



I E G U L D Ī J U M S T A V Ā N Ā K O T N Ē

Overview of scientific results of the project

Reporting period **Nr. 5.**

01.05.2020. - 31.07.2020.

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 EU traffic environment based on industrial research and to rise MSTF Technological Readiness Level from TRL2 to TRL4 (under European Space Agency (ESA) scale) for further evolution of the project.

Project activities and accomplishments during the reporting period:

Activity 1. Design calculations and design documentation for the elements of prototype structure:

Section 1.1. The calculation of the vacuum system

The calculation of the vacuum system has been completed. Preparing report.

Section 1.2. Strength calculation

The strength calculation is complete. Preparing report.

Static strength calculation performed (version 2.0). Further clarification of the technical specifications to calculate the strength and stability of the vacuum chamber housing.

Continued work on designing designs for compositioning. Continued analysis of standards and technical literature on typical loads on objects being moved in intermodal transport.

Section 1.3. Development of design documentation set

On the basis of the results of the prototype vacuum system and strength calculations, further determination of the exterior appearance of the components of the prototype design, drawing up sketches for design.

Section 1.4. Development of 3D CAD model of prototype construction elements

On the basis of an analysis of standards and industry methodologies in the field of 3D modelling of complex equipment and systems, and on the basis of previous calculations, further work on developing a 3D model of prototype design elements.

Activity 2. Prototype software development:

Section 2.1. Development of prototype working algorithm

The algorithm development job is complete. A report is being prepared.

Section 2.2. Prototype software and hardware development

Work has been launched on developing software for prototype vacuum bilge system elements controllers. Software development of the prototype cryogenic system has been launched..

Activity 3. Production of structural elements and assembly of prototypes

Section 3.1. Production of prototype construction elements

Work on the construction of prototype elements has been launched, procurement of materials and components is ongoing.

Activity 4. Industrial research and prototype testing

Section 4.1. Stability tests of the prototype structure under operating conditions

Development of technical materials for organizing the procurement of elements for testing in service. Work continues on the development of a test program and methodology. The technical requirements for the system for collecting and processing information on vibro-shock loading under operating conditions are determined.