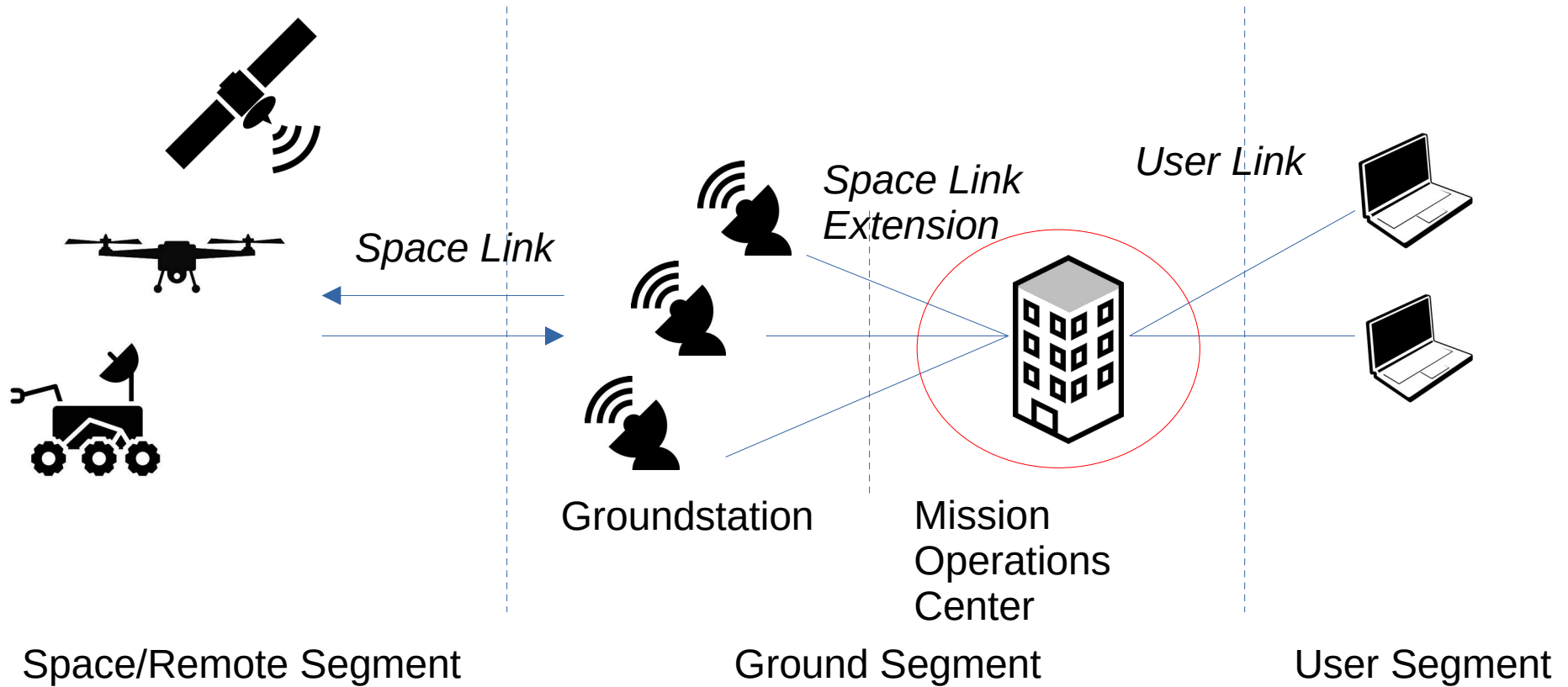


Open Source Mission Operations Systems

Segments





073 134313
+0063948

European Space Operations Centre

esa
esoc

Operator workstation with multiple monitors and a telephone. The desk is equipped with several computer monitors displaying data, a keyboard, and a telephone. The operator is seated in a black office chair, focused on the screens.

Operator workstation with multiple monitors. The desk is equipped with several computer monitors displaying data, a keyboard, and a telephone. The operator is seated in a black office chair, focused on the screens.

Operator workstation with multiple monitors. The desk is equipped with several computer monitors displaying data, a keyboard, and a telephone. The operator is seated in a black office chair, focused on the screens.

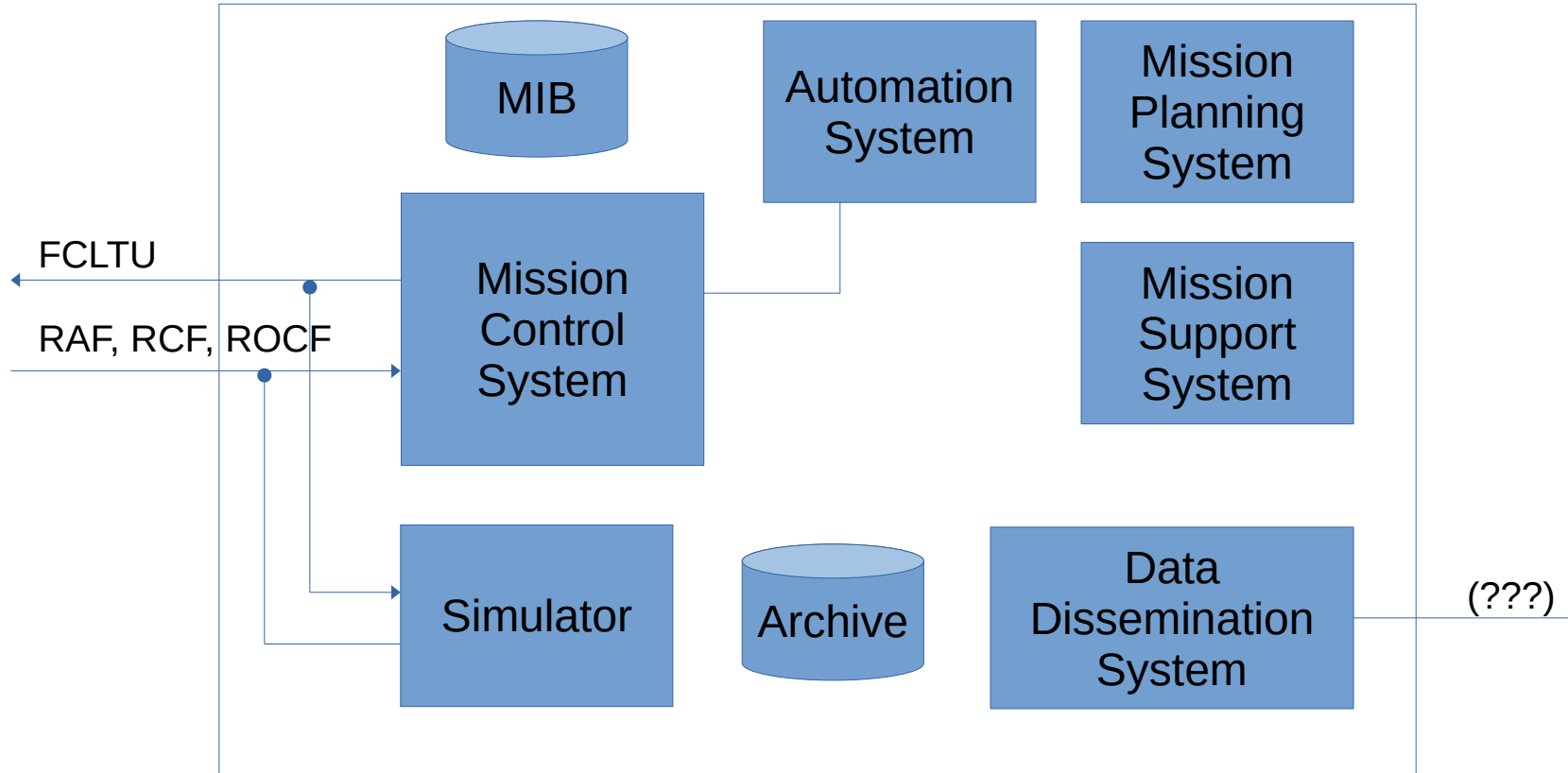
Operator workstation with multiple monitors. The desk is equipped with several computer monitors displaying data, a keyboard, and a telephone. The operator is seated in a black office chair, focused on the screens.

Operator workstation with multiple monitors. The desk is equipped with several computer monitors displaying data, a keyboard, and a telephone. The operator is seated in a black office chair, focused on the screens.

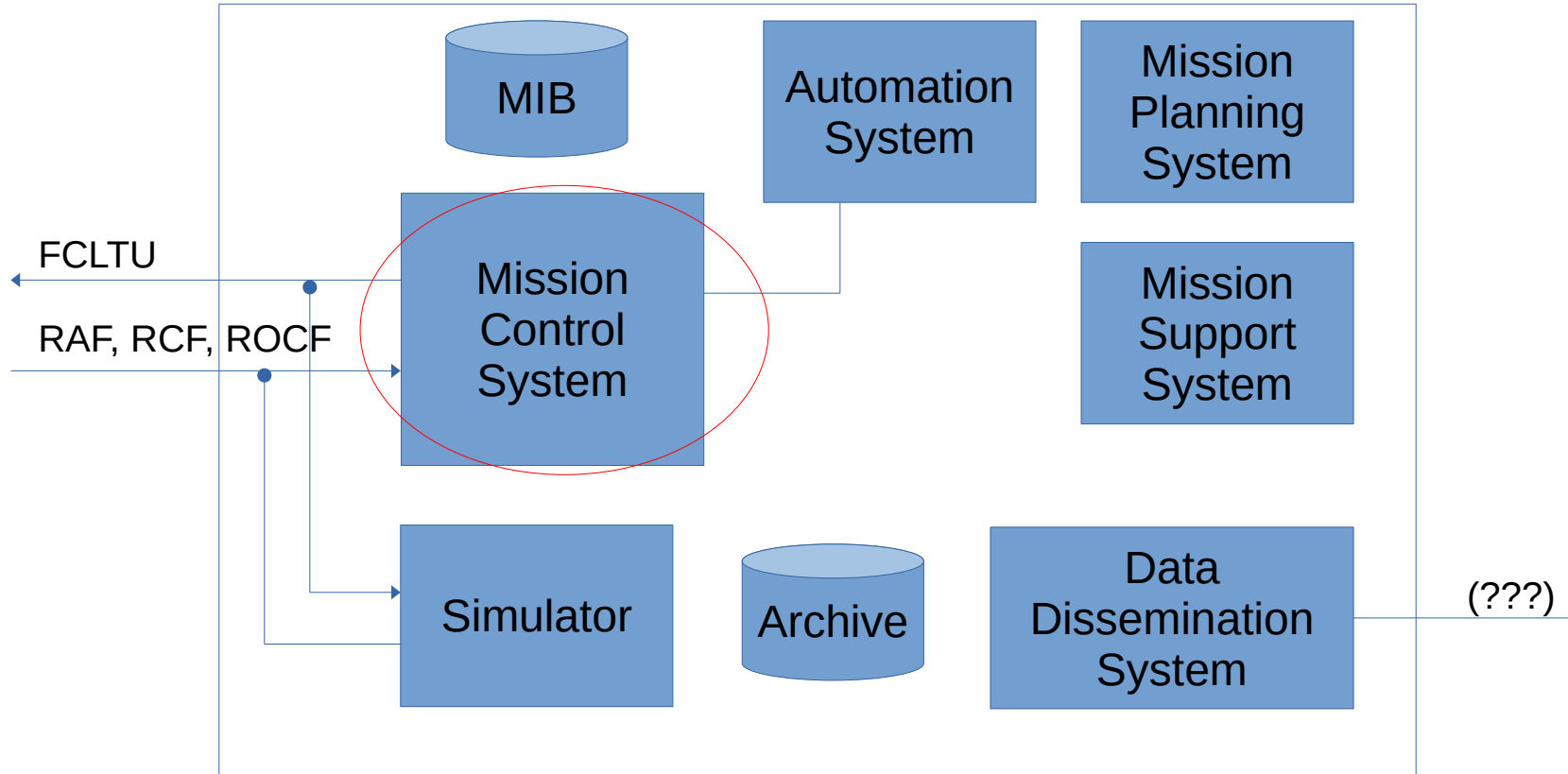
Operator workstation with multiple monitors. The desk is equipped with several computer monitors displaying data, a keyboard, and a telephone. The operator is seated in a black office chair, focused on the screens.

Main operator workstation in the foreground. The desk is equipped with multiple monitors displaying data, a keyboard, a mouse, and a telephone. The operator is seated in a black office chair, focused on the screens. Papers and a binder are visible on the desk.

Mission Operations Center

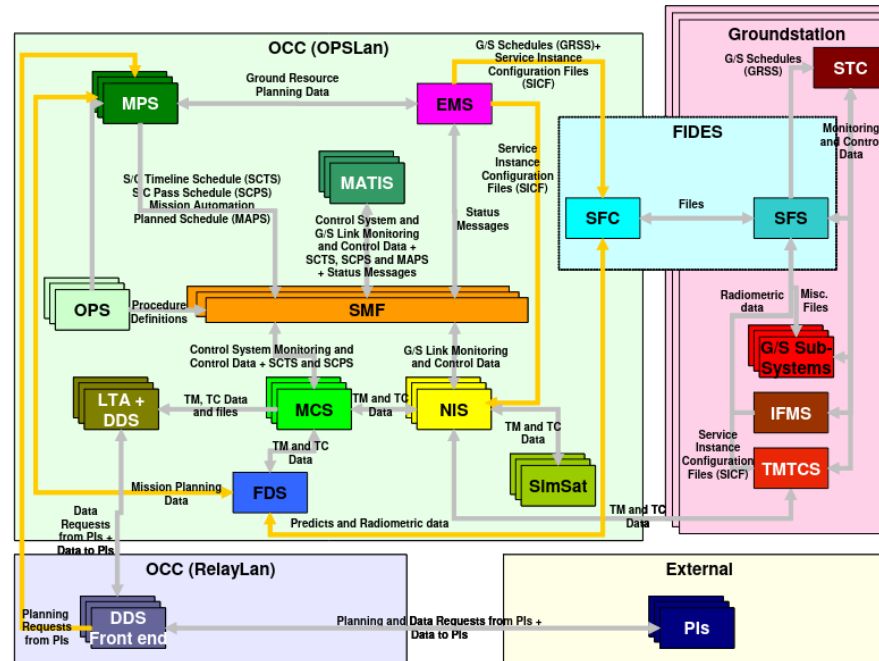


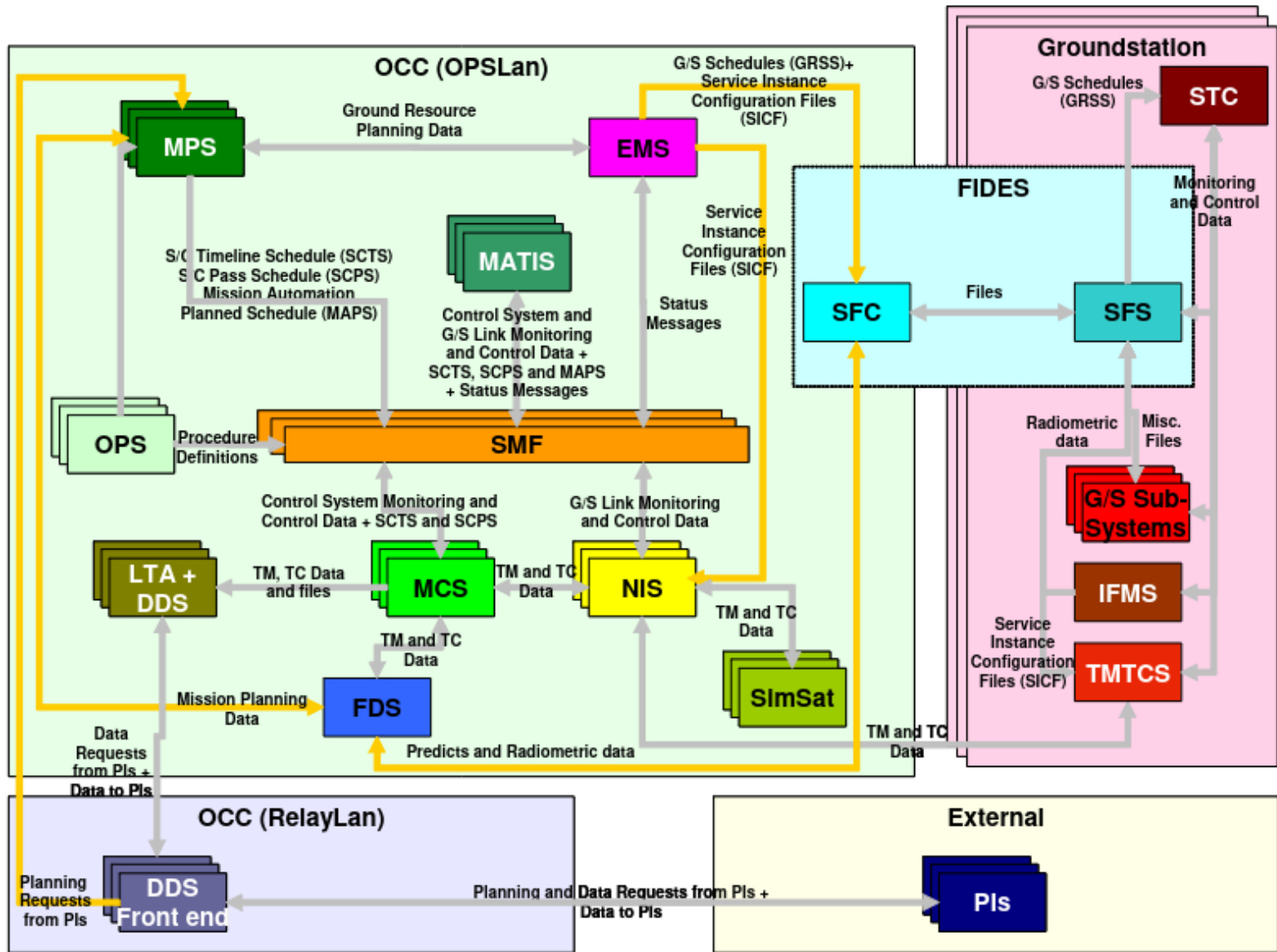
Mission Operations Center



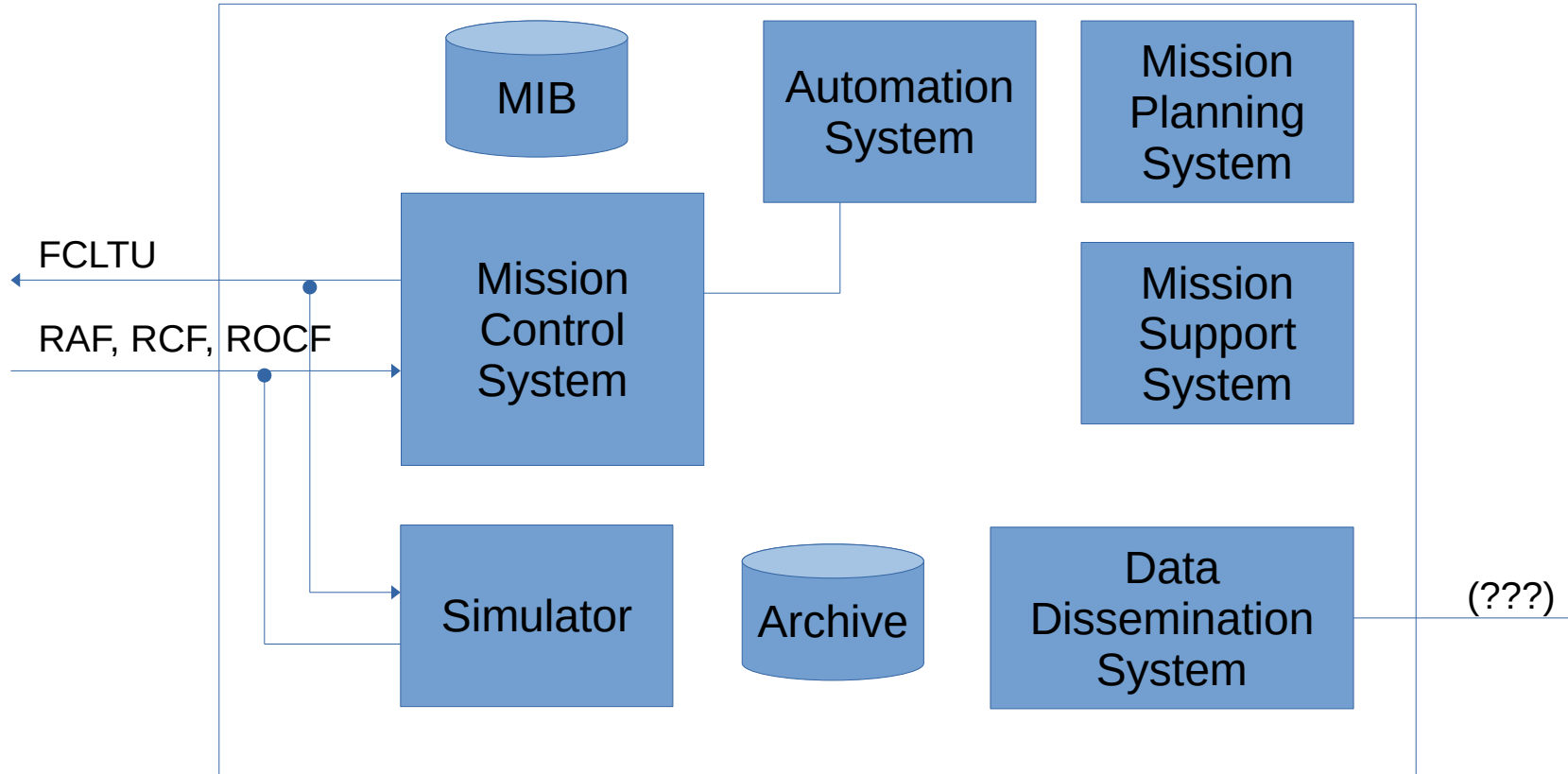
EGOS / ESA (not open source)

- <http://iiis.org/cds2008/cd2008sci/CITSA2008/PapersPdf/I030TX.pdf>

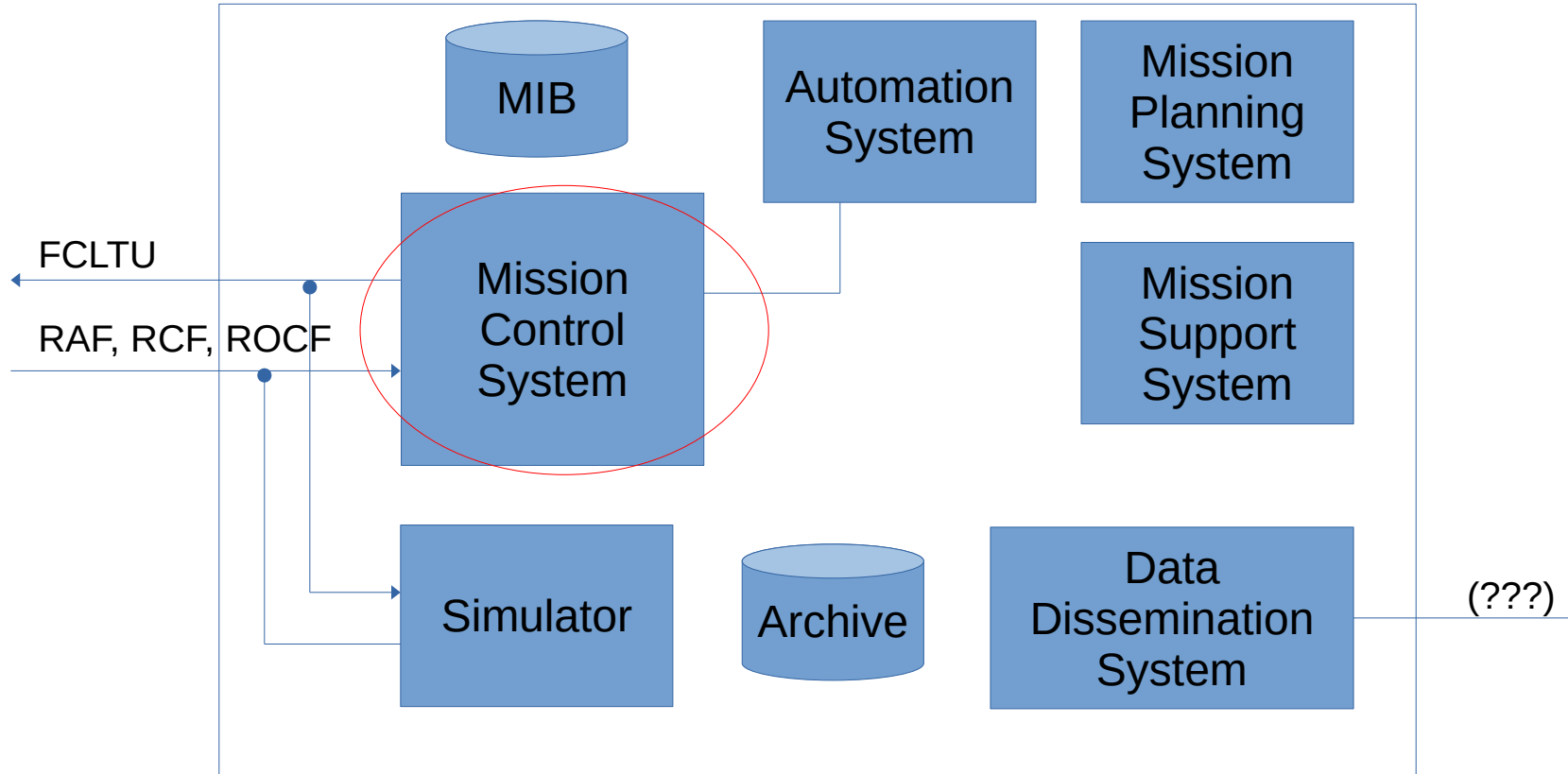




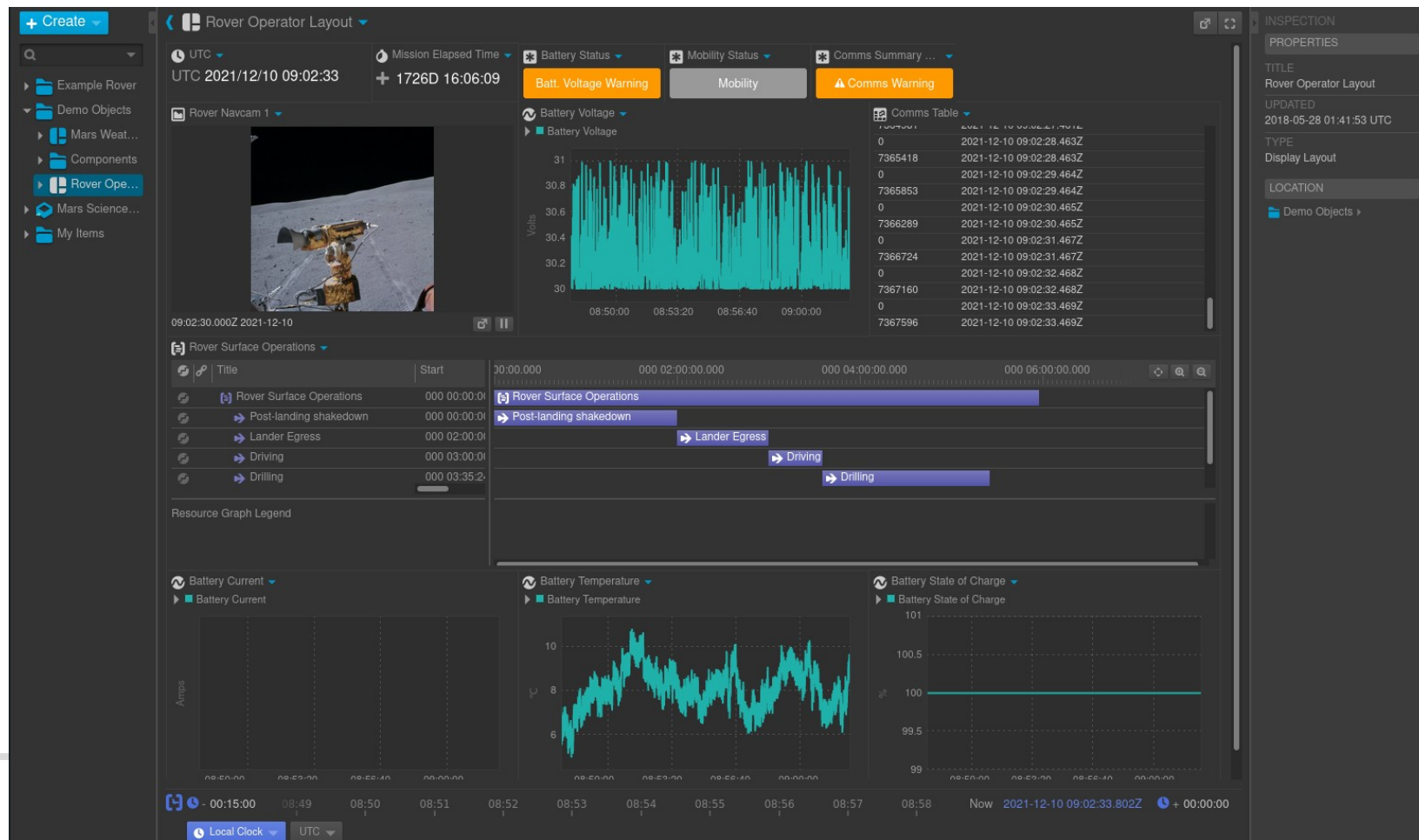
Mission Operations Center



Mission Operations Center



Examples of Open Source Mission Control Systems



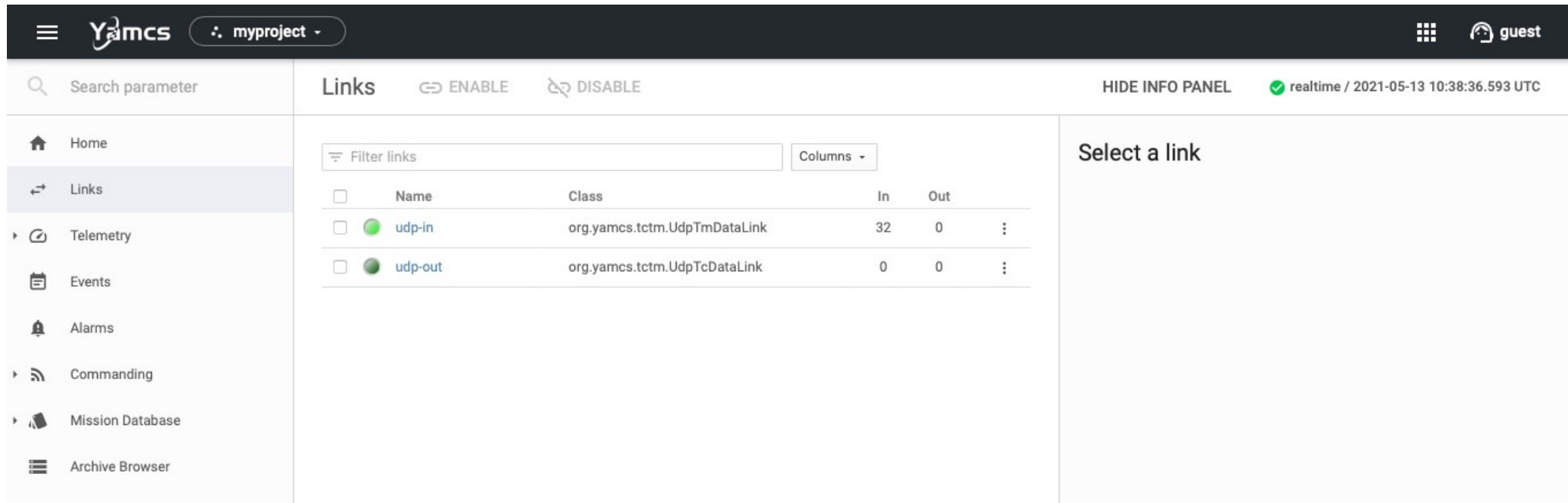
The screenshot displays the OpenMCT interface for a 'Rover Operator Layout'. The interface is organized into several key sections:

- Left Panel:** A navigation tree with a search bar and folders including 'Example Rover', 'Demo Objects', 'Mars Weat...', 'Components', 'Rover Ope...', 'Mars Science...', and 'My Items'.
- Top Bar:** Shows the current layout 'Rover Operator Layout', the time zone 'UTC', and the current time 'UTC 2021/12/10 09:02:33'. It also displays 'Mission Elapsed Time' as '+ 1726D 16:06:09' and three warning indicators: 'Batt. Voltage Warning' (orange), 'Mobility' (grey), and 'Comms Warning' (orange).
- Main View:**
 - Rover Navcam 1:** A video feed showing a rover on a planetary surface, timestamped '09:02:30.000Z 2021-12-10'.
 - Battery Voltage:** A line graph showing voltage in Volts over time, with values fluctuating between approximately 30.0 and 31.0.
 - Comms Table:** A table listing communication events with columns for ID, time, and duration. The data is as follows:

ID	Time	Duration
0	2021-12-10 09:02:28.463Z	
7365418	2021-12-10 09:02:28.463Z	
0	2021-12-10 09:02:29.464Z	
7365853	2021-12-10 09:02:29.464Z	
0	2021-12-10 09:02:30.465Z	
7366289	2021-12-10 09:02:30.465Z	
0	2021-12-10 09:02:31.467Z	
7366724	2021-12-10 09:02:31.467Z	
0	2021-12-10 09:02:32.468Z	
7367160	2021-12-10 09:02:32.468Z	
0	2021-12-10 09:02:33.469Z	
7367596	2021-12-10 09:02:33.469Z	
- Operations Timeline:** A horizontal timeline showing mission phases: 'Rover Surface Operations', 'Post-landing shakedown', 'Lander Egress', 'Driving', and 'Drilling'.
- Resource Graph Legend:** A section for monitoring resource usage.
- Bottom Row of Graphs:** Three graphs showing 'Battery Current' (Amps), 'Battery Temperature' (C), and 'Battery State of Charge' (%).

The bottom of the interface features a 'Local Clock' set to 'UTC' and a detailed time display: 'Now 2021-12-10 09:02:33.802Z + 00:00:00'.

<https://github.com/yamcs/quickstart>



The screenshot shows the Yamcs web interface. The top navigation bar includes the Yamcs logo, a project dropdown menu set to 'myproject', and a user profile for 'guest'. The main content area is titled 'Links' and features 'ENABLE' and 'DISABLE' buttons. A table lists active links with columns for Name, Class, In, and Out. The table contains two entries: 'udp-in' and 'udp-out'. A sidebar on the left provides navigation to Home, Links, Telemetry, Events, Alarms, Commanding, Mission Database, and Archive Browser. A search bar is located at the top left of the main content area. On the right side, there is a 'Select a link' panel and a status indicator showing 'realtime / 2021-05-13 10:38:36.593 UTC'.

Yamcs myproject

Search parameter

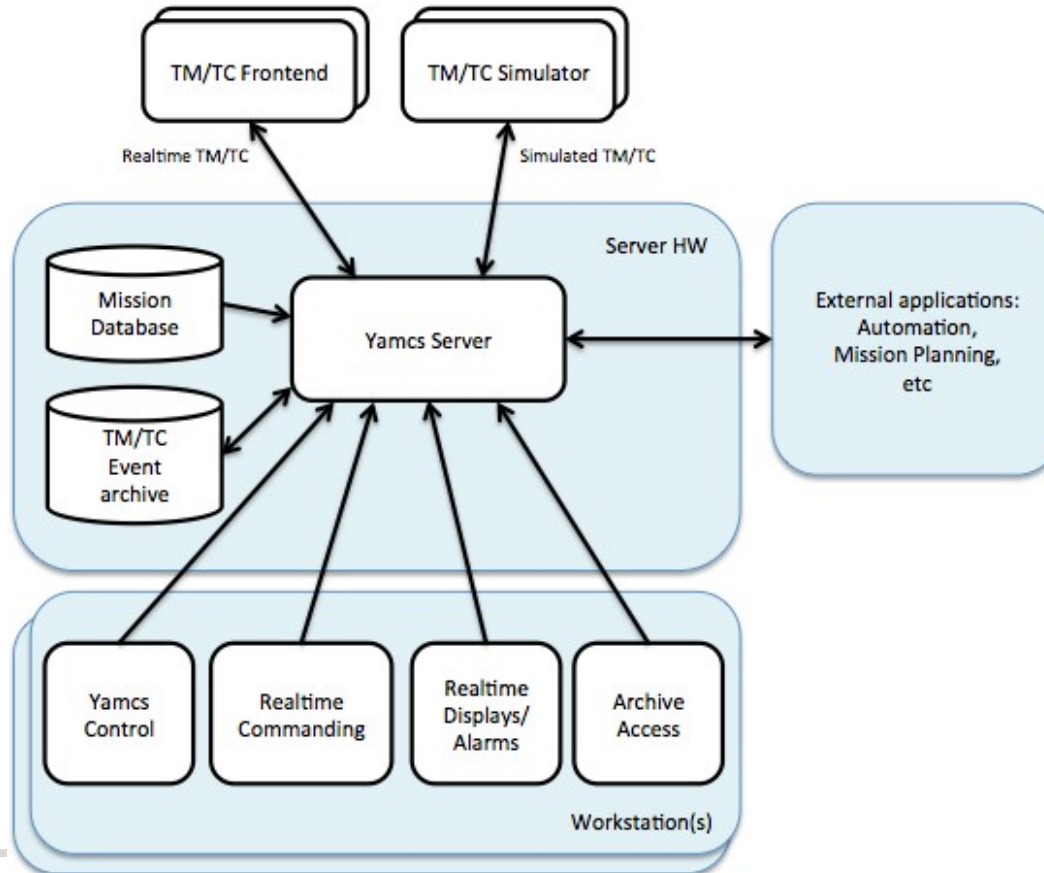
Links ENABLE DISABLE HIDE INFO PANEL realtime / 2021-05-13 10:38:36.593 UTC

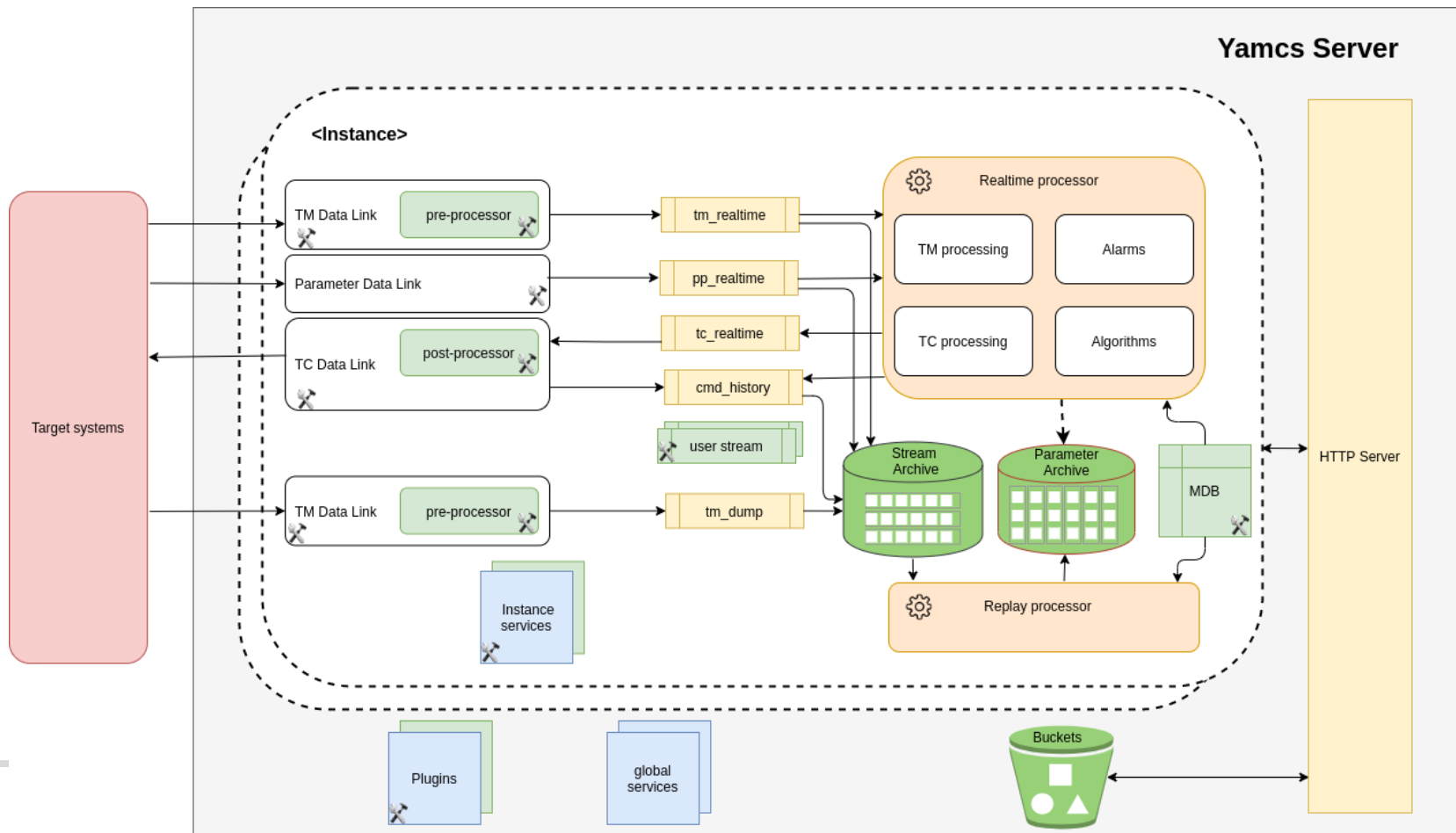
Filter links Columns

<input type="checkbox"/>	Name	Class	In	Out	
<input type="checkbox"/>	udp-in	org.yamcs.tctm.UdpTmDataLink	32	0	:
<input type="checkbox"/>	udp-out	org.yamcs.tctm.UdpTcDataLink	0	0	:

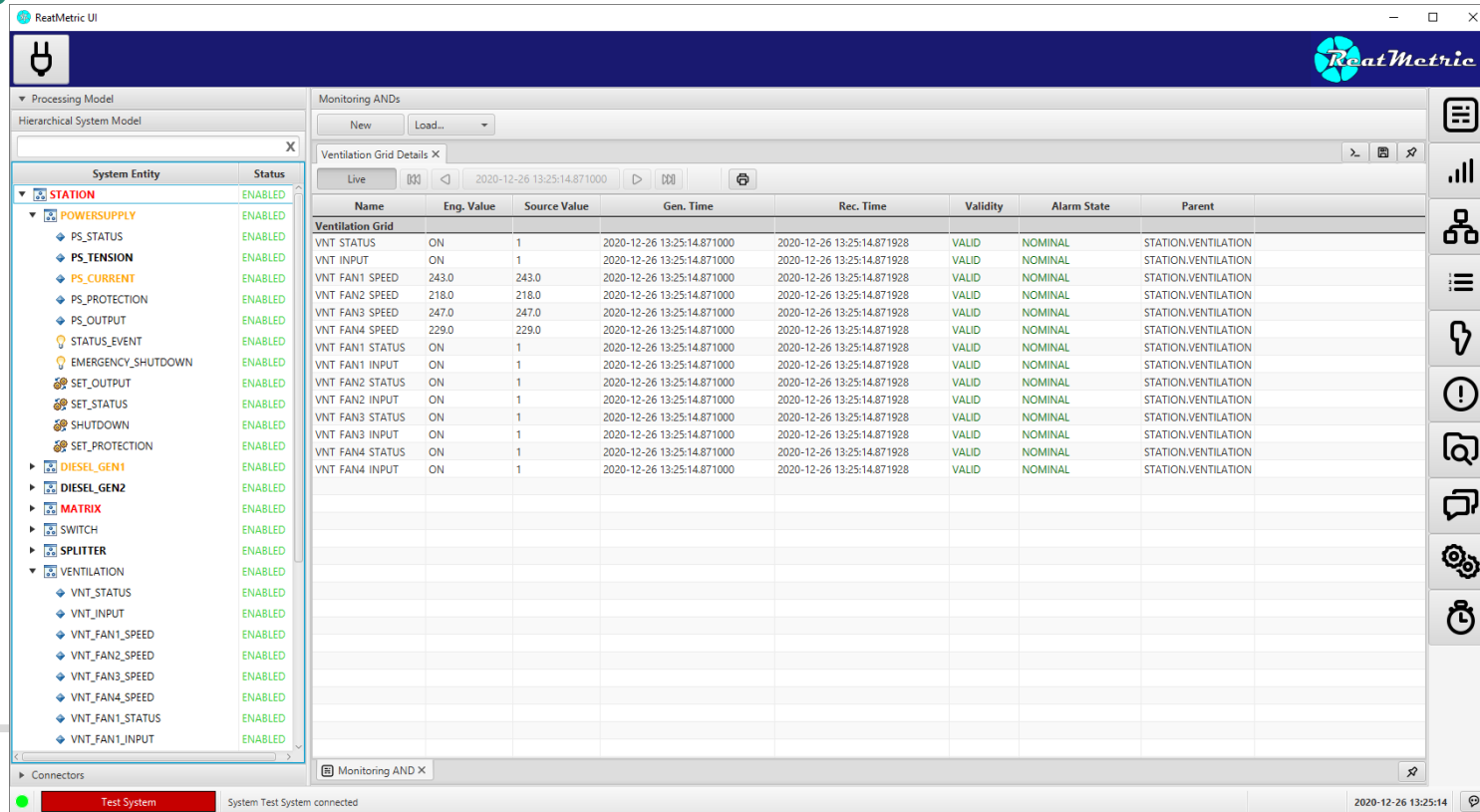
Select a link

Home Links Telemetry Events Alarms Commanding Mission Database Archive Browser



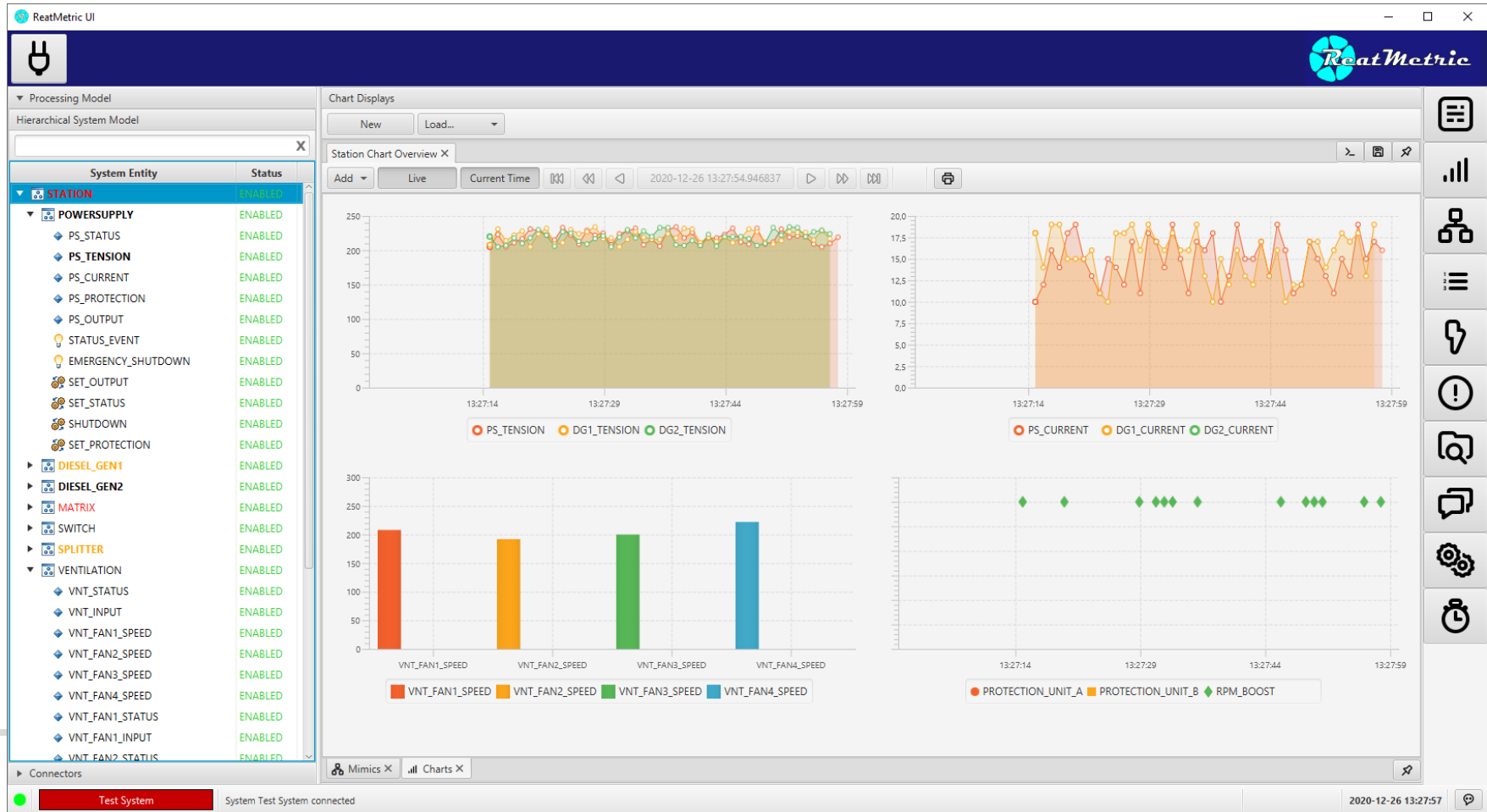


<https://github.com/dariol83/reatmetric>



The screenshot shows the ReatMetric UI interface. On the left, a 'System Entity' tree is expanded to show 'VENTILATION' and its sub-entities like 'VNT_STATUS', 'VNT_INPUT', and fan speeds. The main area displays 'Monitoring ANDs' for 'Ventilation Grid Details' with a table of sensor data. The table includes columns for Name, Eng. Value, Source Value, Gen. Time, Rec. Time, Validity, Alarm State, and Parent. The status bar at the bottom indicates 'Test System' is connected.

Name	Eng. Value	Source Value	Gen. Time	Rec. Time	Validity	Alarm State	Parent
Ventilation Grid							
VNT STATUS	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT INPUT	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN1 SPEED	243.0	243.0	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN2 SPEED	218.0	218.0	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN3 SPEED	247.0	247.0	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN4 SPEED	229.0	229.0	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN1 STATUS	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN1 INPUT	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN2 STATUS	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN2 INPUT	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN3 STATUS	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN3 INPUT	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN4 STATUS	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION
VNT FAN4 INPUT	ON	1	2020-12-26 13:25:14.871000	2020-12-26 13:25:14.871928	VALID	NOMINAL	STATION.VENTILATION



The screenshot displays the ReatMetric UI interface, which is a comprehensive monitoring and control system. The interface is divided into several key sections:

- Connectors Panel (Left):** Shows the 'Station Connector' status as 'OK' with a data rate of 2.2 Kbps and 0 bps.
- Mimics Displays (Top Center):** Features a 'Load...' dropdown and a 'mimics-example X' window with playback controls (Live, Stop, Play, Pause, Full Screen) and a timestamp of 2020-12-26 13:26:44.873000.
- Main Dashboard (Center):** A central schematic diagram shows the interconnections between various system components, including a central power distribution unit and a turbine.
- Power Supply Distributor (Top Left):**
 - Status: ON
 - Measured Tension: 219.0
 - Measured Current: 14.0
 - Overtension Protection: ON
- Diesel Generator 1 (Middle Left):**
 - Status: ON
 - Measured Tension: 226.0
 - Measured Current: 19.0
 - RPM: ON
- Diesel Generator 2 (Bottom Left):**
 - Status: ON
 - Measured Tension: 219.0
 - Measured Current: ---
 - RPM: ON
- Ventilation Grid (Top Right):** Displays four pressure gauges with values: 208.0, 207.0, 192.0, and 219.0.
- Thermal Units (Middle Right):**
 - Global Status: NOMINAL
 - Unit A Status: ON, Temperature: 22.0, Override: ALARM, Protection: ON
 - Unit B Status: ON, Temperature: 24.9, Override: ON, Protection: ON
- Mechanical Turbine (Bottom Right):**
 - Output: 27.0
 - RPM: 54.0

The interface also includes a 'Main Charts' button and a bottom status bar showing 'Test System' connected and the current timestamp: 2020-12-26 13:26:44.

Open Mission Control



<https://openmissioncontrol.wordpress.com>

The screenshot shows the Open Mission Control interface with a mission control room scene. The interface includes a header with "Mission Control Center" and "myPocketQub 442". Below the header, there is a timeline showing simulation speed (30 seconds/second) and current time (12:06:34). The main display area shows a mission control room with several operators at workstations. The room features large screens displaying the ESA logo, a satellite, and a world map. A control panel on the right lists various mission components: IQEA, Qubduino, Open Space, Super Sprite, Orbit View, Super Lab, and Satellite Bus. At the bottom, there are time zones listed: BRINDON (21:11:18), KOUNOU (17:11:18), NEW YORK (16:11:18), MOSCOW (0:11:18), and UTC (20:11:18).

The screenshot shows the Open Mission Control interface with detailed mission data and graphs. The header displays "Mission Control Center" and "myPocketQub 442". Below the header, there is a timeline showing simulation speed (5 seconds/second) and current time (4:08:33). The main display area is divided into several sections:

- CONTROL ROOM:** A menu with options: IQEA, OPEN SPACE, ORBIT VIEW, QUBDUINO, SUPER LAB, SUPER SPRITE, and SATELLITE BUS.
- STATUS:** A table showing the overall status of various components:

Component	Status
SuperLab	working
Probe One	testing
Probe Two	malfunction
- VOLTAGE:** Probe One: 9,72 V; Probe Two: 1,97Vt
- CURRENT:** Probe One: 0,0023 mA; Probe Two: 0,0125 mA
- POWER:** Probe One: 168,23mW; Probe Two: 3,6860mW
- TEMPERATURE:** Probe One: 1,37K9; Probe Two: 1E-6 K

Below the status section, there are two graphs:

- POWER PROBE TWO [W]:** A line graph showing power increasing from approximately 4,7217E-1 to 5,5725E-1 W over time.
- CURRENT PROBE TWO [A]:** A line graph showing current decreasing from approximately 1,6914E-5 to 1,2538E-5 A over time.

At the bottom, there is an EXPORT section with options for DURATION, FORMAT (ASCII or XLS), and DESTINATION (OSX:Users).

<https://github.com/OSWALD2/AURIS>

Mission: **DEFAULT**
Time: 2021.010.16.28.46.358

SPID	Mnemonic	Description	Generation Time	ERT	APID	T	ST	SSC	VC	Source
5071	UNKNOWN		2021.010.16.26.27.544937	2021.010.16.26.29.544000	1766	1	7	8	SCOE	EDEN 1
5071	UNKNOWN		2021.010.16.26.27.544937	2021.010.16.26.29.544000	1766	1	1	7	SCOE	EDEN 1
5071	UNKNOWN		2021.010.16.26.27.123581	2021.010.16.26.29.123000	1766	1	7	6	SCOE	EDEN 1
5071	UNKNOWN		2021.010.16.26.27.123566	2021.010.16.26.29.123000	1766	1	1	5	SCOE	EDEN 1
5071	UNKNOWN		2021.010.16.26.26.924988	2021.010.16.26.28.924000	1766	1	7	4	SCOE	EDEN 1
5071	UNKNOWN		2021.010.16.26.26.924973	2021.010.16.26.28.924000	1766	1	1	3	SCOE	EDEN 1
5071	UNKNOWN		2021.010.16.26.26.523788	2021.010.16.26.28.523000	1766	1	7	2	SCOE	EDEN 1
5071	UNKNOWN		2021.010.16.26.26.523788	2021.010.16.26.28.523000	1766	1	1	1	SCOE	EDEN 1
102	S2KTM000	DH_High_Priority_Parameters	2021.010.16.26.00.626694	2021.010.16.26.02.626870	21	0	0	2	0	NCTRS 1
102	S2KTM000	DH_High_Priority_Parameters	2021.010.16.25.59.171906	2021.010.16.26.01.172158	21	0	0	1	0	NCTRS 1
52	S2KTM052	DH_Housekeeping_Parameters_2	2021.010.16.25.50.539307	2021.010.16.25.52.539471	20	3	25	4	0	NCTRS 1
52	S2KTM052	DH_Housekeeping_Parameters_2	2021.010.16.25.50.123077	2021.010.16.25.52.123295	20	3	25	3	0	NCTRS 1
52	S2KTM052	DH_Housekeeping_Parameters_2	2021.010.16.25.49.938889	2021.010.16.25.51.939138	20	3	25	2	0	NCTRS 1
52	S2KTM052	DH_Housekeeping_Parameters_2	2021.010.16.25.49.483292	2021.010.16.25.51.488755	20	3	25	1	0	NCTRS 1

Time	Level	Source	Message
2021.010.16.26.28.530178	WARN		No packet definition found for packet: APID:1766 Type:1 SubType:1
2021.010.16.25.22.920773	INFO		Starting TM and TC chains...
2021.010.16.25.22.920734	INFO		Initialising User Interface with Data Model...
2021.010.16.25.22.920663	INFO		Successfully loaded data model
2021.010.16.25.22.789326	INFO		Loading Data Model...

Mission: **DEFAULT**
Time: 2021.010.16.33.12.349

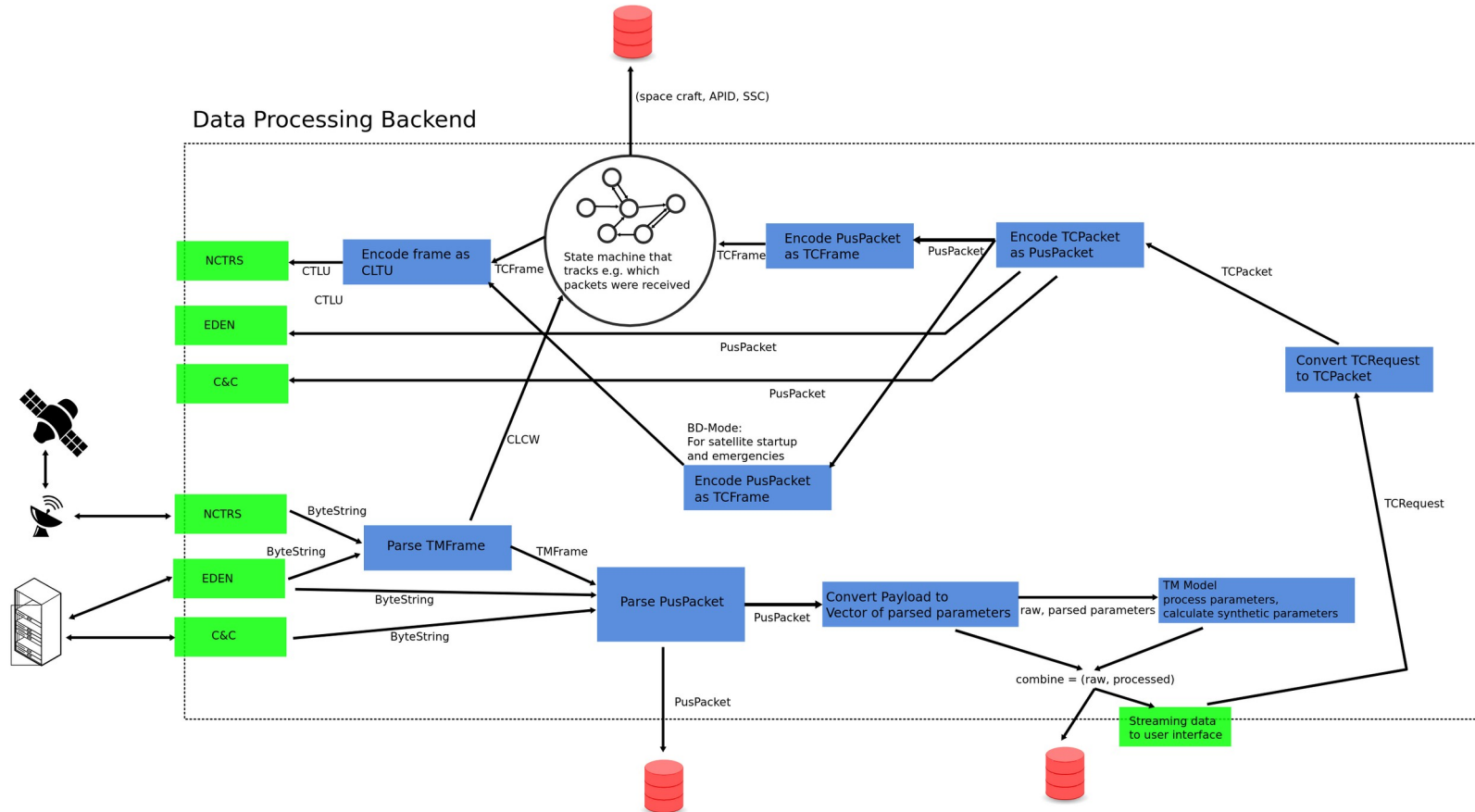
Display 1

Name	Description
S2KTP501	32-BIT REAL (N)
S2KTP502	64-BIT REAL (T)
S2KTP503	32-BIT REAL
S2KTP504	48-BIT REAL (N)

Filter: s2ktp5

Time: 2021.010.16.26.28.530178

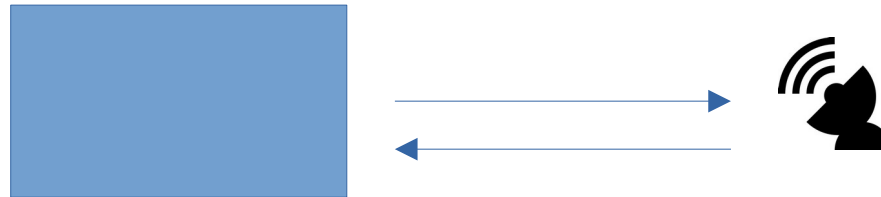
Time	Level	Source	Message
2021.010.16.26.28.530178	WARN		No packet definition found for packet: APID:1766 Type:1 SubType:1
2021.010.16.25.22.920773	INFO		Starting TM and TC chains...
2021.010.16.25.22.920734	INFO		Initialising User Interface with Data Model...
2021.010.16.25.22.920663	INFO		Successfully loaded data model
2021.010.16.25.22.789326	INFO		Loading Data Model...



A Python / Dockerized Open Source Mission Control System?

- Data Link Management for TC and TM (open / close)
- Telemetry Displays
- Telecomand Stack and History
- Database (aka Mission Information Base, MIB)
- Events Display
- Alarms
- ...

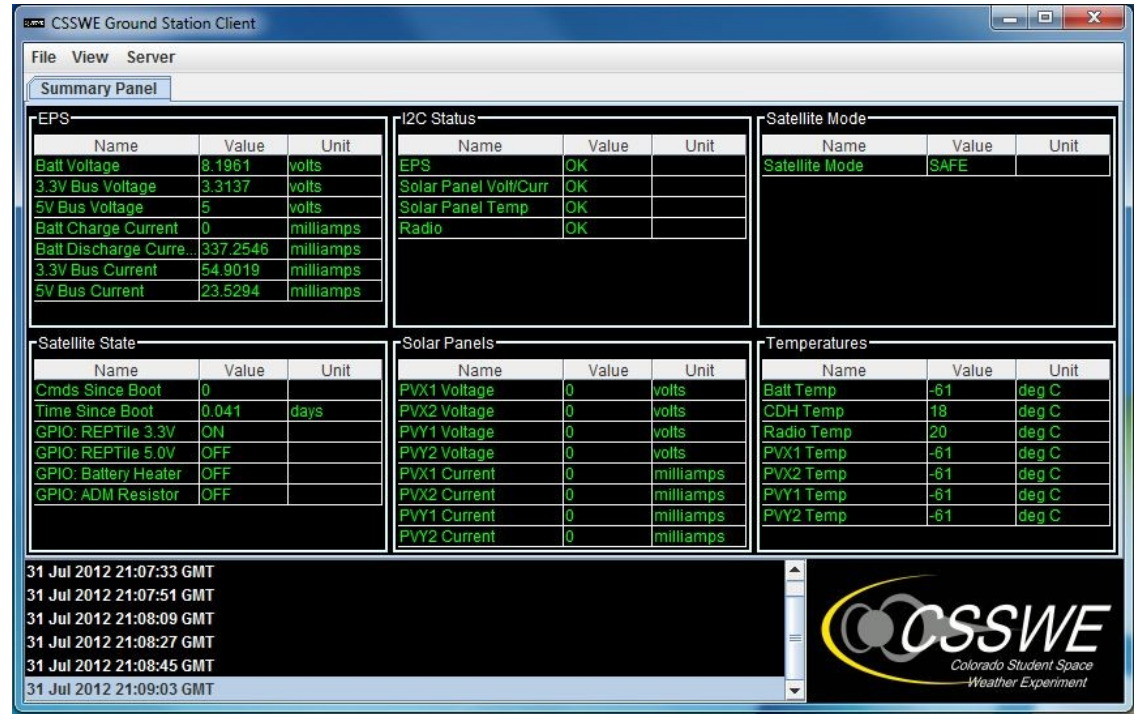
- Data Link Management for TC and TM (open / close)
 - CCSDS SLE protocol
 - Cortex (proprietary protocol)
 - Custom (eg. TCP)?



- Telemetry Displays
 - ANDs (Alpha Numeric Displays)
 - GRDs (Graphical Displays)
 - MIMICs
 - 3D Views

What to consider

- Telemetry Displays
 - ANDs
 - GRDs
 - MIMICs
 - 3D Views



The screenshot displays the CSSWE Ground Station Client software interface. The window title is "CSSWE Ground Station Client". The menu bar includes "File", "View", and "Server". The "Summary Panel" is active, showing several data tables:

- EPS:**

Name	Value	Unit
Batt Voltage	8.1961	volts
3.3V Bus Voltage	3.3137	volts
5V Bus Voltage	5	volts
Batt Charge Current	0	milliamps
Batt Discharge Current	337.2546	milliamps
3.3V Bus Current	54.9019	milliamps
5V Bus Current	23.5294	milliamps
- I2C Status:**

Name	Value	Unit
EPS	OK	
Solar Panel Volt/Curr	OK	
Solar Panel Temp	OK	
Radio	OK	
- Satellite Mode:**

Name	Value	Unit
Satellite Mode	SAFE	
- Satellite State:**

Name	Value	Unit
Cmnds Since Boot	0	
Time Since Boot	0.041	days
GPIO: REPTile 3.3V	ON	
GPIO: REPTile 5.0V	OFF	
GPIO: Battery Heater	OFF	
GPIO: ADM Resistor	OFF	
- Solar Panels:**

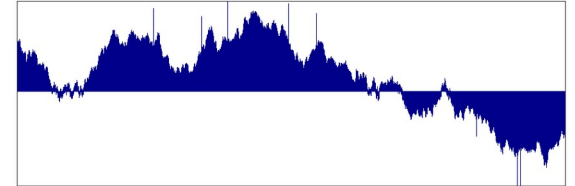
Name	Value	Unit
PVX1 Voltage	0	volts
PVX2 Voltage	0	volts
PVY1 Voltage	0	volts
PVY2 Voltage	0	volts
PVX1 Current	0	milliamps
PVX2 Current	0	milliamps
PVY1 Current	0	milliamps
PVY2 Current	0	milliamps
- Temperatures:**

Name	Value	Unit
Batt Temp	-61	deg C
CDH Temp	18	deg C
Radio Temp	20	deg C
PVX1 Temp	-61	deg C
PVX2 Temp	-61	deg C
PVY1 Temp	-61	deg C
PVY2 Temp	-61	deg C

At the bottom of the window, there is a log of timestamps: 31 Jul 2012 21:07:33 GMT, 31 Jul 2012 21:07:51 GMT, 31 Jul 2012 21:08:09 GMT, 31 Jul 2012 21:08:27 GMT, 31 Jul 2012 21:08:45 GMT, and 31 Jul 2012 21:09:03 GMT. The CSSWE logo is visible in the bottom right corner, with the text "Colorado Student Space Weather Experiment".

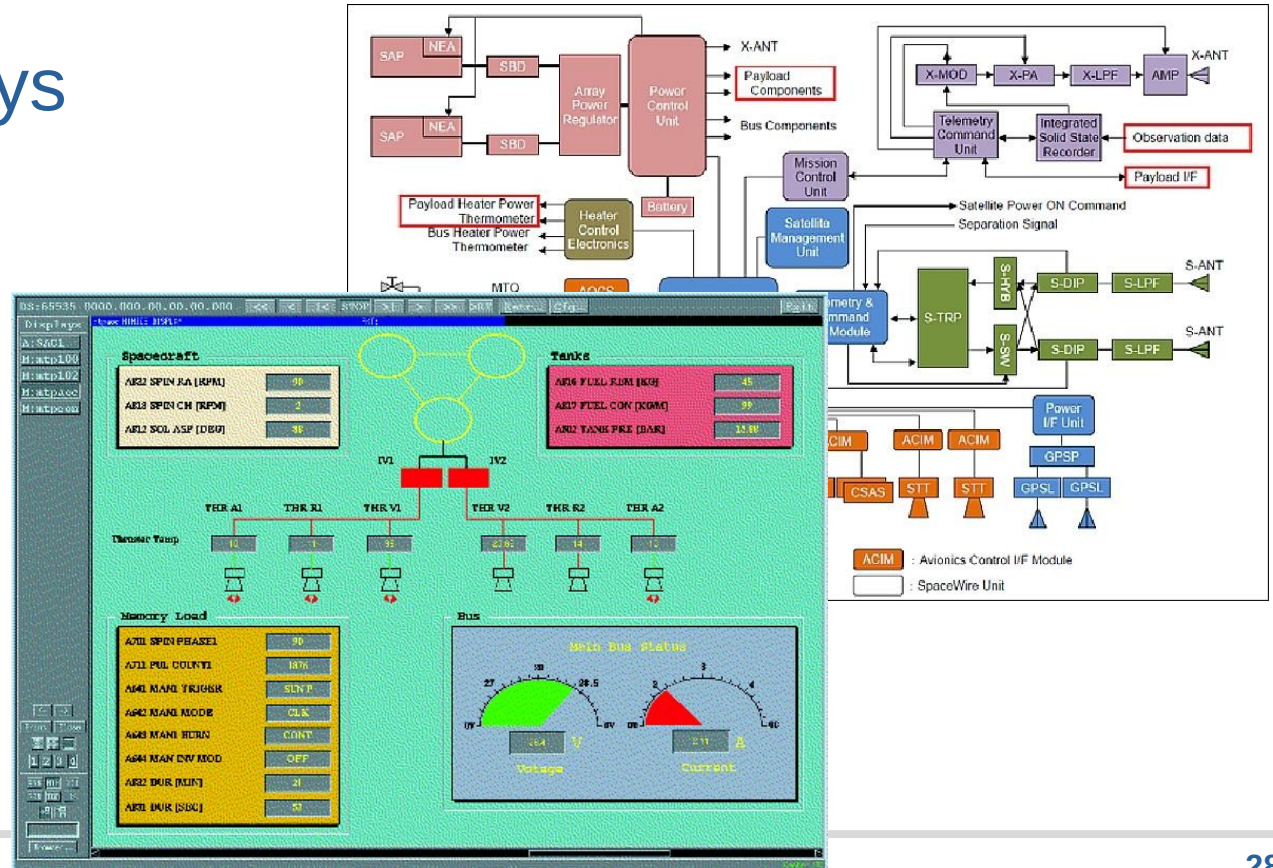
What to consider

- Telemetry Displays
 - ANDs
 - **GRDs**
 - MIMICs
 - 3D Views



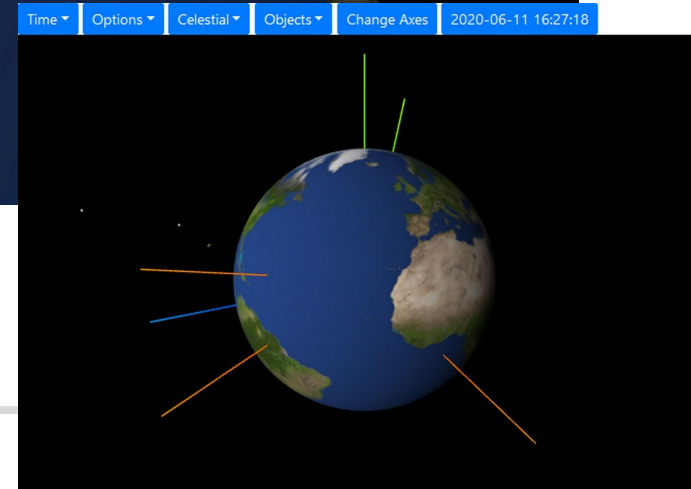
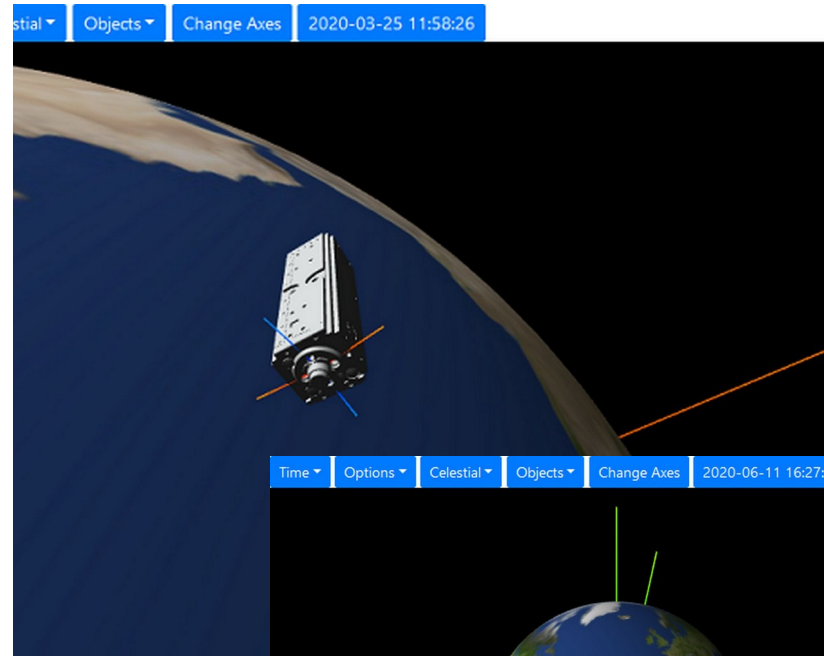
What to consider

- Telemetry Displays
 - ANDs
 - GRDs
 - MIMICs
 - 3D Views



What to consider

- Telemetry Displays
 - ANDs
 - GRDs
 - MIMICs
 - **3D Views**



What to consider



- Telecomand Stack and History

The screenshot shows a window titled "TC History: RTE" with a sub-tab "TC History Report". The window displays a table of task execution history. The table has columns for Name, Description, Sequence, Domain, Release Time, Execution Time, S, D, C, G, B, I, L, S, T, Source, FC, TC, R, G, I, A, S, S, I122, and CO. The data rows show various tasks like S2KTC007, S2KTC124, and S2KTC007, along with their descriptions, sequence numbers, domains, and release/execution times. The table is filtered to show only tasks from the RTE domain. The bottom of the window has a search and filter section with fields for Domain, Type, Sub-Type, APID, Mnemonic, Sequence, Ack, Workstation, Local WS, and Manual Stacks.

Name	Description	Sequence	Domain	Release Time	Execution Time	S	D	C	G	B	I	L	S	T	Source	FC	TC	R	G	I	A	S	S	I122	CO
S2KTC007	TC(3,3)		RTE	2013-255T09:44:54.324	2013-255T09:44:54.406	E	E	E		SR	MS	valmcs4	01	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-169T09:26:56.902	2013-169T09:26:56.943	E	E	E		SR	MS	valmcs4	A7	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-169T09:26:54.308	2013-169T09:26:54.433	E	E	E		SR	MS	valmcs4	A6	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-169T09:26:52.111	2013-169T09:26:52.274	E	E	E		SR	MS	valmcs4	A5	01	S	SSS	S								
S2KTC124	Real Parameters		RTE	2013-168T09:22:36.293	2013-168T09:22:36.340	E	E	E		MS	valmcs4	A4	01	S	SSS										
S2KTC124	Real Parameters		RTE	2013-168T09:22:34.785	2013-168T09:22:34.895	E	E	E		MS	valmcs4	A3	01	S	SSS										
S2KTC124	Real Parameters		RTE	2013-168T09:22:33.800	2013-168T09:22:33.841	E	E	E		MS	valmcs4	A2	01	S	SSS										
S2KTC124	Real Parameters		RTE	2013-168T09:22:32.633	2013-168T09:22:32.753	E	E	E		MS	valmcs4	A1	01	S	SSS										
S2KTC124	Real Parameters		RTE	2013-168T09:22:29.578	2013-168T09:22:29.702	E	E	E		MS	valmcs4	A0	01	S	SSS										
S2KTC124	Real Parameters		RTE	2013-168T09:22:28.149	2013-168T09:22:28.269	E	E	E		MS	valmcs4	9F	01	S	SSS										
S2KTC124	Real Parameters		RTE	2013-168T09:22:26.959	2013-168T09:22:27.042	E	E	E		MS	valmcs4	9E	01	S	SSS										
S2KTC124	Real Parameters		RTE	2013-168T09:20:27.225	2013-168T09:20:27.466	E	E	E		MS	valmcs4	90	01	S	SSS										
S2KTC007	TC(3,3)		RTE	2013-168T09:12:16.372	2013-168T09:12:16.372	O	E	E		SR	MS	valmcs4	90	01	S	TIT	X							X	
S2KTC007	TC(3,3)		RTE	2013-168T09:12:15.346	2013-168T09:12:15.346	O	E	E		SR	MS	valmcs4	90	01	S	TIT	X							X	
S2KTC007	TC(3,3)		RTE	2013-168T09:12:14.331	2013-168T09:12:14.331	O	E	E		SR	MS	valmcs4	90	01	S	TIT	X							X	
S2KTC007	TC(3,3)		RTE	2013-168T09:12:05.410	2013-168T09:12:05.410	E	E	E		SR	MS	valmcs4	00	00	F										
S2KTC007	TC(3,3)		RTE	2013-162T15:14:19.085	2013-162T15:14:19.085	E	E	E		SR	MS	valmcs4	00	00	F										
S2KTC007	TC(3,3)		RTE	2013-162T15:14:07.824	2013-162T15:14:07.824	E	E	E		SR	MS	valmcs4	9C	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:14:06.795	2013-162T15:14:06.878	E	E	E		SR	MS	valmcs4	98	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:14:05.769	2013-162T15:14:05.849	E	E	E		SR	MS	valmcs4	9A	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:14:04.740	2013-162T15:14:04.825	E	E	E		SR	MS	valmcs4	99	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:14:03.714	2013-162T15:14:03.797	E	E	E		SR	MS	valmcs4	98	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:14:02.685	2013-162T15:14:02.812	E	E	E		SR	MS	valmcs4	97	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:14:01.660	2013-162T15:14:01.781	E	E	E		SR	MS	valmcs4	96	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:14:00.632	2013-162T15:14:00.716	E	E	E		SR	MS	valmcs4	95	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:59.607	2013-162T15:13:59.729	E	E	E		SR	MS	valmcs4	94	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:58.581	2013-162T15:13:58.705	E	E	E		SR	MS	valmcs4	93	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:57.550	2013-162T15:13:57.678	E	E	E		SR	MS	valmcs4	92	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:56.523	2013-162T15:13:56.565	E	E	E		SR	MS	valmcs4	91	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:55.491	2013-162T15:13:55.535	E	E	E		SR	MS	valmcs4	90	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:54.462	2013-162T15:13:54.585	E	E	E		SR	MS	valmcs4	8F	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:53.434	2013-162T15:13:53.557	E	E	E		SR	MS	valmcs4	8E	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:52.407	2013-162T15:13:52.529	E	E	E		SR	MS	valmcs4	8D	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:51.378	2013-162T15:13:51.461	E	E	E		SR	MS	valmcs4	8C	01	S	SSS	S								
S2KTC007	TC(3,3)		RTE	2013-162T15:13:50.345	2013-162T15:13:50.426	E	E	E		SR	MS	valmcs4	8B	01	S	SSS	S								

- Database (aka Mission Information Base, MIB)
 - What you receive: 0100110100011101010101...
 - What you want:
 - Frame Counter = 234
 - Batt Temp = 23 deg C
 - Solar Panel +X Current = 235 mA
 - ...

What to consider

- Database (aka Mission Information Base, MIB)
 - SCOS-2000 uses SQL Tables
 - CCSDS released **XTCE** (XML files)

