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Project News

The TechTIDE codes are available with open access!

The TechTIDE consortium has reached an important milestone to make available with open access most of the codes that analyze Digisonde, CDSS and GNSS data to identify Travelling Ionospheric Disturbances and specify their parameters. Computer codes based on the following TechTIDE methodologies are available for download:

- The Electron Density Reconstruction code based on the TaD model
- The GNSS TEC gradients code
- The HF interferometry code
- The Height-Time-Reflection Intensity (HTI) code
- The Spatial and Temporal GNSS analysis and the AART indicator code
- The CDSS analysis code



The users can download the codes and install them in their computers for further experimentation and data analysis.

TechTIDE 1st User Workshop, DLR, Neustrelitz, 15 May 2019

The workshop aims at demonstrating the functionalities of the first TechTIDE release to users from all segments concerned with TID activity. Examples with test cases will be discussed to show the performance of TechTIDE methodologies. The consortium will discuss with the users possible upgrades for the second release. The event is still open for [registration](#).



Warning and Mitigation **T**echnologies for **T**ravelling Ionospheric **D**isturbances **E**ffects

TechTIDE Project

The overarching objective of TechTIDE is to design and test new viable Travelling Ionospheric Disturbances (TID) impact mitigation strategies for the technologies affected and in close collaboration with operators of these technologies, to demonstrate the added value of the proposed mitigation techniques.

TechTIDE Newsletter

This Open Access Newsletter contains description of the TechTIDE project activities and it is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This publication has been produced with the assistance of the European Union under the Horizon 2020 Grant Agreement 776011 of the COMPET-Space Weather 2017 Call. The content of this publication is the sole responsibility of the TechTIDE consortium and can in no way be taken to reflect the views of the European Union.

Latest Achievements

TID Algorithms Definition

TechTIDE TID algorithms have been stored in the website repository (tech-tide.eu) and they are available for open access together with the corresponding user manuals. Currently, the software codes are checked for consistency and they will be presented and analyzed in the forthcoming user workshop that will be held in Neustrelitz on 15th May. Codes and user manuals will be updated according the different shortcomings reported by the users.

TID Activity Metrics Identification

The TechTIDE team is continuing in the analysis of the events included in the EGNOS event list and selected CIR/HSS events which occurred in 2019, e.g. 21-24 January, 2019. The comparison ICME- and CIR-related TID characteristic parameters was carried out. We are starting with the analysis of seasonal and local time dependence of the TID parameters.

Assessment of TID impact in Aerospace and Ground Systems

The assessment of TID impact in Aerospace and Ground Systems will include a statistical analysis of the relationship between the methodologies described in TechTIDE TID algorithms definition technical note and the service degradation in EGNOS, HF geolocation and NRTK.

As was presented in the Interim Review meeting, held in Brussels last month, there are clear evidences about such relationship.

The technical note, derived from the assessment, is in preparation and shall be delivered by April. A first draft of this technical note is being shared with the with the TechTIDE team addressing the mitigation techniques.

Dissemination, Exploitation and Communication

The current focal point of the TechTIDE communication activities is the preparation of the 1st TechTIDE user workshop. The TechTIDE consortium activated all its contacts to users. Many users have been personally contacted and invited to the workshop.

Measures for the dissemination and communication activities (e.g. number of ISI publications, conference session chairs, conference presentations, etc.) have been generated during the interim review phase. Some of the TechTIDE key performance indicators, indicating how well TechTIDE reaches its objectives, are based on these measures.

TechTIDE Interim Review Meeting, Brussels, Belgium, 7 February 2019

The TechTIDE consortium successfully completed the interim review, which took place on 7th February 2019 at REA in Brussels.. The project team has demonstrated excellent performance with a good impact already at this stage of the project and without any delay.

Czech follow on research activities proposed, based on TechTIDE results

The Czech TechTIDE team, submitted a grant proposal based on the TechTIDE results, to the Czech Science Foundation.

TechTIDE Project Members

- National Observatory of Athens (NOA), Greece
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- Ústav Fyziky Atmosféry AV ČR (IAP), Czech Republic
- Institut Royal Meteorologique de Belgique (RMI), Belgium
- Observatorio del Ebro Fundacion (OE), Spain
- Borealis Global Designs Ltd. (BGD), Bulgaria
- Leibniz Institute of Atmospheric Physics, Rostock University (L-IAP), Germany
- Universitat Politecnica de Catalunya (UPC), Spain
- European Satellite Services Provider (ESSP), France
- South Africa National Space Agency (SANSA), South Africa
- Watermann Juergen Friedrich Wilhelm (JFWCONSULT), France
- Frederick University (FU), Cyprus
- German Federal Police (GFP), Germany

Consortium Member Presentation

Observatori de l'Ebre

The "Observatori de l'Ebre", OE, is a Research Institute founded in 1904 to study the Sun-Earth relationships. OE is a "non-profit" Organization belonging to the Ramon Llull University (URL) as University Institute and it has also a relationship with Spanish National Research Council (CSIC).

Currently OE carries out two research lines:

Geomagnetism and

Aeronomy and Climate Change; being active (with national and international based projects of research and development) in both of them. The Geomagnetic and Aeronomy team contribute to projects for space weather specification, forecasting and identification of ionospheric irregularities, it is skilled in investigating the variability of the Earth's ionosphere caused by solar/geomagnetic activity and meteorological effects, and in developing prediction climate ionospheric models and forecasting models of ionospheric disturbance, bounded to the solar activity and to the Interplanetary Magnetic Field conditions. The team also cares the monitoring and analysis of the variability of the Earth's ionosphere and geomagnetic field being significant data contributor to international databases as GIRO and INTERMAGNET, making data, historical and real-time, standardized and available to the near-space community for their research, applications and modelling purposes. OE also



contributes to the International Reference Ionosphere model (IRI) since 2006. OE chairs currently the IRI Working Group and has contributed to develop the last two releases IRI-2012 and IRI-2016. In addition to these aspects, OE manages several geophysical observatories in Spain and in the Antarctic Spanish Base ensuring the continuity and reliability of their observations, with more than a hundred years of history.

In the TechTIDE project, the OE leads work package 2 which is devoted to release the algorithms for the Travelling Ionospheric Disturbances (TIDs) identification and the resulting products for implementation in the TechTIDE warning system. Within WP2, the OE contributes with the detection, in near real time, of Large Scale TIDs through the interferometry TID identification method. OE is also involved in work package 3 concerning the investigation of TID drivers and working package 7 devoted to dissemination, exploitation and communication activities.

Borealis Global Designs Ltd.

The Borealis Global Design, Ltd., is a consulting company established in 2015 in Varna, Bulgaria, to provide highly specialized expertise relevant to detection, evaluation, and mitigation of the ionospheric effects on the navigational and geolocation systems that employ trans-ionospheric signal propagation, including systems for high frequency



geolocation and high accuracy real-time GNSS navigation.

In the TechTIDE project, BGD is responsible for development and operational management of the TID RealTimer, Explorer and Database (TID-RED) software suite for detection and evaluation of the TID events based on data from the TechTIDE's ground-based network of synchronised DPS4D ionospheric sounders (method 2.1 and 2.2). BGD provides technical support and enhancements of TID-RED algorithms for TechTIDE in response to WP5 outcomes and contribute to the TID activity characterization using Net-TIDE results and functional specifications of the test-bed.

Upcoming Events

EGU General Assembly 2019, Vienna, Austria, 7-12 April 2019

TechTIDE will be present at the EGU General Assembly 2019 in Vienna, Austria. Please consider to visit the following sessions and papers presented by the TechTIDE consortium:

Open Session on the Ionosphere and Thermosphere (including ST Division Outstanding ECS Lecture by Chao Xiong), Convener: Dalia Buresova | Co-conveners: David Altadill, A. Belehaki, Andrew Dimmock, Andrew J. Kavanagh, Mirko Piersanti
Orals | Wed, 10 Apr, 14:00-18:00, Room L1

Posters | Attendance Mon, 08 Apr, 16:15–18:00, Hall X4

EGU2019-7216 | Posters | ST3.1, Main drivers and interhemispheric circulation of TIDs, Dalia Buresova, Anna Belehaki, Jurgen Watermann, Ivan Galkin, Ioanna Tsagouri, Daniel Kouba, David Altadill, Estefania Blanch, Tereza Sindelarova, Jaroslav Urbar, John Bosco Habarulema, Zama Katamzi, and Dana Saxonbergova-Jankovicova

Mon, 08 Apr, 16:15–18:00 Hall X4

EGU2019-15468 | Orals | ST3.1, Large-Scale Travelling Ionospheric Disturbances occurrence during the Space Weather events of September 7-8th, 2017, Arthur Amaral Ferreira, Claudia Borries, and Renato Alves Borges

Wed, 10 Apr, 16:15–16:30 Room L1

First TechTIDE User Workshop, DLR, Neustrelitz, Germany, 15 May 2019

The first TechTIDE user workshop will take place on 15th May 2019 in Neustrelitz, Germany. Users are invited to participate the workshop and learn about the capabilities of the TechTIDE system.

Please register here: <http://smodell.besl-eventservice.de/YwwiXLIZNwsS/>

TechTIDE at the TREASURE workshop “A response to user needs in PPP and RTK” on 21st May 2019 in Toulouse, France

TREASURE project is a prestigious Marie Skłodowska – Curie Actions Innovative Training Network, funded through the European Union’s Horizon 2020 Research and Innovation Programme. This project will provide specialist training in the strategic and emerging area of EGNSS. The consortium is comprised of leading European universities, research centers and companies, with associated partners representing



academic and industrial stakeholders from Europe, Australia, Brazil,

Canada, Hong Kong and the US.

Workshop aims the TREASURE fellows to expose their research outcomes and gather feedback from within and outside the project’s network.

TechTIDE project has been invited to give the presentation about how the technology can support space weather applications aiming at presenting the objectives and actual status of the project.

More information about the workshop can be found here: <http://www.treasure-gnss.eu/>

Second TechTIDE General Assembly Meeting and User Workshop, Prague, Czech Republic, 8-11 October 2019

The second TechTIDE General Assembly Meeting and user workshop will bring together the consortium members and users from all operational activities concerned with Travelling Ionospheric Disturbances activity. The Second Release of the TechTIDE Warning System will be presented and assessed by the users. More details will be made available with the next issues of our newsletter.

Imprint

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