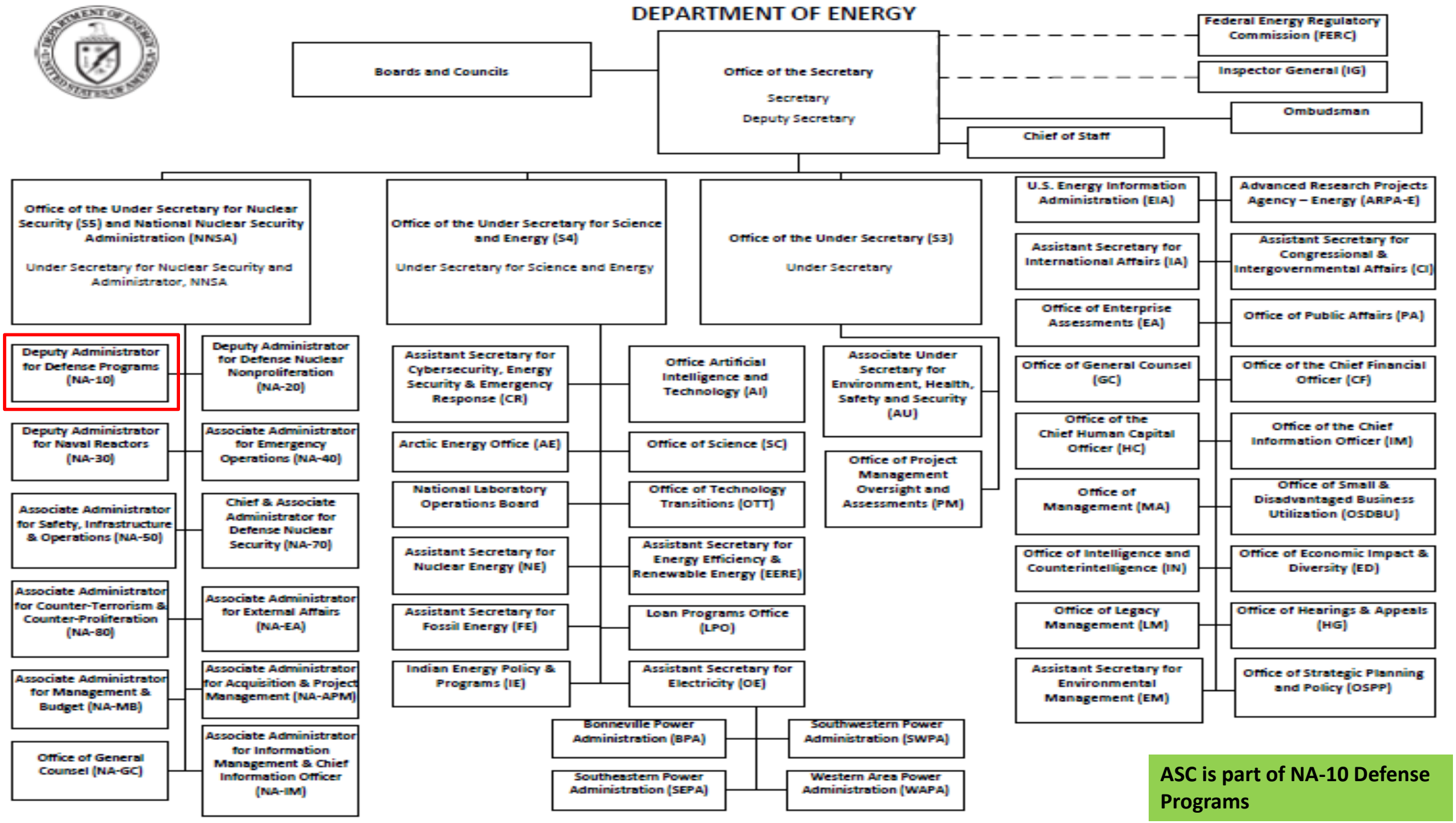
2021 CSGF Program Review
DOE NNSA Welcome

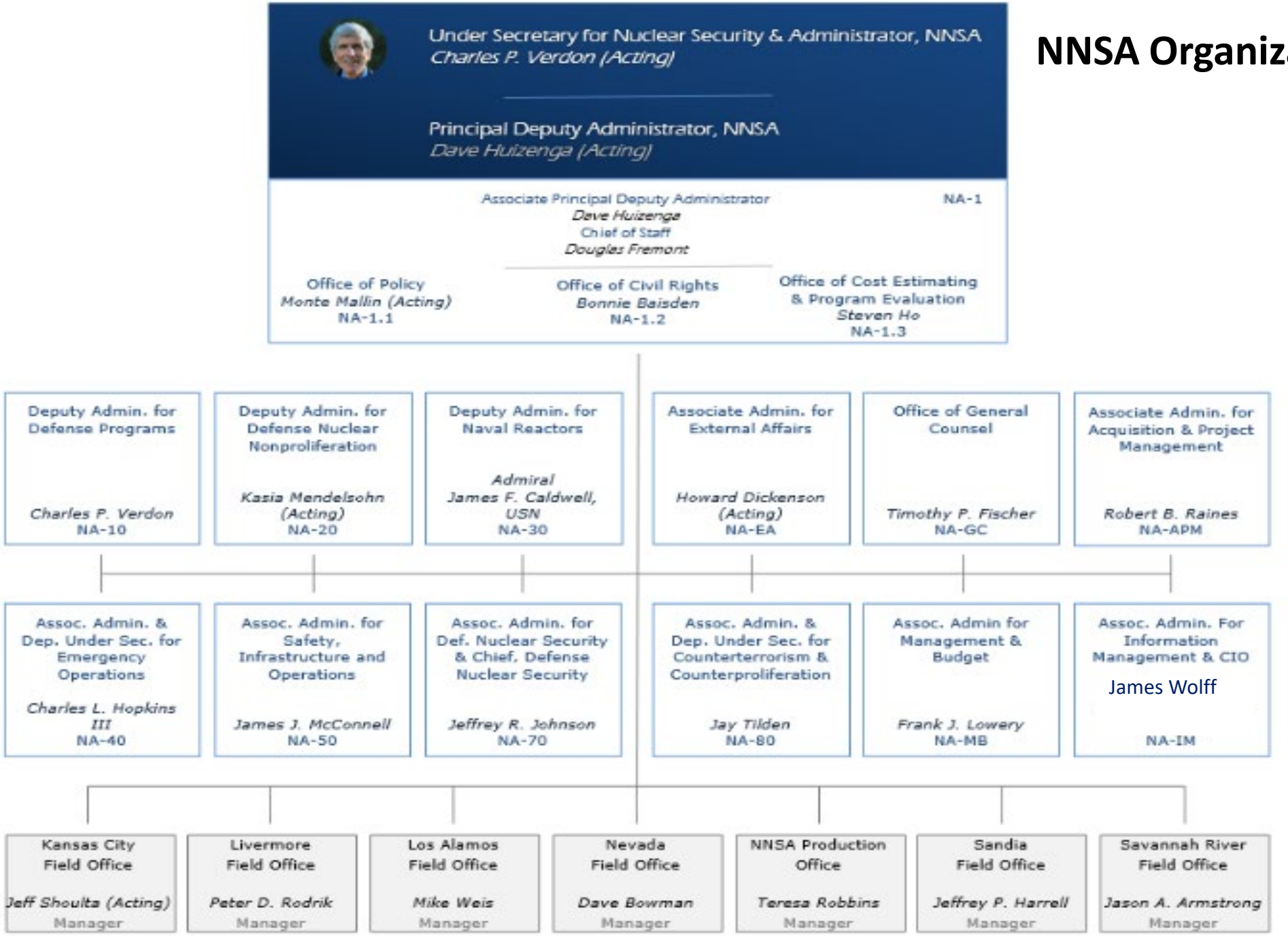
David N. Etim

Federal Program Manager for NNSA Office of Advanced Simulation and Computing and Institutional Research & Development

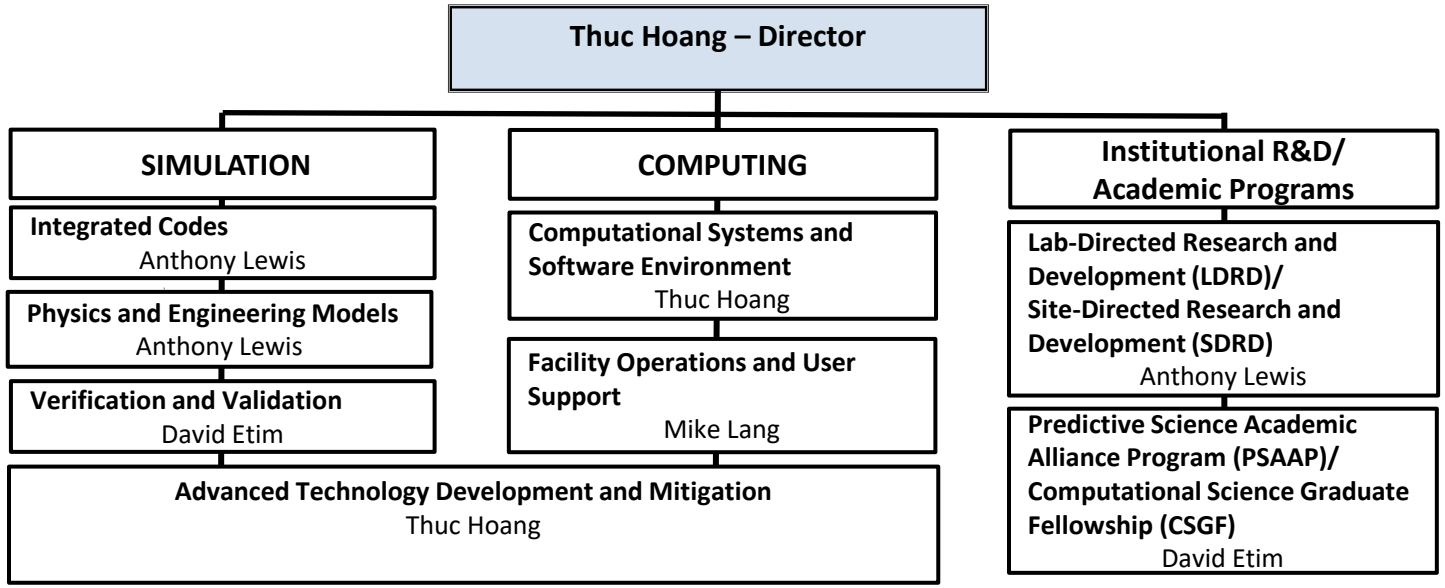


ASC is part of NA-10 Defense Programs

NNSA Organization



ASC Program



Business/Technical Support

Erich Rummel – Budget
Garry Kuhn – Technical Support
Emily Simpson – Technical Support
Tina Macaluso – Technical Support
Christy Nobles – Admin Support
Shawn Burns - SNL
David Stevens - LLNL
Carlos Verdoza – NNSA Graduate Fellow

ASC Initiatives/Special Projects

Advanced Machine Learning (AML) - David Etim
Exascale Computing Initiative (ECI) – Thuc Hoang
Large-Scale Calculations Initiative (LSCI) – David Etim
Production Science Initiative (PSI) - Anthony Lewis
Quantum Computing (QC) – Thuc Hoang

Federal Employees **Contractor**
M&O Detailee

As of Feb. 20, 2021

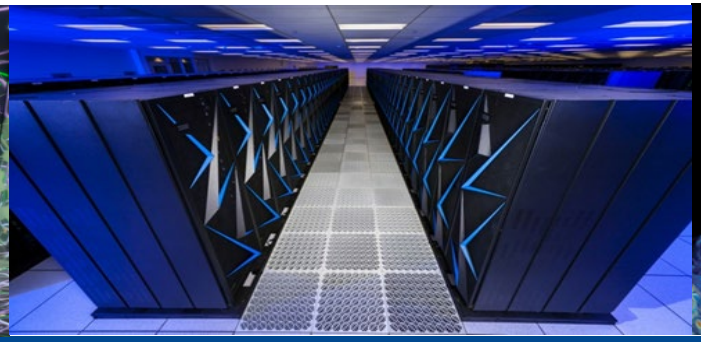
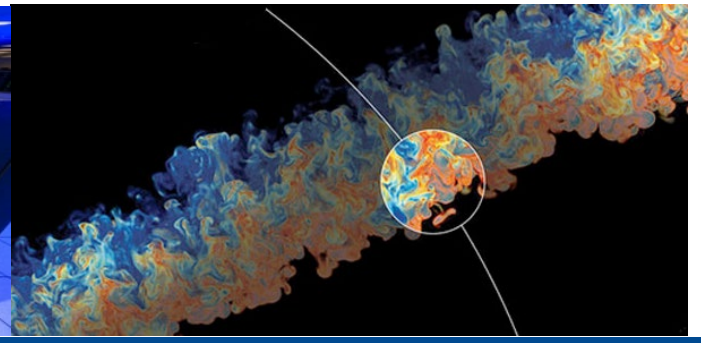
Official Use Only

Advanced Simulation and Computing (ASC)

ASC has three main objectives:

- **Prediction Through Simulation:** Deliver verified and validated physics and engineering codes to enable simulations and risk-informed decisions of nuclear weapons performance, safety, and reliability.
- **Robust Tools:** Develop robust models, codes, and computational techniques to support stockpile needs such as Significant Finding Investigations, Life Extension Programs, annual assessments, as well as evolving future requirements.
- **Balanced Operational Infrastructure:** Implement a balanced computing strategy of platform acquisition and operational infrastructure to meet Directed Stockpile Work and Stockpile Stewardship Program needs for production and advanced simulation capabilities.

ASC is predictive science through simulation: the people, state-of-the-art computational platforms, and simulation tools used in the annual certification of nuclear weapons stockpile.

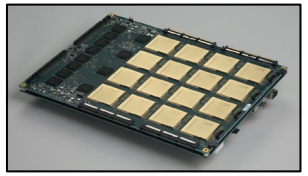
ASC Scope

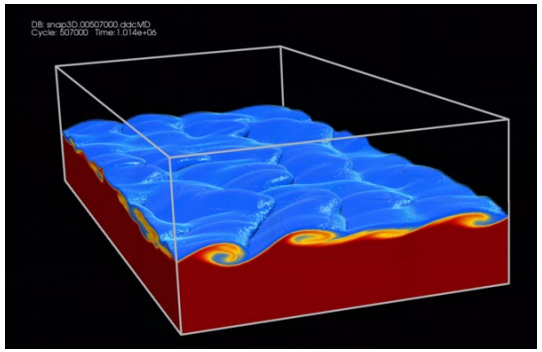
ASC 10-Year Vision

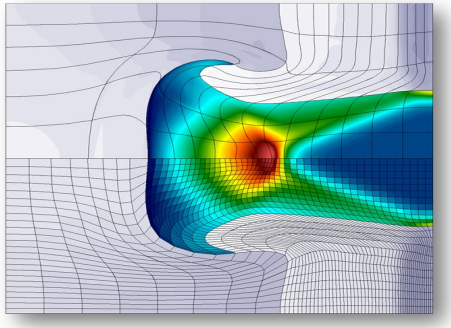
- Ensure a validated predictive capability to address evolutionary and disruptive changes facing the nuclear security enterprise, while seeking to create a more agile environment for computing capability development and user responsiveness by investing in:
  - Continued science and integrated weapons code developments
  - HPC system deployments to provide continued high-performance simulation service to the Nuclear Security Enterprise
  - Next-generation codes and software environment to address changing hardware landscape
  - Modern computing facilities and efficient operational infrastructure
  - Adaptation of future technologies to meet future weapons missions
- A highly skilled and specialized workforce

Challenges

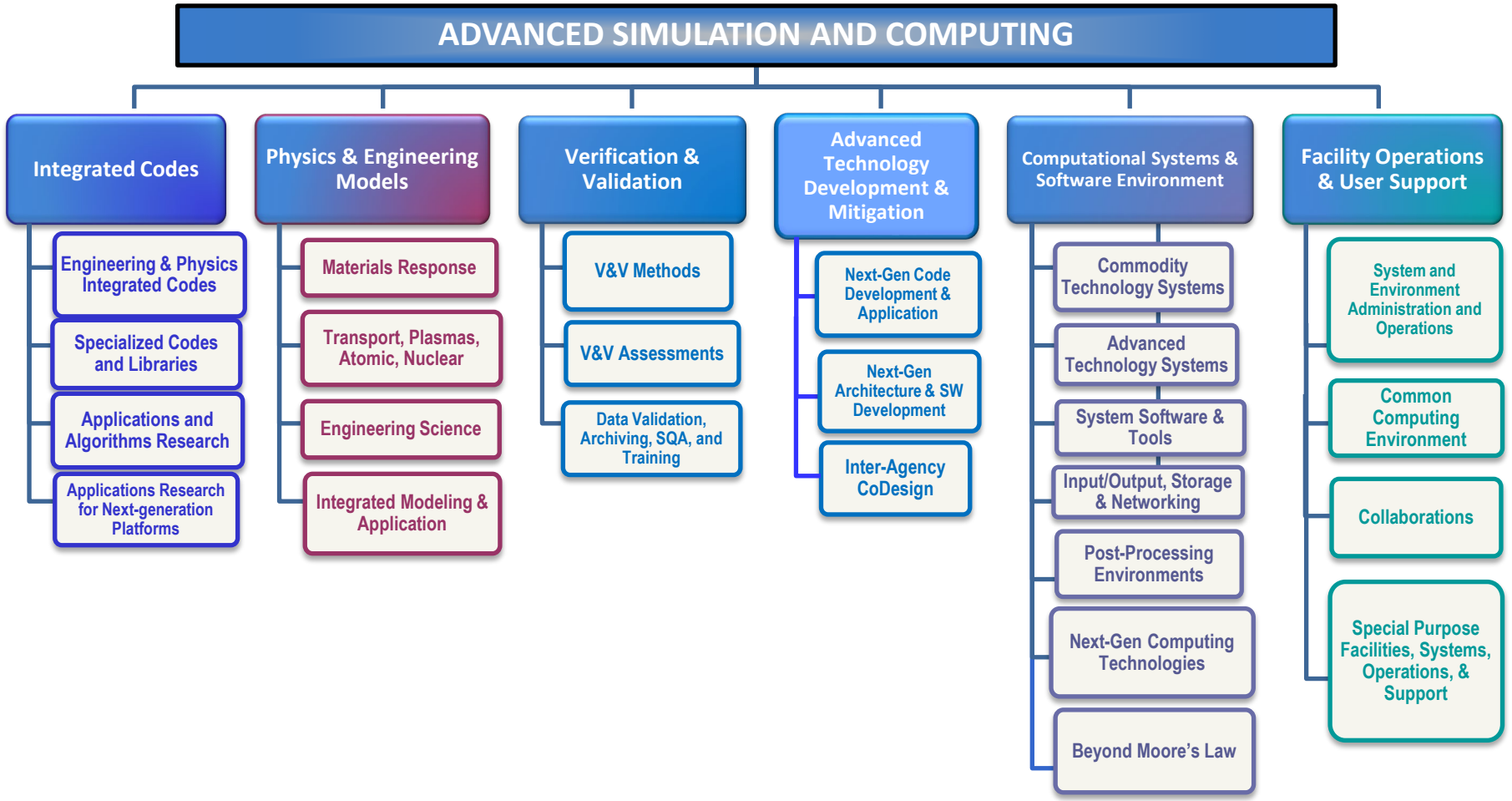
- Reduce mission risk from disruptive computing technologies
- Learn to compute efficiently at large-scales
- Workforce Development
- Improve predictive capability for future nuclear security missions







ASC Program Structure



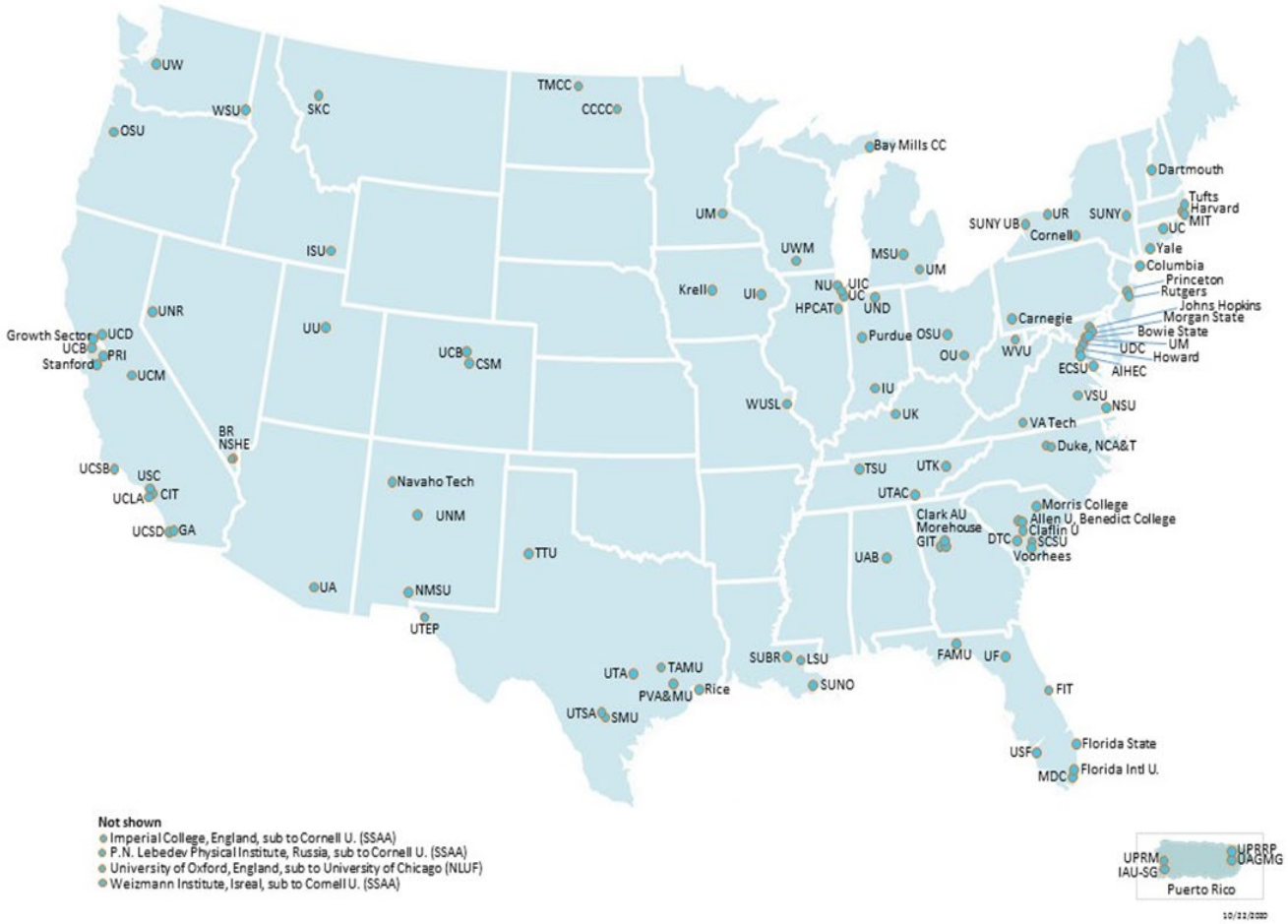
Collaboration with NA-11 Academic Programs

High-level program goals

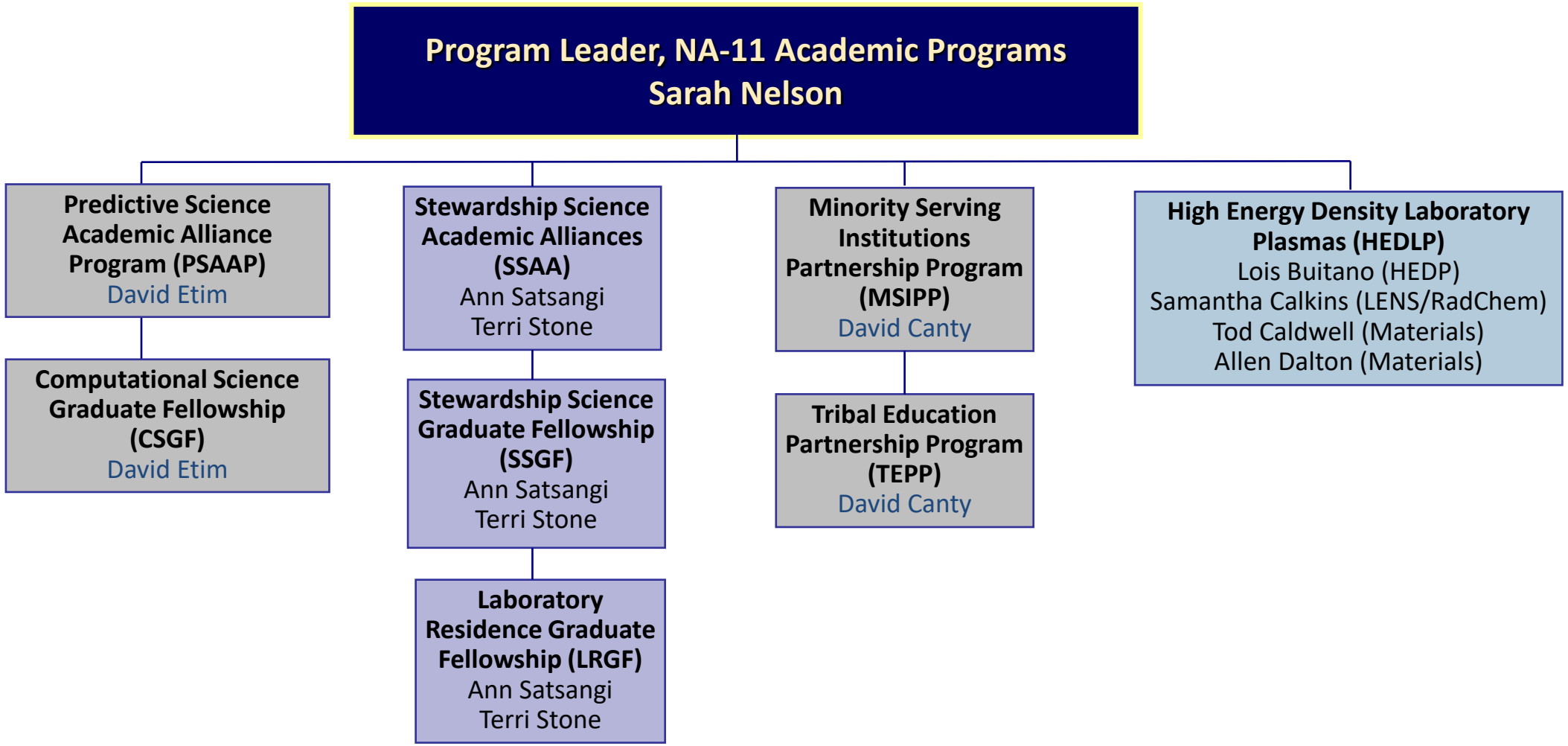
- **Workforce Pipeline:** providing a diverse, skilled, technical future stockpile stewards
- **External Expertise:** assuring quality through external review, critique, challenge
- **Creative Input**: leveraging expertise in areas thinking outside the mission

Goals align with the Beacon for the Future of the Nuclear Deterrent

- Fostering an environment of innovation aimed at improving the stockpile, serving as the proving grounds for new ideas
- Applying RDT&E capabilities to enable a more responsive and efficient production complex
- Investing in the next generation to lead the nuclear security enterprise (NSE) by equipping them with the knowledge, judgement, and state-of-the-art scientific and computing capabilities to achieve the mission



NA-11 Academic Programs Structure



Summary

- **ASC provides the necessary, underpinning simulation and computing capabilities for NNSA Defense Programs:**
  - We enable nuclear certification without underground testing
  - We face an evolving computing landscape
  - We are continuously improving to support new missions
  - We always need to build and retain a highly skilled workforce