled control variables.	Normal, Concise, Verbose, Debug	Normal	N/A

Resource Type	Field	Description	Range	Default Value	Units
VF13ad	ShowProgress	The ShowProgress field determines whether data pertaining to iterations of the solver is both displayed in the message window and written to the report specified by the ReportFile field. When ShowProgress is true, the amount of information contained in the message window and written in the report is controlled by the ReportStyle field.	true, false	TRUE	N/A
VF13ad	Tolerance	The Tolerance field specifies the measure the optimizer will use to determine when an optimal solution has been found based on the value of the goal set in a Minimize command.	Real > 0	1e-5	N/A
VF13ad	UseCentralDifferences	The UseCentralDifferences field allows the user to choose whether or not to use central differencing for numerically determining the derivative. For the default, 'false' value of this field, forward differencing is used to calculate the derivative.	true, false	false	N/A
XYPlot	Maximized	The Maximized field allows the user to maximize the XYPlot window.	true,false	false	N/A
XYPlot	RelativeZOrder	RelativeZOrder field allows the user to select which XYPlot window to display first on the screen. The XYPlot with lowest RelativeZOrder value will be displayed last while XYPlot with highest RelativeZOrder value will be displayed first.	Any Real number	0	N/A

Resource Type	Field	Description	Range	Default Value	Units
XYPlot	ShowGrid	When the ShowGrid field is set to True, then a grid is drawn on an xy-plot. When the ShowGrid field is set to False, then a grid is not drawn.	True,False	True	N/A
XYPlot	ShowPlot	The ShowPlot field allows the user to turn off a plot for a particular run, without deleting the plot object, or removing it from the script. If you select true, then the plot will be shown. If you select false, then the plot will not be shown.	True,False	True	N/A
XYPlot	Size	The Size field allows the user to control the display size of XYPlot window. First value in [0 0] matrix controls horizonal size and second value controls vertical size of XYPlot display window.	Any Real number	[0 0]	N/A
XYPlot	SolverIterations	The SolverIterations field determines whether or not data associated with perturbed trajectories during a solver (Targeter, Optimize) sequence is displayed in the XY plot. When SolverIterations is set to All, all perturbations/iterations are plotted in the XY Plot. When SolverIterations is set to Current, only the current solution or perturbation is plotted in XY Plot. When SolverIterations is set to None, only the final nominal run is plotted on the XYPlot.	Current, All, None	Current	N/A

Resource Type	Field	Description	Range	Default Value	Units
XYPlot	UpperLeft	The UpperLeft field allows the user to pan the XYPlot display window in any direction. First value in [0 0] matrix helps to pan the XYPlot window horizontally and second value helps to pan the window vertically.	Any Real number	[0 0]	N/A
XYPlot	XVariable	The XVariable field allows the user to define the independent variable for an xy-plot. Only one variable can be defined as an independent variable. For example, the line MyXYPlot.XVariable = DefaultSC.A1ModJulian sets the independent variable to be the epoch of DefaultSC in the A1 time system and modified Julian format.	Any user variable, array element, or spacecraft parameter that evaluates to a real number	DefaultSC.A1ModJulian	
XYPlot	YVariables	The YVariables field allows the user to add dependent variables to an xy-plot. All dependent variables are plotted on the y-axis vs the independent variable defined by XVariable. The dependent variable(s) should always be included in curly braces. For example, MyXYPlot.YVariables = {DefaultSC.EarthMJ2000Eq.Y, DefaultSC.EarthMJ2000Eq.Z}.	Any user variable, array element, or spacecraft parameter that evaluates to a real number	DefaultSC.EarthMJ2000Eq.X	N/A