

From teaching tools to mission design and operation tools

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Thibault GATEAU

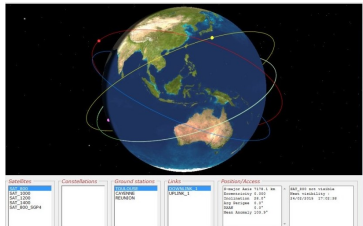
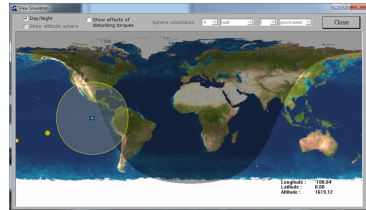


2017 November 27

ISAE-SUPAERO Mission

Teaching support

- Space Mechanics
- Mission Analysis
- Thermal
- Telecommunication
- Power system
- AOCS
- LOS
- Launchers
- ...



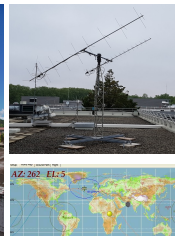
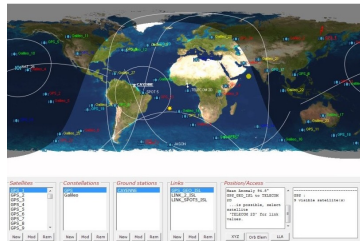
ISAE-SUPAERO Mission

Research & Support

- Engineering Projects
- Research Projects

Means

- UHF/VHF
- S-Band
- Sat' Operation



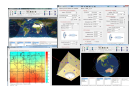
- 1 ISAE-SUPAERO Software Legacy
 - Satorb
 - Simusat
 - Simulaunch
 - Synthesis
- 2 JSatorb: a Satorb possible evolution
- 3 Ground Segment & Operations
- 4 Conclusion & Questions

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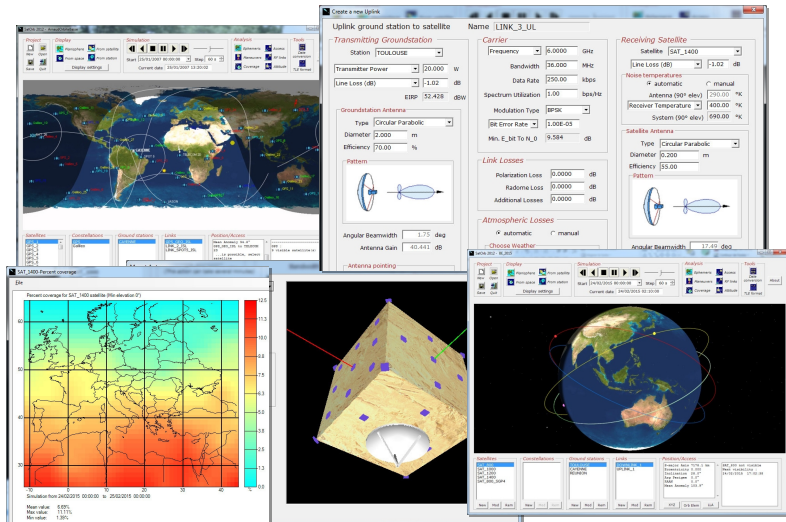
ISAE-SUPAERO Space Software Suite

People involved

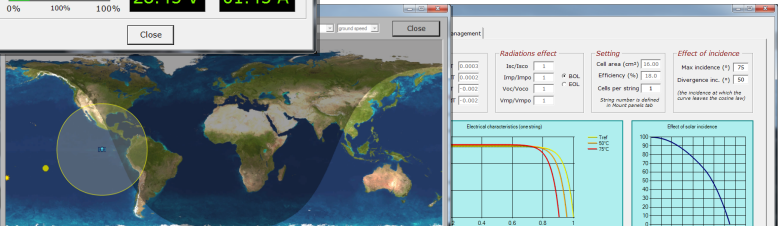
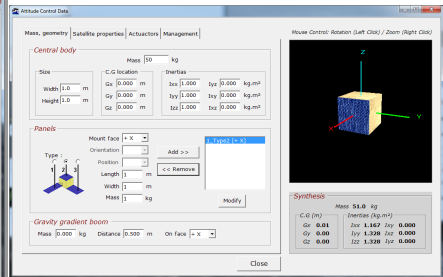
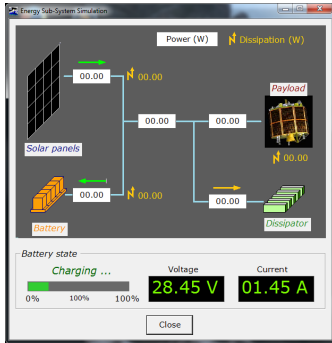
- Initiator (before 2001!):
 - Christian Colongo
- Current Dev Team:
 - Patrice Labedan
 - Guillaume Garrouste
 - Thibault Gateau
- Lot of support from:
 - Students Projects
 - Internships
 - PhD students
 - Collaborations (UTM)



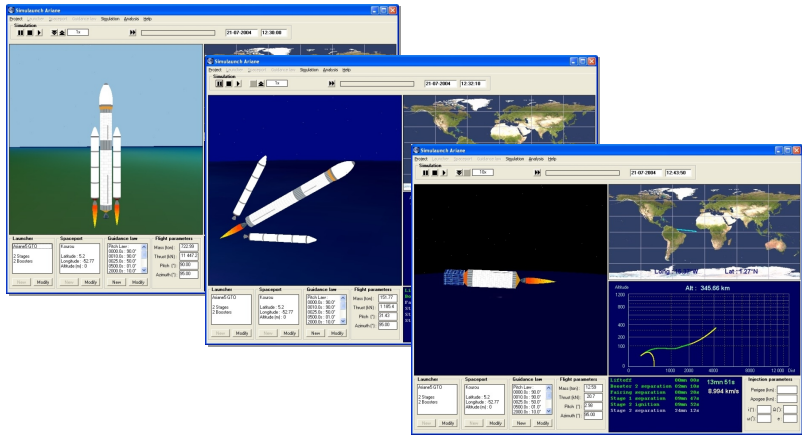
Satorb



Simusat



Simulaunch



Kerbal Space Program before Kerbal Space Program...



ISAE-SUPAERO Software Legacy

Pros: Homemade

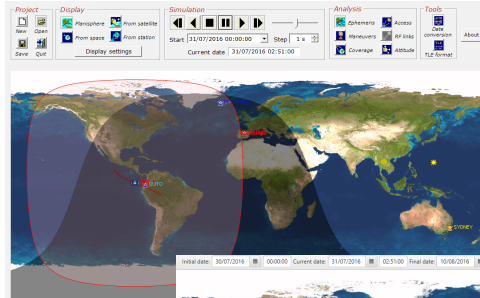
- Fit exactly to ISAE-SUPAERO needs
- Adapt what we want
- No intellectual property issue
- Short dev cycles

Cons: Homemade

- Not open-source, no community behind
- Costful for internal developers
- Not cross platform
- Validation by hand

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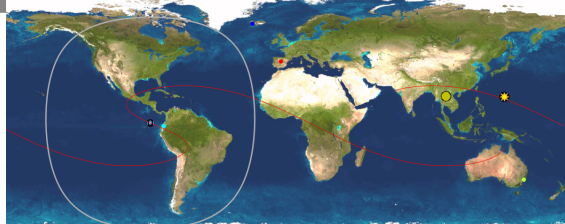
JSatorb: Julio HERNANZ-GONZALEZ (PIR 2016)



From Satorb...

Microsoft
VB.net

... To
JSatorb



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MCC: Nicolas Humeau

The screenshot displays the Eye-Sat software interface, which is used for satellite ground station operations. The interface is divided into several sections:

- Top Bar:** Includes the Eye-Sat logo, a dropdown menu, and tabs for "Télémétrie" (Telemetry) and "Télécommande" (Telecommand).
- Left Panel:** Contains a "Filtrer par date" (Filter by date) section with date ranges (Du: 19/11/2016 12:30:00, À: 21/11/2016 12:30:00) and a "Filtrer par paquets" (Filter by packets) section with a search bar and a list of packet types. The "TM_3_25_PLSBRD" packet type is selected.
- Main Area:** Displays a "Liste des paquets" (List of packets) table with columns for Status, Nom, Date bord, and Date reception. The table shows four packets, all with a status of "OK" (green dot).
- Right Panel:** Contains an "Explorateur de paquet" (Packet explorer) section showing the structure of the selected packet (TM_3_25_PLSBRD). It includes a tree view with "HEADER" and "DATA" sections. The "DATA" section is expanded, showing "PAQUET_VBOOST" and its sub-elements: "EPS_VBOOST1", "EPS_VBOOST2", "EPS_VBOOST3", and "PAQUET_CURSON". Below this is a "Paramètres" (Parameters) table showing the values for the selected parameters.

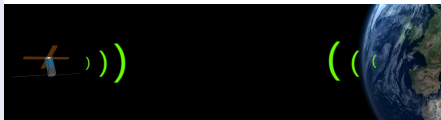
Status	Nom	Date bord	Date reception
OK	TM_3_25_PLSBRD	21/11/2016 12:12:54	22/11/2016 06:12:54
OK	TM_3_25_PLSBRD	21/11/2016 12:08:15	22/11/2016 06:08:15
OK	TM_3_25_PLSBRD	21/11/2016 12:00:59	22/11/2016 06:00:59
OK	TM_3_25_PLSBRD	21/11/2016 12:52:57	22/11/2016 06:52:57

Status	Nom	Valeur	Valeur	Unité
OK	EPS_VBOOST1	-	-	mV
OK	EPS_VBOOST2	-	-	mV
OK	EPS_VBOOST3	-	-	mV

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Nowadays academics requirements

- Open-Source
- Cross-platform
- Standardized



Next steps:

- Still cover teachings requirements
- Required software suite for a whole nanosatellite project
 - Mission analysis
 - Simulation
 - Operation
- Intercompatibility - Input/Outputs Standardization

Thank you for your attention !

Any question ?

