

Science and Technology Centers: Integrative Partnerships Program



**National Research Council
Committee on Strategic Guidance
for NSF's Support of the Atmospheric Sciences
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Science and Technology Centers (STC): Integrative Partnerships

- **Enable innovative research and education projects that promise to contribute to the Nation's future through discovery and learning**
- **Conduct world-class research through partnerships of academic institutions with national laboratories, industry and/or other public/private organizations**
- **Pursue those opportunities in science, engineering, and technology where complexity of the research agenda requires the duration, scope, scale, flexibility, and facilities that center support can provide**



Objectives of the STC Program

- **Support research and education of the highest quality**
- **Exploit opportunities in science, engineering and technology where the complexity of the research agenda requires the advantages of scope, scale, change, duration, equipment and facilities, that a Center can provide**
- **Support innovative frontier investigations at the interfaces of disciplines, and/or fresh approaches within disciplines**

Cont'd



Objectives of the STC Program

- **Engage the Nation's intellectual talent, robustly drawn from its full human diversity, in the conduct of research and education activities**
- **Promote organizational connections and linkages within and between campuses, schools and/or the world beyond (state, local, federal agencies, national labs, industry, international collaborations)**
- **Focus on integrative learning and discovery and the preparation of U.S. students for a broad set of career paths**
- **Foster science and engineering in service to society especially with respect to new research areas, promising new instrumentation and potential new technologies**



STC Center Characteristics

- **Theme that integrates research and education**
- **Based at an academic institution, with a variety of partnering organizations and/or industry**
- **One Center Director, as well as additional associates responsible for detailed center management, education activities, and knowledge transfer**
- **Maximum of 10 years of support, with a two-year phase-out period (years 9 and 10); may be terminated in year 5 if not successful**
- **Annual NSF budget of \$1.5 - \$4 M, but with additional support from partners**
- **External Advisory Committee (conflict-free) composed of interested parties**



Other Embedded Activities

- **Connectivity of various communities -- research, education, communications, ...**
- **Partnerships in research and education**
 - (U/I; U/U; U/State; U/Fed; U/INT ...)
- **International aspects**
- **Curricular creation/reform (e.g., web or other delivery venues)**
- **Models for info/knowledge dissemination**
- **Innovative and non-traditional uses of technologies/communications**



History

- First STC competition in 1987
- Two competitions in late 80's for STCs yielded 25 centers – two STCs terminated early
- Evaluation of the program against its goals and the NSF strategic plan
- 1996 the National Science Board approved New Program Competition every 3 years with a final steady-state budget of about \$80-\$100M
- 1998 competition yielded 5 centers in FY2000
- 2000 competition yielded 6 centers in FY2002
- 2003 competition has ended – awards pending



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MISSION OF CAPS

The mission of CAPS is to develop and demonstrate techniques for the practical numerical prediction of high-impact local weather, particularly thunderstorms, with emphasis on the assimilation of high-resolution observations from Doppler weather radars. CAPS conducts a broad-based program of basic and applied storm-scale research, and its award-winning Advanced Regional Prediction System (ARPS) is used worldwide.

CAPS Announces Integrated Radar Data Services (IRaDS)!!

IRaDS is a new program of the University of Oklahoma -- an extension of Project CRAFT -- that is distributing NEXRAD Level II data on behalf of the National Weather Service. For more information, visit the IRaDS web site at

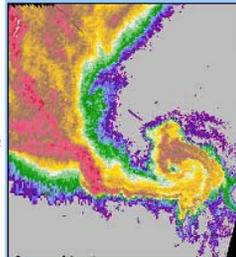
<http://radarservices.org>

CAPS Initializing Daily WRF Forecasts Using ADAS

Along with the ARPS model, CAPS is now running the WRF model daily, in real time, with initial conditions generated by the ARPS Data Assimilation System (ADAS).

[REAL TIME ARPS FORECASTS](#)

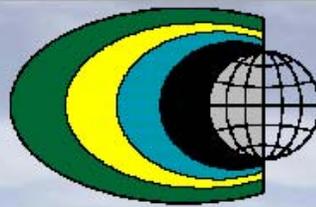
[REAL TIME WRF FORECASTS](#)



⇒ Doctoral student [Edwin Adlerman](#) recently completed his dissertation on the dynamics of cyclic tornadogenesis. The entire dissertation PDF file (105 MB) may be found [HERE](#).

⇒ CAPS is leading a new NSF Large Information Technology Research (ITR) grant, [Linked Environments for Atmospheric Discovery \(LEAD\)](#), that is creating a cyberinfrastructure for mesoscale meteorology research and education. Click [HERE](#) for the LEAD web site.

⇒ CAPS is a major partner in the new NSF Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASA). Click [HERE](#) for the CASA web site.



Center for Clouds, Chemistry & Climate

The Center for Clouds, Chemistry and Climate (C⁴) is a Science and Technology Center funded by the [National Science Foundation](#). C⁴ is located with the [Center for Atmospheric Sciences](#) at the [Scripps Institution of Oceanography](#) of the [University of California, San Diego](#).

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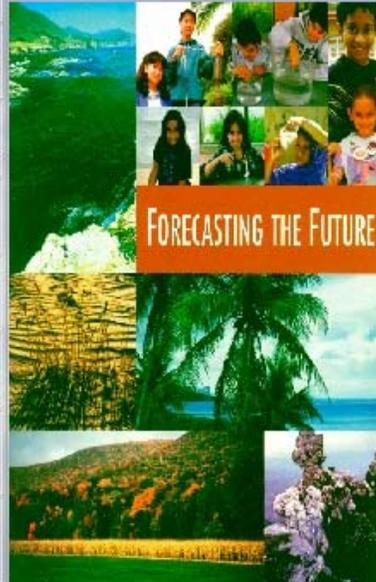
[C⁴ Integrated Data System \(CIDS\)](#)

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Education



Indian Ocean Experiment (INDOEX)

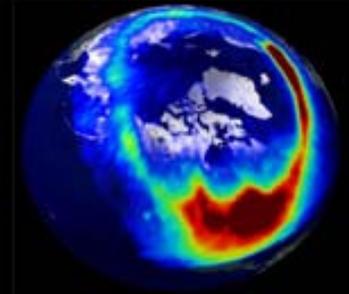
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Kaashidhoo

CISM

CENTER FOR INTEGRATED SPACE WEATHER MODELLING



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WELCOME TO CISM

CISM, the Center for Integrated Space Weather Modeling, is a National Science Foundation (**NSF**) Science and Technology Center (**STC**). CISM formally began operations in August 2002.

OUR VISION:

To understand our changing sun and its effects on the solar system, life, and society.

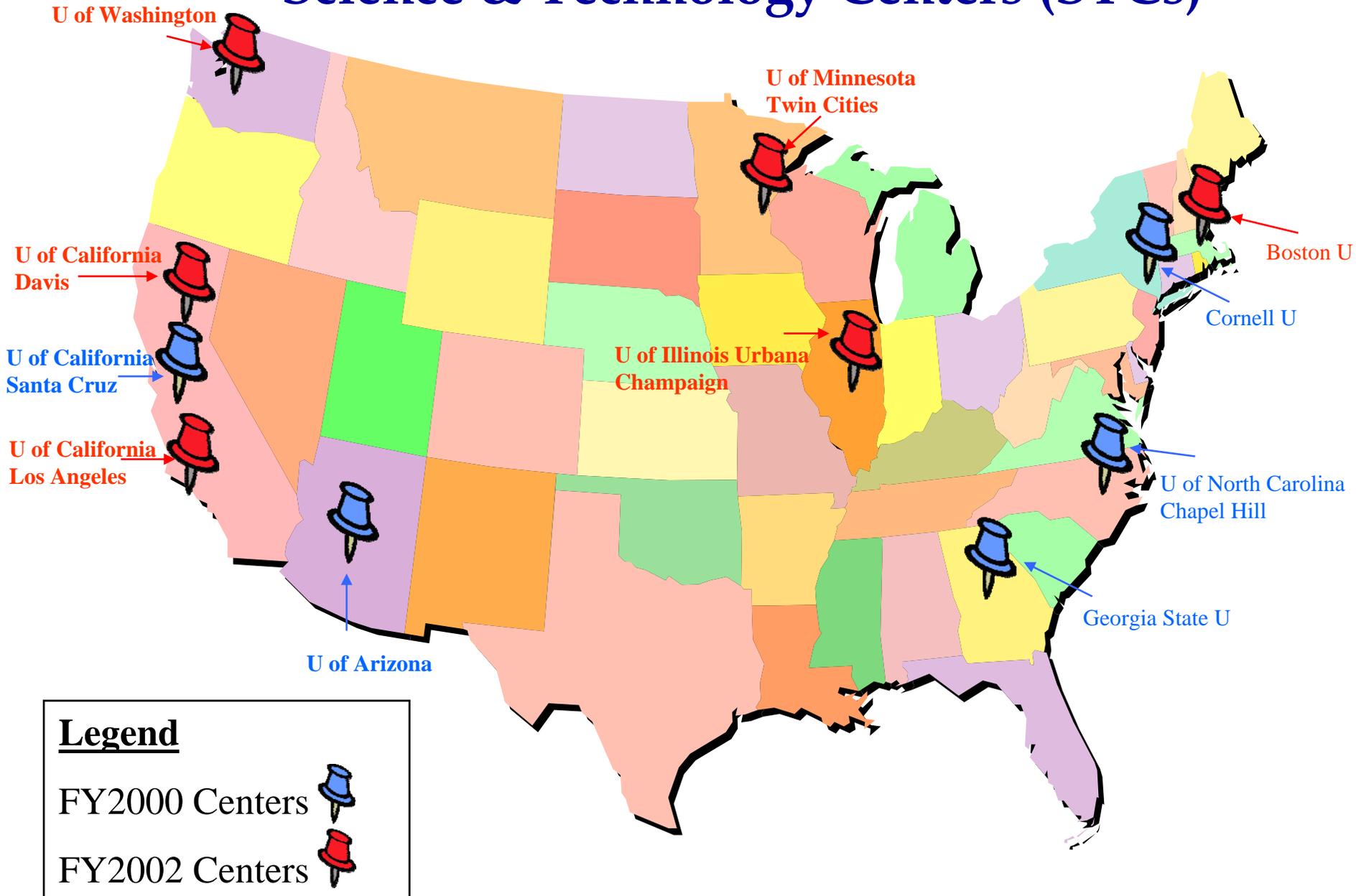
OUR GOAL:

To create a physics-based numerical simulation model that describes the space environment from the Sun to the Earth.

THE USES OF SPACE WEATHER MODELING:

- A scientific tool for increased understanding of the complex space environment.
- A specification and forecast tool for space weather prediction.
- An educational tool for teaching about the space environment.

NSF's Current Science & Technology Centers (STCs)



Class of FY2000 STC Awards

- **Cornell University**
Nanobiotechnology
- **Georgia State University**
Behavioral Neuroscience
- **University of Arizona**
Sustainability of Semi-Arid Hydrology and Riparian Areas
- **University of California Santa Cruz**
Adaptive Optics
- **University of North Carolina Chapel Hill**
Environmentally Responsible Solvents and Processes



Class of FY2002 STC Awards

- **Boston University**
Integrated Space Weather Modeling
- **University of California Davis**
Biophotonics Science and Technology
- **University of California Los Angeles**
Embedded Networked Sensing
- **University of Illinois Urbana Champaign**
Advanced Materials for Water Purification
- **University of Minnesota Twin Cities**
National Center for Earth-surface Dynamics
- **University of Washington**
Materials and Devices for Information Technology Research



Status of STC Classes

- **Classes of 1989 and 1991**
 - 23 centers graduated
- **Class of 2000**
 - beginning 5th year
 - all five recommended for renewal through year 10
- **Class of 2002**
 - beginning 3rd year
 - experienced 2nd site visit
- **Class of 2005**
 - competition underway
 - full proposals invited



STC Evaluation Criteria

- **NSB Approved Merit Review Criteria:**
 - What is the intellectual merit of the proposal activity?
 - What are the broader impacts of the proposed activity?

- **Additional merit review criteria specific to the STC program:**
 - Integration of research and education
 - Integration of diversity into NSF programs, projects , and activities
 - Value of the center-mode to research, education, and knowledge transfer
 - Integrative nature of the proposed center
 - Leadership, management plan, impact of institutional support, and budget



STC Overview

- **Overarching goals:**
 - Conduct world-class science
 - Promote discovery in service to society
 - Pursue excellence in science, math, and engineering education
 - Create meaningful knowledge
- **Core strategies:**
 - Strengthen physical infrastructure
 - Integrate research and education
 - Promote partnerships
 - Develop intellectual capital
 - Capitalize on diversity
 - Build intellectual infrastructure within and between disciplines

