





















T-FORS WP5: Dissemination, Communication and Exploitation

NOA, INGV, OE, RMI, BGD, IAP-P, IAP-L, GFP, FI, ONERA

-  National Observatory of Athens (NOA) 
-  Istituto Nazionale di Geofisica e Vulcanologia (INGV). 
-  **Observatorio del Ebro Fundacion (OE).** 
-  Institut Royal Meteorologique de Belgique (RMI). 
-  Borealis Global Designs EOOD. (BGD). 
-  Ustav Fyziky Atmosfery AV CR (IAP-P). 
-  Leibniz-Institut für Atmosphärenphysik ev an der Universität Rostock (IAP-L). 
-  Bundespolizei (GFP). 
-  Foldfizikai es Urtudományi Kutatóintézet (FI). 
-  Office National d'Etudes et de Recherches Aérospatiales (ONERA). 

PARTNER	Representative	Deputy
OE	David Altadill (david_altadill@obsebre.es)	Antoni Segarra (asegarra@obsebre.es)
INGV	Luca Spogli (luca.spogli@ingv.it)	Lucilla Alfonsi (lucilla.alfonsi@ingv.it)
NOA	Anna Belehaki (abeleha@otenet.gr)	Angeliki Thanasou (athanasou@noa.gr)
RMI	Tobias Verhulst (tobias.verhulst@oma.be)	Stanimir Stankov (S.Stankov@oma.be)
BGD	Ivan Galkin (ivan.galkin@borealis-designs.org)	
IAP-P	Dalia Buresova (buresd@ufa.cas.cz)	Petra Koucka (pkn@ufa.cas.cz)
IAP-L	Jens Mielich (mielich@iap-kborn.de)	Siva Mani (mani@iap-kborn.de)
GFP	Stefan Unger (Stefan.Unger@polizei.bund.de)	Jens Toelle (jens.toelle@polizei.bund.de)
FI	Veronika Barta (bartav@ggki.hu)	Kitti Berenyi (berenyi.kitti@epss.hu)
ONERA	Vincent Fabbro (Vincent.Fabbro@onera.fr)	Philippe Brouard (philippe.brouard@onera.fr)

- **WP5 Objectives**
- **WP5 Tasks**
- **WP5 Calendar**
- **WP5 Summary**
- **WP5 Current Status**
- **Future actions plan**
- **Open discussion**

- **To organize and implement effective dissemination, exploitation and communication activities (D&E&C).**
 - To coordinate the dissemination of results towards the scientific community.
 - To implement Communication activities.
 - To contribute to the establishment of the Innovation Forum (WP4).
 - To provide materials to enhance the users' awareness on the effects of TID in certain types of applications.



- **Task 5.1. Definition of D&E&C strategy.**
 - Lead: OE. Contributors: All Partners.
- **Task 5.2. Dissemination Activities.**
 - Lead: OE. Main Contributor: RMI. Participants: All Partners.
- **Task 5.3. Communication Activities.**
 - Lead: FI. Contributors: All Partners.
- **Task 5.4. Exploitation and Innovation Activities.**
 - Lead: ONERA. Main Contributors: NOA, GFP. Participants: All Partners.



T-FORS Project. Gantt Chart WP 5 Dissemination, Communication and Exploitation																									
		Half 1, 2023					Half 2, 2023					Half 1, 2024					Half 2 2024								
Month	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	T 5.1	Definition of D&E&C strategy																							
	Deliverable	D 5.1																							
	Milestone																								
	T 5.2	Dissemination Activities																							
	Deliverable																					D5.2			
	Milestone																			M14					
	T 5.3	Communication Activities																							
	Deliverable																					D 5.3			
	Milestone									M06															
	T 5.4							Exploitation and Innovation Activities																	
	Deliverable																			D 5.4					
	Milestone											M10													

Milestones updated according to the Grant agreement

Objective	To organize and implement effective Dissemination, Exploitation and Communication activities (D&E&C).
Schedule	T01 (January 2023 to T24 (December 2024)
Partners (PM)	NOA (3.5), INGV (1), OE (Leader, 10), RMI (4), BGD (1), IAP-P (3), IAP-L (1), GFP (2), FI (5), ONERA (2)
WP Predecessor	WP1, WP4
Deliverables	<p>D 5.1. Updated D&E&C Strategy [T04, OE].</p> <p>D 5.2. Dissemination activities Report [T24, OE].</p> <p>D 5.3. Communication activities Report [T24, FI].</p> <p>D 5.4. Exploitation activities Report [T24, ONERA].</p>
Milestones	<p>M 06. Knowledge Hub and e-newsletters kick off [T09].</p> <p>M 10. Specific methodology for setting up the innovation forum [T12].</p> <p>M 14. Release of the final version of forecasting models and deliver presentations in Training School for dissemination of T-FORS models to young researchers [T20].</p>

Milestones updated according to the Grant agreement

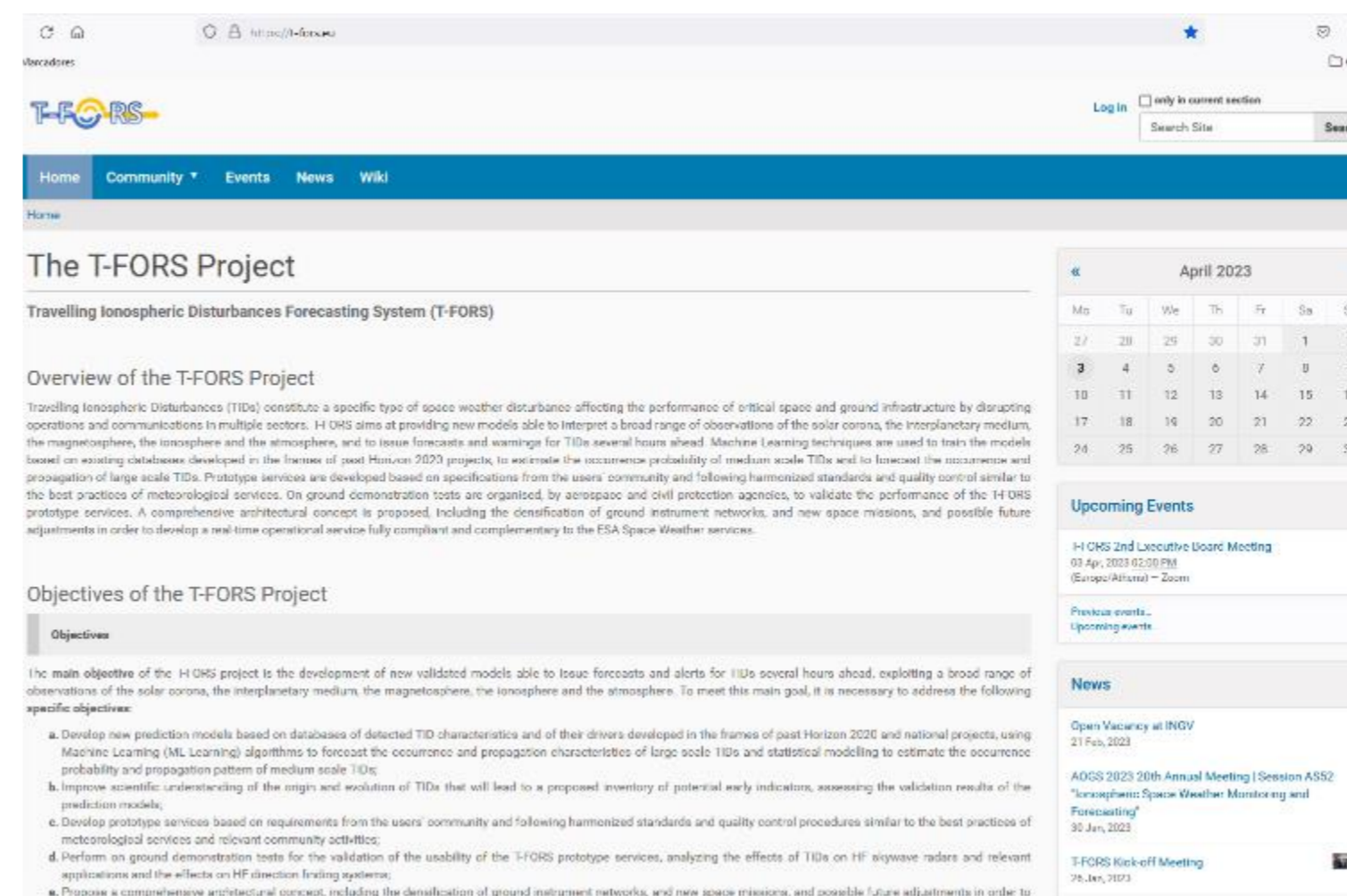
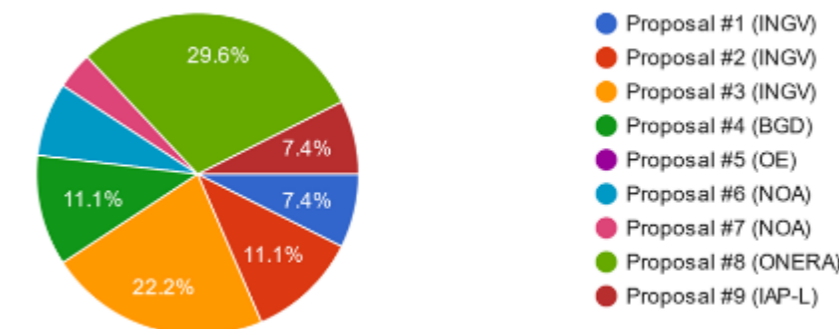
- **WP 5. Tasks & Milestones Achieved.**

- Logo Definition.

- Web Site.

- NOA set up the T-FORS web site under .eu domain

<https://t-fors.eu>



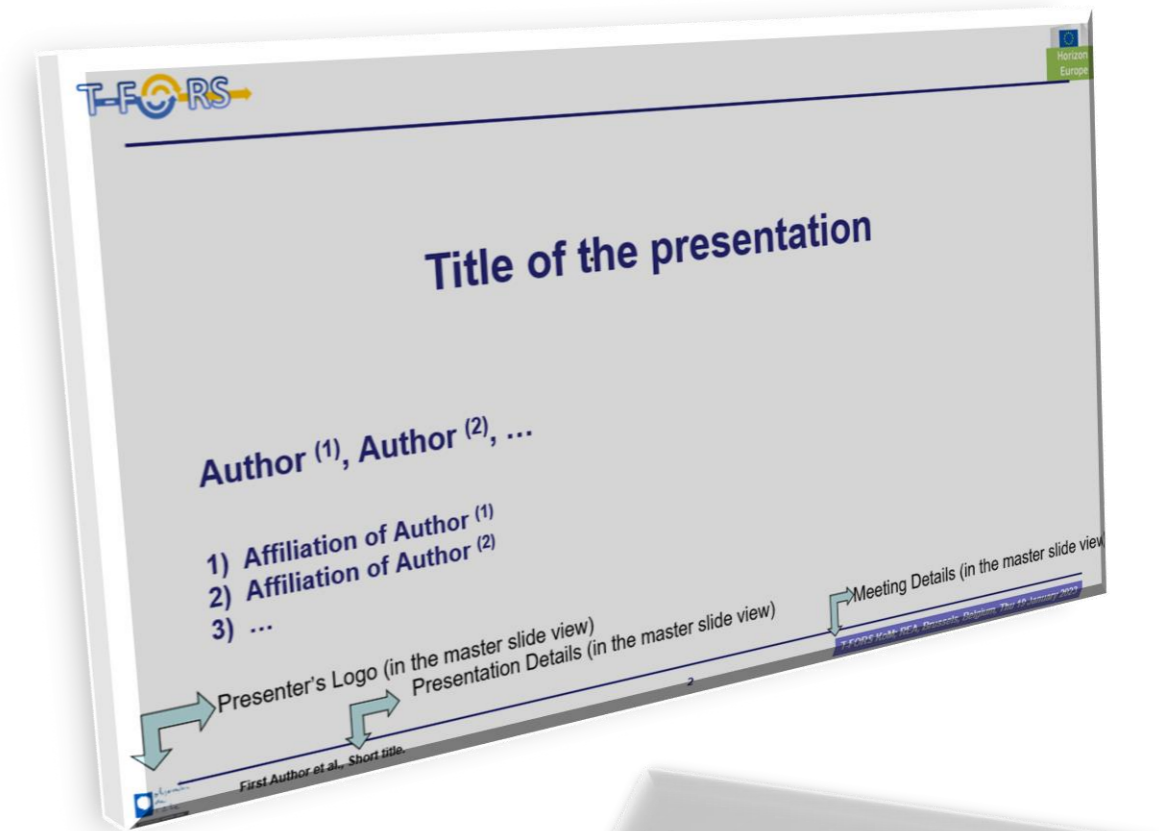
- **WP 5. Tasks & Milestones Achieved.**

- Report Document Template.

- docx & odt files
- <https://vmi536589.contaboserver.net:8443/wiki/documents/20>

- Presentation Document Template.

- pptx & odp files
- <https://vmi536589.contaboserver.net:8443/wiki/documents/20>



- **WP 5. Tasks & Milestones Achieved.**

- **D5.1. Delivered**

- https://vmi536589.contaboserver.net:8443/wiki/attachments/892/T-FORS_Report-D5-1_02_Rev.pdf



- **WP 5. Tasks & Milestones Achieved.**

- ESWW2023 - CD100 session proposal

- ✓ Nowcasting and forecasting Travelling Ionospheric Disturbances for ionospheric weather and mitigation services.
Conveners: David Altadill, Claudio Cesaroni, Sivakandan Mani
- ✓ Programme Committee (PC) has not accepted the session proposal

- Conference papers submitted to:

- ✓ IUGG2023 Berlin: Ionospheric effects of the M7.8 and M7.5 Turkey-Syria Earthquake Sequence on February 6, 2023
- ✓ URSI GASS 2023, Sapporo: T-FORS: a project to develop TID forecasting systems

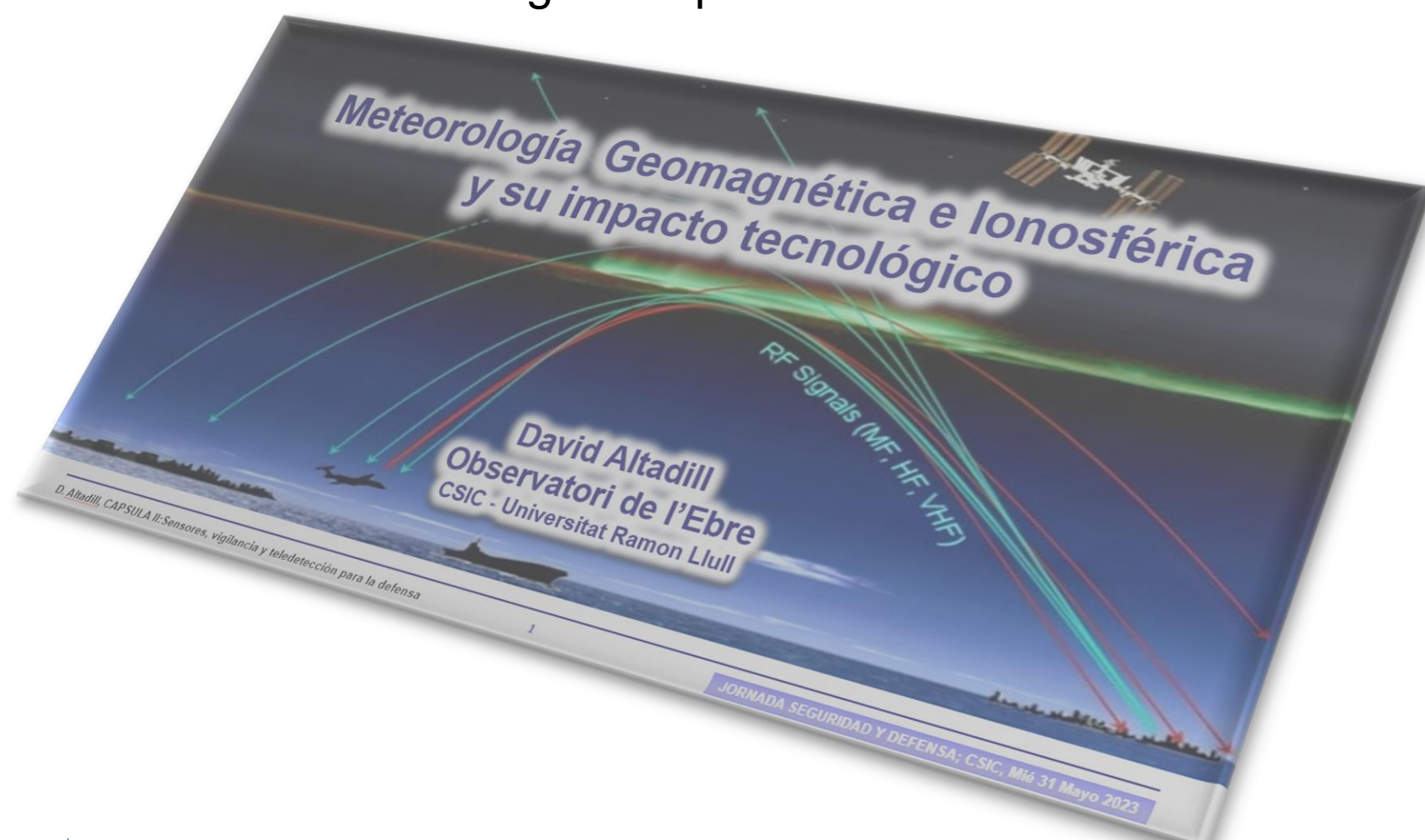
- Submitted articles:

- ✓ JGR-SP: Multi-instrument observations of various ionospheric disturbances caused by the 6 February 2023 Turkey earthquake
- ✓ A section for publications have been created in the Web

- **WP 5. Tasks & Milestones Achieved.**

- **Outreach activity**

- ✓ Pint of Science Spain: “Ionospheric meteorology and technology impacts”
- ✓ CISC Day of scientific collaboration in security and defense: Geomagnetic and Ionospheric Meteorology and its Technological Impact



- **WP 5. Tasks & Milestones Achieved.**

- **Leaflets**

- ✓ General Public: Done!
- ✓ Technical Public / Users: In Progress!
- ✓ School students: In Progress!

The Ionosphere
The ionosphere is defined as the ionized part of the upper atmosphere (60-2000 km approximately). As it contains a significant number of free electrons it has an important influence on the propagation of radio-electric signals. The ionosphere is a tool for ground-based radio-communication systems but it is a noise for space-ground radio-communications systems.

Travelling Ionospheric Disturbances (TID)
Travelling ionospheric disturbances (TIDs) are perturbations that propagate as waves through the ionosphere disrupting the regular propagation of radio-electric signals. TIDs can have different sources, from the top, as geomagnetic storms, and from below, as big earthquakes.

TIDs impacts
TIDs can have multiple effects in the operational of aerospace and ground-based infrastructures, especially in the geolocation, navigation and communication services based on radio-electric signals. Today exists an unprecedented need for high accuracy of a Global Ionospheric Weather Nowcast and Forecast. Finer effects in the ionosphere become important. TID is a "Silent Killer of Accuracy" for accurate-Navigation systems and generator of "Short range catastrophe", for radio-communication systems that cannot detect TID-inflicted errors by themselves. Academy is tasked to provide new understanding and accurate specification of the ionospheric dynamics.

Impact of external origin - Sun - Atmosphere coupling
Solar flares, Solar eclipses, Geomagnetic storms

Impact of internal origin - Earth - Atmosphere coupling
Earthquakes, Eruptions, Tsunamis, Rockets, explosions

Space based communications
Waves reflected by the ionosphere

Objectives
Nowadays exist different techniques to detect in near-real time the presence of TIDs. To improve the performance of the different technological systems, a TID forecast is needed. The main objective for the T-FORS project is forecasting some hours in advance those TIDs generated by the Sun activity, and making a climatological study for the TID generated by the Earth-Atmosphere coupling.

Travelling Ionospheric Disturbances FOREcasting System T-FORS

Consortium
INGV, Observatori de l'Ebre, RMI, BOREALIS GLOBAL, yfi, INSTITUTE OF ATMOSPHERIC PHYSICS CAS, LEIBNIZ-INSTITUT FÜR ATMOSPHERÄN PHYSIK IAP, ONERA THE FRENCH AEROSPACE LAB

Machine Learning FORECAST
Solar, geomagnetic parameters → Properties of Travelling Ionospheric Disturbances → Earth

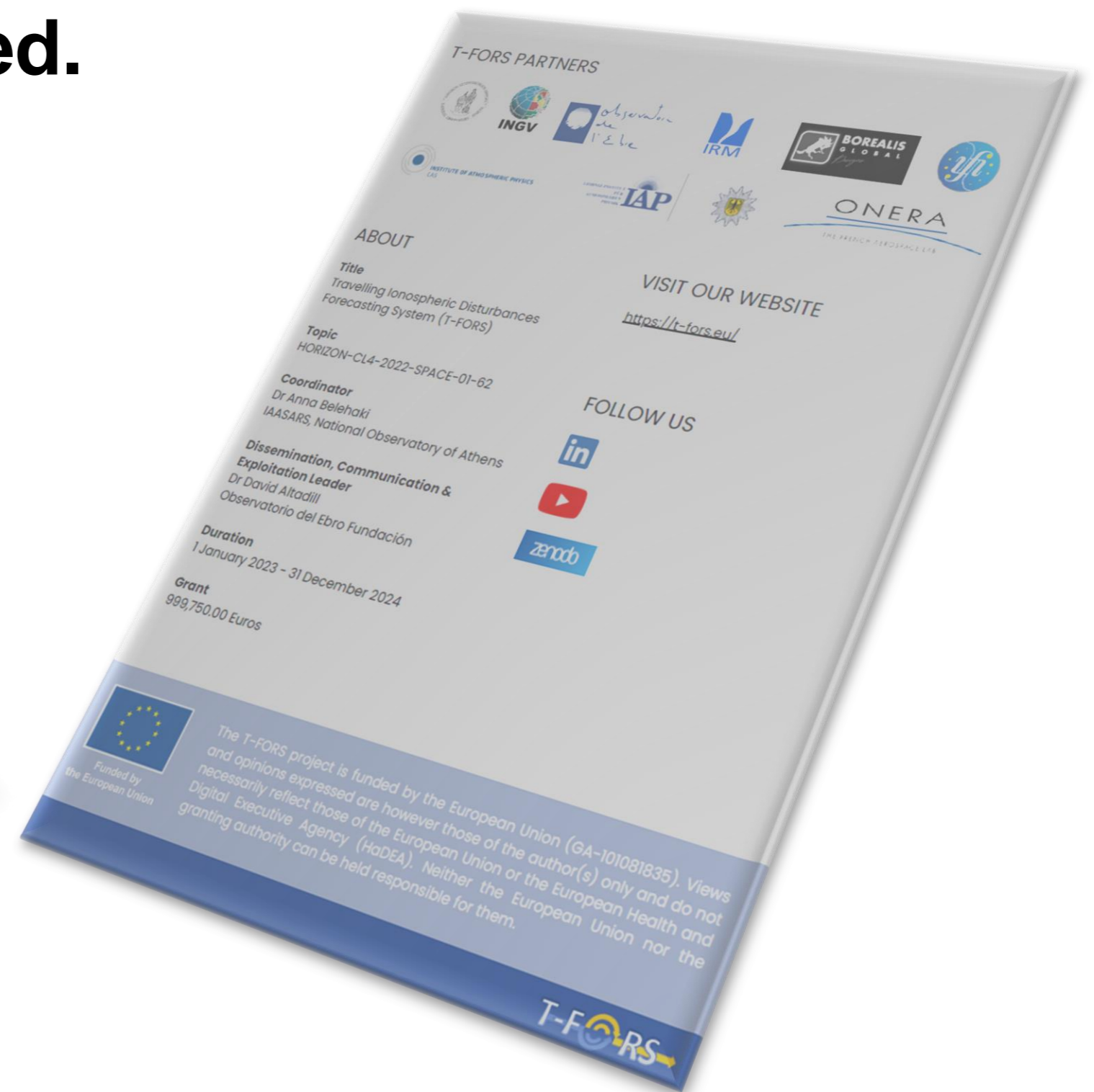
Contact
website: <https://t-fors.eu/>
email address: info@t-fors.eu

Funded by the European Union
The T-FORS project is funded by the European Union (GA-101081835). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency (HaDEA). Neither the European Union nor the Commission is liable for any use that may be made of the information contained in this document.

- **WP 5. Tasks & Milestones Achieved.**

- **Newsletters**

- ✓ Template – DONE!
 - ✓ In Progress for September Launching!



- **Knowledge Hub**

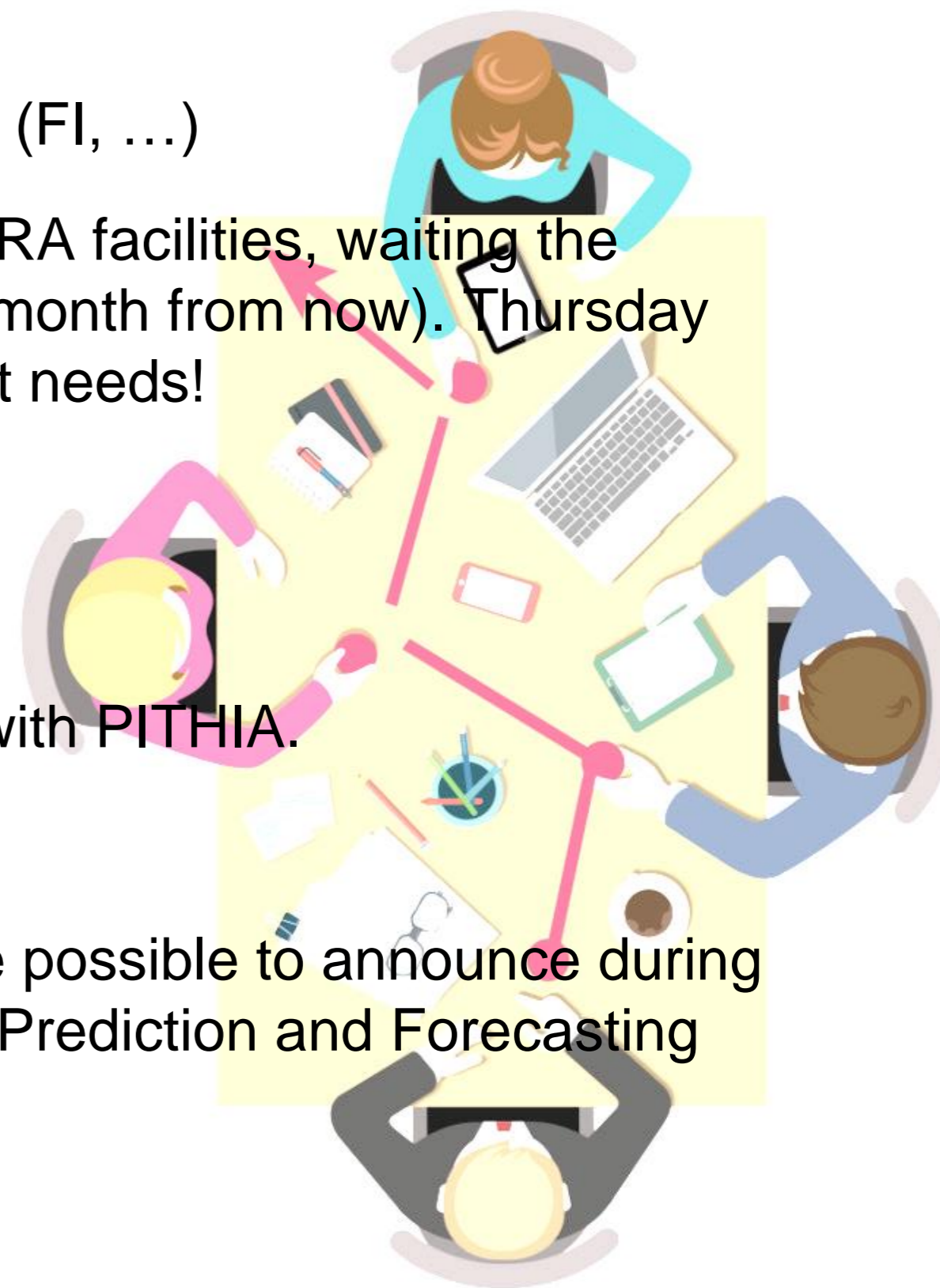
- Training course on ionospheric monitoring and ionograms (FI, ...)
- Innovation Days – Webinars: Room assigned in the ONERA facilities, waiting the Committee Program to validate the program in the CC (1 month from now). Thursday Afternoon. Potential list in the Wiki! 1-2 Users to talk about needs!
- Outreach Video: For Innovation Day, November 2023

In Progress

- Training Schools: To be Organized in spring 2024 jointly with PITHIA.

- **Special Issue in JSWSC**

- Think about aims, scope and potential editors: Would it be possible to announce during ESWW, November 2023? **Wide scope on TIDs** and with Prediction and Forecasting TIDs and impacts on technology!



- **Networks of potential users and stakeholders (WP1)**
 - Initial network feed by the EoI (OE) for inviting to the Innovation day.
 - The wiki has an initial list <https://vmi536589.contaboserver.net:8443/wiki/projects/t-fors/wiki/stakeholders>.
- **Social Networks**
 - LinkedIn account created but not public yet (OE)
 - YouTube channel to do for uploading video presentations
 - Zenodo account created. Included some of the Milestones and may be some of the deliverables too.
- **Cooperation with other projects**
 - Suggestion to write something about T-FORS in the upcoming PITHIA newsletter.



- **Promote T-FORS results with all possible means.**
 - conference papers, feature articles, newsletters, social media, web site, ...

Venue / Channel	Impact
EGU GA (April 2023, 2024)	Aware the research community of the T-FORS developments with the aim to receive updates on the latest achievements and feedback
IUGG GA (July, 2023)	Promotion of T-FORS as a main system that supports excellence in Space Weather impacts in the ionosphere.
ESWW (November 2023, 2024)	Making people aware of the T-FORS developments with the aim to promote opportunities of using T-FORS services and applications in critical operations, especially targeting to European Space Agency operations; aware service developers about the T-FORS tools to support R&D projects.
COSPAR GA (July 2024)	Promotion of T-FORS as a main system that supports excellence in Space Weather impacts in the ionosphere.
URSI GA, AT-RASC (August 2023, TBC)	Promotion of T-FORS as a main system that supports excellence in Space Weather impacts in the ionosphere.
AGU Fall 2023, 2024 (December)	Promotion of T-FORS as a main system that supports excellence in Space Weather impacts in the ionosphere.

- **Innovations Days.**

- Meetings for innovation potential of T-FORS.

Meeting ID	Description
T-FORS Innovation Day first	<p>The meeting is connected with the first Release of the T-FORS prototype. The primary objective is the awareness of the potential users about the impacts of TIDs on their systems, about the basic prediction principles and about the basic functionalities of the T-FORS warning system. A discussion will be organized on how to report problems, questions, recommendations for improvements.</p>
T-FORS Innovation Day second	<p>The meeting is linked with the Release of the final T-FORS prototype and will address technical, policy, organizational and sustainability issues. Selected users will be invited to present their experience on the improvements reached with the application of the mitigation techniques designed based on T-FORS results. They have two goals</p> <ol style="list-style-type: none"> a. To receive feedback from groups from their experience in using the first Release. b. To discuss potential application of TFORS services in the production chain to mitigate Space Weather risks.

- **Training Schools, Innovations Days, Knowledge Hub.**
 - T-FORS communication / dissemination activities.

Activity	Timing	Responsibility / Contributor
Leaflet for the general public	M04	FI/All
Pint of Science ES 2023	M05	OE
European Research Night	M09	NOA
Knowledge Hub	M09	FI/All
e-Newsletter	M09	RMI/All
Leaflet for the school students	M10	IAP-P
Spanish Science Week / Open Day	M11	OE
Organization of the Training School	M15	RMI

Activity	Timing	Responsibility / Contributor
Presentation for schools in the form of video and webinars	M12	ONERA
e-Newsletter	M12	FI/All
Athens Science Festival	M15	NOA
e-Newsletter	M15	FI/All
Pint of Science ES 2024	M17	OE
e-Newsletter	M18	FI/All
European Research Night	M21	NOA
e-Newsletter	M21	FI/All
Spanish Science Week / Open Day	M23	OE
e-Newsletter	M24	FI/All

Thank you for your attention!

Questions / Comments / Updates

-



The T-FORS project is funded by the European Union (GA-101081835). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency (HaDEA). Neither the European Union nor the granting authority can be held responsible for them.