Systema-Thermica

European Space Thermal Engineering Workshop 2022 18th-20th of October, 2022

DEFENCE AND SPACE

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Agenda









Systema - Thermica LTS 4.9.2 Sept. 2022:

- The main effort has been put on ergonomy, optimisations and validation
- Improvements on Thermica & Thermisol

User Interface / Connecting with other software

- New Python console based on Jupyter.
- Step-TAS import/export improvements, now fully support phases of materials.
- New ergonomic features (drag&drop, player displayed in elapsed time, ...)

KEY MESSAGE

Systema-4.9.2 is the new Long Term Support (LTS) version

 \rightarrow Exporting files for the previous **LTS** versions (4.8.3 and 4.5.1) is provided.



Overview

Python API improvements



Since Systema 4.5, the Systema Python API has been continously improved as demonstrated in the previous ESTEW presentations.





Python API improvements

New Python console based on Jupyter.

- → Autocompletion
- → Embedded help
- → Method descriptions etc...

Jupyter QtConsole 4.7.7			
Python 2.7.18 (v2.7.18:8d21aa21	lf2, Apr 20 2020, 13:25:05) [MSC v.1500 64 bit (AMD64)]		
Type "copyright", "credits" or "lic	ense" for more information.		
IPython 5.10.0 An enhanced Ir	nteractive Python.		
? -> Introduction and overv	view of IPython's features.		
%quickref -> Quick reference.			
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🥱 Systema Python console	
Jupyter QtConsole 4.7.7 Python 2.7.18 (v2.7.18:8d21aa21f2, Apr 20 2020, 13:25:05) [MSC v.1500 64 bit (AMD64)] Type "copyright", "credits" or "license" for more information.	
IPython 5.10.0 An enhanced Interactive Python.	
? -> Introduction and overview of IPython's features. %aujckref -> Quick reference	
help -> Python's own help system.	
object? -> Details about 'object', use 'object??' for extra details.	
In [1]: import matplotlib.pyplot as plt	
: fig, ax = plt.subplots()	
: ax.piot(range(10), linestyle=(0, (3, 3)), lw=5)	
Out[1]: [<matplotlib.lines.line2d 0x515dfcc8="" at="">]</matplotlib.lines.line2d>	
8-	
6-	
4 -	
2 -	
0 - 🥒	
0 2 4 6 8	
In [2]:	

Systema 4.9.2 now embeds an extensive **Python 2.7.18** distribution with several packages for scientific computation and applications (matplotlib, pandas, etc...)

Complete list of available modules listed in the release note.

New methods provided in the Python API.

Trajectory / Kinematics



 The supported reference frames in Systema are clarified to avoid confusion.



- Systema allows to import arc or kinematics definitions defined in ICRF.
- New kinematic laws are provided:
 - X direction of ICRF
 - Y direction of ICRF
 - Z direction of ICRF
 - Ecliptic north

- The support of ephemeris and attitude STK file is improved.
- New textual information can be displayed in trajectory tab:
 - The occulting body during eclipses and penumbras
 - The Solar Zenith Angle



These information are also available in the mission log.





FREE COMMENT

SHAPE	Rever
Deint 1	(Fill Deint 2
	X 2
Y 0 Y 0	Y 4
70 70	7.0
DISPLAY PROPERTIES	Add Reven

DRAG & DROP

In modeler tree

Material	Model	Meshing
Model		0
New Model	*	\$
Search in b	rowser	Search
👺 Model		
New New	Object lew Recta	ingle
		:
1		

7

CLOSE ALL WITHOUT SAVING



PLAYER DISPLAYED IN ELAPSED TIME





RESULT PATH

Use the path of the processing files to build the results directory.

RESULT INFORMATIONS	Rever
Result name	
Automatic	
Default result directory	
Mission directory	
Processing directory	
Custom	
COMMENT	Add



AIRBUS

Ergonomy

MAX RECENT FILES

New setting to set the number of recent files displayed in "File" menu

🖓 Settings	?	\times
Profiles Selected profile: de	ault 💠 Manage 🤨	
User Interface File ID Soripting Modeler Schematic	Step Systema Export Be warned when file version is updated during Save Store the saving date in Systema files Import Import Be warned when imported file contains errors General Watching changes to files opened in Systema by other applications Deectivated 10	•
	🚽 Reset 🛛 🗸 Cancel 🗸	Appl

Thermica – Thermisol new features



THERMICA

Solar Lamp : a new specific item called Solar Lamp allows to model a source of UV or IR emission.

Thermica General SolarLamp	
Solar Lamp Energy source type	Overload
Flux	Overload
Ray number	Overload
Solar Lamp Advanced	
Random seed	Overload
Ray threshold	Overload
1 Maximum ray bounces	Overload
[100	
	Themson Generali Solar Lange Indire Lange Indire Lange Indire Lange Indire Lange Advanced Indire Lange Advanced Solar Lange Advanced Indire Lange Advanced Indire Lange Advanced Indire Lange Advanced

- Conduction with Simplified-RCN improved for condensed nodes.
- Solar flux : export of Solar constant value in the .sf.nwk file.
- Planet fluxes : export of Planet direction vector and Solar Zenith Angle now possible in the .pf.nwk file.
- Nodal description : export geometrical positions and normal vectors (FX, FY, FZ, NX, NY, NZ) in H5 file.

Lots of corrected issues thanks to our user feedbacks

THERMISOL

For a test case with :

Number of GL

Number of GR

Number of GF : 530

- GETCSG(Node) routine to get the CSG value of any node _ in the dck file
- The libsolver is now built in 64bits on both Linux and _ Windows while it was only on Linux in Systema 4.9.1 (~2 times faster!)



Computation time



Thermica – Thermisol new features

Solar lamp



\$INITIAL

QS automatically computed in the « Nodal Description » module output in nod.nwk file

np
Lamp_1 (200) :
400 = 2283.79
401 = 4176.31
402 = 4175.85
403 = 2278.95
404 = 1385.41
405 = 1041.59





Systema

The future of Systema

AIRBUS



Systema

The future of Systema

AIRBUS

Conclusion



- Systema-4.9.2 is the new Long Term Support (LTS) version
- Main improvements concern the ergonomy, the python API and the validation.
- New features on Thermica-Thermisol
- Continuous improvements for V4
- V5 definitions and specifications on-going
- New website (available soon!)
- Need to apply for download links (Airbus geo-restrictions)
- Subscribe for V5 updates and review board participation





Thank you

