Chemical Propulsion Information Analysis Center

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**Chemical Propulsion Information Analysis Center - CPIAC**

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CPIAC Overview

- **Mission:** Provide rapid, accurate propulsion science and technology information and analysis in support of national aerospace and defense objectives.

- **Scope:** Propulsion system, propellant and energetic material technologies for:
  - Rockets and Missiles
  - Space Systems
  - Gun-launched Munitions

CPIAC’s 60+ year heritage has provided a constant supporting presence to the DoD and NASA propulsion community, helping to avoid duplication of R&D and resulting in countless savings to the U.S. Government.
CPIAC Heritage

- Rocket Propellant Information Agency established at Johns Hopkins Applied Physics Laboratory with Navy and Army sponsors 1946
- Name changed to Solid Propellant Information Agency 1948
- Air Force begins sponsorship of SPIA 1951
- NASA becomes sponsor 1959
- Interagency Chemical Rocket Propulsion Group (ICRPG) chartered 1962
- SPIA merged with Liquid Propellant Information Agency to form CPIA in 1962
- CPIA designated as DoD Information Analysis Center under NAVSEA 1966
- ICRPG rechartered as JANNAF 1970
- CPIA relocates to APL’s Howard County campus in Laurel, Maryland 1976
- CPIA moves from APL to current Century Plaza headquarters in Columbia, Maryland 1978
- Operation of CPIA transferred from APL to JHU Whiting School of Engineering 1990
- DoD Administrative oversight of CPIA transferred to Defense Technical Information Center 1980
- CPIA designated as DoD Information Analysis Center under NAVSEA 1966
- JHU marks 50 years of continuous operation of CPIA with award of contract from DSCC 1996
- Chemical Propulsion Information Analysis Center established with new contract award to JHU 2005
## Primary Defense Customers

### Army Research Laboratory (ARL)
- Army Research Laboratory (ARL)
- Armament Research, Development & Engineering Center (ARDEC)
- Aviation & Missile Research, Development & Engineering Center (AMRDEC)
- Army Research Office

### Naval Air Warfare Center Weapons Division - China Lake (NAWC/WD)
- Naval Air Warfare Center Weapons Division - China Lake (NAWC/WD)
- Naval Surface Warfare Center Indian Head Division (NSWC/IH)
- Office of Naval Research (ONR)

### Office of the Director of DoD Research & Engineering (DDR&E),
- Office of the Director of DoD Research & Engineering (DDR&E)
- Department of Defense Explosives Safety Board (DDESB)
- Defense Ammunition Center (USADAC)

### Air Force Office of Scientific Research (AFOSR)
- Air Force Office of Scientific Research (AFOSR)
- Air Force Research Laboratory Space & Missile Propulsion Division
- Air Force Research Laboratory Aerospace Propulsion Division

### And All Major Defense Prime and Propulsion Contractors
CPIAC Supports Major Initiatives

- DoD Space Platforms Technology Area Review & Assessment (TARA)
- U.S. Missile Defense (MDA and SMDC)
- Technology for the Sustainment of Strategic Systems (TSSS)
- DDR&E Energetic Materials Investment Planning
- Integrated High Payoff Rocket Propulsion Technology (IHPRPT) Program
- NASA’s Exploration Initiative
CPIAC Supports the JANNAF IPC

JANNAF exists to:

• Promote and facilitate exchange of technical information in a controlled environment (U.S. only)
• Establish and promulgate standards
• Coordinate research and development programs
• Address issues of joint agency interest

12 JANNAF Subcommittees:

• Airbreathing Propulsion
• Combustion
• Exhaust Plume Technology
• Liquid Propulsion
• Modeling and Simulation
• Nondestructive Evaluation
• Propellant and Explosives Development and Characterization
• Propulsion Systems Hazards
• Rocket Nozzle Technology
• Safety and Environmental Protection
• Spacecraft Propulsion
• Structures and Mechanical Behavior

The JANNAF Interagency Propulsion Committee is composed of representatives from the DoD, the military services and NASA
What We Do For JANNAF

• Technical, Administrative and Logistical Support
• Develop and Publish Standards, Guidelines and Specifications
• Maintain and Distribute Performance Simulation Codes
• Host Technical Conferences and Workshops
  – ~Two Conferences per Year (250 to 600 attendees)
  – ~Three to Four Workshops per Year (25 to 75 attendees)
• Publish and Archive Proceedings and Reports

The JANNAF Community is estimated at ~ 4,000 active members
CPIAC Online Information Tools

• Suite of Access Controlled/Secure Database Tools
  – Accessible Online via Internet

• STI Library Access Tool (PIRS)
  – 105,000+ Documents
  – 36,000+ Documents Migrated to DTIC TEMS Project

• Rocket Motor Electronic Database (RMED)
• Solid Propellant Database (SPD)
• Propellant & Explosive Ingredients Database (PEID)
• Liquid Propellant Database (LPD)
• Rocket Propulsion Test Facilities (RPTF) Database
• Insensitive Munitions Test Database (in development)
• R&D Motor Ingredients Database (in development)
Missile Defense Support

• CPIAC conducted an ignition safety assessment for the silo-based Ground-based Interceptor (GBI) Booster.

• CPIAC assisted Arnold Engineering Development Center (AEDC) with acquiring Orion 38 nozzle configuration data necessary to complete an upper stage target simulation analysis for MDA.

• CPIAC researched and provided technical and historical data on the generation of aluminum oxide slag by upper stage rocket motors with partially submerged nozzles for AEDC.
• CPIAC supported the stand-up of the new Solid and Hybrid Propulsion Systems Branch at NASA Marshall Space Flight Center
• CPIAC contributed subject matter expertise and data for design and trade studies on solid boost and crew escape systems
• CPIAC's *Rocket Motor Electronic Database* identified inventory rocket motors to simulate launch loads CLV crew capsule testing.
Tactical Missile Demilitarization

- Tooele Army Depot (TEAD) is the designated DoD demilitarization center for tactical missiles.
- CPIAC has provided technical support for static firing disposal of propellant materials.

- Identification of propellant constituents, consumables, and heavy metals.
- Combustion data for rigid open burning permit process.
- Characterization for Munitions Items Disposition Action System
Operation Iraqi Freedom Support

- CPIAC supported the U.S. Navy Explosive Ordnance Disposal Technical Division in disposal of Soviet Era Iraqi SA-2 missiles
- CPIAC provided:
  - Definitive technical data on liquid propellants for SA-2
  - Expert review of emergency disposal procedures
  - Identification of common dilution solvents for disposal

Propellant (IRFNA) Vapors
CPIAC Summary

• CPIAC is the oldest IAC in operation (since 1946)
  – We are proud to have contributed to the evolution of every phase of this Nation’s space launch and missile capability since WW-II
• CPIAC provides technical data, information and expertise to the rocket, missile and gun propulsion interests of all of the services, DoD components, NASA, and industry contractors
• We support and promote joint service research and development through DTIC, major government initiatives, and the JANNAF IPC - to a community of over 4000 engineers and scientists

• Our services are available for your use, and we are never further than a phone call, e-mail, or website link away…
We’re Here for You, Put Us to Work

• Inquiries: cpiac@cpiac.jhu.edu
• CPIAC Bi-Monthly Technical Bulletin (Electronic)
  – E-mail Subject = ‘Sign Up’ to: Bulletin@cpiac.jhu.edu
• Databases: https://webdatabase.cpiac.jhu.edu/
• Propulsion News: http://www.cpiac.jhu.edu/
• CPIAC Website: http://www.cpiac.jhu.edu/
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