

National Aeronautics and Space Administration

HECC Data Analysis & Visualization

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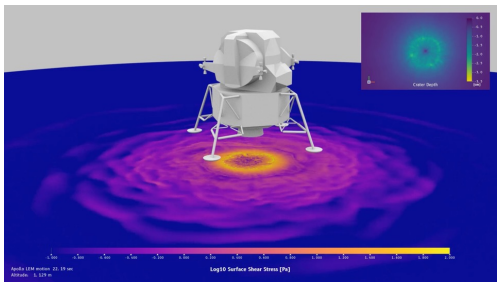
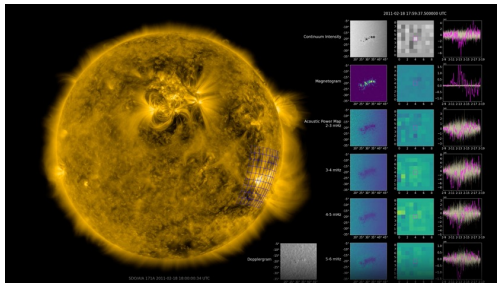
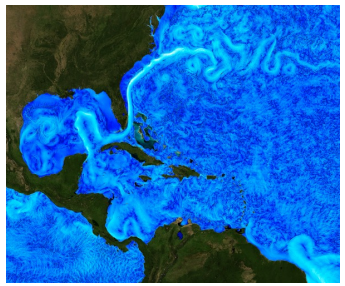
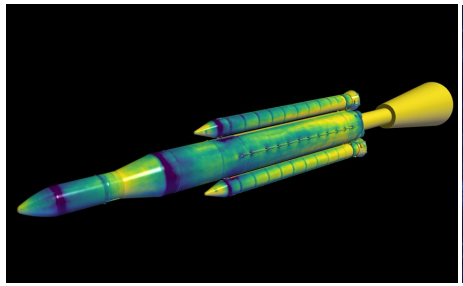
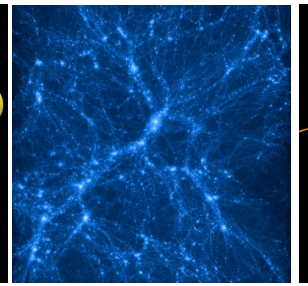
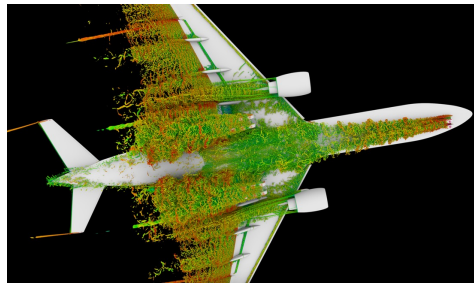


Here's what we can do for you!

- 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.



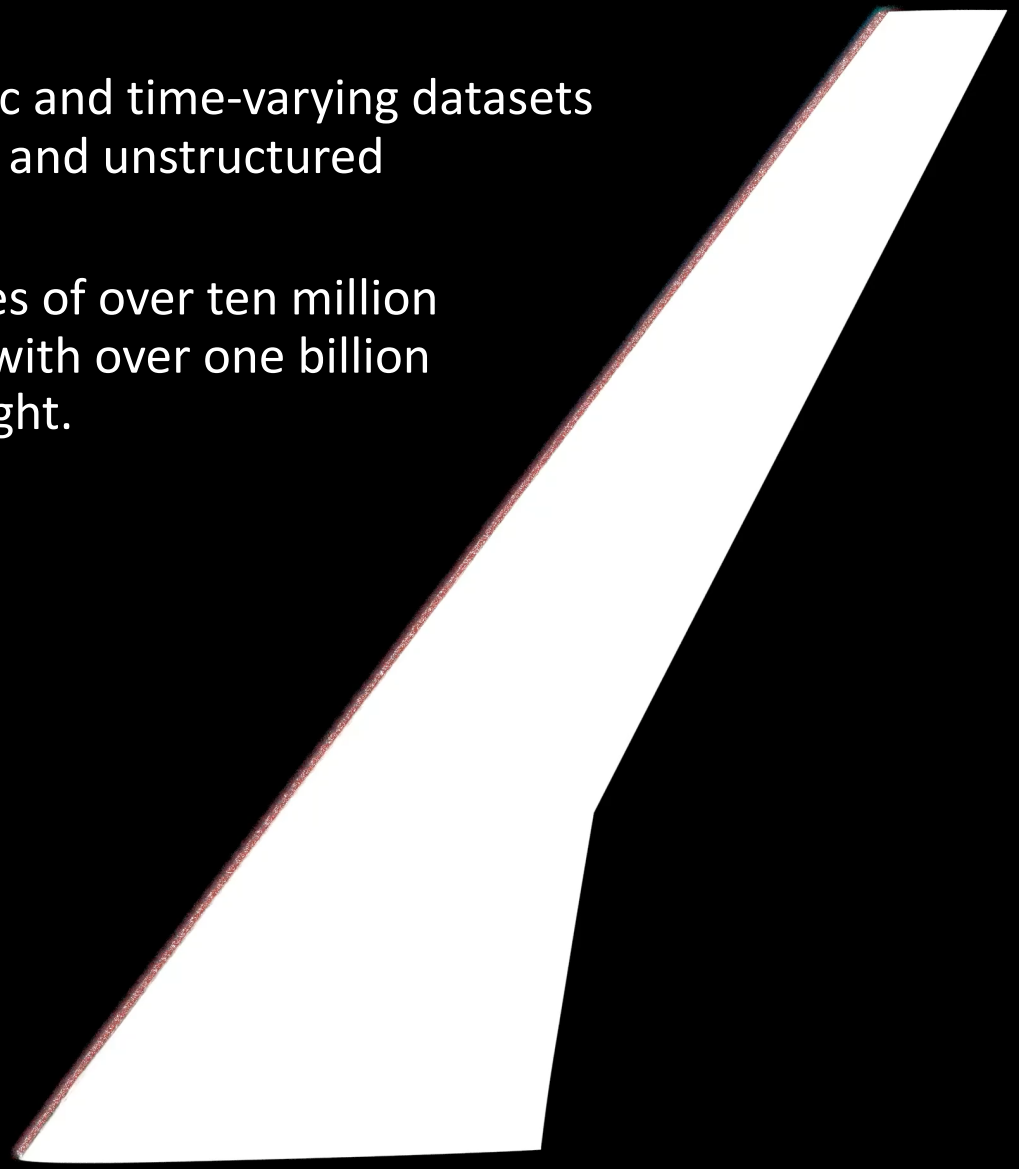


Simulating Observations Of Galaxy Formation

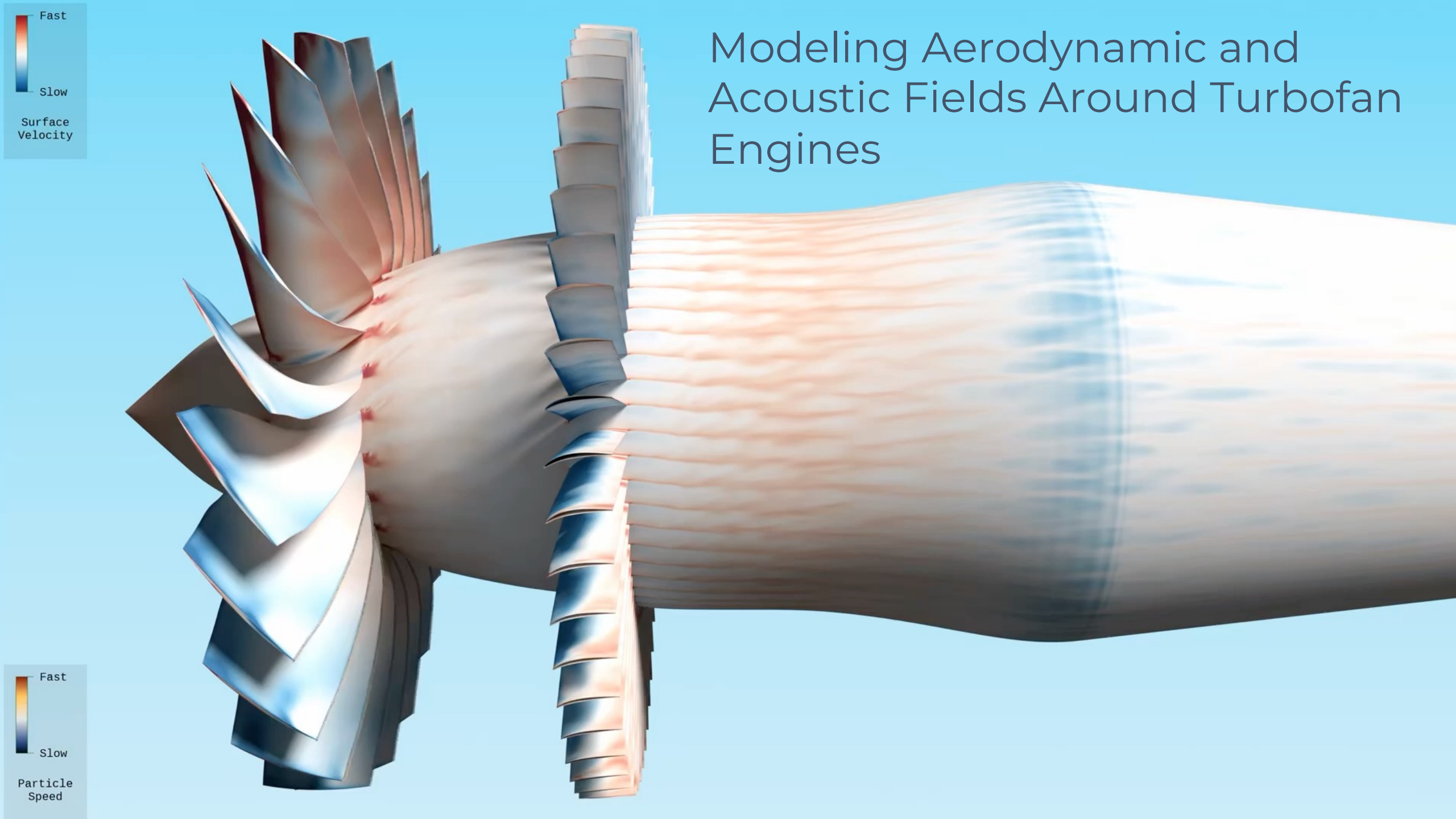
- Streamlined analysis pipeline resulting in a 500x speedup.
- Produced in-house HPC radiative transfer code, yielding additional speedup 60+hrs/frame => 5.5mins/frame.

Distributed Particle Advection

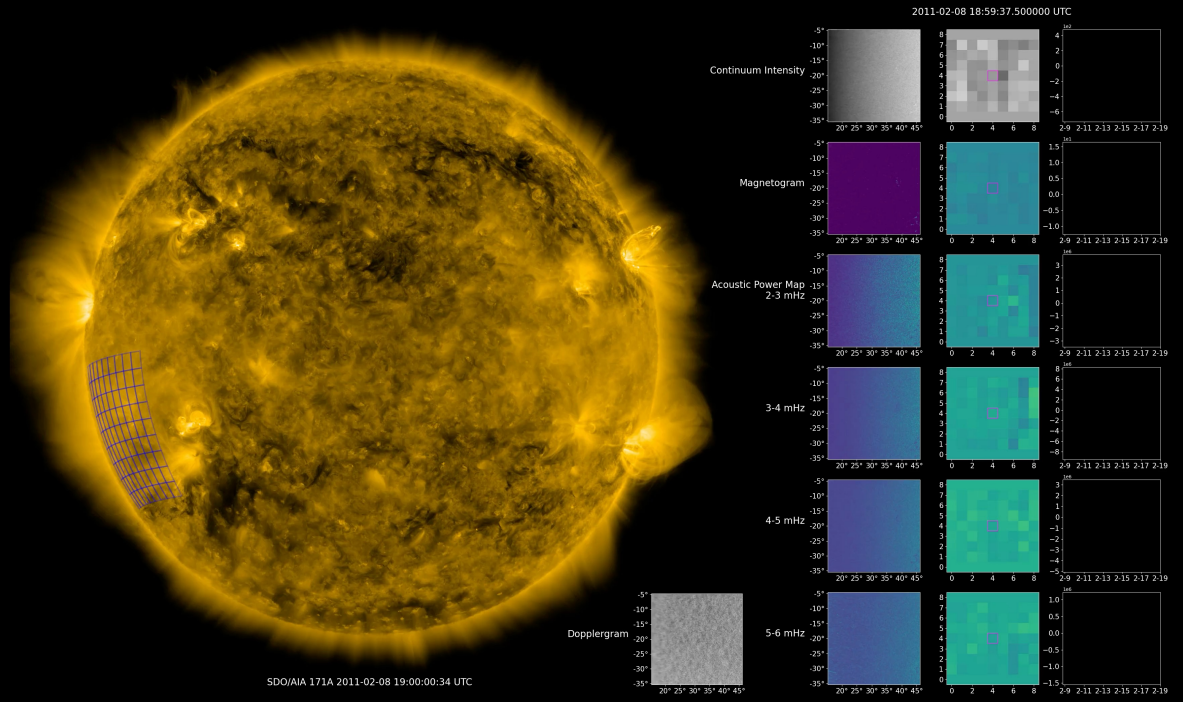
- Supports static and time-varying datasets on curvilinear and unstructured meshes.
- Sustained rates of over ten million particles/sec with over one billion particles in flight.

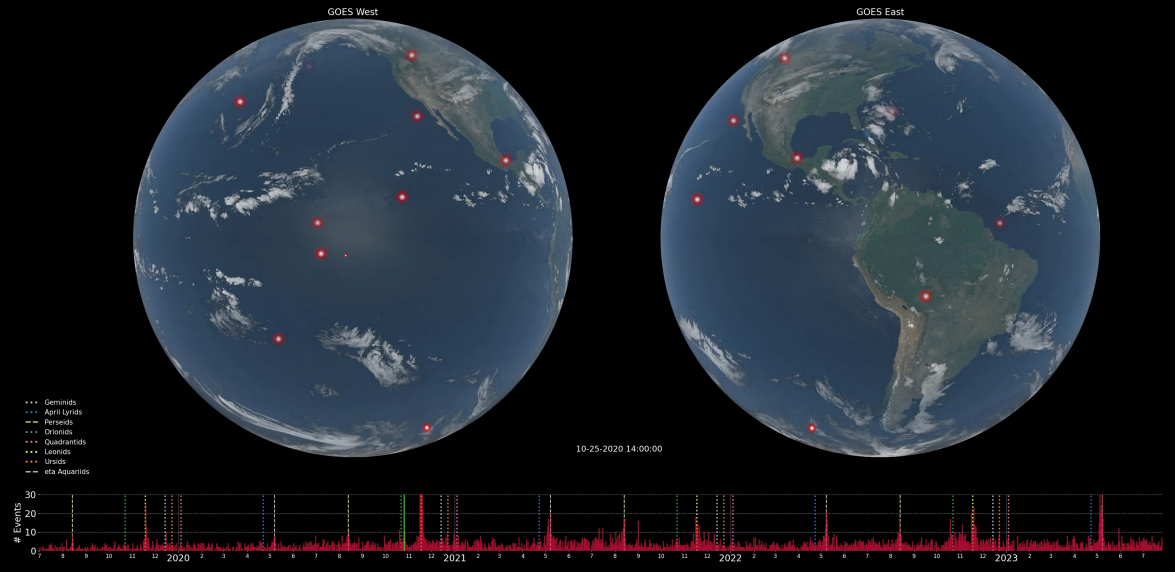


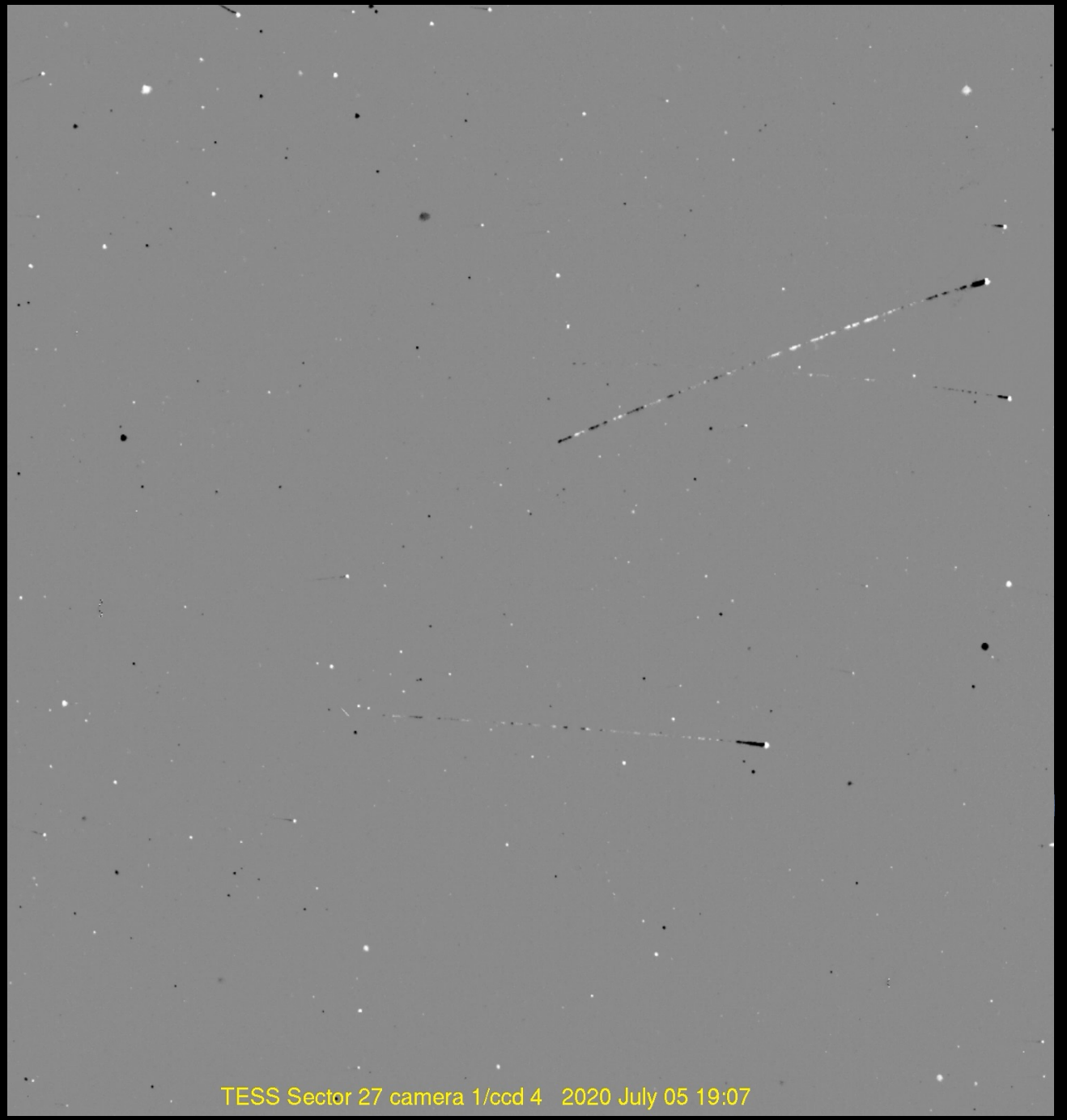
Iced wing CFD Simulations for Aerodynamic Performance Predictions



Modeling Aerodynamic and Acoustic Fields Around Turbofan Engines


2011-02-08 18:59:37.500000 UTC
Continuum Intensity
Magnetogram
Acoustic Power Map 2-3 mHz
3-4 mHz
4-5 mHz
5-6 mHz
Dopplergram
SDO/AIA 171A 2011-02-08 19:00:00:34 UTC

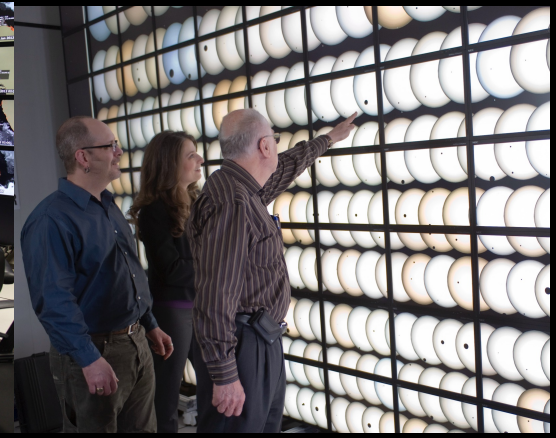

GOES West
GOES East
10-25-2020 14:00:00
Geminids
April Lyrids
Perseids
Orionids
Quadrantids
Leonids
Ursids
eta Aquariids
Events
2020
2021
2022
2023

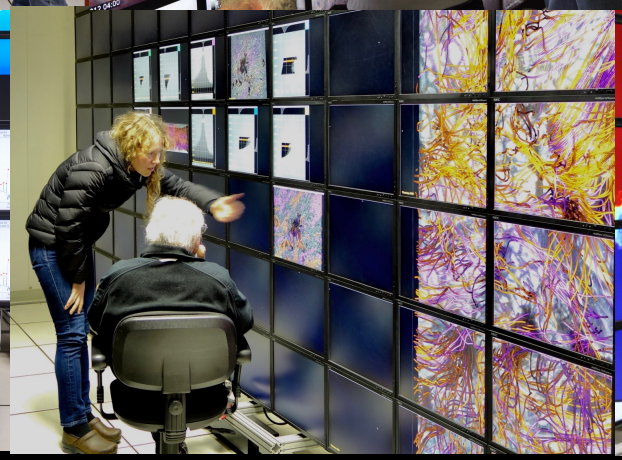
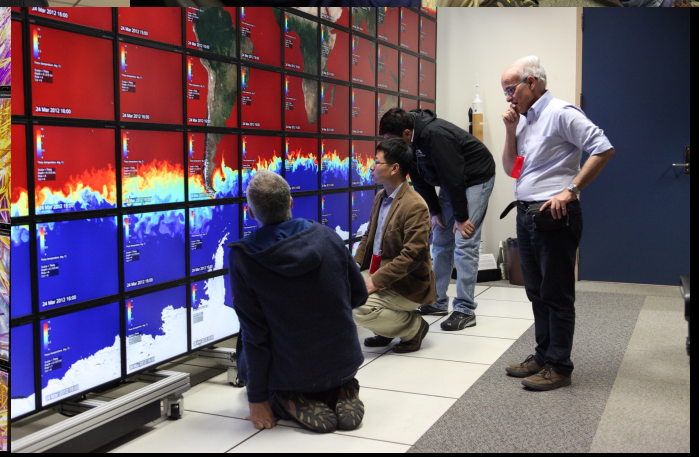

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Supporting Science with the NAS Hyperwall





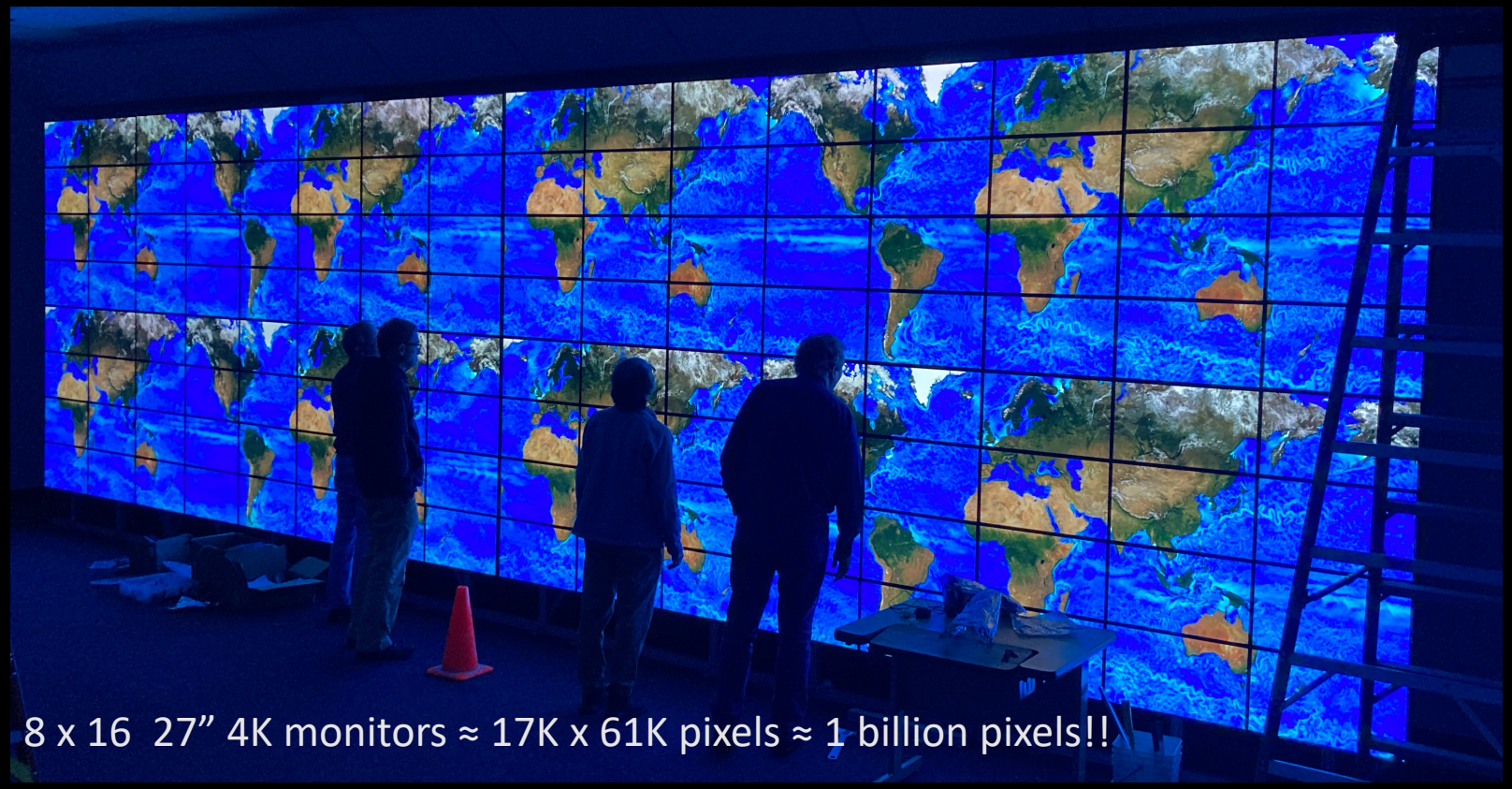



Supporting Science with the NAS Hyperwall





- 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.



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Ideas?
Questions?
Suggestions?

We want to hear from you!

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chris.henze@nasa.gov

