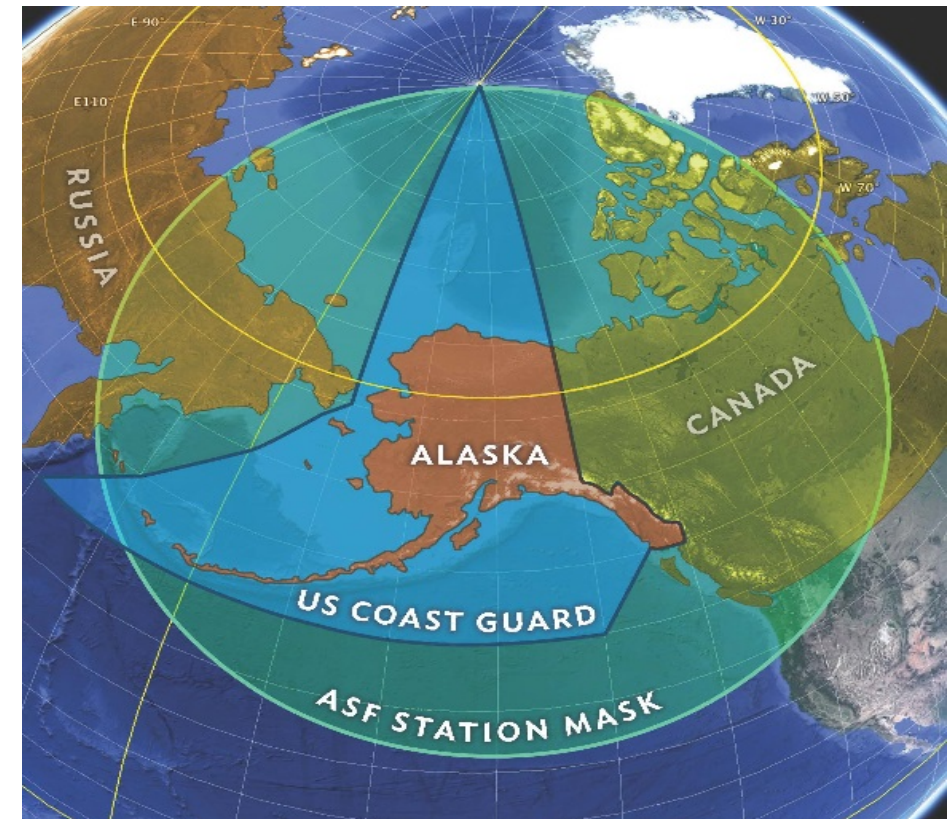




ADAC Project: Evaluation of Potential U.S. Coast Guard Use of CubeSats

- **Project Principal Investigator:
Dr. Nettie La Belle-Hamer**
- **Lead Institution:
Alaska Satellite Facility (ASF) at UAF**
- **Supporting Team:**
 - **Dr. James Newman, Naval Postgraduate School (NPS)**
 - **Giovanni Minelli, NPS**
 - **LCDR Samuel Nassar, U.S. Coast Guard**
- **Project Advocates and Support: USCG**





ADAC Project Evaluation of Potential U.S. Coast Guard Use of CubeSats: Description and Baseline

ASF proposed to set up, house, test, and maintain a prototype high-latitude ground station that will downlink maritime domain information and communications collected from CubeSats passing over the Arctic for the Department of Homeland Security (DHS) United States Coast Guard (USCG) Research and Development Center (RDC). This work involves:

- **Testing and evaluating capabilities to provide Arctic Domain Awareness;**
- **Improving command, control, communications, computers, intelligence, surveillance, reconnaissance (C4ISR) capabilities and enhancing information collection for maximum use in the Arctic environment;**
- **Providing subject matter expertise in Arctic environments.**





Project Evaluation of Potential U.S. Coast Guard Use of CubeSats: Relevance and Method

Relevance to DHS and USCG

- The U.S. Arctic includes areas with limited infrastructure and extreme conditions off the coast of Alaska and the Arctic Ocean
- Cubesats: these small, low-cost satellites offer a potential solution to communications in the Arctic

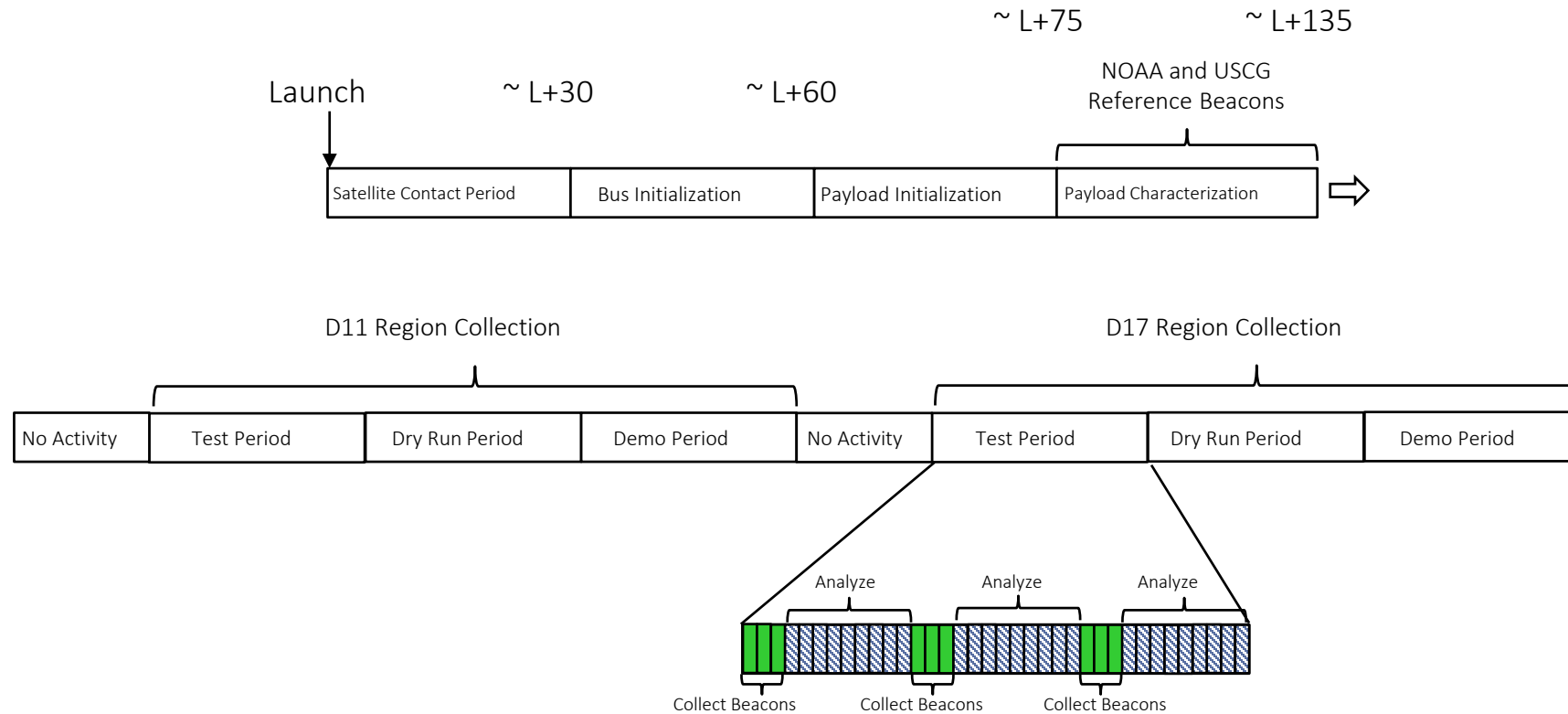
Research Method

- NPS developed the Mobile CubeSat Command and Control (MC3) System, a growing network of remotely-operated autonomous ground stations supporting DoD, DHS, and educational CubeSat R&D programs
- USCG will be launching two cubesats in 2018 through Polar Scout
- ASF installed the UHF and 3-m S- band antenna systems defined by MC3 in the ASF Cubesat Antenna Farm Experiment (CAFÉ)



Project Evaluation of Potential U.S. Coast Guard Use of CubeSats: Schedule and Metrics

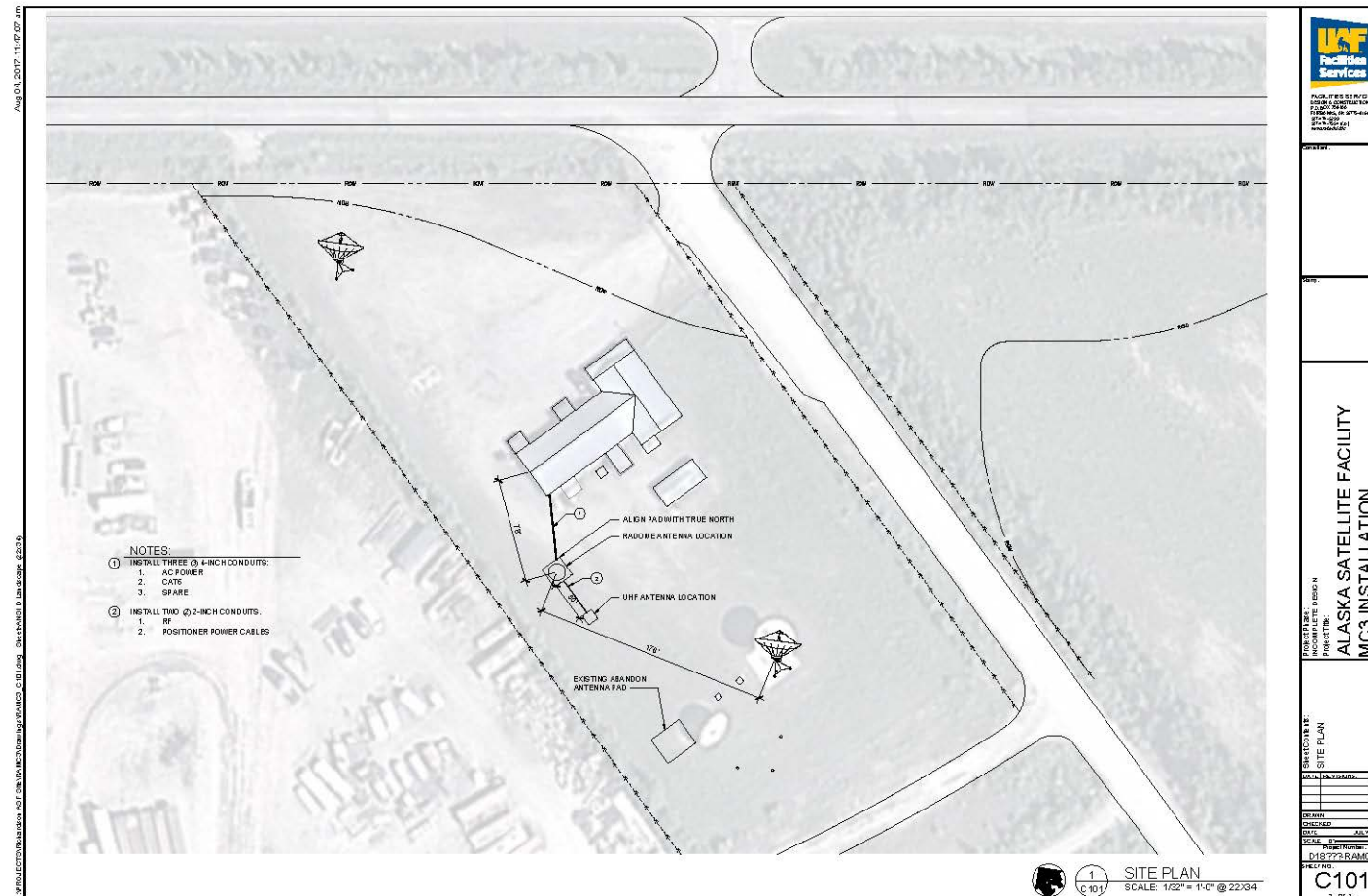
Launch planned for Q2 2018





Project Evaluation of Potential U.S. Coast Guard Use of CubeSats: Installation at ASF in Fairbanks

- Install summer of 2017
-- completed
- Ready for launch in 2018





Project Evaluation of Potential U.S. Coast Guard Use of CubeSats: Planned Research Outcomes

- **Perform a CubeSat payload mission assessment that includes CONOP scenarios supporting USCG mission needs and influences CubeSat requirements**
- **Build and deploy two ground stations for the Mobile CubeSat Command and Control (MC3) ground network**
- **Test and Document the MC3 ground stations performance**
- **Participate in CubeSat technology development, testing, and documentation of performance metrics**





Project Evaluation of Potential U.S. Coast Guard Use of CubeSats: Transition Plans

In order to achieve the desired outcomes of the research, our investigation team plans the following transition pathways:

- Leverage the Lessons Learned through this collaborative effort at
 - NPS
 - USGC Research and Development Center (RDC)
 - Lawrence Livermore National Laboratory (LLNL)
 - Alaska Satellite Facility at UAF
- Prepare a CubeSat Technology Roadmap to support USCG mission needs using the results of this prototyping effort

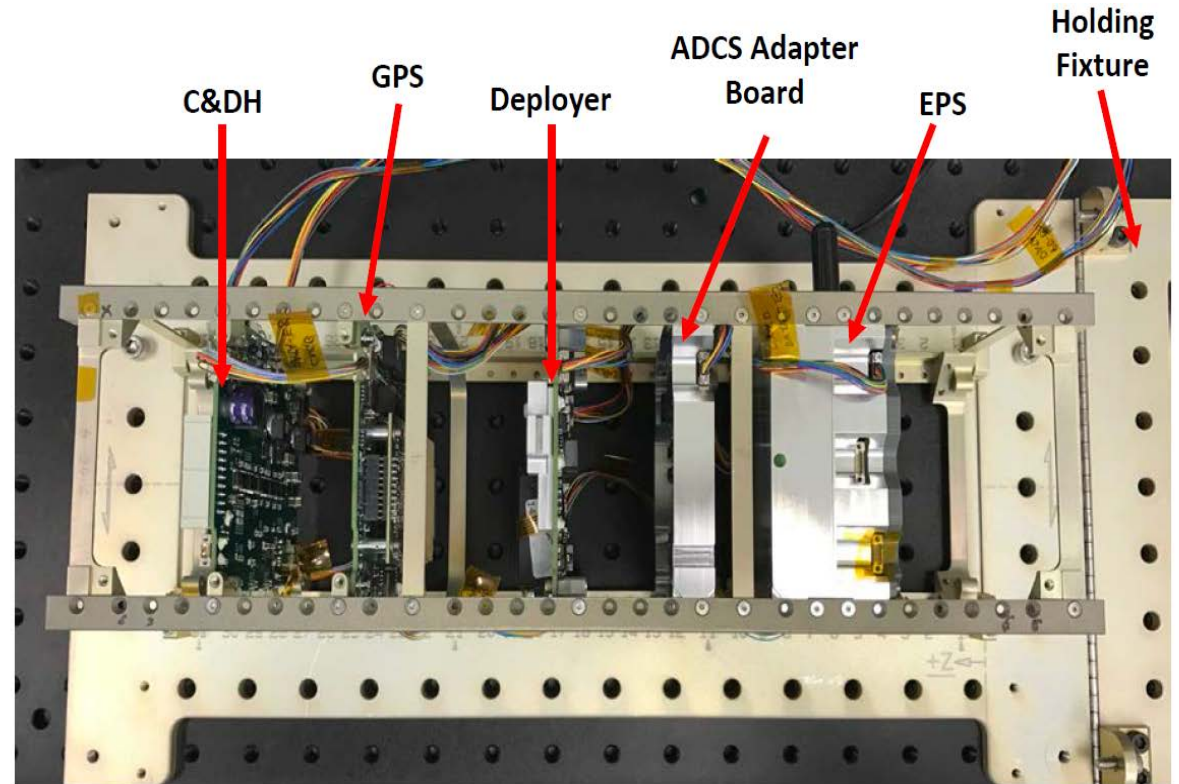
Expected benefit for the USCG: improve operational performance, efficiency, mission execution, resiliency



Ready for questions

Feedback...

- What are we missing?
- What can we improve?
- Who should we connect with to improve odds of research success?



3U CubeSat : NPS, RDC, and LLNL are collaborating on a multi-disciplinary team of instructors and cadets to learn about CubeSat and space operations