NACIONĀLAIS ATTĪSTĪBAS PLĀNS 2020

EIROPAS SAVIENĪBA
Eiropas Reģionālās attīstības fonds

IEGULDĪJUMS TAVĀ NĀKOTNĒ

Overview of scientific results of the project
Reporting period **Nr. 3.**
01.11.2019. - 31.01.2020.

Project: Nr. 1.1.1.1/18/A/133 “Prototype development of transportable in multimodal traffic mobile space test facility "Metamorphosis".

Project promoters: Riga Technical University (Leading Partner), “CRYOGENIC AND VACUUM SYSTEMS” Ltd.

Overall Project Objective: To develop a prototype mobile test facility "Metamorphosis" (MSTF) transported in an intermodal traffic environment on the based of industrial research and to rise MSTF Technological Readiness Level from TRL2 to TRL4 (under European Space Agency (ESA) scale) for further evzlution of the project.

Project activities and accomplishments during the reporting period:

Activity 1. Design calculations and design documentation for the design elements of prototype:
Work 1.1. Calculation of the vacuum system
Vacuum calculation:
In process variational calculation.
In the process of calculating the limiting and working pressure for various tests and various modes of operation of the prototype, as well as possible ranges of their changes based on the preliminary dimensions of the vacuum chamber.
Work is underway to determine the gas composition of the atmosphere and the gas load of the vacuum chamber that occurs during various tests.
The analysis of the quality control methods of the vacuum chamber of the prototype is completed and the methods of quality control and tightness of the prototype are determined.
As a method of quality and tightness control, the method of helium blowing during evacuation and a comparison of the readings of a helium mass spectrometric leak detector connected to the output of a vacuum-pumping system with the readings of a control leak were adopted.
The technical requirements for the mass spectrometric leak detector and residual gas analyzer, which are necessary to control the tightness of the prototype and space technology products in the prototype, are determined.
In the process of determining technical requirements for vacuum valves, valves, compensators and vacuum pumping equipment, electrical, cryogenic and optical inputs.
A preliminary analysis of the equipment available on the vacuum equipment market that meets the previously defined technical requirements and the project budget.

Thermophysical calculation:
Work continues on the development of a thermal model and preliminary calculations of the thermal balance of the prototype for various types of tests.
In the process of determining technical specifications for measuring heat fields and an information processing system.
In the process of determining the technical requirements for infrared sources and cryogenic shrouds.
Work continues on the hydraulic calculation of the cryogenic prototype system.
Work has begun on determining the technical requirements for cryogenic pumps and valves and conducting market analysis based on certain technical requirements and the project budget.
A preliminary pneumatic-hydraulic prototype circuit was developed.

Activity 2. Prototype software development:
Work 2.1. Development of prototype working algorithm
Based on the analysis of test types, work continues on the creation of test program templates in accordance with the requirements of the ESA ECSS standard for the types of tests that will be performed using the MSTF.
Algorithmization work has begun on the test process based on the developed test program templates.