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Ministru kabineta noteikumi Nr.50

Rīgā 2015.gada 27.janvārī (prot. Nr.5 88.§)

Par Latvijas Republikas valdības un Eiropas Kosmosa aģentūras Eiropas sadarbības valsts plāna hartu

*Izdoti saskaņā ar Ministru kabineta iekārtas likuma
31.panta pirmās daļas 2.punktu*

1. Latvijas Republikas valdības un Eiropas Kosmosa aģentūras Eiropas sadarbības valsts plāna harta (turpmāk – harta) ar šiem noteikumiem tiek pieņemta un apstiprināta.
2. Hartā paredzēto saistību izpildi koordinē Izglītības un zinātnes ministrija.
3. Harta stājas spēkā tās 6. pantā noteiktajā laikā un kārtībā.

Ministru prezidente *Laimdota Straujuma*

Izglītības un zinātnes ministre *Mārīte Seile*

PLAN FOR EUROPEAN COOPERATING STATES (PECS) CHARTER BETWEEN THE GOVERNMENT OF THE REPUBLIC OF LATVIA AND THE EUROPEAN SPACE AGENCY

The Government of the Republic of Latvia,

and

The European Space Agency (hereinafter referred to as "the Agency") established by the Convention opened for signature in Paris on 30 May 1975 (hereinafter referred to as "the Convention"),

(hereinafter referred to as the "Parties"),

HAVING REGARD to the European Cooperating State Agreement between the Government of the Republic of Latvia and the European Space Agency signed in Riga (Latvia) on 15 March 2013 (hereinafter referred to as the "ECS Agreement"), and in particular its Article 14.1 which states that: "*The present Agreement, after signature by the Parties and its approval in accordance with the legal order of the Republic of Latvia, shall enter into force upon subscription by the Government of the Republic of Latvia of the PECS Charter referred to in Article 7 and detailed in Appendix I, except for the rules contained in Appendix II A and B which shall be applicable upon signature. This*

subscription of the PECS Charter shall be made at the latest one year after the signature of the present Agreement unless the Parties have agreed another time limit. In the event the said subscription has not occurred within the above time limit, the present Agreement shall be null and void."

HAVING REGARD to the letter sent to the Agency by the Government of the Republic of Latvia on 19 January 2015 No.41/36-229 by which the latter notifies the Agency of the approval of the ECS Agreement in accordance with the legal order of the Republic of Latvia,

HAVE AGREED AS FOLLOWS:

1. The purpose of the present PECS Charter is, within the frame and pursuant to the terms of the ECS Agreement, to define the terms and conditions of the financial contribution of the Government of the Republic of Latvia to the Plan for European Cooperating States thus, subject to the fulfilment of the other conditions outlined in the above mentioned Article 14.1, allowing the Government of the Republic of Latvia to enjoy the benefits of all the rights granted to it as an European Cooperating State in the ECS Agreement.
2. The proposed terms and conditions of the financial contribution of the Government of the Republic of Latvia to the PECS are the following:
 - i) a financial envelope defined in Annex 2 shall be allocated to the PECS, whose content with regard to Government of the Republic of Latvia is defined in Annex 1;
 - ii) a contribution shall be paid within this financial envelope and according to the funding mechanism set out in Annex 2, to cover the costs of executing the PECS.
3. The Annexes to this PECS Charter shall form an integral part of the present Charter.
4. The Government of the Republic of Latvia and the Agency may revise the provisions of this PECS Charter by mutual agreement. Pursuant to the terms of the ECS Agreement, the present PECS Charter may be revised and updated once every year during the 5-year period of the ECS Agreement. Amendments, except for those made exclusively to the Annexes, shall take effect on the date of their signature by the Parties. Amendments made exclusively to the Annexes shall be made in accordance with the terms of these Annexes.
5. The present PECS Charter shall remain in force as long as the ECS Agreement remains in force.
6. The present PECS Charter shall enter into force on the date of its signature by the Parties.

Done in on

In two originals in the English language. The signatories may also establish translations hereof in the French and German languages, which shall not, however, be considered as authoritative for the purposes of interpretation.

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For the Government of the Republic of Latvia

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For the European Space Agency

Annex 1

List of the Republic of Latvia activities

The activities accepted to be undertaken by the Government of the Republic of Latvia under the PECS decided in the year 2015 which, pursuant to the terms of the ECS Agreement, have been approved by the Agency's Programmes Boards and Committees and the PECS Committee, are the following:

A. Earth Observation

1. Development of land cover (LC) / land use (LU) monitoring approach based on fusion of Sentinel-2 images and hyper spectral airborne data

Contractor: Foundation "Institute for Environmental Solutions" (IES), Priekuli

This project is intended to develop improved algorithms for LC-LU classification in Latvia by fusing Sentinel 2 and Landsat 8 data with airborne hyper spectral data. The initial phase will be a simulation of Sentinel-2 data using advanced airborne hyper spectral remote sensing. This will be followed up with a feasibility study on fusion of Sentinel-2 and Landsat-8 Thermal Infrared (TIR) satellite data with airborne remote sensing data.

The main technical objectives of the project are the following:

1. To develop a LC-LU classification scheme in order to support the EU and national decision-making process, and an efficient policy accounting (CAP, subsidies, biodiversity conservation, regional development, climate adaptation, flood risk management, ecological corridors, etc.);
2. To adapt the IES flying laboratory to perform a simulation of Sentinel-2 imagery;
3. To develop a LC-LU classification algorithm for Sentinel-2 data and implement it into a prototype by using experience and products developed in the frame of the other EU-funded projects (e.g. Geoland 2, HLANDATA);
4. To verify the classification results with high resolution airborne RGB images, obtained simultaneously with hyper spectral data and in-situ ground measurements for difficult or questionable sites or classes;
5. To perform a feasibility study on fusion of Sentinel-2 satellite images (simulated by airborne sensors in 2014, and obtained from the satellite after its launch) with airborne hyper spectral data and Landsat-8 TIR bands in order to extract more sub-classes;
6. To assess the influence of atmosphere on satellite data signal by comparing the real Sentinel-2 data (after the satellite launch in 2015) and the results of its simulation by airborne sensors.

Since Sentinel-2 data will not be available before end of 2014, the remote sensing data necessary to start the project will be collected from the flying laboratory of IES. In order to adapt the laboratory for the simulation of Sentinel-2, the spectral sampling and spatial resolution requirements must be taken into account. Information from the GMES Sentinel-2 Mission Requirements document will be used to identify the corresponding requirements.

This project will be totally funded from the Latvian contribution to the PECS budget.

2. Integration of Sentinel 3 and airborne hyper spectral data for improved coastal zone management

Contractor: Foundation "Institute for Environmental Solutions" (IES), Priekuli

The main goal of the project is to develop methods to combine hyper spectral airborne data from the flying laboratory developed by the Institute for Environmental Solutions (IES) with ocean colour remote sensing data, in particular from Sentinel 3. The intention is that these methods will be optimised to take account of the specific properties of the Baltic Sea. The IES will partner with the Estonian Marine Institute (EMI) to build on their coastal remote sensing experience as well as in-situ and laboratory capabilities and develop new and improved remote sensing algorithms and methods suitable for the Baltic Sea condition. The work will include a characterisation of the, potential accuracy of these algorithms for different concentration ranges of optically active substances.

The principal technical objectives of the project are as follows:

1. To characterise the optical properties of coastal waters of the Baltic Sea;
2. To test the performance of current and new processors in retrieving correct water reflectance spectra and water quality products;
3. To develop new remote sensing algorithms if the processors do not provide reliable results;
4. To estimate the theoretical accuracies of the remote sensing products that can be achieved in the case of different concentration ranges of optically active substances.

The airborne and in-situ reflectance data will be collected in hyper spectral mode but the analysis will be carried out taking the technical characteristics of ocean colour sensors such as OLCI (bandwidths, signal to noise ratio, etc.) into account.

The project will first test the performance of the latest MERIS/OLCI processors in producing correct reflectance spectra. The atmospheric effects can be estimated by carrying out simultaneous reflectance measurements from a ship and an aircraft. As from 2015, it should be possible to carry out simultaneous OLCI, CASI, ship measurements to validate the latest processors.

Relatively few data are available on optical variability in the Baltic Sea coastal waters. The current knowledge tells that the absorption and backscattering properties in the different parts of the Baltic Sea may vary by up to two orders of magnitude and there is a significant difference between optical properties of phytoplankton communities during spring and summer periods. As a consequence, there is a strong need in characterising the variability in optical properties of the Baltic Sea in order to be able to develop remote sensing algorithms/methods that provide more reliable water quality products than the existing ones.

Finally there is also an urgent need to evaluate possible accuracy of the remote sensing products as in such optically complex waters since the optically active components may shadow the possibility to estimate concentrations of other substances.

This project will be totally funded from the Latvian contribution to the PECS budget.

B. Space technology.

3. *Rigid polyurethane foams for internal tank insulation for launcher upper stages (Cryofoams)*

Contractor: Latvian State Institute of Wood Chemistry, Riga

In this project, work will be carried out on the development of rigid polyurethane (PUR) foam material for inner cryogenic insulation of a LH2 tank for the next generation launcher with a cryogenic upper stage. The main advantage of PUR foams in comparison with other thermo insulation materials is the possibility to cover this material on the complicated shape metal surfaces by spraying method. The spraying of PUR foams on metal constructions is a chemical and technological process.

This project takes into account the previous experience of the Latvian State Institute of Wood Chemistry and a bi-lateral project with Astrium GmbH where the basic knowledge and experience on how to prepare successful polyol systems was developed. Regarding the current development in nano and micro filler chemistry and technology, the final polyol systems will be further improved.

The properties of PUR foams and their adhesion to substrate materials depend not only on the chemical structure and macromolecule architecture of the polymeric matrix, but also on the technological factors of PUR foam production. The tasks of this project are to investigate some technological effects on the physical and mechanical characteristics of the selected foams and their modifications as well as development of necessary polyol component for production of spraying cryogenic insulation with optimal technological parameters. Technological effects to be tested are as follows:

1. Influence of the A and B components' temperature on the foaming parameters of the composition and the anisotropy of the foams.
2. Influence of the metal surface temperature on the adhesive strength, and the physical and mechanical characteristics of the foams.
3. Effects of the adhesive type and its curing stage on the adhesion of the PUR foams to metal under the application of thermo mechanical loads.
4. Effects of the PUR foams' micro and nano fillers reinforcement on the physical and mechanical characteristics of foams at normal and cryogenic temperatures.
5. PUR foam formation speed on surface of metal construction: cream time, gel time and tack free time.
6. Influence of primer and metal construction temperature to adhesive bond metal – PUR.
7. Factors responsible for adhesion between foam layers (autohesion), and for formation of non-damaged structure between sprayed foam layers.
8. Forecasting formation of possible defects and development of non-destructive test methods for them.

C. Education

4. *Ventspils University College Satellite Technology Education Programme*

Contractor: Ventspils University College (VUC), Ventspils

The main objective of this project is to raise existing competence level of VUC staff in space related technologies and to provide education in space technology development to the students in Latvia. To support research and industry in the fields of space technology and science, a critical mass of engineers and young scientists, experienced in space sector, should be reached in Latvia.

Currently strong competences of the VUC student training programs is in modern technologies used for information and signal processing, embedded system development and modeling, particularly Field Programmable Gate Arrays (FPGA), Hardware Description Languages (HDL), and LabVIEW. VUC's vision is to be the leading space technology research and training centre in Latvia. With Latvia's growing participation in ESA programs in the future, it is necessary to integrate strong competences of the VUC with space applications of those technologies and provide high quality training to the students.

Under the current project, it is intended to focus on two types of activities:

- to develop training course content for students related to signal and information processing applications in satellites based on the newly acquired Cubesat training laboratory in the VUC;
- to continue research and development of new applications on FPGA technology for real Cubesats and Nano-satellites.