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TITLE OF GROUP:	**Spacecraft Monitoring & Control Working Group**
CHAIR:	Mario Merri
Date:	12 October 2005
AREA DIRECTOR:	Nestor Peccia
MAILING LIST:	**moims-sc@mailman.ccsds.org**

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 SM&C GB 1.0 to CCSDS for approval
May 05	Published GB issue 1.0
03 Oct 05	Internal responses to NASA issues on GB available
12 Oct 05	Telecon#18: Internal discussion on responses to NASA issues on GB
24 Oct 05	Agreed responses to NASA issues back to CESB with proposed GB ToC
28 Nov 05	GB draft 1.1 available
12 Dec 05	Comments due to GB draft 1.1
20 Dec 05	Telecon#23: agreement on new SM&C GB and disposition of RIDs from 1st Internal Agency Review of the 3 HP RBs
30 Jan 06	Submission of GB 2.0 to CCSDS for approval

GOAL 2a (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 3 HP RBs draft 0.1
27 Oct 04	Telecon#13: Discussion 2 HP RBs draft 0.1
14 Jan 05	Delivery of 3 HP RBs draft 0.2
26 Jan 05	Telecon#14: discussion on 3 HP RBs drafts 0.2
16 Mar 05	Telecon#15: discussion on general status

4 Apr 05	Delivery of 3 HP RBs draft 0.3
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
20 Jul 05	Telecon#17: discussion on 3 HP RBs
31 Aug 05	Delivery of 3 HP RBs draft 0.4
30 Nov 05	End of 1st internal Agency review of 3 HP RBs draft 0.4
31 May 06	Delivery of 3 HP RBs draft 0.5 (1st review + prototype feedback)
30 Jun 06	End of 2nd internal Agency review of 3 HP RBs draft 0.5
Fall WS 06	Start of public review of 3 RBs

GOAL 2b (Prototype)

Date	Milestone
31 May 05	Prototype Concept Paper available
31 Oct 05	Delivery of prototype SoW draft 0.1 (MM)
1 Dec 05	Start prototype work (estimated duration 6m)
1 Jun 06	Some co-working component of prototype available

GOAL 3 (XTCE Review)

Date	Milestone
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
12 Oct 05	JMu to draft and distribute XTCE MB ToC with highlights of the content of each chapter
14 Oct 05	CF+KR draft and distribute XTCE GB ToC with highlights of the content of each chapter
19 Oct 05	Telecon#19 to discuss comments and Kick off work (5pm CET)
01 Nov 05	Deadline for submission of OMG issues towards XTCE 1.1 draft
02 Nov 05	CF+KR+JMu+JMo distribute XTCE GB draft 0.1
08 Nov 05	Telecon#20 to discuss XTCE GB draft 0.1 (5pm CET)
16 Nov 05	JMu+JMo distribute XTCE GB draft 0.2
22 Nov 05	Telecon#21 to discuss XTCE GB draft 0.2 (5pm CET)
30 Nov 05	JMu+JMo distribute XTCE GB issue 1.0
01 Dec 05	Delivery of XTCE 1.1 draft (CCSDS RIDs + all OMG issues up to 1st Nov)
01 Dec 05	Start of 2nd CCSDS Agency review (end 28 Feb 06)
12 Dec 05	CF+KR+JMu+JMo distribute XTCE MB draft 0.1
14 Dec 05	Telecon#22 to discuss XTCE MB draft 0.1 (5pm CET)
16 Jan 06	CF+KR+JMu+JMo distribute XTCE MB draft 0.2
19 Jan 06	Telecon#24 to discuss XTCE MB draft 0.2 (5pm CET)
15 Feb 06	CF+KR+JMu+JMo distribute XTCE MB issue 1.0
28 Feb 06	End of 2nd CCSDS Agency review (start 01 Dec 05)
30 Apr 06	Delivery of XTCE 1.1 final (BB)

GOAL 4 (Other SM&C Services)

Date	Milestone
4 Apr 05	New drafts of the RBs as follows: • SM&C Time Service • SM&C Remote Software Management Service
1 Sep 05	Availability of revised versions of • SM&C Time Service • SM&C Remote Software Management Service • SM&C Automation Service (NEW)

Spring 2006	Availability of the consolidated RBs for • SM&C Time Service • SM&C Remote Software Management Service • SM&C Automation Service
Fall WS 2006	Availability of the BBs for • 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.