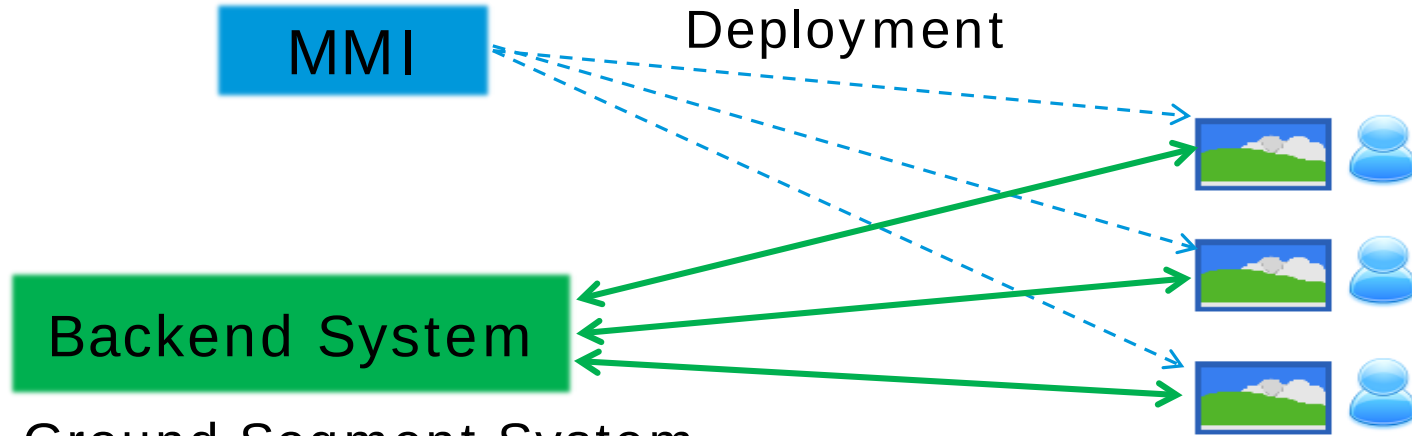


An Easy Way to Web User Interfaces for Ground Segment Systems

Felix Flentge, Holger Dreihahn, Gonçalo Lopes, David Marina,
Jean Schuetz

03/02/2017

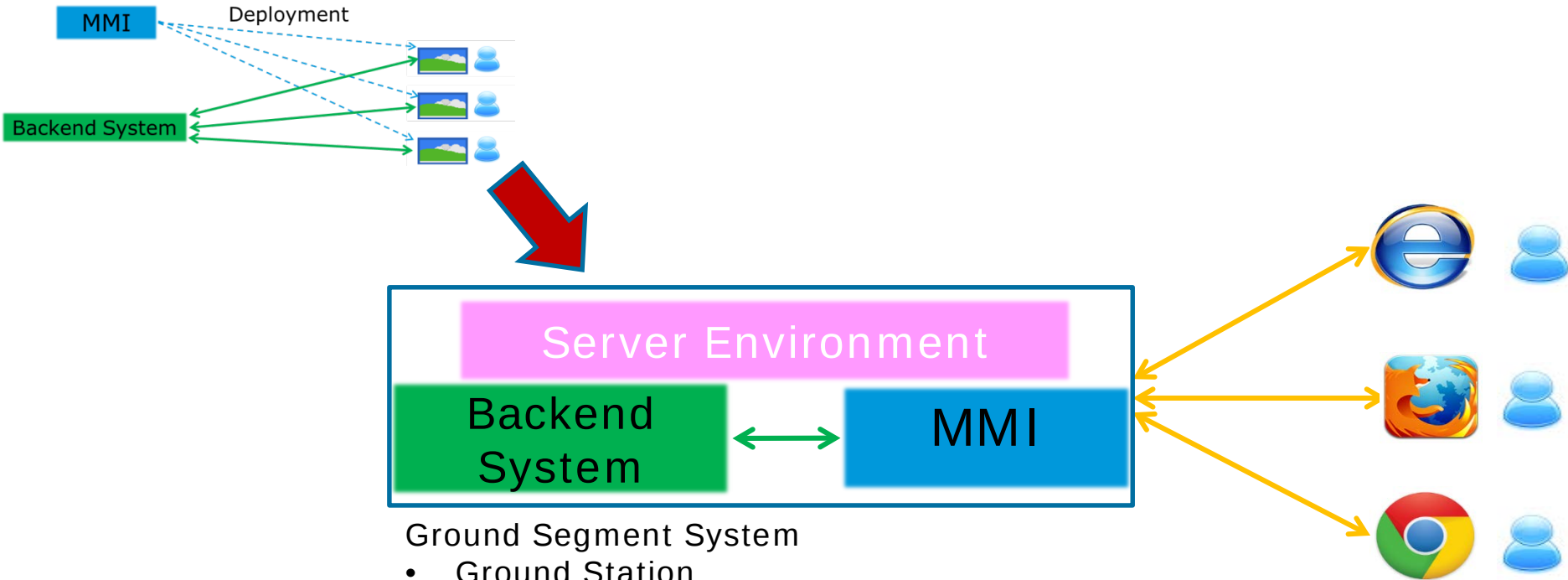


Ground Segment System

- Ground Station
- Mission Control
- Planning & Scheduling

Non-space Systems

From Rich Client ... to Web-based



Ground Segment System

- Ground Station
- Mission Control
- Planning & Scheduling

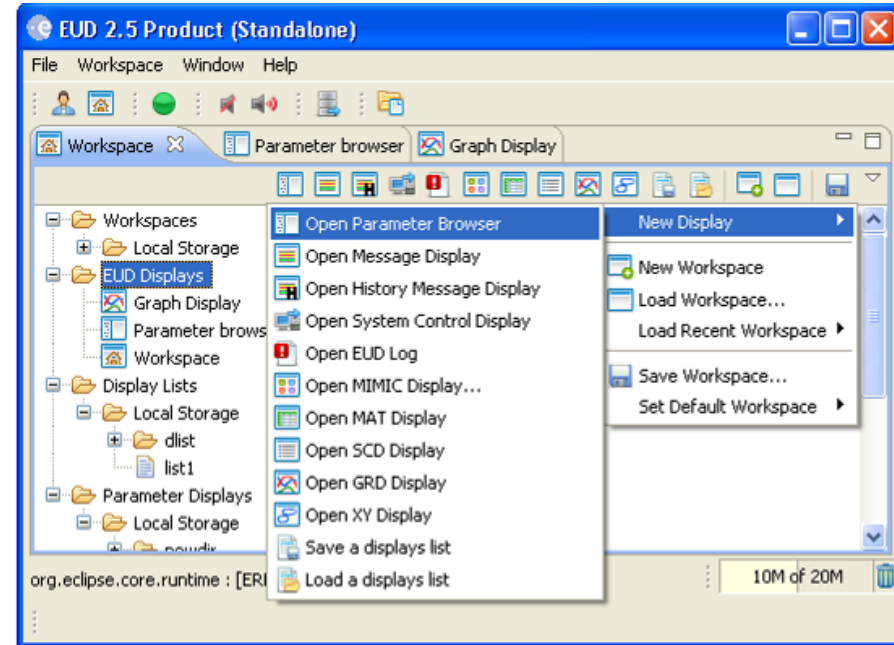
Non-space systems

Felix Flentge, Holger Dreihahn, Gonalo Lopes, David Marina, Jean Schuetz | ESOC | 03/02/2017 | Slide 3

1. Motivation – Current State
2. Rich Clients vs Web-based User Interfaces
3. Eclipse Remote Application Platform (RAP)
4. Implementation of Web-based MMI
 - a. EGOS User Desktop (EUD) / WebEUD
 - b. Semi-automatic creation of ground station subsystem web-based MMI
5. Conclusion & Outlook

Motivation – Current State

- MMI for ground data systems used to be implemented as **separate standalone application**
- Use of **frameworks** (Eclipse Rich Client Platform) allows to exploit commonalities and a more harmonized look & feel
- **EGOS User Desktop** providing common functionality for ground data systems



- **Update**: update of all clients required
- **Deployment** (thin clients, screen forwarding): issues with audio, z-layering, printing
- **Management of user configurations**: requires synchronisation between all installed instances
- **Portability**: ok, but sometimes subtle issues and no mobile devices

- Update: updates deployed on server only ✓
- Deployment: audio, z-layering, printing via web browser ✓
- Management of user configurations: done on the server ✓
- Portability: support for different browsers necessary; mobile devices can be used ?
- Usability: What about the usability of web-based MMI? Look & Feel? ?
- Effort: What is the effort of switching to web-based MMI? Which skills are needed? ?

Quiz

RICH CLIENT OR WEB APPLICATION ?

Quiz: Web or Rich Client?

Link Status  FIDE#1 (324) 20/11/2015 0811:3

Admin State **IN SERVICE** Basic State **OPERABLE** Rem. Sessions **CLOSED** Control Mode **MONITOR**

MASTER test1     >>

☐ GMMI Chat

FIDE#1

- Driver 1
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 2
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 3
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 4
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 5
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher

Run Immediate Pull

Driver 2 - Task State **FREE** Compl. Cond. **UNDEFINED**

Run ADSD Immediately

Task State **FREE** Compl. Cond. **UNDEFINED**

Driver 7	suspended	running
Driver 8	suspended	running
Driver 9	suspended	running
Driver 10	suspended	running
Driver 11	suspended	running

Backup Task State **NOT COMPL**

Run Backup Immediately

Task State **FREE** Compl. Cond. **UNDEFINED**

Archive Data

Prime Archive Available **FALSE** Available Disk Space at Prime ... MB

Backup Archive Available **FALSE** Available Disk Space at Backu... MB

Run Immediate Pull

Driver 1 - Task State **FREE** Compl. Cond. **UNDEFINED**

Run Immediate Push

Driver 1 - Task State **FREE** Compl. Cond. **UNDEFINED**

Backup Times **08:05:00/1**

resumed **0 min**

Last Backup Execution Time **unknown**

State of Last Backup Execution **unknown**

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Quiz: Web or Rich Client?

Link Status  FIDE#1 (324) 20/11/2015 0811:3

Admin State **IN SERVICE** Basic State **OPERABLE** Rem. Sessions **CLOSED** Control Mode **MONITOR**

MASTER test1     >>

GMMI Chat

FIDE#1

- Driver 1
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 2
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 3
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 4
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher
- Driver 5
 - Push Data
 - Pull Data
 - Driver Control
 - Run Immediate Pull
 - Run Immediate Push
 - Run Specific Puller
 - Run Specific Pusher

Run Immediate Pull

Driver 2 - Task State **FREE** Compl. Cond. **UNDEFINED**

Run ADSD Immediately

Task State **FREE** Compl. Cond. **UNDEFINED**

Driver 7	suspended	running
Driver 8	suspended	running
Driver 9	suspended	running
Driver 10	suspended	running
Driver 11	suspended	running

Backup Task State **NOT COMPL**

Run Backup Immediately

Task State **FREE** Compl. Cond. **UNDEFINED**



Archive Data

Prime Archive Available	FALSE	Available Disk Space at Prime ...	MB
Backup Archive Available	FALSE	Available Disk Space at Backu...	MB

Run Immediate Pull

Driver 1 - Task State **FREE** Compl. Cond. **UNDEFINED**

Run Immediate Push

Driver 1 - Task State **FREE** Compl. Cond. **UNDEFINED**

Backup Times

resumed

0 min

Last Backup Execution Time

08:05:00/1

State of Last Backup Execution

unknown

Web-based MMI run via Java Web Start

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Quiz: Web or Rich Client?



File FIDES2 Workspace Window Help

Backup Task:

Current status: **Enabled**
Last execution status: **Successful**
Last execution time: 2015.323.12.50.51.000
Next execution time: 2015.324.12.50.51.000

Cleanup Task:

Current status: **Enabled**
Last execution status: **Successful**
Last execution time: 2015.324.02.00.00.000
Next execution time: 2015.325.02.00.00.000

Drivers:

Operated SFC: **SFCprocessor** Naming service: **127.0.0.1** Backup task: **Enabled** Cleanup task: **Enabled**

Filter by Driver ID:

Driver ID	Driver Status	Primary Host	Backup Hosts	Last execution status
Navigation	Enabled	10.90.200.49:21		Error
Engineering	Enabled	10.32.60.53:21		Error
STATE	Enabled	10.80.202.10		Error
FDS	Enabled	10.80.202.10:21	10.90.202.11:21	Error
EPS	Enabled	10.33.202.56:21	10.90.202.23:21	Error

No driver selected

Type	Configuration ID	Status	Last execution status	Last execution time	Next planned execution
------	------------------	--------	-----------------------	---------------------	------------------------

Message Display:

Identifier	Severity	Message	Time	ComponentSource	SystemSource
	INFORMATION	Transferer 'STDM_INTG' completed (with anomaly, no files transferred)	2015.324.08.11.34.069	SFC	
	ERROR	Transferer 'STDM_INTG' abandoned due to no External System available	2015.324.08.11.34.069	SFC	
	ERROR	Transferer 'STDM_INTG' Unable to connect/login to esocfd@10.90.202.10	2015.324.08.11.34.069	SFC	
	INFORMATION	Retriever 'Dop_VL2_INTG' completed (with anomaly, no files retrieved)	2015.324.08.11.34.067	SFC	
	ERROR	Retriever 'Dop_VL2_INTG' abandoned due to no External System available	2015.324.08.11.34.067	SFC	
	ERROR	Retriever 'Dop_VL2_INTG' Unable to connect/login to esocfd@10.90.202.10	2015.324.08.11.34.067	SFC	
	INFORMATION	Transferer 'SCSS' completed (with anomaly, no files transferred)	2015.324.08.11.34.064	SFC	
	ERROR	Transferer 'SCSS' abandoned due to no External System available	2015.324.08.11.34.063	SFC	



Quiz: Web or Rich Client?

File FIDES2 Workspace Window Help

Backup Task:                                                  

Current status: **Enabled**

Last execution status: **Successful**

Last execution time: 2015.323.12.50.51.000

Next execution time: 2015.324.12.50.51.000

Enable Disable

Run now Abort

Suspend Resume

Configure...

Cleanup Task:                                                  

Current status: **Enabled**

Last execution status: **Successful**

Last execution time: 2015.324.02.00.00.000

Next execution time: 2015.325.02.00.00.000

Enable Disable

Run now Abort

Suspend Resume

Configure...

Drivers:                                      

Operated SFC: **SFCprocessor** Naming service: **127.0.0.1** Backup task: **Enabled** Cleanup task: **Enabled**

Filter by Driver ID:

Driver ID	Driver Status	Primary Host	Backup Hosts	Last execution status
Navigation	Enabled	10.90.200.49:21		Error
Engineering	Enabled	10.32.60.53:21		Error
STATE	Enabled	10.80.202.10		Error
FDS	Enabled	10.80.202.10:21	10.90.202.11:21	Error
EPS	Enabled	10.33.202.56:21	10.90.202.23:21	Error

No driver selected

Type	Configuration ID	Status	Last execution status	Last execution time	Next planned execution
------	------------------	--------	-----------------------	---------------------	------------------------

Message Display:                                                  

Identifier	Severity	Message	Time	ComponentSource	SystemSource
	INFORMATION	Transferer 'STDM_INTG' completed (with anomaly, no files transferred)	2015.324.08.11.34.069	SFC	
	ERROR	Transferer 'STDM_INTG' abandoned due to no External System available	2015.324.08.11.34.069	SFC	
	ERROR	Transferer 'STDM_INTG' U			
	INFORMATION	Retriever 'Dop_VL2_INTG' c			
	ERROR	Retriever 'Dop_VL2_INTG' a			
	ERROR	Retriever 'Dop_VL2_INTG' U			
	INFORMATION	Transferer 'SCSS' complet			
	ERROR	Transferer 'SCSS' abandoned due to no External System available	2015.324.08.11.34.063	SFC	

EUD-based Rich Client on Linux (Gnome)

Quiz: Web or Rich Client?



File Workspace Window

MASTER: test2 Control TMTc#1 Rem. Session TCS#1 TPS#1

Workspace Cur CLTU Session Cur FSP Session Cur FSP VCs

	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	VC 7	VC 8	VC 9	VC 10	VC 11	VC 12	VC 13	VC 14	VC 15
Id	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
SegMaxLen	200	200	200	0	0	0	0	0	0	0	0	0	0	0	0
GenSegHeader	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
GenFECE	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
MAPMuxScheme	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo
MAPMuxCtrl	0	0	0	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
BitRandomEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BlockingTO	10000	10000	10000	0	0	0	0	0	0	0	0	0	0	0	0
BlockingUsage	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
ADSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BDSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
FOPSlidingW	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0
TimerInitial	60	60	60	0	0	0	0	0	0	0	0	0	0	0	0
TimeoutType	Alert	suspendAD	suspendAD	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert
TxLimit	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0

Message Display

Time	Severity	Message
2015.324.08.24.00.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.48.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.36.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.24.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.12.000	WARNING	TPS - Unable to connect to NNO_TCDS1

[INFO] Privileges: (EUD)PR_CMD received for User: test2 of System: GSSC_APPLICATION

100% TMTc#1 10.33.109.26 02/01/2011/2015 08:23:50

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Quiz: Web or Rich Client?



File Workspace Window

MASTER: test2 Control TMTCS#1 Rem. Session TCS#1 TPS#1

Workspace Cur CLTU Session Cur FSP Session Cur FSP VCs

	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	VC 7	VC 8	VC 9	VC 10	VC 11	VC 12	VC 13	VC 14	VC 15
Id	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
SegMaxLen	200	200	200	0	0	0	0	0	0	0	0	0	0	0	0
GenSegHeader	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
GenFECE	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
MAPMuxScheme	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo
MAPMuxCtrl	0	0	0	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
BitRandomEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BlockingTO	10000	10000	10000	0	0	0	0	0	0	0	0	0	0	0	0
BlockingUsage	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
ADSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BDSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
FOPSlidingW	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0
TimerInitial	60	60	60	0	0	0	0	0	0	0	0	0	0	0	0
TimeoutType	Alert	suspendAD	suspendAD	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert
TxLimit	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0

Message Display

Time	Severity	Message
2015.324.08.24.00.000	WARNING	
2015.324.08.23.48.000	WARNING	
2015.324.08.23.36.000	WARNING	
2015.324.08.23.24.000	WARNING	
2015.324.08.23.12.000	WARNING	TPS - Unable to connect to NNO. TCS#1

[INFO] Privileges: (EUD)PR_CMD received for User: test2 of System: GSSC_APPLICATION

WebEUD-based MMI in Web-Browser (firefox)



Quiz: Web or Rich Client?



EUD SSC 1.6 TMTCC#1 10.33.199.28

File Workspace Window Help

MASTER: test2 Control TMTCC#1 Rem. Session TCS#1 TPS#1

Workspace Cur FSP VCs

	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	VC 7	VC 8	VC 9	VC 10	VC 11	VC 12	VC 13	VC 14	VC 15
Id	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
SegMaxLen	200	200	200	0	0	0	0	0	0	0	0	0	0	0	0
GenSegHeader	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
GenFECE	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
MAPMuxScheme	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo
MAPMuxCtrl	0	0	0	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
BitRandomEnabl	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BlockingTO	10000	10000	10000	0	0	0	0	0	0	0	0	0	0	0	0
BlockingUsage	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
ADSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BDSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
FOPSlidingW	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0
TimerInitial	60	60	60	0	0	0	0	0	0	0	0	0	0	0	0
TimeoutType	Alert	suspendAD	suspendAD	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert
TxLimit	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0

Message Display

Time	Severity	Message
2015.324.10.00.36.000	WARNING	
2015.324.10.00.24.000	WARNING	
2015.324.10.00.12.000	WARNING	
2015.324.10.00.00.000	WARNING	
2015.324.09.59.48.000	WARNING	

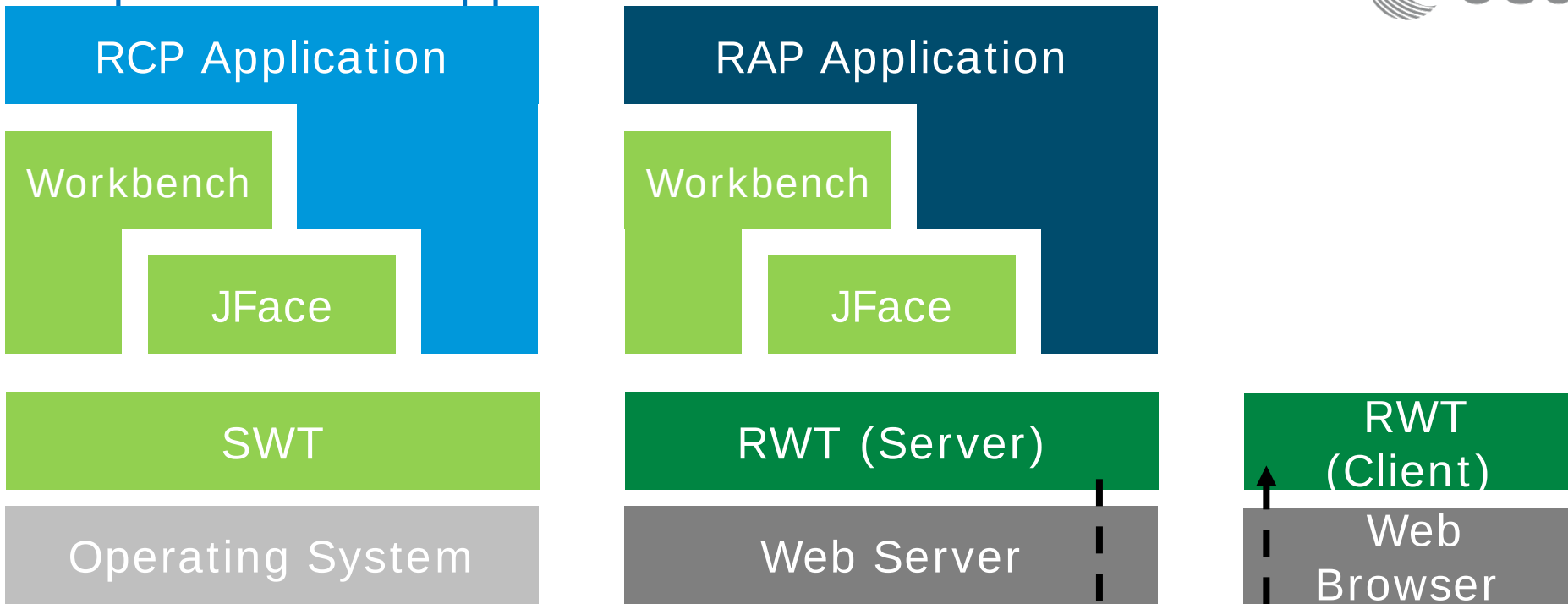
[WARNING] Unable to load EudTableCursor. Falling back to the regular TableCursor.

user1 TMTCC#1 10.33.19 (324) 20/11/2015 1000.43

Eud-based Rich Client on Linux (Gnome)



Eclipse Remote Application Platform

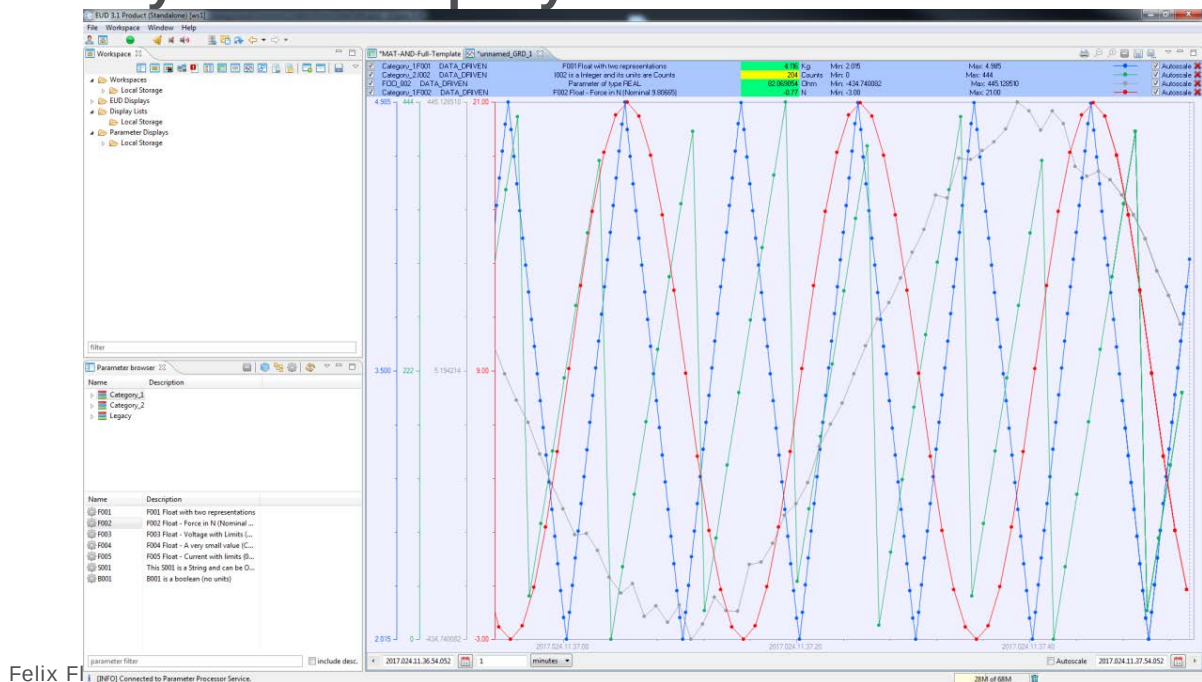


Eclipse RAP provides the **RAP Widget Toolkit (RWT)** which implements the **Standard Widget Toolkit (SWT) API**.

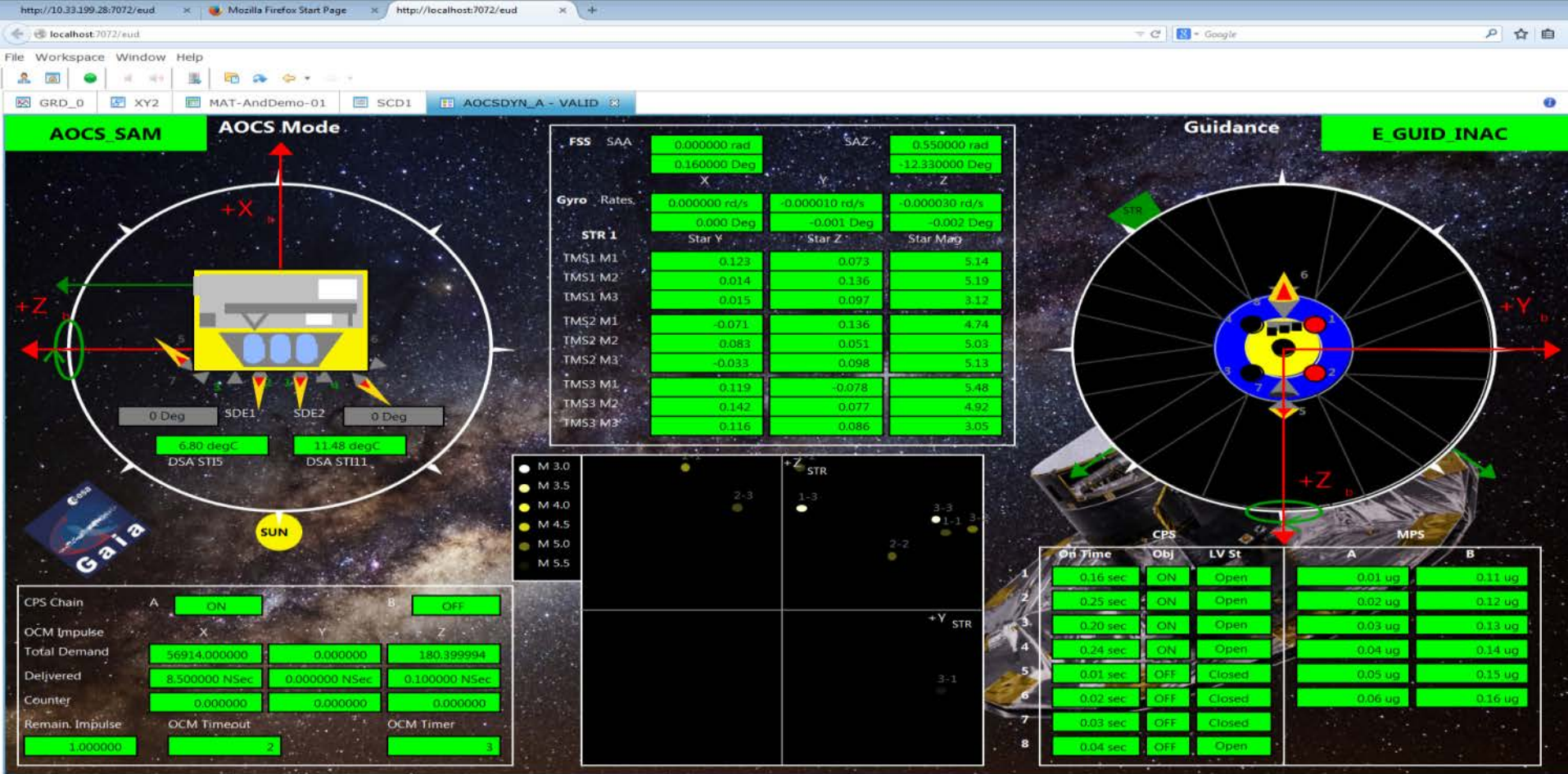
Felix Flentge, Holger Dreihahn, Gonçalo Lopes, David Marina, Jean Schuetz | ESOC | 03/02/2017 | Slide 16

- Developers write **Java code** (but be aware of multi-user support) → no html, javascript, ...
- **Porting of existing RCP** applications is straightforward
- **Single Sourcing** (same code for RCP and RAP application)
- Supports **drag & drop, menus, drawing, ...**
- Support **all major browsers**
- Client-side implementation of user interaction and low bandwidth usage → Can be used on **limited WAN links with high latency**

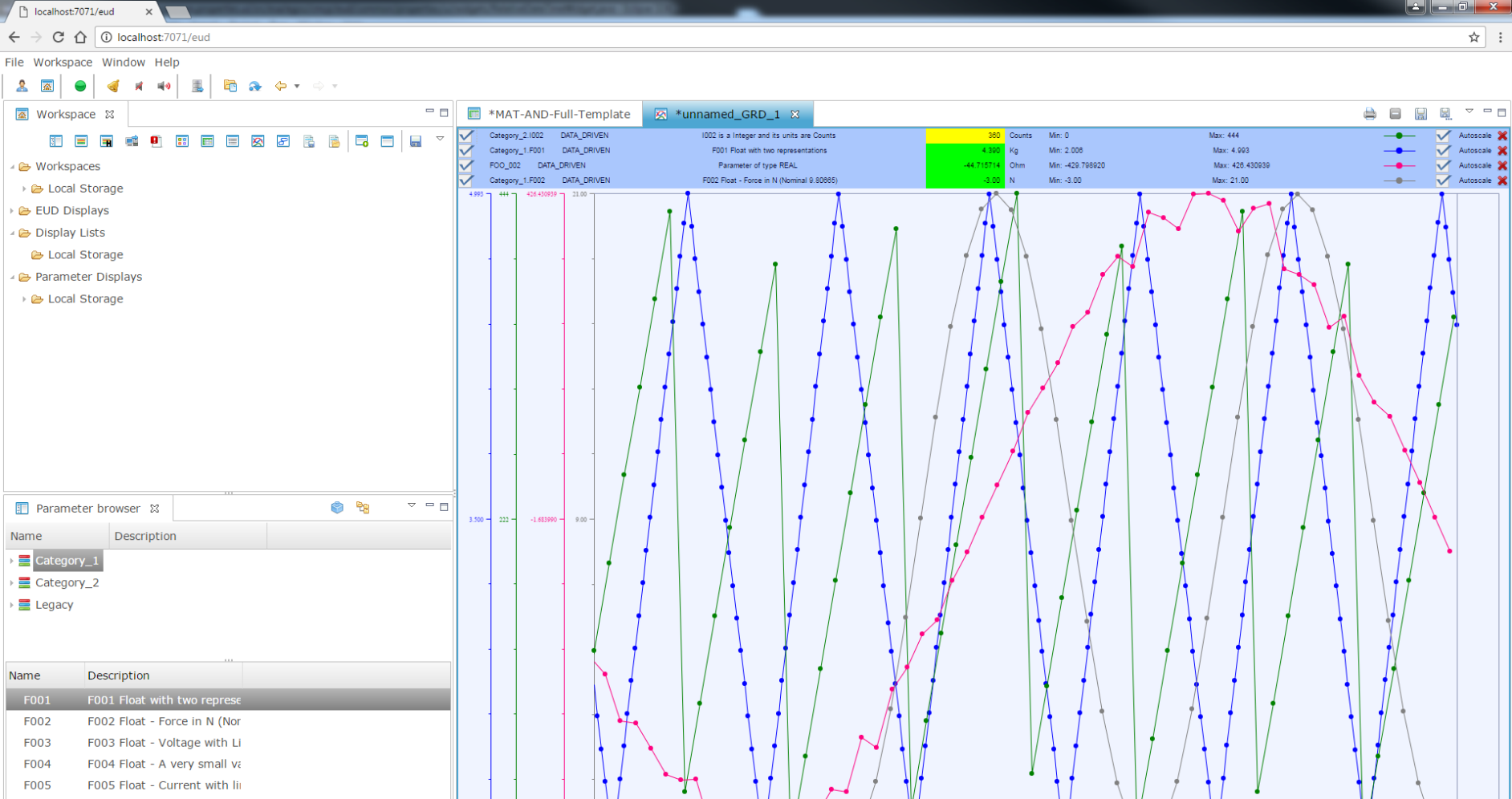
- **RCP-based UI Framework** for ESA Ground Data Systems
- Provides a set of **commonly used displays**:
 - Matrix Display
 - Plot Display
 - System Control
 - Messages Display
 - MIMIC Display
 - ... and many more



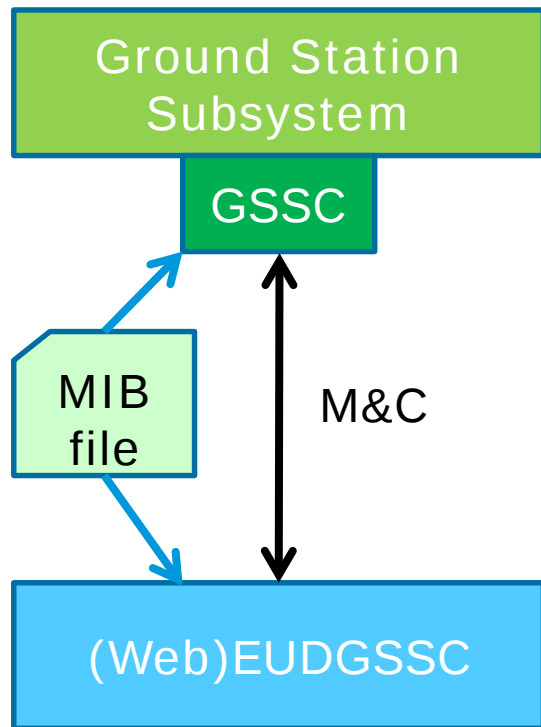
- Single Sourcing with RCP and RAP; typical issues:
 - **multi-user environment:**
 - separation of application and session scope
 - use of session singletons
 - provision of session context to background jobs
 - missing extension points or API
 - RCP/RAP specific plugin fragments
- **~2-3 men month of effort**
- **All displays**, including plots and mimics, are available



WebEUD – Mimics



Web-based Ground Station Subsystem MMI



- ESA Ground Station Subsystems implement a common M&C interface via the Generic Subsystem Controller
- M&C capabilities (and some MMI aspects) are define in a MIB file
- The (Web)EUDGSSC uses the MIB to auto-generate subsystem-specific navigation, parameter and task displays
- New displays can be created by drag&drop
- Mimics can be designed with a Mimic Designer (or can be generated from different sources)
- Additional subsystem-specific displays can be easily implemented

File Workspace Window

MASTER: test2 Control TMTC#1 Rem Session TCS#1 TPS#1

Workspace Cur CLTU Session Cur FSP Session Cur FSP VCs

	VC 1	VC 2	VC 3	VC 4	VC 5	VC 6	VC 7	VC 8	VC 9	VC 10	VC 11	VC 12	VC 13	VC 14	VC 15
Id	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
SegMaxLen	200	200	200	0	0	0	0	0	0	0	0	0	0	0	0
GenSegHeader	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
GenFECF	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
MAPMuxScheme	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo	Fifo
MAPMuxCtrl	0	0	0	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
BitRandomEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BlockingTO	10000	10000	10000	0	0	0	0	0	0	0	0	0	0	0	0
BlockingUsage	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
ADSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
BDSegEnable	Disable	Disable	Disable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable	Enable
FOPSlidingW	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0
TimerInitial	60	60	60	0	0	0	0	0	0	0	0	0	0	0	0
TimeoutType	Alert	suspendAD	suspendAD	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert	Alert
TxLimit	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0

TMTC#1

- TCS SSU
 - Forward Session
 - Cur CLTU Session
 - Cur FSP Session
 - Cur FSP VCs
 - Last Resp/HB header
 - CLTU ACC Response
 - CLTU Rad Response
 - CLCW Src Status
 - Layer Status
 - Throw Events
 - FOP Parameters
 - Manage Fwd Session
 - Save Fwd Session
 - GoNogoForwardSession
 - Delete TCS Archive
 - Check TCS Archive
 - Test PDU
 - TPS SSU
 - Telemetry Sources
 - Uplink Systems
 - Front End Equipment
 - CLCW Source Systems

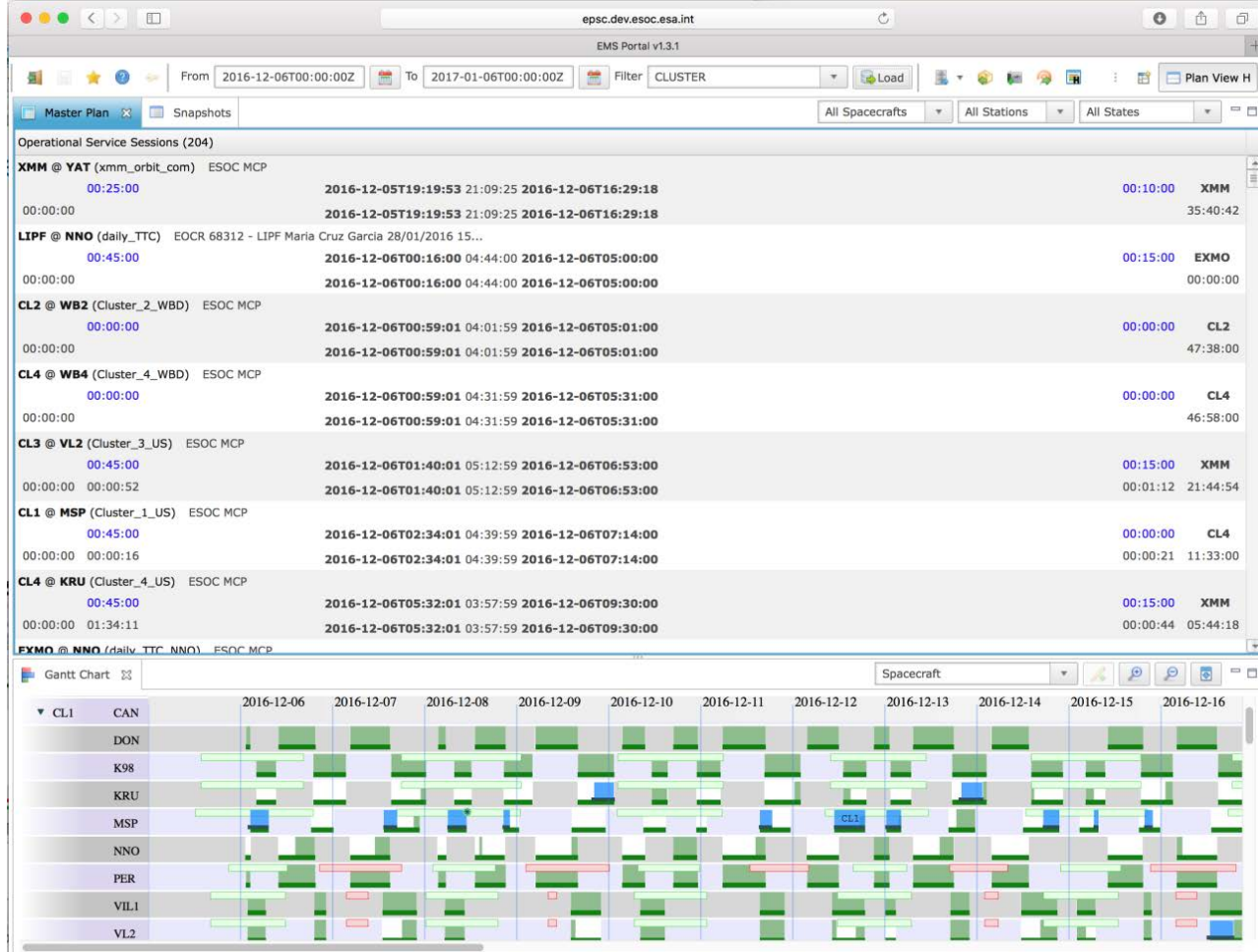
Message Display

Time	Severity	Message
2015.324.08.24.00.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.48.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.36.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.24.000	WARNING	TPS - Unable to connect to NNO_TCDS1
2015.324.08.23.12.000	WARNING	TPS - Unable to connect to NNO_TCDS1

[INFO] Privileges: (EUD)PR CMD received for User: test2 of System: GSSC APPLICATION

test2 TMTC#1 10.33.198.20 13247 2011/2015 0823:59

WebEUDGSSC – SLE Provider



RAP Application: ESTRACK Management System

Conclusion and Outlook

- Web-based MMI allow to solve issues regarding **deployment, update, screen forwarding and user management**
- Web-based MMI can provide a **similar look & feel** as RCP applications
- **Eclipse RAP** allows to create web-based MMI like Rich Clients with very little additional effort

Next Steps:

- Web-based MMI to control CFDP downlink to ground station
- Porting of WebEUD(GSSC) to Eclipse e4 application platform