ECLSS ORION GFAST

Exploration Ground Systems — UNLOCKING deep space exploration

ORION · KSC ENGINEERING · NASA

Raymond Stewart

Undergrad Senior at University of Central Florida studying Mechanical Engineering
Graduation Date: December 15, 2019
Pathway Semesters: Spring – Summer 2018

University of Central Florida · NASA

Kennedy Space Center NE-XF
Directorate: Engineering
Division: Exploration
Branch: Environmental & Life Support Systems

Path to Pathways

- US Navy – 2005 -2015
  - Fire Controlman
    - Close-In Weapons System
    - 4 Deployments
  - US Diplomat – Rabat MO
    - Defense Attaché Office

- NASA OSSI NIFS Intern – Fall 2017
  - Environmental Control System
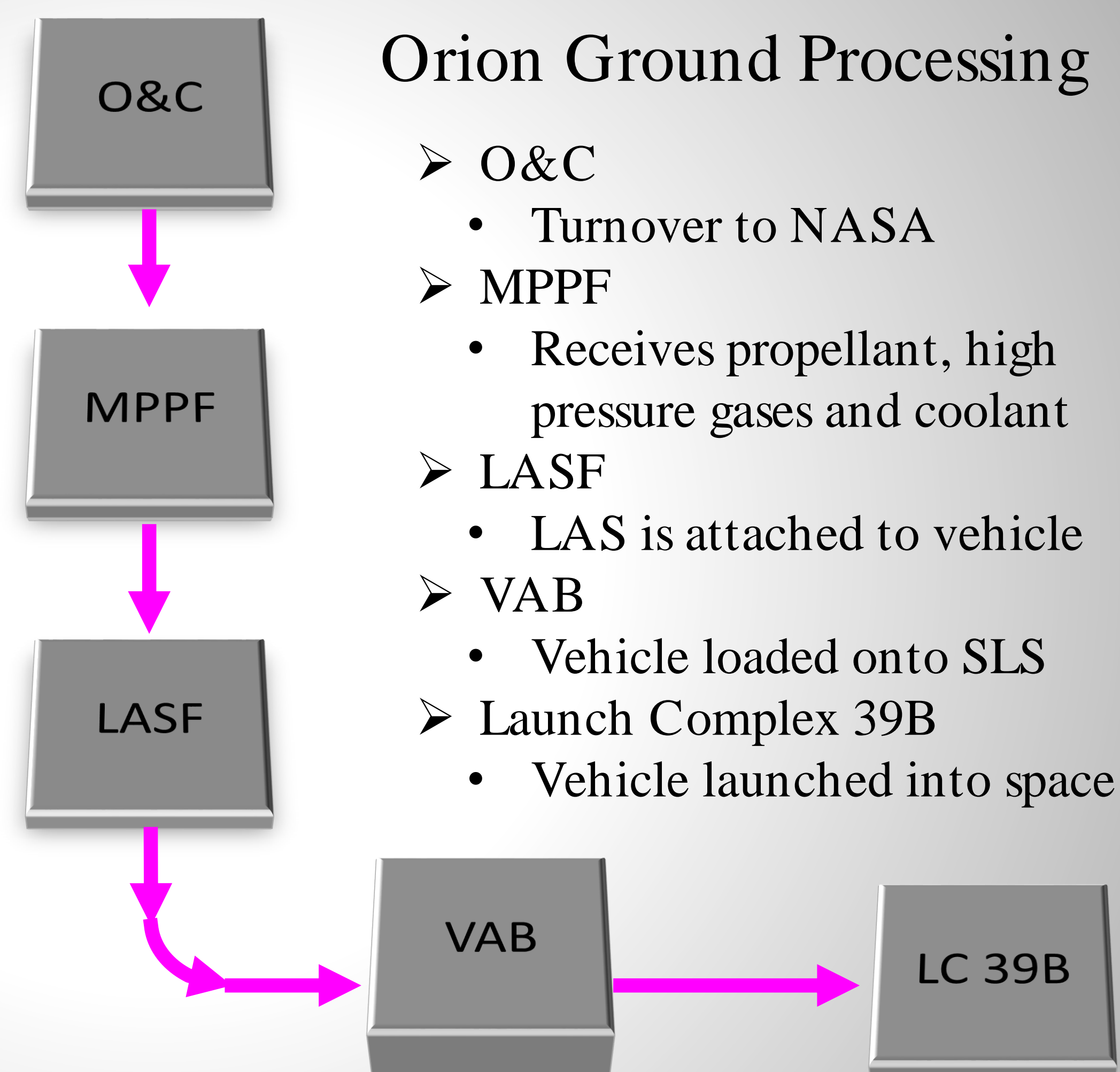 - Test Procedures for ECS LC 39B

What's Next

- Continuing Education at the University of Cental Florida for the Fall 2018 semester.

- Will return to NASA in Dec. 2018.

- Will be working on Verification testing of the software after Fall 2018.

- Will work in a part-time capacity until graduation in December 2019.

Environmental Control and Life Support System for Orion Ground and Flight Application Software Team

*Image source: www.nasa.gov – Image gallery

Orion Ground Processing

O&C → MPPF → LASF → VAB → LC 39B

- O&C
  - Turnover to NASA
- MPPF
  - Receives propellant, high pressure gases and coolant
- LASF
  - LAS is attached to vehicle
- VAB
  - Vehicle loaded onto SLS
- Launch Complex 39B
  - Vehicle launched into space

Reactive Control Logic

- For when Orion is powered up during processing.
- Monitors the health of critical vehicle systems.
- Provides automated protection for the vehicle during ground processing
- Alerts the operator of the condition so the operator can take action if necessary.

HERA

- Hybrid Electronic Radiation Assessor
- Detects the amount of radiation inside CM
- System will get checked out prior to launch

Project Overview

- Develop Reactive Control Logic software necessary for Orion during ground processing prior to launch and after recovery.

- Develop the software used in the operational testing of the Hybrid Electronic Radiation Assessor.

- Develop the displays used by console Operators for RCLs & HERA

Significance

- The new Space Launch System (SLS) requires new software to be developed at Kennedy Space Center for operations.
- During critical phases of Orion's processing, it's important to have software in place to protect the vehicle, and personnel.
- While engineers are manning consoles in the Launch Control Center, it is also beneficial for those operators to know the software.

New Skills

- CMMI for Development Certification
- Programming in C++ (ACL IDE)
- Programs
  - Creo Parametric
  - AFT Arrow/Fathom
  - FactoryTalk View
  - Ladder Logic
  - Linux
  - AccuRev & ClearQuest
  - NetBeans & Nexus
- Software Development Process (NASA)
- Environmental Control System & ECLSS Orion knowledge