

JANNAF Convenes in San Diego for Joint CS, APS, and PSHS Meeting

JANNAF's 41st Combustion Subcommittee (CS) Meeting, 29th Airbreathing Propulsion Subcommittee (APS) Meeting, and 23rd Propulsion Systems Hazards Subcommittee (PSHS) Meeting were held jointly during the week of 4-8 December 2006 at the San Diego Hotel and Marina and the Naval Fleet Training Intelligence Center, San Diego, California. Mrs. Alice I. Atwood of the Naval Air Warfare Center Weapons Division, China Lake, Calif. served as the Joint Meeting Chair. Approximately 370 scientists, engineers, and managers attended the meeting with a total of 222 papers presented in 41 technical sessions, representing slightly fewer attendees, but with more papers than the 2005 Meeting in Charleston, South Carolina. This year's numbers represent an increase since the Modeling and Simulation Subcommittee contributed to the Charleston Meeting. The PSHS had a sizable increase in their sessions and papers with this meeting, partially due to a surge in activity on Joint Service Insensitive Munitions.

The meeting opened with an interesting keynote address by Dr. Spiro Lekoudis, Director of Weapons Systems in the Office of the Deputy Under Secretary of Defense for Science and Technology (S&T). Dr. Lekoudis discussed "*The R&D Choices and Priorities Facing the U.S.*" and highlighted the general categories of threats facing the U.S., the importance of propulsion, the advances needed in the future, the investments and the choices facing the R&D community.

Opening ceremonies also included presentation of an Executive Committee (EC) award as well as awards for outstanding sustained contributions to JANNAF. Dr. Unmeel Mehta, NASA Ames Research Center, was presented an EC Award for his diligent and sustained contributions as the first Technical Steering Group (TSG) Chair of the Modeling and Simulation Subcommittee (MSS) and in recognition of his efforts in starting the MSS. The Combustion Subcommittee (CS) awards for outstanding sustained contribution were presented to Dr. Michael J. Nusca, Army Research Laboratory, Maryland, and Dr. Rich Behrens, Sandia National Laboratory, California. The Airbreathing Propulsion Subcommittee (APS) awards for sustained contribution were presented to Dr. Louis A. Povinelli, NASA Glenn Research Center, Ohio, and Mr. Earl Andrews, NASA Langley Research Center and Swales Aerospace Incorporated, Virginia. The Propulsion Systems Hazards Subcommittee (PSHS) award for sustained contribution was presented to Ms. Jamie M. Fisher, Army RDECOM, Alabama. A Certificate of Recognition for service to the PSHS Community and JANNAF was awarded to Mr. Daniel F. Schwartz, Air Force Research Laboratory, Edwards AFB, California.

The CS technical program included presentation of 95 technical papers in 21 technical sessions sponsored by the CS, with papers in 3 sessions on Future Alternative Fuels cosponsored with the APS. These numbers represent an approximate 25% increase over the 2005 Meeting in Charleston. The CS technical sessions covered: combustion modeling of solid propellants; motor performance prediction; de-composition of energetic materials; enhanced blast modeling, test and evaluation, and formulations; reactive materials; aluminum agglomeration and combustion; gun propellants and ingredients; gun igniters and primers; gun interior ballistics modeling of small caliber ammunition; combustion diagnostics; and component characterization and development. The jointly sponsored session covered: future alternative fuels for propulsion system design.

Meetings of all current CS technical panels were held during the week. Formation of two new technical panels was approved by the CS TSG: the Reactive Materials Panel, which will be a joint panel with the PEDCS, and the Liquid Fuel Kinetics and Properties Panel, which will be a joint panel with the APS, LPS and MSS. Charters and tasks are being formulated. If you have interest in participating, contact the respective TSG Chairs for more information. The current Kinetics Panel is diligently developing a report, anticipated in mid-to-late 2007, containing recommendations on the R&D required to implement new energetic ingredients in munitions. A follow-up meeting was held in San Diego by the participants of a 3-day workshop held previously at ARL in October 2006. The joint CS/PEDCS Propellant Burning Rate Panel was disbanded

with the conclusion of its recent work: completion and reporting of two workshops on Closed Bomb Burning Rate Methods and Novel Gun Propellants; and, the establishment of a Gun Propellant Database. The Flowfield Diagnostics Panel is continuing to foster better collaboration between the computational and experimental communities. The CS TSG is helping this panel by identifying specific diagnostic problems of concern.

Future CS workshops being considered include "Reactive Materials," "Condensed Phase Kinetics," "Improvements to Performance Prediction Methods," "Gun Propellant Ignition," "Small Caliber Ammunition," and "Replacement Fuels for Hypergolics." Advise the program committee members (identified in the meeting program) if you support or are interested in participating in any of these proposed workshops.

The APS technical program included presentation of 64 technical papers in 10 technical sessions sponsored by the APS with papers in 3 sessions on Future Alternative Fuels cosponsored with the CS. These numbers represent a slight decrease from the 2005 Charleston Meeting. The technical sessions covered: airbreathing propulsion testing; hypersonic propulsion integration; hypersonic technology overviews; sessions on X-43A, GDE-2, HyCAUSE and Rectangular-to-Elliptical Transition (REST) Flowpath; hypersonic airframe structures and materials; scramjet fuel injection; and, flowpath isolators. The jointly sponsored session covered: future alternative fuels for propulsion system design.

Meetings of all current APS technical panels were held during the week. The APS Engine Test and Validation Panel is very busy developing standards for scramjet engine testing, drawn from Publication 710, *Scramjet Propulsion Testing, Recommended Practices and Guidelines* (2nd Ed.), released December 2005. Additionally, this panel is examining test medium effects in scramjet testing, and sponsored a specialist session on flight testing as an essential part of scramjet engine development. The Component Level and Physical Modeling Panel is interested in pursuing activities in two areas: turbulent mixing, Schmidt number modeling and data collection; and, isolator CFD modeling. The Structures and Materials Panel has continuing interests to identify the following: state of the art (SOA) in non-metallic high temperature materials; a technology roadmap for developments; and, existing and needed test facilities. The Fuels Panel has interests in joint activities with the CS, LPS and MSS involving the kinetics of liquid hydrocarbon fuels. The Advanced Engine Cycle Panel's primary interests involve using existing X-43A engine test references data to validate analysis codes. The APS conducted a specialist session on "Flight Test – As an Essential Element of Scramjet Engine Development," and two workshops on "Scaling Laws for Hypersonic Aerospace Systems - Workshop III" and "Scramjet Engine Test Standards - Workshop VII."

Future APS workshops being considered are "Uncertainty in Hypersonic R&D - Including Scramjet Predictive Analyses, Ground Test, and Flight Test" and "Use of Community Codes in Conjunction with X-43A datasets to Analyze Engine Performance." Advise the program committee members (identified in the meeting program) if you support or are interested in participating in any of these proposed workshops.

The PSHS technical program included presentation of 63 technical papers in 9 sessions covering fast cookoff and cookoff response; hazard classification and explosives safety; shock, impact and violent reaction; and insensitive munitions technology. The number of papers represented an increase of more than 50% from the 2005 Charleston Meeting, largely due to a renewed level of activity in the area of insensitive munitions technology development for Joint Service applications, which accounted for nearly half of the PSHS program.

Meetings of all current PSHS technical panels were also held during the week. The Safety and Hazard Classification Panel is planning a second workshop on the topic of solid rocket motor handling safety, either in conjunction with the upcoming JANNAF Propulsion Meeting in May 2007, or later in the Spring. CPIAC representatives updated the panel on their funded effort to develop a database of solid propellant-related accidents. The Cookoff Panel focused on tentative plans for a workshop to discuss the current SOA in cookoff modeling and simulation capabilities. The panel believes it is essential to assess the community's current capabilities and prioritize

future efforts. The newly formed Insensitive Munitions (IM) Technology Panel held its first meeting in San Diego. Ms. Jamie Fisher, Army RDECOM, and Mr. Stephen Struck, AFRL, will cochair this panel. Initial panel tasks will include the generation of an historical record of IM technology efforts conducted by various organizations, and the development of a catalog of IM technologies applicable to tactical rocket motors.

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

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