



Overview of scientific results of the project

Reference period **Nr. 1.**

01.05.2019 - 31.07.2019

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

Project implementers: Riga Technical University (Leading Partner), "CRYOGENIC AND VACUUM SYSTEMS" Ltd.

Overall Project Objective: To develop a prototype of the mobile testing facility "Metamorphosis" (MSTF), transported in an intermodal traffic environment on the base of industrial research and to rise MSTF Technology 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 design elements of the prototype:

Work 1.1. Calculation of the vacuum system

Outcomes:

Vacuum calculation:

Work has begun of the prototype vacuum chamber variational calculation and determination of the necessary for prototyping volumes and sizes of the vacuum chamber on its basis.

Started the calculation of the ultimate and working pressures for various tests and various modes of operation of the prototype, as well as possible ranges of their change.

Thermophysical calculation:

The development of a thermal model has begun.

Started the preliminary calculations of the thermal balance of the prototype for various types of tests.

Work 1.2. Vacuum vessel strengthen and stability calculation

Outcomes:

Started the determination of the mechanical structure and system of connections of the elements of the prototype, weights and efforts, interactions between the components of the prototype.

The development of a scheme for the static loading of prototype elements has begun.

Job started of creating models of the basic elements by sectioning the basic elements of the prototype.

An analysis of the applicability of EN standards and industry methodologies for strength analysis within the framework of this project has begun.

Activity 2. Prototype software development:

Work 2.1. Development of the prototype working algorithm

Outcomes:

Started the analysis of all types of tests that are planned to be performed using the MSTF test facility.

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