

Large Attendance and Special Topics Highlight JANNAF Meeting in Colorado Springs

The 39th JANNAF Combustion Subcommittee (CS), 27th JANNAF Airbreathing Propulsion Subcommittee (APS), 21st Propulsion Systems Hazards Subcommittee (PSHS) Meeting, and the 3rd JANNAF Modeling & Simulation Subcommittee (MSS) Meetings were jointly held during the week of 1-5 December 2003 at the Antlers Adam's Mark Hotel and The Aerospace Corporation, Colorado Springs, CO. Ms. Susan Peters of the Naval Surface Warfare Center, Indian Head, MD served as the joint Meeting Chairman. Nearly 500 scientists, engineers, and managers attended the meeting with a total of 364 papers presented in 61 technical sessions, representing over a 25% increase in attendees and 45% increase in papers over the 2002 Meeting in Destin, Florida. Contributors to the growth included APS sessions on NASA's Next Generation Launch Technology (NGLT) and Columbia Accident Investigation, CS/PSHS sessions on Hydrogen Peroxide technology, and the continued the growth of APS and MSS participation in general.

The meeting opened with a crowd pleasing special presentation by Major General (retired) John L. Barry, Executive Director of the Columbia Accident Investigation Board (CAIB), on "When the Right Stuff Goes Wrong." Maj. Gen. Barry was most recently Director of Plans and Programs, Headquarters Air Force Materiel Command, Wright-Patterson AFB, Ohio. Barry's presentation was followed by three specialist sessions reviewing the external and internal aerothermodynamics of the STS-107 flight. Mr. Douglas E. Coats, President of Software and Engineering Associates (SEA), Incorporated, Carson City, Nevada, gave an informative keynote address on "Changes in Propulsion Modeling Over the Last Four Decades." Mr. Gene Allen, MSC Software Corporation, offered a presentation in an MSS plenary session entitled "Complexity and Risk Management: New Challenges for Engineering in the 21st Century."

Opening ceremonies also included presentation of awards for outstanding contributions to JANNAF and the respective subcommittees. Mr. Karl Kraeutle, formerly of the Naval Air Warfare Center at China Lake, was posthumously honored as a recipient of the Combustion Subcommittee Award. Due to Kraeutle's recent passing, Ms. Alice Atwood graciously accepted the award for the family and in honor of her mentor. Airbreathing Propulsion Subcommittee Awards were presented to Dr. David Riggins of the University of Missouri-Rolla, and to Dr. David Van Wie of The Johns Hopkins University Applied Physics Laboratory. The first MSS Subcommittee Recognition Awards were given to Mr. Scott Hyde, ATK Thiokol Propulsion, and to Ms. Joan Pallix, NASA Ames Research Center.

Two individuals were honored as recipients of the Executive Committee (EC) Lifetime Achievement Award for their sustained service to JANNAF. Dr. Thomas L. "Thom" Boggs, Senior Scientist, Energetics Research at the Naval Air Warfare Center was honored for his more than three decades of active participation in the CS and PSHS technical steering groups and multiple panels, as well as a record of authorship of over 120 JANNAF papers and counting. The second recipient, Mr. Albert W. "Al" Horst, Chief of the Weapons and Ballistics Concepts Division at the Army Research Laboratory, Aberdeen Proving Ground Maryland, has a lengthy record of service on the Combustion Subcommittee, including two stints as Subcommittee

Chairman. Most recently, Horst completed a three-year term as chairman of the JANNAF Executive Committee in 2002, after being elevated to the EC nearly ten years ago.

The CS technical program included presentation of 63 technical papers in eight CS sessions and an additional 32 papers in 5 joint sessions cosponsored by APS, PSHS and MSS. The CS technical sessions covered propellant and ingredient combustion; propellant combustion modeling; metal and nano-sized material combustion; gun modeling; gun ignition; gun propellants and barrel erosion; combustion instability and gaseous flame studies; plasma propellant interactions; liquid and gaseous propulsion component development; and included a specialist session on flow field diagnostics. The joint sessions covered scramjet combustion and component modeling and simulation; scramjet combustion, test and analysis; fuel and propellant technology; and hydrogen peroxide propulsion applications and testing. The Kinetics Panel is identifying tasks in thermobarics, micro devices and new technologies, and liquid and gaseous hydrocarbon kinetics. The Propellant Burning Rate Panel is collaborating with the Propellant Development & Characterization Subcommittee (PDCS) to establish a electronic database of gun propellant data. Two future workshops were identified on “Novel Ingredients & Formulations for Gun Propellants,” and “Closed Bomb Methods.”

The APS technical program included presentation of 130 technical papers in 21 APS sessions and an additional 59 papers in 11 joint sessions cosponsored by CS and MSS. The technical sessions covered scramjet and combined cycle instrumentation and testing; scramjet and combined cycle thermal management; hypersonic technology overviews; TBCC technology; aerothermodynamics, flow physics and tools; ISTAR/RBCC system and component development; hypersonic aerodynamics, aeropropulsion and flight mechanics; high speed inlet technology; flowpath design and test; X-43C hypersonic flight demonstrator; composite cryogenic tanks; metal cryogenic tanks; leading edge and acreage TPS; enabling airbreathing and cross cutting technology; airframe hot and integrated metallic and composite structures; advanced materials and safe life; airframe CMC control surfaces. The joint sessions covered future responsive space launch concepts; STS-107 external aerodynamics, internal flowfield and aerothermodynamics; ISTAR and combined cycle modeling and simulation; numerical system simulation; scramjet combustion and component modeling and simulation; scramjet combustion, test and analysis; and fuel and propellant technology. The APS Engine Test & Validation Panel is very busy developing practices and standards for scramjet engine testing.

The APS conducted three evening workshops on “Scramjet Engine Test Standards”, “Scramjet Test Medium Effects,” and “Scaling Laws for Hypersonic Aerospace Systems.” Two future APS workshops were identified on “Integrated Approach to Flight Clearance for Hypersonic Vehicles,” and “Analytical and Experimental Determination of Lean Blowout Limits in Scramjets.” Participants were pleased with the technical program, continuing the trend of providing a strong forum for review of US hypersonic propulsion technology.

The PSHS technical program included presentation of 35 technical papers in six sessions sponsored by the PSHS with an additional 15 papers in 2 joint sessions on hydrogen peroxide propulsion applications and testing cosponsored by CS. Technical sessions covered characterization of cookoff phenomena; quantifying the response of energetic materials to cookoff; violent reaction and detonation; projectile impact; the vulnerability of solid gun

propellants; and various solid rocket motor safety and hazard classification topics. Reflecting the continuing interest in the development of models to predict the response of energetic materials to hazard stimuli, a significant number of presentations described activities in the areas of cookoff and impact simulation, as well as experiments aimed at providing needed data to the modeling and simulation community.

Meetings of all current PSHS technical panels were also held during the week. The Cookoff Panel discussed the accomplishments of the recently completed DOD/DOE collaborative research initiative to develop validation experiments for cookoff to aid in the evaluation of computational tools under development. Plans were made to prepare comprehensive documentation of this effort. Additional discussions addressed the remaining shortfalls, such as the prediction of response violence and fragmentation, and opportunities for the panel to support and improve ongoing cookoff testing programs. Discussions in the Impact/Shock Induced Reactions Panel centered around the role of the panel in ongoing impact modeling efforts, and providing support to DoD's Insensitive Munitions technology development and assessment efforts. All of the PSHS panels expressed a need for increased collaboration between JANNAF panels, and increased participation of industry partners.

The MSS technical program included presentation of 61 technical papers in 9 sessions sponsored by the MSS with an additional 54 papers in 10 sessions cosponsored with the APS and CS. The technical sessions covered: liquid propulsion system integration; NASA/DoD IHM program overviews; nano technology for propulsion systems; uncertainty quantification; system level diagnostics and prognostics; health monitoring and fault detection; and virtual engineering. The jointly sponsored sessions covered: future responsive space launch concepts; STS-107 external aerodynamics, internal flowfield and aerothermodynamics; ISTAR and combined cycle modeling and simulation; numerical system simulation; scramjet combustion and component modeling and simulation; and fuel and propellant technology. The MSS Panels met to review activities and identify future tasks. This third meeting of the MSS continued its healthy growth trend with a substantial increase in participation since the 2002 meeting.

JANNAF continues to be effective in addressing problems of mutual interest to the government, industry and academia. Fruitful meetings of current CS, APS, PSHS, and MSS Technical Steering Groups were held throughout the week, contributing to the future direction of your technical activities. Overall, the meeting was judged to be a great success by the participants and stands witness to the improving health of the propulsion industry.

The combined proceedings of this meeting will be published on CD-ROM in February 2004. For ordering information, contact CPIA Customer Service at 410-992-7300 ext. 202 or 211.

This review was published in the January 2004 issue of the CPIA Bulletin.