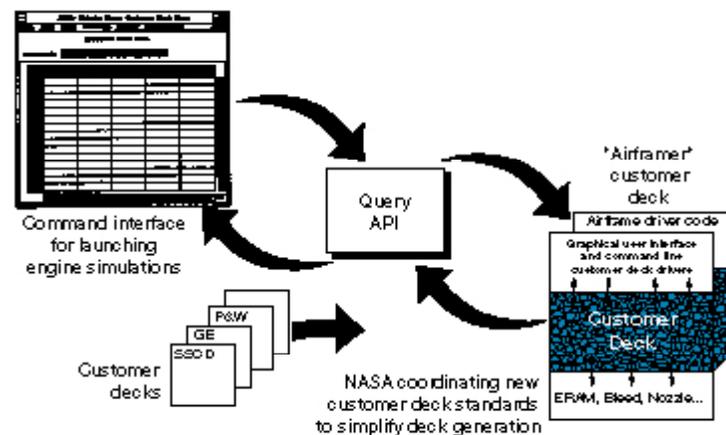


Steady-State Cycle Deck Launcher Developed for Numerical Propulsion System Simulation

One of the objectives of NASA's High Performance Computing and Communications Program's (HPCCP) Numerical Propulsion System Simulation (NPSS) is to reduce the time and cost of generating aerothermal numerical representations of engines, called customer decks. These customer decks, which are delivered to airframe companies by various U.S. engine companies, numerically characterize an engine's performance as defined by the particular U.S. airframe manufacturer. Until recently, all numerical models were provided with a Fortran-compatible interface in compliance with the Society of Automotive Engineers (SAE) document AS681F, and data communication was performed via a standard, labeled common structure in compliance with AS681F. Recently, the SAE committee began to develop a new standard: AS681G. AS681G addresses multiple language requirements for customer decks along with alternative data communication techniques.



Steady-State Cycle Deck (SSCD) provides a mechanism to incorporate various customer decks.

Along with the SAE committee, the NPSS Steady-State Cycle Deck project team developed a standard Application Program Interface (API) supported by a graphical user interface. This work will result in Aerospace Recommended Practice 4868 (ARP4868). The Steady-State Cycle Deck work was validated against the Energy Efficient Engine customer deck, which is publicly available. The Energy Efficient Engine wrapper was used not only to validate ARP4868 but also to demonstrate how to wrap an existing customer deck. The graphical user interface for the Steady-State Cycle Deck facilitates the use of the new standard and makes it easier to design and analyze a customer deck. This software was developed following I. Jacobson's Object-Oriented Design methodology and is implemented in C++.

The AS681G standard will establish a common generic interface for U.S. engine companies and airframe manufacturers. This will lead to more accurate cycle models, quicker model generation, and faster validation leading to specifications. The standard will facilitate cooperative work between industry and NASA. The NPSS Steady-State Cycle Deck team released a batch version of the Steady-State Cycle Deck in March 1996. Version 1.1 was released in June 1996.

During fiscal 1997, NPSS accepted enhancements and modifications to the Steady-State Cycle Deck launcher. Consistent with NPSS' commercialization plan, these modifications will be done by a third party that can provide long-term software support.

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