

# CPEA-2012 - Annual report 2013

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## Project information

### Project title

Norwegian-Ukrainian cooperation aimed to sustainable development of the education process in geospace researches

**Project number** CPEA-2012/10021

## A - Information on the partnership

### A.1 Norwegian partner

#### A.1.1 Main partner institution in Norway (liN)

The Arctic University of Norway (NO-UiT)

#### A.1.2. Institutional legal representative

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#### A.1.3 Responsible department/faculty/unit

Proposing Department: Faculty of Science and Technology

#### A.1.4 Head of department

Name: Eltoft, Torbjørn  
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#### A.1.5 Project coordinator

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Norway  
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#### A.1.6 Changes since project document

New head of department, item A.1.4.

### A.2 Partner in cooperating country

#### A.2.1 Main partner institution in cooperating country (loN)

Institute of Ionosphere under NAS and MES of Ukraine (UA)

## A.2.2 Institutional legal representative

Name: Domnin, Igor  
Gender: Male  
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Address: 16, Chervonopraporna Str., 61002, Kharkiv, Ukraine  
Phone number: +38(057) 706-22-87  
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## A.2.3 Responsible department/faculty/unit

Proposing department/faculty: Scientific-educational center of the remote radio sounding of the ionosphere, "Ionosphere"

## A.2.4 Head of department

Name: Pulyayev, Valeriy  
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## A.2.5 Project coordinator

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## A.2.6 Changes since project document

No changes.

## A.3 Additional partners involved in the project

### A.3.1 Additional partners

Institution: UA-Institute of Radio Astronomy (UA)  
Unit: Radio Physics of Geospace  
Project researcher: Koloskov, Oleksandr  
Gender: Male  
Position: Senior Scientist, PhD

### A.3.2 Changes

No changes.

## A.4 Academic staff and researchers involved in the project (other than coordinators)

### A.4.1 Academic staff/researchers involved in the project

Name	Gender	Institution	Position	Degree
Barabash, Volodymyr	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	researcher	PhD student
Belyey, Vasyl	Male	NO-The Arctic University of Norway	Research Scientist	PhD
Bogomaz, Oleksandr	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	PhD student, researcher	Master diploma
Brekke, Asgeir	Male	NO-The Arctic University of Norway	Professor	Professor

Burmaka, Viktor	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	PhD student, researcher	Master diploma
Charkina, Olesya	Female	UA-Institute of Radio Astronomy	PhD student, researcher	Master diploma
Domnin, Igor	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	Director	DSc., Professor
Galushko, Volodymyr	Male	UA-Institute of Radio Astronomy	Senior scientist	PhD
Kascheyev, Anton	Male	UA-Institute of Radio Astronomy	Scientific associate, researcher	PhD
Katsko (Kharytonova), Sofiia	Female	UA-Institute of Ionosphere under NAS and MES of Ukraine	PhD student, researcher	Master diploma
Kotov, Dmytro	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	PhD student, researcher	Master diploma
Kozlov, Sergiy	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	lector, researcher	PhD student
Lialiuk, Oleksii	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	PhD student, researcher	Master diploma
Løvhaug, Unni Pia	Female	NO-The Arctic University of Norway	Professor	PhD
Panasenko, Sergii	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	Senior scientist	PhD
Siusiuk, Maryna	Female	UA-Institute of Ionosphere under NAS and MES of Ukraine	Researcher	Master diploma
Soina, Anna	Female	UA-Institute of Radio Astronomy	PhD student, researcher	Master diploma
Sopin, Andrii	Male	UA-Institute of Radio Astronomy	PhD student, researcher	Master diploma
Vickers, Hannah	Female	NO-The Arctic University of Norway	Post doktor	PhD
Yampolski, Yuri	Male	UA-Institute of Radio Astronomy	Head of department	Associate member of NASU, DSc., Prof.
Zalizovski, Andrey	Male	UA-Institute of Radio Astronomy	Senior scientist	PhD

No changes.

## B

### B.1

#### B.1.1 Objectives

Basically overall objective and sub-goals of the project remain unchanged.

#### B.1.2 Milestones

Activity	Start year	Start month	End year	End month	Status
Support of international ionospheric conferences for young scientist to be organized in Ukraine with participation of representatives from the University of Tromsø and other countries.	2012	Apr	2014	Oct	Started

Arrangement of practical works at the research facilities of the observatories of the IION and IRA. Organizing topical workshops for Ukrainian and Norwegian scientists.					
Support for students and young scientists to participate in international conferences and schools on the project-related subjects ("EISCAT workshop", "EISCAT radar school" etc.).	2012	Jul	2014	Dec	Started
Involvement of students and young scientists in the conference "Electromagnetic Methods of Environmental Studies" to be organized in Ukraine by IRA. Support of the invited presentations by representatives of the University of Tromsø. Organizing a topical workshop for Ukrainian and Norwegian scientists during the conference.	2012	Sep	2012	Oct	Completed
Guidance and assistance in the preparation of graduate works of bachelors, specialists and masters.	2012	Sep	2014	Dec	Started
Guidance of the PhD students. Assistance in arranging student's scientific seminars and workshops.	2012	Sep	2014	Dec	Started
Performance of field works in Norway and Ukraine aimed at improving the Internet-controlled diagnostic facilities developed by IRA. Adaptation of the facility software for the needs of the educational process. Organization of practical works with the equipment using special web-based software.	2012	Sep	2014	Dec	Started
Preparation and implementation of practical works for students on the incoherent scatter radars of the Ukrainian and Norwegian observatories. Arrangement of student measuring campaigns. Organization of student training in the operation with internet-controlled research facilities and working with online scientific databases.	2012	Sep	2014	Dec	Started
Preparation and publication of educational and training materials for students. Development of the special software for practical works of the students.	2012	Sep	2014	Dec	Started
Preparation of courses of lectures "Radio engineering systems in radiophysic researches", "Statistical radiophysics", "Radioreceivers in radiophysics", "Systems analysis and computer simulation" by academic staff/scientific staff of the Institute of Ionosphere, which to be delivered in the Ukrainian institutions.	2012	Sep	2014	Dec	Started
Preparation of scientific publications by academic staff and researchers jointly with students.	2012	Sep	2014	Dec	Started
Providing the scholarship and fellowship programs for Ukrainian students at the University of Tromsø and EISCAT observatories.	2012	Sep	2014	Dec	Started
Refresher training of the academic and technical staff of the partner institutions at the ionospheric observatory of IION	2012	Sep	2014	Dec	Started
Refresher training of the academic and technical staff of the Ukrainian institutions at the University of Tromsø and EISCAT observatories. Organization of workshops and topical seminars	2012	Sep	2014	Dec	Started

to share the experience of the staff of partner organizations.					
Preparation of courses of lectures "Atmospheric-space weather systems interaction" and "Remote techniques for investigating the near-earth space environment" by academic staff/scientific staff of the Institute of Radio Astronomy to be delivered in the University of Tromsø.	2013	Jan	2014	Dec	Started
Preparation of courses of lectures "Cosmic geophysics" and "Techniques for investigating the near-earth space environment" by academic staff/scientific staff of the University of Tromsø to be delivered in the Ukrainian institutions.	2013	Jan	2014	Dec	Started
Training of administrative staff of the Ukrainian institutions in Norway.	2013	Jan	2014	Dec	Started

### B.1.3 Activities in 2013

#### Planned activities

1. The International Conference "Remote Radio Sounding of the Ionosphere (ION-2013)" will be organized in Ukraine by IION and IRA, September 30 – October 4, 2013. Conference program includes plenary papers as well as presentations in working groups. These presentations will focus on processing and interpretation of ionospheric data, developing and modernization of data processing techniques and software, improving teaching methods, etc.

In addition to the activities described in the Project document we plan to carry out scientific school for PhD students and young scientists simultaneously with the conference as well as some training courses for students of the National Technical University "Kharkiv Polytechnic Institute" during the academic year. These courses will focus on learning of modern scientific theories and techniques of diagnostic of near-Earth plasma and will improve the theoretical knowledge and practical skills of students in the area of experimental physics and environmental studies. We plan to involve students and young scientists as well as leading researchers from Ukraine, Norway, Russia and other countries to participation in the Conference and School

2. It is planned to support several PhD students/scientists from the Institute of ionosphere and Institute of Radio Astronomy to attend international conferences/schools. At the moment participation of Ukrainian representatives at EISCAT International Symposium 2013 and EISCAT Radar School 2013 are envisaged

3. Fellowship programs for Ukrainian PhD students (from Institute of ionosphere and Institute of Radio Astronomy) at the University of Tromsø and EISCAT observatories are planned

4. Two courses, namely, "Radio engineering systems in radiophysics researches" (5 credits) for students majoring in "Radiophysics and Electronics" (7.070201) and permanent one "Computerization of specialized environments" (6 credits) for students majoring in "Computer engineering" (6.050102), will be delivered by IION academic staff in the National Technical University "Kharkiv Polytechnic Institute"

5. Cycles of review lectures "Atmospheric-space weather systems interaction" and "Remote techniques for investigating the near-earth space environment" will be prepared by the academic/scientific staff of the Institute of Radio Astronomy. One of these will be delivered by representatives of IRA in the University of Tromsø

6. Preparation of courses of lectures by academic/scientific staff of the University of Tromsø to be delivered in the Ukrainian institutions

7. Implementation of practical works/courses for students and young scientists at the Ukrainian and Norwegian ionospheric observatories. Performance of joint Norwegian-Ukrainian observations for studying polar and mid-latitude ionosphere and heating-induced phenomena in the near Earth plasma environment. Arrangement of student measuring campaigns. Field work in Norway and Ukraine for

modernization and deployment of new research facilities to be further used in education and research activity

8. Training of the academic and technical staff of the Ukrainian institutions at the observatory of the Institute of ionosphere. Training of the academic and technical staff of the Ukrainian institutions at the University of Tromsø and EISCAT observatories

9. Preparation of scientific publications by academic staff and researchers jointly with students. Preparation and publication of educational and training materials for students. Supervision and assistance in the preparation of graduate works of bachelors and masters. Supervision of the PhD students and assistance in defense of PhD thesis for Viktor Burmaka (IION)

### **Actual activities**

1. The International School-Conference "Remote Radio Sounding of the Ionosphere (ION-2013)" was carried out in Ukraine from September 30 until October 4, 2013 in Maly Mayak (Crimea, <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Presentation/Конференция-2013.pdf>). The conference was organized by IoN (Institute of Ionosphere and Institute of Radio Astronomy) and funded by the project. 66 participants (42 from Ukraine and 24 from other countries) including 28 students and postgraduate students who represented 10 educational and research institutions took part in the conference. Scientists presented 14 poster and 18 oral reports (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Сборник.pdf>) within the following research areas:

- a. Radio equipment and methods;
- b. Signal Processing and Signal Visualisation;
- c. Informatics applied to the ionosphere;
- d. Physics and modeling of ionospheric processes.

Presentations of young scientists have demonstrated new results concerning investigation and simulation of phenomena and processes in near-Earth space environment as well as new techniques of data processing and new radiophysics methods of diagnostic of the ionosphere and magnetosphere. The conference has shown high level of knowledge of young scientists and students in analyzing and solving complex fundamental and applied problems of geospace studies and has demonstrated active work of the initial group of the Project (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Presentation/Презентация.pdf>). In addition to the scientific program of the conference, open discussions between project coordinators from Norway and Ukraine, directors and administrative staff of IoN were organized. The participants discussed future activities of the project and prepared draft proposals for Agreements of scientific cooperation between IoN and IiN, which were approved and signed later (see C.1.1).

The scientific school for students and young scientists was organized both simultaneously with the conference and through the academic year in the form of classes and practical courses for students and young researchers of IoN. During the conference leading scientists from Norway, Sweden, Russia and Ukraine gave 9 lectures concerning modern aspects of geospace research.

- "Aperture synthesis imaging radar and the EISCAT-3D project". C. La Hoz, Prof. of the UiT (Norway);
  - "The physical effects of the Chelyabinsk meteoroid". L.F. Chernogor, Prof. of the KhNU named after V.N. Karazin (Ukraine);
  - "Interferometric radar imaging on Svalbard". V. Belyey, PhD researcher of the UiT (Norway);
  - "Radiotomography of the ionosphere based on satellite navigation systems". V.E. Kunitsyn, Prof. of the Physics Institute of MSU named after M.V.Lomonosov (Moscow, Russia);
  - "The Sura heating facility: status and recent results". V.K. Frolov, Prof. of the Scientific-Research Institute of Radio Physics (N. Novgorod, Russia);
  - "Flaming auroral rays and naturally enhanced ion acoustic lines". B. Gustavsson, Prof. of the UiT (Norway);
  - "Comparison of the IRI model at high latitudes with measurements from the EISCAT Svalbard radar over a solar cycle". L.M. Bjoland, PhD student of the UiT (Norway);
  - "Features of distance sounding of the ionosphere by means of the incoherent scattering of radio waves". V.O. Pulyayev, Prof. of the Institute of Ionosphere (Ukraine);
  - "Frequency-and-angular sounding of the ionosphere". Yu.M. Yampolski, Member of the National Academy of Sciences, Prof. of the Institute of Radio Astronomy (Ukraine).
- ([https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Training\\_staff/Lectures\\_staff.pdf](https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Training_staff/Lectures_staff.pdf)).

After the conference, the Norwegian Coordinator of the Project Prof. C. La Hoz, visited the Institute of the Ionosphere (Kharkiv) and gave lectures "Space Geophysics" for the students of National Technical University "Kharkiv Polytechnic Institute" (NTU "KhPI") specialized in "Radio Physics and Electronics", and "Specialized computer systems"

([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education\\_students/Lectures-2013.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education_students/Lectures-2013.pdf))

Special classes and practical training courses were carried out through all the academic year. Students and young scientists operated and interacted with hardware and software of the Incoherent scatter radar and Ionosonde facility as well as studied techniques of data processing and visualisation.

Special sessions of the school-conference "Remote Radio Sounding of the Ionosphere (ION-2013)" were organized in June 3-5, 2013 at the Observatory of the Institute of Ionosphere (50 km from Kharkiv). 47 students in their 3rd and 4th year of study at NTU "KhPI" (specializations: "Applied physics" and "Computer engineering") took part in this event and twenty of them made presentations.

Then students visited the museum of the Second World War in the village Sokolovo.

([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education\\_students/School\\_conference.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education_students/School_conference.pdf)).

Several student measuring campaigns with IS radar were organized at the IION Observatory (see item 7 for more details).

Project activities were presented in the University press and at the web page:

(<http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Publications/Article-1.pdf>,

<http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Publications/Article-2.pdf>, <http://iion.org.ua>)

– International cooperation.

The list of the scientific conferences and schools that were attended by students and young scientists from IRA and IION are the following:

a. The VIth International Antarctic Conference "Internationalization of research in Antarctica is the path to spiritual unity of mankind". (May 15–17, 2013, Kyiv, Ukraine) – 4 presentations.

b. The XXIst International Scientific Conference: Information Technologies: science, engineering, technology, education, health (Kharkiv, Ukraine, May 29-31, 2013).- 9 presentations.

c. The XVIth International EISCAT Symposium (Lancaster, UK, August 12–16, 2013). - 3 presentations.

d. The XIIIth Ukrainian Conference on Space Research (Yevpatoria, Ukraine, September 2–6, 2013). - 4 presentations.

e. Baikal Young Scientists' International School on Fundamental Physics "Physical processes in outer and near-Earth space". XIII Young Scientists' Conference "Interaction of fields and radiation with matter" (Irkutsk, Russia, September 19 – 24, 2013). - 7 presentations.

f. International School-Conference "Remote Radio Sounding of the Ionosphere (ION-2013)" (Maly Mayak, Crimea, Ukraine, September 30 – October 4, 2013). - 18 presentations.

g. The Ist Ukrainian conference "Ionospheric research in radiophysics" (RPhIR-2013). (Kharkov, Ukraine, October 24-25, 2013). - 1 presentation.

h. Conference on Planetary Atmospheric Electricity (October 28 – November 01, 2013, Borok, Russia). -1 presentation.

i. Conference "Actual Problems of Automation and Instrumentation of Ukraine" (Kharkov, Ukraine, December 12-13, 2013). - 2 presentations.

2. a) Participation of four Ukrainian postgraduate students/scientists at the EISCAT International Symposium (August 12-16, 2013) was supported by the Project.

(<https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Presentation/Плакат.pdf>).

Two representatives of IION (Sergii Panasenko – PhD, Artem Miroshnikov postgraduate student) and two from IRA (Andrey Zalizovski – PhD, Olesia Charkina - postgraduate student) made the following presentations:

- Sergii Panasenko "Observations of Travelling Ionospheric Disturbances over Kharkiv (Ukraine) during High Power HF Heating".

- Artem Miroshnikov "Kharkiv Institute ionosphere incoherent scatter radar (Ukraine) expresses data processing on a remote server and visualization of results"

- Andrey Zalizovski "3D diagnostics of natural and stimulated polar ionospheric inhomogeneities"

- Olesia Charkina "Application of imaging riometers for investigating ionospheric scintillations and absorption of radiation from discrete cosmic sources in the HF modified polar ionosphere" Additionally after the Symposium:

- Andrey Zalizovski took part in the work of the 13th EISCAT Science Oversight Committee SOC Meeting, Lancaster UK, August 17-18, 2013 and made the report: "Current state and prospect of EISCAT-Ukraine collaboration"

- Olesia Charkina gave a seminar at the Lancaster University and initiated student measuring campaign with EISCAT (heater, UHF radar) and KAIRA facility which was performed in October 2013 (see item 7 for more details).

b) 28 students and postgraduate students from Ukraine, Norway and Russia took part in the School-Conference "Remote Radio Sounding of the Ionosphere (ION-2013)" (September, 30 - October, 4, 2013, Malyi Mayak, Crimea, Ukraine). They made 14 poster presentations and 4 oral presentations.

c) Ukrainian postgraduate student Mykola Baru took part in the Conference on Planetary Atmospheric Electricity (28 October – 01 November, 2013, Borok, Russia) and made the presentation: "Observations of Ionospheric Alfvén Resonances by the network of space magnetometers".

3. Fellowship programs for four Ukrainian postgraduate students: Maryna Siusiuk, Sofiya Katsko (IION) and Olesia Charkina, Dmytro Shulga (IRA) have been supported by the Project funds. The postgraduate students visited the Arctic University of Norway (UiT) from October 20 till November 12, 2013 and EISCAT observatory at Svalbard (November 12-16, 2013). The fellowship programmes included theoretic courses and seminars, as well as practical training and student measuring campaigns: TROUP and NURA

The activities were the following:

- Lectures performed by academic staff of UiT:

a) "Incoherent Scattering Theory" by Prof. Cesar La Hoz (UiT).

b) "Spectrum of Incoherent Scattering" by Prof. Cesar La Hoz (UiT).

c) "Radar Equation" by Prof. Cesar La Hoz (UiT).

d) "Charged Dust Particles in the Polar Mesosphere" by Prof. Ove Havnes (UiT) .

e) "Long Term Time Series of Ionospheric Measurements" by postgraduate student Lindis Bjoland (UiT) .

f) "On shock aurora, traveling convection vortices and other transient phenomena in the high latitude dayside ionosphere" by Dr. Magnar Gullikstad Johnsen (UiT) .

g) "HF Radio Induced Optical Emissions. Experimental space physics made visible" by Prof. Björn Gustavsson (UiT) .

h) "Ionization Processes in the Ionosphere" by Prof. Asgeir Brekke (UiT) .

i) "Parameterization of the solar activity effect on the upper thermospheric density observed using the EISCAT Svalbard Radar" by Dr. Hannah Vickers (UiT) .

- Seminars and practical training performed during "NURA" experiment (Svalbard, Longyearbyen):

a) "Interferometric radar imaging", by Dr. Vasyl Belyey.

b) "EASI interferometer", by Dr. Vasyl Belyey.

c) Practical work with EASI interferometer", by Dr. Vasyl Belyey.

- Seminars/workshops performed by Ukrainian postgraduate students in UiT:

a) "Application of imaging riometers for investigating ionospheric scintillations and absorption of radiation from Discrete Cosmic Sources (DCS)" by Olesia Charkina (IRA).

b) "Defining the profile of ion composition at altitudes of lower and middle ionosphere" by Maryna Siusiuk (IION).

c) "Continuous ionospheric monitoring by the vertical sounding method: A technique for missed data restoration" by Dmytro Shulga (IRA).

d) "Ionospheric parameters during magnetic storms over Kharkiv" by Sofiia Katsko (IION).

- Measuring campaigns:

a) "TROUP" (October 29-31, 2013) – dual purpose (training and science) experiment. The main aims of the campaign were to train Ukrainian students in use of EISCAT incoherent scatter radar and HF heating facility, as well as performing observations according to the programmes proposed by students (see item 7 for more details).

b) "NURA" (November 12-15, 2013) – Joint ionospheric heating experiments performed by SPEAR-facility and ESR observations which were complemented by other instruments such as a network of HF receivers and ELF band magnetometer installed in Northern Scandinavia by IRA scientists (see item 7 for more details).

- Additionally several excursions to the EISCAT research facilities were implemented by academic staff of UiT.

a) Tour-presentation "EISCAT scientific community" was organized by Prof. Cesar La Hoz (UiT) at EISCAT observatory at Ramfjordmoen (<http://www.eiscat.uit.no/index.html>). It includes:



- Tour around the EISCAT IS radars.
- Tour around EISCAT heater and MORRO radar.

b) Tour-presentation "EISCAT Svalbard IS radar and EASI interferometer" was organized by Dr. Vasyly Belyey (UiT) at EISCAT observatory (Svalbard).

4. Five new courses were implemented by project participants for the students of NTU "KhPI" in 2013. These courses provide new knowledge in modern scientific theories and techniques of diagnostic of near-Earth plasma as well as improvement of theoretical and practical skills of students in the area of experimental physics and environmental studies. The courses are based both on the experience of Ukrainian academic staff and on the new knowledge gained during the project execution. ([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Documentation/New lectures.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Documentation/New%20lectures.pdf)):

a) Lecturer Prof. V. Pulyayev. IION. Courses:

- "Radio engineering systems in radiophysics research" (lectures, laboratory practices, practical classes - 5 credits) for students majoring in "Radiophysics and electronics" (7.070201).

- "Computerization of specialized environments" (lectures, laboratory work, practical classes – 6-7 credits) for bachelors majoring in "Computer engineering" (6.050102).

b) Lecturer Panasenko Sergii, PhD, senior scientist of the IION. Course: "Systems analysis and computer simulation" (lectures, laboratory work, practical classes - 5 credits) for bachelors majoring in "Computer engineering" (6.050102).

c) Lecturer Kotov Dmytro, postgraduate student, researcher of the IION. Course: "Statistical radiophysics" (lectures, laboratory work, practical classes - 4 credits) for bachelors majoring in "Radio Physics and Electronics" (7.070201).

d) Lecturer Bogomaz Oleksandr, postgraduate student, researcher of the IION. Course: "Radio receivers in radiophysics" (lectures, laboratory work, practical classes - 4 credits) for masters majoring in "Radio Physics and Electronics" (7.070201).

5. During 2013 year Ukrainian participants of the project delivered seven review lectures within the subject area "Remote techniques for investigating the near-earth space environment". Five lectures were delivered in the Arctic University of Norway (UiT) and two during School-Conference "Remote Radio Sounding of the Ionosphere (ION-2013)". The lecturers and titles are the following:

a) Alexander Koloskov, PhD (IRA). "Monitoring of low frequency electromagnetic fields at the Ukrainian Antarctic Station and in Ukraine".

b) Anton Kashcheyev, PhD (IRA). "High frequency radio instruments and techniques for diagnostics of the ionosphere developed in IRA".

c) Vira Pronenko, PhD (LCISR). "Main directions of research and production activity of Lviv Centre of Institute for Space Research".

d) Ruben Fediy, PhD, Vice-Director of the IRA. "Main Scientific Activities of Scientific Research at the Institute of Radio Astronomy NASU".

e) Mykhaylo Lyashenko, PhD (IION) "Modeling of the dynamic and thermal process parameter variations in the ionosphere during solar eclipses".

f) V.O. Pulyayev, Professor (IION). "Features of distant sounding of the ionosphere by the means of the incoherent scattering of radio waves".

g) Yu.M. Yampolski, Member of the National Academy of Science, Professor (IRA) "Frequency-and-angular sounding of the ionosphere".

6. Lectures for Ukrainian students and young scientists were delivered by academic/scientific staff of UiT in the frame of International School-Conference (ION-2013) and training program for Ukrainian postgraduate students at UiT:

a) "Aperture synthesis imaging radar and the EISCAT-3D project" by Prof. C. La Hoz.

b) "Interferometric radar imaging on Svalbard" by Dr. V. Belyey.

c) "Flaming auroral rays and naturally enhanced ion acoustic lines" by Prof. B. Gustavsson.

d) "A comparison of the IRI model at high latitudes with measurements from the EISCAT Svalbard radar over a solar cycle" by PhD student L.M. Bjoland.

e) "Space Geophysics" by Prof. C. La Hoz.

f) "Incoherent Scattering Theory" by Prof. C. La Hoz.

g) "Spectrum of Incoherent Scattering" by Prof. C. La Hoz.

h) "Radar Equation" by Prof. C. La Hoz.

i) "Charged Dust Particles in the Polar Mesosphere" by Prof. Ove Havnes.

- j) "Long Term Time Series of Ionospheric Measurements" by PhD. student Lindis Bjoland.
- k) "On shock aurora, traveling convection vortices and other transient phenomena in the high latitude dayside ionosphere" by Dr. Magnar Gullikstad Johnsen.
- l) "HF Radio Induced Optical Emissions. Experimental space physics made visible" by Prof. Björn Gustavsson.
- m) "Ionization Processes in the Ionosphere" by Prof. Asgeir Brekke (UiT).
- n) "Parameterization of the solar activity effect on the upper thermospheric density observed using the EISCAT Svalbard Radar" by Dr. Hannah Vickers.

7. a) Practical work/courses for students and young scientists:

210 hours of practical training courses for students and young scientists were carried out at the Ionospheric Observatory of the Institute of Ionosphere in 2013 year. During this dual purpose (training and science) research campaigns, students and young scientists operated the incoherent scatter radar and ionospheric station for vertical sounding of the ionosphere. Students were trained in many aspects of running radar experiments, data acquisition, processing and analyzing, etc. Several cooperative experiments with research facilities located in Ukraine, Russia and Norway were performed. ([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Educations\\_staff/Dates-2013.doc](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Educations_staff/Dates-2013.doc)). The ionosphere measuring campaigns were performed during the following time intervals in 2013:

- 18-19 June - during the Summer solstice;
- 25-30 July - during rocket launch "Ariane 5" (Kourou) (Observatory IION and EISCAT);
- 21-22 August - simultaneous/coordinated with operation of the heating facility SURA (N. Novgorod, Russia);
- 9-10 September – simultaneous/coordinated with operation of the heating facility SURA (N. Novgorod, Russia);
- 28-31 October - simultaneous/coordinated with operation of EISCAT heating facility (Observatory IION and EISCAT);
- 13-14 November - simultaneous/coordinated with operation of SPEAR heating facility (Observatory IION, EISCAT and SPEAR);
- 18-19 December - during the Winter solstice.

b) Joint Norwegian-Ukrainian observations. Students measuring campaigns: - "TOURP" experiment. October 29, 30, 31

(<http://www.eiscat.se/schedule/schedule.cgi?year=2013&month=10&S=on&TRO=on&HEA=on>).

The purpose of the experiments was to train Ukrainian scientists in as many aspects of the EISCAT radar as possible at the Ramfjord site - understanding the radar experiments and data acquisition, running experiments and analyzing the recorded data. The measuring campaign also included coordinated heater experiments for investigating ionospheric irregularities through observations of discrete cosmic source scintillations using the KAIRA facility. The experiment was initiated by postgraduate student Olesia Charkina who proposed this idea during the EISCAT International Symposium and discussed it with scientists from Lancaster University (England) and Sodankylä Geophysic Observatory (Finland). Another purpose of the experiment was to study the scattering of signals from the EISCAT heater from ionospheric irregularities produced by the heater radiation itself. To that end, we have monitored Doppler spectra of the heater signals at several greatly dispersed receiving sites.

- "NURA" experiment. November 12, 13, 14, 15

(<http://www.eiscat.se/schedule/schedule.cgi?year=2013&month=11&S=on&ESR=on&SPE=on>).

Multiple heating modulation schemes were used to study different processes in the ionosphere, including electron acceleration, artificial aurora, SEE, ELF (Schumann and Alfvén band) wave excitation. ESR observations were complemented by other instruments such as optical instruments, ePOP satellite, a network of HF receivers, and ELF band magnetometer.

c) Field works. In September 2013 Ukrainian researchers installed a new ELF waveband magnetometer for monitoring of Schumann and Ionospheric Alfvén Resonances at SOUSY observatory (Svalbard). This facility is similar to devices already installed at Low Frequency Observatory (Ukraine) and Ukrainian Antarctic Station (Antarctic Peninsula). The magnetometer is operating in Internet-controlled mode. The data of observations are automatically processed and visualised at the web page of IRA ([http://geospace.com.ua/en/data/elf\\_spg.php](http://geospace.com.ua/en/data/elf_spg.php)). These data will be used both for scientific research and for training of students and young scientists of IRA and IION. Also during the field works the Internet-controlled HF instruments at KHO observatory (Svalbard) was upgraded. The HF data also are visualised at the IRA web page ([http://geospace.com.ua/en/data/hf\\_spg.php](http://geospace.com.ua/en/data/hf_spg.php)).

8. a) Eleven representatives of the academic/technical/research staff of the Ukrainian institutions (A. Miroshnikov, M. Lyashenko, O. Bogomaz, D. Kotov, M. Siusiuk, O. Lialiuk, V. Burmaka, S. Katsko, O. Charkina, A. Soina and D. Shulga) have been trained at the Observatory of the Institute of Ionosphere and the EISCAT Observatories (Tromsø and Svalbard) during several measuring campaigns which were carried out from June to December 2013 (full list of the campaigns was presented in the item 7.1).

b) Four representatives of the academic and scientific staff of the Ukrainian institutions (M. Lyashenko, O. Koloskov, A. Kashcheyev and R. Fediy) have been trained at the Arctic University of Norway (UiT) and at the EISCAT observatories. They have been familiarized themselves with the following issues:

- Introduction to the features of the educational process in Norway.
- Monitoring of ionospheric plasma using the most advanced research facilities of EISCAT and techniques of observations and data processing developed by EISCAT community.
- Studying of space weather.
- Understanding ionospheric processes in the auroral regions and studying of the human impact on near Earth plasma environment.
- Functioning of the systems of global communication, navigation, forecasting of hazardous effects in the ionosphere, etc.

They have improved their theoretical knowledge and practical skills in the following research areas:

- Design of modern hardware and mathematical methods for diagnosis of geospace by means of incoherent scatter radars (ISR).
- Organizing and conducting experiments using ISR.
- Study of the principles of practical work with geophysical data in Intranet and Internet databases.
- Modeling of the characteristics of dynamic processes in the ionosphere.

c) The initial group of the project has organized in Ukraine (September-November) 2013 workshops for student and administrative / scientific staff of IION, IRA, Kharkiv National University and NTU "KhPI". The workshops were attended by representatives of SIU ([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Training\\_staff/Training\\_staff.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Training_staff/Training_staff.pdf)) and administration of UiT (<http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Publications/Article-3.pdf>).

9. a) Two postgraduate students Victor Burmaka (IION) and Andrii Sopin (IRA) defended their PhD theses in 2013. Their PhD theses were prepared under the supervision of participants of the project. The titles of theses are the following:

- "Wave disturbances in the ionosphere: observations by HP" (dis. candidate fiz.-mat. science / V.P. Burmaka. - Kharkov, IRE, - 180 P.)

([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education\\_students/PhD\\_works.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education_students/PhD_works.pdf)),

- "Radio diagnostics of ionospheric disturbances stimulated by powerful tropospheric processes" (dis. candidate fiz.-mat. science / A.A. Sopin. - Kharkov, IRE, - 171 P.)

b) Project participants provided supervision and consultation for 26 students of the NTU "KhPI" (specialization "Radio Physics and Electronics") in preparation of bachelor's and master's theses as well as gave assistance to twenty students in defense of bachelor's, specialist's and master's works.

([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education\\_students/Bachelors.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education_students/Bachelors.pdf)),

([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education\\_students/Specialists.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education_students/Specialists.pdf)),

([http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education\\_students/Magisters.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Education_students/Magisters.pdf)).

c) Two volumes of the book "Radio and ionosphere" based on the results of research carried out in the Institute of Ionosphere and conference proceedings of young scientists were published in 2013.

Two textbooks for students in radio- and geophysics (V.O. Pulyayev, E.V. Rogozhkin, O.V. Bogomaz "Computational routines for the analysis of incoherent scattering in ionospheric plasma" (in Ukrainian), Kharkiv, 2014, 272 p.; L.F. Chernogor, I.F. Domnin "Physics of Geomagnetic Storms", - Kharkiv, 2014, 408 p. (in Russian)) were prepared for publication by project participants.

(<http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Publications/Monographs.pdf>)

d) Fifty scientific works of the project participants co-authored with students were published in 2013. The list of the publication is the following:

- 1) Domnin I.F., Emelyanov L.Y., Ljashenko M.V., Chernogor L.F. Solar eclipse August 1, 2008 over Kharkiv. 1. The results of observations by incoherent scatter // *Geomagnetism and Aeronomy* . - 2013 . - V. 53, № 1. - p. 119-129 (in Russian).
- 2) Domnin I.F., Yemelyanov L.Ya., Lyashenko M.V., Chernogor L.F. Solar eclipse of August 1, 2008, above Kharkiv: 1. Results of incoherent scatter observations // *Geomagnetism and Aeronomy*. - 2013 . V. 53 , № 1. - 113-123 p., doi: 10.1134/S0016793213010076.
- 3) Cherniak Iu.V., Lysenko V.N. Measurements of the Ionosphere Plasma Electron Density Variation by the Kharkov Incoherent Scatter Radar // *Acta Geophysica*. - 2013 . - Vol. 61 , No. 5 . - p. 1289-1303, doi: 10.2478/s11600-013-0118-0.
- 4) Burmaka V.P., Chernogor L.F. Solar eclipse August 1, 2008 over Kharkiv .2 . The results of observations of wave disturbances in the ionosphere // *Geomagnetism and Aeronomy* . - 2013 . - V. 53 , № 4 . - S. 509-521 (in Russian).
- 5) Burmaka V.P., Chernogor L.F. Solar eclipse of August 1, 2008, above Kharkiv: 2 . Observation resultsof wave disturbances in the ionosphere // *Geomagnetism and Aeronomy*. - 2013 . - V. 53 , № 4 . - p. 479-491, doi: 10.1134/S001679321304004X.
- 6) Ljashenko M.V., Chernogor L.F. Solar eclipse August 1, 2008 over Kharkiv. 3. Results of calculations and discussion // *Geomagnetism and Aeronomy* . - 2013 . - V. 53 , № 3 . - p. 384-393, doi: 10.7868/S0016794013020090 (in Russian).
- 7) Lyashenko M.V., Chernogor L.F. Solar eclipse of August 1, 2008, above Kharkov: 3. Calculation results and discussion // *Geomagnetism and Aeronomy*. - 2013 . - V. 53 , № 3 . - p. 367-376, doi: 10.1137/S0016793213020096.
- 8) Lyashenko M.V. The effects of the partial solar eclipse on January 4, 2011 in the variety of thermal process parameters in ionosphere // *Sun and Geosphere*. - 2013. - V. 8, № 1. - p. 15-18.
- 9) Bogomaz A.V., Kotov D.V., Siusiuk M.N. Sensitivity estimates obtained concentrations of heavy ions to uncertainties set temperature of charged particles in the method of incoherent scatter // *Journal of NTU "KPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 10-13 (in Russian).
- 10) Chepurnyj Y.N., Emelyanov L.Y., Iskra D.A. Measurement of the antenna pattern of the NDA-100 by reflections from the man-made space objects // *Journal of NTU "KhPI". Series: Radio and ionosphere Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 14-20 (in Russian).
- 11) Bogomaz A.V., Pidruchnaya N.A., Puliaev V.A. The results of the signal processing IS considering the width of the spectrum of the probe pulse // *Journal of NTU "KhPI". Series: Radio and ionosphere - Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 21-24 (in Russian).
- 12) Temerev M.O., Pulyayev V.A. Development of spectrum analyzer based on the Fast Fourier Transform // *Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 25-28 (in Russian).
- 13) Bogomaz A.V., Kotov D.V. Software package for the new generation of data incoherent scatter radars Unified Processing of the Results of Incoherent Scatter Experiments (UPRISE) // *Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , 2013. - № 28 (1001). - p . 29-37 (in Russian).
- 14) Emelyanov L.Y., Lyalyuk A.I., Rogozhkin E.V., Hramov E.A. Temples mathematical and software complex chirp sounding of the ionosphere // *Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 38-45 (in Russian).
- 15) Puliaev V.A., Beloserov D.P., Miroshnikov A.E. Record ionospheric parameters in a database format Madrigal // *Journal of NTU "KPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 46-52 (in Russian).
- 16) Fisun A.V., Skvortsov T.A. Optimal estimate of the Faraday effect in the linear polarization basis with partially polarized signal // *Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p. 53-56 (in Russian).
- 17) Bogomaz A.V., Miroshnikov A.E. Express data processing incoherent scatter radar on a remote server // *Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 63-68 (in Russian).
- 18) Kotov D.V., Shulga M.A. Modelling variations in hydrogen ion concentration using incoherent scatter radar data // *Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 69-74 (in Russian).
- 19) Dzyubanov D.A., Emelyanov L.Y., Loiko A.A. Score speed of the neutral atmosphere at altitudes of maximum F- region according to the incoherent scattering /// *Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI "* , -2013. - № 28 (1001). - p . 75-81 (in Russian).

- 20) Bogomaz A.V., Iskra D.A. Hardware and software system to simulate incoherently scattered signal / Journal of NTU "KhPI". Series: Radio and ionosphere. - Kh.: NTU " KhPI " , 2013 . - № 33 ( 1066 ) . - p. 3-7 (in Russian).
- 21) Skvortsov T.A., Fisun A.V. Effective surface scattering of electrons in a magnetic field / Journal of NTU "KhPI". Series: Radio and ionosphere. - Kh.: NTU " KhPI " , 2013 . - № 33 ( 1066 ) . - p. 8-11 (in Russian).
- 22) Panasenko S.V., Mamedov S.A. Detection of traveling ionospheric disturbances in the power of quasi-periodic variations incoherently scattered signal / Journal of NTU "KhPI". Series: Radio and ionosphere - Kh.: NTU " KhPI " , 2013 . - № 33 ( 1066 ) . - p. 12-18 (in Russian).
- 23) Katsko S.V., Chernogor L.F. Features ionospheric effects during a geomagnetic storm superstrong 5-6 August 2011 over Kharkiv / Journal of NTU "KhPI". Series: Radio and ionosphere. - Kh.: NTU " KhPI " , 2013 . - № 33 ( 1066 ) . - p. 29-33 (in Russian).
- 24) Iskra D.A. Increase the accuracy of determining the autocorrelation functions of incoherent scattering signal / Journal of NTU "KhPI". Series: Radio and ionosphere. - Kh.: NTU " KhPI " , 2013 . - № 33 ( 1066 ) . - p. 34-37 (in Russian).
- 25) Chepurnyj Y.N., Lyalyuk A.I. Assessing the level of interference from debris when measure ionospheric parameters on the radar antenna with HP -100 NDA / Journal of NTU "KhPI". Series: Radio and ionosphere. - Kh.: NTU " KhPI " , 2013 . - № 33 ( 1066 ) . - p. 38-45 (in Russian).
- 26) Miroschnikov AE, AV Bogomaz Cross-platform software to work with the database of the Institute of Ionosphere / Journal of NTU "KhPI". Series: Radio and ionosphere- Kh.: NTU "KhPI" , 2013. - № 33 ( 1066 ) . - p. 46-50 (in Russian).
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- 32) Kotov D.V. Seasonal variation of the relative concentration of hydrogen ions in the outer ionosphere over Ukraine according to the method of incoherent scattering and comparison with the data model IRI2012 .2 . Maximum solar activity // Radio Physics and Radio Astronomy . - 2013 . - V. 18 , № 1. - p. 43-48 (in Russian).
- 33) Bogomaz A.V. Statistical error in determining the temperature and the ionic composition of the ionospheric plasma by means of incoherent scattering. The simulation results // Proceedings of the Baikal International Youth Scientific School on Fundamental Physics and XIII Conference of Young Scientists "Interaction fields and radiation with matter " (Irkutsk, Russia , 9 - 14 September 2013 ) . Irkutsk : ISTP , 2013 . - p. 127-128 (in Russian).
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- 37) Bezrodny V.G., Watkins B, Charkina O.B., et al. Inter-beam cross-correlation processing of ionospheric scintillations of discrete cosmic sources observed by imaging hf riometers. Radiophysics and radioastronomy. V. 18, N 3, p 224-230, 2013 (in Russian).
- 38) Bezrodny V.G., Watkins B, Charkina O.B., et al. Inter-beam cross-correlation processing of ionospheric scintillations of discrete cosmic sources observed by imaging hf riometers. International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 39, September 30 – October 4, 2013.
- 39) Baru, N.A., A.V. Koloskov, Yu.M. Yampolskiy, R.A. Rahmatullin, Investigation of the ionospheric Alfvén resonator characteristics using data of observation in Antarctica and Eurasia, International School-Conference "Remote radio sounding of the ionosphere", Book of abstracts, p. 27, Maly Mayak (Big Alushta), Crimea, Ukraine, September, 30 – October, 4, 2013.
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- 42) Zalizovski A.V., Kascheev S.B., Pikulik I.I., et al. Effects of HF signals scattering on the plasma in homogeneities of the auroral ovals. International School-Conference "Remote radio sounding of the ionosphere", Book of abstract, p. 31, Maly Mayak (Big Alushta), Crimea, Ukraine, September, 30 – October, 4, 2013 (in Russian).
- 43) A. Paznukhov, Soina A., Yampolski Y., et al. Detection of weekly variations in the level of natural ELF noise // Proceedings of VI International Antarctic Conference "Internationalization of research in Antarctica is the path to spiritual unity of mankind". - p. 292-293, Kyiv, Ukraine, May 15–17, 2013.
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- 50) Soina A.V., Zanimonski E.M., Paznukov A.V., et al. Manifestations of technogenic activity in the characteristics of the ambient environment // Proceedings of the Baikal International Youth Scientific School on Fundamental Physics and the XIIIth Conference of Young Scientists "Interaction fields and radiation with matter" . - p. 76-77, Irkutsk, Russia , 9 - 14 September 2013 (in Russian)

#### **B.1.4 Deviations and delays**

There were no major deviations from the planned activities in 2013.

Some deviations in payments of the Institute of Ionosphere for equipment and services occurred since the transfer of the advance payments from Norway were delayed (the first portion of the funds was

received in July 2013, the second in September 2013). As a result, about 20% of payments of the IION were delayed by the Ukrainian State Treasury that resulted in debt to creditors. A more detailed explanation and our proposals how to minimize these risks in the 2014 year are presented in item C.1.4 of the report.

According to the results of the 2012-2013 the experience of delivering review presentations and lectures with participations of Norwegian and Ukrainian scientists, postgraduates and students was quite successful. We propose to continue and expand these activities in 2014 including joint seminars, workshops, which will be performed during joint conferences/schools for young scientists, refresh training of staff, cooperative measuring campaigns, field works, training programs for students, etc. New knowledge and skills obtained by the project participants within this cooperation will be used for the development of new and improvement of already existing curricula, which will be delivered in domestic institutions on the permanent basis.

### B.1.5 Student mobility

Level	From	To	Gender	Months
PhD	Ukraine (UA)	Norway (NO)	Female	1
Maryna Siusiuk, Fellowship program for Ukrainian postgraduate students at the University of Tromsø and EISCAT observatories / a) listening lectures on plasma physics and techniques of incoherent scattering given by leading scientists from Norway, USA and Ukraine; b) participation in experiments with EISCAT IS radars (Tromsø and Svalbard); c) data processing for detection of wave processes in the ionosphere; d) calculating the parameters of space plasma during artificial HF heating of the ionosphere; e) participation in seminars and making presentation "Defining the profile of ion composition at altitudes of lower and middle ionosphere"; f) making the review of literature in the UiT library; g) studying of the principles of practical work with network databases.				
PhD	Ukraine (UA)	Norway (NO)	Female	1
Sofiya Kharytonova (Katsko), Fellowship program for Ukrainian postgraduate students at the University of Tromsø and EISCAT observatories / a) listening lectures on plasma physics and techniques of incoherent scattering given by leading scientists from Norway, USA and Ukraine; b) participation in experiments with EISCAT IS radars (Tromsø and Svalbard); c) studying of the technical characteristics and operational principles of the EISCAT IS radars; d) calculation and analysis of the ionospheric parameters during disturbed conditions (magnetic storms); e) participation in seminars and making presentation "Ionospheric parameters during magnetic storms above Kharkov"; f) making the review of literature in the UiT library;				
PhD	Ukraine (UA)	Norway (NO)	Female	1
Olesia Charkina, Fellowship program for Ukrainian postgraduate students at the University of Tromsø and EISCAT observatories / a) listening lectures on plasma physics and techniques of incoherent scattering given by leading scientists from Norway, USA and Ukraine; b) participation in experiments with EISCAT IS radars (Tromsø and Svalbard); c) providing of the coordinated heater experiments for investigating ionospheric irregularities through observations of discrete cosmic source scintillations using KAIRA facility; d) calculating the parameters of ionosphere using data from KAIRA facility and EISCAT IS radar; e) participation in seminars and making presentation " Application of imaging riometers for investigating ionospheric scintillations and absorption of radiation from Discrete Cosmic Sources (DCS)"; f) making the review of literature in the UiT library; g) studying of the principles of practical work with network databases.				
PhD	Ukraine (UA)	Norway (NO)	Male	1
Dmytro Shulga, Fellowship program for Ukrainian postgraduate students at the University of Tromsø and EISCAT observatories / a) listening lectures on plasma physics and techniques of incoherent scattering given by leading scientists from Norway, USA and Ukraine; b) participation in experiments with EISCAT IS radars (Tromsø and Svalbard); c) Exploration of the technique of systematic sounding of ionosphere used at EISCAT observatories; d) Making a comparative analysis of Tromsø and UAS Ak.Vernadsky ionosonde data arrays; e) Plotting 3D graphics of critical frequency; f) participation in seminars and providing the report " Continuous ionospheric monitoring by the vertical sounding method: A technique for missed data restoration "; f) making the review of literature in the UiT library; g) studying of the principles of practical work with network databases.				
<b>Total</b>			<b>4</b>	<b>4</b>

## B.2

### B.2.1 Work plan 2013

1. The International Conference "Remote Radio Sounding of the Ionosphere (IION-2014)" will be organized in Ukraine by IION in autumn 2014. Conference program includes plenary papers as well as presentations in working groups. These presentations will focus on processing and interpretation of ionospheric data, development and modernization of data processing techniques and software, improving teaching methods, etc.

We plan to involve students and young scientists as well as leading researchers from Ukraine, Norway, Russia and other countries to participate in the Conference.

2. It is planned to support several postgraduate students and scientists from the Institute of ionosphere and Institute of Radio Astronomy for attending international conferences/schools:

- EGU General Assembly-2014, Vienna, Austria, April 27 - May 02, 2014;
- the XXIY Scientific Conference "Propagation of Radio Waves", Irkutsk, Russia, June 29-July 5, 2014;
- URSI General Assembly and Scientific Symposium (Beijing, China, August 6 – 23, 2014);
- 11th European Space Weather Week (Belgium, November 17 – 21, 2014) and others.

3. Training programs for Ukrainian postgraduate students are planned (from Institute of ionosphere and Institute of Radio Astronomy) at the Arctic University of Norway and EISCAT observatories.

4. Management training of the representatives of Ukrainian institutions in Norway. Joint visits of administrative staff of partner-organizations to share experience. Training of the academic / scientific / technical staff of the Ukrainian institutions at the Arctic University of Norway and EISCAT observatories. Training of the academic / scientific / technical staff at the observatory of the Institute of ionosphere.

5. Two courses, namely, "Radio engineering systems in radiophysics research" (5 credits) for students majoring in "Radiophysics and Electronics" (7.070201) and permanent in "Computerization of specialized environments" (6 credits) for students majoring in "Computer engineering" (6.050102) will be improved considering the experience gained in 2013 year and continue to deliver by IION academic staff in the National Technical University "Kharkiv Polytechnic Institute".

6. Cycles of review lectures "Interaction of atmospheric-space weather systems" and "Remote techniques for investigating the near-earth space environment" will be prepared by the academic/scientific staff of the Institute of Radio Astronomy and will be delivered for the students and young scientists of IiN and IoN.

7. Cycles of review lectures on the subject areas "Space geophysics" and "Techniques for investigating the near-earth space environment" will be prepared by academic/scientific staff of the Arctic University and be delivered for the students and young scientists of IiN and IoN.

8. Implementation of practical works/courses for students and young scientists at the Ukrainian and Norwegian ionospheric observatories. Performance of joint Norwegian-Ukrainian observations for studying polar and mid-latitude ionosphere and heating-induced phenomena in the near Earth plasma environment. Arrangement of student measuring campaigns. Field work in Norway and Ukraine for modernization and deployment of new research facilities to be further used in education and research activity.

9. Further preparation of scientific publications by academic staff and researchers jointly with students. Preparation and publication of educational and training materials for students. Supervision and assistance in the preparation of graduate works of bachelors and masters. The postgraduate students' supervision and assistance in defense of PhD thesis of Dmytro Kotov (IION).

## C - Additional information

### C.1.1 Synergies

The prospects for cooperation in educational and scientific spheres between Norwegian and Ukrainian institutions were discussed by project coordinators, directors and administrative staff of IoN during School-Conference ION-2013. As a consequence of this activity:

- a) "Agreement on Scientific Cooperation between the Institute of Radio Astronomy NASU and the Arctic University of Norway (UiT)" valid for a period of 5 years was approved and signed during the visit of Ruben Fediy, Deputy Director of IRA UASU to the Arctic University of Norway October 14, 2013;
- b) Agreement on Scientific Cooperation between the Institute of Ionosphere (IION) and the Arctic University of Norway (UiT)" valid to 18.11.2018 was approved and signed during the visit of Mykhaylo Lyashenko the Scientific Secretary of IION to the Arctic University of Norway in November 2013;
- c) Meeting of the Igor Domnin, Director of IION and Leonid Tovazhnyanskyy, Head of the university of NTU "KhPI" with Tatiana Savinova, coordinator of the cooperation of the Arctic University of Norway with countries of FSU was held on December 10, 2013. As a result, in the frame of the Quota program the agreement on two-year master programs at UiT for two Ukrainian students (NTU "KhPI" department of "Radioelectronics") were approved ([http:// dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Publications/Article-3.pdf](http://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2013/Publications/Article-3.pdf)).
- d) Project researcher from IRA Alexander Koloskov took part in the Conference "Norway and Ukraine: Experiences and Opportunities for Cooperation" (26-27 September, 2013, Kiev). He presented a report



“Norwegian-Ukrainian cooperation aimed to sustainable development of the education process in geospace research”. The presentation describes the project activities that took place in 2012-2013 and prospects for further cooperation of IiN and IoN in education and science.

### **C.1.2 Gender perspective**

The project provides equal opportunities for participants of both genders. English language courses were organized for female-candidates in Ukraine to increase their chance to be involved in the project activities. This made it possible for Siusiuk Maryna, Kharytonova (Katsko) Sofiia (from IION) and Charkina Olesya (from IRA) to take part in fellowship program at UiT in 2013. Their visits to the Observatories (IION, IRA and CEDAR) and participation in the International conferences, seminars and workshops are planned for 2014. We also plan that Soina Anna (IRA) will take part in the fellowship program at UiT in 2014. Lindis Bjoland (postgraduate students from UiT) has participated in the School-Conference "Remote Radio Sounding of the Ionosphere" in 2013. We plan that Siusiuk Maryna will participate in "EISCAT radar school 2014".

### **C.1.3 Anti-corruption**

#### **Anti-corruption**

Actual project activities during 2013 were in line with the rules of the “Norwegian Cooperation Program in Higher Education with Eurasia” and appropriate Financial guidelines. The financial documents were prepared in accordance with the Norwegian (for IiN) and Ukrainian (for IoN) rules of regulations, correspondingly. The Project did not use any unscheduled funds.

### **C.1.4 Risk management**

There are no clear risk factors for the fulfillment of the basic project activities. The main difficulties are in the very slow procedures and bureaucratic financial rules in Ukraine. As we have already mentioned in the Annual Report 2012, after receiving funds from Norway (in NOK) IoN is required to first exchange them to UAH (Ukrainian currency). This transaction can take up to several weeks, since the Ukrainian bank announces a tender to sell NOK. After the tender is completed, IoN can use the money but it is necessary to obtain permission for any payment from the Ukrainian State Treasury. In 2013 the Ukrainian State Treasury delayed about 20% of payments resulting in debt to suppliers. The delayed payments are as follows:

1. Office infrastructure (NOK 15 150. Equipment for students training and presentations ordered in the computer shop:):
    - personal computer and projector for presentations;
    - screen and power supply for the projector.
  2. Books/periodicals/publication costs/dissertations (7 925 NOK - publication fee to the publishing house of NTU "KhP" for two textbooks in radiophysics for students).
  3. Networking/conferences/seminars/workshops (17 160 NOK – service fee for the student conference in NTU "KhP").
  4. General administration costs/overhead (20 170 NOK):
    - Air-conditioner for class-room;
    - Spare parts for the student bus.
- 100% of payment for office equipment and publication of books are delayed until now.

At the same time, almost all payments for radar operation (bills for electricity) were allowed by Ukrainian State Treasury. Unfortunately, the current situation in Ukraine is such that we cannot influence decisions of the Ukrainian State Treasury. Note that the experience of 2012-2013 demonstrates big efficiency of the participation of students in scientific experiments and practical trainings at the IION Observatory. Young people are also interested in studying in Norway in the framework of two-year master programs at UiT (two students from NTU “KhPI” have applied). Measuring campaigns and practical trainings at the IION observatory stimulate students to work in the area of geoscience after graduating from the University. All these activities became possible because of the funding provided to IION Observatory by the project. To continue these efforts and to minimize delayed payments in the future we propose to restructure the IION budget for 2014 and use funds rather for radar operation (bills for electricity) instead of for equipment and services (these payments were stopped in 2013). We plan to get funding for the International Conference “Remote Radio Sounding of the Ionosphere (IION-2014)” from the national sources (Ministry of Science and Education and National Academy of Sciences of Ukraine). The total budget of IION will remain unchanged.

We indicate the proposed changes of the budget in the table D.3.1.

# D

## D.1 Expenditure

### D.1.1 Expenditure

NOK - Norwegian kroner	Expenditure 2013	Budget 2013
<b>Scholarships/fellowships</b>		
Scholarships to Bachelor students	0	0
Scholarships to Master students	0	0
Fellowship grants to Ph.D students	144 272	145 550
<b>SUM - Scholarships/fellowships</b>	<b>144 272</b>	<b>145 550</b>
<b>Infrastructure</b>		
Scientific equipment	73 941	41 740
Office infrastructure/software	4 024	19 174
<b>SUM - Infrastructure</b>	<b>77 965</b>	<b>60 914</b>
<b>Institutional development</b>		
Books/periodicals/publication costs/dissertations	0	7 925
Networking/conferences/seminars/workshops	102 840	120 000
Travel expenditure, partner in cooperating country (IoN)	195 425	272 000
Travel expenditure, partner in Norway (IiN)	123 141	95 099
Costs for gender equalization related activities	0	0
Other operating costs/running costs (specify in comments - not general overhead)	286 886	297 130
<b>SUM - Institutional development</b>	<b>708 292</b>	<b>792 154</b>
<b>Project management</b>		
Compensation to department in Norway (IiN)	0	0
Compensation to department in cooperating country (IoN)	0	0
<b>SUM - Project management</b>	<b>0</b>	<b>0</b>
<b>Project administration</b>		
General administration costs/overhead (max 7 percent of total budget)	47 640	67 810
<b>SUM - Project administration</b>	<b>47 640</b>	<b>67 810</b>
<b>SUM - Total</b>	<b>978 169</b>	<b>1 066 428</b>

#### Expenditure details for The Arctic University of Norway (NO-Uit)

NOK - Norwegian kroner	Expenditure 2013	Budget 2013
<b>Scholarships/fellowships</b>		
Scholarships to Bachelor students	0	0
Scholarships to Master students	0	0
Fellowship grants to Ph.D students	144 272	145 550
<b>SUM - Scholarships/fellowships</b>	<b>144 272</b>	<b>145 550</b>
<b>Infrastructure</b>		
Scientific equipment	73 941	41 740
Office infrastructure/software	0	0
<b>SUM - Infrastructure</b>	<b>73 941</b>	<b>41 740</b>
<b>Institutional development</b>		
Books/periodicals/publication costs/dissertations	0	0
Networking/conferences/seminars/workshops	0	0
Travel expenditure, partner in cooperating country (IoN)	195 425	272 000
Travel expenditure, partner in Norway (IiN)	123 141	95 099
Costs for gender equalization related activities	0	0
Other operating costs/running costs (specify in comments - not general overhead)	139 970	144 000
<b>SUM - Institutional development</b>	<b>458 536</b>	<b>511 099</b>
<b>Project management</b>		
Compensation to department in Norway (IiN)	0	0
Compensation to department in cooperating country (IoN)	0	0
<b>SUM - Project management</b>	<b>0</b>	<b>0</b>
<b>Project administration</b>		
General administration costs/overhead (max 7 percent of total budget)	47 640	47 640
<b>SUM - Project administration</b>	<b>47 640</b>	<b>47 640</b>
<b>SUM - Total</b>	<b>724 389</b>	<b>746 029</b>

**Expenditure details for Institute of Ionosphere under NAS and MES of Ukraine (UA)**

NOK - Norwegian kroner	Expenditure 2013	Budget 2013
<b>Scholarships/fellowships</b>		
Scholarships to Bachelor students	0	0
Scholarships to Master students	0	0
Fellowship grants to Ph.D students	0	0
<b>SUM - Scholarships/fellowships</b>	<b>0</b>	<b>0</b>
<b>Infrastructure</b>		
Scientific equipment	0	0
Office infrastructure/software	4 024	19 174
<b>SUM - Infrastructure</b>	<b>4 024</b>	<b>19 174</b>
<b>Institutional development</b>		
Books/periodicals/publication costs/dissertations	0	7 925
Networking/conferences/seminars/workshops	102 840	120 000
Travel expenditure, partner in cooperating country (IoN)	0	0
Travel expenditure, partner in Norway (IiN)	0	0
Costs for gender equalization related activities	0	0
Other operating costs/running costs (specify in comments - not general overhead)	146 916	153 130
<b>SUM - Institutional development</b>	<b>249 756</b>	<b>281 055</b>
<b>Project management</b>		
Compensation to department in Norway (IiN)	0	0
Compensation to department in cooperating country (IoN)	0	0
<b>SUM - Project management</b>	<b>0</b>	<b>0</b>
<b>Project administration</b>		
General administration costs/overhead (max 7 percent of total budget)	0	20 170
<b>SUM - Project administration</b>	<b>0</b>	<b>20 170</b>
<b>SUM - Total</b>	<b>253 780</b>	<b>320 399</b>

**D.1.2 Explanations to deviations between budget and expenditure**

1. Because of some delays with transferring funds from IiN (first advance payment was received in July 2013, second in the beginning of September 2013), the Ukrainian bank handling the account of the Institute of Ionosphere could not perform all payments till December 31, 2013, and that resulted in debt to suppliers. Some examples of these payments were already indicated in the item C.1.4. The complete list of not utilized funds are as follows:

- 20 425.00 UAH (15 150.00 NOK) in the item "Office infrastructure/software";
- 10 461.00 UAH (7 925.00 NOK) in the item "Books/periodicals/publication costs/dissertations";
- 24 023.50 UAH (17 160.00 NOK) in the item "Networking/conferences/seminars/workshops";
- 8 469.00 UAH (6 214.00 NOK) in the item "Other operating costs/running costs";
- 26 198.00 UAH (20 170.0 NOK) in the item "General administration".

2. Regarding the budget of the IiN, the item "Scientific equipment" was overspent because we purchased in Ukraine world-class ELF magnetometer for studying global lightning activity. This device was specially designed for Svalbard and installed by Ukrainian participants of the project during field works for round-the-clock operation. ELF data from this facility are already available in the Internet ([http://geospace.com.ua/en/data/elf\\_spg.php](http://geospace.com.ua/en/data/elf_spg.php)). Project participants already use these data for educational purposes and science. This purchase and redistribution of unused funds from the budget item "Travel expenditure, partner in cooperating country" were approved by SIU in 2013. The item "Travel expenditure, partner in Norway (IiN)" was overspent. It happened because more Norwegian scientists than indicated in the specification of the budget 2013 took part in the school conference in Ukraine. All funds from the budget item "other costs" (both for IiN and for IoN) were used for students training and organizing of students measuring campaigns with the unique research facilities (Incoherent scatter radars, heating facility, etc.) in Norway and Ukraine. These activities are described in B.1.3.

**D.2 Balance****D.2 Balance**

	<b>IoN</b>	<b>liN</b>	<b>Total</b>
<b>Balance transferred from 2012</b>	4 154	134 279	138 433
<b>Disbursement from SIU 2013</b>		927 995	927 995
<b>Transferred from liN to IoN</b>	316 245	316 245	
<b>Available amount</b>	320 399	746 029	1 066 428
<b>Expenditures</b>	253 780	724 389	978 169
<b>Balance</b>	66 619	21 640	88 259
<b>Return to SIU</b>	0	0	0
<b>New balance</b>	66 619	21 640	88 259

**Application for transfer of unused funds**

1. Because not utilized money of the IION budget (89 577,45 UAH - 66 619.0 NOK) was already converted from NOK to UAH it is very complicated to return them to SIU. We propose to transfer them to the budget of the Institute of Ionosphere 2014 and use for payments of the debt to suppliers.

2. Regarding the liN we ask to transfer unused funds 21640 NOK to the budget 2014. We would like to distribute unused funds between all the items of the project budget.

## D.3 Budget

### D.3.1 Budget

NOK - Norwegian kroner	Expenditure 2012	Expenditure 2013	Budget 2014	Sum	Total budget from project document
<b>Scholarships/fellowships</b>					
Scholarships to Bachelor students	0	0	0	0	0
Scholarships to Master students	0	0	0	0	0
Fellowship grants to Ph.D students	54 450	144 272	95 000	293 722	294 000
<b>SUM - Scholarships/fellowships</b>	<b>54 450</b>	<b>144 272</b>	<b>95 000</b>	<b>293 722</b>	<b>294 000</b>
<b>Infrastructure</b>					
Scientific equipment	14 940	73 941	35 160	124 041	90 710
Office infrastructure/software	5 185	4 024	16 350	25 559	32 300
<b>SUM - Infrastructure</b>	<b>20 125</b>	<b>77 965</b>	<b>51 510</b>	<b>149 600</b>	<b>123 010</b>
<b>Institutional development</b>					
Books/periodicals/publication costs/dissertations	0	0	9 025	9 025	15 850
Networking/conferences/seminars/workshops	0	102 840	17 160	120 000	180 000
Travel expenditure, partner in cooperating country (IoN)	193 000	195 425	280 000	668 425	737 000
Travel expenditure, partner in Norway (IiN)	27 901	123 141	97 990	249 032	212 000
Costs for gender equalization related activities	0	0	0	0	0
Other operating costs/running costs (specify in comments - not general overhead)	224 811	286 886	380 839	892 536	822 000
<b>SUM - Institutional development</b>	<b>445 712</b>	<b>708 292</b>	<b>785 014</b>	<b>1 939 018</b>	<b>1 966 850</b>
<b>Project management</b>					
Compensation to department in Norway (IiN)	0	0	0	0	0
Compensation to department in cooperating country (IoN)	0	0	0	0	0
<b>SUM - Project management</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Project administration</b>					
General administration costs/overhead (max 7 percent of total budget)	40 290	47 640	84 730	172 660	171 140
<b>SUM - Project administration</b>	<b>40 290</b>	<b>47 640</b>	<b>84 730</b>	<b>172 660</b>	<b>171 140</b>
<b>SUM - Total</b>	<b>560 577</b>	<b>978 169</b>	<b>1 016 254</b>	<b>2 555 000</b>	<b>2 555 000</b>

#### Budget details for The Arctic University of Norway (NO-Uit)

NOK - Norwegian kroner	Expenditure 2012	Expenditure 2013	Budget 2014	Sum	Total budget from project document
<b>Scholarships/fellowships</b>					
Scholarships to Bachelor students	0	0	0	0	0
Scholarships to Master students	0	0	0	0	0
Fellowship grants to Ph.D students	54 450	144 272	95 000	293 722	0
<b>SUM - Scholarships/fellowships</b>	<b>54 450</b>	<b>144 272</b>	<b>95 000</b>	<b>293 722</b>	<b>0</b>
<b>Infrastructure</b>					
Scientific equipment	14 940	73 941	35 160	124 041	0
Office infrastructure/software	0	0	0	0	0
<b>SUM - Infrastructure</b>	<b>14 940</b>	<b>73 941</b>	<b>35 160</b>	<b>124 041</b>	<b>0</b>
<b>Institutional development</b>					
Books/periodicals/publication costs/dissertations	0	0	0	0	0
Networking/conferences/seminars/workshops	0	0	0	0	0
Travel expenditure, partner in cooperating country (IoN)	193 000	195 425	280 000	668 425	0
Travel expenditure, partner in Norway (IiN)	27 901	123 141	97 990	249 032	0
Costs for gender equalization related activities	0	0	0	0	0
Other operating costs/running costs (specify in comments - not general overhead)	120 000	139 970	145 000	404 970	0
<b>SUM - Institutional development</b>	<b>340 901</b>	<b>458 536</b>	<b>522 990</b>	<b>1 322 427</b>	<b>0</b>
<b>Project management</b>					
Compensation to department in Norway (IiN)	0	0	0	0	0
Compensation to department in cooperating country (IoN)	0	0	0	0	0
<b>SUM - Project management</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Project administration</b>					
General administration costs/overhead (max 7 percent of total budget)	31 700	47 640	49 160	128 500	0
<b>SUM - Project administration</b>	<b>31 700</b>	<b>47 640</b>	<b>49 160</b>	<b>128 500</b>	<b>0</b>
<b>SUM - Total</b>	<b>441 991</b>	<b>724 389</b>	<b>702 310</b>	<b>1 868 690</b>	<b>0</b>

**Budget details for Institute of Ionosphere under NAS and MES of Ukraine (UA)**

NOK - Norwegian kroner	Expenditure 2012	Expenditure 2013	Budget 2014	Sum	Total budget from project document
<b>Scholarships/fellowships</b>					
Scholarships to Bachelor students	0	0	0	0	0
Scholarships to Master students	0	0	0	0	0
Fellowship grants to Ph.D students	0	0	0	0	0
<b>SUM - Scholarships/fellowships</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Infrastructure</b>					
Scientific equipment	0	0	0	0	0
Office infrastructure/software	5 185	4 024	16 350	25 559	0
<b>SUM - Infrastructure</b>	<b>5 185</b>	<b>4 024</b>	<b>16 350</b>	<b>25 559</b>	<b>0</b>
<b>Institutional development</b>					
Books/periodicals/publication costs/dissertations	0	0	9 025	9 025	0
Networking/conferences/seminars/workshops	0	102 840	17 160	120 000	0
Travel expenditure, partner in cooperating country (IoN)	0	0	0	0	0
Travel expenditure, partner in Norway (liN)	0	0	0	0	0
Costs for gender equalization related activities	0	0	0	0	0
Other operating costs/running costs (specify in comments - not general overhead)	104 811	146 916	235 839	487 566	0
<b>SUM - Institutional development</b>	<b>104 811</b>	<b>249 756</b>	<b>262 024</b>	<b>616 591</b>	<b>0</b>
<b>Project management</b>					
Compensation to department in Norway (liN)	0	0	0	0	0
Compensation to department in cooperating country (IoN)	0	0	0	0	0
<b>SUM - Project management</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Project administration</b>					
General administration costs/overhead (max 7 percent of total budget)	8 590	0	35 570	44 160	0
<b>SUM - Project administration</b>	<b>8 590</b>	<b>0</b>	<b>35 570</b>	<b>44 160</b>	<b>0</b>
<b>SUM - Total</b>	<b>118 586</b>	<b>253 780</b>	<b>313 944</b>	<b>686 310</b>	<b>0</b>

**D.3.2 Comments to budget**

1. As was mentioned earlier, we propose to transfer the following funds from the 2013 budget of the Institute of Ionosphere to its budget of 2014 and use them for payments of the debt to suppliers:

- 15 150.00 NOK in the item "Office infrastructure/software";
- 7 925.00 NOK in the item "Books/periodicals/publication costs/dissertations";
- 17 160.00 NOK the in item "Networking/conferences/seminars/workshops";
- 6 214.00 NOK the in item "Other operating costs/running costs";
- 20 170.0 NOK in the item "General administration".
- TOTAL: 66 619.0 NOK

Additionally to minimize the risk of delayed payments in the future we propose to restructure the Institute of Ionosphere budget for 2014 the following way. Taking into account that almost all payments for radar operation (bills for electricity) were allowed by Ukrainian State Treasury in 2013 we ask SIU to transfer to the item "Other operating costs/running costs" some funds from the other items, namely:

- 9 800 NOK from the item "Office infrastructure/software" (16 350.00 NOK remains considering proposed transferring of 15 150.00 NOK from the budget 2013).
- 6 825 NOK from the item "Books/periodicals/publication costs/dissertations" (9 025.00 NOK remains considering proposed transferring of 7 925.00 NOK from the budget 2013).
- 60 000 NOK from the item "Networking/conferences/seminars/workshops" (17 160.00 NOK remains considering proposed transferring of 17 160.00 NOK from the budget 2013).

All these funds will be used for payment of the debt to suppliers acquired in 2013).

As a result the total sum of the budget item "Other operating costs/running costs" of the Institute of Ionosphere budget 2014 will be 235 839.00 NOK in total (229 625.00 NOK taking into account transfers from other items plus 6 214.00 NOK transferred from the 2013 budget)

The Item "General administration" remains unchanged - 35 570.00 NOK.

The total budget of the Institute of Ionosphere 2012-2014 remains unchanged - 686 310.00 NOK.

2. Regarding the liN we do not expect large deviations from the planned budget. We propose to distribute 21 640.00 NOK, which we ask to transfer from the budget 2013, as follows:

- add 1 000.00 NOK to the item "Fellowship grants to Ph.D students", new sum will be 95 000.00 NOK;
- add 1 130.00 NOK to the item "Scientific equipment", new sum will be 35 160.00 NOK;
- add 8 000.00 NOK to the item "Travel expenditure, partner in cooperating country (IoN)", new sum will be 280 000.00 NOK;
- add 8 990.00 NOK to the item "Travel expenditure, partner in Norway (liN)", new sum will be 97 990.00 NOK;

- add 1 000.00 NOK to the item "Other operating costs/running costs", new sum will be 145 000.00 NOK;
- add 1 520.00 NOK to the item "General administration costs/overhead", new sum will be 49 160.00 NOK;

Making this distribution, we give preference to mutual visits of project participants between IoN and liN for organizing joint seminars, workshops, conference/school for young scientists, refresh training of staff, cooperative measuring campaigns, field works, and training programs for students, etc.

The total budget of the Arctic University of Norway 2012-2014 remains unchanged - 1 868 690.00 NOK.

## E - Signature

### E.1 Signature

Date:	Signature:
Position:	
	Head of Department

Date:	Signature:
Position:	
	Project coordinator