

3.7.3 Working Group on Prediction

Introduction The IERS Working Group on Prediction (WGP) was proposed at the IERS Directing Board meeting in December 2005 and work began early in 2006. The group was designed to address fundamental questions concerning IERS predictions and to determine what can be done to improve the IERS prediction of Earth orientation. Specifically, the WGP was tasked to determine what prediction products are needed by the user community and to examine the fundamental properties of the different input data sets and algorithms (see IERS website <<http://www.iers.org/MainDisp.csl?pid=167-1100082>>). There are two areas of investigation: the input data (geodetic and geophysical information) and the algorithms used to process the data. The WGP establishment grew out of IERS Rapid Service/Prediction Center (RS/PC) concerns about the continued relevance of current products, new accuracy requirements, the impact of new data sets, and viable new prediction methodologies and the desire to build on the interest generated by the EOP Prediction Comparison Campaign of the Technical University of Vienna and the efforts of the IERS Combination Pilot Project (see section 3.7.2). Another expectation of the RS/PC was a definitive assessment of the current state-of-the-art in EOP prediction.

Goals and Objectives The goals and objectives of the WGP are the following:

1. Determine the desired Earth orientation parameter (EOP) prediction products – What is needed by the user community?
2. Determine the importance of the input data – What new data sets are available? Are data sets interchangeable? Are some sources inherently better?
3. Determine which types of input data create an optimal prediction – What is the noise of the series? What smoothing is best? What geophysical phenomena are being measured?
4. Determine the strengths and weaknesses of the prediction algorithms – Which algorithms perform best under what circumstances? How can problems be mitigated?
5. Determine the interactions between series and algorithms that are beneficial or harmful - What qualities of certain data sets make them well-suited or poorly-suited for certain algorithms?

WG Meetings The first meeting of the WGP was held on 6 April 2006 at the European Geophysical Union meeting in Vienna. The topics discussed included an overview of the project, a review of the charter highlighting the goals and objectives, and the proposed structure. In addition, a draft survey form to determine what IERS prediction products users need was discussed. Several useful suggestions were

made and subsequently incorporated into the survey form and the planned activities. Efforts were made to determine who besides the individuals on the IERS and RS/PC mailing lists should be solicited to participate in the user survey.

A planning meeting with the subgroup chairs and the WGP chair was held at the 2006 December American Geophysical Union meeting in San Francisco. The user survey form was finalized and plans were made for the analysis of anticipated survey data. Also, plans were made for presentations at the EGU and a potential workshop in conjunction with another technical meeting. Additional tasks were specified for the input data subgroup and the algorithms subgroup.

WG Activities

The plans and activities of the WG were summarized in a paper given at the December 2006 AGU Fall Meeting in San Francisco. Specific algorithm topics discussed included prediction methods, formulations, flow diagrams, accuracy dependencies, and problems associated with individual prediction methods. Specific input data concerns to be addressed include minimizing data latency, sensitivities to missing data, loss of information at common epochs, new potential geophysical fluids information, and optimum combination of data. Other plans include determining optimum parameters for combination prediction algorithms, geophysical causes of prediction errors, and examining pathological timeframes for prediction. In addition the opportunity and the timeframe for participation in upcoming EOP prediction user survey were highlighted.

EOP Prediction Survey

The first task of the WGP was to determine whether the current RS/PC products, which were developed more than 15 years ago, are adequate or whether modifications and/or improvements are necessary to meet more stringent requirements. Therefore, a short EOP user survey was developed by the WGP and posted on the RS/PC website to address goal #1. The IERS invited participation from those on the IERS mailing lists, those who receive IERS RS/PC products, and any others thought to have an interest in EOP predictions (see IERS Message No. 104). The survey consisted of 10 questions that involved mostly checking boxes with a limited number of options. The intent was to categorize the various classes of users and their accuracy requirements. The form was to be easy to complete and still provide enough characteristics to help the WGP focus its effort. Given the variety of high-precision applications which need EOP predictions, what characteristics (type, accuracy, data spacing, data span, form, *etc.*) are required and are new products needed.

Future Meetings

Presentations are planned for the April 2007 European Geophysical Union Meeting in Vienna and also for the September 2007

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Journées Meeting in Meudon, France. It is hoped that a special session on “EOP Combination and Prediction” can be included in the Journées meeting. That meeting will also be an opportunity to solicit additional feedback on WP activities.

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