



Warning and Mitigation Technologies for Travelling Ionospheric Disturbances Effects

TechTIDE

D8.2

Key Performance Indicators (KPI) Definition

Version 1.0

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Table of Contents

Document Information.....	2
Abstract	3
Document history.....	3
Disclaimer	3
Executive Summary	4
1. TechTIDE expected impacts	4
2. Methodology to derive KPIs	5
3. Methodology to monitor KPIs	7
4. Conclusions.....	8

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Abstract

The report specifies the key performance indicators to measure and monitor the impact of TechTIDE in all project's phases.

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Executive Summary

The success of the TechTIDE is based on the impact of the project in science and application domains. More specifically, TechTIDE is expected to:

- Improve the understanding of Space Weather phenomena and especially of phenomena that lead to the generation of the different types of TIDs.
- Improve the understanding of the impact of TIDs on systems directly affected
- Analyze viable mitigation strategies and demonstrate how these strategies add a value to operational services

Therefore, the implementation of a strategy for the development of reliable TID detection techniques that can be implemented in real-time, the networking with the users to specify the impact and support the mitigation technologies and the development of actions for the systematic use of the TechTIDE products and services will ensure success and sustainability for the TechTIDE achievements. To this effect, TechTIDE would greatly benefit from measuring and monitoring its impact during all project's phases based on Key Performance Indicators (KPIs) adjusted to the expected impacts.

In this report, Deliverable D8.2, we are proposing a preliminary set of Key Performance Indicators that correspond to the project impacts, and we propose a methodology for the monitoring of KPIs, adjusted to the schedule of the various TechTIDE activities. As it is planned in the technical annex, following their definition (in Month 3) the key performance indicators will be monitored by WP8 and the results will be reported in the yearly progress reports and in the final report.

1. TechTIDE expected impacts

TechTIDE impacts are expected in the following areas:

Scientific advances in the understanding of Space Weather phenomena and especially of phenomena that lead to the generation of the different types of TIDs – this is an impact that the project will achieve through the development of TID detection techniques (WP2) through the definition of activity metrics (WP3) and through the development of the warning system (WP4).

Bridging the gap between science and applications – this impact refers to the understanding of the specific effects imposed in each technology by TIDs (WP5), the awareness of the operators of these technologies about potential threats and the

collaborative work between researchers and representatives from the operations domain to design mitigation technologies (WP7).

Use of TechTIDE results in operations – this is the ultimate goal expected to be achieved from the project. The direct impact will be the support to mitigation technologies (WP6) especially relevant to EGNOS, N-RTK and HF operations whose representatives participate in TechTIDE project either as partners or as advisors. Other communities may have benefit from TechTIDE warnings and products, such as the LOFAR and SKA radio observations. As an indirect impact, capacity enhancement is expected for SMEs and industries which support the testing of the various TechTIDE releases in order to ensure the alignment of the provided services with the users’ requirements. This procedure, in combination to the open access policy to be adopted from TechTIDE, will strengthen European competitiveness and growth of the companies involved by developing innovations meeting the needs of the European and global markets.

To measure and monitor the impact of TechTIDE in all project’s phases, the management team will specify and measure periodically a set of performance indicators.

2. Methodology to derive KPIs

In the Figure 1 below we attempt to map each of the key TechTIDE activities and the expected impacts to a set of KPIs.

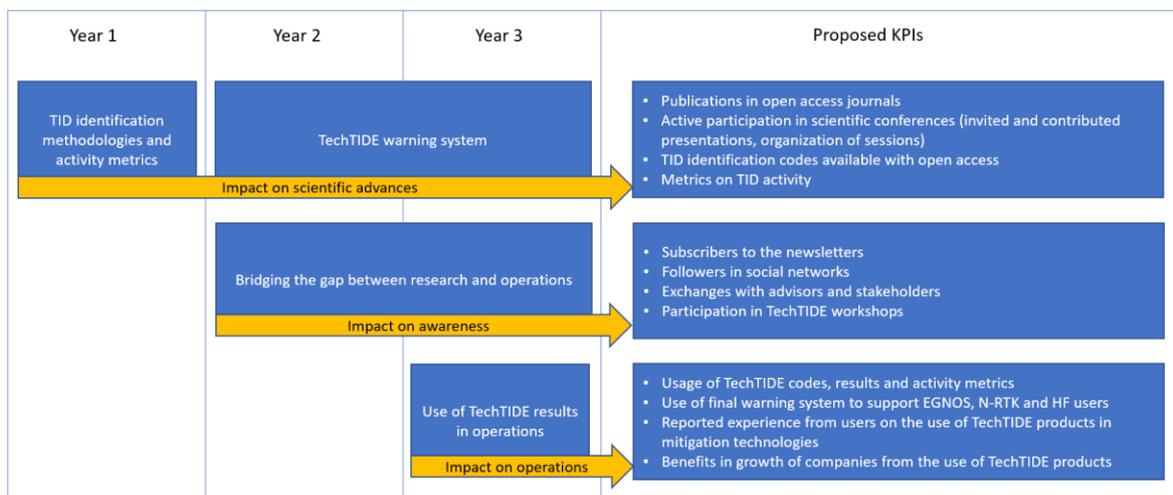


Figure 1: A diagram mapping the main TechTIDE impacts to proposed KPIs

The **impact on scientific advances** is expected to be the result of the work implemented in WP2, WP3 and WP4. The work in WP2 and WP3 has started within the first months and it will be the main focus of TechTIDE activities for the first year of the project implementation while it was expected to lead to mature results the second year of the project. Therefore, the impact on the scientific advances is expected to be measurable from the start, mainly through the active participation in conferences. In the 2nd and 3rd year, more data to monitor the impact on scientific advances will be available, considering the publications on TechTIDE

identification codes and on TID activity metrics. The following KPIs are proposed in this first category:

- Number of active participations in scientific conferences and especially invited talks and sessions organized by the consortium members
- Number of publications in open access journals
- Number of TID identification codes available with open access for off-line execution and re-use
- The use of the TID activity reports and of the corresponding metrics from the scientific community and their integration to space weather reports released by European and international centers, for example the International Environment Service (ISES) Warning Centers.

The **impact on awareness** refers to the increase of understanding of both scientists and users about the effects of TIDs in the smooth operation of the systems affected. This is the main goal of WP5. In addition, the systematic networking with the users and stakeholders, to be achieved in WP7, is also expected to contribute to this goal. These activities will start within the first year of the project, but tangible results can be expected only in the 2nd and 3rd year, when the results will be specific and mature. The following KPIs are proposed for this second category:

- Number of subscribers to the TechTIDE newsletters
- Number of TechTIDE followers in the social networks
- Number of members in TechTIDE users network
- Exchanges with advisors and stakeholders (f2f meetings and teleconferences, quality of recommendations received by the advisors, discussions with stakeholders that can lead to innovation, etc)
- Number of participants in TechTIDE users' workshops
- Assessment of quality of presentations in TechTIDE users' workshops, and of exchanges and discussions in respect to the impact on the TechTIDE services to be released by the final warning system.

The **impact of TechTIDE results in operations** can be monitored only when WP6 and WP4 provide the final release of the TechTIDE warning system, which is planned to happen within the last months of the project. However, after the 2nd release of the warning system that is scheduled for M24, we will be in the position to monitor the usage of the various TechTIDE products and the functionality of the warning system as a whole, and from there to draw some conclusions regarding potential impact to the operations. In parallel discussions in the three users' workshops planned in M18, M24 and M30 will give us an indication about possible benefits especially for SMEs and industries. The following KPIs are proposed in the third category:

- Impact on the mitigation strategies, i.e. measure which TechTIDE products are exploited mostly by the users' communities for the development of mitigation strategies
- Usage of the TechTIDE codes and value-added products; number of hits, downloads, etc.
- Number of interactions with the users through the TechTIDE users support center
- Service robustness (availability vs outages)
- Use of final warning system to support EGNOS, N-RTK and HF users
- Reported experience from users on the use of TechTIDE products in mitigation technologies
- Reported benefits in the growth of companies from the use of TechTIDE open access codes, tools, products, reports and publications, monitoring results such as the funding of new TechTIDE-relevant projects and activities and the creation of new jobs.

3. Methodology to monitor KPIs

Depending on the nature of each KPI, different methodologies will be applied.

A number of KPIs are based on the qualitative assessment of the project outcomes. In this category we can refer to the assessment of quality of presentations in TechTIDE users' workshops; the experience from users on the use of TechTIDE products in mitigation technologies; the quality of exchanges with advisors and stakeholders. For such KPIs, we will proceed to an assessment based on the scientific quality standards adopted by the TechTIDE members, who are all scientists with excellent publication record, and serve as editors in highly ranked scientific journals and as members of European and international evaluation committees.

There is also a good number of KPIs that are more quantitative and need to be monitored through the system using web analytics tools such as Google Analytics, AWStats, etc. These tools are expected to provide useful information concerning the systematic use of the system and its overall impact. Monitoring online users, visits and visitors, as well as providing interactive map of visitor locations are some of the features of the above tools. Page statistics, including mostly visited or downloaded products will be also provided. The monitoring service is considered as an input for the WP4 specifications.

In addition to the above, the public web site and the wiki will be helpful tools for keeping a track for the consortium activities that have an effect in KPIs monitoring. The public web site will keep a record on the public presentations, users' meetings, events, etc. Moreover, visitor statistics, frequencies, preferences, and interests will also be recorded. Concerning the wiki, minutes from the discussions with the advisors, the users and the stakeholders will be uploaded, in order to further improve the KPIs' monitoring.



4. Conclusions

This report, Deliverable D8.2, presents a preliminary derivation of the Key Performance Indicators (KPIs) that will help the consortium and the EU officers and evaluators, to assess the impact of the project.

The impacts will be achieved gradually, as the TechTIDE project implementation progresses. First impacts are expected to be monitored at the end of the first year and will be mainly on scientific advances. The second year we should also be able to detect impacts on users' awareness, while at the end of the project all impacts should be detectable, including the impact on mitigation technologies.

The results of the KPI monitoring will be included in the yearly progress reports. The first set of KPIs that will be monitored at the end of the first year will be indicative of the suitability of our monitoring methodology and if required some corrective actions will be considered.