# QB50


**FP7-284427**

## WP 250: Satellite Control Software

# Deliverable D250.2: SCS description and software

*Update to Year-1 D250.2*

*Issue 1, Revision 1*

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# RECORD OF REVISIONS

| ISS/REV | Date | Modifications | Created/modified by |
|---|---|---|---|
| 1/0 | 02 December 2014 | First issue. First release to QB50 project and REA. Version 2.0 of the software. | S. Billeter |
| 1/1 | 23 March 2015 | Update including the Downlink Forwarder and the Automatic Data Upload to VKI. Version 2.1 of the software. | Y. Voumard |



# TERMS AND ABBREVIATIONS

| | |
|---|---|
| SCS | Satellite Control Software |

# REFERENCES

[R1] "QB50-EPFL-SSC-SCS-ICD-D2501", EPFL report, Mar. 2015.

[R2] "QB50-EPFL-SSC-SCS-UM-D2503", EPFL report, Mar. 2015.

# 1 SCS DESCRIPTION

The Satellite Control Software (SCS) is a part of the overall ground segment. The SCS manages the satellite data on the ground, uplinks commands, download telemetries and science data. It interfaces with the user (CubeSat operations team), and provides decoded satellite data to the radio-amateurs. The SCS is typically located at the CubeSat university (server), although user clients allow control of the satellite from any internet-connected laptop.

The QB50 ground segment architecture is shown in its "SCS-centric way" in Figure 1. Complementary information of the overall ground segment information can be found in [R1]. The Satellite Control System is able to communicate with many different ground stations to control a CubeSat. Figure 1 shows a logical view of the software and in particular, the provided SCS is highlighted.

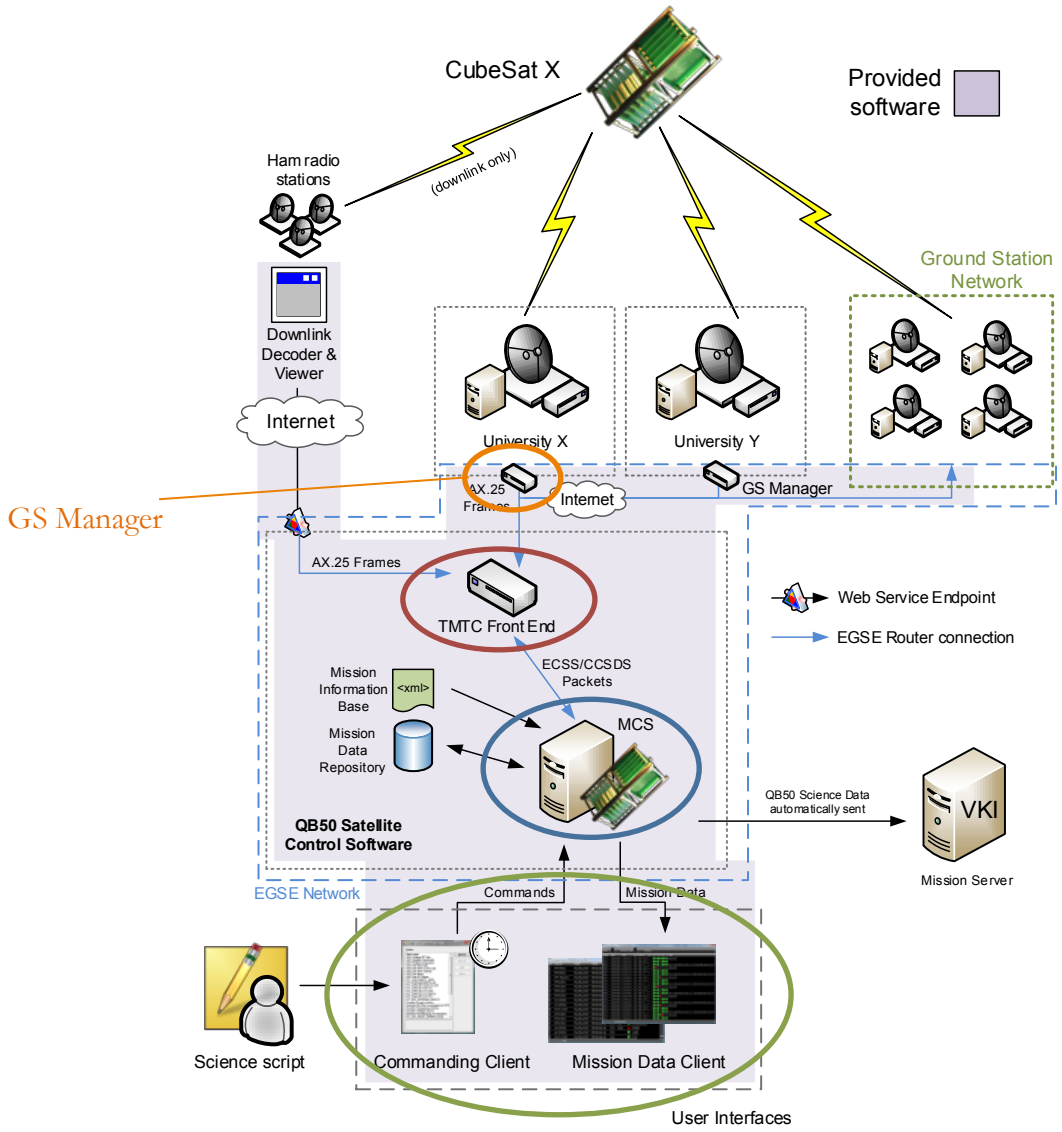
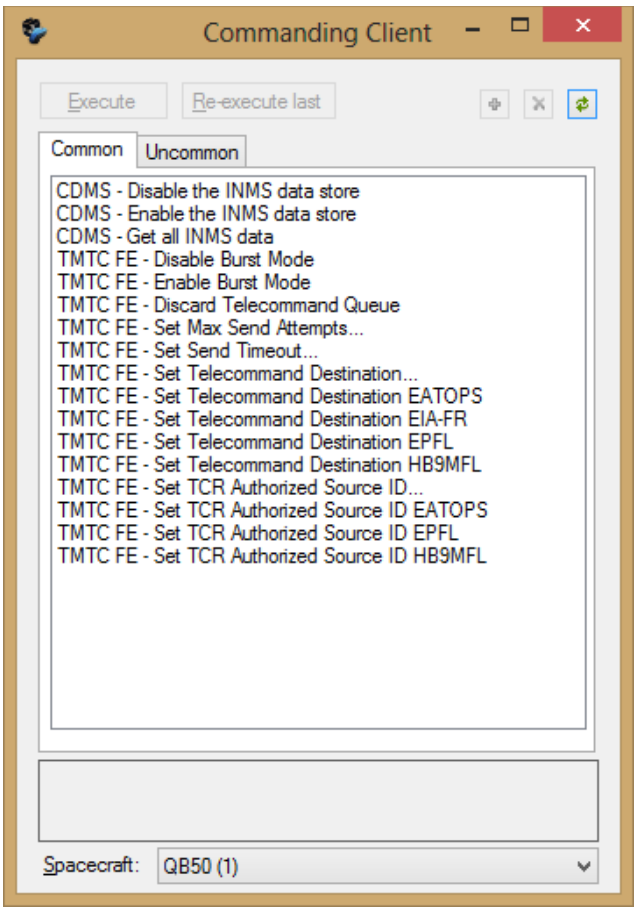


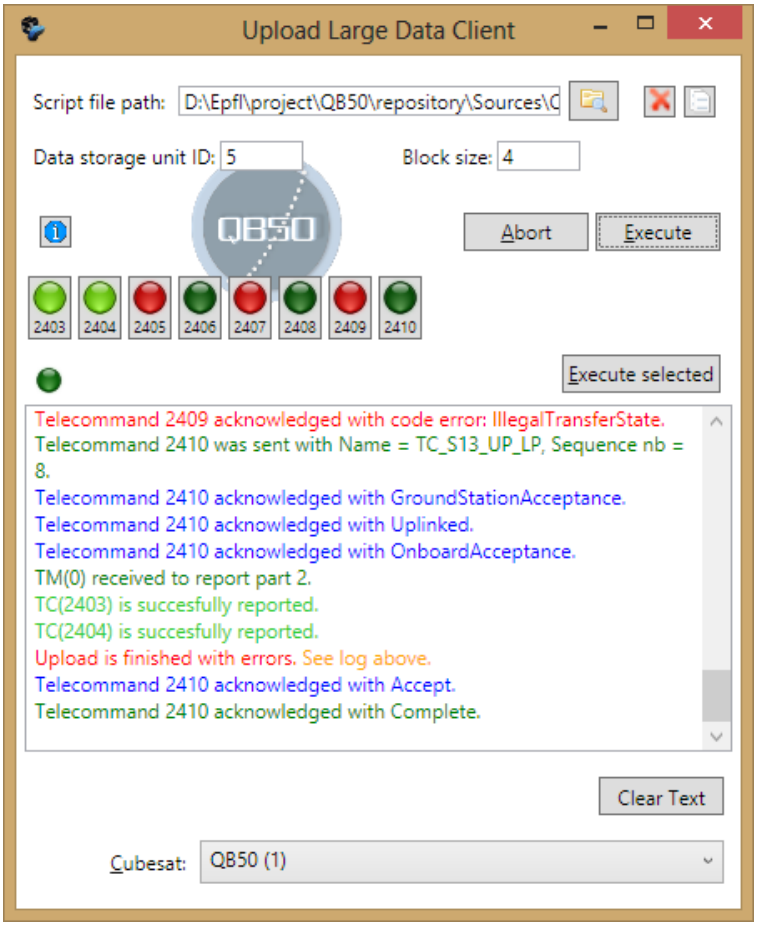

**Figure 1: Overview of Satellite Control System Software.**

# 2 SCREENSHOTS

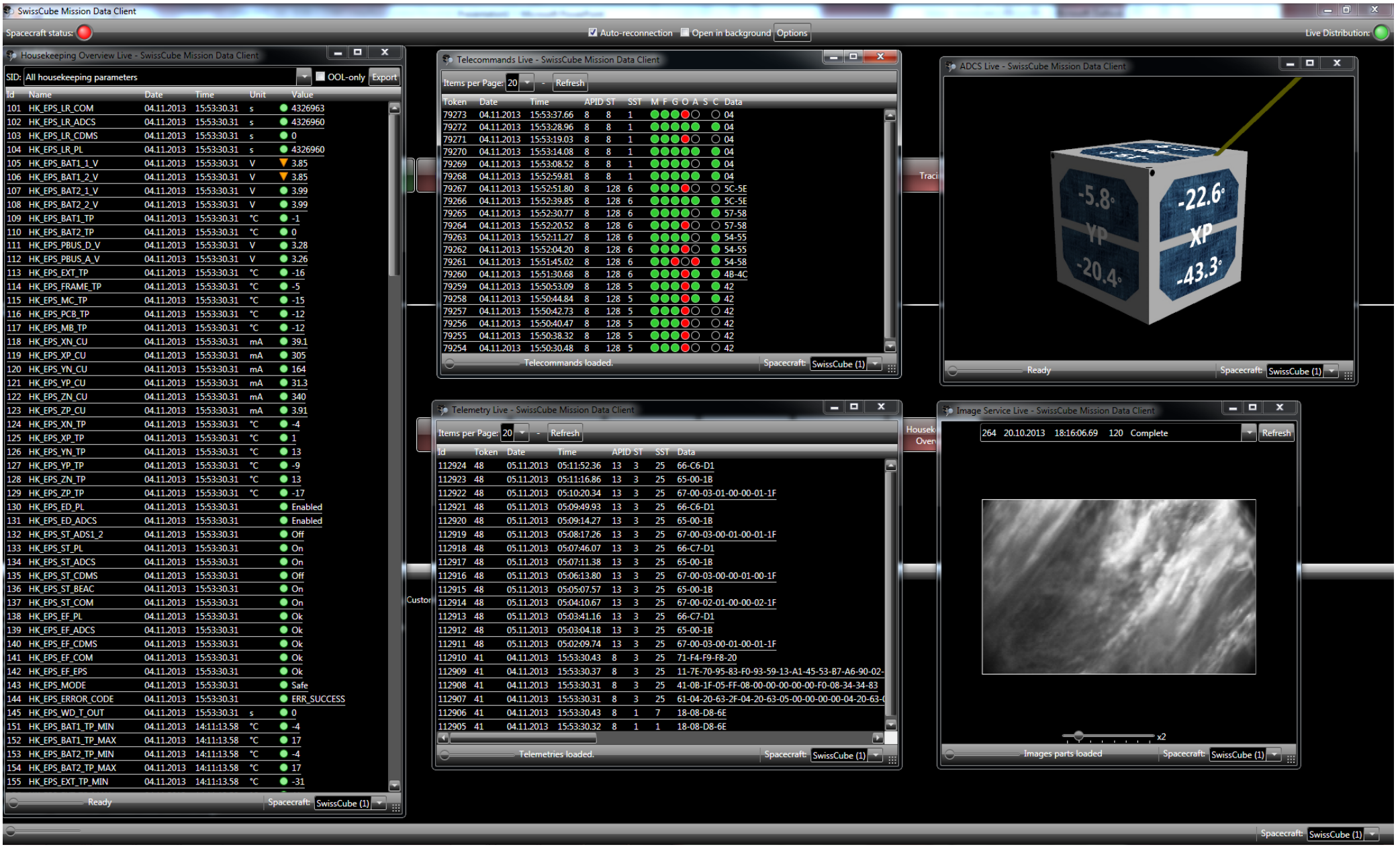
## 2.1 Commanding Client



## 2.2 Upload Data Client




## 2.3 Mission Data Client


SwissCube Mission Data Client
Spacecraft status:
Auto-reconnection
Open in background
Options
Live Distribution:
Housekeeping Overview Live - SwissCube Mission Data Client
SID: All housekeeping parameters
OOL-only
Export
Id Name Date Time Unit Value
101 HK_EPS_LR_COM 04.11.2013 15:53:30.31 s 4326963
102 HK_EPS_LR_ADCS 04.11.2013 15:53:30.31 s 4326960
103 HK_EPS_LR_CDMS 04.11.2013 15:53:30.31 s 0
104 HK_EPS_LR_PL 04.11.2013 15:53:30.31 s 4326960
105 HK_EPS_BAT1_1_V 04.11.2013 15:53:30.31 V 3.85
106 HK_EPS_BAT1_2_V 04.11.2013 15:53:30.31 V 3.85
107 HK_EPS_BAT2_1_V 04.11.2013 15:53:30.31 V 3.99
108 HK_EPS_BAT2_2_V 04.11.2013 15:53:30.31 V 3.99
109 HK_EPS_BAT1_TP 04.11.2013 15:53:30.31 °C -1
110 HK_EPS_BAT2_TP 04.11.2013 15:53:30.31 °C 0
111 HK_EPS_PBUS_D_V 04.11.2013 15:53:30.31 V 3.28
112 HK_EPS_PBUS_A_V 04.11.2013 15:53:30.31 V 3.26
113 HK_EPS_EXT_TP 04.11.2013 15:53:30.31 °C -16
114 HK_EPS_FRAME_TP 04.11.2013 15:53:30.31 °C -5
115 HK_EPS_MC_TP 04.11.2013 15:53:30.31 °C -15
116 HK_EPS_PCB_TP 04.11.2013 15:53:30.31 °C -12
117 HK_EPS_MB_TP 04.11.2013 15:53:30.31 °C -12
118 HK_EPS_XN_CU 04.11.2013 15:53:30.31 mA 39.1
119 HK_EPS_XP_CU 04.11.2013 15:53:30.31 mA 305
120 HK_EPS_YN_CU 04.11.2013 15:53:30.31 mA 164
121 HK_EPS_YP_CU 04.11.2013 15:53:30.31 mA 31.3
122 HK_EPS_ZN_CU 04.11.2013 15:53:30.31 mA 340
123 HK_EPS_ZP_CU 04.11.2013 15:53:30.31 mA 3.91
124 HK_EPS_XN_TP 04.11.2013 15:53:30.31 °C -4
125 HK_EPS_XP_TP 04.11.2013 15:53:30.31 °C 1
126 HK_EPS_YN_TP 04.11.2013 15:53:30.31 °C 13
127 HK_EPS_YP_TP 04.11.2013 15:53:30.31 °C -9
128 HK_EPS_ZN_TP 04.11.2013 15:53:30.31 °C 13
129 HK_EPS_ZP_TP 04.11.2013 15:53:30.31 °C -17
130 HK_EPS_ED_PL 04.11.2013 15:53:30.31 Enabled
131 HK_EPS_ED_ADCS 04.11.2013 15:53:30.31 Enabled
132 HK_EPS_ST_ADS1_2 04.11.2013 15:53:30.31 Off
133 HK_EPS_ST_PL 04.11.2013 15:53:30.31 On
134 HK_EPS_ST_ADCS 04.11.2013 15:53:30.31 On
135 HK_EPS_ST_CDMS 04.11.2013 15:53:30.31 Off
136 HK_EPS_ST_BEAC 04.11.2013 15:53:30.31 On
137 HK_EPS_ST_COM 04.11.2013 15:53:30.31 On
138 HK_EPS_EF_PL 04.11.2013 15:53:30.31 Ok
139 HK_EPS_EF_ADCS 04.11.2013 15:53:30.31 Ok
140 HK_EPS_EF_CDMS 04.11.2013 15:53:30.31 Ok
141 HK_EPS_EF_COM 04.11.2013 15:53:30.31 Ok
142 HK_EPS_EF_EPS 04.11.2013 15:53:30.31 Ok
143 HK_EPS_MODE 04.11.2013 15:53:30.31 Safe
144 HK_EPS_ERROR_CODE 04.11.2013 15:53:30.31 ERR_SUCCESS
145 HK_EPS_WD_T_OUT 04.11.2013 15:53:30.31 s 0
151 HK_EPS_BAT1_TP_MIN 04.11.2013 14:11:13.58 °C -4
152 HK_EPS_BAT1_TP_MAX 04.11.2013 14:11:13.58 °C 17
153 HK_EPS_BAT2_TP_MIN 04.11.2013 14:11:13.58 °C -4
154 HK_EPS_BAT2_TP_MAX 04.11.2013 14:11:13.58 °C 17
155 HK_EPS_EXT_TP_MIN 04.11.2013 14:11:13.58 °C -31
Ready
Spacecraft: SwissCube (1)
Telecommands Live - SwissCube Mission Data Client
Items per Page: 20
Refresh
Token Date Time APID ST SST M F G O A S C Data
79273 04.11.2013 15:53:37.66 8 8 1 04
79272 04.11.2013 15:53:28.96 8 8 1 04
79271 04.11.2013 15:53:19.03 8 8 1 04
79270 04.11.2013 15:53:14.08 8 8 1 04
79269 04.11.2013 15:53:08.52 8 8 1 04
79268 04.11.2013 15:52:59.81 8 8 1 04
79267 04.11.2013 15:52:51.80 8 128 6 5C-5E
79266 04.11.2013 15:52:39.85 8 128 6 5C-5E
79265 04.11.2013 15:52:30.77 8 128 6 57-58
79264 04.11.2013 15:52:20.52 8 128 6 57-58
79263 04.11.2013 15:52:11.27 8 128 6 54-55
79262 04.11.2013 15:52:04.20 8 128 6 54-55
79261 04.11.2013 15:51:45.02 8 128 6 54-58
79260 04.11.2013 15:51:30.68 8 128 6 4B-4C
79259 04.11.2013 15:50:53.09 8 128 5 42
79258 04.11.2013 15:50:44.84 8 128 5 42
79257 04.11.2013 15:50:42.73 8 128 5 42
79256 04.11.2013 15:50:40.47 8 128 5 42
79255 04.11.2013 15:50:38.32 8 128 5 42
79254 04.11.2013 15:50:30.48 8 128 5 42
Telecommands loaded.
Spacecraft: SwissCube (1)
ADCS Live - SwissCube Mission Data Client
-5.8°
YP
-20.4°
-22.6°
XP
-43.3°
Ready
Spacecraft: SwissCube (1)
Telemetry Live - SwissCube Mission Data Client
Items per Page: 20
Refresh
Id Token Date Time APID ST SST Data
112924 48 05.11.2013 05:11:52.36 13 3 25 66-C6-D1
112923 48 05.11.2013 05:11:16.86 13 3 25 65-00-1B
112922 48 05.11.2013 05:10:20.34 13 3 25 67-00-03-01-00-00-01-1F
112921 48 05.11.2013 05:09:49.93 13 3 25 66-C6-D1
112920 48 05.11.2013 05:09:14.27 13 3 25 65-00-1B
112919 48 05.11.2013 05:08:17.26 13 3 25 67-00-03-00-01-00-01-1F
112918 48 05.11.2013 05:07:46.07 13 3 25 66-C7-D1
112917 48 05.11.2013 05:07:11.38 13 3 25 65-00-1B
112916 48 05.11.2013 05:06:13.80 13 3 25 67-00-03-00-00-01-00-1F
112915 48 05.11.2013 05:05:07.57 13 3 25 65-00-1B
112914 48 05.11.2013 05:04:10.67 13 3 25 67-00-02-01-00-00-02-1F
112913 48 05.11.2013 05:03:41.16 13 3 25 66-C7-D1
112912 48 05.11.2013 05:03:04.18 13 3 25 65-00-1B
112911 48 05.11.2013 05:02:09.74 13 3 25 67-00-03-00-01-00-01-1F
112910 41 04.11.2013 15:53:30.43 8 3 25 71-F4-F9-F8-20
112909 41 04.11.2013 15:53:30.37 8 3 25 11-7E-70-95-83-F0-93-59-13-A1-45-53-B7-A6-90-02-
112908 41 04.11.2013 15:53:30.31 8 3 25 41-0B-1F-05-FF-08-00-00-00-00-00-F0-08-34-34-83
112907 41 04.11.2013 15:53:30.31 8 3 25 61-04-20-63-2F-04-20-63-05-00-00-00-00-04-20-63-
112906 41 04.11.2013 15:53:30.43 8 1 7 18-08-D8-6E
112905 41 04.11.2013 15:53:30.32 8 1 1 18-08-D8-6E
Telemetries loaded.
Spacecraft: SwissCube (1)
Image Service Live - SwissCube Mission Data Client
264 20.10.2013 18:16:06.69 120 Complete
Refresh
x2
Images parts loaded
Spacecraft: SwissCube (1)
Spacecraft: SwissCube (1)