

## INTAS PROJECT: KEY PARAMETERS FOR SPACE WEATHER

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### ABSTRACT

Establishing an efficient space weather forecasting system will demand joint efforts between scientists (observers and modellers) from different branches of geophysics, space and solar physics, relying on the interdisciplinary approach. In autumn 2001 the two-year INTAS network project: “Key Parameters for Space Weather” began, providing a unique opportunity of bringing together expertise from both NIS and INTAS members in various areas of space weather related topics. The purpose of the project is to develop the “key parameters” that are needed for space weather prediction, including the initial parameters originating from observations and the predicted parameters obtained from simulations. This paper will introduce the project, highlighting the main scientific aims of the project and emphasising the benefits of the INTAS network approach for collaboration.

Key words: INTAS network; space weather; key parameters.

### 1. INTRODUCTION TO NETWORK

The space environment is immense covering the Sun, interplanetary space and Earth’s local environment (the magnetosphere, the ionosphere and the atmosphere). To establish an efficient space weather forecasting system will demand joint efforts between scientists from many branches of geophysics, space and solar physics. The INTAS network project: “Key Parameters for Space Weather”, brings together expertise from both NIS (New Independent States of the former Soviet Union) and INTAS members in various areas of space weather related topics.

INTAS is an independent International Association formed by the European Community, European Union’s Member States and like minded countries acting to preserve and promote the valuable scientific potential of the INTAS partner countries through East-West Scientific co-operation. More information about INTAS can be found on their web-site <<http://www.intas.be/>>.

The INTAS network project: “Key Parameters for Space Weather” started in autumn 2001 and will last for two years. It consists of four INTAS teams and fourteen NIS teams (see Table 1). The project is introduced in this paper; the aims of the project are high-lighted in Section 2 and the working program is presented in the Section that follows. Benefits of this type of INTAS network project and closing remarks are given in Section 4.

### 2. AIMS OF PROJECT

Present space weather forecasting utilises a wide observational (space- and ground-based) network, which mainly allows to perform short-term (hours) and long-term (months to years) forecasting of “significant events”. Many parameters are available for space weather forecasting (e.g. solar activity, geomagnetic indexes, near Earth radiation fluxes, solar wind and IMF parameters, SEP and GCR fluxes, solar emission at different wave-lengths). However, it is not always clear which parameters are the most representative of each type of “significant event”.

The main aims of this project are to develop the “key parameters” that are needed for space weather prediction from an inter-disciplinary approach, including: 1.) Initial parameters originating from observations, 2.) Predicted parameters obtained from simulations. To achieve these goals, scientists (observers and modellers) from different branches of geophysics, space and solar physics are combining their efforts by optimising information, emphasising the importance of communication (team-work) between many different laboratories. The combination and coordination of these efforts is possible by means of different kinds of scientific network communications such as electronic conferences, workshops, etc.

### 3. WORKING PROGRAM

To achieve the above aims a planning and task allocation is continuously being updated and includes exchange of results between the various teams. Tasks have been divided into four main parts, each part

Table 1. Project Members

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**INTAS MEMBERS**

Mullard Space Science Laboratory  
 Finnish Meteorological Institute  
 Belgian Institute for Space Aeronomy  
 Royal Observatory of Belgium

**NIS MEMBERS**

Skobeltsyn Institute of Nuclear Physics, Moscow State University  
 Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation, Russian Academy of Sciences  
 Space Research Institute  
 Pushchino Radioastronomy Observatory  
 Institute of Physics, University of St.Petersburg  
 Pulkovo Astronomical Observatory, Department of Solar Physics  
 Radiophysical Research Institute  
 Polar Geophysical Institute  
 Irkutsk State Economics Academy  
 Crimean Astrophysical Observatory  
 Institute of Cosmophysical Research and Aeronomy  
 Institute of Ionosphere, Ministry of Science and High Education, Republic of Kazakhstan  
 Arctic and Antarctic Research Institute  
 Lebedev Physical Institute of Russian Academy of Sciences

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consisting of numerous tasks: 1.) Upgrade of the NIS Network and Distribution of Data, 2.) Conferences, 3.) Workshops, 4.) Summer Schools. The most important task under point 1) is identification of “Key Space Weather Parameters” and “Case Studies”; this task also links all the other tasks together. More exactly this task means identifying “Case Studies” for various space weather inducing phenomenon to test “Key Parameters”. The usage of data and models of all teams will be used to test the above. A table has been created listing the specific expertise of different groups to identify these “Key Parameters” and “Case Studies” have been selected for cross-comparison between NIS and INTAS teams.

The Kick-off Meeting was held in two parts: 1.) on 23 and 25 September 2001 in parallel with the Irkutsk conference on Solar-Terrestrial Conference to allow many team members to participate, 2.) on 1 October 2001 at the Skobeltsyn Institute of Nuclear Physics in Moscow with a smaller group of people. During the first phase of this project informal meetings have also been held at conferences, team visits, etc.. During the summer of 2002 a progress meeting will be held and a final presentation meeting will be held in the late spring of 2003.

**4. BENEFITS OF NETWORK**

To facilitate communication between NIS and INTAS team members a web-site is under construction.

Part of this web-site will be made available for people outside the INTAS network in the near future. The benefits of this INTAS network is that NIS members will have their observations and models made available to a broader public. Also NIS scientists (especially young scientists) will present INTAS related results at conferences and workshops both in INTAS and NIS countries in the years 2001 to 2003. Results obtained through this network will also be published in relevant journals.

The results of this INTAS project will provide input for future work and other proposals in the space weather field for the team members. Furthermore, the results will help supplement other national and international space weather efforts. Future collaborations between the team members will be an important outcome of this project. Any questions concerning this INTAS network, please contact the author who is the coordinator of the network.

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