

# COTS/CRS: KSC Evolving Host Initiatives with Commercial Space Partners

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**Summer 2010**

## **Introduction**

NASA's Commercial Crew and Cargo Program Office (C3PO) leads the agency's commercial efforts to stimulate United States private companies as the shuttle program comes to a close. Through the Commercial Orbital Transportation Services (COTS) program, two companies, SpaceX and Orbital, were selected to demonstrate their ability to perform flights to the International Space Station. The Commercial Resupply Services (CRS) Project leverages off the COTS experience, and awarded these two private companies contracts to resupply the International Space Station after shuttle fly out.

As a 2010 summer intern, I supported the COTS/CRS team in their team meetings, attended and contributed to project discussions and planning, and assisted in developing visual representations for the variety of processes and organizational endeavors required for the program to run smoothly. One aspect of the COTS/CRS program gives the involved private companies the opportunity to request available services from Kennedy Space Center (KSC); one of my projects included assisting in the development of a related Task Order Request (TOR) process. In addition, an integral part of the project was to maintain and enhance the team database for processing the variety of TORs. My experience in the project gave me great insight into the growing field of commercial space activities.

The development of the TOR process involved coordinating representatives from a variety of backgrounds at KSC. A clear and concise visual representation of the TOR process in the form of a flow chart was necessary to successfully implement a task order request from one of NASA's commercial partners. The goals of the process charts were to communicate the team's ideas and foster a common thought process while at the same time allow the process to grow and evolve. It was critical that the requests from the private companies were addressed

quickly and thoroughly as the process developed this summer is expected to have extensive future use.

### **Goals and Purpose of the Project**

After establishing an overarching, agency-level Commercial Space Launch Agreement (CSLA) with NASA, SpaceX and Orbital were then required to formulate sub agreements with individual NASA centers. An excerpt from the sub agreement between KSC and one of its commercial partners states:

“These facilities and support services will be made available to [commercial space partner] only upon an ‘as available, noninterference’ basis with NASA mission requirements and previous Agency or KSC commitments or launch operations. Each service will be offered only upon a cost-reimbursable basis following a timely, specific, approved request initiated by [commercial space partner], unless specified otherwise herein. Furthermore, this Subagreement defines the KSC or KSC contractor services to be available for use by [commercial space partner]. Any determination by KSC officials that the requested service is either not available or would interfere with its ongoing or projected launch operations will be deemed conclusive and not subject to judicial review or appeal. Services may be limited to activities occurring on NASA KSC controlled property.”

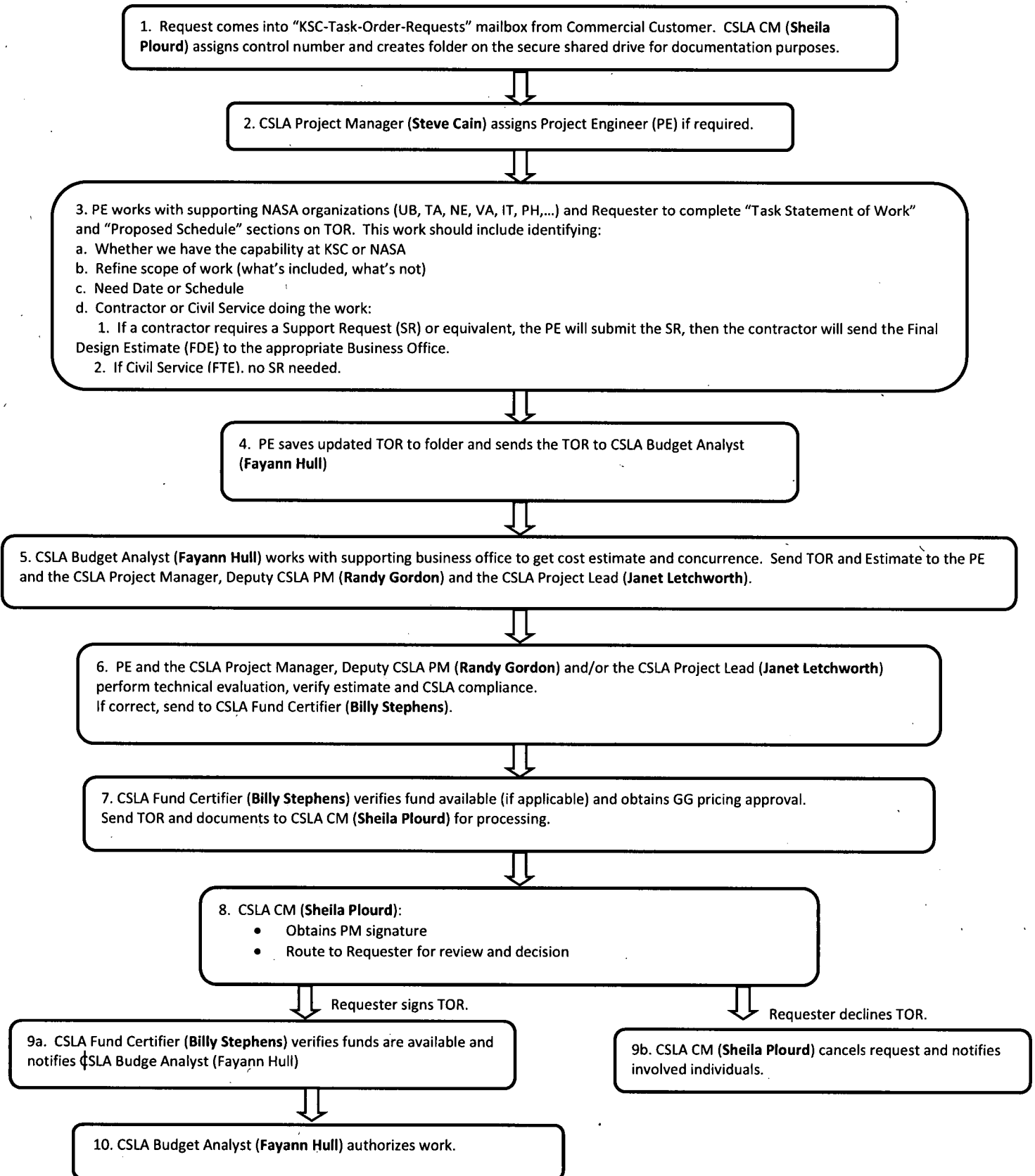
Once a commercial space partner has determined they may require a KSC service, a representative from the commercial partner submits a Task Order Request (TOR). The TOR

may either be a direct request for a service or a request for a cost estimate for multiple services that may be implemented in the future. Once the TOR is submitted by the commercial partner, the request is assigned a control number and the members of the KSC CSLA team are notified of the new TOR. The project manager then assigns a Project Engineer who has previous experience with the nature of the request. The project engineer works with the commercial partner to refine the technical aspects of the TOR including the scope of the request and proposed schedule. This step is especially essential because it continues to foster a working relationship with the commercial partner. If it is determined contractor work is necessary to complete the request, the project engineer submits the necessary paperwork to obtain a Final Design Estimate (FDE) through an existing NASA contractor. The KSC CSLA Budget Analyst then works with supporting business offices to get cost estimate and concurrence. Members of the CSLA team then perform a technical evaluation, and verify the estimate and CSLA compliance. The TOR and final estimate are sent back to the commercial partner (requester) for review and decision. If the commercial partner accepts the estimate, the work is authorized and implemented when the work is needed. If the requester declines the TOR, the request is canceled and the involved individuals are notified.

The individual steps of the TOR process and resultant flow chart (Figure 1) are the result of months of CSLA team meetings and revisions. The processes created now are the foundations for which KSC will rely on as commercial space endeavors increase. The COTS/CRS project sparked the future of space travel. The relationships between private commercial space companies and the NASA centers are being forged today.

Figure 1.

# Task Order Request (TOR) Process



## **NASA MUST Internship Impact**

My experience as a visiting member on the COTS/CRS team and project not only gave me great insight and experience in the growing field of commercial space activities, but also a glimpse into the breadth of activities that engineers are involved on a daily basis.

The NASA-MUST program offers its participants an educational experience like no other. As a participant in the program, I gained valuable insight and exposure to the growing field of engineering and the impact on the many projects that NASA hosts. The internship provided opportunities to interact with engineering professionals in my field of interest and create lasting professional networking contacts. I had the opportunity to meet with and shadow engineers, managers, technicians, and other critical project professionals. From meeting with SpaceX representatives to initiate the TOR process, to working with the individuals responsible for ensuring that all actions of the TOR process were successfully carried out, I was able to experience different levels of the KSC host initiatives processes firsthand. It was especially rewarding to talk with female scientists and engineers who gave me the opportunity to learn about their perspectives on the field of engineering and to see what it is really like to be a female engineer in the job market.

The importance of efficient communication was heavily stressed throughout the internship experience. Whether the medium of communication is through graphical representations of processes, or team meetings with interdepartmental individuals, the key to success is effective communication. Many projects arose throughout the summer that required the use of PowerPoint charts and graphs. Since the area of commercial space is relatively new and exponentially growing, the need for clear, educational charts was often necessary to introduce upcoming commercial projects and endeavors. My mentors were extremely helpful as

they showed me various communication techniques and how to effectively present ideas. They encouraged me to actively participate in team meetings and discussions, and to ask hard questions. I believe the valuable real-world experience gained from my NASA internship and guidance from my mentors has given me the skills necessary to confidently complete my education and begin my own career as an engineer.