NASA Advisory Council Presentation
Status of Exploration Systems Development

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for Exploration Systems Development
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## ESD Summary Schedule

### Version: 2013-10-31

| Element          | FY11 Q1 | FY12 Q1 | FY12 Q2 | FY12 Q3 | FY12 Q4 | FY13 Q1 | FY13 Q2 | FY13 Q3 | FY13 Q4 | FY14 Q1 | FY14 Q2 | FY14 Q3 | FY14 Q4 | FY15 Q1 | FY15 Q2 | FY15 Q3 | FY15 Q4 | FY16 Q1 | FY16 Q2 | FY16 Q3 | FY16 Q4 | FY17 Q1 | FY17 Q2 | FY17 Q3 | FY17 Q4 | FY18 Q1 | FY18 Q2 |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| **HEO / ESD**    |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| **SLS**          |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| **Booster**      |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| **Core Stage**   |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| **ICPS**         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| **Orion**        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| **Flight Article** |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| **GSDO**         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |

### Milestones to Sync
- Design
- Build

### Progress to date
- Milestones are "complete" milestones unless noted

For comments contact david.l.webster@nasa.gov
Orion EFT-1 Accomplishments
Crew Module Propulsion and ECLSS System Assembly
Orion Fully Powered at KSC
Orion EFT-1 Accomplishments
Heat Shield Developmental Flight Instrumentation Installation
ORION EFT-1 ACCOMPLISHMENTS
Thermal Protection System Tile and Backshell Status

- A 100%
- B 100%
- C 100%
- D 100%
- E 100%
- F 64%
- G 100%
- H 100%
- I 100%

- Total Backshell 96%

- Complete:
  - A
  - B
  - C
  - D
  - E
  - F
  - G
  - H
  - I

- Dates:
  - A 11/19/13
  - B 11/19/13
  - C 11/19/13
  - D 11/2/13
  - E 11/2/13
  - F 11/21/13
  - G 1/10/14
  - H 12/2/13
  - I
Paint in Process

- Primer/Pore Sealer Application
- Pore Sealer Sanding
- Paint Applied
- Loading into the Super Guppy
Arrival at Kennedy Space Center
EFT-1 Service Module
Nozzle Ablative Insulation Fit Checks on Flight Nozzles at Stennis Space Center
Core Stage Flight Computers Installed and Almost Ready for Testing
Completed Painting of the Crew Vehicle Stage Adapter

VAC Foundation – Overall View
Self Propelled Modular Transporter to Support Manufacturing and Assembly of the Core Stage
Drawings for 70% of the mass of Core Stage has been released
Weld Tools Operational

- Segmented Ring Tool (Rings)
- Vertical Weld Center (Barrels)
- Enhanced Robotic Weld Tool (Domes)
First Dome Welded at MAF
GSDO Accomplishments
Vehicle Integration & Launch (VIL)

CT-1 rolled out of HB 3 and in CT yard for testing

Removal of items in AB compartments of ML Base

Roller Assembly Installation Work

Flame Trench/Flame Deflector Demolition
Building to Exploration Flight Test-1

**ACCOMPLISHMENTS**

- 06/2012  Crew module to KSC
- 07/2012  Cryogenic propulsion stage processing
- 02/2013  Heat shield structure completed
- 10/2011 - 7/2013 Nine successful parachute tests
- 08/2013  Stationary recovery test at Norfolk
- 09/2013  Avcoat application completed, testing begins
- 11/2013  Successful fairing separation test
- 11/2013  Heat shield shipment to KSC
- 11/2013  Orion power-on at KSC

**WHAT'S NEXT**

- January 2014  EFT-1 crew module/service module mate, KSC
- March 2014  Flight test article ready
- May 2014  Flight vehicle ready for ground ops
- July 2014  Vehicle on stand, KSC
- Fall 2014  EFT-1 launch, KSC
Asteroid Redirect Crewed Mission Overview

- Deliver crew on SLS and Orion
- Attach Orion to robotic spacecraft
- Perform extra-vehicular activity (EVA) to retrieve asteroid samples
- Return crew safely to Earth with asteroid samples in the Orion
Summary

• NASA continues to make great progress with SLS, Orion and GSDo
  – SLS preparing for final KDP-C approval Jan 2014
  – GSDo preparing for PDR early 2014
  – Orion on track for EFT-1 in September, 2014

• SLS, Orion, and GSDo programs remain on track for the first integrated test flight, Exploration Mission-1.