

JANNAF Community Meets in Orlando for Joint Subcommittee Meeting

The 6th Modeling and Simulation Subcommittee (MSS)/4th Liquid Propulsion Subcommittee (LPS)/3rd Spacecraft Propulsion Subcommittee (SPS) joint technical meeting marks another success for the JANNAF community. Dr. James M. Haas of the Air Force Research Laboratory (AFRL) at Edwards AFB, Calif., chaired the joint program of 230 technical papers and presentations, during the week of December 8-12, at the Hilton Walt Disney World Resort located in Orlando, Florida.

The subcommittees executed a very strong meeting with a high density of quality technical work. In total, there were 15 sessions in MSS, 17 sessions in LPS, and 15 sessions in SPS. The turnout and quality of the sessions are a testament to the stability and importance of these subcommittees and members' dedication to their communities.

Technical Highlights

Mr. Richard S. Matlock, Program Director for the Ballistic Missile Defense System Kill Vehicles Program presented the keynote address on Tuesday, December 9th. A packed house was very interested to hear about the current activities and future plans of the Missile Defense Agency. A number of great videos of successful interceptions and a kill vehicle hover test made this keynote one to remember.

In other special engagements, Allan McDonald, Bob Geisler, and Angela Faulkner provided a history lesson of launch vehicle failures with an eye towards a 20/20 hindsight evaluation of how they may have been prevented. The Modeling and Simulation Subcommittee also hosted a workshop, serving as the official kickoff for an AFRL-funded study for JANNAF on the business case of health management for solid rocket motors and liquid rocket engines.

The Spacecraft Propulsion Subcommittee hosted three well attended working groups on electric propulsion (EP) topics. The EP Life Qualification Standard Working Group addressed the issues of what combination of testing and analysis is appropriate for thruster lifetime qualification, and is tasked with clearly defining a standard method to qualify Hall and gridded-ion thruster life using specific ground test criteria coupled with numerical erosion and life model predictions. The High Power EP Analysis of Alternatives Working Group discussion was to determine which technologies in electric propulsion are potential candidates for next generation, multi-kilowatt DoD EP applications. The EP Modeling and Simulation Working Group was formed to reach consensus on the scope and depth of a manual of EP physical data intended to solve the current paucity of physical data to validate the quality of computational simulations.

Awards Highlights

Continuing a tradition instituted at the 2005 JANNAF meeting held in Monterey, student achievements and participation were highlighted during the awards ceremony. The SPS recognized Mr. Erik Dambach of Purdue University for his 2007 paper "An Investigation into the Hypergolicity of Dicyanamide-based Ionic Liquid Fuels with Common Oxidizers." Erik was presented with a certificate for his achievement.

Panel Activities

The MSS Simulation Credibility: Uncertainty, Verification, Validation, and Risk Panel held their 2nd workshop to gather support for the creation of the "JANNAF Guide to UQ, V&V, and Simulation Credibility in Propulsion and Energetics Modeling." The consensus between those attending was that a guide, as opposed to a standard, for simulation credibility is the right method to achieve broader adoption. The panel is soliciting example cases in which the methods and procedures outlined in the guide can be demonstrated. Seven presentations of potential example cases were given, which included topics such as performance prediction of solid rocket motors, scramjet isolator flow field prediction, unit problems for combustion instability in liquid rocket engines, non-reactive swirl stabilized flame tube, and vortex preservation in computational fluid dynamics (CFD). Although many of the



Program Chair Dr. James M. Haas and Keynote Speaker Mr. Richard S. Matlock.

presented example cases included the use of CFD as the code for the simulation, the guide activity will not be specific to CFD. Authors and additional example cases are still desired for the guide, and interested parties should contact CPIAC's Nick Keim at nkeim@cpiac.jhu.edu.

The Virtual Engineering Panel is starting a round robin to address the lack of comparisons between the many multidisciplinary optimization (MDO) tools that are in existence and use throughout the industry. The round robin will quantify the variance between tools and benefit both government and private customers. Candidate problems to be analyzed by each of the tools were identified and will be focused through additional meetings. The panel plans to hold teleconferences between JANNAF meetings.

The Integrated Health Management (IHM) Panel continued their combined efforts with the LPS Engine Health Management (EHM) Panel hosting the business case workshop for health management in liquid rocket engines and solid rocket motors. The business case activity being spearheaded by Jim MacConnell of Consensus Technologies aims for broad industry participation in order to gather all the necessary information required for a complete and accurate analysis of the potential benefit of health management. The study is being modeled after a previous business case Consensus Technologies put together for AFRL on health management for unmanned aerial vehicles. In addition to the business case, the IHM and EHM panels along with the Structures & Mechanical Behavior Subcommittee continued their series of workshops of sensors for health management. The workshop included a brainstorming session on requirements for reliable sensors and the initial planning for a JANNAF health management database for sensor technologies.

The LPS Test Practices and Standards Panel held a working group in order to renew efforts on the "Liquid Rocket Engine Test Guide." Remaining action items required to release the test guide were identified. There was also an important discussion on the need to remind the community that the document is a guideline, not a specification. Preliminary versions of the test guide are already being used in the small private commercial sector with great success.

The Hydrocarbon (HC) Fuels Panel discussed a wide range of topics including the following:

- the addition of the APS Fuels Panel to the HC Fuels Panel
- the need to continue to shepherd the RP and LCH4 specifications
- a desire by the panel to adopt the recommendations and findings from the September 2008 HC Fuels Workshop at NIST
- a desire by the panel to assist the propulsion community in evaluating the compositional variability of RP-1 (and RP-2 in the longer term).

The SPS panels were also very active. The SPS Chemical Propulsion Panel presented a status update on their efforts with the Spacecraft Propulsion Database currently under development in conjunction with CPIAC. The SPS Electrical Propulsion Panel hosted three working groups, which were previously mentioned. The panel meeting included a discussion of a variety of new and continuing tasks to generate useful tools to solve current problems as well as a briefing on the reason for the recent spike in the price of Xenon. The SPS Micropropulsion Panel discussed the initial progress in collecting micropropulsion technology information for a database tool.

Meeting Proceedings

Meeting proceedings for the combined MSS/LPS/SPS Technical Meeting and the Health Management Sensors Workshop will be published separately and will be available soon. Contact the CPIAC main office at (410) 992-7300 for more information, or to order any of the proceedings.

7th Modeling and Simulation, 5th Liquid Propulsion, 4th Spacecraft Propulsion Joint Meeting

The next joint MSS/LPS/SPS meeting is tentatively scheduled for May 2010 and will coincide with the 57th JANNAF Propulsion Meeting (JPM).

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