INFRASTRUCTURAL HARDWARE PLATFORM OF THE COMMON IT SPACE FOR FUSION RESEARCH (FUSIONSPACE) WORK STATUS [[1]](#footnote-1)\*)

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Portone S.S., Semenov O.I., Nagornyi N.V., Mironov A.Yu., Larionov A.S., Ezhova Z.V., Semenov E.V., Mironova E.Yu., Semenov I.B., Grigorian L.A.

Institution «Project Center ITER», support@iterrf.ru

ITER, the world’s biggest fusion experimental machine, will start its operation in 2025. The ITER tokamak will be equipped with more than 180 technological and diagnostic systems, generating a massive data stream every day (2.2 PB per day). The data generated by the tokamak will be of critical importance for the development of fusion science, will allow us to evaluate the effectiveness of the selected technological solutions and determine the vector for the creating of new fusion technologies.

 Russian Federation is a full-fledged member of the international ITER project, as a consequence the ITER data will be available to Russian scientists. Accordingly, there was a need to create a technological base capable of providing the possibility of joint participation in geographically distributed experiments, as well as the storage and processing of data such as ITER data.

Infrastructural hardware platform of the common IT space for fusion research (FusionSpace.RU) has become such a technological basis for a joint fusion experiment integration. FusionSpace.RU allows to carry out the processes of planning and conducting a scientific experiment, providing access to scientific and experimental data, thematic software for data analysis, visualization and other specialized IT services for the main actors in Russian fusion research.

The report presents the status of work on the FusionSpace.RU development. The project had started in 2021. The functionality of the platform was formulated, a technical project was developed, and a test site FusionSpace.RU was created. Test site included 9 remote participation centers (*complexes for the remote participation in fusion experiments, include workplaces that provide the opportunity for local work with the scientific data*), 6 joint laboratories (*software and hardware infrastructure for collecting and exchanging scientific data, which provides an interface with a source of scientific data*) and a central node (*a set of server and network infrastructure that ensures the functioning of the platform*).

In 2022, the main challenge was to test and create on the basis of the developed working documentation a pre-production model of the central node that complies the previously formulated requirements, as well as the development of software within the current stage: scientific and technical analysis of existing software tools for working with data at fusion facilities and the developing of basic functionality of information exchange web-portal.

It is planned to test and create prototypes of the remaining FusionSpace.RU nodes – remote participation centers and joint laboratories in 2023-2024. No less important is the next stage of software development for interaction between nodes, as well as for providing analysis and display of experimental data. Implementing hardware and software solutions should not only provide the possibility of integrating national fusion research, but also provide the opportunity to work with the ITER data. This will become possible because of unified formats and data structures application, compatible with IMAS, integration with mathematical software and codes and other approaches that have proven themselves in international practice and are successfully applied in the ITER project.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/E/ru/KE-Portone.docx) [↑](#footnote-ref-1)