OAK RIDGE National Laboratory

Welcome to the February 2023 Frontier Training Workshop

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ORNL is managed by UT-Battelle LLC for the US Department of Energy

U.S. DEPARTMENT OF ENERGY

Office of Science User Facilities

28 world-leading facilities serving over 33,000 researchers annually

- supercomputers,
- high intensity x-ray, neutron, and electron sources,
- nanoscience facilities,
- genomic sequencing facilities,
- particle accelerators,
- fusion/plasma physics facilities, and
- atmospheric monitoring capabilities.

- **Open access; allocation determined through peer review of proposals**

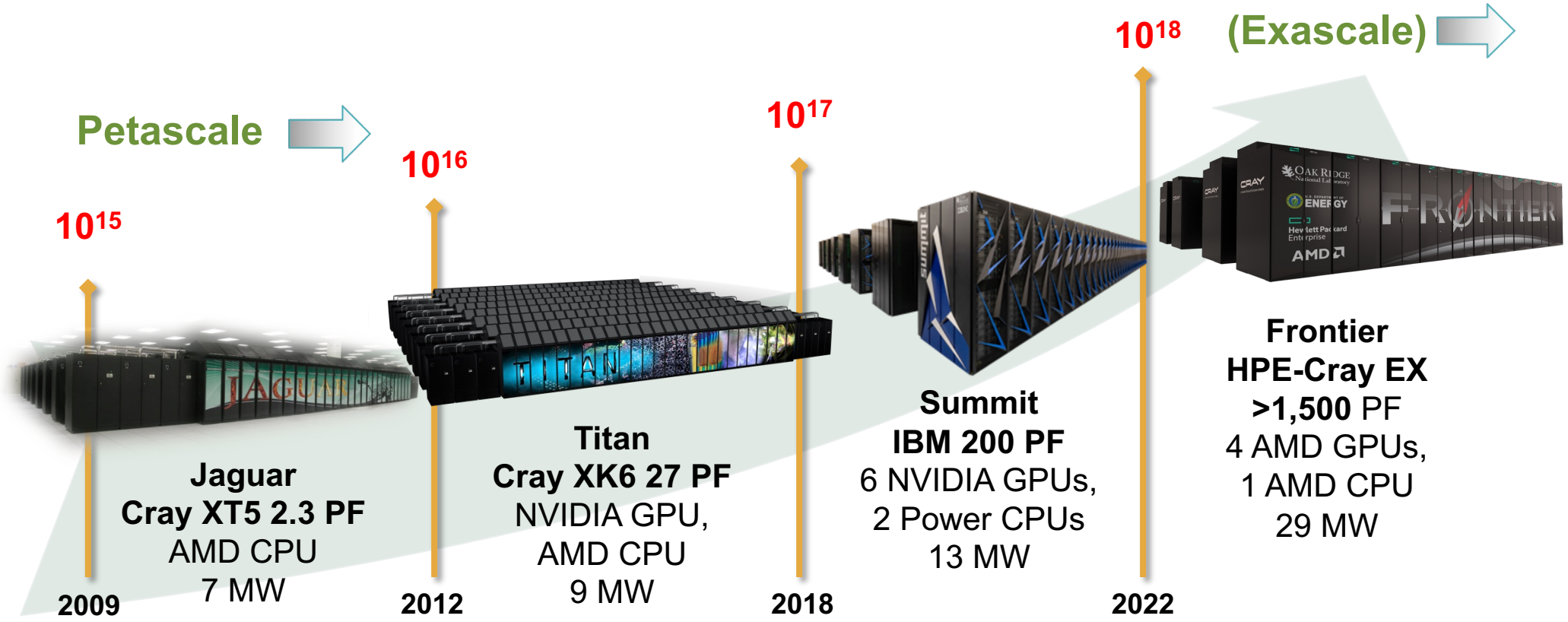
- **Free for non-proprietary work published in the open literature**

- Full cost recovery for proprietary work

http://science.energy.gov/user-facilities/user-facilities-at-a-glance/

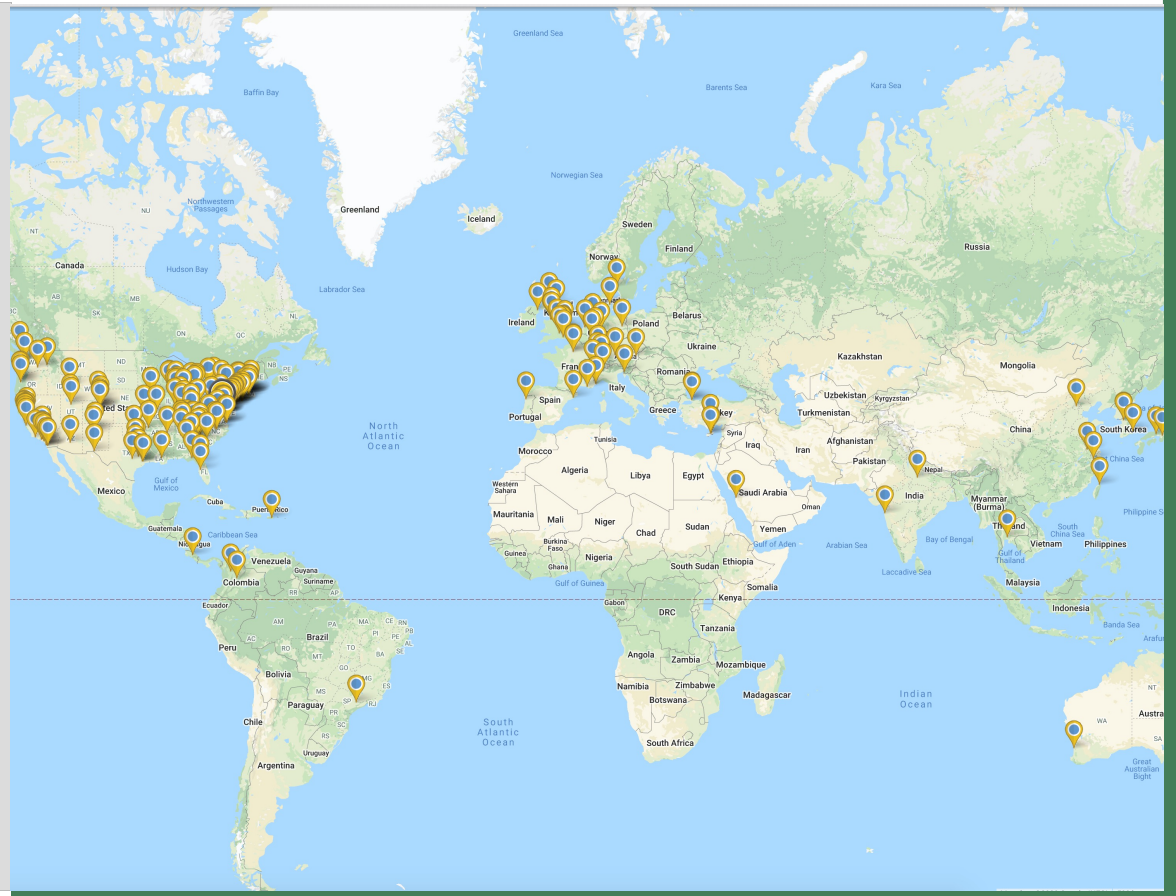
Oak Ridge Leadership Computing Facility – a DOE Office of Science User Facility

Mission: Providing world-class computational and data resources and specialized services for the most computationally intensive global challenges	Vision: Deliver transforming discoveries in energy technologies, materials, biology, environment, health, etc.



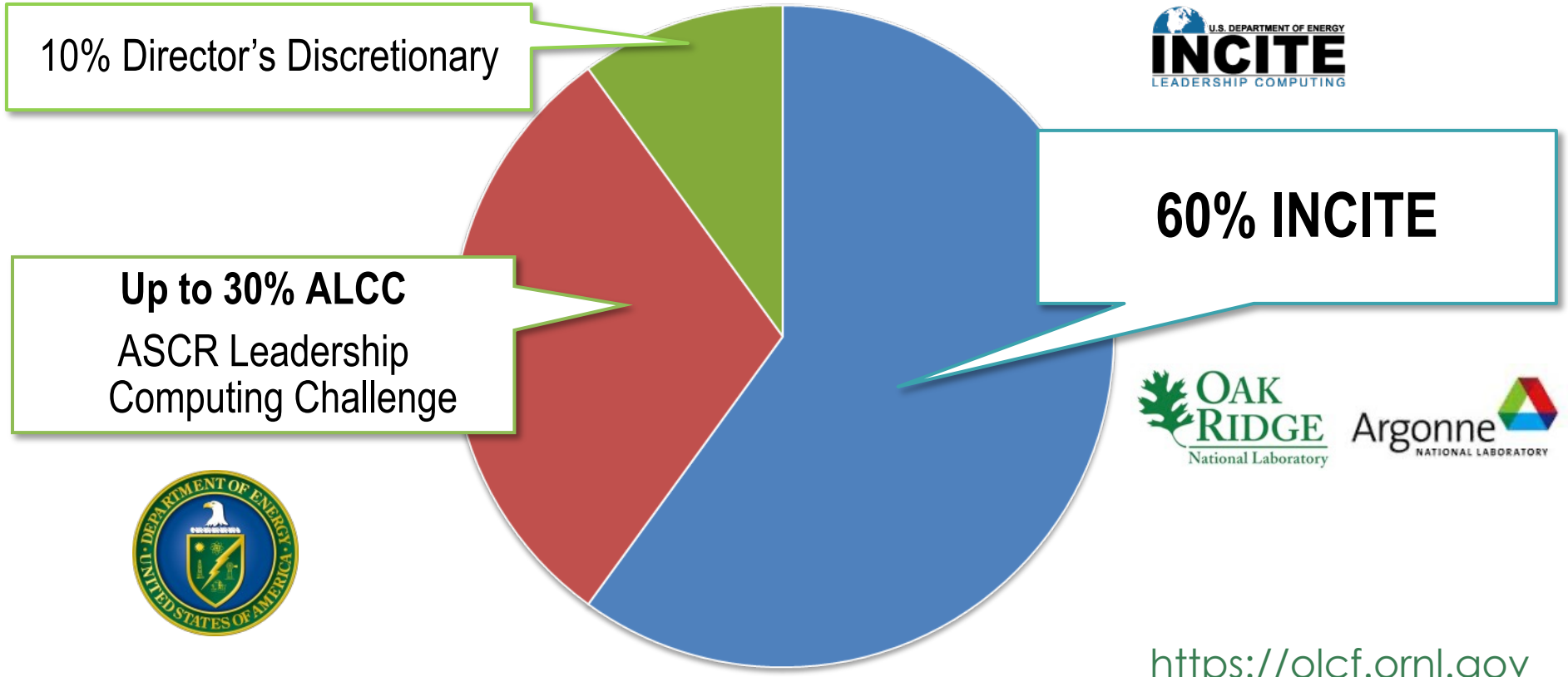
OLCF Users

- The OLCF averages about 1,500 unique users who are located around the world
- OLCF users come from academia, industry, and govt institutions
- Users are attached to projects which run up to 3 years in duration. We average about 250 research projects per year.
- OLCF resources are allocated through three highly competitive allocation programs requiring peer reviewed proposals



Three primary user programs for access to LCF

Distribution of allocable hours



https://olcf.ornl.gov

OAK RIDGE NATIONAL LABORATORY'S FRONTIER SUPERCOMPUTER

- **74 HPE Cray EX cabinets**
- **9,408 AMD EPYC CPUs, 37,632 AMD GPUs**
- **700 petabytes of storage capacity, peak write speeds of 5 terabytes per second using Cray Clusterstor Storage System**
- **90 miles of HPE Slingshot networking cables**

TOP500

#1*

1.1 exaflops of performance on the TOP500 List.

*May and November 2022

GREEN500

#2*

62.04 gigaflops/watt power efficiency on a single cabinet.

*November 2022

HPL-MxP

#1*

7.9 exaflops on the HPL-MxP (formerly HPL-AI) benchmark.

*November 2022

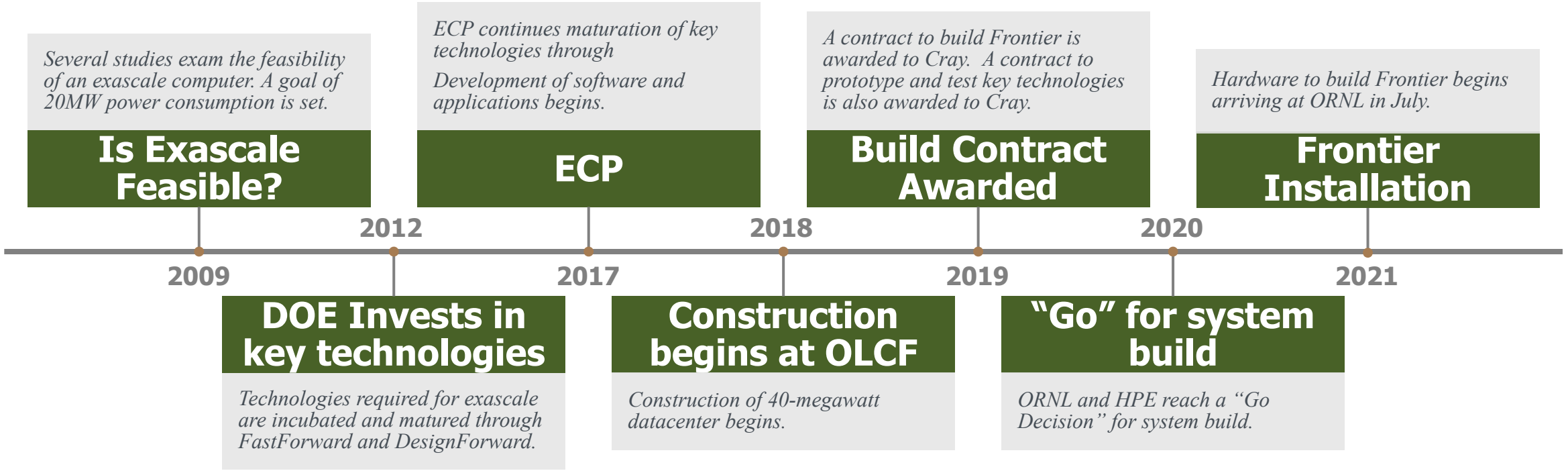
Sources: May 30, 2022, and November 14, 2022, Top500 releases

What does it take to build a leadership class computer?

- Time
- Many talented people
- A little excavation and demolition
- Great partners

Time

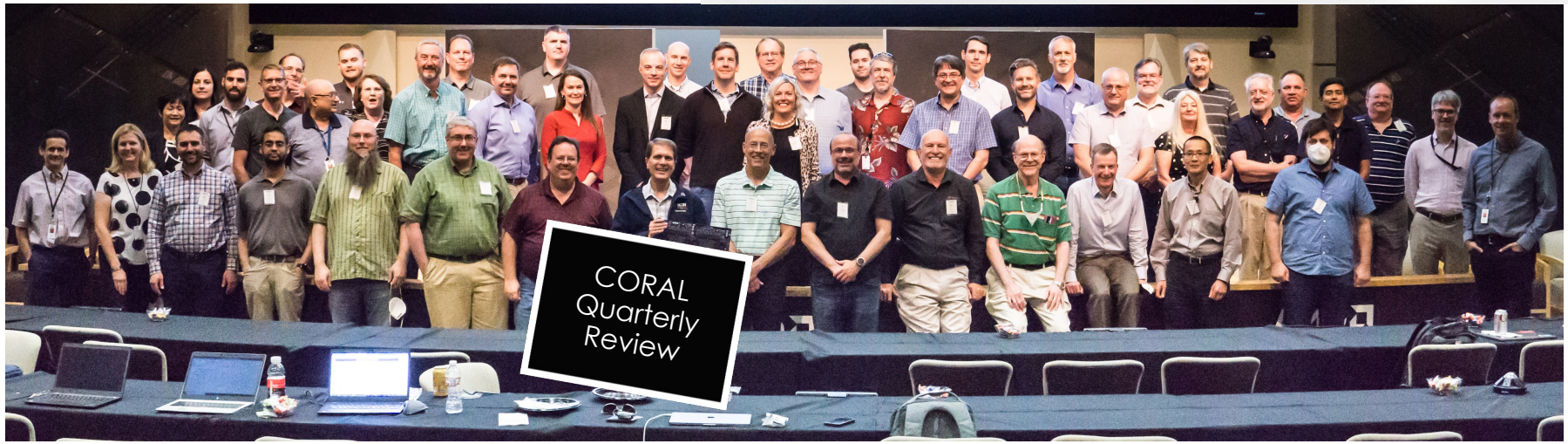
Decadal effort to deliver U. S. Exascale systems lead to Frontier



Frontier Entering User Operations in 2023

Many Talented and Hardworking People

- Broad support from DOE HQ and Site Office
- 150 experts from 6 labs met in late 2018 to review technical proposals for Frontier
- 1,000 ECP staff
- 90 OLCF staff
- 20+ application/software teams through ECP
- Over 200 electrical and mechanical workers
- Over 300 HPE and AMD engineers
- And more



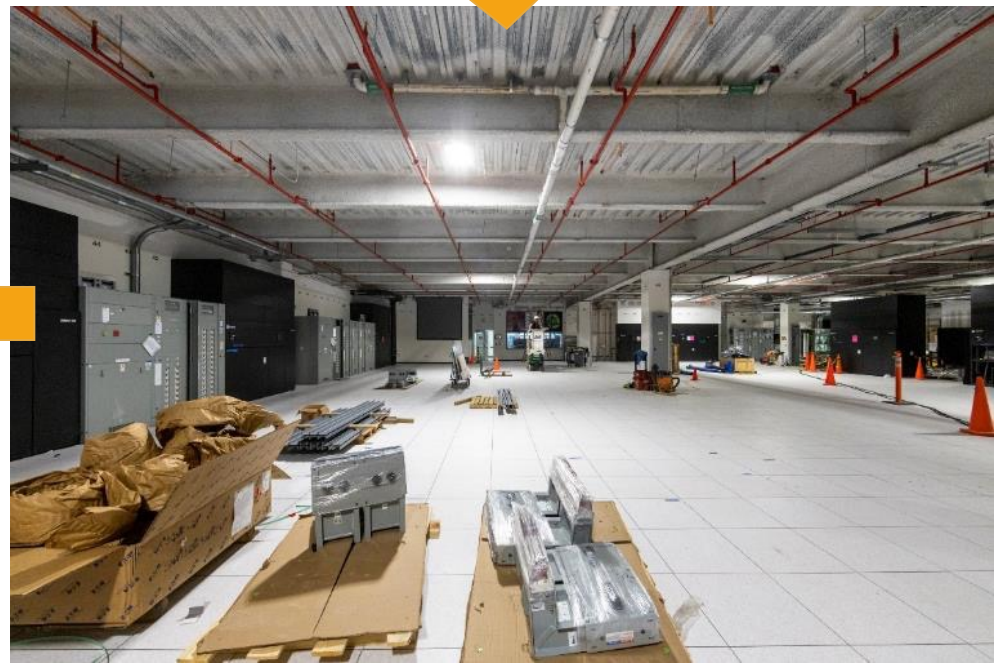
A Little Demolition

- 30 offices, 8 laboratories, and a 20,000 s.f. data center

Became the space for 40 MW of cooling

2.5 miles of new power lines installed

The old Titan data center becomes the new Frontier data center



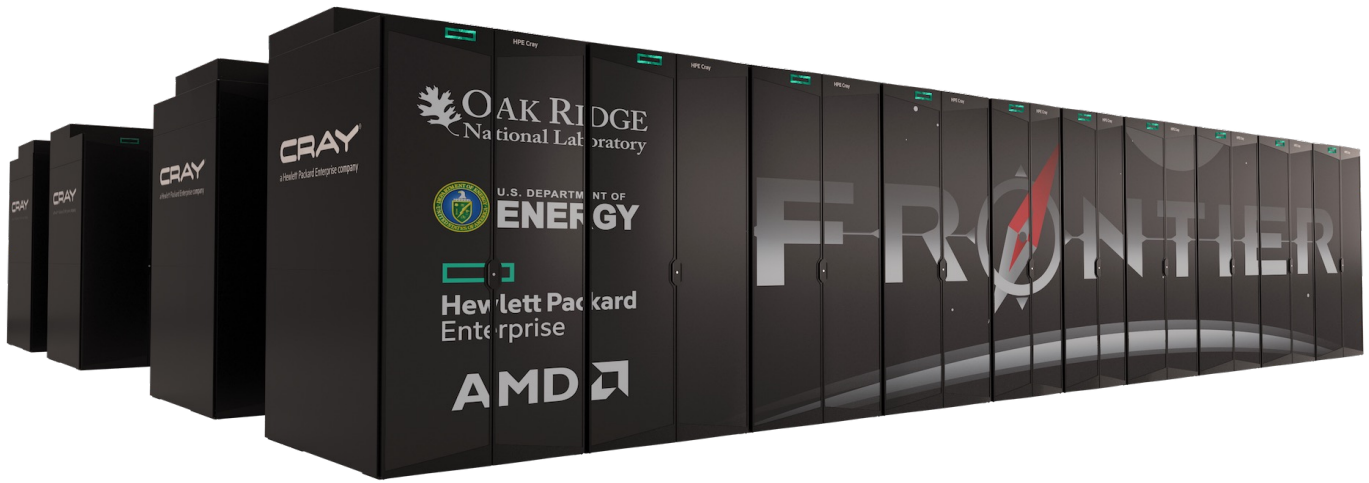
Great partners

– A pandemic, the supply chain, and tremendous complexity…oh my!

Next Steps

- We are in the final stages of the Orion file system deployment
- Once Orion is ready to be deployed, we will conduct a short final system test and checkout and then begin those projects in the User Programs with allocations in the pipeline including:
  - INCITE Teams
  - ECP Application and Software Teams
  - Early Science Teams
  - Small number of 2022-2023 ALCC Teams
- ALCC 2023-2024 are in the proposal pipeline now with an expected start date of July 1, 2023
- Our expectation is that we will start taking Director's Discretionary proposals for Frontier in March, 2023
- We will be communicating a Summit decommissioning schedule shortly and plan to remove Summit from user operations near the end of this CY.

Thank You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