

SPIS 4.0 RC2

Improvements, major changes and

new features

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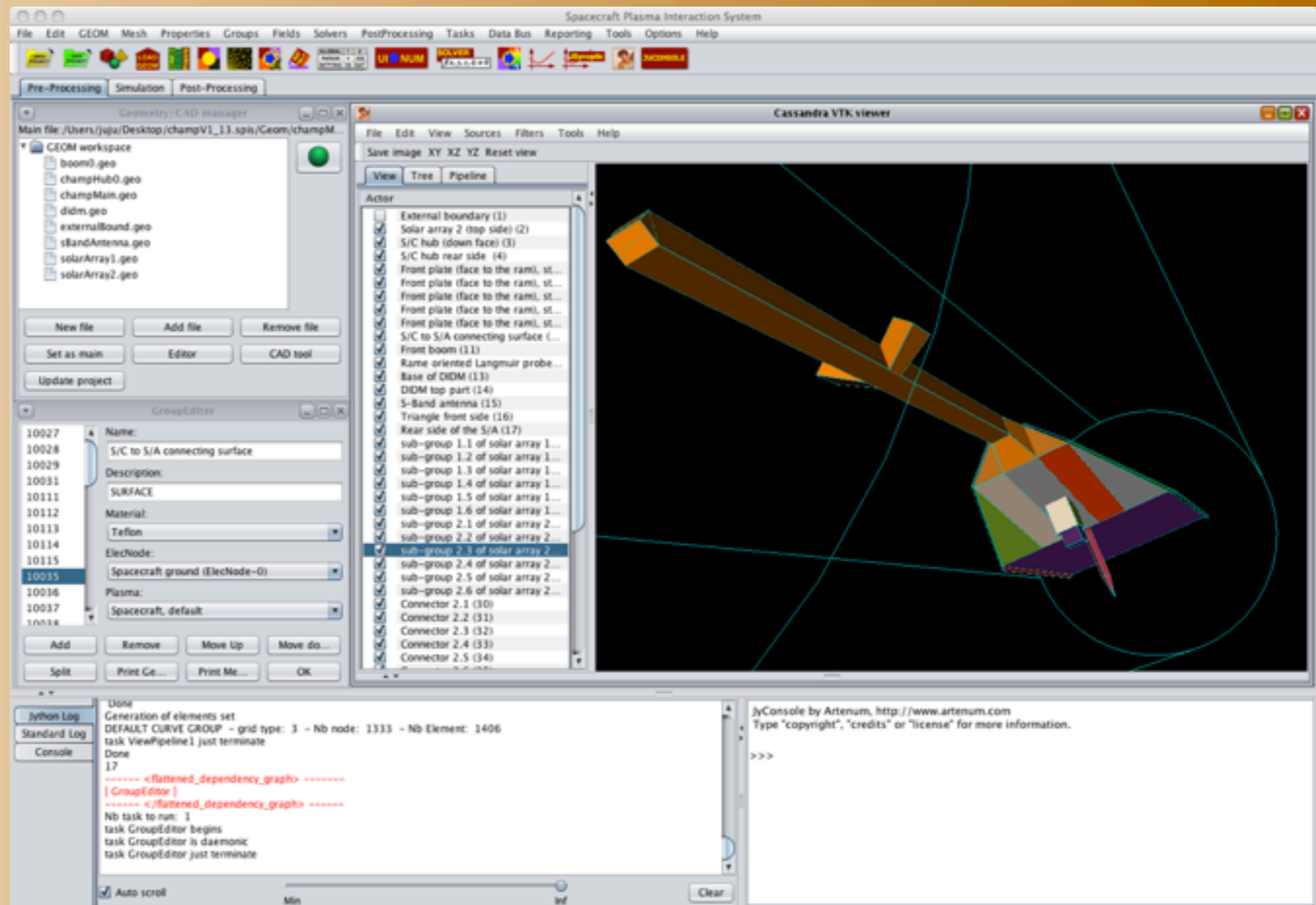
SPINE meeting Toulouse

28 Septembre 2009

(1) Artenum, (2) ONERA

The SPIS-UI framework

- ▶ Help to handle the whole processing chain
 - ▶ Pre-processing
 - ▶ Simulation control
 - ▶ Post-processing
- ▶ Framework components based
 - ▶ Tasks
 - ▶ Tool box
 - ▶ Modular
- ▶ Multi-platform
- ▶ GUI/batch mode
- ▶ Include a TaskManager
- ▶ Customisable

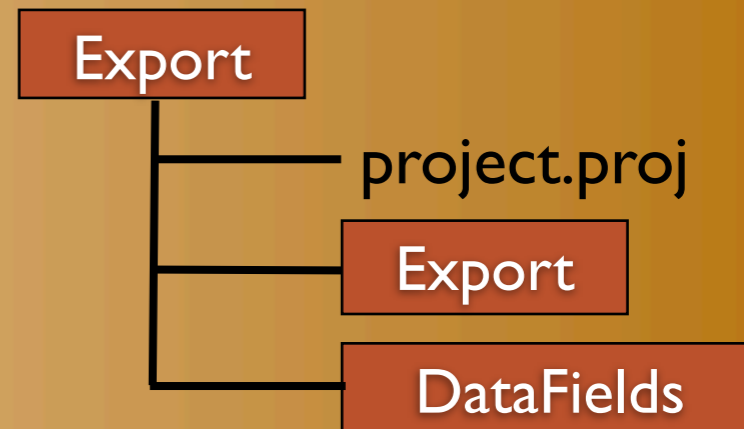
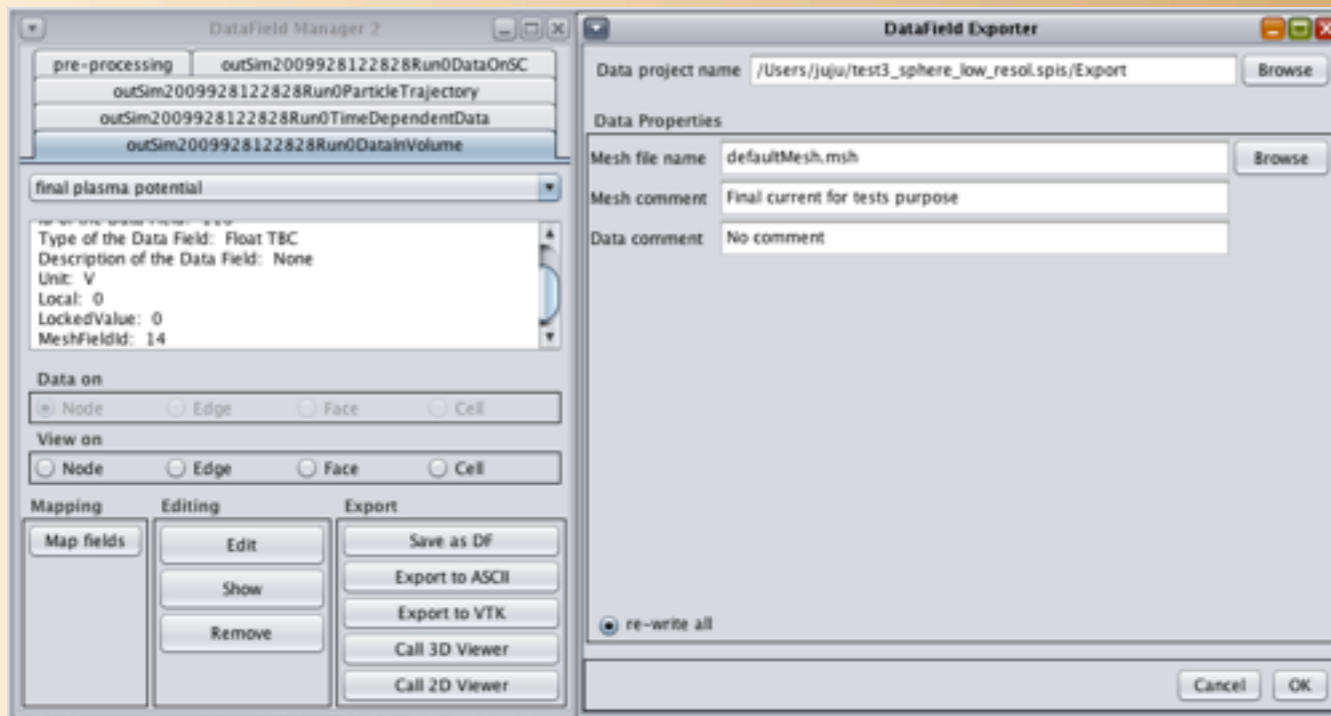


SPIS-UI major improvements

- ▶ Full migration to VTK 5.3
 - ▶ Better performances and more filters
 - ▶ Fully compliant with Mac OSX
 - ▶ More stable
- ▶ Full migration to JVM 1.6 32/64bits
 - ▶ Improved performances
 - ▶ In 64 bits, remove the memory limitation
- ▶ Full migration to Jython 2.2
 - ▶ Better performances
 - ▶ Closer to the evolution of Python
- ▶ Migration to Gmsh 2.xxx (since SPIS 3.7 RC9)
 - ▶ Improved meshing capabilities (integration of
 - ▶ Better stability
 - ▶ Gmsh is able to imports STEP, IGES and BREP files thanks to OpenCascade.
 - ▶ Gmsh interfaces with additional external mesh generators like Netgen and TetGen
- ▶ Improvement of the self-consistency of the persistence scheme
 - ▶ Saving the mesh from the memory foot-print

Contribution: a new ASCII exporting module

- ▶ This contribution has been funded by the LATMOS UVSQ-CNRS/INSU-UPMC laboratory, France, supervised by Jean-Jacques Berthelier.
- ▶ Special thanks to Richard Marchand of University of Alberta for his advices.
- ▶ Export DataField and MeshFields in ASCII row based format with a link to the mesh structure.
- ▶ MD5 based inter-files relationship



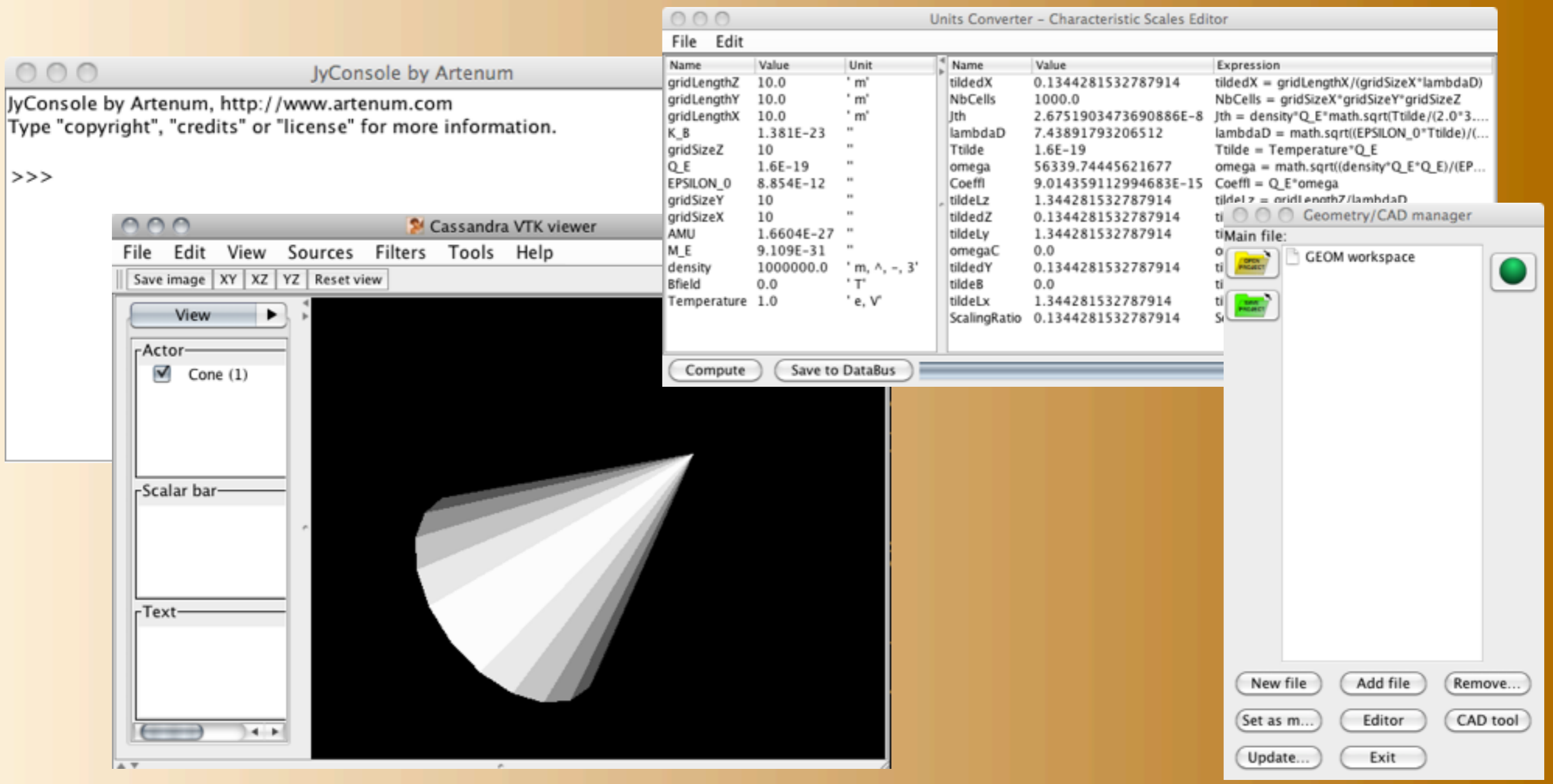
```
# format :
# file_name_of_related_mesh (see .proj control file for more informations
# Number_of_values
# Localisation_on_cell ( 0 = on node, 1 = on edge, 2 = on face, 3 = on cell
# value Id_of_the_hosting_element (Id starting at 1)
# defaultMesh.msh
1322
0
-0.03271356225013733 39
-0.03271356225013733 2
-0.03271356225013733 165
-0.03271356225013733 69
...
```

```
$NOD
1323
1 1.0 0.0 0.0
2 -1.0 0.0 0.0
3 0.0 1.0 0.0
4 0.0 -1.0 0.0
5 0.0 0.0 1.0
6 0.0 0.0 -1.0
7 0.0 0.0 0.0
8 -10.0 10.0 10.0
9 10.0 10.0 10.0
....
```

```
# Files identification list
# MD5 key, file name, relative path, hostname, last update, access rights, comment
'd6ff5850b5dc0442c400ecb64a6a8a2e', 'defaultMesh.msh', 'Mesh', 'raminagrobis.local', '2009_9_28_15_47_0_0_271_1', 'rws', 'Final current for tests purpose'
'48e651fb86a658091ba7478180c238d0', 'final_plasma_potential.dat', 'DataField', 'raminagrobis.local', '2009_9_28_14_54_17_0_271_1', 'rws', 'No comment'
# Files dependency list
# MD5 key of the pointing file, MD5_dep1, MD5_dep2, MD5_dep3 ...
'd6ff5850b5dc0442c400ecb64a6a8a2e', '4c1ca92eefbdc095db248dbd1d70767d', '747e1782a83c916eef79bdb8af708293', '48e651fb86a658091ba7478180c238d0', '4c1ca92eefbdc095db248dbd1d70767d'
'48e651fb86a658091ba7478180c238d0', 'd6ff5850b5dc0442c400ecb64a6a8a2e'
....
```


Modularisation of components as standalone applications

- Modularisation of components being run as standalone application as well SPIS-UI tasks.



The screenshot displays four overlapping application windows:

- JyConsole by Artenum:** A terminal window with the URL <http://www.artenum.com> and a prompt `>>>`.
- Cassandra VTK viewer:** A 3D visualization window showing a cone. The interface includes a menu (File, Edit, View, Sources, Filters, Tools, Help), a toolbar (Save image, XY, XZ, YZ, Reset view), and a sidebar with sections for Actor (Cone (1)), Scalar bar, and Text.
- Units Converter - Characteristic Scales Editor:** A parameter editor window with a table of variables and their values.

Name	Value	Unit	Name	Value	Expression
gridLengthZ	10.0	' m'	tildedX	0.1344281532787914	tildedX = gridLengthX/(gridSizeX*lambdaD)
gridLengthY	10.0	' m'	NbCells	1000.0	NbCells = gridSizeX*gridSizeY*gridSizeZ
gridLengthX	10.0	' m'	Jth	2.6751903473690886E-8	Jth = density*Q_E*math.sqrt(Ttilde)/(2.0*3....
K_B	1.381E-23	"	lambdaD	7.43891793206512	lambdaD = math.sqrt((EPSILON_0*Ttilde)/(...
gridSizeZ	10	"	Ttilde	1.6E-19	Ttilde = Temperature*Q_E
Q_E	1.6E-19	"	omega	56339.74445621677	omega = math.sqrt((density*Q_E*Q_E)/(EP...
EPSILON_0	8.854E-12	"	Coeffl	9.014359112994683E-15	Coeffl = Q_E*omega
gridSizeY	10	"	tildeLz	1.344281532787914	tildeLz = gridLengthZ/lambdaD
gridSizeX	10	"	tildedZ	0.1344281532787914	tildedZ = gridLengthZ/(gridSizeX*lambdaD)
AMU	1.6604E-27	"	tildeLy	1.344281532787914	tildeLy = gridLengthY/lambdaD
M_E	9.109E-31	"	omegaC	0.0	
density	1000000.0	' m, ^, -, 3'	tildedY	0.1344281532787914	tildedY = gridLengthY/(gridSizeY*lambdaD)
Bfield	0.0	' T'	tildeB	0.0	
Temperature	1.0	' e, V'	tildeLx	1.344281532787914	tildeLx = gridLengthX/lambdaD
			ScalingRatio	0.1344281532787914	
- Geometry/CAD manager:** A file manager window showing a 'Main file:' section with a file named 'GEOM workspace' and buttons for 'New file', 'Add file', 'Remove...', 'Set as m...', 'Editor', 'CAD tool', 'Update...', and 'Exit'.

Additional minor actions and community life

- ▶ Additional improvements
 - ▶ Introduction of JyConsole 1.4
 - ▶ Update and improvement of launching scripts.
 - ▶ Improvement of the portability (Mac OSX, Linux full support of 32/64 bits)
 - ▶ Several bugs fixes
 - ▶ Improved robustness in degraded mode (e.g if native layers not supported on your platform)
 - ▶ Documentation update
 - ▶ Various and packaging code clean-up
- ▶ Community life
 - ▶ More and more active forums
 - ▶ Improved registrations of new users
 - ▶ Dedicated person in charge (zorin@artenum.com)
 - ▶ Reduced registration delays (about 24h)
 - ▶ Effort to reduce the increasing number of spams
 - ▶ About 270 registered users today

Some advices and recommendations for a better use

- ▶ Make benefits of multi-core CPUs (e.g Intel Core2 Duo/Athlon 2x)
 - ▶ SPIS-UI is multi-threaded
 - ▶ The maxim number of thread can be adjusted depending on your CPUs, your memory and your OS: See `GL_MAX_THREADS_STACK` flag in `Bin/config.py`
- ▶ Adapt the memory stack of the JVM to your need and the capabilities of your computer.
 - ▶ Set the `JVM_XMX` flag in the launching script.
- ▶ Meshing difficulties
 - ▶ Use the options panel in Gmsh
- ▶ Large and long runs
 - ▶ Use the batch mode

SPIS 4.0 Release candidate

- ▶ Available on the SPINE platform
 - ▶ www.spis.org
- ▶ Style a *Release Candidate*
 - ▶ Tested on a set of platforms (OS, hardware), but this set is never large enough
 - ▶ Please send feedbacks, comments and critics to us !
 - ▶ Bugtracker
 - ▶ E-mail
 - ▶ Forum