



Colorado Center for Astrodynamics Research (CCAR)

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Dr. Jeng-Hwa Yee
JHU / APL

November 10, 2007

Dear Dr. Yee:

The members of the National Science Foundation's Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) science steering committee strongly support the extended mission of the NASA TIMED spacecraft.

CEDAR has been an active part of the TIMED mission since the mission's inception, with CEDAR's collection of ground-based capabilities considered to be the mission's "fifth instrument". The complementary nature of ground-based and space-based observations is well recognized and absolutely required if we are to unravel the longitudinal, latitudinal, altitudinal dependencies within the coupled system. Scientifically, the TIMED / CEDAR collaboration has been mutually beneficial with TIMED / CEDAR coordinated data campaigns, data exchange through the CEDAR and NASA databases, and scientific workshops all leading to joint publications. The CEDAR community has also helped the TIMED mission by providing validation and calibration of the TIMED instruments.

The extended mission of TIMED will complete an entire solar cycle in its mission lifetime of observing the ionosphere-thermosphere-mesosphere (ITM). In this extended mission, the ITM will experience solar minimum and the ascending phase of the solar cycle. This is a unique opportunity to study the influence of the lower atmospheric energy flux on the ITM when the energy flux from the sun and geomagnetic activity are at a minimum. The extended mission aligns well with CEDAR goals. CEDAR is embarking on a systems level approach to study the ITM. In this holistic approach, the internal stresses from the earth's lower atmosphere and external stresses from the sun's atmosphere and the earth's magnetosphere are fundamental in driving the ITM system. The SEE / GUVI / SABER and TIDI instruments are poised to investigate the ITM response during quiet solar conditions. The CEDAR ground-based observing network is also considerably more extensive than it was during the past solar minimum. This combination of measurements will be unprecedented and enable extensive investigation of the ITM response during solar minimum conditions. When the full solar cycle TIMED observations are combined with other long term CEDAR data sets, trends associated with climate change can be more thoroughly investigated.

The CEDAR Science Steering Committee stresses the importance of continued observations of the ITM region and the value of the role that the TIMED mission plays in our collective efforts to advance our understanding of this atmosphere-space boundary layer. There are no new missions planned by NASA to observe this critical region in our geospace environment. We are just beginning to piece together the role of the various spheres and the influence of their

interactions on the geospace system as a whole. Understanding these interactions is crucial in furthering our ability to predict potentially damaging space weather effects such as charging events on satellites, atmospheric drag, positioning errors in GPS, dangerous radiation levels for humans in space, and many others. We must observe the ITM and place its response in context with the entire suite of observations that make up the NASA great observatory. The logical next step is to extend the NASA TIMED mission and prepare for new ITM missions in the near future.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey P. Thayer". The signature is fluid and cursive, with the first name "Jeffrey" being more prominent and the last name "Thayer" following in a similar style.

Jeffrey P. Thayer, Ph.D., Professor, Aerospace Engineering Sciences Department
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