
**Options and Decisions on Human
Exploration Discussion
August 5, 2009**

***Review of US Human Space
Flight Plans Committee***

Topics for Discussion

- 1. Review and discuss potential decisions on human exploration**
- 2. Deliberate on options for going forward**
- 3. Agree to process for forward planning**

Decisions (1 of 3)

1. What is the phase out plan of the Shuttle?

- Fly out remainder of flights safely (Currently part of policy, but FY 11 funding not part of President's budget)
- Extend Shuttle at 1-2 flights per year through 2015 (Only in conjunction with extended ISS, SDV derived heavy lifter and commercial crew)

2. What is the future of the ISS?

- End US participation in ISS at the end of 2015
- Continue US participation, through at least 2020 (Possible to use at minimal capability, or at enhanced level of US utilization)

3. What is the largest lift capability to LEO needed?

- 25 mt
- 75 mt
- 125 mt

Decisions (2 of 3)

4. **Should the government developed launch system be based on NASA/Shuttle heritage or an EELV based systems?**
 - NASA/Shuttle heritage
 - EELV

5. **How should crew be carried to LEO (ISS in particular)?**
 - US government provided systems
 - Commercial/international
 - Commercial/international with US system backup

6. **What should be the plan for in-space depoting/refueling?**
 - Consider it enabling and require
 - Consider it enhancing and develop

Decisions (3 of 3)

7. **What is the first destination for exploration beyond LEO?**
 - Moon with surface exploration
 - Deep space with no surface exploration immediately
 - Mars first , with surface exploration

8. **What is the role for commercial entities in exploration?**
 - Stimulate by architectures which encourage greater commercial involvement and provide on-ramps for e.g. cargo, fuel, crew to LEO, beyond LEO systems
 - Current strategy of commercial cargo to LEO, but otherwise normal acquisition process

864 total possible options for consideration

Integrated Options for Reference, but not Consideration Going Forward

Main Option	Budget 10-20	Shuttle Retirement	ISS Life	Crew to LEO	Heavy Lift	Refueling Option	First >LEO Destination	Commercial Engagement
Program of Record Based on PMR 09	> FY10 Budget	2010	2015	Ares I	Ares V	no	Lunar sortie/outpost	COTS cargo
Our Assessment of PMR 09	> FY10 Budget	2011	2015	Ares I	Ares V	no	Lunar sortie/outpost	COTS cargo
Increased confidence	> FY10 Budget	2010	2015	Ares I	Ares V	no	Lunar sortie/outpost	COTS cargo
Original 2005 plan	>> FY10 Budget	2010	2015	CLV	CaLV	no	Lunar surface	none

Integrated Options for Consideration Going Forward

Main Option	Budget	Shuttle	ISS	Crew to	Heavy	Refueling	First >LEO	Commercial
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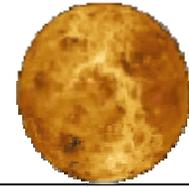
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Other Considerations

- I. **What should be the role of international participation?**
- II. **Role of robotics?**
- III. **Technology development?**
- IV. **Role of NASA and its Institutions?**

Questions for Discussion

- **Does this array reasonably capture the reports of the sub-groups presented last week at our public meetings?**
- **Are the options presented reasonable and consistent?**
- **Are there options that should be added based on new considerations or evidence?**
- **Are there any options that could be deleted based on discussion today?**

Work Going Forward

- **Development of budget and schedule that matches the content and assumptions for each integrated options**
 - **Constrained to the FY 10 budget guidance for some, with schedule as the free variable**
 - **Not constrained to the FY 10 budget for most (additional resources may arrive due to commercial investment and international participation)**
- **Evaluate based on the valuation criteria presented and approved by the Committee at the meeting last Thursday**
- **Present costed and evaluated options for deliberation by the Committee next week**