Exploration Medical System Demonstration (EMSD) Project

HRP Investigator Workshop

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Team Members

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Slide 2

W1   In some cases you have noted "MD" and in others not -
Wyleuser, 1/10/2012

Outline

o **EMSD Project**

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EMSD Background

o The Exploration Medical System Demonstration (EMSD) is a project under the Exploration Medical Capability (ExMC) element managed by the Human Research Program (HRP).

o The vision for the EMSD is to utilize ISS as a test bed to show that several medical technologies needed for an exploration mission and medical informatics tools for managing evidence and decision making can be integrated into a single system and used by the on-orbit crew in an efficient and meaningful manner.

EMSD Needs

o   Exploration mission medical care challenges include resource and resupply constraints limiting the extent to which medical conditions can be treated, the inability for crew to evacuate to Earth during many mission phases, and rendering of medical care by a non-clinician crew member.

o   The EMSD is being developed to assist the Crew Medical Officers (CMO) in optimizing medical care delivery in this setting.

o   The EMSD will integrate medical technologies and medical informatics tools for managing evidence and decision making.

EMSD Goals

o   The goal of the on-orbit demonstration is to show the ability to gather medical data, present it to the crew medical officer, and provide an improved health care delivery capability utilizing the ISS as a test bed.

o   The ground demonstration will characterize integrated informatics system capabilities as well as aid in the certification of the system prior to flight.

EMSD Objectives

o   Reduce and even possibly eliminate the time required for on-orbit crew and ground personnel (which include Surgeon, Biomedical Engineer (BME) Flight Controller, and Medical Operations Data Specialist) to access and move medical data from one application to another.

o   Demonstrate that the on-orbit crew has the ability to access medical data/information using an intuitive and crew-friendly software solution to assist/aid in the treatment of a medical condition

o   Develop a common data management framework and architecture that can be ubiquitously used to automate repetitive data collection, management, and communications tasks for all crew health and life sciences activities

EMSD Objectives (cont'd)

o Develop a common data management framework and architecture that allows for scalability, extensibility, and interoperability of data sources and data users.

o Lower total cost of ownership for development and sustainment of peripheral hardware and software that use EMSD for data management.

o Provide better crew health outcome via reduction in crew errors, crew time, and ground time.
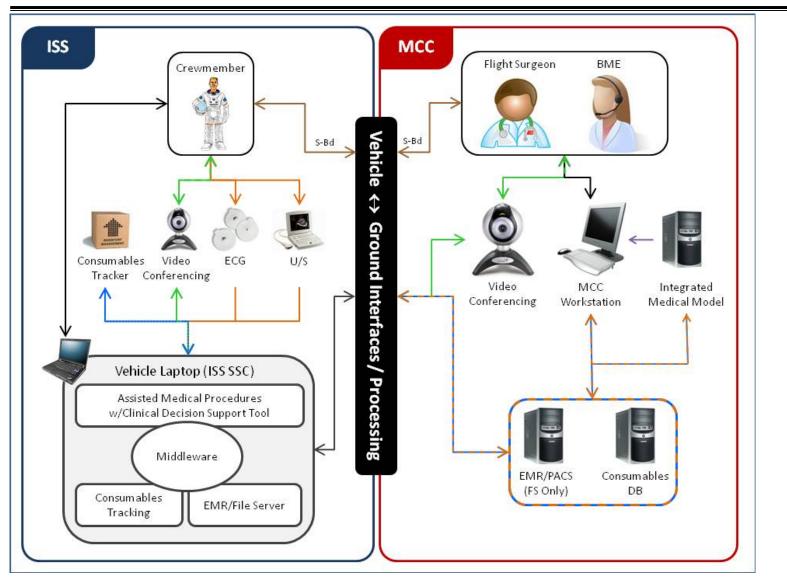
Overview of Operational Concept

o   The Operational Concept presents an end-to-end EMSD for an exploration class mission to a NEA. The Operational Concept includes the strategies and capabilities needed for the EMSD:

- Middleware
- Consumables Tracking
- Electronic Medical Records
- Assisted Medical Procedures w/Clinical Decision Support
- Dry Electrodes
- Flexible Ultrasound
- Video Conferencing

o   The diagram on the following slide illustrates the interactions between crewmembers, medical system components, ground based medical systems, and on-orbit data repositories. System interactions include crew physical and graphic user interfaces, peripheral component interactions, and vehicle-to-ground data linkages.
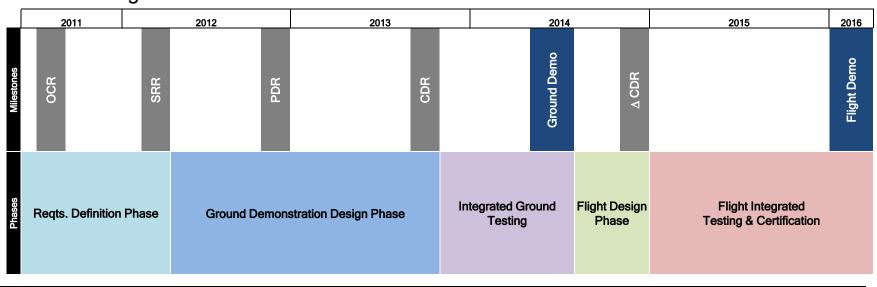
EMSD Functional Diagram

EMSD Status

o   The operational concept review (OCR) was held Sept 2011. Stakeholders participating in the review included the ExMC element, ExMC Advisory Group Members, Flight Surgeons, NASA Engineering, NASA Safety, and the NSBRI. The EMSD Operational Concept was baselined on Oct 7th.

o   Planning and coordination of System Requirements Review (SRR) and products are in work.

- System Requirements Document

- Project Management Plan

- Software Development Plan

EMSD Project Schedule

o **Project Schedule**

- Ops Con Review (OCR) in 10/7/2011

- System Requirements Review (SRR) in 3/6/2012

- Preliminary Design Review 1&2 in 12/30/2012

- Critical Design Review (CDR) in 9/30/2013

- Ground Demonstration in 6/30/2014

- Delta CDR after Ground Demonstration in 12/30/2014
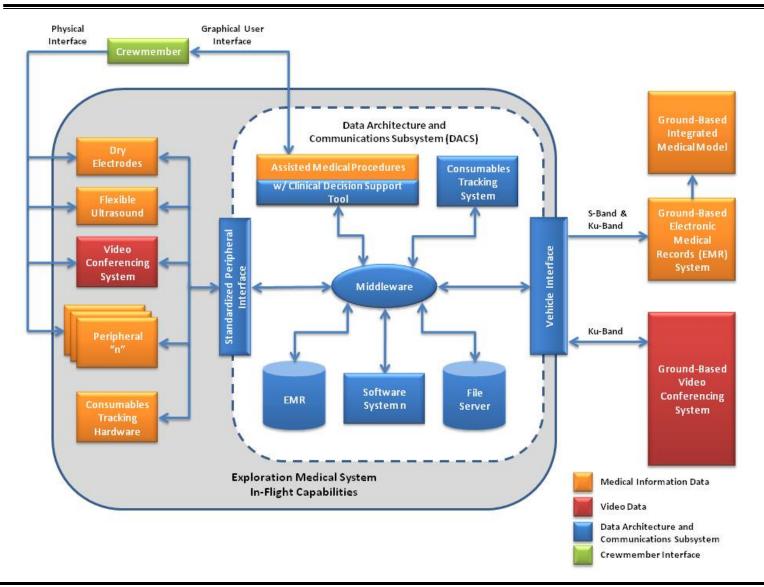
- Flight demo in 9/30/2016

Any Questions?

Backup Slides

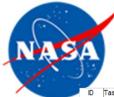# Functional Diagram

EMSD MS Project Schedule

ID	Task Name	Duration	Start	Finish	% Complete
1	Exploration Medical System Demonstration	1360 days?	Mon 7/18/11	Fri 9/30/16	25%
2	EMSD Operatioanl Concept Document Development	39 days?	Mon 7/18/11	Thu 9/8/11	100%
3	EMSD Operation Concept Review (OCR)	21 days	Thu 9/8/11	Fri 10/7/11	100%
4	EMSD OCR - Kickoff	0 days	Thu 9/8/11	Thu 9/8/11	100%
5	EMSD OCR - Comments Due from Reviewers	0 days	Fri 9/16/11	Fri 9/16/11	100%
6	EMSD OCR - Disposition of Comments	0 days	Fri 9/30/11	Fri 9/30/11	100%
7	EMSD OCR - ExMC Element Management Baseline	0 days	Fri 10/7/11	Fri 10/7/11	100%
8	EMSD SRR Document Development	112 days?	Mon 10/3/11	Tue 3/6/12	0%
9	IMM TIM	0 days	Tue 11/1/11	Tue 11/1/11	100%
10	EMSD System Requirements Review (SRR includes AMP, EMR and Middleware) - ExMC Element SRR Phase 1	26 days	Tue 3/6/12	Tue 4/10/12	0%
11	EMSD SRR - RID Tool Open	0 days	Tue 3/6/12	Tue 3/6/12	0%
12	EMSD SRR - RIDS Due from Reviewers	16 days	Tue 3/6/12	Tue 3/27/12	0%
13	EMSD SRR - Disposition of RIDS	26 days	Tue 3/6/12	Tue 4/10/12	0%
14	EMSD SRR - Board	0 days	Tue 4/10/12	Tue 4/10/12	0%
15	Assisted Medical Procedures (AMP) w/Clinical Design Tool Operational Concept Update and Requirements Development	154 days?	Fri 11/11/11	Wed 6/13/12	36%
16	AMP Ops Con Update	36 days?	Fri 11/11/11	Fri 12/30/11	100%
17	AMP Ops Con - ExMC AG	1 day	Tue 1/17/12	Tue 1/17/12	100%
18	AMP Requirements Document Update	34 days	Wed 1/18/12	Mon 3/5/12	0%
19	AMP Market Survey	30 days	Wed 5/2/12	Tue 6/12/12	0%
20	AMP Downselect	1 day	Wed 6/13/12	Wed 6/13/12	0%
21	EMR Operational Concept and Requirements Development	126 days?	Wed 12/21/11	Wed 6/13/12	0%
22	EMR TIM to Define Ops Con	0 days	Wed 12/21/11	Wed 12/21/11	100%
23	EMR Ops Con Baseline - ExMC AG	0 days	Mon 2/6/12	Mon 2/6/12	0%
24	EMR Requirements Document Development	22 days	Mon 2/6/12	Tue 3/6/12	0%
25	EMR Market Survey	30 days?	Wed 5/2/12	Tue 6/12/12	0%
26	EMR Downselect	1 day?	Wed 6/13/12	Wed 6/13/12	0%
27	Advanced Dental Kit Operational Concept and Requirements Development	252 days?	Tue 11/15/11	Wed 10/31/12	38%
28	Space Flight Dental Event Summary Report	24 days?	Tue 11/15/11	Fri 12/16/11	100%
29	Dental Ops Con Draft	44 days?	Tue 11/29/11	Fri 1/27/12	100%
30	Dental Working Group	0 days	Fri 3/23/12	Fri 3/23/12	0%
31	Dental Ops Con Baseline - ExMC AG	0 days	Fri 4/6/12	Fri 4/6/12	0%
32	Dental Requirements Document Development	81 days?	Mon 4/9/12	Mon 7/30/12	0%
33	Video Conferencing Technology Market Survey	30 days?	Wed 9/19/12	Tue 10/30/12	0%
34	Video Conferencing Downselect	1 day?	Wed 10/31/12	Wed 10/31/12	0%
35	EMSD Hardware/Software Solicitation and Procurement (Middleware, AMP, & EMR)	46 days?	Wed 4/11/12	Wed 6/13/12	0%
36	EMSD Draft RFP	16 days?	Wed 4/11/12	Wed 5/2/12	0%
37	EMSD RFP Solicitation Process	30 days?	Wed 5/2/12	Tue 6/12/12	0%
38	EMSD RFP Solicitation Response	0 days	Tue 6/12/12	Tue 6/12/12	0%
39	EMSD Procurement Downselect	1 day?	Wed 6/13/12	Wed 6/13/12	0%
40	EMSD Preliminary Design Review (PDR)	1 day?	Mon 12/31/12	Mon 12/31/12	0%
41	EMSD Critical Design Review (CDR)	1 day?	Mon 9/30/13	Mon 9/30/13	0%