

# **AFOSR SPACE SCIENCES VIEW OF CCMC**

**11 Oct 05**



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# Introduction



- **Motivation for AF investment in space weather**
- **Portfolio overview**
- **Definitions of AF research funding**
- **My expectations of proposals**



# Systems Affected by Space Weather



- **Navigation**
  - **Scintillation, geomagnetic activity, solar flare, energetic particles**
- **Communication**
  - **Scintillation, geomagnetic activity, solar flare, energetic particles**
- **Space Situational Awareness**
  - **Drag, scintillation, ionospheric ion densities**
- **Satellite Health**
  - **Ionizing radiation, energetic particles, geomagnetic activity**
- **Radar**
  - **Geomagnetic activity, solar radio bursts**
- **Avionics**
  - **Ionospheric induced currents, energetic particles**



# Space Weather Modeling Requirements



- **Ionospheric forecasting (24-120 hours)**
- **Magnetospheric forecasting (24-120 hours)**
- **Solar activity and solar wind forecasting (24-120 hours)**
  - **Pressure**
  - **Density**
  - **Energy**
  - **Magnetic field**
  - **Electric field**
  - **Currents**
  - **Circulation**
  - **Scintillation**
  - **Geomagnetic storms**
  - **Auroral oval location**
  - **South Atlantic anomaly**
  - **Particle precipitation**
  - **Satellite drag**



# Space Weather Modeling Requirements



- **Solar Emission Forecasting (24-120 hours)**
  - Flare time, location, and intensity
  - Particle and electromagnetic emissions
  - Coronal mass Ejections (CMEs)
  - Solar Surface parameters



# General Program



- **Ionospheric/Magnetospheric Physics**
- **Solar/Heliospheric Physics**
- **Space Environment Measurements**
- **Space Environment Modification**
  - **Plasma Physics Theory**
  - **Space Environment Data Assimilation**
  - **Space Environment Modeling**



# AFOSR View of CCMC



- **Model verification**
- **Model validation**
- **Make models available to researchers**
- **Advance cooperation between  
Researchers**



# Basic Research



Basic research is **systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts** without specific applications towards processes or products in mind. It includes all scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs.



# Applied Research



Applied research is systematic study to understand the means to meet a recognized and specific need. It is a **systematic expansion and application of knowledge to develop useful materials, devices, and systems or methods**. It may be oriented, ultimately, toward the design, development, and improvement of prototypes and new processes to meet general mission area requirements. Applied research may translate promising basic research into solutions for broadly defined military needs, short of system development.



# Advanced Technology Development



Advanced Technology Development (ATD) includes concept and technology demonstrations of components and subsystems or system models. The models **may be form, fit and function prototypes or scaled models that serve the same demonstration purpose.** The results of this type of effort **are proof of technological feasibility and assessment of subsystem and component operability and producibility** rather than the development of hardware for service use. ATD includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.



# What I Look for in Proposals



- In the abstract, clearly and concisely define
  - the objectives
  - the approach to achieve the objectives
  - the scientific merit of the proposed research
- Explain why the research is leading edge, more revolutionary than evolutionary (one paragraph )
- Explaining why the topic should be of interest to the AF and DoD if it is not immediately obvious (one paragraph )



# The Bottom Line



- I hope to get 50 or more white papers
- I plan encourage 10-15 proposals
- I hope fund 5-8 new proposals
- 2006 Time Line
  - White papers due March
  - Proposals due June
  - Prospective funding decisions by October
  - Start date December 1



# How does your proposal rate



- Revolutionary, game changing, cutting edge
- Leading
- Evolutionary
- Incremental
  
- Well planned, high returns