

CPEA-2012 - Final report

Project identification

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 Main partner institution in Norway

A.1.1 Institution in Norway (liN)

The Arctic University of Norway (NO-UiT)

A.1.2 Department (liN)

Proposing Department: Faculty of Science and Technology

A.1.3 Institutional legal representative (liN)

Name: Opheim, John Arne
Gender: Male
E-mail: postmottak@nt.uit.no
Address: University of Tromsø
Faculty of science and technology
N-9011 Breivika
Norway
Phone number: +47 776 44001
Fax number: +47 776 44765

A.1.4 Project coordinator (liN)

Name: La Hoz, Cesar
Gender: Male
E-mail: cesar.la.hoz@uit.no
Address: Department of physics and technology
The University of Tromsø
N-9037 TROMSØ
Norway
Phone number: +47 776 45161
Fax number: +47 776 45580

A.1.5 Changes since previous report

Have there been any changes to the information above since the previous report?

No

Comment (if "yes" is ticked)

A.2 Main partner institution outside Norway

A.2.1 Institution outside (loN)

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

A.2.2 Department (loN)

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

A.2.3 Institutional legal representative (IoN)

Name: Domnin, Igor
Gender: Male
E-mail: iion@kpi.kharkov.ua
Address: 16, Chervonopraporna Str., 61002, Kharkiv, Ukraine
Phone number: +38(057) 706-22-87
Fax number: +38(057) 706-22-87

A.2.4 Project coordinator (IoN)

Name: Pulyayev, Valeriy
Gender: Male
E-mail: pulyayev@kpi.kharkov.ua
Address: 16, Chervonopraporna Str., 61002, Kharkiv, Ukraine
Phone number: +38(057) 707-62-21, +38(067) 358-96-33
Fax number: +38(057) 706-22-87

A.2.5 Changes since previous report

Have there been any changes to the information above since the previous report?

No

Comment (if "yes" is ticked)

A.3

A.3.1 Network 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 since previous report

Have there been any changes to the information above since the previous report?

No

Comment (if "yes" is ticked)

A.4

A.4.1 Participants in the project

Name	Gender	Institution	Position	Degree
Barabash, Volodymyr	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	researcher	PhD student
Baru, Mykola	Male	UA-Institute of Radio Astronomy	PhD student, researcher	Master diploma
Belyey, Vasyl	Male	NO-The Arctic University of Norway	Research Scientist	PhD
Bjoland, Lindis	Female	NO-The Arctic University of Norway	PhD Student	Master diploma
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 emeritus, lecturer	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
Gustavsson, Björn	Male	NO-The Arctic University of Norway	Professor, lecturer	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
Lyashenko, Mykhaylo	Male	UA-Institute of Ionosphere under NAS and MES of Ukraine	Scientific secretary, researcher	PhD
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

Have there been any changes to the information above since the previous report?

Yes

Comment (if "yes" is ticked)

There were some changes of the project participants.

New participants:

Name: Gustavsson, Björn

Gender: Male

Degree: PhD

Position: Professor, lecturer

Institution: NO-UiT the Arctic University of Norway

Name: Bjoland, Lindis
 Gender: Female
 Degree: Master diploma
 Position: PhD Student
 Institution: NO-UiT the Arctic University of Norway

Name: Lyashenko, Mykhaylo
 Gender: Male
 Degree: PhD
 Position: Scientific secretary, researcher
 Institution: UA-Institute of Ionosphere under NAS and MES of Ukraine

Name: Baru, Mykola,
 Gender: Male
 Degree: Master diploma
 Position: PhD student, researcher
 Institution: UA-Institute of Radio Astronomy

Discontinued participants:
 Belyey, Vasyi
 Vickers, Hannah
 Kascheyev, Anton

B - Progress

B.1 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. Arrangement of practical works at the research facilities of the observatories of the IION and IRA. Organizing topical workshops for Ukrainian and Norwegian scientists.	2012	Apr	2014	Oct	Completed
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	Completed
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	Completed
Guidance of the PhD students. Assistance in arranging student's scientific seminars and workshops.	2012	Sep	2014	Dec	Completed
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	2012	Sep	2014	Dec	Completed

practical works with the equipment using special web-based software.					
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	Completed
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	Completed
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	Completed
Preparation of scientific publications by academic staff and researchers jointly with students.	2012	Sep	2014	Dec	Completed
Providing the scholarship and fellowship programs for Ukrainian students at the University of Tromsø and EISCAT observatories.	2012	Sep	2014	Dec	Completed
Refresher training of the academic and technical staff of the partner institutions at the ionospheric observatory of IION	2012	Sep	2014	Dec	Completed
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 to share the experience of the staff of partner organizations.	2012	Sep	2014	Dec	Completed
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	Completed
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	Completed
Training of administrative staff of the Ukrainian institutions in Norway.	2013	Jan	2014	Dec	Completed

Planned activities

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).

Actual activities

The activities described below are presented on the web pages www.kpi.kharkiv.edu/iion and http://geospace.com.ua/en/research/education.html#CPEA_2012_10021

1. Because of the unstable political situation in the Eastern Ukraine and potential risk for visitors the venue of the International School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)" was changed from Kharkiv (Ukraine) to Tromsø (Norway). The conference was organized in the period November 12-19, 2014. The organizers are UiT the Arctic University of Norway, Norwegian Centre for International Cooperation in Education (SIU), EISCAT Scientific Association (EISCAT), Institute of Radio Astronomy (IRA), Institute of Ionosphere NAS – MES Ukraine (IION), National Technical University "Kharkiv Polytechnic Institute" (NTU KhPI). 26 participants (including 13 students and PhD students) from Norway, Ukraine, Sweden and USA took part in the Conference (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Conf.pdf>). The conference includes plenary sessions (November 12, 14), external session at the EISCAT Observatory in Ramfjordmoen (November 13) and measuring campaign at EISCAT observatory, organized under the program proposed by PhD students (November 17-19).

During the first three days 19 lectures of the academic staff (including review lectures of on the subject area of "Atmospheric space weather systems interaction" and "Remote techniques for investigating the near earth space environment" delivered by Ukrainian participants) and 7 student's presentations occurred. In addition, during the external session at EISCAT observatory (November 13) educational EISCAT experiment and training courses concerning the data processing and visualizing took place. The purpose of these activities were to train students and young scientists, which are taking part in the School-Conference, in as many aspects of the EISCAT research facilities as possible (understanding the radar/heater experiments and data acquisition, running experiments and analyzing the recorded data etc.)

The student's measuring campaign was carried out on November 17-19, 2014. PhD students proposed the scientific tasks for the campaign. The first task of the experiment was the excitation of different

types of waves in the near Earth plasma and their observation at different distances from the source. This part of experiment also included coordinated runs of IS radar of the Institute of Ionosphere near Kharkiv (Ukraine). The second task was studying of the scattering of signals from the EISCAT heater at ionospheric irregularities produced by the heater radiation itself. To that end we have recorded Doppler spectra of the heater signal at several greatly dispersed receiving sites, including observation points in Tromsø and Svalbard (HF facilities developed within the current project), near Kharkiv (Ukraine) and at the Ukrainian Antarctic Station.

The excursion around the UiT campus, visit to the University library and tour to the research facilities located in Ramfjordmoen were organized within the Conference. It should be noted the interest in the Conference expressed by the National Academy of Sciences of Ukraine (NASU). The scientific secretary of the Branch of Physics and Astronomy of NASU Dmytro Tarashchenko took part in the Conference and has prepared a popular publication "Geospace is the area of cooperation of the Ukrainian and Norwegian scientists" in the regular newspaper of NASU (in Ukrainian).

2. Several postgraduate students and scientists from the Institute of ionosphere and Institute of Radio Astronomy were supported for participation in the international conferences/schools.

a) EGU General Assembly-2014, Vienna, Austria, April 27 - May 02, 2014

(see <https://dl.dropboxusercontent.com/u/7237147/ion.org.ua/Activities-2014/Vienna.pdf>):

– Dmytro Kotov (IION) has delivered the presentation: "The upper transition height over the Kharkiv incoherent scatter radar before, during and after the extreme minimum of the solar activity: Observational results and comparison with the IRI-2012 model";

– Vladimir Barabash (IION) has delivered the presentation "Ionospheric manifestations of acoustic-gravity waves".

b) URSI General Assembly and Scientific Symposium (Beijing, China, August 6 – 23, 2014)

(see <https://dl.dropboxusercontent.com/u/7237147/ion.org.ua/Activities-2014/China.pdf>):

– Mykhaylo Lyashenko (IION) has delivered the presentation: "Estimation of the electric field zonal component value and modeling of the vertical component of the plasma drift velocity and neutral wind velocity in ionosphere over Kharkiv (Ukraine) during August 5-6, 2011 and November 12-13, 2012 magnetic storms";

– Oleksandr Koloskov (IRA) has delivered the presentation: " Long-term monitoring of the Schumann resonance signals from Antarctica";

– Olesia Charkina (IRA) has delivered the presentation: "Attenuation of scintillation of discrete cosmic sources in the case of non-resonance HF heating of the upper ionosphere".

c) 11th European Space Weather Week (Belgium, November 17 – 21, 2014)

(see <https://dl.dropboxusercontent.com/u/7237147/ion.org.ua/Activities-2014/Belgium.pdf>):

– Mykhaylo Lyashenko (IION) has delivered the presentation: "Dynamic and thermal processes in geospace during November 13 – 15, 2012 magnetic storm over Kharkov (Eastern Ukraine)";

– Andrei Zalizovski (IRA) has delivered the presentation: "Manifestation of interaction between atmospheric and space climate systems".

d) A visit to the XXIV Scientific Conference "Propagation of Radio Waves", Irkutsk, Russia, in June 2014 did not take place due to the political situation in Ukraine and Russia. However, two poster presentations:

A.V. Koloskov, Yu.M.Yampolski, R.A. Rahmatulin, Cesar La Hoz, N.A. Baru, "Multiposition studies of the Ionospheric Alfvén Resonator" and A.V. Koloskov, O.V. Budanov, Yu.M.Yampolski, R.A. Rahmatulin, A.Yu. Pashinin, "Features of the Schumann resonances over complete cycle of solar activity" were prepared by project participants and presented by coauthors from Russia.

In addition, on September 23, 2014 the Eurasia Programme Workshop was carried out at National University of "Kyiv-Mohyla Academy" in Kiev. Oleksandr Koloskov (Project researcher from IRA) has delivered the presentation "Norwegian-Ukrainian cooperation aimed to sustainable development of the education process in geospace researches".

3. a) Six students from the Ukrainian institutions (M. Siusiuk, V. Barabash, C. Kozlov, M. Baru, A. Soina, A. Koloskov) have visited Tromsø in the period November 09-22, 2014. The program of their visit includes:

- Participation in the School-Conference ION-2014 (listening lectures, delivering presentations, training at EISCAT observatory during the educational experiment).

- Participation in the student's measuring campaign (the program for measuring campaign was proposed by the same students) at EISCAT and the coordinated runs of the Incoherent scatter (IS) radar of IION near Kharkiv.

- Acquaintance with IS radar and Heating facility at EISCAT observatory in Ramfjordmoen.
- Acquaintance with the internet-controlled HF and ELF facilities installed in Tromsø and Svalbard. Working with HF facilities during measuring campaign. Works on the movement of HF facility from the old building of the Auroral Observatory and mounting it in the new UiT building in Campus.
- Training in processing of the data collected during the student's campaign and calculating the characteristic of the ionosphere. Working with "Madrigal" and other Internet-accessible databases. Discussing the results with Norwegian and Ukrainian scientists.
- The excursion around UiT campus, visit to the University library and tour to the research facilities located in Ramfjordmoen

b) Ukrainian PhD student O. Charkina has visited Tromsø in the period February 01-11, 2015. The program of her visit includes:

- Acquaintance with IS radar and Heating facility at EISCAT observatory in Ramfjordmoen.
- Practical training with RTG and GUIDAP software at EISCAT observatory.
- Analyzing the ionospheric conditions and choosing optimal operation modes for EISCAT heating facility.
- Preparing and running educational and science measuring campaign intended for investigation of the scintillation intensity for the discrete cosmic source radiation in the modified polar ionosphere. This experiment also includes the coordinated runs of KAIRA facility for investigating of ionospheric irregularities through observations of the discrete cosmic source scintillations.
- Preliminary data processing.
- Delivering presentation "Investigation of ionospheric scintillations of radiation from discrete cosmic sources in the modified polar ionosphere" at the seminar in the Arctic University of Norway.

c) In 2013 a few long-term collaboration agreements between the Arctic University of Norway and Ukrainian institutions were signed. As a result of this cooperation, four students from the National Technical University "Kharkiv polytechnic Institute" (Shulga Maryna, Sharkadi Mykhailo, Reznychenko Artem and Siladi Oleksandr) were awarded from the Norwegian Quota Scheme program for two-year (from 2014) Master degree training at the Arctic university of Norway (see <https://dl.dropboxusercontent.com/u/7237147/ion.org.ua/Activities-2014/Post-gr.pdf>). It was decided that students will have two supervisors (from UiT, Norway and from IION or IRA, Ukraine). Themes of the Master Theses and plans for cooperation were discussed during the visit of Ukrainian participants to Tromsø in November 2014.

4. Training of the representatives of Ukrainian institutions was organized at the Arctic University of Norway, at Observatories located in Tromsø and Svalbard, and at the Observatory of the Institute of Ionosphere.

(see <https://dl.dropboxusercontent.com/u/7237147/ion.org.ua/Activities-2014/Conf.pdf>):

a) Eleven representatives of the students and research staff of the Ukrainian institutions (V. Barabash, M. Lyashenko, O. Bogomaz, D. Kotov, M. Siusiuk, A. Zalizovski, O. Koloskov, C. Kozlov, S. Katsko, A. Soina and M. Baru) have been trained at the Observatory of the Institute of Ionosphere and the EISCAT Observatory located in Ramfjordmoen during several measuring campaigns which were carried out from June to December 2014.

b) Four representatives of the academic and administrative staff of the Ukrainian institutions (Igor Domnin – Director the Institute of ionosphere; Yuri Yampolski – the Head of Department of "Radiophysics of Geospace" of IRA, Valeriy Pulyayev – deputy director the Institute of ionosphere and Dmytro Tarashchenko – the scientific secretary of the Branch of Physic and Astronomy of NASU) visited the Arctic University of Norway in the period from August to November 2014. They have been familiarized themselves with the following issues:

- methodologies of the educational process in Norway;
- current status of the scientific research facilities of UiT and EISCAT and how they can be used in the educational process and for scientific researches;
- Norwegian experience in popularization and promotion of environmental studies and geospace researches.

In addition, they have delivered several lectures at UiT concerning educational and scientific activities of the Ukrainian institutions and discussed the perspective of future Norwegian-Ukrainian collaboration with Norwegian project coordinator Cesar La Hoz and representatives of UiT Administration.

c) Four representatives of the scientific staff of the Ukrainian institutions (V. Galushko, A. Zalizovski, O. Koloskov, D. Kotov) visited Norway during July-November 2014. They have been trained in the Arctic University of Norway) and at the observatories in Ramfjordmoen and at Svalbard. They have improved their theoretical knowledge and practical skills in the following research areas:

- Monitoring of ionospheric plasma using the most advanced research facilities of EISCAT and techniques of observations and data processing developed by EISCAT community.
- Characteristics of modern hardware and software of incoherent scatter radars and EISCAT heating facility.
- Understanding ionospheric processes in the auroral regions and studying of the human impact on near Earth plasma environment.
- Studying of space weather.

In addition, open discussions of current and future activities in the frame of the SIU Project and Ukrainian membership in EISCAT were carried out.

d) As was mentioned above six Ukrainian students (M. Siusiuk, V. Barabash, C. Kozlov, M. Baru, A. Soina, A. Koloskov) visited Norway in November 2014. The main tasks of this visit were participation in the International School-Conference ION-2014 and in the student's measuring campaign at EISCAT. In addition, during the visit students have been familiarized themselves with the following issues:

- Organizing and conducting experiments with IS radars and heating facility;
- Modern and future radar facilities for diagnostic of the ionosphere. EISCAT 3D Project.
- Functioning of the systems of global communication, navigation, forecasting of hazardous effects in the
- Studying of the principles of practical work with geophysical data in Intranet and Internet databases including "Madrigal"
- Anomalous Plasma Line Echo investigations
- Plasma convection and irregularities over the polar ionosphere.

5. Two courses prepared by prof. V. Pulyayev, namely, "Radio engineering systems in radiophysics research" (lectures, laboratory work, practical classes – 5 credits) for Ukrainian students majoring in "Radiophysics and Electronics" (7.070201) and "Computerization of specialized environments" (lectures, laboratory work, practical classes – 5 credits) for students majoring in "Computer engineering" (6.050102) have been revised (see <https://dl.dropboxusercontent.com/u/7237147/ion.org.ua/Activities-2014/Lectures.pdf>). These courses provide new knowledge in modern scientific theories and techniques of diagnostic of near-Earth plasma as well as improve theoretical and practical skills of the 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 by lecturers within the project.

In addition, following three courses have been revised and continued to delivering by:

- a) Lecturer Panasenko Sergii, PhD, senior scientist of the IION. Course: "Systems analysis and computer simulation" (lectures, laboratory works, practical classes – 5 credits) for bachelors majoring in "Computer engineering" (6.050102).
- b) Lecturer Kotov Dmytro, PhD student, researcher of the IION. Course: "Statistical radiophysics" (lectures, laboratory works, practical classes – 4 credits) for bachelors majoring in "Radio Physics and Electronics" (7.070201).
- c) Lecturer Bogomaz Oleksandr, PhD student, researcher of the IION. Course: "Radio receivers in radiophysics" (lectures, laboratory works, practical classes – 4 credits) for masters majoring in "Radio Physics and Electronics" (7.070201).

6. Cycle of review lectures (17 during all project period) on the subject areas "Remote techniques for investigating the near-earth space environment" and "Interaction of atmospheric-space weather systems" have been prepared by the academic/scientific staff of the IRA and ION delivered for the students and young scientists of IIN and ION:

Lectures prepared and delivered by the academic staff of IION and IRA are as follows:

- Prof. I. Domnin – Results of ionospheric diagnostic in Ukraine using Kharkiv incoherent scatter radar
- Dr. A. Zalizovski – Ionospheric effects in superlong HF signal propagation;
- Dr. A. Zalizovski – Atmospheric and Space Weather Systems Interaction;
- Dr. A. Zalizovski - Ukrainian Geospace research in Antarctica
- Dr. R. Fediy – Main Scientific Activities of Scientific Research at the Institute of Radio Astronomy NASU;
- Dr. M. Lyashenko – Modeling of the dynamic and thermal process parameter variations in the ionosphere during solar eclipses;
- Dr. A. Kashcheyev – High frequency radio instruments and techniques for diagnostics of the ionosphere developed in IRA;

- Dr. A. Koloskov – Monitoring of low frequency electromagnetic fields at the Ukrainian Antarctic Station and in Ukraine;
- Dr. A. Koloskov – HF and ELF facilities as the educational tools for Geospace research;
- Dr. D. Kotov – Upper transition height during the last solar minimum: Surprises, Doubts, and Explanations.
- Dr. S. Panasenko - Methods for detecting wave processes in the ionospheric plasma using Kharkiv incoherent scatter data;
- Dr. S. Panasenko - Aperiodic and quasi-periodic processes in the ionosphere over Kharkiv, Ukraine accompanying high-power HF heating by the “Sura” facility
- Dr. V. Pronenko – “Main directions of research and production activity of Lviv Centre of Institute for Space Research”
- Prof. V.Pulyayev – Features of distant sounding of the ionosphere by the means of the incoherent scattering of radio waves;
- Prof. V. Pulyayev - ISR research in the educational process at the KhPI – IION;
- Prof. Yu.Yampolski, Member of the National Academy of Science (IRA) – “Frequency-and angular sounding of the ionosphere;
- Prof. Y.Yampolski – Ukraine-Norway Geospace Research and Education activity”

7. Cycles of review lectures (24 during all project period) on the subject areas “Space geophysics” and “Techniques for investigating the near-earth space environment” were prepared by academic/scientific staff of the Norwegian institution and were delivered for the students and young scientists of IiN and IoN:

- Dr. V. Belyey - EASI interferometer. How it works?
- Dr. V. Belyey - Hardware and software of EASI interferometer;
- Dr. V. Belyey – Interferometric radar imaging on Svalbard;
- Prof. A. Brekke - Ionization Processes in the Ionosphere;
- Prof. T. Eltoft – Radar Remote Sensing;
- Dr. M. Gullikstad Johnsen - On shock aurora, traveling convection vortices and other transient phenomena in the high latitude dayside ionosphere;
- Prof. B. Gustavsson - HF Radio Induced Optical Emissions. Experimental space physics made visible;
- Prof. B. Gustavsson - Flaming auroral rays and naturally enhanced ion acoustic lines;
- Prof. B. Gustavsson – Anomalous Plasma Line Echo investigations;
- Prof. B. Gustavsson - Some notes on Incoherent Scatter Radar Observations of enhanced Plasma Lines during Auroral Precipitation
- Prof. Ove Havnes - Charged Dust Particles in the Polar Mesosphere;
- Prof. C. La Hoz – Theory of radar imaging. How it works?
- Prof. C. La Hoz – Polar mesospheric summer echoes;
- Prof. C. La Hoz - Aperture synthesis imaging radar and the EISCAT-3D project;
- Prof. C. La Hoz - Space Geophysics;
- Prof. C. La Hoz - Incoherent Scattering Theory;
- Prof. C. La Hoz - Spectrum of Incoherent Scattering;
- Prof. C. La Hoz - Radar Equation;
- Prof. C. La Hoz – Ionospheric sounding by Incoherent scattering;
- Prof. C. La Hoz – The EISCAT_3D Project;
- Prof. Unni Pia Løvhaug – Anomalous Plasma Ion Echo investigations;
- Dr. M. Rietveld – Introductory lecture on the EISCAT facilities;
- Dr. M. Rietveld – Results from EISCAT Heating;
- Dr. H. Vickers - Parameterization of the solar activity effect on the upper thermospheric density observed using the EISCAT Svalbard Radar.

8. Practical works/courses for students and young scientists:

a) Special classes and practical training courses were carried out at the Observatory of the Institute of Ionosphere through all the academic year (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Train.pdf>). Students and young scientists operated with hardware and software of the Incoherent scatter radar and Ionosonde facility as well as studied techniques of data processing and visualizing.

Some results of the student activity have been presented during special session of the school-conference, which was organized in May 2014 at the IION Observatory. 27 bachelors from NTU “KhPI” made presentations of their graduate works during this event

(see https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/School_conf.pdf).

10 student measuring campaigns and several excursions to IS radar were organized at IION Observatory (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Practice-work.pdf>; <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Field-work.pdf>).

b) The total duration of training courses for students and young scientists at the Ionospheric Observatory of IION in 2014-2015 years was 416 hours. These courses include both practical classes and dual purpose (training and science) measuring campaigns. Students and young scientists operated with incoherent scatter radar and ionospheric station for vertical sounding of the ionosphere. They were trained in many aspects of running radar experiments, data acquisition, processing and analyzing, etc. Data processing technique was based on the software packages specially designed for remote processing of the ionospheric data using Internet connection (see www.kpi.kharkiv.edu/iion – Specialized software for IS radar).

The ionosphere measuring campaigns performed during 2014-2015 years are as follows;

- 18-19 March 2014 – training courses for students intended for measurements of the characteristics of radar equipment, characteristics of feeder lines and antenna switch;
- 11-23 June 2014 – practical training courses for the students and young scientists. Educational experiments intended for gaining the practical experience of running IS radar and ionosonde facility;
- 24-27 June 2014 – experiments during the Summer solstice;
- 21-23 September 2014 – experiments during the Autumnal equinox;
- 24-29 September 2014 – study of the magnetic storm; experiments during rocket launch "Ariane 5" (Kourou) (observatories IION and EISCAT jointly);
- 29 October 2014 – training courses for students: measurement of hardware characteristics of the IS radar systems;
- 13-19 November 2014 – joint experiments with EISCAT (coordinated with EISCAT UHF IS radar and heating facility).
- 16-19 December 2014 – experiments during the Winter solstice.
- 27-28 January 2015 – Practical classes for masters (students of the NTU "KhPI"): conducting experiments to study the modes of radiation with long and short pulses, Faraday rotation measurements, observation of the plasma line.
- 2-6 February 2015 - educational and science measuring campaign at EISCAT observatory intended for investigation of the scintillation intensity for the discreet cosmic source radiation in the modified polar ionosphere. This experiment also includes the coordinated runs of KAIRA facility.
- 3-4 February 2015 – joint experiments with EISCAT (see previous item) and SURA (N. Novgorod, Russia) heating facilities .
- 10-13 February 2015 – joint experiments with heating facility SURA (N. Novgorod, Russia).

It should be noted, that some of these campaigns were performed in cooperation with other research facilities located in Ukraine, Russia and Norway. (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/datas-2014.pdf>).

c) Field works.

In July-August 2014 Volodymyr Galushko and Oleksandr Koloskov from IRA have visited Tromsø and Svalbard to perform testing, maintenance and upgrade of the HF and ELF facilities.

They have mounted and installed new specially designed PCs for HF facility in Tromsø and ELF facility at Svalbard, set and configure new enhanced system for remote control and data transfer via Internet connection. This system provides full access to PC from remote location and automatic data transferring to the main server located in Ukraine. They also installed the same system for HF receiver located in Svalbard. HF and ELF data are automatically processed and visualized in real-time at the IRA web page (<http://geospace.com.ua/en/data.html>) for both educational and scientific purposes. In addition they provide maintains and testing of ELF facility after the winter season (ELF sensors and feeding cables are located at the open and these works are important to provide good quality of the data). During 2014, there were several visits of ION representatives to Observatory of IION and Low Frequency Observatory of IRA. During these visits special software packages, which allow remote processing and visualizing of data from these observatories were tested and installed. This software packages were used to access and process data from Ukrainian and Norwegian observatories during practical works with students and measuring campaigns.

In November 2014 Ukrainian students use internet-controlled HF and ELF facilities installed in Tromsø and Svalbard as the research tools during measuring campaign at EISCAT. After the campaign they moved the HF facility from the old building of the Auroral Observatory and mounted it in the new UiT building in Campus.

d) The list of the scientific conferences and schools, which were attended by students and young scientists from IRA and IION are as follows (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Report.pdf>):

- XXXIst URSI General Assembly and Scientific Symposium (Beijing, China (CIE), August 17-23, 2014). – 3 presentations;
- XXIV Scientific Conference "Propagation" (PPB-24). – June 29-July 5, Irkutsk, 2014. – 3 presentations;
- EGU General Assembly 2014 (Vienna, Austria, 27 April-02 May 2014). – 2 presentations;
- 14th Ukrainian Conference on Space Research. – Uzhgorod, 8-12 September 2014. – 2 presentations;
- 10th International Conference "Problems of Geocosmos" – 1 presentation;
- St. Petersburg, Petrodvoretz, October 6-10, 2014 – 1 presentation;
- XXII International Scientific Conference on Information Technology: science, engineering, technology, education and health (MicroCAD-2014). – Kharkiv, Ukraine, NTU "KhPI", 15-17 October 2014. – 4 presentations;
- International School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014), 12-19 November 2014. – 5 presentation.
- 11-th European Space Weather Week (November 17-21, Liege, Belgium). – 2 presentations.

f) The educational activity and cooperative scientific research were promoted in Ukrainian mass media (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/TV.pdf>).

9. a) Two textbooks for students in radio- and geophysics developed by Ukrainian project participants were published in 2014:

- 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)
- 29 scientific papers and conference preceding prepared by academic staff and researchers jointly with students were published

b) Two PhD students Dmytro Kotov (IION) and Olexandr Bogomaz (IION) have defended their PhD works in 2014-2015. Their PhD theses were prepared under the supervision of participants of the project (see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Phd.pdf>).

The titles of theses are as follows:

- "Variations in the ion composition in the topside ionosphere over Ukraine according to the incoherent scatter technique data" (diss. candidate phys.-math. science / D. Kotov. - Kharkov, IRE, - 185 P);
- "Improving the efficiency of information transformation in the system for diagnosing the state of the ionospheric environment" (diss. candidate techn. science / O. Bogomaz. - Kharkov, NTU "KhPI", - 191 P).

PhD student from IRA O. Charkina have prepared her thesis and plan to defend it through 2015. The theme of the thesis is: "Transionospheric sounding using imaging riometers and radiation from discrete cosmic sources".

c) Project participants carry out supervision and consultation for 28 students of the NTU "KhPI" (specialization "Radio Physics and Electronics") in preparation of bachelor's and master's theses as well as gave the assistance to twenty two students in defense of bachelor's, specialist's and master's works

(see <https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Bach.pdf>;
<https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Spec.pdf>;
<https://dl.dropboxusercontent.com/u/7237147/iion.org.ua/Activities-2014/Mag.pdf>).

B.3 Deviations and delays

There were no major deviations from the planned activities and delays in the project activities and milestones.

Main differences from the planned activities were caused by the political crisis in Ukraine started in the beginning of 2014 year. In September-October 2013 the first School-Conference "Remote Radio Sounding of the Ionosphere (ION-2013)" took place in Crimea (Ukraine). The representatives of the academic staff and PhD student from the Arctic University of Norway took part in this event. In October after the conference, the Norwegian participants visited Ukrainian institutions in Kharkiv. Both at the conference in Crimea and in the Institute of Ionosphere (Kharkiv) several review lectures on the subject areas "Space geophysics" and "Techniques for investigating the near-earth space environment" were delivered by Norwegian participants. The continuation of this activity was planned for 2014. However,

because of a terrorist threat in the Eastern part of Ukraine visits of Norwegian partners to the Ukrainian institutions became very risky. That's why next School-Conference for students and young scientists ION-2014 was organized in Norway instead of Ukraine. For the same reason the cycle of review lectures developed by Norwegian participants was delivered in Norway. Implementation of this activity in Ukraine is postponed, and planned to be performed after normalization of the political situation in Ukraine. The review lectures on the subject areas "Atmospheric space weather systems interaction" and "Remote techniques for investigating the near earth space environment" were delivered in Norway by Ukrainian participants since 2012 until 2014. We plan to continue cooperation between Ukrainian and Norwegian institutions and hope that these lectures may become the permanent curriculum in the framework of new long-termed project. It worth to note that the practice of delivering guest lectures in Norway as well as new knowledge and skills gained by Ukrainian participants during their visits to Norwegian institution were very useful for Ukrainian lecturers. They used this experience while preparing and delivering new permanent courses in Ukraine ("Radio engineering systems in radiophysics research", "Computerization of specialized environments", "Systems analysis and computer simulation", "Radio Physics and Electronics", "Radio receivers in radiophysics"). Changing of venue of the School-Conference from Ukraine to Norway resulted in higher costs for travel, accommodation and living expenses for participants (in comparison with the same conference in Ukraine). Because of this to provide the adequate number of Ukrainian participants at the School-Conference and during measuring campaign duration of the fellowship program in Norway for Ukrainian students have been reduced from initially planned one month to two weeks.

In 2014 the Ukrainian institutions have received the funds of the Project with a delay. The first portion of funding has been transferred to the financial account of IION at the end of August 2014. The second payment was made at the end of October 2014. As a result, by the end of the year 2014 the IION had the unspent funds (25% from the budget 2014 or NOK 62,800) related to the item "Other operating costs (energy costs for the radar at the observatory of IION)". These funds were postponed for the period January 1 – February 28, 2015 with the permission of SIU. The practical courses for students and scientific-educational experiments have been expended for this period as well. One experiment (February 2-6, 2015) was performed jointly with EISCAT observatory and KAIRA facility. Ukrainian PhD student Olesia Charkina has visited EISCAT observatory for this period to run EISCAT radar and provide interaction with KAIRA facility.

Level	From	To	Gender	Months
PhD	Ukraine (UA)	Norway (NO)	Male	1
Barabash Volodymyr. Fellowship program for Ukrainian students at the Arctic University of Norway (UIT) and EISCAT observatories / a) Participation in the School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)" and delivering presentation: "Ionospheric manifestations of acoustic-gravity waves under quiet and disturbed conditions"; b) Participation in the student's measuring campaign at EISCAT observatory, calculating the parameters of space plasma during artificial HF heating of the ionosphere; c) Participation in the field-works with HF receiving facility; d) data processing for detection of wave processes in the ionosphere; e) studying the techniques of data processing and visualizing using standard EISCAT software.				
PhD	Ukraine (UA)	Norway (NO)	Male	1
Sergii Kozlov. Fellowship program for Ukrainian students at the Arctic University of Norway (UIT) and EISCAT observatories / a) Participation in the School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)" and delivering presentation: "Automated a data collection system for the control state of complex IS"; b) Participation in the student's measuring campaign at EISCAT observatory, running IS radar using RTG and GUIDAP software; c) Participation in the field-works with HF receiving facility; d) Analysis of the technical characteristics of the EISCAT UHF radar hardware and signal processing algorithms.				
PhD	Ukraine (UA)	Norway (NO)	Male	1
Mykola Baru. Fellowship program for Ukrainian students at the Arctic University of Norway (UIT) and EISCAT observatories / a) Participation in the School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)" and delivering presentation: "Ground based and satellite observations of the Ionospheric Alfvén Resonance"; b) Participation in the student's measuring campaign at EISCAT observatory, running HF and ELF facilities located in Tromsø, Svalbard and Ukraine; c) Participation in the field-works with HF receiving facility, mounting HF facility in new location and making test measurements; d) Analysis of the technical characteristics of the system of remote access to the research facilities; e) Processing data arrays from HF and ELF facilities recorded during the campaign.				
PhD	Ukraine (UA)	Norway (NO)	Female	1
Anna Soina. Fellowship program for Ukrainian students at the Arctic University of Norway (UIT) and EISCAT observatories / a) Participation in the School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)" and delivering presentation: "Weekly variations of the parameters of the ambient environment"; b) Participation				

in the student's measuring campaign at EISCAT observatory, collectinf visualized data of IS radar from the WEB (RTG and GUISDAP real-time plots); c) Participation in the field-works with ELF facility; d) Analysis of the technical characteristics of the magnetometers of TGO; e) Working with literature in the library of the University of Tromsø.				
Bachelor	Ukraine (UA)	Norway (NO)	Male	1
Andrii Koloskov. Scholarship program for Ukrainian students at the Arctic University of Norway (UIT) and EISCAT observatories / a) Participation in the School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)"; b) Participation in the student's measuring campaign at EISCAT observatory, monitoring ionospheric conditions using the ionosonde data; c) Participation in the field-works with HF receiving facility, mounting HF facility in new location and making test measurements; d) Practical training with GUISDAP software; e) Processing of the ID radar data using GUISDAP software.				
PhD	Ukraine (UA)	Norway (NO)	Female	1
Olesia Charkina. Fellowship program for Ukrainian students at the Arctic University of Norway (UIT) and EISCAT observatories / a) Practical training with RTG and GUISDAP software at EISCAT observatory; b) Analyzing the ionospheric conditions and choosing optimal operation modes for EISCAT heating facility; c) Preparing and running special measuring campaign intended for investigation of scintillation intensity for discreet cosmic source radiation in the modified polar ionosphere; d) Delivering presentation "Investigation of ionospheric scintillations of radiation from discrete cosmic sources in the modified polar ionosphere " at the seminar in the the Arctic University of Norway.				
PhD	Ukraine (UA)	Norway (NO)	Female	1
Maryna Siusiuk. Fellowship program for Ukrainian students at the Arctic University of Norway (UIT) and EISCAT observatories / a) Participation in the School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)" and delivering presentation: "Variants of transforming the ionospheric parameters of Kharkov radar to the database format "Madrigal""; b) Participation in the student's measuring campaign at EISCAT observatory, collecting data records from UHF radar and working with "Madrigal" data base; c) Participation in the field-works with HF receiving facility d) data processing for detection of wave processes in the ionosphere; e) studying of the principles of practical work with network databases.				
Total			7	7

C - Results and achievements

C.1

Expected results stated in the Project document

Expected result
Implementation of new curriculums in Space physics, Radio physics and electronics and specialized computer systems at the institutions involved in the project.
A new permanent course "Computerization of specialized environments" will be organized in Ukraine. The course will consist of lectures and practical works in the subject area of "Research facilities and techniques for diagnostic of the near earth space environment". The course will be based both on the experience of Ukrainian academic stuff in operation with national research facilities and on the new knowledge gained during the refresher training in Norway. The learners will gain experience in operation with incoherent scatter radars, devices with Internet control and modern techniques for data processing using information from online databases.
Installation of new internet-controlled, compact-size research facilities for diagnostics of the near-earth space environment in Norway and Ukraine. Integration of these instruments into the education process to be used by students and scientists of both countries for obtaining a new knowledge about the geospace.
Organization of annual international ionospheric conferences for the students and young scientists in Ukraine. Involvement of students, young scientists and key specialists from Norway and other countries to participate in the conference. Arrangement of the practical works with the research facilities of the observatories of IION and IRA during the conferences.
Support for fellowship of Ukrainian students in the academic and scientific institutions of Norway.
Participation of students and young scientists in international conferences and youth scientific schools on the project-related subjects ("EISCAT workshop", "EISCAT radar school" etc.).
Preparation and publication of educational and training materials for students. Development of the special software for practical works of the students.
Preparation of scientific publications by academic staff and researchers jointly with students.
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 to share the experience between the staff of the partner organizations. Sustained improvement of the qualification level of academic, technical and

administrative staff of the Ukrainian institutions to enhance the higher education level in Ukraine in accordance with the standards of the European educational space, as determined by the Bologna Declaration.

The improvement of the theoretical knowledge and practical skills of students in the area of experimental physics and environmental studies. Integration of the applied knowledge with the basic university education. Completion of the staff of the research institutions by the cleverest students.

For the past decades Ukraine and Norway cooperation in the field of Geospace science was mainly concentrated in research area. As a result in 2007 Ukraine obtained the privileges of the Full Associated Status in EISCAT. In 2011 the "Joint Geospace Research Program by the National Academy of Sciences of Ukraine and European Incoherent Scatter Scientific Association (NASU – EISCAT) for 2012 – 2015" was approved by NASU. Thus, implementation of current project focused on the sphere of higher education will contribute essentially to the balance of educational and research components in the long-term cooperation between Norway and Ukraine.

To what extent were results previously identified at application stage achieved?

The results obtained in the course of the project, in general do not differ from those specified at the application stage. The brief summary of the results are as follows:

1. New curricula in Radio physics and specialized computer systems were implemented in Ukrainian institution (see next item for more details). Norwegian participants prepared the cycle of review lectures in the area of Space physics. These lectures were delivered in Ukraine during the visits of Norwegian participants in 2013, and in the frame of School-conference ION-2014, which was carried out in Tromsø in 2014. The implementation of the curriculum in Ukraine is postponed, and planned to be performed after normalization of the political situation in Ukraine. In addition, new knowledge gained by Norwegian participants during the project period is used for improvement of already existed curricula in Space physics delivering in Norwegian institution.

2. 2 new permanent courses "Computerization of specialized environments" (lectures, laboratory practices, practical classes - 5 credits) for bachelors majoring in "Computer engineering" (6.050102) and "Radio engineering systems in radiophysics research" (lectures, laboratory practices, practical classes - 5 credits) for students majoring in "Radiophysics and electronics" (7.070201) were developed by Prof. V. Pulyayev. 3 courses within similar subject area - "Radio engineering systems in radiophysics research" (lecturer – S. Panasenko; lectures, laboratory works, practical classes; 5 credits; for bachelors majoring in "Computer engineering" - 6.050102), "Systems analysis and computer simulation" (lecturer - D. Kotov; lectures, laboratory work, practical classes; 4 credits; for bachelors majoring in "Radio Physics and Electronics" - 7.070201), "Radio receivers in radiophysics" (Lecturer – O. Bogomaz; lectures, laboratory works, practical classes; 4 credits; for masters majoring in "Radio Physics and Electronics" - 7.070201) were revised. Ukrainian project participants delivered these courses for the students of National Technical University "Kharkiv Polytechnic Institute" (NTU "KhPI"). Lectors have used the experience of scientific cooperation with Norwegian colleagues as well as new knowledge and skills gained during the refresher training in Norway while developing these curricula. An important element of these courses is special software package designed in ION for remote processing of the IS radar data using Internet connection (see <http://www.kpi.kharkiv.edu/ion> – Specialized software for IS radar for more details). Data from international ionospheric online databases are used as well.

3. Several Internet-controlled compact-size research facilities intended for diagnostics of the near-earth space environment in HF and ELF waveband were installed and upgraded during the project period. They worked both in the regime of round-the-clock monitoring and in special observation modes implemented during measuring campaigns. In the latter case the remote control of the facility is performed in real time using network connection. To use these data for the purposes of science and training of students, special software for data transferring, processing and visualizing using Internet connection was developed. Data of observations are automatically uploaded to the file-server of IRA and visualized at the web page (<http://geospace.com.ua/en/data.html>). These data are used for training of students and young scientists during student's measuring campaigns.

4. Three international ionospheric conferences for the students and young scientists ("Electromagnetic Methods of Environmental Studies" - EMES-2012, "Remote Radio Sounding of the Ionosphere" – ION-2013 and ION-2014) were organized during the project period. The last two conferences were accompanied by educational measuring campaigns and practical classes for students and young scientists which were carried at the observatory of the Institute of Ionosphere in Ukraine (2013) and at EISCAT observatory in Ramfjordmoen, Norway (2014).

5. 15 students from Ukrainian institutions were awarded by fellowship and scholarship programs and visited Norwegian institution during the project period. The involved students visited the Arctic University of Norway (UiT) and ionospheric observatories including EISCAT site at Svalbard. These programs included: theoretical courses and practical trainings in UiT, delivering presentations at the scientific seminars, organizing and conducting students measuring campaigns with IS radar and heating facility, field works with compact-size facilities installed during the project period etc.

In a result of signing the long-term collaboration agreements between the Norwegian and Ukrainian institutions, 4 students from the National Technical University "Kharkiv polytechnic Institute" were awarded from the Norwegian Quota Scheme program for two-year Master degree training at the Arctic university of Norway started in August 2014.

6. 39 students and young scientists from Ukrainian and Norwegian institutions were supported from the project funds and made presentations at the: EMES-2012, ION-2013 and 2014. 14 students and scientists from Ukrainian institutions took part in other international conferences and schools for young scientists and made scientific presentation using project funds during the project period. These events are as follows: Radar School in Sodankylä (Finland), EISCAT Symposium (Lancaster University, England), Conference on planetary atmospheric electricity (Borok, Russia), EGU General Assembly 2014 (Vienna, Austria), URSI General Assembly 2014 (Beijing, China), 11-th Space Weather Week (Liege, Belgium). In general students and young scientists made presentations at 21 international conference and schools during the project period.

7. a) Two textbooks for students in radio- and geophysics developed by Ukrainian project participants were published in 2014:

- 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))

b) Special software package was developed in IION for remote processing of the data of IS radar of the Institute of Ionosphere using Internet connection (<http://www.kpi.kharkiv.edu/iion> – Specialized software for IS radar).

Special software packages were developed in IRA to provide transferring, processing and visualizing of the data collected by compact-size HF and ELF facilities installed in Tromsø, Svalbard and Ukraine (at Low Frequency Observatory).

This software was used for training of students and young scientists during student's measuring campaigns and practical classes.

8. 8. More than fifty scientific papers and conference proceedings and 2 textbooks for students were prepared and published by the academic staff, researchers and students during the project period.

9. 5 representatives of the administration staff and 9 researchers/lectors from Ukrainian institutions were trained in the Arctic University of Norway and at EISCAT observatories. They have been familiarized with the following issues: current status of EISCAT research facilities and how they can be used in the educational process and for scientific researches; ionospheric processes in the auroral regions and studying of the human impact on the near Earth plasma environment; introduction to the features of the educational process in Norway. Ukrainian participants delivered lectures and gave seminars in Norwegian institution, discussed further collaboration in education and science and approved long-term scientific agreements between the Arctic University of Norway and Ukrainian institutions, took part in the field works etc. 23 researchers and representatives of administrative and technical staff were trained at the observatories of IION and IRA during the project period. 39 workshops and topical seminars were organized in Ukrainian institutions.

10. Results described in the previous items demonstrate the improvement of the theoretical knowledge and practical skills of the students in the area of the experimental physics and environmental studies. Integration of the applied knowledge with the basic university education was supported by including practical training of the students and measuring campaign at the modern research facilities (IS radars of IION and EISCAT, EISCAT heating facility, compact-size HF and ELF systems) into the educational process of the institutions involved into the project. Completion of the staff of the research institutions has been performed by PhD students. 5 PhD students have defended their theses during the project

period and one student has prepared PhD thesis and will defend it in 2015. All these young scientists continue working in the same Ukrainian institutions.

If your results were different to those indicated at application stage, please explain the reasons for these changes.

There is no big difference between the results achieved during the project period and those that indicated at application stage.

Objectives stated in the Project document

The project is focused on the development and dissemination of fundamental and applied knowledge of the properties of the near-earth space environment, as well as on the implementation of the modern scientific theories and diagnostic techniques to the educational process for training of highly qualified specialists in the areas of geospace researches and development of space weather concept. To achieve the project objectives students and young scientists will work on research facilities (including unique incoherent scatter radars) of the institutions involved into the project. Sharing of the original techniques of observation and data processing, models of the ionosphere including modern MHD (magnetohydrodynamics) models, software and educational methodology developed by Norwegian and Ukrainian institutions are also planned. The proposed activities are as follows:

1. Development of existing and establishment of new curriculums. It is proposed that the lectures will be developed by domestic and visiting lecturers of the Norwegian and Ukrainian parties. Joint meetings and seminars as well as exchange of visitors during the preparation of new courses are also planned.
2. Organization of workshops and practical works for students using incoherent scatter radars, as well as a large number of other research facilities (ionosondes, HF receivers, permanent GPS stations, magnetometers, ionospheric riometers, etc.) is proposed.
3. Modernization and deployment of new research facilities in Norway and Ukraine to be further used in education and research activity.
4. Training of students and young scientists to use information from public available databases. Organization of practical work with student on the technique of the processing and interpreting of the information from network databases.
5. Scholarships and fellowships for Ukrainian students in Norway. Sponsoring the participation of undergraduate, graduate and young scientists in the international scientific schools, workshops and conferences. Publication of the student's papers in the international scientific journals.
6. Writing and publication of scientific books, teaching materials and methodological papers for students.
7. Training of academic staff of the institution-participants of the project.
8. Training of technical and administrative staff of the institutions involved in the project.
9. Organization and support of the international youth conferences on the ionospheric research.

An important addition to the educational program is the scientific one. It includes:

1. Establishment and support of long-term collaboration between the Observatories of EISCAT, the Institute of Radio Astronomy and the Institute of the Ionosphere.
2. Coordination of national programs of observations of the ionosphere in order to develop techniques of environmental monitoring above the Europe.
3. Studies of the morphology and dynamics of the ionosphere through collaborative efforts of the observatories involved into the project, investigation of longitude-latitude variations of the characteristics of ionosphere above Norway and Ukraine.
4. Implementation of researchers, data, algorithms and software exchange. Joint interpretation of results and publication of scientific and methodical papers.

To what extent were the objectives previously stated at application stage achieved?

All objectives previously stated at application stage were achieved. Educational objectives (items 1-9 at the top of the list) and activities have been discussed in fact in item B and earlier in item C1 of this document. In this section we describe the objectives of the scientific program (items 1-4 at the bottom of the list):

1. Long-term collaboration between the Observatories of EISCAT, the Institute of Radio Astronomy and the Institute of the Ionosphere is supported by cooperation agreements between the institutions. Agreements IRA-UiT and IION-UiT valid for 5 years were approved in 2013. The first result of this cooperation is two-year Master degree training programs at the Arctic university of Norway in the framework of Norwegian Quota Scheme for four Ukrainian students started in August 2014.

2. Institutions involved into the project represent Norway and Ukraine in EISCAT scientific Association. To coordinate joint research activity the National Academy of Sciences of Ukraine has approved the "Joint Geospace Research Program by the National Academy of Sciences of Ukraine and European Incoherent Scatter Scientific Association (NASU – EISCAT) for 2012 – 2015". The further improvement of the cooperation between UiT, IRA and IION in scientific researches is important integral part of this program. In 2014 the Proposals for scientific collaboration Ukraine – EISCAT until 2020 were developed.

3 & 4. During the project period 5 measuring campaigns (about 72 hours of the observations) jointly EISCAT-IION and 12 measuring campaign separately at IION observatory (about 350 hours of the observations) were carried out. These data were used for calculating the longitude-latitude variations of the characteristics of the ionosphere above Norway and Ukraine using data processing algorithms and software of EISCAT and IION. The results of these researches are described in scientific papers and conference proceedings prepared by project participants (see the item D.3 - publications for more details).

In case of underachievement, please explain which objectives were not achieved and for what reasons.

All the project objectives are achieved.

C.2

C.2.1 Added value

To what extent have the results of the project benefitted target groups outside the partner institutions, such as public authorities?

During the implementation of the joint project the individual experience of partners has been spread out on the inter-institutional level. This activity is strongly supported by the Ministry of Education and Science of Ukraine and National Academy of Sciences of Ukraine. The scientific secretary of the Branch of Physics and Astronomy of NASU Dmytro Tarashchenko took part in the conferences ION-2013 and ION 2014. He has prepared a popular article "Geospace is the area of cooperation of the Ukrainian and Norwegian scientists" which was published in the regular newspaper of NASU. In addition, the representatives of NAS and MES of Ukraine took part in the conference "Norway and Ukraine: Experiences and Opportunities for Cooperation" and seminar "Norwegian-Ukrainian Cooperation in Higher Education".

During the project period (2012-2014) three participants of the Project (V. Burmaka, D. Kotov and M. Liashenko) were awarded by diplomas and scholarships of the Cabinet of Ministers of Ukraine for young scientists. PhD students from IRA (A.Sopin, M.Baru and O.Charkina) were awarded by the scholarships of the President of Ukraine and scholarship of NASU for young scientists.

Young scientists of the Institute of Ionosphere and Institute of Radio Astronomy are working closely with the regional authorities of Kharkiv. They took part in the scientific contests organized on the regional level. Ukrainian Project coordinator Valeriy Pulyayev on behalf of the regional authorities was awarded by the diploma and scholarship named by academician G.F. Proskura for his impact to science and development of the technique and socio-economic spheres in the Kharkiv region.

Information about educational and scientific activity of the project has been presented in press and on TV. Several newspapers including regular newspaper of NAS and MES of Ukraine "World" published several articles about the Project, and central television channels of Ukraine - "1+1" and "ICTV" prepared TV programs devoted to the Project activities (<https://dl.dropboxusercontent.com/u/7237147/ion.org.ua/Activities-2014/TV.pdf>).

C.2.2 Sustainability and plans for future cooperation

Will project activities continue after the project period?

Yes

Are the partners planning any future collaborative activities? If not, why?

We plan to continue project activities after the project period. In 2015 we will continue cooperation in the framework of the Project CPEALA-2014/10001 "Harmonization of the Norwegian-Ukrainian educational activities in geospace researches". Within this project, we propose to implement a new type of cooperative activity – joint supervision of students. In August 2014 a group of four students from the National Technical University "KhPI" were awarded by two-year Master degree scholarship at the

Arctic University of Norway by the Norwegian Quota Scholarship Scheme. We suggested that students would have two supervisors (from UiT, Norway and from IION and IRA, Ukraine). This idea, on the one hand, will support the internationalization of the programs and, on the other hand, will increase the level of teacher's coordination from the both sides. We plan to involve more students to this cooperation activity (two new vacancies allocated for 2015). It should be noted that Master students programs most likely will be continue on to the PhD level. To prepare students-candidates for studying in Norway within Quota Scholarship Scheme, and to reduce the adaptation period for the future years we plan to develop proposals for 1-2 course(s) to be delivered in Ukraine with content similar to the courses in the Arctic University of Norway. We also plan to carry out the educational measuring campaigns using Norwegian and Ukrainian heater/IS radars as well as involvement in the educational process of the compact-sized internet-controlled diagnostic facilities, installed during the long-term project. We will develop compendia for working with these facilities, which will continue to be used after the project period. In the future, we plan to develop web-based software for conducting practical classes "in virtual space" using internet access to control facilities and process observational data. The experience gained by students during educational campaigns will be used for observations within PhD level study programs.

The important result of the project is concerned with possibility for the academic staff to use the experience gained within visits to partner institutions and international scientific events for development of theoretical and practical courses for students. This allows coordinating the subjects and contents of learning courses with requirements of all parties in training of specialists in geospace research. Delivering of permanent training courses which have been included to the curricula of institutions guarantees that the activities will continue after the project period. It should be noted that coordination of interaction between lecturers of the partner institutions, which is necessary for continuing of cooperative activities, requires less resources than initial stage of cooperation.

We plan to apply for a new long-term project assuming that a new Eurasia call will be announced.

Therefore, we hope that our current cooperation will continue in the framework of a new long-term joint project with SIU.

It should be noted that Ukraine is Full Associate member of EISCAT. IRA and IION represent Ukraine in EISCAT international scientific Association. Accordingly, the National Academy of Sciences of Ukraine has approved the "Joint Geospace Research Program by the National Academy of Sciences of Ukraine and European Incoherent Scatter Scientific Association (NASU – EISCAT) for 2012 – 2015". In 2014 the Proposals for scientific collaboration Ukraine – EISCAT until 2020 were developed. The further improvement of the cooperation between UiT, IRA and IION is an important integral part of this program and will contribute in an essential way to the harmonization of research and education.

C.2.3 Risk factors and challenges

Please give a brief description of the main risk factors and challenges throughout the project period and how these challenges have been responded to.

During 2012 - the first year of the project there were no clear risk factors for the project fulfillment. Some minor discrepancies between the planed and actual budgets for 2012 of IoN were caused by a delay in transferring the funds because of too late signing of the Project Contract in 2012.

During 2013 - the main difficulties were in the very slow procedures and bureaucratic financial rules in Ukraine. 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. At the same time, almost all payments for radar operation (bills for electricity) were allowed by the Ukrainian State Treasury. Note that the experience of 2012-2013 demonstrates big efficiency of the participation of the 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 IION observatory stimulate students to work in the area of geosciences 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 proposed to restructure 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).

During 2014 the main difficulty is associated with potential risk for visitors due to the unpredictable situation in Ukraine. Following the recommendation of the Norwegian Ministry of Foreign Affairs to avoid travel to eastern part of Ukraine, we proposed to change the venue of the International school-conference for young scientists ION-2014. In addition, respective redirection of funds between the budget items was performed because the venue of ION-2014 was changed. In 2014 the Ukrainian institutions have received the funds of the Project with a delay. The first portion of funding has been transferred to the financial account of IION at the end of August 2014. The second payment was made at the end of October 2014. As a result, by the end of the year 2014 IION had the unspent funds (25% from the budget 2014 or NOK 62,800) related to the item "Other operating costs (energy costs for the radar at the observatory of IION)". These funds were postponed for the period January 1 – February 28, 2015 with the permission of SIU.

From our point of view, the main risk factors for the future cooperation of the Ukrainian and Norwegian institutions may be associated with unstable political situation in Eastern Ukraine. Therefore, while planning future activities it is necessary to provide opportunity how to cancel activities planned for implementation in Ukraine and replace them by appropriate similar activities in Norway. It should be noted that the Ukrainian government do their utmost to stabilize the situation in the country, and any help of the world community in this process is critically important. In that regards the successful continuation of current cooperation will be very helpful for further integration of Ukraine in European community.

C.2.4 Anti-corruption

Which measures have been taken to ensure that corruption or mismanagement of funds would not take place in the project? Have any irregularities occurred?

Actual project activities during 2012-2015 were in line with the rules of the "Norwegian Cooperation Programme in Higher Education with Eurasia" an appropriate Financial guidelines. The financial documents were prepared in accordance with the Norwegian (for IiN) and Ukrainian (for IoN) rules of regulations, respectively. The Project did not use any unscheduled funds and was not sent finance for other purposes.

C.2.5 Synergies

Has the project managed to achieve synergies with other Norwegian or international programmes? If so, please specify.

The prospects for cooperation in the 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 in September-October 2013. These discussions were continued during the meeting of the Igor Domnin, Director of IION and Leonid Tovazhnyanskyy, Rector of NTU "KhPI" with Tatiana Savinova, coordinator of the cooperation of the Arctic University of Norway with countries of FSU. 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) Four students from the National Technical University "Kharkiv polytechnic Institute" (Shulga Maryna, Sharkadi Mykhailo, Reznynchenko Artem and Siladi Oleksandr) were awarded from the Norwegian Quota Scheme program for two-year (from 2014) Master degree training at the Arctic university of Norway.
- d) The prospects for the future cooperation in educational and scientific spheres between Norwegian and Ukrainian institutions were discussed by project coordinators and administration of IoN (I. Domnin, Yu. Yampolski) and the Arctic University of Norway (UiT) during the meeting in Tromsø in September 2014 and later during School-Conference ION-2014 in October 2014. As a result, a novel concept of joint Norway/Ukraine supervision of the students was suggested – and two new vacancies for Ukrainian students have been allocated for 2015 in the framework of the Norwegian Quota Scholarship Scheme.
- e) Project researcher from IRA Oleksandr 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.

f) Project researcher from IRA Oleksandr Koloskov and project coordinator from IION Valeriy Pulyayev took part in the seminar at Kyiv-Mohyla Academy "Norwegian-Ukrainian Cooperation in Higher Education" (23 September, 2014, Kiev). They made a presentation describes the project activities that took place in 2012-2014 and prospects for further cooperation of IiN and IoN in education and science.

C.2.6 Gender perspective

Will the project have any concrete consequences for gender issues at the involved institutions?

No

Please describe what has been done to integrate a gender perspective in the project. This includes both recruitment and the actual setup of research and education activities.

The project provided equal opportunities for participants of either gender.

To increase the chance for female-candidates to be involved in the Project activities, English language courses were organized for Siusiuk Maryna (from IION), Kharytonova Sofiia (Katsko) (from IION), Soina Anna (from IRA), and Charkina Olesya (from IRA). This gave them the opportunity to participate in the International conferences, seminars and workshops and possibility to take part in fellowship programs at the Arctic University of Norway (UiT) in 2012, 2013 and 2014. In 2013 Charkina Olesya took part in EISCAT International Symposium and also delivered scientific presentation at Lancaster University after this event. In 2014 she made presentation at the international conference "URSI General Assembly and Scientific Symposium" (Beijing, China). Lindis Bjoland (postgraduate student from UiT) has participated in the School-Conferences "Remote Radio Sounding of the Ionosphere" in 2013 and 2014.

Shulga Maryna (student from the National Technical University "Kharkiv polytechnic Institute") was awarded from the Norwegian Quota Scheme program for two-year (from August 2014) Master degree training at the Arctic university of Norway.

C.3

C.3 Popular science presentation

Today geospace (the near Earth space environment) can be considered as a real habitat of human civilization. Satellite systems are involved in almost every sphere of the modern life, providing the needs of humanity in the global communication, navigation, forecast of hazardous events, environmental monitoring of land and ocean surfaces etc. For this reason the study, visual representation and prediction of the processes occurring in the near-Earth space are extremely important for ensuring reliable operation of the ground-based and satellite radio systems. Monitoring of the "space weather" is also indispensable for understanding the problem of global climate change which is another formidable challenge to humanity. To succeed in solving these problems, cooperative efforts of international research and educational centers are required. The current project was aimed at implementing modern scientific theories and techniques for geospace researches into the educational process in Norway at the Arctic University of Tromsø (UiT), and in Ukraine at the Institute of Ionosphere (IION) and at the Institute of Radio Astronomy (IRA). Technically, the project was based on combining the unique capabilities of the incoherent scatter radars located in the polar (Norway) and midlatitude (Ukraine) regions with the potential of the global network of already existing (ionosondes, GPS stations, magnetometers, imagine riometers etc.) and specially developed within the project (HF receivers and ELF magnetometers) research facilities. The Project envisaged not only practical training and special classes at the observatories but also organizing special scientific-educational measuring campaigns suggested and carried out by students. During the Project duration 5 measuring campaigns of the kind (72 hours of observations) were carried out in Norway and 17 campaigns (about 350 hours of observations) in Ukraine using the participant institutions' observatories, the EISCAT radar near Tromsø in Norway and the Kharkiv radar in Ukraine. The major efforts within the Project were oriented towards developing permanent curricula (specifically, 3 regular courses were improved and 2 new courses were implemented at IoN) and cycles of review lectures (17 lectures by IoN and 24 by IiN); conducting school-conferences for students (3 conferences, about 50 students participated); organizing fellowship programs for students (15 students from IoN and 1 from IiN); supporting students and young scientists to participate in international conferences (14 persons); refresher training (14 participants in IiN, 23 participants in IoN); installing new internet-controlled research facilities (2 HF receivers, ELF magnetometer); preparing scientific publications and teaching materials for students (57 scientific papers and conference proceedings and 2 textbooks for students were prepared and published); training students at IoN observatory (163 students were involved); defending of B.Sc., M.Sc. and PhD diplomas (73 B.Sc. and M.Sc. projects and 5 PhD projects). Two long-term collaboration agreements between the

IoN and liN were signed in 2013. These agreements provided an opportunity for four Ukrainian students to be awarded scholarships by the Norwegian Quota Scheme program for two-year master degree training at liN (started in August 2014). Two new vacancies have been allocated for 2015. A new short-term cooperative project has been approved by SIU for 2015 to support this activity.

D - Project data

D.1

D.1 Standard indicators

Number of joint courses developed (only courses that yield ECTS should be reported)

2012	2013	2014	SUM
0	2	0	2

Number of joint study programmes developed

2012	2013	2014	SUM
0	0	0	0

Number of joint degrees developed

2012	2013	2014	SUM
0	0	0	0

Number of courses revised (only courses that yield ECTS should be reported)

2012	2013	2014	SUM
0	3	5	8

Number of study programmes revised

2012	2013	2014	SUM
0	0	1	1

Number of students who have taken joint course(s)

2012	2013	2014	SUM
0	68	73	141

Number of digital learning resources developed

2012	2013	2014	SUM
1	1	1	3

Number of textbooks developed

2012	2013	2014	SUM
0	0	2	2

Number of guest lectures held

2012	2013	2014	SUM
8	19	15	42

Number of workshops/seminars held

2012	2013	2014	SUM
10	13	16	39

Number of participants in workshops/seminars

2012	2013	2014	SUM
77	134	144	355

D.2

D.2 Student and staff mobility

Short-term mobility (1 to 4 weeks)

	2012	2013	2014	SUM
Bachelor's students	0	0	1	1

Master's students	0	0	0	0
PhD students	4	5	6	15
Academic staff	4	7	4	15
Administrative staff	0	1	4	5
Total short-term mobility	8	13	15	36

Long-term mobility (more than 4 weeks)

	2012	2013	2014	SUM
Bachelor's students	0	0	0	0
Master's students	0	0	0	0
PhD students	0	0	0	0
Academic staff	0	0	0	0
Administrative staff	0	0	0	0
Total long-term mobility	0	0	0	0

D.3

D.3 Publications

Title:	3D diagnostics of natural and stimulated polar ionospheric inhomogeneities
Author(s):	Zalizovski A.V., Yampolski Yu.M., Koloskov A.V., Galushko V.G., Kashcheyev A.S., Kashcheyev S.B., La Hoz C., Brekke A., Belyey V.S., and Rietveld M.
Publisher:	Proceedings of the the 16th International EISCAT symposium
Date of publication (mm.yyyy):	08/2013
Number of pages:	1
Link to online version of publication:	
Peer reviewed:	No
Open access publication:	No
Joint publication:	Yes
Type of publication:	Refereed conference paper
Comments:	Presentation at scientific conference in English

Title: A comparison of the IRI model at high latitudes with measurements from the EISCAT Svalbard radar over a solar cycle
Author(s): Bjoland L.M., Belyey V., Lovhaug U.P., La Hoz C.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 24
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: A library of routines for incoherent scatter radar data processing
Author(s): Bogomaz O.V., Kotov D.V.
Publisher: NTU "KhPI ", – 2014. - № 47 (1089). – p. 10-14
Date of publication (mm.yyyy): 07/2014
Number of pages: 5
Link to online version of publication:
Peer reviewed: No
Open access publication: No
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in English

Title: A possible mechanism of the “self-scattering effect” of powerful HF signals in the ionosphere
Author(s): Galushko V.G., Bezrodny V.G., Koloskov, A.V. and Zalizovski A.V.
Publisher: Radiophysics and Radioastronomy. – 2012.–v. 17, No 4.– p. 320-332
Date of publication (mm.yyyy): 06/2012
Number of pages: 13
Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/40>
Peer reviewed: Yes
Open access publication: Yes
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in Russian

Title: Analysis of variations of the critical frequency f₀F₂ of the ionosphere over Kharkov during two solar cycles
Author(s): Yemelyanov L., Kononenko A.
Publisher: International School-Conference “Remote radio sounding of the ionosphere”, Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 48
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Aperiodic Large-Scale Disturbances in the Ionospheric E Region Stimulated by High-Power HF Heating
Author(s): Chernogor L.F., Domnin I.F., Panasenko S.V., Uryadov V. P.
Publisher: Radiophysics and Quantum Electronics. – 2012. – V. 55, No 3. – Pp. 156 – 167.
DOI:10.1007/s11141-012-9356-2
Date of publication (mm.yyyy): 08/2012
Number of pages: 12
Link to online version of publication: <http://link.springer.com/article/10.1007%2Fs11141-012-9356-2>
Peer reviewed: Yes
Open access publication: No
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in English

Title: Aperiodic Large-Scale Disturbances in the Lower Ionosphere. Ionosonde Observation Results
Author(s): Chernogor L. F., Frolov V. L., Barabash V.V.
Publisher: Radiophysics and Quantum Electronics. – 2014. – V. 57, No 2. – Pp. 100 – 116, doi: 10.1007/s11141-014-9496-7
Date of publication (mm.yyyy): 07/2014
Number of pages: 7
Link to online version of publication: <http://link.springer.com/article/10.1007%2Fs11141-014-9496-7>
Peer reviewed: Yes
Open access publication: No
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in English

Title: Aperture synthesis imaging radar and the EISCAT_3D project
Author(s): La Hoz C.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 17
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Application of imaging riometers for investigating ionospheric scintillations and absorption of radiation from discrete cosmic sources in the HF modified polar ionosphere
Author(s): Charkina, O.V., V.G. Bezrodny, Yu.M. Yampolski, B. Watkins
Publisher: The 16th International EISCAT symposium, Lancaster UK, 12-16 August 2013
Date of publication (mm.yyyy): 08/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Assessment interference from space debris when measured ionospheric parameters at the Kharkov IS radar
Author(s): Lialiuk O.I., Chepurnyy J.N.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 49
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Automation of the control action for the IS complex
Author(s): Kozlov S., Pulyayev V.
Publisher: Automation of the control action for the IS complex, International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 47
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Behavior of light ions over Kharkiv: the results of observation using incoherent scatter technique
 Author(s): Kotov D.V.
 Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 33
 Date of publication (mm.yyyy): 10/2013
 Number of pages: 1
 Link to online version of publication:
 Peer reviewed: Not relevant
 Open access publication: No
 Joint publication: No
 Type of publication: Refereed conference paper
 Comments: in English

Title: Choosing of the database structure to store the Kharkiv incoherent scatter radar
 Author(s): Kozlov S.S. and Pulyayev V.O.
 Publisher: Radiotechnique –2012. –No. 169. –p. 110-115
 Date of publication (mm.yyyy): 06/2012
 Number of pages: 6
 Link to online version of publication:
 Peer reviewed: Yes
 Open access publication: No
 Joint publication: No
 Type of publication: Article published in scientific journal
 Comments: in Russian

Title:	Computational routines for the analysis of incoherent scattering in ionospheric plasma
Author(s):	Pulyayev V.O., Rogozhkin E.V., Bogomaz O.V.
Publisher:	Kharkiv
Date of publication (mm.yyyy):	05/2014
Number of pages:	264
Link to online version of publication:	
Peer reviewed:	Not relevant
Open access publication:	No
Joint publication:	No
Type of publication:	Book
Comments:	Textbook in Ukrainian

Title:	Creation of a multi-position system of HF diagnostics of dynamic processes in the polar Ionosphere
Author(s):	Koloskov A.V., Yampolski Yu.M., La Hoz C., Brekke A., Beley V., Kascheev S.B., Pikulik I.I.
Publisher:	International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 32
Date of publication (mm.yyyy):	10/2013
Number of pages:	1
Link to online version of publication:	
Peer reviewed:	No
Open access publication:	Yes
Joint publication:	Yes
Type of publication:	Refereed conference paper
Comments:	in English

Title: Detection of travelling ionospheric disturbances in variations of incoherent scatter power
Author(s): Mamedov A.O., Panasenko S.V.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 50
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Dynamic and thermal processes in geospace during November 13 – 15, 2012 magnetic storm over Kharkov (Eastern Ukraine)
Author(s): Lyashenko M.V.
Publisher: 11-th European Space Weather Week (November 17 – 21, Liege, Belgium). – 2014.
Date of publication (mm.yyyy): 11/2014
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Dynamic and thermal processes in the geospace plasma during August 5-6, 2011 magnetic storm
Author(s): Lyashenko M.V.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 34
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Estimation of the electric field zonal component value and modeling of the vertical component of the plasma drift velocity and neutral wind velocity in ionosphere over Kharkiv (Ukraine) during August 5 – 6, 2011 and November 13 – 15, 2012 magnetic storms
Author(s): Lyashenko M.V.
Publisher: Proceedings of the XXXIst URSI General Assembly and Scientific Symposium (Beijing, China (CIE), August 17-23, 2014)
Date of publication (mm.yyyy): 08/2014
Number of pages: 4
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Evaluation technique for the F2 layer critical frequency by the difference of ionosphere Alfvén resonance eigenfrequencies
 Author(s): Baru N.A., Koloskov A.V., Yampolsky Y.M., Pashinin A.Y.
 Publisher: Radio Physics and Radio Astronomy, Vol. 19, № 2, pp. 151 - 159
 Date of publication (mm.yyyy): 06/2014
 Number of pages: 9
 Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/1173> 2014-06-01
 Peer reviewed: Yes
 Open access publication: Yes
 Joint publication: No
 Type of publication: Article published in scientific journal
 Comments: in Russian

Title: Features of distance sounding ionosphere by means of incoherent scattering of radio waves
 Author(s): Pulyayev V.O.
 Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 19
 Date of publication (mm.yyyy): 10/2013
 Number of pages: 1
 Link to online version of publication:
 Peer reviewed: Not relevant
 Open access publication: No
 Joint publication: No
 Type of publication: Refereed conference paper
 Comments: in English

Title: Features of IS signal processing at intermediate
Author(s): Hramov E.A., Rogozhkin E.V., Lialuak O.I.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 53
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Flaming auroral rays and naturally enhanced ion acoustic lines
Author(s): Gustavsson B.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 25
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Frequency-and-angular sounding of the ionosphere
 Author(s): Galushko V.G
 Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 18
 Date of publication (mm.yyyy): 10/2013
 Number of pages: 1
 Link to online version of publication:
 Peer reviewed: Not relevant
 Open access publication: No
 Joint publication: No
 Type of publication: Refereed conference paper
 Comments: in English

Title: HF wave scattering by field-aligned plasma irregularities considering refraction in the ionosphere
 Author(s): Galushko V.G., Bezrodny V.G., Koloskov A.V., Paznukhov V. V., and Reinisch B.W
 Publisher: Radio Science, vol. 48, 1-10, 2013. DOI: 10.1029/2012RS005072
 Date of publication (mm.yyyy): 04/2013
 Number of pages: 10
 Link to online version of publication: <http://onlinelibrary.wiley.com/doi/10.1029/2012RS005072/citedby>
 Peer reviewed: Yes
 Open access publication: No
 Joint publication: No
 Type of publication: Article published in scientific journal
 Comments: in English

Title: Improving the efficiency of information transformation in the system for diagnosing the state of the ionospheric environment
Author(s): Bogomaz O.
Publisher: Kharkov, NTU "KhPI"
Date of publication (mm.yyyy): 03/2014
Number of pages: 191
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: PhD thesis
Comments: in Russian

Title: Inter-beam cross-correlation processing of ionospheric scintillations of discrete cosmic sources observed by imaging hf riometers
Author(s): Bezrodny V.G., Watkins B, Charkina O.B., et al.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 39
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in Russian

Title: Interferometric radar imaging at Svalbard
Author(s): Belyey V., Schlatter N., La Hoz C., Lovhaug U.P., Brekke A.
Publisher: Interferometric radar imaging at Svalbard.
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Investigation of the ionospheric Alfvén resonator characteristics using data of observation in Antarctica and Eurasia
Author(s): Baru, N.A., A.V. Koloskov, Yu.M. Yampolskiy, R.A. Rahmatullin
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 27
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Ionospheric manifestations of acoustic-gravity waves under quiet and disturbed conditions
Author(s): Barabash V., Chernogor L., Panasenko S.V.
Publisher: EGU General Assembly 2014 (Vienna, Austria, 27 April – 02 May 2014). Geophysical Research Abstracts. Vol. 16, EGU2014-6162, 2014.– P. 6162
Date of publication (mm.yyyy): 05/2014
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Ionospheric processes during the geospace storm of August 5–6, 2011
Author(s): I.F. Domnin, L.Y. Yemelyanov, M.V. Lyashenko, S.V. Kharytonova, and L.F. Chernogor
Publisher: Radiophysics and Radioastronomy. – 2012.–v. 17, No 4.– p. 320-332
Date of publication (mm.yyyy): 08/2012
Number of pages: 13
Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/626>
Peer reviewed: Yes
Open access publication: Yes
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in Russian

Title: Ionospheric storm August 5-6, 2011 .: results of the calculations the main effects
Author(s): Katsko S.V., Domnin I.F., Yemelyanov L.Ya., Ljashenko M.V., Chernogor L.F.
Publisher: Radio Physics and Radio Astronomy. - 2014. - V. 19, № 1. - S. 26-39.
Date of publication (mm.yyyy): 03/2014
Number of pages: 14
Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/1163>
Peer reviewed: Yes
Open access publication: Yes
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in Russian

Title: Ionospheric storm on 13-14 November 2012: results of calculations of thermal and dynamic effects
Author(s): Domnin I.F., Katsko S.V., Ljashenko M.V., Chernogor L.F.
Publisher: Radio Physics and Radio Astronomy. - 2014.-T. 19, № 4. - S. 336-347
Date of publication (mm.yyyy): 12/2014
Number of pages: 12
Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/1192>
Peer reviewed: Yes
Open access publication: Yes
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in Russian

Title: Kharkiv incoherent scatter facility
Author(s): Domnin I.F., Chepurnyy Ya.M., Yemelyanov L.Ya., Chernyaev S.V., Kononenko A.F., Kotov D.V., Bogomaz O.V., Iskra D.A.
Publisher: Journal of NTU "KhPI". Series: Radio and ionosphere – Kh.: NTU "KhPI ", – 2014. - № 47 (1089). – p. 28-42
Date of publication (mm.yyyy): 07/2014
Number of pages: 15
Link to online version of publication:
Peer reviewed: No
Open access publication: No
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in English

Title: Manifestations of interaction between atmospheric and space climate systems
Author(s): Zalizovski A.V., Yampolski Y.M., Sopin A.O., Zanimonsky E.M.
Publisher: 11-th European Space Weather Week (November 17 – 21, Liege, Belgium). – 2014.
Date of publication (mm.yyyy): 11/2014
Number of pages: 1
Link to online version of publication: http://www.stce.be/esww11/contributions/public/Session14/S14-P-07-ZalizovskiA/Poster_ESWW11_Zalizovski.pdf
Peer reviewed: Not relevant
Open access publication: Yes
Joint publication: No
Type of publication: Refereed conference paper
Comments: in English

Title: Modeling the H⁺ ions concentration distribution under the chemical equilibrium conditions
 Author(s): Shulga M.A., Kotov D.V.
 Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 55
 Date of publication (mm.yyyy): 10/2013
 Number of pages: 1
 Link to online version of publication:
 Peer reviewed: Not relevant
 Open access publication: Yes
 Joint publication: No
 Type of publication: Refereed conference paper
 Comments: in English

Title: Network of Internet-controlled HF receivers for ionospheric researches
 Author(s): Koloskov A.V., Yampolsky Y.M., Zalizovsky A.V., Galushko V.G., Kashcheev A.S., La Hoz, Brekke A., Belei V.S., Rietveld M.T
 Publisher: Radio Physics and Radio Astronomy, Vol. 19, № 4, p. 324-335
 Date of publication (mm.yyyy): 12/2014
 Number of pages: 12
 Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/1191>
 Peer reviewed: Yes
 Open access publication: Yes
 Joint publication: Yes
 Type of publication: Article published in scientific journal
 Comments: in Russian

Title: On the possibility of bistatic HF ionospheric sounding by exact time signals
Author(s): Kashcheyev S.B., Zalizovski A.V., Sopin A.A., and Pikulik I.I..
Publisher: Radio Physics and Radio Astronomy . - 2013 . - V. 18 , № 1. - p. 34-42
Date of publication (mm.yyyy): 03/2013
Number of pages: 9
Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/1118>
Peer reviewed: Yes
Open access publication: Yes
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in Russian

Title: Partial solar eclipse of January 4, 2011 above Kharkiv: observation and simulation results
Author(s): Domnin I.F., Yemelyanov L.Ya., Lyashenko M.V., Chernogor L.F.
Publisher: Geomagnetism and Aeronomy. – 2014. – Vol. 54, № 5. – P. 583 – 592, doi: 10.1134/S0016793214040112
Date of publication (mm.yyyy): 09/2014
Number of pages: 10
Link to online version of publication: <http://link.springer.com/article/10.1134%2FS0016793214040112>
Peer reviewed: Yes
Open access publication: No
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in English

Title:	Physics of Geomagnetic Storms
Author(s):	Domin I.F., Chernogor L.F.
Publisher:	Kharkiv
Date of publication (mm.yyyy):	05/2014
Number of pages:	408
Link to online version of publication:	
Peer reviewed:	Not relevant
Open access publication:	No
Joint publication:	No
Type of publication:	Book
Comments:	Textbook in Russian

Title:	Program of data exchange in XML format of ISR express data processing system running on the server-side
Author(s):	Miroshnicov A., Bogomaz O., Zhuk A.
Publisher:	International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 51
Date of publication (mm.yyyy):	10/2013
Number of pages:	1
Link to online version of publication:	
Peer reviewed:	Not relevant
Open access publication:	No
Joint publication:	No
Type of publication:	Refereed conference paper
Comments:	in English

Title:	Radio diagnostics of ionospheric disturbances stimulated by powerful tropospheric processes
Author(s):	Sopin A.
Publisher:	Kharkov, IRE
Date of publication (mm.yyyy):	05/2013
Number of pages:	171
Link to online version of publication:	
Peer reviewed:	Not relevant
Open access publication:	No
Joint publication:	No
Type of publication:	PhD thesis
Comments:	in Russian

Title:	Refinement of the incoherent scatter radar constant
Author(s):	Shapovalova D.V., Pulyayev V.A.
Publisher:	Journal of NTU "KhPI". Series: Radio and ionosphere – Kh.: NTU "KhPI ", – 2014. - № 47 (1089). – p. 5-9
Date of publication (mm.yyyy):	07/2014
Number of pages:	6
Link to online version of publication:	
Peer reviewed:	No
Open access publication:	No
Joint publication:	No
Type of publication:	Article published in scientific journal
Comments:	in English

Title: Results of Radiophysical Study of Wave processes in the Ionospheric Plasma During Its Heating by High-Power HF Radio transmission of "Sura" facility
Author(s): Domnin I.F., Panasenko S.V., Uryadov V.P., Chernogor L.F.
Publisher: Radiophysics and Quantum Electronics. – 2012. – V. 55, No 4. – P. 253 – 265.
DOI:10.1007/s11141-012-9364-2
Date of publication (mm.yyyy): 09/2012
Number of pages: 13
Link to online version of publication: <http://link.springer.com/article/10.1007%2Fs11141-012-9364-2>
Peer reviewed: Yes
Open access publication: No
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in English

Title: Search of "weekend effect" in the intensity of natural VLF noise variations
Author(s): Paznukhov A.V., Yampolski Y.M. and Zanimonskiy Y.M. and Soina A.V..
Publisher: Radiophysics and Radioastronomy. – 2012.–v. 17, No 1.– p. 67-73
Date of publication (mm.yyyy): 04/2012
Number of pages: 7
Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/414>
Peer reviewed: Yes
Open access publication: Yes
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in Russian

Title:	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
Author(s):	Kotov D.V.
Publisher:	Radio Physics and Radio Astronomy . - 2013 . - V. 18 , № 1. - p. 43-48
Date of publication (mm.yyyy):	03/2013
Number of pages:	6
Link to online version of publication:	http://journal.rian.kharkov.ua/index.php/ra/article/view/1119
Peer reviewed:	Yes
Open access publication:	Yes
Joint publication:	No
Type of publication:	Article published in scientific journal
Comments:	in Russian

Title:	Seasonal variations of hydrogen ions fraction in the topside ionosphere over Ukraine according to the incoherent scattering technique data and comparison with IRI-2012 model data: 1. solar activity minimum
Author(s):	Domnin I.F., Kotov D.V., and Chernogor L.F..
Publisher:	Radiophysics and Radioastronomy. – 2012.– v. 17, n. 3.– p. 233-239
Date of publication (mm.yyyy):	09/2012
Number of pages:	7
Link to online version of publication:	http://journal.rian.kharkov.ua/index.php/ra/article/view/617
Peer reviewed:	Yes
Open access publication:	Yes
Joint publication:	No
Type of publication:	Article published in scientific journal
Comments:	in Russian

Title: Statistical characteristics of Pc 1 pulsations in the Antarctic peninsula area
Author(s): Paznukov A.V., Koloskov A.V., Zalizovskis A.V., et
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly
Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 35
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in Russian

Title: Study of ionospheric processes over Ukraine
Author(s): Chernogor L.F., Domnin I.F., Yemelyanov L.Ya., Kotov D.V.
Publisher: Space Research in Ukraine / Edited by O.Fedorov.-2012.-p. 49-68
Date of publication (mm.yyyy): 12/2012
Number of pages: 19
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Chapter in edited volume
Comments: in English

Title: The effects of scattering of HF signals on plasma inhomogeneities polar ovals
 Author(s): Zalizovsky A.V., Kashcheev S.B., Pikulik I.I., Sopin A.A., Yampolsky Yu.M.
 Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 31
 Date of publication (mm.yyyy): 10/2013
 Number of pages: 1
 Link to online version of publication:
 Peer reviewed: Not relevant
 Open access publication: No
 Joint publication: No
 Type of publication: Refereed conference paper
 Comments: in Russian

Title: The effects of the partial solar eclipse on January 4, 2011 in the variety of thermal process parameters in ionosphere
 Author(s): Lyashenko M.V.
 Publisher: Sun and Geosphere. - 2013. - V. 8, № 1. - p. 15-18
 Date of publication (mm.yyyy): 04/2013
 Number of pages: 4
 Link to online version of publication: http://newserver.stil.bas.bg/SUNGEO/00SGArhiv/SG_v8_No1_2013-pp-15-18.pdf
 Peer reviewed: Yes
 Open access publication: Yes
 Joint publication: No
 Type of publication: Article published in scientific journal
 Comments: in English

Title:	The upper transition height over the Kharkiv incoherent scatter radar before, during and after the extreme minimum of the solar activity: Observational results and comparison with the IRI-2012 model
Author(s):	Kotov D., Truhlik V., Richards P., Huba J., Chernogor L., Bogomaz O., Domnin I.
Publisher:	EGU General Assembly 2014 (Vienna, Austria, 27 April – 02 May 2014). Geophysical Research Abstracts. Vol. 16, EGU2014-5652-2, 2014.– P. 5652.
Date of publication (mm.yyyy):	05/2014
Number of pages:	1
Link to online version of publication:	
Peer reviewed:	Not relevant
Open access publication:	No
Joint publication:	No
Type of publication:	Refereed conference paper
Comments:	in English

Title:	Towards the ambiguity in the inverse problem in studies of the middle ionosphere using incoherent scattering technique
Author(s):	Siusiuk M.M., Bogomaz O.V.
Publisher:	International School-Conference “Remote radio sounding of the ionosphere”, Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 52
Date of publication (mm.yyyy):	10/2013
Number of pages:	1
Link to online version of publication:	
Peer reviewed:	Not relevant
Open access publication:	No
Joint publication:	No
Type of publication:	Refereed conference paper
Comments:	in English

Title: Travelling ionospheric disturbances over Kharkiv, Ukraine, accompanying the operation of EISCAT heater facility
Author(s): Panasenko S.V., Rietveld M.T., La Hoz C., Dominin I.F.
Publisher: Journal of NTU "KhPI". Series: Radio and ionosphere
Date of publication (mm.yyyy): 06/2014
Number of pages: 7
Link to online version of publication:
Peer reviewed: No
Open access publication: No
Joint publication: Yes
Type of publication: Article published in scientific journal
Comments: in English

Title: Variations in the ion composition in the topside ionosphere over Ukraine according to the incoherent scatter technique data
Author(s): Kotov D.
Publisher: Kharkov, IRE
Date of publication (mm.yyyy): 03/2014
Number of pages: 185
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: PhD thesis
Comments: in Russian

Title: Variations of the electric field zonal component, the vertical component of the plasma drift and neutral wind velocities in ionosphere over Kharkov (Ukraine) during August 5 – 6, 2011 and November 13 – 15, 2012 magnetic storms

Author(s): Domnin I.F., La Hoz C., Lyashenko M.V.

Publisher: Journal of NTU "KhPI". Series: Radio and ionosphere

Date of publication (mm.yyyy): 05/2014

Number of pages: 7

Link to online version of publication:

Peer reviewed: No

Open access publication: Yes

Joint publication: Yes

Type of publication: Article published in scientific journal

Comments: in English

Title: Wave disturbance in the ionosphere over Kharkiv, Ukraine, accompanying EISCAT heater experiments

Author(s): Panasenko S.V.

Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 36

Date of publication (mm.yyyy): 10/2013

Number of pages: 1

Link to online version of publication:

Peer reviewed: Not relevant

Open access publication: No

Joint publication: No

Type of publication: Refereed conference paper

Comments: in English

Title: Wave Disturbances in the Ionosphere during last Solar Activity minimum
Author(s): Burmaka V.P., Chernogor L.F.
Publisher: Geomagnetism and Aeronomy. – 2012. – V. 52, No. 2. – P. 183 – 196. DOI:10.1134/S001679321202003X
Date of publication (mm.yyyy): 04/2012
Number of pages: 14
Link to online version of publication: <http://link.springer.com/article/10.1134/S001679321202003X>
Peer reviewed: Yes
Open access publication: No
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in English

Title: Wave disturbances in the ionosphere observations by ISR
Author(s): Burmaka V.
Publisher: Kharkov, IRE
Date of publication (mm.yyyy): 05/2013
Number of pages: 180
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: PhD thesis
Comments: in Russian

Title: Wave perturbations of the electron concentration in the F2 layer of the ionosphere : seasonal diurnal variations
Author(s): Chernogor L.F., Barabash V.A.
Publisher: Radio Physics and Radio Astronomy . - 2012 . - V. 17 , №4 . - p. 353-362
Date of publication (mm.yyyy): 12/2012
Number of pages: 10
Link to online version of publication: <http://journal.rian.kharkov.ua/index.php/ra/article/view/629>
Peer reviewed: Yes
Open access publication: Yes
Joint publication: No
Type of publication: Article published in scientific journal
Comments: in Russian

Title: Wave processes in the ionosphere during magnetic storms in January 2010 and in August 2011
Author(s): Burmaka V.P., Chernogor L.F.
Publisher: International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 29
Date of publication (mm.yyyy): 10/2013
Number of pages: 1
Link to online version of publication:
Peer reviewed: Not relevant
Open access publication: No
Joint publication: No
Type of publication: Refereed conference paper
Comments: in Russian

Title:	Weakening of the scintillation of discrete cosmic sources with non-resonant RF heating of the upper ionosphere
Author(s):	Bezrodnyi V.G., Watkins B., Charkin O.V., Yampolsky Y.M.
Publisher:	Radio Physics and Radio Astronomy, Vol. 19, № 1, pp. 40 - 47
Date of publication (mm.yyyy):	03/2014
Number of pages:	8
Link to online version of publication:	http://journal.rian.kharkov.ua/index.php/ra/article/view/1164
Peer reviewed:	Yes
Open access publication:	Yes
Joint publication:	No
Type of publication:	Article published in scientific journal
Comments:	in Russian

Title:	Weekly variations of the parameters of the ambient environment as a manifestation of technogenic effect
Author(s):	Soina A.V., Paznukov A.V., Yampolski Yu.M., et al.
Publisher:	International School-Conference "Remote radio sounding of the ionosphere", Maly Mayak (Big Alushta), Crimea, Ukraine, Book of abstracts, p. 37
Date of publication (mm.yyyy):	10/2013
Number of pages:	1
Link to online version of publication:	
Peer reviewed:	Not relevant
Open access publication:	No
Joint publication:	No
Type of publication:	Refereed conference paper
Comments:	in Russian

E - Project assessment

E.1

E.1 What impact did the project have on the students?

Increased language skills

4

Increased knowledge about partner countries

5 (high)

Increased analytical and subject-specific skills

5 (high)

Increased employability

5 (high)

E.2

E.2 What impact did the project have on the academic staff?

Increased language skills

4

Increased pedagogical skills

5 (high)

Increased project management skills

5 (high)

Increased knowledge about partner countries

5 (high)

E.3

E.3 What impact did the project have on the institutions?

Changes to the curriculum/study programme

4

Changes to organisational arrangements

4

Changes in language teaching policy

4

Increased cooperation among staff

5 (high)

Better link between research and higher education

5 (high)

Introduction of new teaching methods

5 (high)

Introduction of new teaching materials

4

Introduction of quality assurance mechanisms

4

F - Expenditure and balance

F.1

F.1.1 Expenditure 2014

NOK - Norwegian kroner	Budget 2014	Expenditure 2014
Scholarships/fellowships		
Scholarships to Bachelor students	0	9 739
Scholarships to Master students	0	0
Fellowship grants to Ph.D students	95 000	84 847
SUM - Scholarships/fellowships	95 000	94 586
Infrastructure		
Scientific equipment	35 160	21 231
Office infrastructure/software	16 350	16 350
SUM - Infrastructure	51 510	37 581
Institutional development		
Books/periodicals/publication costs/dissertations	9 025	9 025
Networking/conferences/seminars/workshops	17 160	111 981
Travel expenditure, partner in cooperating country (IoN)	280 000	311 416
Travel expenditure, partner in Norway (IiN)	97 990	13 718
Costs for gender equalization related activities	0	0
Other operating costs/running costs (specify in comments - not general overhead)	380 839	353 839
SUM - Institutional development	785 014	799 979
Project management		
Compensation to department in Norway (IiN)	0	0
Compensation to department in cooperating country (IoN)	0	0
SUM - Project management	0	0
Project administration		
General administration costs/overhead (max 7 percent of total budget)	84 730	83 210
SUM - Project administration	84 730	83 210
SUM - Total	1 016 254	1 015 356

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

NOK - Norwegian kroner	Budget 2014	Expenditure 2014
Scholarships/fellowships		
Scholarships to Bachelor students	0	9 739
Scholarships to Master students	0	0
Fellowship grants to Ph.D students	95 000	84 847
SUM - Scholarships/fellowships	95 000	94 586
Infrastructure		
Scientific equipment	35 160	21 231
Office infrastructure/software	0	0
SUM - Infrastructure	35 160	21 231
Institutional development		
Books/periodicals/publication costs/dissertations	0	0
Networking/conferences/seminars/workshops	0	94 821
Travel expenditure, partner in cooperating country (IoN)	280 000	311 416
Travel expenditure, partner in Norway (IiN)	97 990	13 718
Costs for gender equalization related activities	0	0
Other operating costs/running costs (specify in comments - not general overhead)	145 000	118 000
SUM - Institutional development	522 990	537 955
Project management		
Compensation to department in Norway (IiN)	0	0
Compensation to department in cooperating country (IoN)	0	0
SUM - Project management	0	0
Project administration		
General administration costs/overhead (max 7 percent of total budget)	49 160	47 640
SUM - Project administration	49 160	47 640
SUM - Total	702 310	701 412

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

NOK - Norwegian kroner	Budget 2014	Expenditure 2014
Scholarships/fellowships		
Scholarships to Bachelor students	0	0
Scholarships to Master students	0	0
Fellowship grants to Ph.D students	0	0
SUM - Scholarships/fellowships	0	0
Infrastructure		
Scientific equipment	0	0
Office infrastructure/software	16 350	16 350
SUM - Infrastructure	16 350	16 350
Institutional development		
Books/periodicals/publication costs/dissertations	9 025	9 025
Networking/conferences/seminars/workshops	17 160	17 160
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)	235 839	235 839
SUM - Institutional development	262 024	262 024
Project management		
Compensation to department in Norway (IiN)	0	0
Compensation to department in cooperating country (IoN)	0	0
SUM - Project management	0	0
Project administration		
General administration costs/overhead (max 7 percent of total budget)	35 570	35 570
SUM - Project administration	35 570	35 570
SUM - Total	313 944	313 944

F.1.2 Explanations to deviations between budget and expenditure

The Arctic University of Norway (NO-UiT):

1) Because of the unstable political situation in the Eastern Ukraine and potential risk for visitors the venue of the International School-Conference "Remote Radio Sounding of the Ionosphere (ION-2014)" was changed from Kharkiv (Ukraine) to Tromsø (Norway). That is why the distribution of funds between budget items differed from the planned one. The expenses for item "Travel expenditure, partner in Norway (IiN)" were significantly reduced, because conference in Ukraine was canceled and Norwegian participants didn't visit Ukraine. One part of these funds was used to support conferences in Tromsø – item "Networking/conferences/seminars/workshops". The other part was used to support participation of Ukrainian members in the ION-2014. Because of this, the expenses for item "Travel expenditure, partner in cooperating country IoN" were increased. We did not spend all funds from the item "Scientific equipment" because we used less money for upgrade and maintenance of HF and ELF facilities than was planned initially. In addition, we didn't use all funds from the item "Other operating costs/running costs" intended to support the students measuring campaign at EISCAT observatory in Norway because the sum of payment to EISCAT for the operation of the diagnostic equipment was less than initially planned. There were no major deviations between budget and expenditure for other items.

2) The actual project activities are described in details in section B. In brief, project funds were used as follows:

- Scholarships/fellowships. Support of fellowship programs for 7 Ukrainian students at the Arctic University of Norway and EISCAT observatories and flight tickets for students.
- Scientific equipment. Expenses for upgrade and maintenance of HF and ELF facilities located in Tromsø and Svalbard
- Networking/conferences/seminars/workshops. Support of the International School-Conference ION-2014 in Tromsø and measuring campaign at EISCAT observatory, organized under the program proposed by the students (meals, coffee breaks, transport to/from EISCAT, costs for guest lecturers, conference materials and equipment, representation costs etc.)
- Travel expenditure, partner in cooperating country (IoN). Expenses for participation of: 7 Ukrainian participants (students, academic staff) in the International schools and conferences; 2 Ukrainian researchers in the field works in Tromsø and Svalbard (upgrade and maintenance of HF and ELF facilities); 2 Ukrainian members of the administrative staff in refresher training at UiT; 5 Ukrainian participants (academic and administrative staff) in the School-conference ION-2014.
- Travel expenditure, partner in Norway (IiN). Travel expenses of the Norwegian participants for taking part in project related events.
- Other operating costs/running costs. Payment to EISCAT to support the operation of the diagnostic equipment during the students measuring campaign at EISCAT observatory in Norway.
- Administrative costs.

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

There were no difference between budget and expenditure. In brief, project funds were used as follows:

- Office infrastructure/software. Payment to IT Company, which have developed and installed at IION server software packages intended for remote processing of the ionospheric data using Internet connection. This software is used for students training.
- Books/periodicals/publication costs/dissertations. Payments to printing house which published two textbooks which have been developed by project participants for students in radiophysics and geophysics.
- Networking/conferences/seminars/workshops. Late payment to logistic company, which supported ION-2013 conference. This payment was delayed by the Ukrainian State Treasury in 2013.
- Other operating costs/running costs. Expenses for running radar and ionosonde at IION Observatory during students training (bills for electricity and maintenance of the equipment) in 2014: NOK 167 039. Expenses for running radar and ionosonde at IION Observatory during students training (bills for electricity and maintenance of the equipment) in 2015: NOK 68 800.
- Administrative costs.

F.2

D.2 Balance

	IoN	IiN	Total
Balance transferred from 2013	66 619	21 640	88 259
Disbursement from SIU 2014		927 995	927 995
Transferred from IiN to IoN	247 325	247 325	
Available amount	313 944	702 310	1 016 254
Expenditures	313 944	701 412	1 015 356
Balance	0	898	898
Return to SIU	0	898	898
New balance	0	0	0

F.3

F.3 Expenditures 2012-2014

NOK - Norwegian kroner	Expenditure 2012	Expenditure 2013	Expenditure 2014	Sum	Total budget from project document
Scholarships/fellowships					
Scholarships to Bachelor students	0	0	9 739	9 739	0
Scholarships to Master students	0	0	0	0	0
Fellowship grants to Ph.D students	54 450	144 272	84 847	283 569	294 000
SUM - Scholarships/fellowships	54 450	144 272	94 586	293 308	294 000
Infrastructure					
Scientific equipment	14 940	73 941	21 231	110 112	90 710
Office infrastructure/software	5 185	4 024	16 350	25 559	32 300
SUM - Infrastructure	20 125	77 965	37 581	135 671	123 010
Institutional development					
Books/periodicals/publication costs/dissertations	0	0	9 025	9 025	15 850
Networking/conferences/seminars/workshops	0	102 840	111 981	214 821	180 000
Travel expenditure, partner in cooperating country (IoN)	193 000	195 425	311 416	699 841	737 000
Travel expenditure, partner in Norway (IiN)	27 901	123 141	13 718	164 760	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	353 839	865 536	822 000
SUM - Institutional development	445 712	708 292	799 979	1 953 983	1 966 850
Project management					
Compensation to department in Norway (IiN)	0	0	0	0	0
Compensation to department in cooperating country (IoN)	0	0	0	0	0
SUM - Project management	0	0	0	0	0
Project administration					
General administration costs/overhead (max 7 percent of total budget)	40 290	47 640	83 210	171 140	171 140
SUM - Project administration	40 290	47 640	83 210	171 140	171 140
SUM - Total	560 577	978 169	1 015 356	2 554 102	2 555 000

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

NOK - Norwegian kroner	Expenditure 2012	Expenditure 2013	Expenditure 2014	Sum	Total budget from project document
Scholarships/fellowships					
Scholarships to Bachelor students	0	0	9 739	9 739	0
Scholarships to Master students	0	0	0	0	0
Fellowship grants to Ph.D students	54 450	144 272	84 847	283 569	0
SUM - Scholarships/fellowships	54 450	144 272	94 586	293 308	0
Infrastructure					
Scientific equipment	14 940	73 941	21 231	110 112	0
Office infrastructure/software	0	0	0	0	0
SUM - Infrastructure	14 940	73 941	21 231	110 112	0
Institutional development					
Books/periodicals/publication costs/dissertations	0	0	0	0	0
Networking/conferences/seminars/workshops	0	0	94 821	94 821	0
Travel expenditure, partner in cooperating country (IoN)	193 000	195 425	311 416	699 841	0
Travel expenditure, partner in Norway (IiN)	27 901	123 141	13 718	164 760	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	118 000	377 970	0
SUM - Institutional development	340 901	458 536	537 955	1 337 392	0
Project management					
Compensation to department in Norway (IiN)	0	0	0	0	0
Compensation to department in cooperating country (IoN)	0	0	0	0	0
SUM - Project management	0	0	0	0	0
Project administration					
General administration costs/overhead (max 7 percent of total budget)	31 700	47 640	47 640	126 980	0
SUM - Project administration	31 700	47 640	47 640	126 980	0
SUM - Total	441 991	724 389	701 412	1 867 792	0

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

NOK - Norwegian kroner	Expenditure 2012	Expenditure 2013	Expenditure 2014	Sum	Total budget from project document
Scholarships/fellowships					
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
SUM - Scholarships/fellowships	0	0	0	0	0
Infrastructure					
Scientific equipment	0	0	0	0	0
Office infrastructure/software	5 185	4 024	16 350	25 559	0
SUM - Infrastructure	5 185	4 024	16 350	25 559	0
Institutional development					
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 (IiN)	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
SUM - Institutional development	104 811	249 756	262 024	616 591	0
Project management					
Compensation to department in Norway (IiN)	0	0	0	0	0
Compensation to department in cooperating country (IoN)	0	0	0	0	0
SUM - Project management	0	0	0	0	0
Project administration					
General administration costs/overhead (max 7 percent of total budget)	8 590	0	35 570	44 160	0
SUM - Project administration	8 590	0	35 570	44 160	0
SUM - Total	118 586	253 780	313 944	686 310	0

Confirmation

Confirmation

Confirmation regarding correctness of information

I, the Project Coordinator at the Institution in Norway, hereby confirm (a) that to the best of my knowledge, the information provided in this online report form is in all respects complete and correct at the time of the submission of the report, and (b) that I am aware that provision of incomplete and/or incorrect information in such report forms may constitute breach of the contract between SIU and the Institution in Norway which may entail withdrawal of the funding and/or other contractual sanctions against the Institution in Norway.

Confirmation regarding institutional approval

I, the Project Coordinator at the Institution in Norway, hereby confirm that the contents and submission of this online report form has been approved at the appropriate scientific and/or administrative level(s) within the Institution in Norway, in accordance with the said institution's policies, rules and regulations.