

TITLE OF GROUP: **Spacecraft Monitoring & Control Working Group**

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A. RATIONALE:

The ability to standardize the interfaces for spacecraft monitoring and control (SM&C) will allow significant saving in the development of the flight components and the ground segment of future space missions. In fact, it will be possible to use standardized SM&C infrastructure systems, to seamlessly transfer data across systems, and to adopt commercial-off-the-shelf applications for monitoring and control. The high level goal of this standardization effort is to make economies by:

- a) allowing interoperability with partner system and infrastructure.
- b) reducing the risk of space missions by re-using systems and operational concepts, thus increasing their reliability.
- c) facilitating the development of generic (infrastructure) on-board and on ground software that can be shared by multiple projects via simple re-configuration
- d) applying the SM&C approach and systems throughout all mission phases and to other M&C domains (e.g., ground stations, control centers, test facilities, etc.)

The scope of SM&C includes:

- 1 **Operational concept:** definition of an operational concept that covers a set of standard operations activities related to the monitoring and control of both ground and space segments.
- 2 **Core Set of Services:** definition of an extensible set of services to support the operational concept together with its information model and behaviours. This includes (non exhaustively) ground systems such as Automatic Command and Control, Data Archiving and Retrieval, Flight Dynamics, Mission Planning, Automation, and Performance Evaluation.
- 3 **Application-layer information:** definition of the standard information set to be exchanged for SM&C purposes.

B. GOALS AND DELIVERABLES:

The goal of the working group is

GOAL 1: to pave the way for the technical work that will be performed in the context of spacecraft monitoring and control. This will be done by defining the technology-independent framework to be used in future

work. It is noted that this activity involves also the space segment and therefore requires close coordination with the SOIS. This will be done by initially producing a white book and to bring it to Green status.

- GOAL 2: to specify and produce the corresponding Reed Books for the following initial set of services:
- SM&C Protocol
 - SM&C Common Services
 - SM&C Core Services
- GOAL 3: to update the XTCE standard with the result of the public review together with the OMG
- GOAL 4: to specify the other high level services identified in the Green Book

C. SCHEDULE:

GOAL 1 (GB)

Date	Milestone
5 Nov 03	Telecon#03: status report
3 Dec 03	Telecon#04: status report
5 Jan 04	White Book – draft 0.1
28 Jan 04	Telecon#05: Review
18 Feb 04	White Book – draft 0.2
3 Mar 04	Telecon#06: status report
28 May 04	White Book – draft 0.5
4 Jun 04	Telecon: agreement on WB draft 0.5
26 Aug 04	Deadline for comments to WB after 3-month informal agency review
2 Sep 04	Telecon: agreement on comment disposition
23 Sep 04	Submission of WB to CCSDS as proposed GB
4 April 05	Updated GB (integrating changes from CCSDS review) available
15 April 05	Submission of GB to CCSDS for approval

GOAL 2 (High Priority (HP) RBs)

Date	Milestone
14 Jul 04	Delivery of concept paper
21 Jul 04	Telecon#11: agreement on concept paper
15 Oct 04	Delivery of Common SM&C Protocol Service Draft 0.1 and the Core SM&C Application Services Draft 0.1
27 Oct 04	Telecon#13: Discussion 2 RBs draft 0.1
14 Jan 05	Delivery of SM&C Protocol Draft 0.2 and the Core SM&C Application Services Draft 0.2 and SM&C Common Services draft 0.1
26 Jan 05	Telecon#14: discussion on 3 RBs drafts 0.2
16 Mar 05	Telecon#15: discussion on general status
4 Apr 05	New drafts of the RBs as follows: <ul style="list-style-type: none"> • SM&C Protocol: update with received comments • SM&C Common Services: update with received comments and expand the service specification • SM&C Core Services: update with received comments and expand the service the information model.
31 May 05	Prototype Concept Paper available
6 Jun 05	Availability of TN on feasibility of AMS for SM&C
15 Jun 05	Telecon#16: discussion on 5 RBs + prototype approach + AMS
11 Jul 05	Intermediate version of 3 RBs.
20 Jul 05	Telecon#17: discussion on 3 RBs
31 Aug 05	Consolidated version of 3 RBs.
01 Oct 05	Start prototype work (estimated duration 6m)
01 Jan 06	Start of public review of 3 RBs
Spring WS 2006	Availability of the 3 BBs and Prototypes

GOAL 3 (XTCE Review)

15 Feb 05	Submission of XTCE review datapackage to CCSDS Secretariat for initiation of the Public Review
11-15 Apr 05	Disposition of XTCE RIDs
30 Aug 05	Availability of new draft issue of XTCE (only specifications, no green book) incorporating agreed RIDs
01 Sep 05-31 Oct 05	CCSDS Agency review
30 Apr 06	Approved XTCE by OMG

GOAL 4 (Other SM&C Services)

4 Apr 05	New drafts of the RBs as follows: <ul style="list-style-type: none"> • SM&C Time Service • SM&C Remote Software Management Service
1 Sep 05	Availability of revised versions of <ul style="list-style-type: none"> • SM&C Time Service • SM&C Remote Software Management Service • SM&C Automation Service (NEW)
Spring 2006	Availability of the consolidated RBs for <ul style="list-style-type: none"> • SM&C Time Service • SM&C Remote Software Management Service • SM&C Automation Service
Fall WS 2006	Availability of the BBs for <ul style="list-style-type: none"> • SM&C Time Service • SM&C Remote Software Management Service • SM&C Automation Service

D. RISK MANAGEMENT STRATEGY:

D1 Technical risks:

- None.

D2 Management risks:

- Risk 1: Unavailability of resources to finalise started work and the relative prototypes
- Mitigation: Reduce individual agencies costs by distributing work across several agencies participating to the WG. Bring issue to CMC so as to raise awareness of contributing agencies. In the worst case, descope the work.

E. RESOURCE REQUIREMENTS:

Under separate attachment.