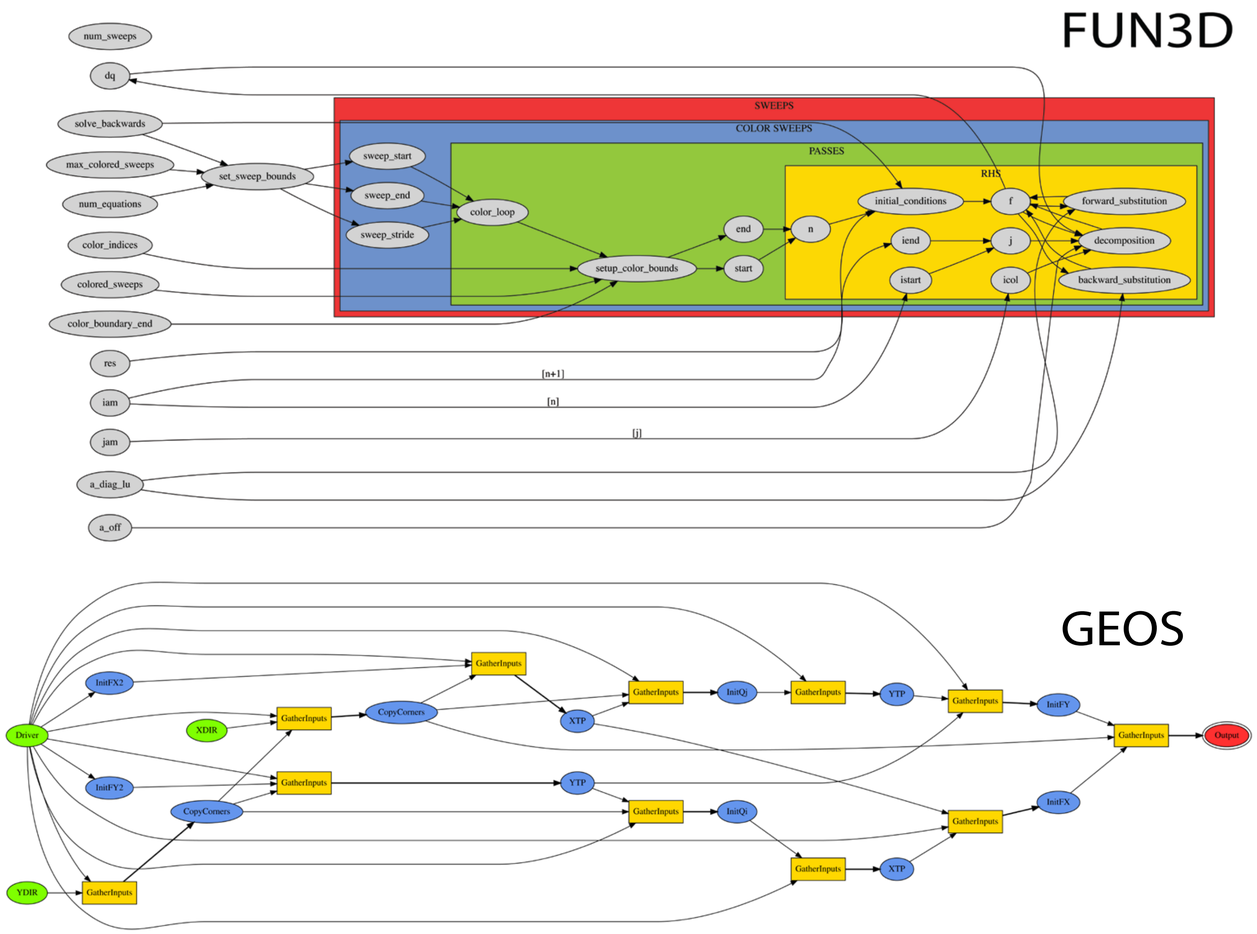
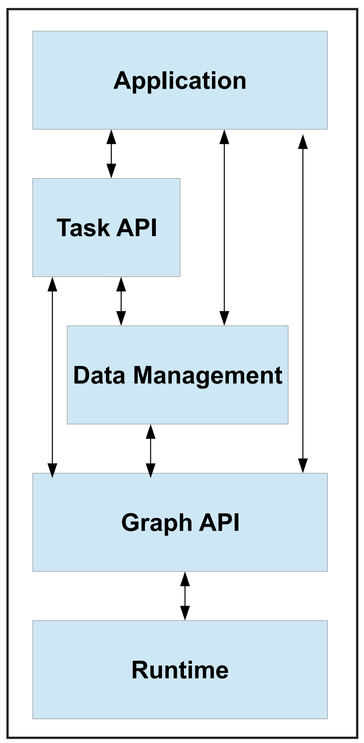


The upper flow graph represents the breakdown of FUN3D's linear system solver into its six fundamental tasks, the connections between tasks, and the flow of input and output (I/O) data. The colored blocks represent the iterations over the tasks to solve the system. Similarly, the lower flow graph shows the finite-volume dynamical core from GEOS split into several core tasks with additional bookkeeping tasks to handle data management. *Adam Markey, Marcus Hayes, EM Photonics*



The Task-Based Scheduler and associated API are designed to be generic and extensible so that they can be used by a wide variety of applications. Having several layers in the API allows developers to selectively use the features that benefit them most while bypassing other layers if desired. Each API layer is built upon the public APIs of other layers so that developers can extend features for use-cases not originally envisioned. *Adam Markey, Marcus Hayes, EM Photonics*

National Aeronautics and Space Administration

Task-Based HPC Scheduler for Scalable, Cross-Platform Software

Building modern high-performance computing (HPC) software requires detailed knowledge of multiple processing and interconnect architectures, making it difficult for domain experts to write efficient software. We are developing tools to handle data movement and the scheduling of computational tasks automatically, allowing developers to spend more time on the science of their applications. While potentially relevant to a wide range of NASA applications, this work focuses on the Goddard Earth Observing System (GEOS) climate modeling software run on the Discover supercomputer at NASA's Goddard Space Flight Center and the FUN3D computational fluid dynamics package developed at NASA's Langley Research Center.

Ariel Sherman, EM Photonics/NASA Goddard Space Flight Center
Eric Kelmelis, EM Photonics/NASA Goddard Space Flight Center