COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

Recent Developments in NASA's Commercial Crew Acquisition Strategy

Friday, September 14, 2012
9:30 a.m. – 11:30 p.m.
2318 Rayburn House Office Building

Purpose

NASA recently awarded more than $1.1 Billion to three companies to develop competing concepts for human space transportation launch systems. This hearing will review NASA's rationale for selecting the three companies; consider the cost and safety implications of these recent decisions; and given the unique nature of Space Act Agreements, examine the level of NASA's insight and thus, its ability to evaluate technical and safety requirements.

Witnesses

Mr. William H. Gerstenmaier, Associate Administrator, Human Exploration and Operations Mission Directorate, National Aeronautics and Space Administration

VADM Joseph W. Dyer, USN (Ret.), Chairman, Aerospace Safety Advisory Panel

Introduction

NASA's commercial crew program is funding the development of multiple competing concepts for human spaceflight vehicles. With this program the government is stimulating aerospace companies to develop human spaceflight vehicles and systems that NASA hopes will eventually result in multiple, safe crew transportation options from which NASA can then purchase crew transportation services to ferry astronauts to and from the International Space Station by 2017. The program has been underway since 2010, allocating a total of $366 Million among six companies in the first two phases.

On August 3, 2012, NASA selected three companies to receive a total of $1.113 Billion in the third phase of the program, bringing the level of federal spending to nearly $1.5 Billion. This third phase is known as Commercial Crew Integrated Capability (CCiCap) and runs thru May 2014. Optional milestones beyond May 2014, if exercised by NASA, will require additional funding. As with the two previous phases (CCDev1 & CCDev2), NASA is granting the money using Space Act Agreements (SAAs), instead of Federal Acquisition Regulations. According to NASA, SAA grants cannot be used to purchase anything for the "*direct benefit or use of the U.S. Government*."[1]

[1] Chiles Act: 31 USC 6303

Ultimately though, before NASA can purchase any transportation services from successful developers, it will have to certify that the systems are capable of performing NASA's missions and are safe enough to carry American and our international partner astronauts to the ISS.

Since the U.S. government will not *own* the vehicles, the designs, or the intellectual property, NASA plans to fund two follow-on contracts – contracts that conform to Federal Acquisition Regulations – to certify these systems before flight to ensure they meet NASA's technical and safety requirements. During the current phase of design, under an SAA, no NASA crew transportation system requirements can be levied on the commercial partners.[2] As a result, NASA cannot exercise the same level of insight it normally has in other technology development efforts. NASA has not been able to credibly estimate the expected total cost to certify the companies' designs, or the cost to buy launch services. To a large degree the per-seat cost will depend on the number, and financial strength of non-government purchasers that enter the market.

Background

On February 1, 2010, NASA initiated the first phase of its Commercial Crew Development program (CCDev1), using stimulus funds from the American Recovery and Reinvestment Act of 2009. With CCDev1 NASA awarded a total of $50 Million using Space Act Agreements (SAA) to fund five competing companies. On April 18, 2011, NASA initiated the second phase (CCDev2), awarding a total of $269.3 Million to four competing companies. On September 19, 2011, NASA granted an additional $46.2 Million to two of the companies, bringing the total CCDev2 awards to $315.5 Million.

The current (third) phase of the program in known as the Commercial Crew Integrated Capability (CCiCap). According to the solicitation the CCiCap strategic goals are as follows:

1. *Advancing multiple integrated crew transportation systems to an orbital crewed demonstration flight no later than the middle of the decade or as early as possible.*
2. *Achieving significant industry financial investment.*
3. *Achieving affordable development costs.*
4. *Providing the initial crew transportation system capability that will lead to long-term cost effective access to Low Earth Orbit.*
5. *Developing a capability to Low Earth Orbit that supports commercial markets for both commercial and Government customers*.

The overall safety goal was stated in general terms:

"*Successful commercial human space flight demands the highest commitment to safety; therefore NASA has the goal of fostering a safety culture in the commercial space flight industry that ultimately will minimize the risks associated with human space flight to LEO. NASA's goal is for Participants to demonstrate safety processes that include strong inline checks and balances, healthy tension between responsible organizations, value-added independent assessments and appropriate data archival, which will increase Government confidence in the Participant's approach to safety."*

[2] August 17, 2011 NASA letter to industry http://commercialcrew.nasa.gov/document_file_get.cfm?docid=249

NASA's goal for the Commercial Crew Development program is to stimulate the aerospace industry to develop multiple, competitive, privately operated, human spaceflight vehicles and systems. Although the government is paying for about 90 percent[3] of this development, NASA will not *own* the vehicles or retain the designs, intellectual property, or data rights. Private entities will own and operate the vehicles and systems. Instead of the government specifying what is needed, the private entities will propose their designs, on their development schedule, with the hope of meeting NASA's objectives. NASA is not requiring any certified cost or pricing information. Further, NASA will delegate to the companies the responsibility to ensure that lower-tier suppliers provide components meeting specified performance requirements. In this way NASA will no longer control *how* the government's requirements are met, and instead give that responsibility to the private companies.

On August 3, 2012 NASA awarded Space Act Agreements to three different companies with a combined value of $1.113 Billion. Boeing will receive $460 Million, SpaceX will receive $440 Million, and Sierra Nevada will receive $212.5 Million. The CCiCap Space Act Agreements cover a base period of 21 months (ending in May 2014).

The following table, derived from the CCiCap Selection Statement[4], illustrates NASA's final evaluation ratings.

NASA Evaluation Ratings		**Sierra Nevada**		**ATK**		**Boeing**		**SpaceX**	
		Tech.	Bus.	Tech.	Bus.	Tech.	Bus.	Tech.	Bus.
Effectiveness	Very High	X	X			X		X	X
	High				X				
	Moderate			X			X		
	Low								
	Very Low								
Confidence	High					X	X		X
	Medium	X	X		X			X	
	Low			X					

[3] 90 percent is indicative of the approximate relative contribution of the Federal Government. The actual non-government cash or in-kind contributions of the commercial partners is proprietary information and varies by company, and may be greater or less than 10 percent of the total.

[4] http://commercialcrew.nasa.gov/document_file_get.cfm?docID=645

The following table illustrates NASA's Commercial Crew program spending by company through the CCiCap base period to May 2014.

Commercial Crew Program $'s in Millions (years)	CCDev1 (2010-2011)	CCDev2 (2011-2012)	CCiCap (2012-2014)	Total NASA (2010-2014)
Alliant Techsystems (ATK)		0.0		0.0
Blue Origin	3.7	22.0		25.7
Boeing	18.0	112.9	460.0	590.9
Excalibur Almaz		0.0		0.0
Paragon Space Development	1.4			1.4
Sierra Nevada	20.0	105.6	212.5	338.1
SpaceX		75.0	440.0	515.0
United Launch Alliance	6.7	0.0		6.7
Total	**49.8**	**315.5**	**1,112.5**	**1,477.8**

In addition to the funds shown above, the three companies selected for CCiCap submitted optional milestones, that include such big ticket items as launch and landing simulations, spacecraft qualification testing, crew escape system pad abort tests, purchasing launch vehicles necessary for demonstration flights, and crewed orbital test flights. The optional milestones have aggregate total cost estimates in the range of $4.5 Billion, more than four times greater than the costs assumed for the CCiCap base period (2012-2014).

Updated Acquisition Strategy

Concurrent with the CCiCap awards NASA released the following updated acquisition strategy.

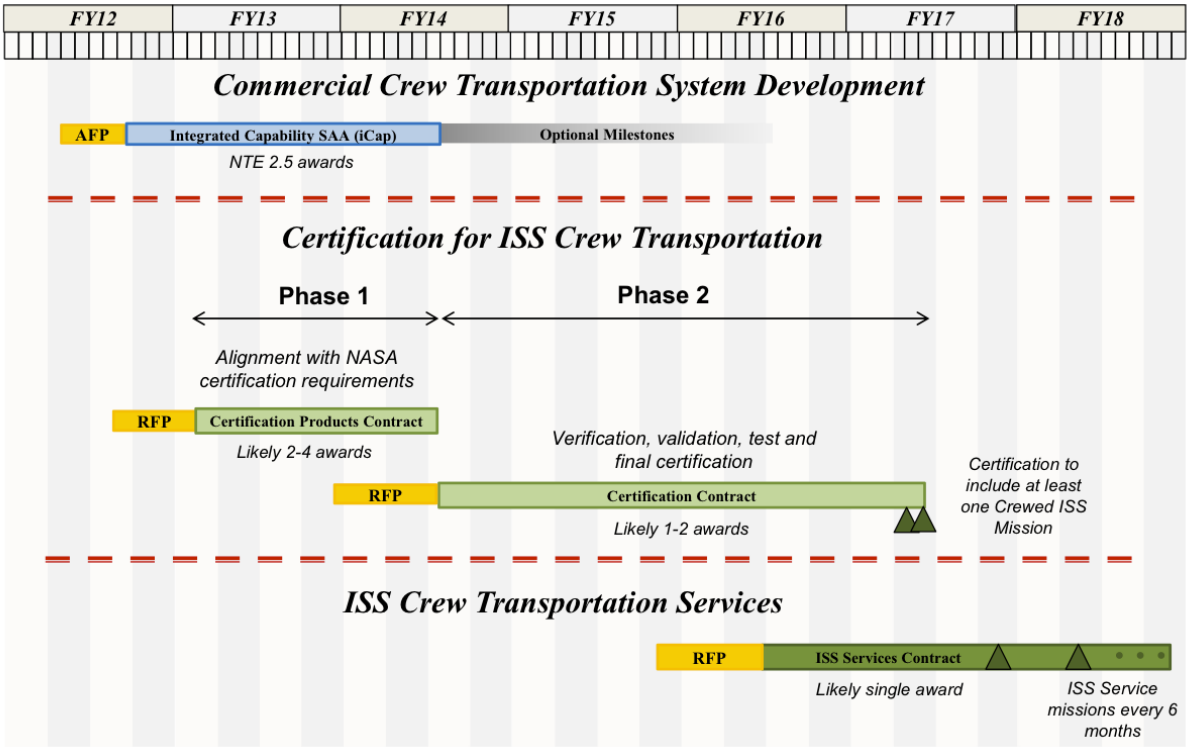

Figure 2: Overall CCP Roadmap

The three Space Act Agreements in the CCiCap phase are represented by the top bar in the figure above. NASA believes that during this time the companies will complete their integrated designs including the launch vehicle, crew-carrying spacecraft, and launch abort systems for crew safety. As mentioned earlier, no NASA requirements can be levied during the CCiCap phase, but it is increasingly apparent to NASA that ensuring that the systems developed during this process comply with NASA's requirements necessitates procurement contracts based on Federal Acquisition Regulations. If NASA waits too long to begin certification of a company's design, any necessary changes will likely be more complex and costly.

As a result, NASA has decided to begin initial certification activities in the near future – which are depicted in the figure above under the heading Certification for ISS Crew Transportation – and will use FAR-based procurement contracts. NASA plans to award two to four FAR-based fixed-price contracts in the first phase of certification known as the Certification Products Contract (CPC). The CPC period of performance will be approximately 15 months, with an expected award date in February 2013. According to NASA the CPC awards will not exceed $10 Million per award, and the total value of all CPC awards is expected to be $30-40 Million.

It is also important to note from the figure above that NASA is planning to buy ISS Crew Transportation Services at least one year *BEFORE* companies have completed NASA's certification. Therefore, it's unclear how NASA will know if these systems are safe.

Below is the schedule for NASA certification activities

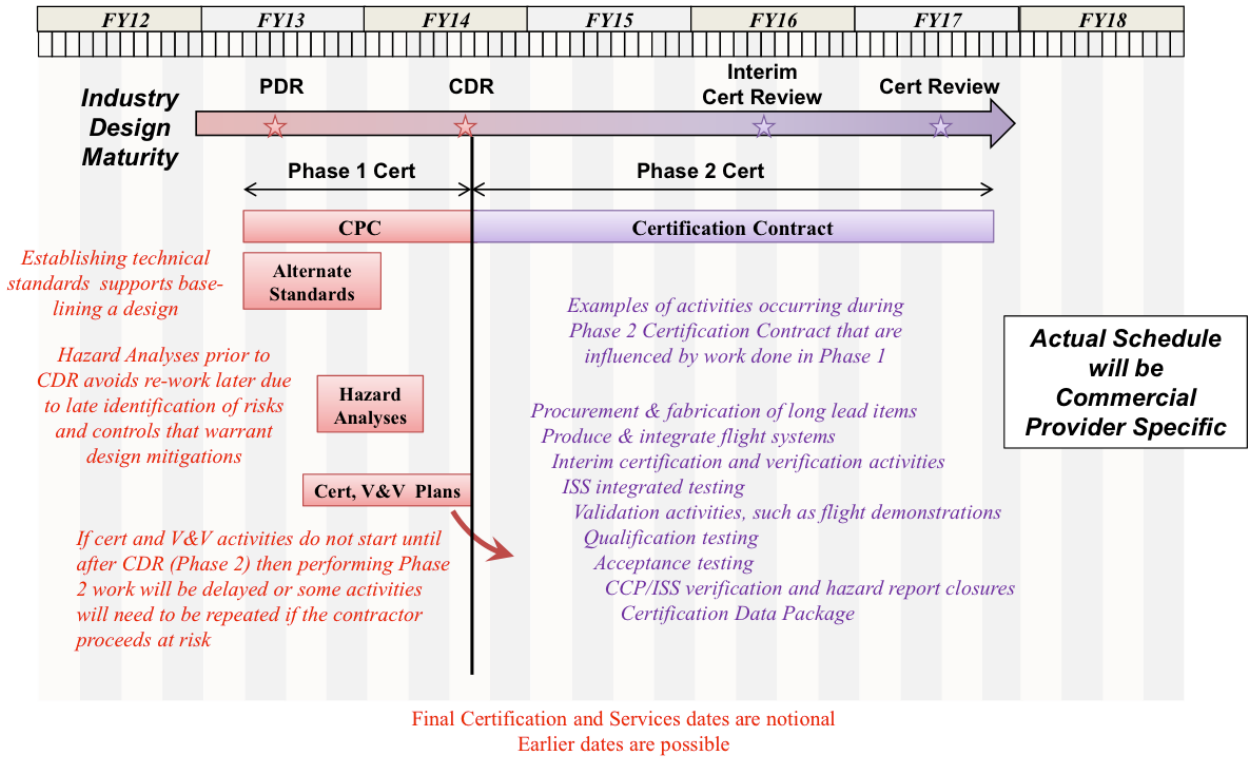

Figure 1: NASA's CTS Certification Activities

NASA hopes that by the end of the Phase 1 Certification that more than one company will have an integrated design sufficient to enter a Phase 2 competition leading eventually to a crewed ISS test mission.

Overarching Questions

- Does NASA's planned acquisition process provide the best value to the government?
- What are NASA's strategic goals for CCiCap, and were the CCiCap awards correctly evaluated against NASA's stated strategic goals?
- Do the goals reflect the needs of the government and our international partners for access to ISS?
- Will this process result in the safest, most efficient, human spaceflight vehicle to meet the government's needs to service the International Space Station?
- Why is NASA planning to award crew transportation contracts before the systems are certified for NASA's mission? How much increased cost and risk does the government assume as a result of this decision?

Appendix 1

Commercial Crew Program Appropriated Budget Compared to Fiscal Year (FY) Obligations

						Notional				
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	TOTAL
President's Budget Request	0.0	0.0	500.0	792.8	829.7	829.7	829.7	829.7	829.7	
Original Commercial Crew Appropriations	51.1	0.0	312.0	406.0						
Operating Plan Adjustments		0.1	9.4	-14.0						
Total Commercial Crew*	51.1	0.1	321.4	392.0	829.7	829.7	829.7	829.7	829.7	4913.1
Obligations by FY**	0.0	51.2	302.0	411.4	829.7	829.7	829.7	829.7	829.7	4913.1
Unobligated Roll Through	51.1	0.0	19.4	0.0	0.0	0.0	0.0	0.0	0.0	

Explanation of FY 2009 Unobligated Roll Through: The FY 2009 appropriation for Commercial Crew was part of the American Recovery and Reinvestment Act of 2009. The funds were not made available to the program until August 2009.

Explanation of the FY 2011 Unobligated Roll Through: In the June 2012 Operating Plan (approved July 2012), FY 2011 Commercial Crew funding was increased by $14M and the FY 2012 funding was decreased by $14M. As of September 30, 2011, there was only $5.4M of unobligated FY 2011 funds. Due to the reprogramming in the June 2012 Operating Plan, the FY 2011 unobligated increased by $14M. The funds carried over into FY 2012 included program support costs such as civil servant labor to support CCDEV2 and CCiCap.

* "Total Commercial Crew" line reflects the latest Operating Plans through FY 2012 and the FY 2013 President's budget request for FY 2013 through FY 2017; in FY 2010, $0.1M was transferred from Commercial Cargo to Commercial Crew to ensure continuity of operations under a FY 2011 continuing resolution. Current House markup provides $500M and current Senate markup provides $525M in FY 2013.

** Commercial Crew has obligated $383.1M in FY 2012 through August 2012. They are planning to obligate the remaining $28.3M in September 2012 for a total of $411.4M. Future obligations have been estimated using our current acquisition schedule.

In future years, Commercial Crew anticipates obligating the majority of the funds within the same year as appropriated.

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