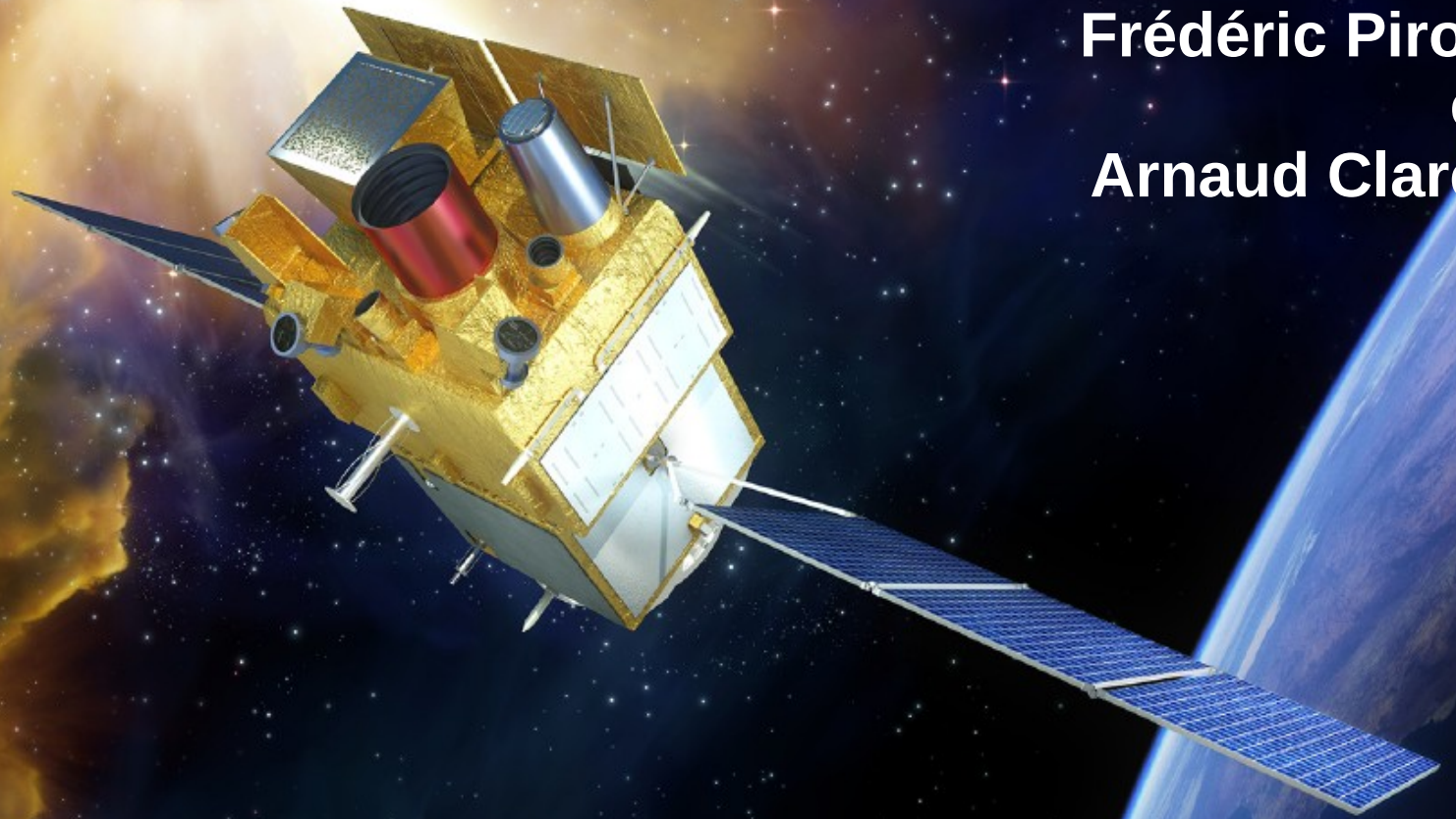


SVOM : organisation de l'exploitation scientifique en France

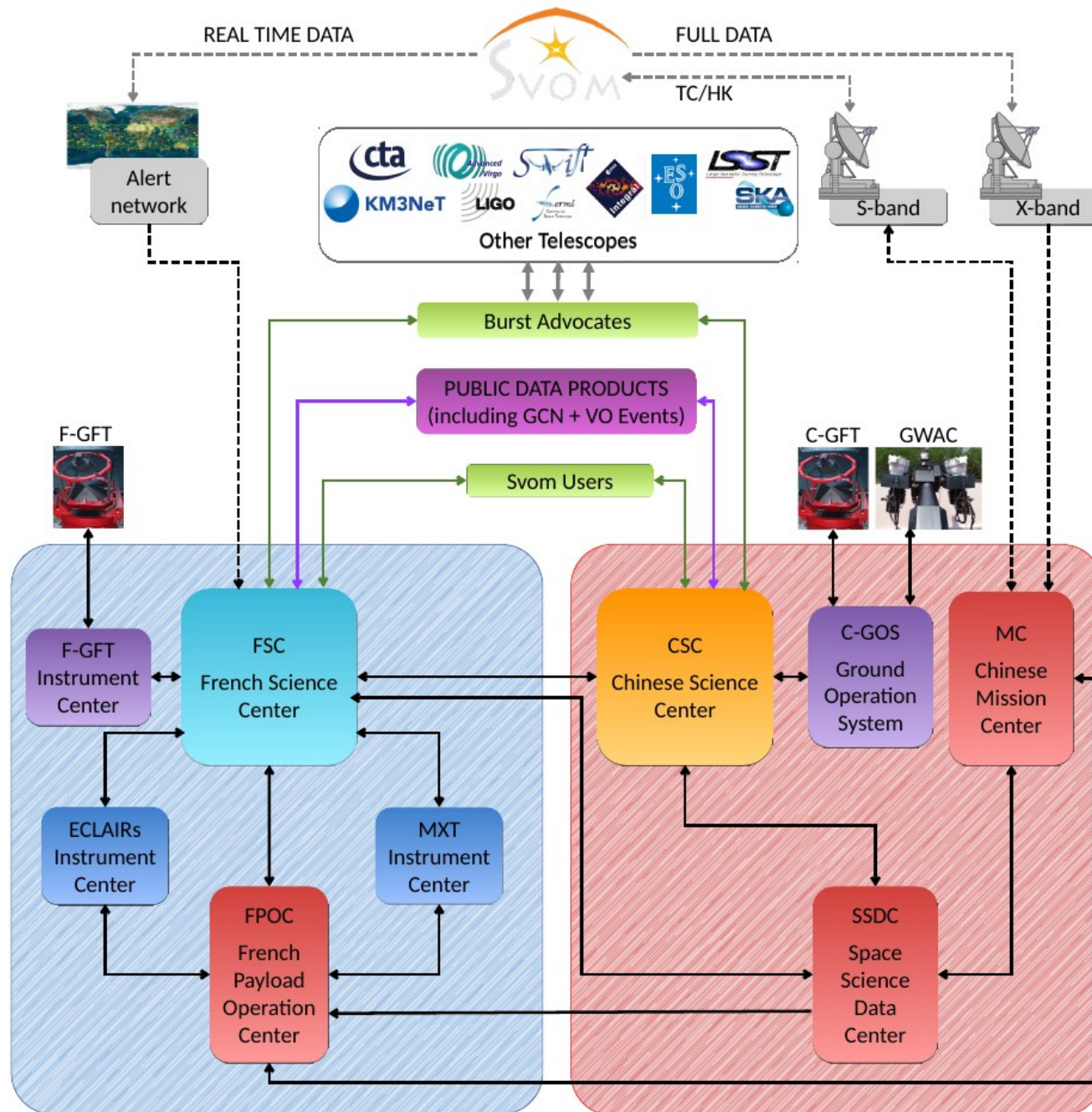
**Frédéric Piron
et
Arnaud Claret**



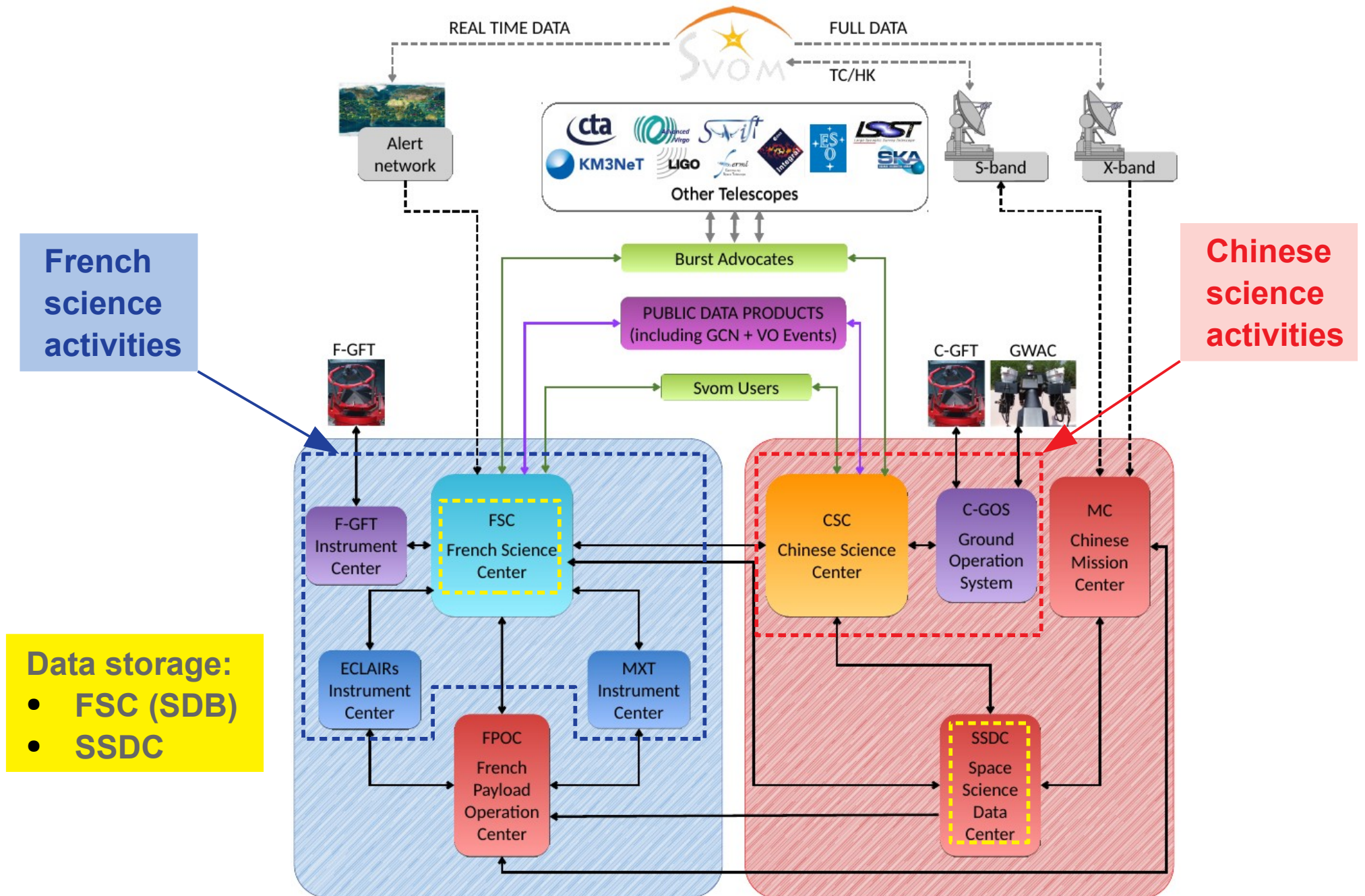
Outline

- **French science activities in the SVOM Ground Segment**
- **The Burst Advocate**
 - Tasks and support team
 - Shift management
- **System view of Scientific Products in France**
- **Burst Advocate tools: recent developments**

SVOM Ground Segment



SVOM Ground Segment



Burst Advocate tasks

The BA (one for each burst candidate) has an astronomical role and must distribute quickly the information

- Supervises the distribution of alert notices based on VHF data (small amount, near real time)
 - N1 notices: results processed on-board, managed automatically (pipelines)
 - N2 notices: results produced automatically (pipelines)
- Validates the trigger (false alert?)
 - For example, based on crude classification and space weather
- Monitors the follow-up observations with robotic telescopes
- Supervises the analysis of X-band data (full data set, received hours after the trigger)
 - Automated analyses (pipelines)
 - Interactive and refined analyses (by Instrument Scientists, see next slide)
 - Distribution of N3 notices (instrument specific)
- Writes the all-instrument circular on the basis of X-band data
- Organises a teleconference for interesting GRBs (revisit through ToO?)
- Monitors the follow-up observations with large telescopes
- Writes a report for each GRB candidate

Burst Advocate support team

Based on Swift / Fermi / INTEGRAL experience and feedback

- **Instrument Scientist (IS, one for each instrument): expert on data analysis**
 - Generates the final scientific products elaborated from X-band data
 - Sends the circular relative to one instrument
- **Instrument Expert (IE, one for each instrument): on-call expert with an engineering role**
- **BA-assistant (one at each science center CSC/FSC): provides local support to BAs**
 - Helps unexperienced BAs
 - Helps to coordinate follow-up observations, including for the ToO program
 - Checks the pertinence of GRB revisit
 - Identifies flares of catalogued sources (real triggers but not GRBs)
 - Provides help for ToO-MM (multi-messenger) activities

Burst Advocate shift management

- **Under Chinese responsibility**
 - Tool developed by China
 - Lists of BA, IS, IE, BA-assistant provided in advance

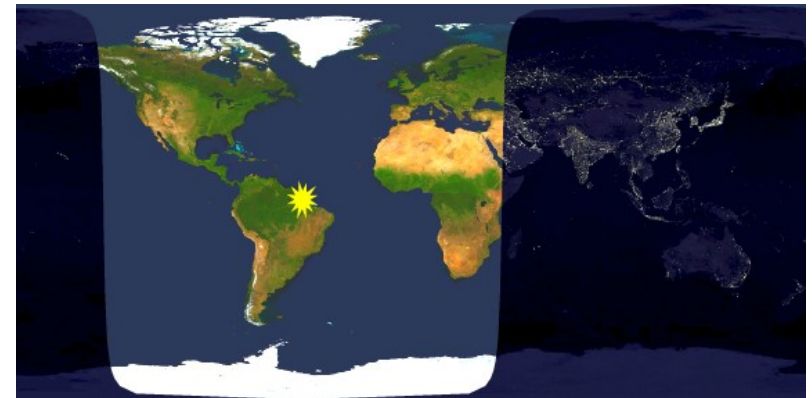
- **The global agreement for the mission is applied to the shift duration: 60% China vs. 40% France**
 - 14.5h over 24h duration for China, 7:00 - 21:30 LT
 - 9.5h over 24h duration for France, 15:30 - 1:00 LT (8:30 - 18:00 LT in Mexico)

@1:30 Paris (7:30 China)



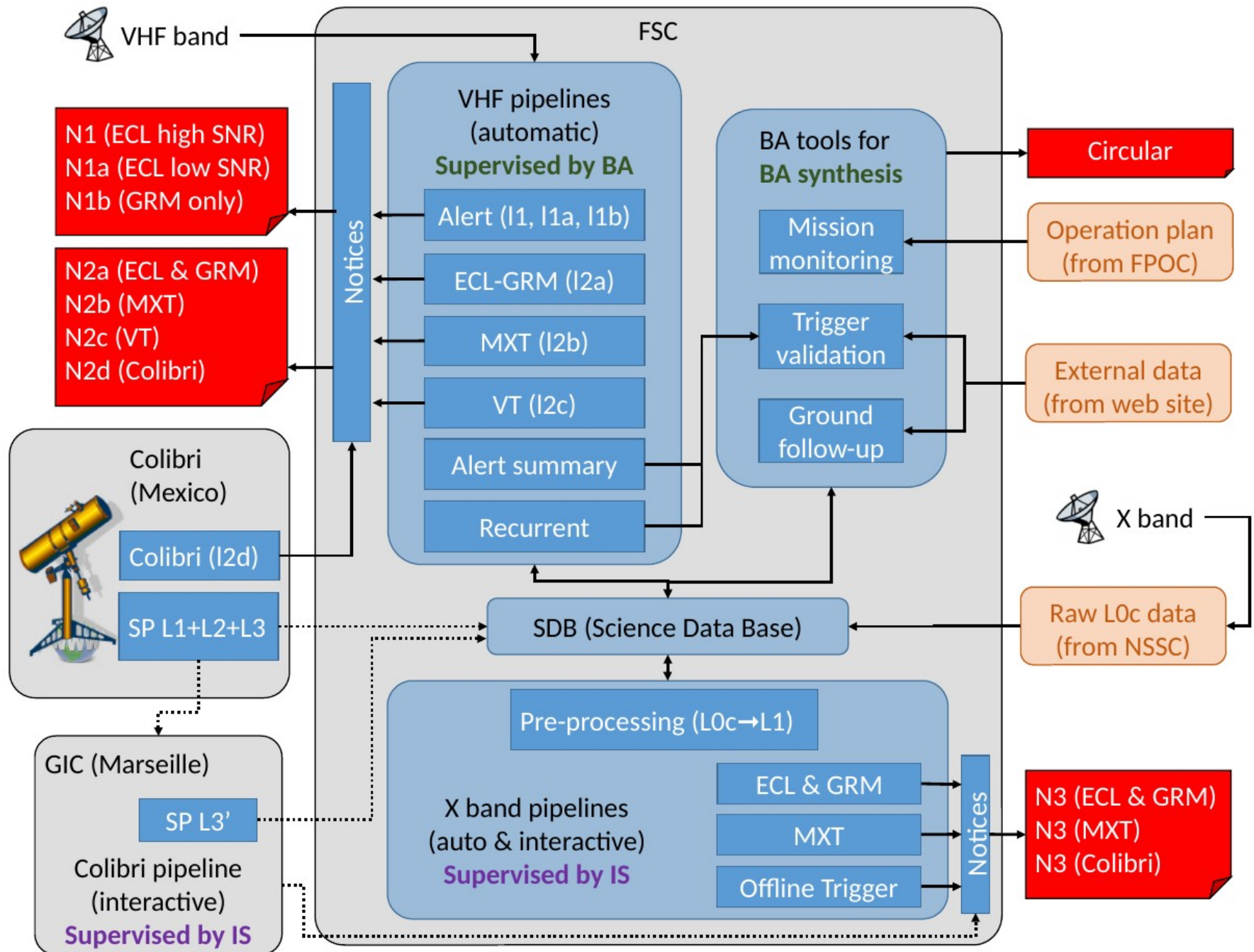
Western telescopes are operating when the Chinese shift starts

@16:30 Paris (22:30 China)



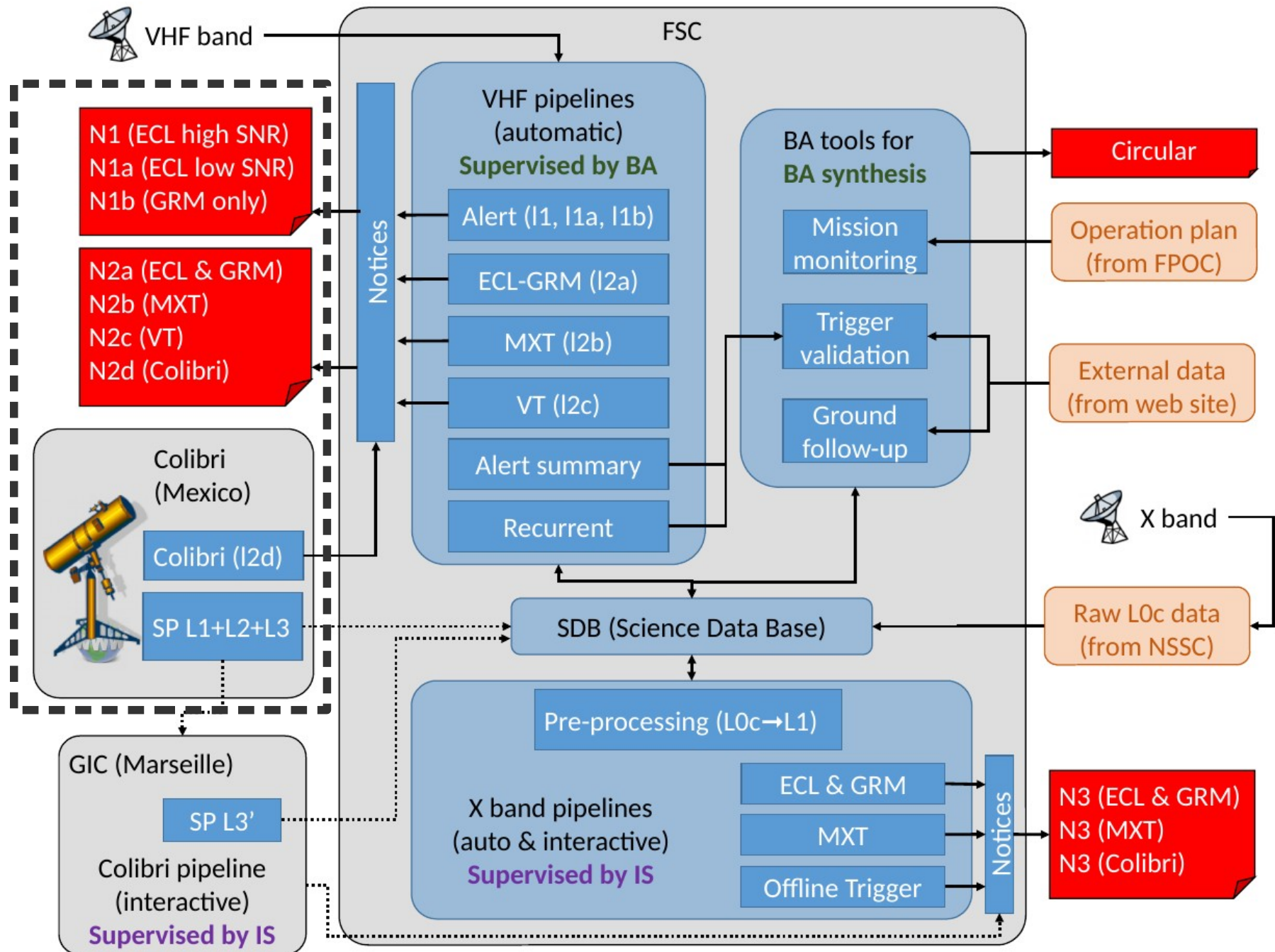
Eastern telescopes are operating when the French shift starts

System view of scientific products (Core Program)



System view of scientific products (Core Program)

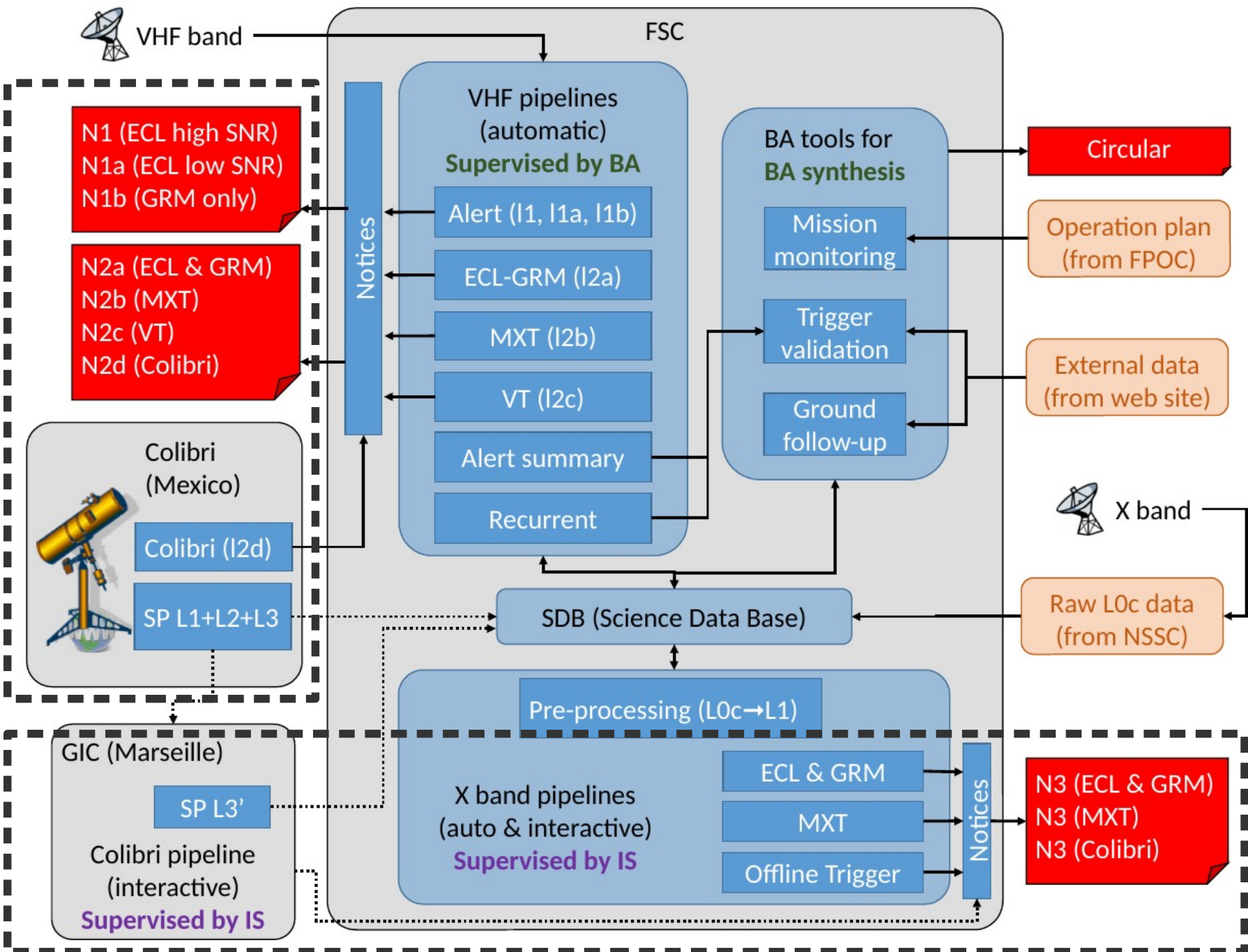
Mainly automatic



System view of scientific products (Core Program)

Mainly automatic

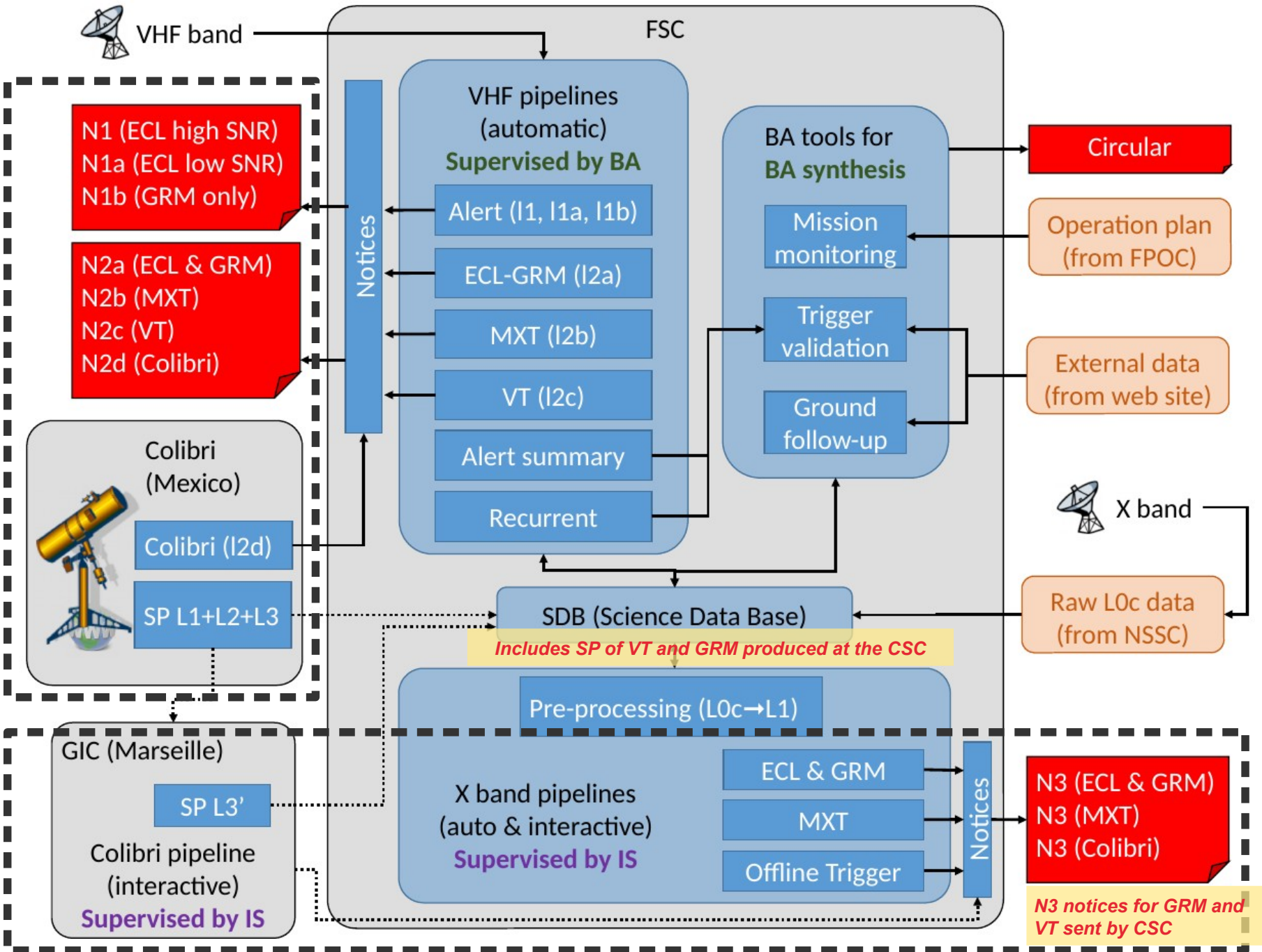
Instrument Scientists



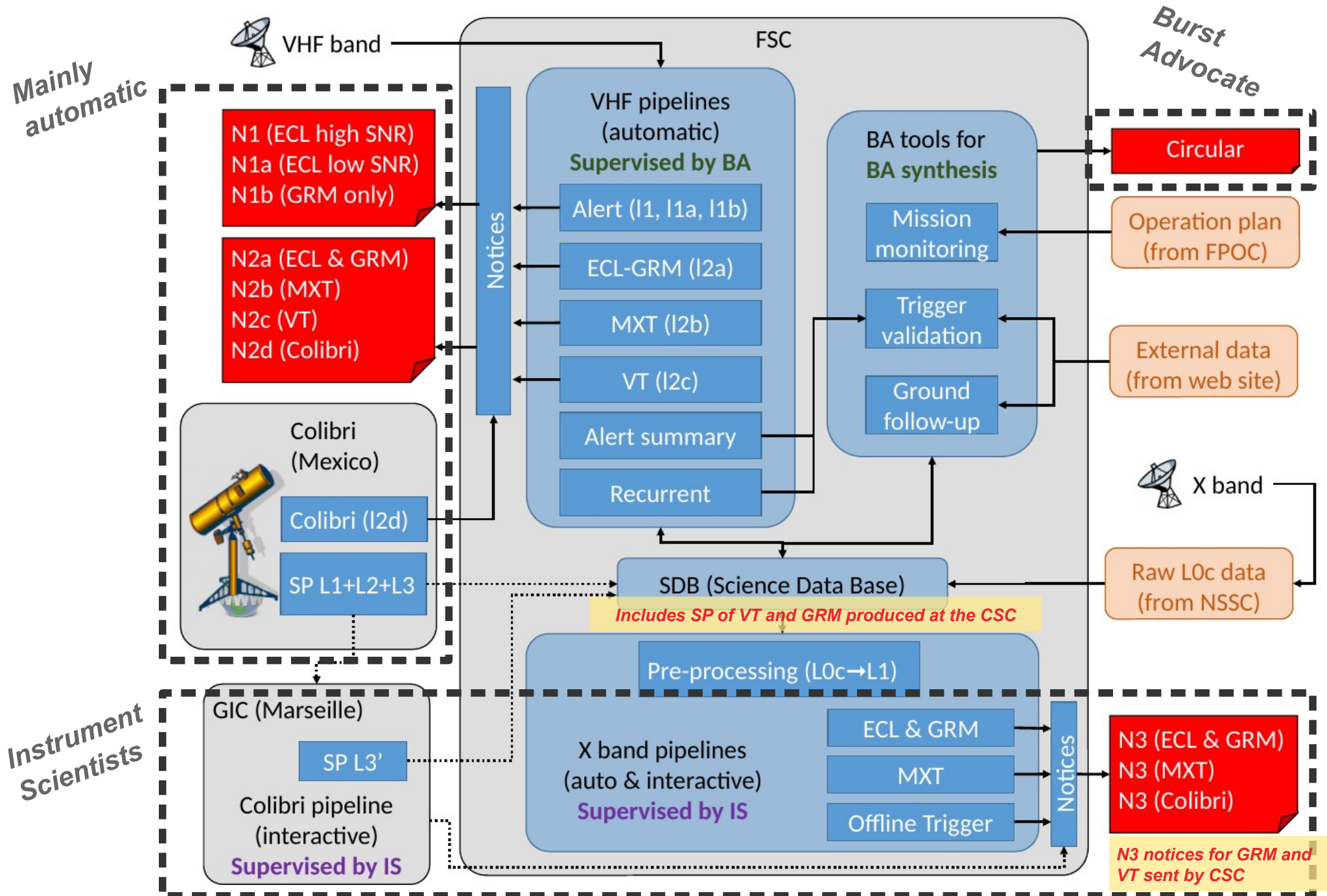
System view of scientific products (Core Program)

Mainly automatic

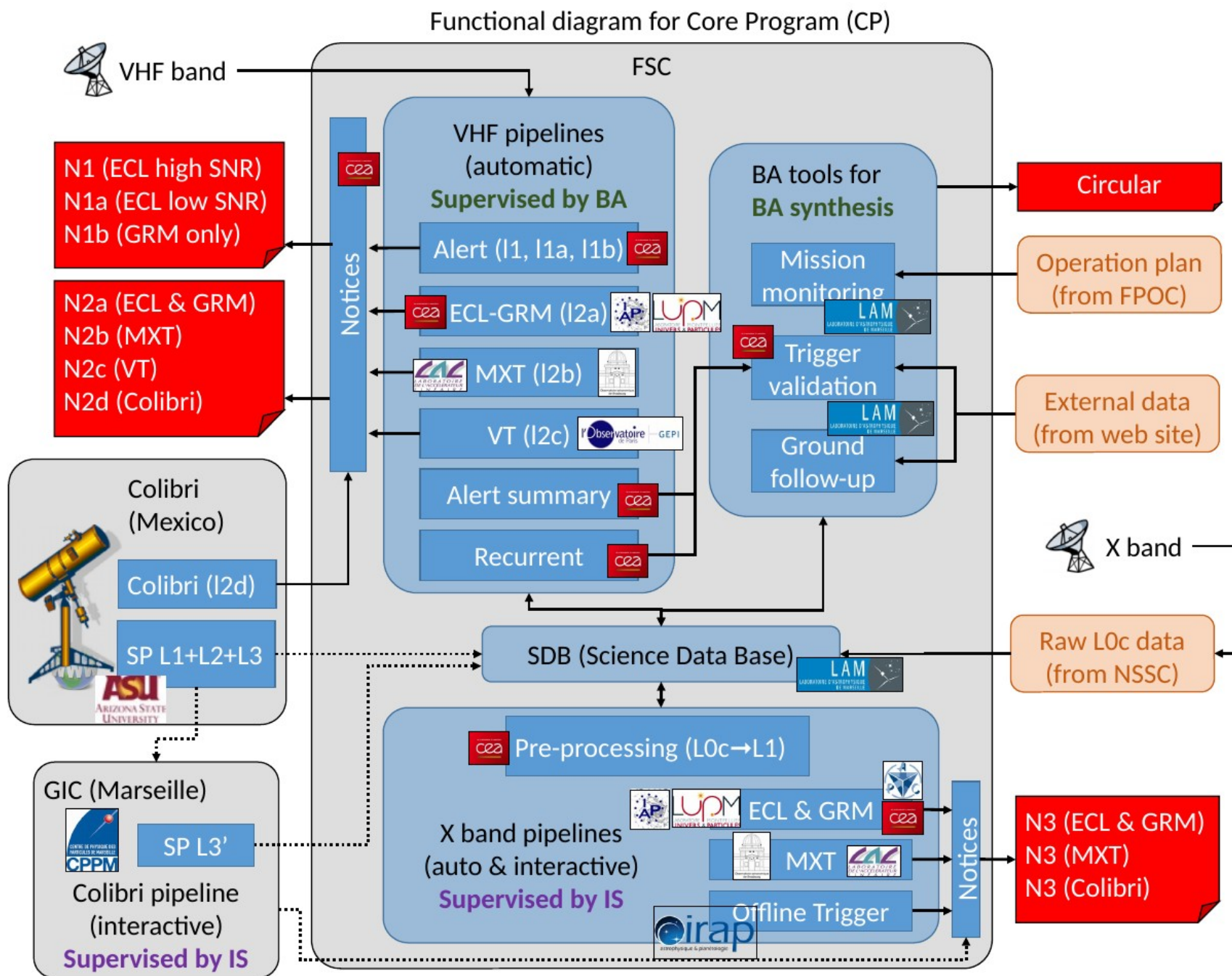
Instrument Scientists



System view of scientific products (Core Program)



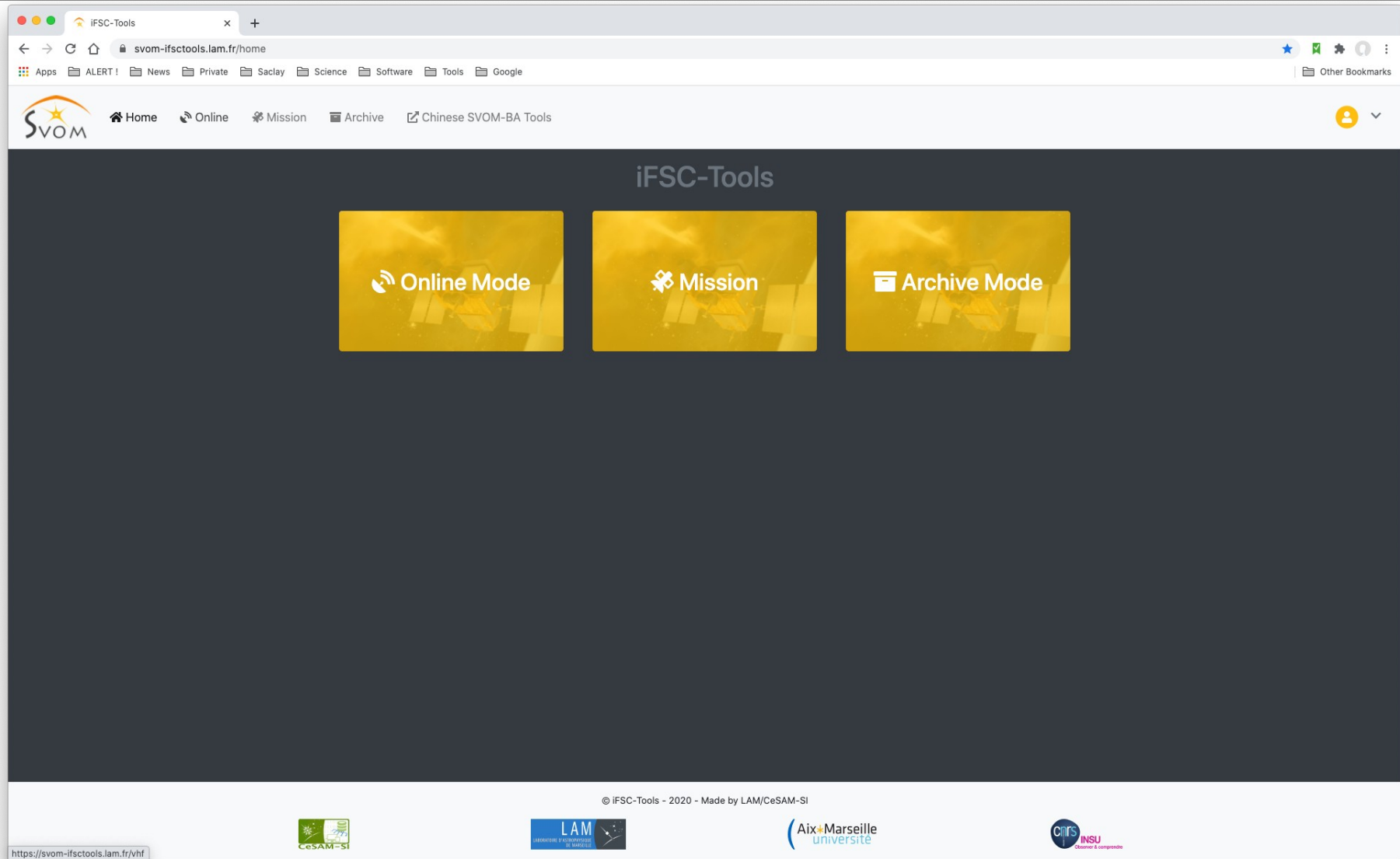
Responsibilities of French laboratories (Core Program)



Burst Advocate tools

- **China responsibilities (CSC BA-tools)**
 - Management tool for BA shifts
 - Validation / display tools for visible telescopes
- **France responsibilities (iFSC-tools)**
 - Monitoring of the VHF packet reception in real time
 - Validation / display tools for ECLAIRs, MXT, Colibri (+GRM and VT)
 - For Instrument Scientists working in French Instrument Centers (ECLAIRs-IC, MXT-IC, GFT/Colibri-IC): monitoring of scientific products
- **iFSC-tools and CSC BA-tools are complementary**
 - In practice, the BA will be connected to both web interfaces
 - All products are shared on data-bases (SDB for FSC, NSSC for CSC)
- **Prototype iFSC-tools v2 will be used for the next Data Challenge (DC-2) end 2020**
 - Analysis of the full VHF data set, test of the degraded scenario for data reception

Screenshots of iFSC-tools (LAM)



Screenshots of iFSC-tools (LAM)

The screenshot displays the iFSC-tools web interface. At the top, the browser address bar shows the URL `svom-ifsctools.lam.fr/vhf/vhf-eclgrm`. The SVOM logo and navigation menu are visible. The main content area features a time selection bar set to `T0 +3940s` and a dropdown menu for selecting the GRB-DC1 sequence step. Below this, a row of buttons allows users to display ECLAIRS & GRM products, MXT, VT, Localisation, and Packets. The 'ECLAIRS & GRM data products' section lists several key parameters:

- Trigger Time**: 7 Pk, T0 : 2021-01-30T10:39:19.958
- Quick Confidence Level**: 7 Pk, SNR : 11
- Quick position**: 7 Pk, Ra, Dec: 51.922,46.66 R90: 8.7'

The 'On-board count light curves - ECL' section shows three plots for different energy channels: 6.4s, 0.8s, and 0.1s. Each plot displays 'Counts / [Energy Channel]' on the y-axis and 'T-T0' on the x-axis. The 6.4s plot shows a sharp peak at T-T0 = 0. The 0.8s plot shows a broader peak. The 0.1s plot shows a rising light curve. An 'Analysis' button is present above the plots. Below the ECL plots, the 'On-board count light curves - GRM' section is partially visible, showing 22 Pk HP and 42 Pk LP data points.

Screenshots of iFSC-tools (LAM)

The screenshot displays the iFSC-tools web interface. At the top, the browser address bar shows the URL `svom-ifsc.tools.lam.fr/vhf/vhf-mxt`. The navigation menu includes Home, Online, Mission, Archive, and Chinese SVOM-BA Tools. The main content area features a toolbar with icons for ECL & GRM (with a red notification badge '2'), MXT (highlighted in yellow), VT, Localisation, and Packets. Below the toolbar, the 'MXT data products' section lists several data items:

Product Name	Count	Details	Actions
Trigger Time	1 Pk	DT_S1: 108 s	Show/Hide history, Download
Quick flux determination	1 Pk	QF_S1: 215 cnt/s QF_ERR_S1: 14.663"	Show/Hide history, Download
Quick position	47 Pk	Ra, Dec: 51.862,46.827 Err_S1: 56"	Show/Hide history, Download
Quick Light Curve	47 Pk		Download

The 'Quick Light Curve' section contains a plot of 'Counts / 6.4s' versus 'T-T0'. The y-axis ranges from 0.0e+0 to 7.0e+0, and the x-axis ranges from 0 to 3,000. The plot shows a sharp initial peak at T-T0 = 0, followed by a rapid decay to a baseline level of approximately 2.0e+0 counts/6.4s by T-T0 = 500. A shaded gray area below the main plot indicates a secondary data series or uncertainty.

Screenshots of iFSC-tools (LAM)

The screenshot displays the iFSC-tools web interface. At the top, there is a navigation menu with links for Home, Online, Mission, Archive, and Chinese SVOM-BA Tools. The main content area features a toolbar with buttons for ECL & GRM (2 alerts), MXT (4 alerts), VT (1 alert), Localisation (selected), and Packets. Below the toolbar is the 'Localisation Display' section, which includes a table of quick positions and a star field visualization.

Quick position-	Pk	Ra, Dec:	Other Info	Action
ECLAIRS	7	51.922,46.66 R90: 8.7"		Show/Hide history
MXT	47	51.862,46.827	Err_S1: 56"	Show/Hide history

The star field visualization shows a central cluster of stars marked with yellow crosses, surrounded by a yellow circle. The interface includes a search bar, a zoom control, and a field of view (FoV) indicator.

© IFSC-Tools - 2020 - Made by LAM/CeSAM-SI

Logos for CeSAM-SI, LAM (Laboratoire d'Astrophysique de Marseille), Aix-Marseille université, and CNRS INSU (Observer & comprendre) are visible at the bottom.

Screenshots of iFSC-tools (LAM)

The screenshot displays the iFSC-tools web interface. At the top, there are several browser tabs labeled "iFSC-Tools". The active browser window shows the URL "svom-ifsc tools.lam.fr/vhf/vhf-vt". The page header includes the SVOM logo and navigation links: Home, Online, Mission, Archive, and Chinese SVOM-BA Tools. A user profile icon is visible in the top right corner.

The main content area features a timeline with a yellow progress bar. The current time is "TO +3940s". A dropdown menu allows selecting the step of the GRB-DC1 sequence. Below the timeline is a navigation bar with five buttons: "ECL & GRM" (2 alerts), "MXT" (4 alerts), "VT" (selected), "Localisation", and "Packets".

The "VT data products" section displays a plot for "OBATT" with "1 Pk". The plot shows a distribution of red dots and black diamonds, with a vertical line and a horizontal line intersecting at the center. A yellow box on the right side of the plot contains the text: "GFT/Colibri data will be integrated later".