「ロシアにおける電磁波規制と関連技術」　に関する講演会
http://cobalt.cneas.tohoku.ac.jp/users/sato/EMC-ISTC.htm

期日　10月22日　（水）　13:30-16:30
会場　東北大学　東京分室　http://www.bureau.tohoku.ac.jp/somu/bun/bun.html
　　（東京駅北口　東京都千代田区丸の内１丁目７番１２号　　サピアタワー１０階）
主催　ISTC
協賛　東北大学　東北アジア研究センター
「第45回ロシア先端科学技術に関するISTC Japan Workshop」
テーマ　「ロシアにおける電磁波規制と関連技術」

ロシアの電波ばく露基準に関する技術的解説していただくと共に、現在のロシアにおける環境電磁工学技術の紹介、研究活動、企業化などの現状を紹介していただきます。
主催者ISTC　（http://www.mofa.go.jp/mofaj/gaiko/technology/istc_1.html）は旧ソ連の研究者と日米欧の研究者、企業との共同研究を推進しています。今回、環境電磁工学(EMC)に携わるロシア人研究者を招へいし、講演会を開催いたします。合わせて我が国の研究者との交流により共同研究などへ結びつけていただきたいと思います。
講演は英語で行います。一部ロシア語による講演には日本語通訳をつけます。

参加は無料です。
ただし事前登録が必要です。参加希望者は東北大学東北アジア研究センター国際連携室：徳田由佳子助教（tokub@cneas.tohoku.ac.jp,　(022) 795 3139）あてに10月21日までにご登録ください。
(1) 参加者氏名
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Valentina Nikitina (St.Petersburg State Marine Technical University)
Electromagnetic fields on board ships. Assessment of danger for the crew, hygienic regulation, Russian experience in protection from EMF".
Nikolay Khokhlov (Limited Liability Company NANODIAGNOSTIKA)
Quasistatic electromagnetic tomography methods and its applications
developed in the Institute for Radioengineering and Electronics(Moscow, Russia)
Nina Rubtsova (Research Institute of Occupational Health of Russian Academy of Medical Sciences)
EMF Hhygienic standardization　in the Russian Federation and prospects of its harmonization with international
Alexander Worshevsky (ELEMCOM)
EMC Standardization and activities in Russia
Nikolay Chubinsky (Moscow Institute of Physics and Technology)
The electromagnetic field probe for registration of ultra wideband pulses

関連する以下の講演会にもご参加ください。　http://cobalt.cneas.tohoku.ac.jp/users/sato/EMC-ISTC.htm
(1)　10月24日　(金)　米沢　（山形大学）
環境電磁工学研究会（EMCJ）・マイクロ波研究会（MW）(10月23,24日)
http://www.ieice.org/~emcj/jpn/
共催　電子情報通信学会　マイクロ波研究会，環境電磁工学研究会　(EMCJ)、IEEEEMCS仙台チャプタ
会場 山形大学ベンチャー・ビジネス・ラボラトリー セミナーホール

(2)　10 月 25 日（土）　13:30-17:00　（仙台国際センター、小会議室１　http://www.sira.or.jp/icenter/）
共催　東北大学東北アジア研究センター、ISTC、仙台 EMC 研究センター推進部会
参加無料

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講演要旨

Valentina Nikitina (St.Petersburg State Marine Technical University)
Electromagnetic fields on board ships. Assessment of danger for the crew, hygienic regulation, Russian experience in protection from EMF".

Statistics shows that no less than two thirds of accidents in the water transport take place due to false actions of the navigators and crews of ships (human factor). This report considers the problems of hygienic assessment of electromagnetic fields on board ships, possible role and significance of the electromagnetic factor in ensuring the navigation safety. The unfavorable electromagnetic situation on board ships (in premises and on open decks) is formed by the changed natural electromagnetic background and EMF radiation of technical aids. First of all, these are electro-energetic systems, which are the sources of low frequency magnetic fields. The highest levels of magnetic fields are registered at watch posts in the premises of the power compartment. There is a problem of irradiation of the crew by radiofrequency EMF produced by the antennas of radars and marine radio communication transmitters on the open decks. Investigations on hygienic assessment and biological effect of modulated EMF produced by the marine radioelectronic aids were performed in the Soviet Union. As a result of the complex studies the maximum permissible EMF levels were developed. The sanitary-epidemiological rules and norms «Electromagnetic fields on board navigation vehicles and at marine objects. Hygienic safety requirements» were put into effect in 2006. The Federal special program "Development of civil marine technical aids for 2009-2016" is adopted in Russia. The section of the document "Marine technical aids operation safety" notes the need to lower the degree of human exposure to electromagnetic fields". The international standards (IMO, ISO, IES and others) determine only operational requirements to the equipment. According to our opinion, today it is necessary to develop an International standard establishing the unified requirements to providing electromagnetic safety of ship crews.

Nikolay Khokhlov (Limited Liability Company NANODIAGNOSTIKA)
Quasistatic electromagnetic tomography methods and its applications
developed in the Institute for Radioengineering and Electronics(Moscow, Russia)

Some new quasistatic tomography methods have been developed for different medical applications in the Laboratory of mathematical methods in radio physics of the Institute of Radioengineering and Electronics of RAS: Electric impedance tomography (EIT)/ Magnetic induction tomography (MIT)/ Electric field tomography (EFT). EIT is the technique enabling to visualize spatial distribution of electrical impedance (or conductivity) inside the human body. The device uses voltage measurements on the object's surface when the electric current passes through the volume, as initial data for the image reconstruction. High accuracy initial electrical data are processed by fast and effective reconstruction algorithms. As the measurements in electrical impedance tomography can be performed rather fast, it enables to visualize many processes (such as heart pulsation) in real time. MIT unlike EIT doesn't requires electrical contacts with the body and uses interaction of oscillating magnetic field with conductive media. The conductivity (and permittivity) can be reconstructed from the measurements of perturbed field outside the objects. The EFT method exploits interaction of high-frequency electric field with inhomogeneous conductive medium without contact with the electrodes. Unlike an electrical impedance tomography no electric current is injected into the medium from the outside.

Nina Rubtsova (Research Institute of Occupational Health of Russian Academy of Medical Sciences)
EMF Hhygienic standardization in the Russian Federation and prospects of its harmonization with international

In Russia EMF hygienic standards are developed on the basis of hygienic, clinical-physiological, epidemiological and experimental researches in view of published scientific data. The main role is played the data of experimental researches under chronic exposure allowing to receive time-value dependences of biological effects and to establish a threshold of harmful effects. Hygienic norms are developed for discrete frequency ranges. In Russia there are hygienic norms of occupational exposure for hypo-geomagnetic conditions, static electric and magnetic fields, 50 Hz electric and magnetic field and radiofrequency EMF (from 10 kHz to 300 GHz), and for special EMF case (ultra broadband pulses). General public hygienic standards are developed for static electric field, power frequency (50 Hz) electric and magnetic fields and radiofrequency EMF (from 30 kHz to 300 GHz). Sanitary Rules and Norms are developed for mobile communication systems (27-2400 MHz frequency range) and VDT. The basic problems of international harmonization of EMF norms is different principles of threshold permissible levels definition in RF and ICNIRP (as international) - chronic exposure adverse effects in RF and acute exposure hazard in international rules.

Alexander Worshevsky (ELEMCOM)
EMC Standardization and activities in Russia

Federal agency of technical regulation is the national competent body in Russia. EMC law is under consideration. Technical Committee (TC EMC) prepares national EMC standards. Specialists from different institutes and organizations work in Technical Committee. There are many subcommittees. Russian Maritime Register of shipping set EMC requirements for shipboard equipment. Many EMC standards have become mandatory. Standards are used to prove EMC properties of products. Basic and generic standards are based on IEC standards. Many product family and product standards have been renovated. The equipment of potential hazardous objects such as ships, railroad, nuclear power plants has the highest immunity. The standards require 10 immunity tests for shipboard and 16 tests for nuclear power plant equipment. The test level is higher then the level used in generic standard for industry environment. New current tests in grounding wires are mandatory. Immunity test of the whole system after an installation will be determined. EMC test equipment are produced in Russia. There are accredited laboratories for EMC tests in accordance with national and international EMC standards. Some laboratories have unique equipment for ligtning and high level electromagnetic field tests.

Nikolay Chubinsky (Moscow Institute of Physics and Technology)
The electromagnetic field probe for registration of ultra wideband pulses

Measurement of parameters radiated ultra wideband (UWB) pulses is of interest for many applied and scientific researches. They include an UWB radar with extremely high spatial resolution, sounding of media with average and big losses (georadar systems), a wireless UWB communication systems, a systems for monitoring of the radiated electromagnetic pulses parameters. The last are used in various researches, including at the decision of the electromagnetic compatibility problems. The main elements of such measurements are of electromagnetic field probes. They are intended for measurements of spatial distributions of the radiated signals. As against measuring antennas, they have the small electric sizes that allow to carry out measurements with higher spatial resolution. The majority of such probe designs are developed for registration a relative narrow-band (quasicoherent) signals. Even at relatively wide of covering frequency range, with rare exception, it cannot be used for measurements of parameters radiated UWB pulses having relative width of a spectrum more of an octave.
It is caused by a dispersion, that is by nonlinearity of the phase characteristic the element - converter of an electromagnetic field in an electric signal on its output. The design of the electromagnetic pulse probe is developed and investigated. It has the smooth phase characteristic close to linear at frequencies of 100-2500 MHz. Thus minimization of dispersive distortions of the nanosecond pulses is achieved. The probe is made on the three-layer printed-circuit-board together with sections of microstrip lines. The last provide balancing a connecting line between the probe and the recording device (a digital oscillograph). Thus attenuation of inphase interfering signal is achieved on 25-30 dB. The similar probe for registration electromagnetic UWB pulses by nanosecond duration with the field amplitude up to 50-100 kV/m is developed. Output signals of similar devices considerably differ from time function of an electromagnetic field. The processing algorithms of the registered signals are developed and are allowing to restore the true form of a field in a point of an arrangement of the probe.