National Center for Communication, Navigation, and Surveillance Research (NCCR)

ACAST WORKSHOP
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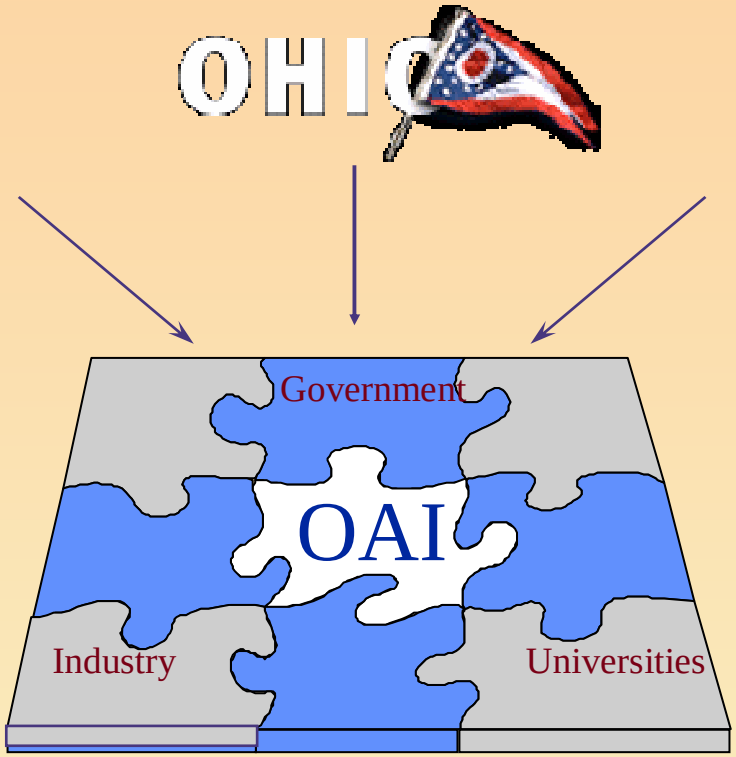
Ohio Aerospace Institute

Outline

- Brief OAI overview
- The need for this center
- Center objectives
- Approach/anticipated roles
- Next Steps

OAI's Heritage



OAI is a neutral, independent, 501(c)3 nonprofit organization formed in 1990.

OAI's Mission

To enhance and expand Ohio's aerospace and aerospace-related capabilities through research and technology partnerships, education, training and networking

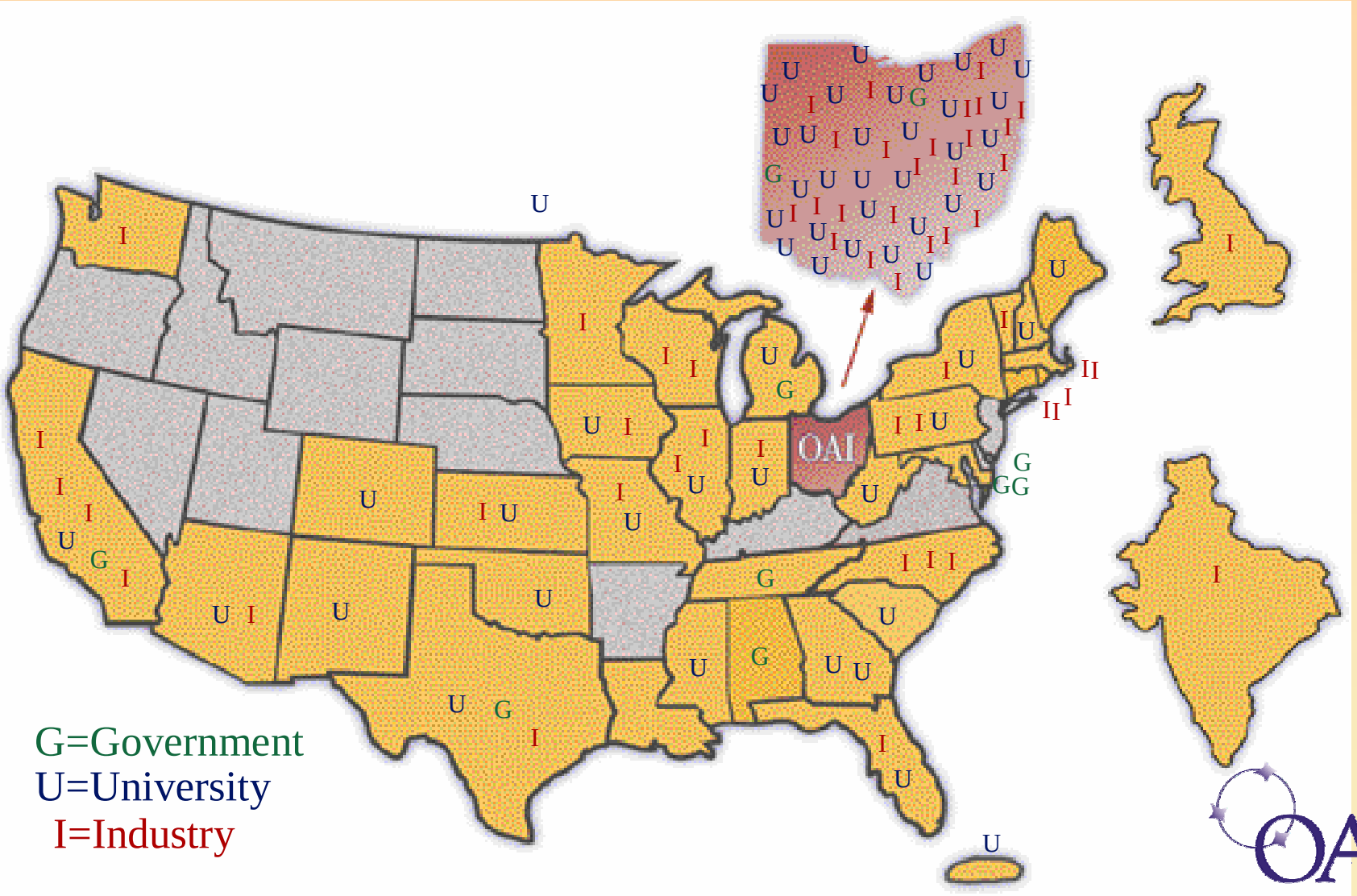
Customers

2 Federal Labs (NASA Glenn and AFRL)

Aerospace and aero-space related companies with operations in Ohio

Ohio universities with advanced engineering and research programs

OAI Facilitates Technology Collaborations



Aeroacoustics Research Consortium

AARC

AeroAcoustics Research Consortium

World-class *precompetitive* research in:

- **Engine noise (source definition)**
- **Prediction**
- **Mitigation**

Leverage:

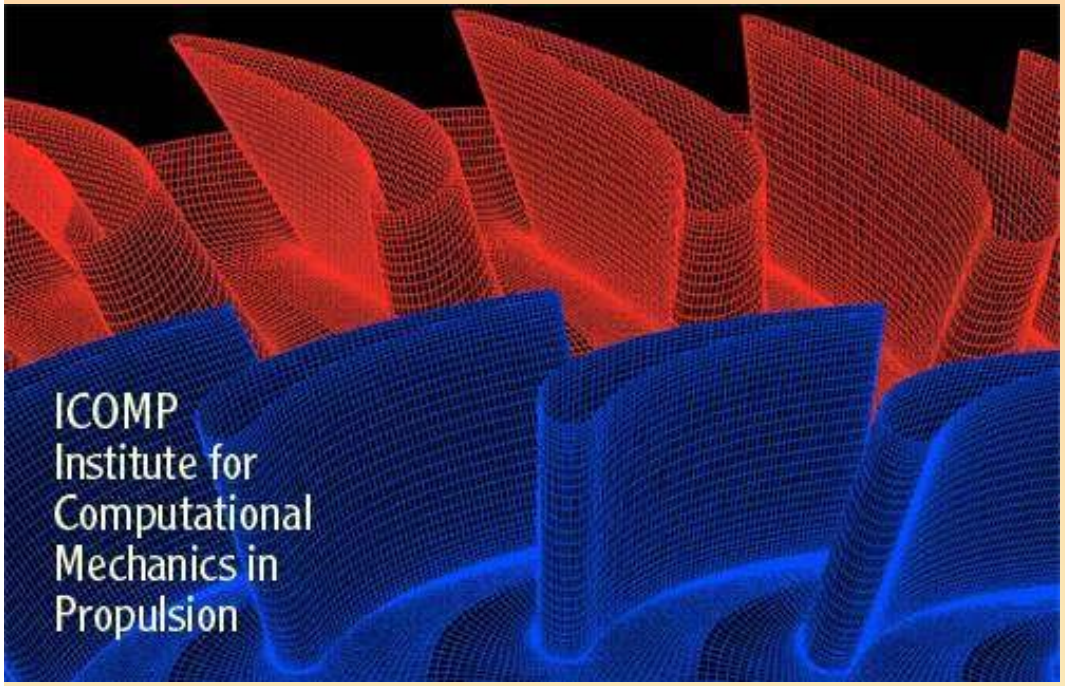
- **2.5X for NASA**
- **6X for Industry Sponsors**

Members:

- **NASA Glenn Research Center**
- **Boeing**
- **GEAE**
- **Honeywell**
- **Pratt & Whitney**
- **Rolls-Royce**

OAI

Institute for Computational Mechanics in Propulsion



- **Performs research at Wright-Patterson AFB and NASA Glenn in:**
  - **Computational Modeling**
  - **Materials**
  - **Structures and Acoustics**
  - **Power and Propulsion**
  - **Turbomachinery**
  - **Instrumentation**
  - **Controls**

- **Recent achievements include**
  - **New coatings for advanced gas turbine blades**
  - **New advanced plasma devices**
- **AFOSR Star Team Recognition**

Propulsion Instrumentation Working Group

Team Members:

- GE Aircraft Engines
- Pratt & Whitney
- Rolls-Royce
- Honeywell
- Siemens Westinghouse
- Williams International
- Air Force Research Laboratory
- NASA Glenn Research Center
- Arnold Engineering and Development Center
- Naval Air Warfare Center
- Ohio Aerospace Institute (OAI)

- Coordinates propulsion-related test instrumentation research activities.
- Cooperatively addresses critical propulsion engine-development test instrumentation and sensor issues.

- **OAI's Role**
  - Administrative and technical oversight
  - Facilitates the formation of research and development teams
  - Proposal development

Current Efforts in Progress

- High Pressure Dynamic Sensor
  - Ken Semega – AFRL/PRTS
- CO MEMS Sensor
  - Amy Lynch – AFRL/PRTC

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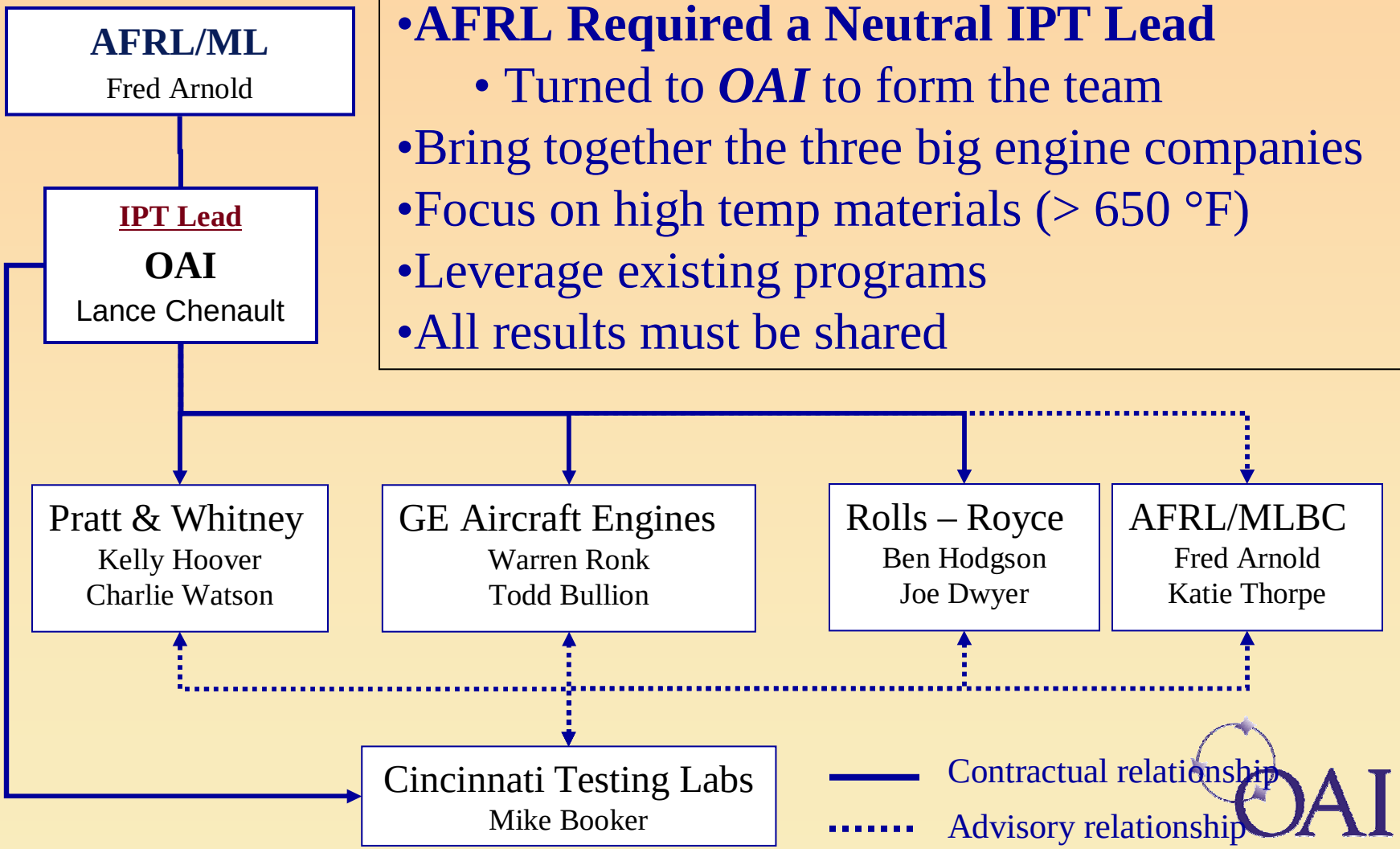
VAATE - Evaluation of High Temperature Polymer Matrix Composites

- **AFRL Required a Neutral IPT Lead**
  - Turned to ***OAI*** to form the team
- Bring together the three big engine companies
- Focus on high temp materials (> 650 °F)
- Leverage existing programs
- All results must be shared



Academic Team Members:

- Bowling Green State University
- Central State University
- Cleveland State University
- Ohio University
- University of Cincinnati
- Kent State University
- Ohio State University
- Miami University
- University of Akron
- University of Toledo
- Wright State University

OhioView is a grassroots organization formed in 1996 to make satellite data more accessible and to fill the knowledge gap in education about the the uses of geological satellite data.

Government Team Members:

- NASA Glenn Research Center
- U.S. Geological Survey
- Ohio State Center of Mapping
- OhioLINK

Benefit of Satellite Data to Ohio:

- Geospatial data in the classroom
- Ability to monitor environmental issues
  - Flood risk, urban sprawl, crop health

Facilitator:

- *Ohio Aerospace Institute (OAI)*

National Center for CNS Research

The Challenge

- Limited capabilities and capacities of today's air traffic system
- Architecture based on 1960's technology and operating concepts
- System can be enhanced to allow for additional 30% capacity but not the 3X growth rate anticipated by 2025
- Significant changes in the current concepts of operations will be needed to accommodate this demand while maintaining safety and security

National Center for CNS Research

The Challenge (cont)

- Numerous studies and analyses have pointed to the need for a major Communications, Navigation and Surveillance (CNS) R&D effort that will enable radical changes in the methodologies for which air traffic management will be implemented and conducted in the future

- There is currently no comprehensive CNS R&D program in the U.S. to address the civil aviation needs

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National Center for CNS Research

Objective

Formation of a consortium to create a collaborative "critical mass" among government, industry, and academia involved in aeronautical CNS R&D and system implementation and utilization

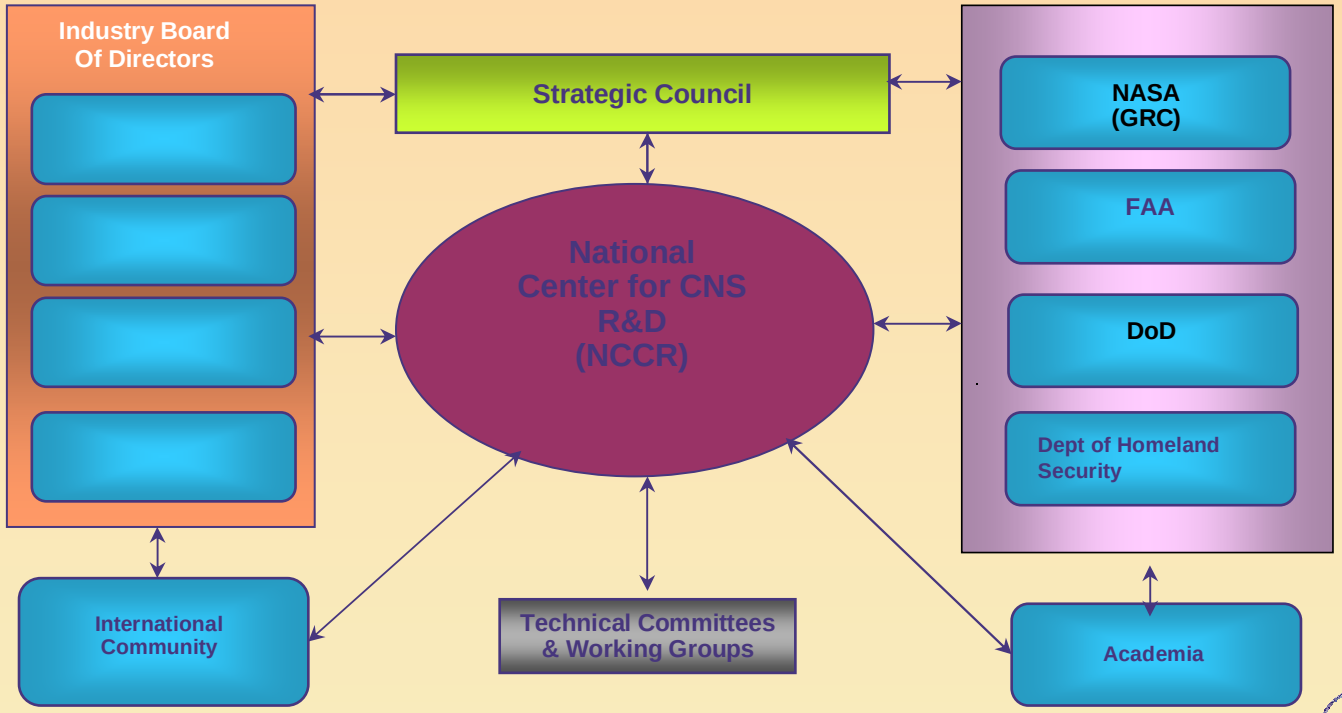
National Center for CNS Research

The NCCR will…

- Serve as a national driver to *leverage* and *integrate* the *resources, knowledge and capabilities of industry, government, and academia* to attack critical elements of the R&D needed to create the digital airspace infrastructure of the future
- Advocate the national agenda and roadmap for CNS R&D
- Facilitate, coordinate, and perform cutting edge R&D in support of the agenda and roadmap
- Help establish key CNS standards to enable interoperability across the national and global airspace and help streamline the certification process

National Center for CNS Research

Potential Organizational Structure



National Center for CNS Research

Anticipated Roles – NASA GRC

- Serve as the lead NASA Center to develop next-generation CNS architectures and technologies
- Provide leadership, direction and strategies essential to develop a comprehensive, effective and integrated technology development program for the next generation CNS infrastructure
- Work closely with OAI to identify range of approaches to organize and operate the NCCR and engage industry and government
- Provide support for educational outreach
- Help identify research focus areas and requirements
- Technology development
- Technology transition
- Member of Strategic Council

OAI

National Center for CNS Research

Anticipated Roles – Industry

- Provide early feedback to the OAI/GRC team on consortium structure and details on anticipated future roles and responsibilities
- Help identify research focus areas and requirements
- Technology development
- Technology demonstrations, standardization and certification
- Technology transition
- Key role in implementing the infrastructure when roadmaps/architectures are defined
- Member of Strategic Council

National Center for CNS Research

Anticipated Roles – Government

- Provide feedback to the OAI/GRC team on consortium structure and details on anticipated future roles and responsibilities
- Help identify research focus areas and requirements
- Help determine how NCCR will work with other government bodies (FAA, JPDO, etc.) and sponsor collaborative research
- Work closely with industry to develop an aggressive integrated CNS roadmap, architecture and technology development program that will be globally interoperable
- Member of Strategic Council

National Center for CNS Research

Anticipated Roles – Academia

- Development of next-generation CNS architectures and technologies
- Long term research and workforce development aspects (e.g. education and training) in addition to technology development
- Stimulation of careers in technical support fields essential to future aviation systems (i.e. information technology, avionics, communications, networking, security, etc)

National Center for CNS Research

Anticipated Roles – International Participants

- Help establish and advocate global interoperability standards and operations
- Joint technology demonstrations

National Center for CNS Research

Anticipated Roles – OAI

- OAI will have responsibility for identifying a range of approaches to organize and operate the NCCR
- Principal point of contact for the Consortium
- Administration, Coordination and Management
- Member of Strategic Council

National Center for CNS Research

Status and Next Steps

- Phase 1 activity is just underway (Aug 05 – Feb 06)
- Phase 1 effort: Develop an overall plan for the development, organization and operation of the NCCR including determination of strategies for funding CNS research activities
- Aug 17th breakout session to kickoff I-U-G involvement
- Meetings with key government/industry partners
- Phase 2: Implementation Phase

National Center for CNS Research

Summary

- Establishment of a National Center for CNS Research is underway
- Creates a critical mass of CNS resources and enables easy access to technical experts working on problems relevant to NASA, FAA, and DoD requirements
- Leverages CNS core competencies from all organizations
- Leverage of investments from each participating organization
- Development of an integrated CNS roadmap