



HECC Data Analysis & Visualization

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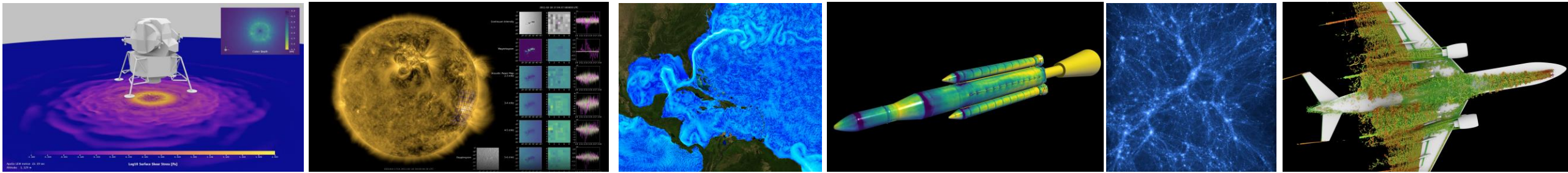


Here's what we can do for you!

- Collaborate to develop custom data analysis and scientific visualization products:
 - Handle all modern computational grid systems and point data.
 - Specialize in handling large, complex, non-standard datasets.
 - Provide support extending beyond existing capabilities.



Here's what we can do for you! (cont.)



- Create images and animations for research and presentations.
- Apply scalar and vector field visualization techniques.
- Create derived quantities from computational primitives, including differentials.
- Deploy feature extraction techniques, e.g., extracting vortices.
- Use topological methods for scalar and vector fields.
- Provide time series analysis.
- Apply machine learning techniques.



You can also get in-depth support

- **Concurrent Visualization**

- Instrument code for direct access to data without disk I/O.
- Create high-cadence visualizations (e.g., every timestep) with little or no overhead.

- **Scalable I/O**

- Implement parallel I/O strategies for large-scale codes.

- **Big Data Management and Workflows**

- Exploit software and hardware features for large data handling.
- Develop file, filesystem, and archive strategies for scalable performance.

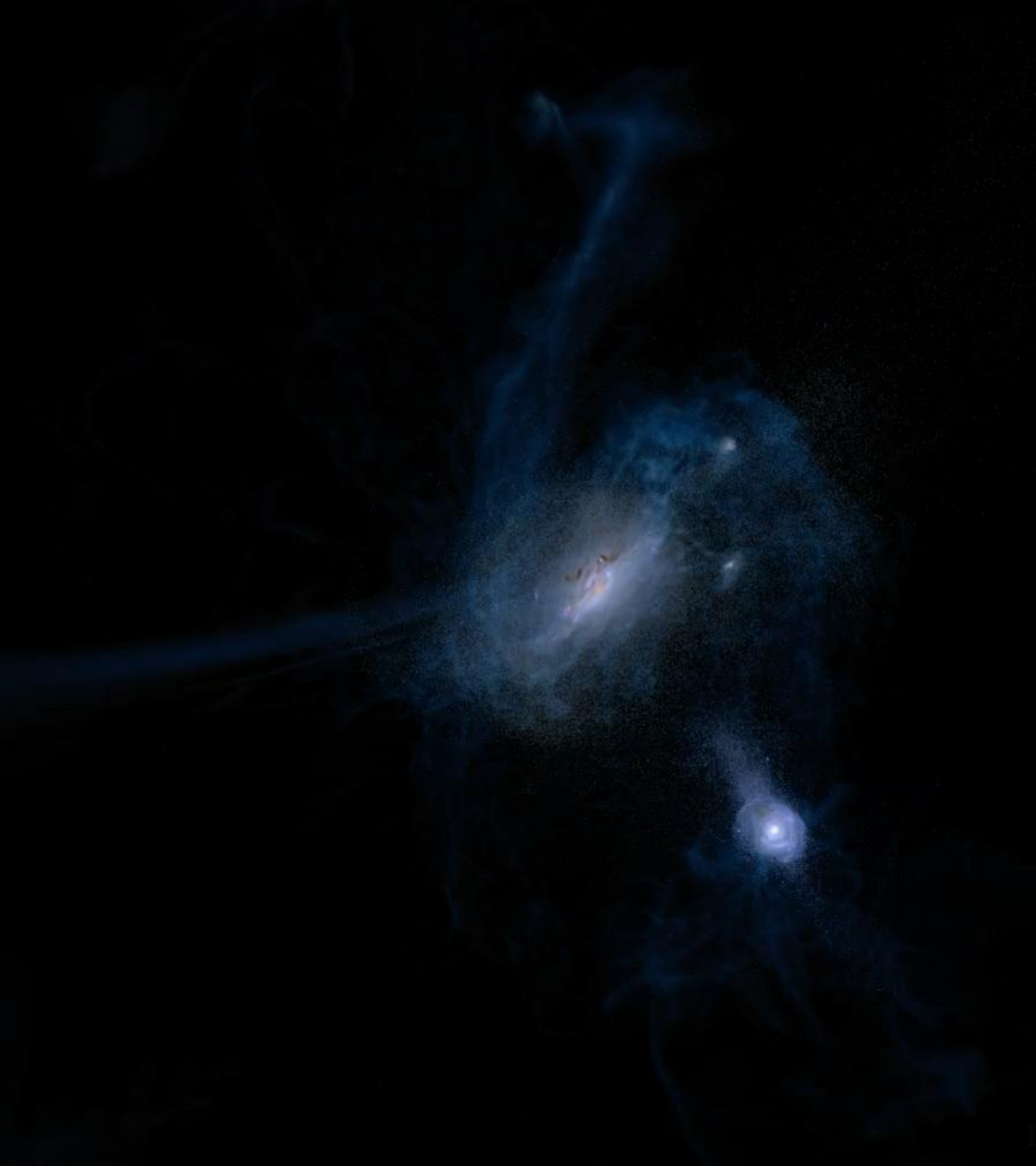
- **Custom Interactive Data Exploration Environments**

- To use the hyperwall at NASA Ames, you must come to us!



Ocean scientists using the hyperwall with concurrent visualization at the NASA Advanced Supercomputing Division.



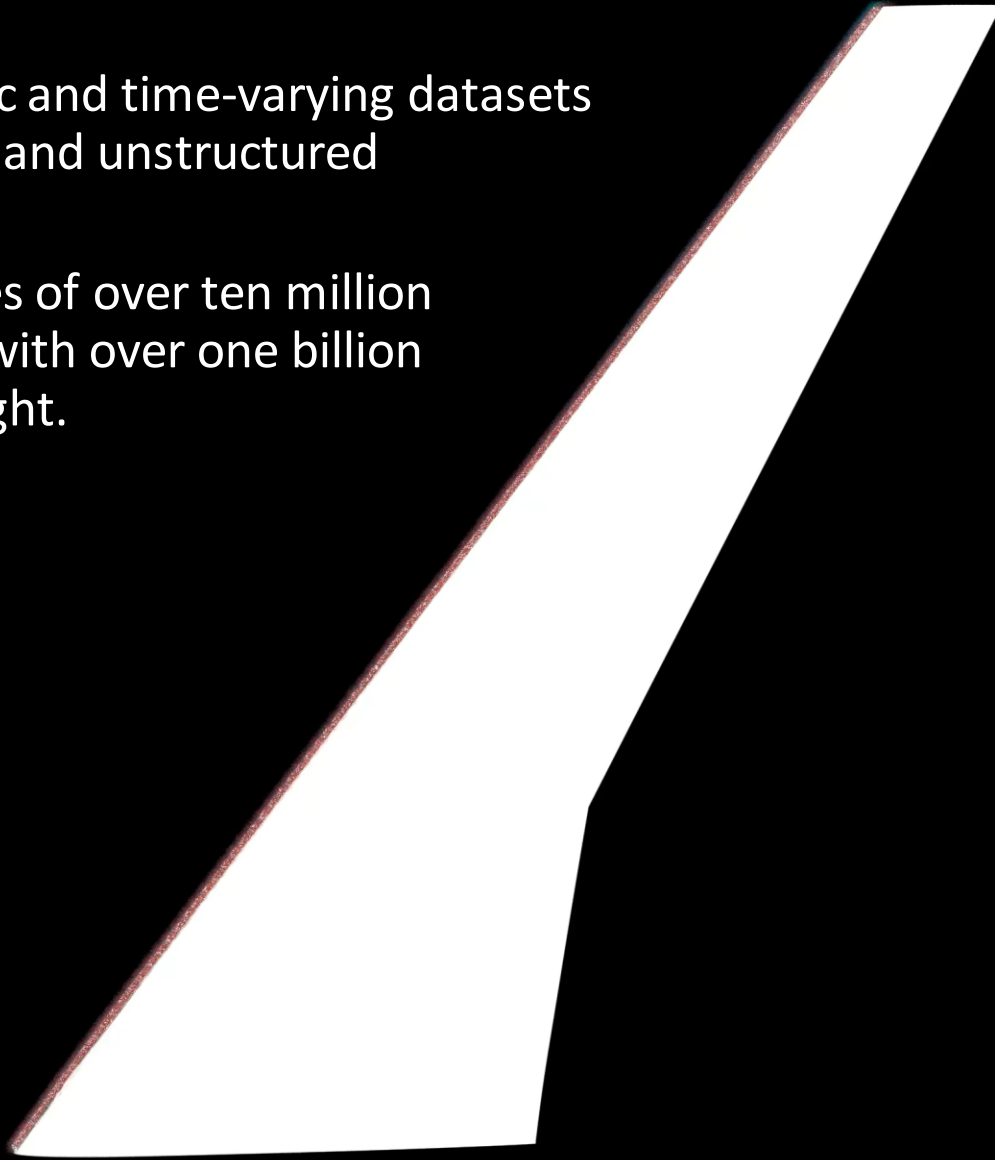


Simulating Observations Of Galaxy Formation

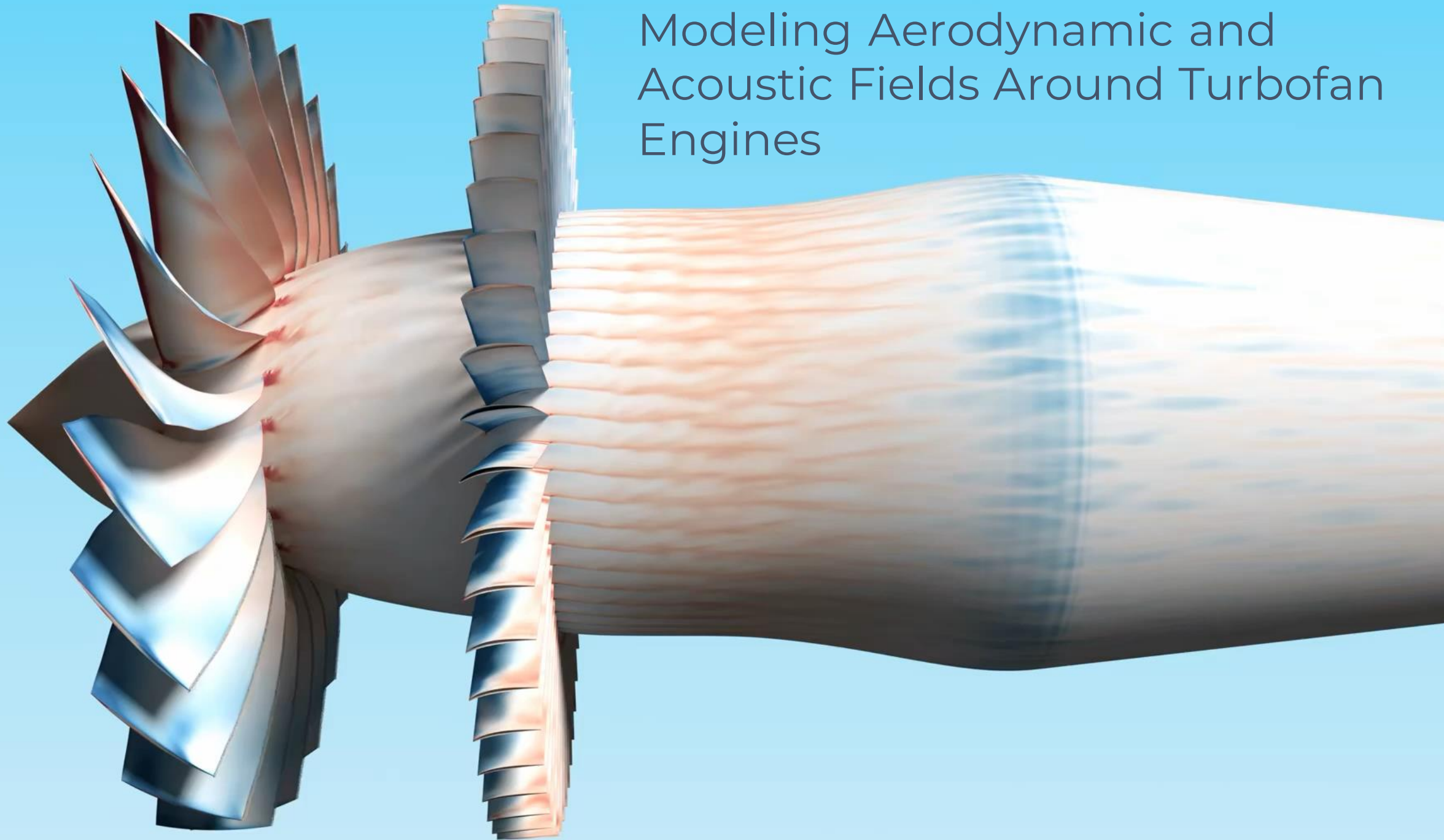
- Streamlined analysis pipeline resulting in a 500x speedup.
- Produced in-house HPC radiative transfer code, yielding additional speedup 60+hrs/frame => 5.5mins/frame.

Distributed Particle Advection

- Supports static and time-varying datasets on curvilinear and unstructured meshes.
- Sustained rates of over ten million particles/sec with over one billion particles in flight.

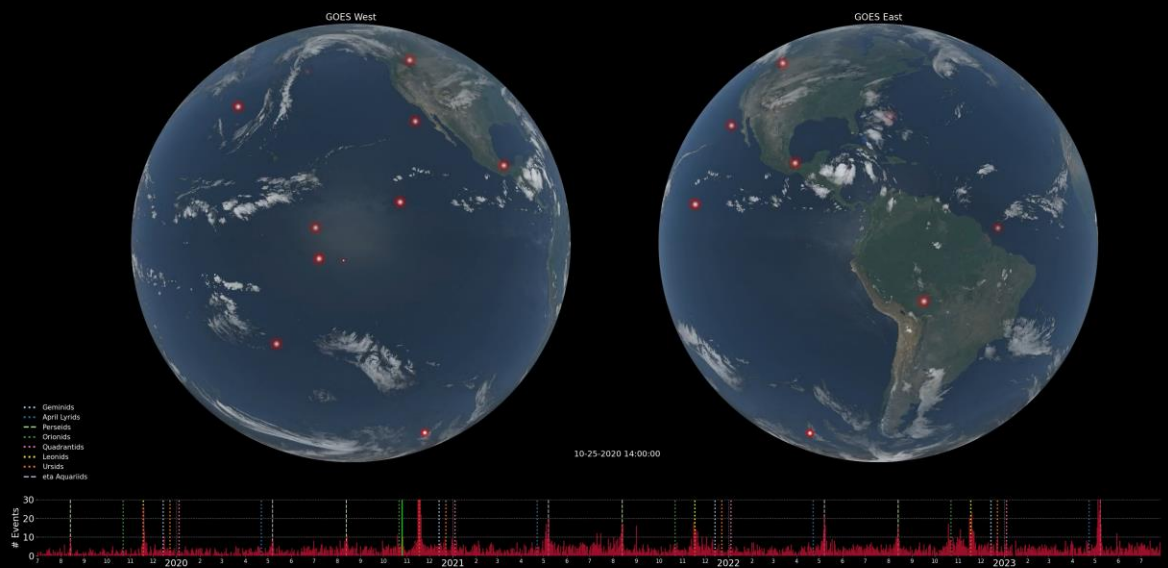
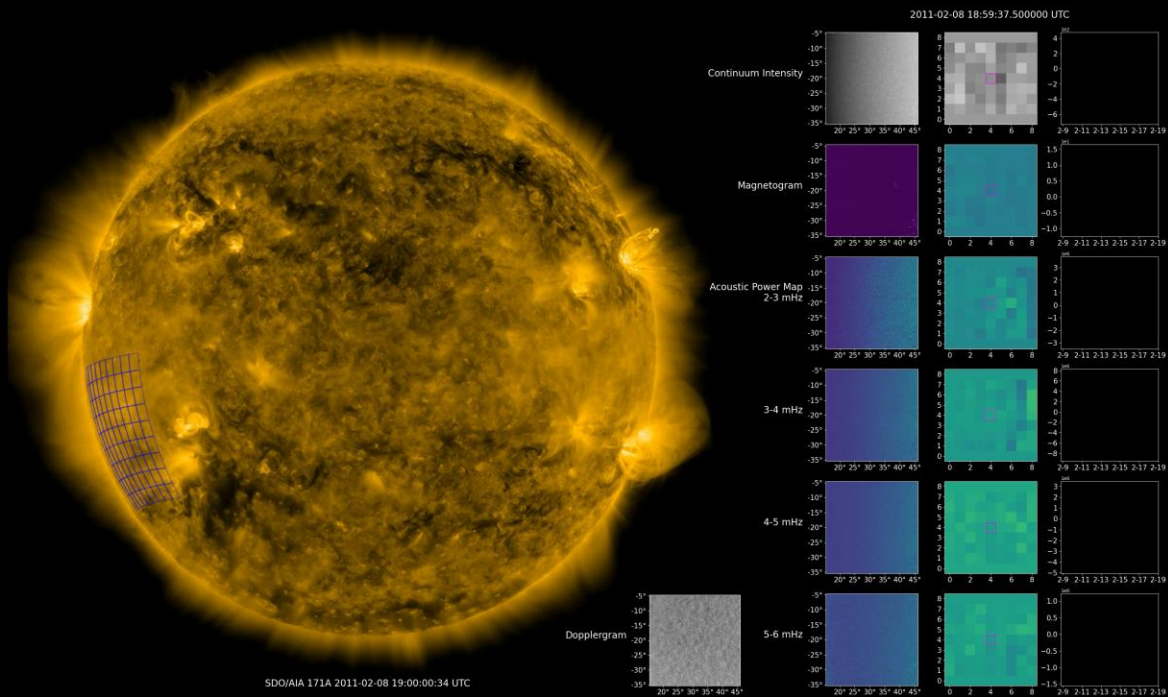


Modeling Aerodynamic and Acoustic Fields Around Turbofan Engines

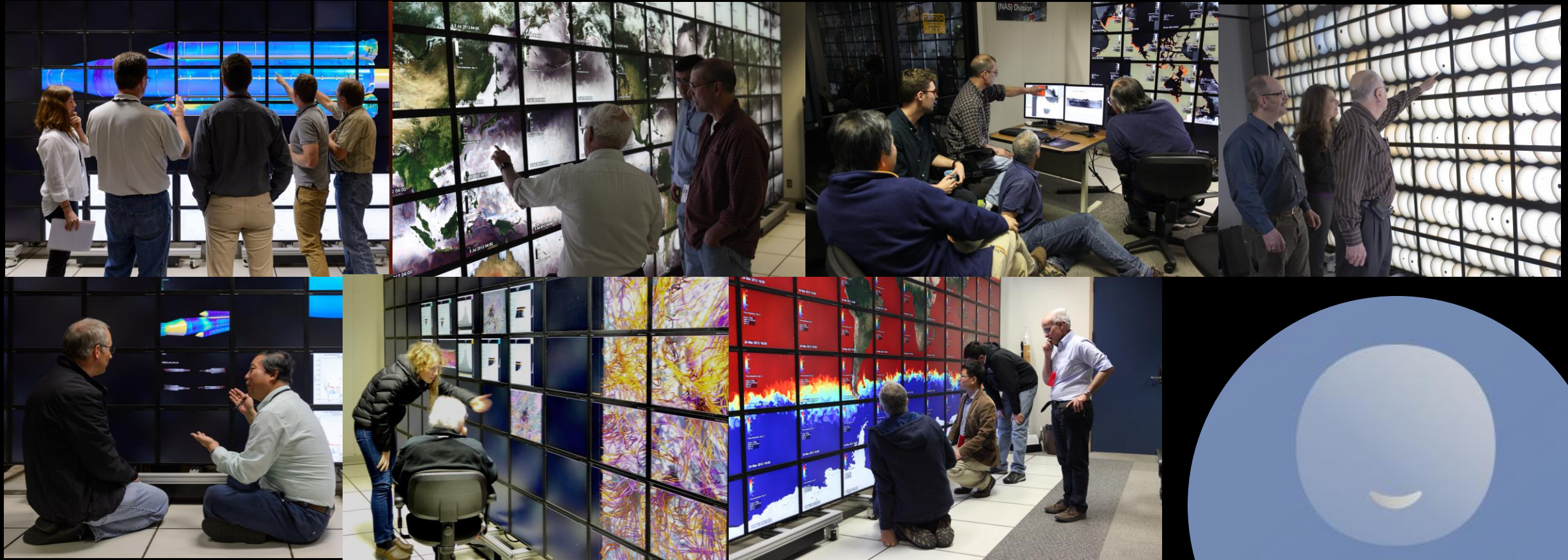


Fast
Slow
Surface Velocity

Fast
Slow
Particle Speed



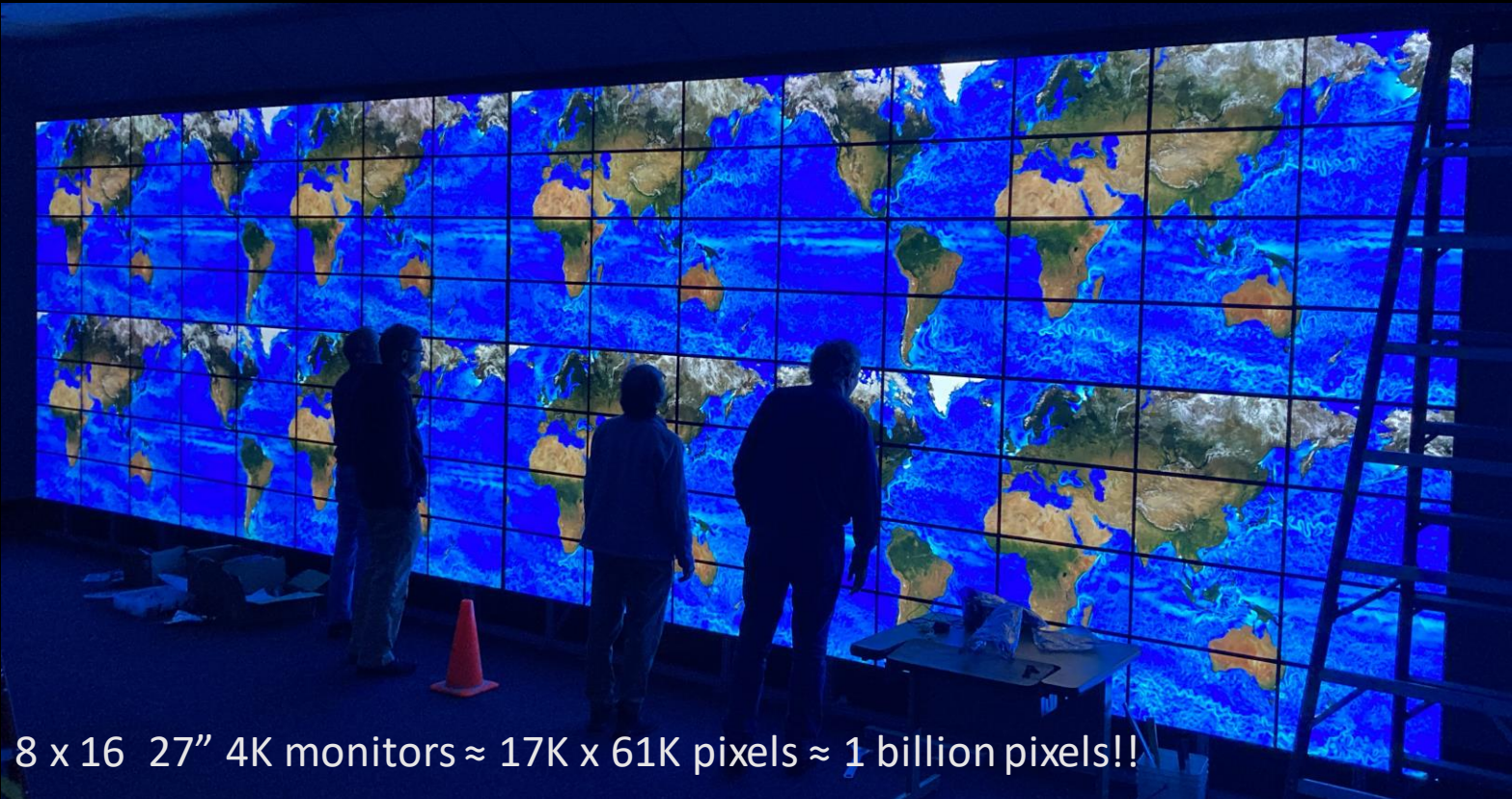
Supporting Science with the NAS Hyperwall



Supporting Science with the NAS Hyperwall



- 128 CPU nodes, each with 2 24-core Intel Xeon Platinum 8268 processors.
- Total cores: 6,144 processor cores.
- 128 NVIDIA Quatro RTX 6000 GPUs.
- 1.8 PB BeeGFS filesystem built on the SSDs.
- Interconnects: woven into the NAS infrastructure via InfiniBand.



8 x 16 27" 4K monitors $\approx$ 17K x 61K pixels $\approx$ 1 billion pixels!!





Ideas? Questions? Suggestions?

We want to hear from you!
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