

Center Planning and Development Multi-user Spaceport Initiatives

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The history of American spaceflight is encapsulated within the gates of the John F. Kennedy Space Center and the Cape Canaveral Air Force Station. Launch Complex 39 (LC-39) has launched every manned spacecraft from Florida since the Apollo Program. To send a rocket to space, the rocket must be assembled, integrated, and tested. The Vehicle Assembly Building (VAB) allows the vertical assembly and integration of launch vehicles with close proximity to launch pads LC-39A and LC-39B and the Shuttle Landing Facility. With the retirement of the Space Shuttle and the rise of the Space Launch System, the VAB had idle space which could be used by another entity to maximize the use of such a unique facility. This availability became an opportunity to create a multi-user facility in line with the Kennedy Space Center (KSC) Master Plan, a detailed plan to transform KSC from a solely government operated facility to a 21st century multi-user spaceport.

During the summer of 2015, I, Christopher J. Kennedy, was granted the opportunity to work on Center Planning and Development: Multi-user Spaceport Initiatives under the direction of David R. Cox, a Partnership Development Manager at the John F. Kennedy Space Center. This assignment included becoming an integrated member of the Announcement for Proposals (AFP) team tasked with enabling multi-user operations within the VAB. My main objectives included supporting the AFP team with document integration and configuration management, as well as conducting research, and assisting with an external industry day related to the AFP. By becoming a functional member of the AFP team, I was able to assist the team and the overall objective of the Center Planning and Development (CPD) Directorate, to enable a multi-user 21st century spaceport at KSC in accordance with the KSC Master Plan.

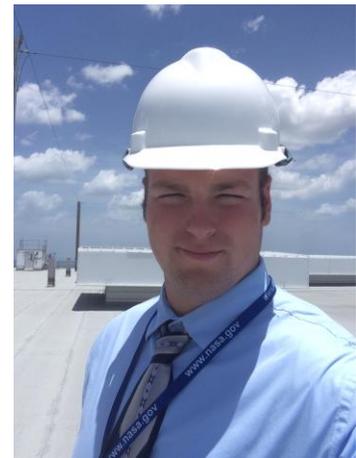


Figure 1. C. Kennedy on the roof of the Vehicle Assembly Building

This internship, though my first at KSC, was my fifth summer internship experience with NASA over the past five years. I was inspired by NASA's mission of exploration and the Space Shuttle Program, travelling to Florida in 2010 to witness the launch of STS- 132. I selected a STEM major in aerospace engineering at Florida Institute of Technology, where I am currently an undergraduate senior. The mission to further enable multi-user operations at KSC is essential

to the future of KSC as a premier 21st century spaceport in an evolving and highly competitive launch environment. The opportunity to advance this critical objective motivated me to apply to an internship within the CPD Directorate. All internships which I have participated in have used the OSSI: SOLAR/ NIFS application. This system is how I discovered the Multi-User Spaceport Initiatives Internship Experience and applied to it.



Figure 3. Mobile Launcher Platform and the VAB



Figure 2. LC-39A and B

During my experience in CPD, I became an integrated member of the AFP team tasked with developing an AFP for use of VAB High Bay 2 (VAB HB2) and the Mobile Launcher Platforms (MLPs). These assets were identified as available for potential partners, furthering NASA’s goal of transforming Kennedy Space Center into a dynamic, multi-user, 21st century spaceport. As part of the AFP team, I integrated the AFP with the VAB HB2 Model Use Agreement and the MLP Loan Terms and Conditions. These documents were released with the AFP to ensure that all potential proposers understood all the terms of use proposed by NASA for multi-use integration of VAB activities and services. Configuration management was maintained on the integrated document through final team review and release. This review process required receiving, integrating, and dispositioning all comments from multiple stakeholders, including legal, financial, and technical parties, within the organization until release of the AFP to the public, through NAIS and fbo.gov on June 15, 2015.

Post release, I assisted in the creation of the AFP activity schedule and provided input to the AFP timeline. These dates included deadlines and activities such as Industry Day, a question and answer period, and the due date for all proposals. An Industry Day was organized to allow potential proposers to view the available assets and ask questions relevant to the AFP. I organized logistics for Industry Day and assured that the tour and presentation room were available and ready. I also assisted in the creation and editing of presentation materials used for Industry Day. Following a preview tour to ensure event compatibility, the Industry Day went smoothly and allowed potential proposers to get a better understanding of the VAB and MLP and

ask related questions to the AFP team. Continuing to support the AFP team, I created an evaluation template for the Proposal Evaluation Panel (PEP), referencing the AFP, which will streamline the evaluation process for the PEP and maintain consistency between individual evaluations. This template included an Acceptability Screening and Initial Review which utilized the more advanced features of Microsoft Excel to produce a user friendly template which allows a fair evaluation and provides the PEP with all the information they will need to produce further documentation of their activities. The template, created in Microsoft Excel, uses a numerical counter to change the color of indicated cells and conditional formatting to change the message presented. The inputs for these values are checkboxes and radio buttons offered through the Excel Developer suite. This document can be quickly amended to support future AFP evaluations by tailoring the evaluation factors to the specific AFP. This will allow CPD to maintain a consistent evaluation template throughout multiple AFP processes which will be necessary as KSC continues to progress as a truly multi-use facility.

To further assist the AFP team and PEP, I created a binder containing all documents, presentations, and notes pertinent to the AFP process for VAB HB2 and the MLPs. In addition to these tasks, I regularly attended AFP team meetings and CPD department meetings which kept everyone aligned with the current policies and activities of CPD. Additional objectives included the compilation of weekly notes, CPD updates on recent activities which are edited and shared with the Center Director and his staff. Lastly, as an intern, I was assigned to interview and input accounts of lessons learned into a NASA Engineering Network Lessons Learned website which allows NASA to prevent repetition through analyzing issues which arose in past events and activities within the Agency. This will ensure that any lessons learned are captured to assist future AFP and CPD teams by streamlining the AFP process through learning from each previous process. These tasks assisted both the AFP team and the CPD directorate in

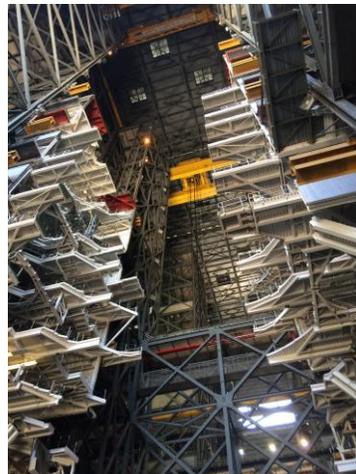


Figure 4. Movable Platforms in VAB HB 1



Figure 5. Crawlerway to LC-39A and LC-39B

accomplishing their goals during the summer of 2015 and beyond. The VAB HB2/MLPs AFP team is setting a precedent as only the third AFP process team and the first to involve a truly multi-use facility, the VAB.



Figure 6. Space Apps Challenge Discussions

In addition to these opportunity specific tasks, all KSC Interns also participated in Innovation& Brainstorming Training and the Space Apps Challenge, where small teams developed creative solutions to NASA related problems. It was an excellent team building exercise which allowed my team to work on a simulated Rocket Countdown app, which would educate the public while providing real time updates during launch operations at KSC. We then presented our product to a large audience, an invaluable skill building experience for future presentations. These intern activities allowed me to understand how day to day operations at KSC are conducted and afforded me the opportunity to network with both interns and employees during my time on center. By interacting with fellow interns, we were able to share our experiences and meet many people who are also very passionate about the mission of NASA.

Seeing the Kennedy Space Center from a management and development perspective granted me the opportunity to grasp the scope of the changes occurring not only at KSC, but across the aerospace industry. As an aerospace engineer, most of your concentration is dedicated to one product or mission, and the big picture is often lost to specific focus. The position has redefined my viewpoint of the aerospace industry which I will be entering in the near future. My appreciation for the management aspect of a mission and their role in integrating the mission with its subcomponents has grown, as I have seen how many interactions and interpersonal skills are required to effectively manage a project team. Upon completion of my degree, I will continue studying flight test engineering and look toward NASA for a future career. I may consider systems engineering or project management in the future, which will allow me to lead fellow scientists and engineers towards the objectives of an integrated project, as demonstrated throughout my experience by my mentor.

While I did not publish or present any material during the course of this experience, The AFP team released the AFP and subsequent documents, which I was responsible for maintaining.

These documents can be found at: <https://prod.nais.nasa.gov/cgi-bin/eps/sol.cgi?acqid=165724> .
AFP documentation includes the integrated AFP and the Questions and Answers document.

In conclusion, my experience at KSC gave me the opportunity to explore careers at NASA and understand the complex and dynamic nature of the projects being conducted at America's premier launch facility. Through NASA and the Florida Space Grant Consortium, I became part of the Center Planning and Development Directorate, which is transforming KSC from a government only facility into a 21st century multi-user spaceport. The AFP for VAB HB2 and the MLPs has been a remarkable document and process to develop, as the AFP team has put many years into this objective. By allowing a commercial partner to use VAB HB2, the Vehicle Assembly Building will be a multi-user facility, supporting the ultimate mission of CPD, KSC, and NASA by moving from a monolithic NASA program field installation to a multi-user spaceport on federal property. This experience will be beneficial to my future academic and career goals and has reinforced my passion for STEM by observing the daily operations of the Kennedy Space Center.



Figure 7. C. Kennedy in Front of Vehicle Assembly Building

I, Christopher J. Kennedy, grant the NASA Florida Space Grant Consortium consent to use the content of my reports to showcase my project on the FSGC website and to Florida's State Congressional Delegates and NASA HQ.

Additional Quotes on my Experience at Kennedy Space Center

“Working with the Center Planning and Development Directorate on this historic transformation of Kennedy Space Center has allowed me to be part of a lasting change at KSC through my work on the AFP for VAB HB2/ MLPs.”

“Having the ability to see the aerospace industry from a higher level really gave me the chance to see how I will fit into the future workforce.”

“The STEM pipeline is alive and well at NASA. It has granted me the ability to follow my passions, space exploration and flight. Opportunities like this have the potential to inspire and reinforce the STEM workforce at NASA and across the country.”

“By enabling multi-user operations at KSC, I have grown as a student and recognize the demand for a passionate and capable future American STEM workforce. The future requires the inspiration of those in the present for its development and success, and that is exactly what my experience at KSC has accomplished.”

References

KSC Master Plan 2012-2032, Center Planning and Development Directorate, Kennedy Space Center, 2012. <http://masterplan.ksc.nasa.gov/>

M--VEHICLE ASSEMBLY BUILDING HIGH BAY 2 - ANNOUNCEMENT FOR

PROPOSALS, National Aeronautics and Space Administration, Kennedy Space Center, 2015.

https://www.fbo.gov/index?s=opportunity&mode=form&id=816a610f43010294366253aa97ea17b7&tab=core&_cview=1

Partnership Development, Center Planning and Development Directorate, Kennedy Space

Center, 2015. <http://kscpartnerships.ksc.nasa.gov/>

VEHICLE ASSEMBLY BUILDING HIGH BAY 2 - ANNOUNCEMENT FOR PROPOSALS,

SOL AFP-KSC-VAB--HB2-MLP-2015, National Aeronautics and Space Administration, Kennedy Space Center, 2015. <https://prod.nais.nasa.gov/cgi-bin/eps/sol.cgi?acqid=165724>