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| **IALA COUNCIL**  **59th Session** | **December 9-10, 2014**  **IALA Headquarters** |

**Agenda item 11 – INTERNATIONAL**

**11.2 FERNS**

11.2.1 Report of FERNS Council 23

Note by the Secretariat

**1 - Executive Summary**

The 23rd session of the FERNS Council was held in Ningbo, The People’s Republic of China, during the period 20 – 24 October, 2014. The Chairman was Mr. Zhai Jiugang, Deputy Director General of the Maritime Safety Administration of the People’s Republic of China (China MSA). Representatives of China, Japan, Korea and Russia as well as Observers from IALA and UK participated in the session.

The meeting allowed each participating country to give the situation of the functioning of the Loan-C/Chayka chains in the region and on the off-air schedules for next year, as well as the technical and operational matters concerning them. It was also the occasion to discuss regional cooperation on radionavigation and to inform Council Members on projects and realizations implemented in each of the countries.

During the meeting, Japan confirmed the decision to terminate all Loran-C stations. The last stations to be closed will be Gesashi LORAN-C station on February 1, 2015. Japan will withdraw from FERNS Agreement at the same date, as notified through the diplomatic channel. For Russia and China, they informed the Council that they continue to modernize their existing Loran-C and Chayka stations, whilst Korea is developing a complete coverage of its waters with e-Loran stations which should be completed by 2016 and fully operational by 2018, according to its latest implementation plan. Furthermore, Russia and Korea continue their cooperation for the creation of a new cooperative chain to compensate the closure of the Japanese chains.

Regarding the revision of the FERNS Agreement, China, Korea and Russia expressed no objection to the text of the amendment circulated by China more than 90 days before the meeting and agreed to notify their acceptance to Russia, the next hosting country of the Council. The three countries took note that Japan will not be any more Party to the Agreement when the amendment enters into force.

**2 – Action requested**

The Council is requested to note the report of the 23rd session of the FERNS Council, as attached.

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**FERNS Council CS23/11/1**

**23rd Session**

**REPORT**

**on**

**The twenty third Session of the Council of the**

**Far East Radionavigation Service (FERNS)**

**1. Opening of the Session**

* 1. The twenty third session of the Council (FERNS 23) was held in the Nocedream Resort, Ningbo, the People’s Republic of China, during the period 20 – 24 October, 2014 (including one day of Technical Working Group meeting). The Chairman, Mr. Zhai Jiugang, Deputy Director General of the Maritime Safety Administration of the People’s Republic of China (China MSA), opened the meeting and welcomed the participants on his behalf and on behalf of Captain Chen Aiping, Director General of China MSA.He recalled the successful work of the FERNS Council which has met every year since 1992. He wished all participants to have a good time in Ningbo, an historic place, but also a large port surrounding by lakes and mountains. He then declared opened the 23rd session of the FERNS Council.

1.2 At the invitation of the Chairman each participant was introduced to the meeting. Representatives of the following Members and Observers participated in the session:

Members:

The People’s Republic of China;

Japan;

The Republic of Korea;

The Russian Federation.

Observers:

IALA;

United Kingdom.

The Representative of Japan read a letter from Mr. Masahiro Ozaki, Director, Aids to Navigation Management Division, Maritime Traffic Department, Japan Coast Guard, in which he conveyed his apologize for not attending the meeting and expressed his gratitude to China MSA for all efforts as to holding the 23rd Council meeting. He wrote: “*as you know, Japan will terminate the operation of Gesashi Loran C station as of February 1st, 2015, and we will withdraw from the FERNS Agreement. Up to now, international cooperation chains of Loran C and Chayka could be operated appropriately and it contributes to ensure the safe navigation in the Far Eastern waters. We will continue to make contributions in terms of ensuring the safe navigation in the Far Eastern waters though we will withdraw from FERNS Agreement. And we would like to express our gratitude for all the efforts of each party so far.”*

The Representative of Russia conveyed the apologize of Mr. Oleg Bryanda, Deputy Director of Departament of Radioelectronic Industry, Ministry of Industry and Trade of the Russian Federation and Mr. Victor Tsarev, Director General of the Internavigation Research and Technical Centre, and read a letter from Mr.Sergey Hohlov, Director of Departament of Radioelectronic Industry, Ministry of Industry and Trade of the Russian Federation, in which he recalled the work done in Russia to continue the improvement of the Chayka system, including the creation of the new Russia-Korean chain. He also underlined that FERNS is the only international forum where to discuss radionavigation matters in the Far-East and Arctic regions.

1.3 A full list of participants is given in Annex 1.

**2. Approval of the Agenda**

2.1 The draft agenda was accepted for the conduct of the meeting without amendment. The agenda and the list of documents submitted for discussion are given at Annexes 2 and 3, respectively. Detailing the work programme, the Chairman informed the participants that they would have the opportunity to participate to a technical tour on Thursday around Ningbo.

**3.** **Presentation of Reports by Each Country on the Loran-C/Chayka Programme**

3.1 China reported **(CS 23/3/1)** on the operation, maintenance, technical update, and personnel training about Chinese Loran-C system, in particular an upgrading of the over-voltage protection system and an overhaul of the power supply for part of the system.

It was noted that, during the period from August 2012 to July 2013, the signal availability met the specified requirements, taking into account the quarterly planned 96-hour off-air maintenance mechanism which would continue during the 2014-2015 period.

3.2 Japan presented a report **(CS 23/3/2)** on the operational status of the North West Pacific Chain (D Chain) showing the availability of each baseline, of each transmitting station and of triad from August 2013 to July 2014. The figures are 99.82 % and above including scheduled off-air period, except for the Niijima master station which was off-air since 19 June 2012 due to antenna failure after a huge typhoon. The Niijima station terminated in 2014.

The Chairman wondered if FERNS should not change its logo in the future, which contains four corners representing the four participants. However, this logo is also a successful symbolic representation of the FERNS works and the number of corners or directions could be kept, waiting for the comeback of Japan or for the adhesion of other countries.

3.3 The status of Loran-C stations of the Korean Chain (GRI 9930) was given in document (**CS 23/3/3)**. Information on signal availability of each station and baseline of the chain was also provided. The figures are 99.28 % and above, except for the Ussuriisk station showing 90.18% availability on annual average mainly due to routine maintenance.

3.4 Russia gave the results **(CS 23/3/4)** of operational analysis of the Russian Stations in Chains B and C. The availability was 0.9999 for chain B and 100% for chain C stations for the period October 2013 – October 2014, the maintenance time for each station with user warning being not taken into account.

*3.5* The IALA observer started his intervention by conveying the apologizes from Mr. Michael Card, Deputy Secretary General of IALA, which was unable to attend the meeting for personal reasons and requested Jean-Charles Leclair to present the presentation **(23/3/5)** that he prepared for the Council on his behalf. The presentation mainly focused on the role of IALA regarding the development and implementation of e-Navigation:

* the work of the e-Navigation Committee and the different forums leaded by IALA on the subject;
* the topics particularly developed by the Association;
* the specific works made by the working group 5 of the e-Navigation Committee on Position, Navigation and Timing (PNT);
* the importance of Test-beds and the way to inform the international maritime community through the dedicated website ([www.e-navigation.net](http://www.e-navigation.net)).

In addition, IALA gave information on:

* the Conference held in La Coruña in May 2014;
* the decision taken during the Conference by the General Assembly to start the process to change the status of the Association from an NGO to an IGO.
* training and capacity building through the IALA World-Wide Academy. It was the occasion for the Dean of The Academy to address his sincere gratitude to China, Japan and Korea for the support that each country under different form provides to the Academy.

3.6 The observer from UK reported **(CS 23/3/6)** on the United Kingdom eLoran programme. He recalled the vulnerability of satellite navigation and the risk of interruption of the service by solar weather, accidental radio interference and, increasingly, intentional jamming. He gave several example of trials and consequences of the GNSS vulnerability, not only for marine navigation but also for other applications, including ashore. He detailed the multiple uses of GPS today as well as the requirement of a resilient PNT for the implementation of e-Navigation and the importance of precise timing that eLoran can provide.

He then gave details on the GLA’s eLoran system, presently on air, serving the port of Dover and the UK section of the Dover Strait, and also capable of providing precise telecommunications timing across the UK and Ireland. UK provided indications on the plan to develop e-Loran in his country: 7 ports would be equipped by the end of 2014 and full UK waters coverage would be expected for 2019, in particular to reach the IMO obligations regarding recognition of a worldwide navigational system which requires 10 meters accuracy in port approaches and entrance. He ended his presentation by explaining the present situation of Loran in Europe and the closures expected at the end of 2015, which will make the development of eLoran at stake. GLA is presently looking for an alternative solution through industry initiatives to explore operating eLoran as a commercial enterprise across Europe.

Responding to several questions from the Chairman, UK confirmed that all GNSS systems have the same weakness regarding jamming as the signal received is very weak and easy to jam. It is not the case for eLoran which uses a much higher power with low frequency. That system is also a positive solution for navigation in Arctic and Antarctic waters when the satellites are low on the horizon and grouped into same direction, which limits the accuracy of GNSS. The modern receivers are compatible with GNSS and Loran systems and can select the most appropriate signal.

Russia asked if GLA was able to test the Chayka signal received from Slonim. It was indicated that the tests started two weeks ago with a receiver located near Rotterdam and that the results will be provided directly to Russia.

**4 Operational matters for FERNS co-operating chains**

4.1 Scheduled Off-air for 2014

China collated **(CS 23/4/1.1, CS 23/4/1.2, CS 23/4/1.3 and CS 23/4/1.4)** the off-air schedules of all the FERNS chains. All Members are requested to check the list and to report to Russia for any modification before the 1st of December 2014. Then Russia is invited to circulate the final list to all Members countries no later than 31 December 2014.

4.2 Other operational matters

4.2.1 The Russian Federation recalled the presentation made during the TWG session where it gave information **(CS 23/4/2.1)** about works on analyses of Chayka signal and the similarities with the Loran-C specifications. These works had been done by the Russian Institute of Radionavigation and Time. The results of the research have shown that the signals received at Chayka stations slightly differ from the Loran-C specifications. However, it is confirmed ounce again that it is acceptable to applicate Chayka signal jointly with Loran-C.

**5. Technical matters for FERNS cooperating chains**

5.1 China made a presentation **(CS 23/5/1)** on the demodulation and decoding methods for an enhanced Loran-C signal. Enhanced Loran-C navigation technology is a new technology with data broadcast function through modulating pulse signal transmitted by Loran-C. The data demodulation in the receiver is proceeded under the premise that the signal phase tracking and cycle identification has been done. The demodulated data use the trace point as the base, and then obtained by processing the A/D sampling data which was orthogonal sampled before and after a certain width of the trace point. The test results show that:

* the availability of the demodulation and decoding method has been verified. The demodulation and decoding probability of the signal received from Chongzuo and Raoping in Hezhou was greater than 90%;
* the one-way data transmission function of Loran C was implemented by using the data broadcast technology of the enhanced Loran C. The regional differential information could be provided for the satellite navigation systems, while automatic timing application of Loran C and one-way data broadcast communication application were implemented by this technology.

5.2 Korea informed the Council **(CS 23/5/2)** of a modification for the implementation plan of the Korea eLoran System as described in 2013. The Korea Government indeed recognized the necessity to amend the Korea eLoran System described at the 22nd FERNS Council and decided to adopt the following phased approach:

* 2014-2016: installation of 3 eLoran transmitting stations (1 new station, 2 improved stations) and 2 dLoran reference stations,
* 2017: Test operation,
* 2018: Normal operation
* After the test operation of the modified Korea eLoran system, the Korean Government will consider possible additional stations for full operational capability.

5.3 Russia recalled **(CS 23/5/3)** that, at the 21st session of the FERNS Council, the Russian delegation presented a proposal for the creation of a joint Russian - Korean navigation chain in the Far East, taking into account Japan's decision to close all its Loran-C stations. A bilateral meeting between the delegations of the Russian Federation and the Republic of Korea took place during the 22nd session in Jeju, Republic of Korea, where it was decided to develop a Memorandum of Understanding and to organize mutual visits at the stations of Ussurijsk and Pohang to analyze the situation at both stations.

Russia informed the Council that the competent Authorities of the Russian Federation have approved the draft Memorandum of Understanding and agreed the visits of the Ussuriisk station. This information was passed to Korea on the 20th of August, 2014. Further discussions through a bilateral meeting between Russian and Korean Delegation were held succesfully in the afternoon on 22nd Oct. during the 23rd FERNS Council session and the two delegations agreed the creation of the Russia – Korea Chain through a Memorandum of Understanding at a ministerial level between the two countries. It was agreed that further details and technical matters would carry out between the contact points.

Furthermore, as discussed at the last FERNS Council session and taking into account that the Ussuriisk station was put into operation in July 2013, the delegations of the Russian Federation and of the Republic of Korea agreed on the necessity of the creation of an Internet communication network for the exchange of information about the quality of work of the stations to improve reliability and performance of Loran/Chayka chain between the two countries, instead of fax and e-mail. In this case, it was agreed to use the software proposed by Korea. Unfortunately such tests have not yet been carried out due to difficulties of using the proposed channel for Russian stations, which are managed by the Ministry of Defense of the Russian Federation. Alternative solutions should be searched and these issues will be resolved.

5.4 UK presented on the work of the Radio Technical Commission for Maritime Services (RTCM) Special Committee 127 on eLoran Systems (**CS23/5/4)**. The background and history of the committee was explained, the terms of reference of SC-127 were described and a status report on the production of the Minimum Performance Standard (MPS) for eLoran receivers was presented. The current standard document is at draft version 2.04, with most sections complete and only minor additions required ahead of final publication and release of the draft before the end of 2014. The committee has added detailed information to the document on a proposed integrity computation algorithm and Additional Secondary Factor (ASF) storage and processing. It was explained that the section describing receiver testing and test results has been removed from the document in order not to delay the publication of the main standard document. The receiver testing section will be handled as a separate document to be completed in collaboration with receiver manufacturers. The next step in the standards process is to submit a draft standard to the IMO, which will be required for IEC to start work on the testing standard. An IMO input on eLoran could be in the form of an annex to the multi-system receiver standard already being worked upon. The committee would welcome additional members and FERNS participants were encouraged to join.

Responding to a question from the Chairman, UK expressed the view that eLoran is primarly developed as a back-up of the GNSS and not as an alternative. Today the best accuracy achieved is 5 m. which can still be improved in the future with new technology. But, the degree of accuracy will remain inferior to the accuracy of GNSS, as eLoran uses long waves, whilst all types of GNSS use short waves. Today to improve eLoran it would be necessary to make it a more sustainable system to use (IMO decision) to incite industry to intensify its research.

Russian delegation expressed the proposal to join SC 127 works in the area of the production of minimum performance standards and the other future standard document of SC 127. It was agreed to organise the communication between SC 127 and Russia.

**6. Coordination of other radio navigation services in the Far East**

6.1.1 China introduced document **(CS 23/6/1.1)** which presented a Maritime Service Platform based on the IALA e-Navigation Common Shore-Based System Architecture (CSSA). In 2011, China MSA decided to start the construction of such a platform taking into account its experience in information technology and maritime communication systems accumulated over the years. Completing the collection, aggregation and integration of multi-class ship navigation data and maritime safety resources, and taking into account maritime regulation and the public application demands, China MSA developed an electronic chart based on navigation integrated application platform, which includes the Navigation Integrated Application System (NIAS) for internal users, and the AIS Information Service Platform (AISP) for external applications. Both NIAS and AISP are designed in accordance with the general principles of e-Navigation CSSA. The platform is also in line with international standards through OGC (Open Geospatial Consortium) electronic chart service, as well as in accordance with the internationally advanced big data processing technology, to provide users with comprehensive application of computer and mobile phone terminals. The development of the basic platform is a key project for China MSA and will take several years of works. It is a main element to clear to achieve e-Navigation construction within China waters. The following steps will be to organise the use of the platform by all stakeholders concerned to allow them access to the information they need.

Responding to a question from Korea, China agreed that small ships data will not necessarily be included in the platform, although many fishing vessels are now equipped with AIS class B.

6.1.2 China presented a report **(CS 23/6/1.2)** on the development of e-NAV Test-bed of the Yangshan Port of Shanghai. The report started by a description of the local conditions: importance of the port, unfavorable factors of sailing and purposes of its construction. Then it reviewed the different requirements from the users, first the navigators, and the all other stakeholders. The report listed the main contents of the realization:

* construction and improvement of the navigation safety support services (such as differential positioning facilities, amelioration of aids to navigation, hydrographic surveys, charting and hydrological information, development and adaptation of main hardware equipment to meet the navigators demands),
* building of comprehensive operational system for traffic monitoring and information sharing, including using a data cloud.

The report also described how the test bed will respond to the IALA requirements and will take into account all the principles adopted by IMO on e-Navigation. The results will be made available to the e-Navigation community through the dedicated web site (www.e-navigation.net). Further works include completion of funding and granting of approbation, as, in the same time, it will be essential to keep attention on the fast development world-wide of this rapid evolving concept.

6.2 In its document **(CS 23/6/2)** Korea gave information on the development and the operation of a software used for the DGNSS Reference Station and Integrity Monitor (RSIM) in 17 different sites. The Ministry of Oceans and Fisheries has developed a new DGNSS software RSIM (K-RSIM version 1.0) in order to prepare for the diversification of International GNSS. The developed software has been installed and is operating in 4 maritime sites since October 2013. It has provided service for DGLONASS since July 2014. Furthermore, the correction technology for the China's BeiDou navigation system has been developed since 2013 with the aim to enter into operation in 2016.

6.3 Russia made a comprehensive description **(CS 23/6/3.1)** of the implementation of the AIS in the country, used by ships sailing both the sea and on inland waterways. On shore side, there are:

* 54 AIS Base Stations installed. 27 AIS Base Stations transmit differential corrections (GLONASS/GPS).
* 5 Virtual AIS Aids to Navigation (AIS AtoN) devices are installed in Baltic sea.
* 10 AIS receivers are installed on Kuril islands for AIS vessel monitoring.
* 156 AIS Pilot equipment.

Russia has also started to install AIS receivers in space (the first space craft with a payload of AIS receiver was launch in July 2014). Trials are very encouraging.

Russia is actively participating in regional international monitoring systems and promotes the development of such systems with its neighboring countries.

6.4 Russia gave an overview **(CS 23/6/3.2)** of the status and the future development of the Russian Maritime Differential Subsystem in the Far East. At present it includes 17 reference stations (RS) of the Maritime Differential Subsystem (MDSS) of the Global Navigation Satellite System, 5 Regional Control Centers (RCC) and a Monitoring Center of the MDSS. 13 RS are in the Far East. It is programmed an increase of MDSS coverage in the Far Eastern waters through the deployment of new reference stations and with their integration into the GLONASS ground control contour.

Modernization will touch all MDSS levels and allows in particular:

* to produce reception and processing of GPS, GLONASS and future GNSS (Galileo, BeiDou) radio signals, SDCM GLONASS signals, SBAS;
* to increase accuracy characteristics (error of positioning no more than 3 meters);
* to form and give code and phase measuring in the frequency range L1, L2, L3, L5, which allows to use it as reference station for the realization of “step and repeat”, quick static (“stay - go”) and Real Time Kinematic mode;
* to give corrective information for use in Impulsive-Phased Radionavigation System (IPRS) as Chayka.

It was noted that the quality of MDSS stations operation depends on the optimal choice of frequency-distance separation with other radio-electronic facilities, on competent and consistent international legal protection of frequencies allocated for MDSS differential stations. In this regard, focus should be once again turned on the necessity to coordinate the Frequency plan for differential GNSS stations in the Far East.

On this particular matter the observer from IALA recalled that there is a list of the frequencies used by the different DGNSS stations worldwide available on the IALA Website, and that it is important that each provider updates the list.

**7 Draft Amendments to the FERNS Agreement**

7.1 China recalledthat it circulated the text of the Amendment as agreed during the 22nd Council meeting **(CS 23/7/1)**in April last, more than 90 days before this 23rd Council meeting in accordance with Article 10, paragraph 2, of the FERNS Agreement.

7.2 One amendment **(CS 23/7/3)** was received by Korea regarding the Article 1, 2nd paragraph, to read: *<“Program” means the activities to be carried out by the Parties to provide, operate and coordinate radionavigation services of the region, in particular the service of “Loran-C”, “Chayka” and follow-up developing radionavigation system(eLoran etc.).>*,

instead of *<“Program” means the activities to be carried out by the Parties to provide, operate and coordinate radionavigation services of the region, in particular the service of “Loran-C” and “Chayka” radionavigation systems >*

Finally, after a short discussion, China, Korea and Russia agreed the text as followed:

*<“Program” means the activities to be carried out by the Parties to provide, operate and coordinate radionavigation services of the region, in particular the service of “Loran-C”, “Chayka” and follow-up developing radionavigation systems.>*

The same wording applies to Article 4.

7.3Then Japan presented document **(CS 23/7/2)** and recalled that Japan will terminate the operation of Gesashi LORAN-C station as of February 1, 2015, and will withdraw from FERNS Agreement as notified by the diplomatic channel. Japan considered that there is no necessity for amending FERNS Agreement before its withdrawing from FERNS Agreement, and amendments could be discussed after. In those conditions, Japan cannot approve the amendment of FERNS Agreement as proposed at the 23rd Council session.

Russia expressed the view that the amendment has been on the table of the Council for more than three years and that is now time to conclude. Taking into account that China, Korea and Russia had no objection on the text of the Agreement circulated by China before the meeting according to Article 10, paragraph 2, it is possible to now apply Article 10 paragraph 3, between the three countries concerned as Japan will not be any more Party to the Agreement when the amendment enters into force.

China and Korea agreed with the Russian proposal, and the Chairman concluded that China and Korea are invited to notify to Russia their acceptance of the amendment, taking into account the Korean proposal as modified during the discussion in paragraphe 7.2, and in turn Russia will inform China and Korea of the date of entry into force of the amendment, sixty days after having received all the notifications of acceptance.

**8. Report of the 9th TWG Meeting**

8.1 The Chairman of the TWG, Prof. Dr. Seung-gi Gug, reported that the Group received and discussed several presentations on technical matters, not only on Loran-C and Chayka but also on the new generation of those systems and other radionavigation systems and equipment. He also reported on the bi-lateral discussions between Korea and Russia on the creation of the new Russia - Korea Chain.

8.2 The Chairman of the Technical Working Group also proposed that the date and venue of the 10th session of the FERNS TWG would be the eve of the first day of the 24th session in Russia. If further discussions are needed on the matters concerned, they should be conducted by correspondence through e-mails or fax before the 10th session. There was no objection to the proposal.

**9. Other business**

9.1 Russia made a presentation **(CS 23/9/1.1)** on Radionavigation in Member-Countries of the Commonwealth of Independent States (CIS). On 30th of May, 2014 the Heads of CIS Government Council adopted the Interstate Radionavigation Program for the CIS member-countries for the period until 2016. The aim of the Program is the development of high-accuracy radionavigation fields and the creation of interfacing elements for navigation systems as well as their adoptions by the CIS member-countries.

The countries taking part in the realization of the Program are:

* The Russian Federation
* The Republic of Belarus
* The Republic of Kazakhstan
* The Republic of Tajikistan
* The Kyrgyz Republic

It involves:

* Development of statutory&regulatory and normative&technical documents to regulate the creation and use of radionavigation aids and systems on the territory of CIS member-countries;
* Development and creation of interfacing elements for various navigation systems and their adoptions created by the CIS member-countries, as well as the development of various systems and tools based on the use of signals from navigation systems;
* Development of automated systems and tools for monitoring and control of transport systems, structures, natural hazards.

It includes the implementation of a pilot project of creation, coupling and interaction of a pulse-phase radio-navigation system in the territories of CIS member-countries, including two chains. The creation of the chains and the creation of a single information-navigation space contains prerequisite from the different countries involved such as:

* availability of the national high-precision coordinate-time support, deployed in the Republic of Belarus, the Republic of Kazakhstan, the Russian Federation,
* positive experience on use of the collection and adaptation measurements stations SDCM in the Republic Kazakhstan and the Russian Federation
* practical experience of common use of high-precision navigation systems and GNSS augmentations.

Responding to a question from the Chairman, Russia explained that the programme was signed with a final date in 2016, but at that stage there is no doubt that it will be up-dated and renewed. It implies all mode of transport, including roads, with the possibility to extend such system to the road joining China to Russia.

9.1.2 Russia introduced a document **(CS 23/9/1.2)** on the cooperation in the field of navigation and synchronization technologies with a company named “PROGRESS Microelectronics Research Institute” (JSC “PROGRESS MRI”). This company is the leading microelectronics company in the state-owned Rostec Corporation. It is involved in research and design of ASICs, modules and systems for various applications. Today company’s design areas are extended to telecommunication, radiolocation, GLONASS/GPS receiver on board, control software and others. More than 350 types of IC were designed for industrial and commercial applications.

9.1.3 Russia presented the activities on technologies and equipment of the NAVIS Group regarding GLONASS/GPS/GALILEO. It has offices in Russia (Moscow and St Petersburg) as well as in Ukraine and Switzerland. Its main achievements are:

* Creation of original structure schemes of navigation receivers GLONASS/GPS/GALILEO
* Design of the original algorithms of processing of navigation signals GLONASS/GPS/GALILEO and decision of navigation tasks in multi-systems receivers
* Design of precision navigation receivers for high precision megaurements according best world standards
* Possession of technologies of creation of specialized element base on the level of modern microelectronic technologies.

Today NAVIS Inc. mainly focuses on:

* OEM modules
* Equipment for marine ships
* Equipment for ground transport
* Marine differential subsystems
* Signals simulators
* Geodesic equipment
* Equipment for time-frequency synchronization
* Terminals for transport monitoring systems
* Civil aviation equipment

**10. Date and venue of the 24th Session**

10.1 Taking into account the withdrawal of Japan, and at the invitation of the Russian Federation it was agreed that the 24th session of the Council will be convened in Moscow in October 2015. Russia will determine the precise venue for the meeting and will inform members of FERNS not later than May 31st, 2015.

**11. Closing of the session**

11.1 The Council reviewed the draft report of the 23rd session and adopted it with amendments. The final report is given in Document **CS 23/11/1**.

11.2 The Council expressed its great appreciation to the People’s Republic of China, in particular its Maritime Safety Administration (China MSA) for the excellent arrangements made for the meeting, the hospitality that had been shown to all participants and the very interesting visits that were undertaken. A special thanks was addressed to Captain Chen Aiping, Director General of China MSA, as well as to Captain Zhai Jiugang, Deputy Director-General of China MSA, for having chaired the meeting with great competence and diligence.

11.3 The Chairman extended his appreciation to all the delegates for the hard work, mutual understanding and co-operation that has contributed to the success of FERNS in general and to the 23rd session of the Council in particular.

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**Annex 1**

**List of Participants**

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| **Member Countries** | | | |
| **China** | The Maritime Safety Administration of the People's Republic of China  (China MSA) | ZHAI Jiugang | Deputy Director General |
| ZENG Hui | Director, Department of AtoN, Hydrography and Radio Communication |
| LI Shubing | Deputy Director General,  The Navigation Guarantee Center of North China Sea |
| MA Min | Section Chief |
| WANG Cheng | Section Chief |
| HOU Anjian | Section Chief |
| WANG Rui | Senior Engineer |
| LIANG Erbing | Senior Engineer |
| ZHAN Xinghua | Senior Engineer |
| CHEN Jinde | Senior Engineer |
| ZHAO Xuejun | Senior Engineer |
| YANG Wenzhi | Section Chief, Donghai Navigation Safety Administration |
| LU Yongqiang | Deputy Director, Donghai Navigation Safety Administration |
| Xi’an Navigation Technology Research Institute | WANG Wei | Researcher |
| LUO Rui | Researcher |
| **Japan** | Japan Coast Guard | Kazuyuki TANAKA | Director, Disaster Management of Aids to Navigation |
| **Korea** | Ministry of Oceans and Fisheries | KIM HYEJUNG | Director, Maritime Safety Facilities Division |
| LEE Jong-Cheol | Deputy Director, Maritime Safety Facilities Division |
| Korean Maritime and Ocean University | GUG Seung-Gi | Head of Department of Coast Guard Studies |
| PARK HYERI | Researcher |
| **Russia** | The Ministry of Defense | Aleksandr SLEPTSOV | Control point Chief |
| The Internavigation Research and Technical Centre (IRTC) | Vasily REDKOZUBOV | Deputy Director General |
| Margarita AFANASYEVA | Head of the service |

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| **Technical Working Group** | | | |
| **Korea** | Korean Maritime and Ocean University | GUG Seung-Gi | Head of Department of Coast Guard Studies |

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| **Observers** | | | |
| **IALA** | IALA World-Wide Academy | Jean-Charles LECLAIR | Dean |
| **UK** | The General Lighthouse Authorities of UK and Ireland | Paul WILLIAMS | Principal Development Engineer |

**Annex 2**

**Draft Agenda**

1. Opening of the session
2. Adoption of the agenda
3. Presentation of reports by each country on the Loran-C/Chayka programme
4. Operational matters for FERNS cooperating chains
   1. Scheduled off-air for 2015
   2. Other operational matters
5. Technical matters for FERNS cooperating chains
6. Coordination of other radio navigation services in the Far East
7. Discussion of amendments to the FERNS Agreement
8. Report of the 9th TWG Meeting
9. Other business
10. Date and venue of the 24th session
11. Report of the 23rd session of the FERNS council
12. Closing the session

**Annexe 3**

**List of Documents**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Doc. No.** | | | | **Description** | **Contributor** |
| **CS23/1** | | | | **Opening the 21st FERNS Council session** |  |
|  | | | 1 | Welcoming speech on behalf of China MSA | **China** |
|  | | | 2 | List of participants | **China** |
|  | | | 3 | List of Documents | **China** |
|  | | | 4 | Programme of the 23rd FERNS Council session | **China** |
| **CS23/2** | | | | **Agenda** | **China** |
| **CS23/3** | | | | **Presentation of reports by each country on the LORAN-C/ Chayka programs** |  |
|  | | 1 | | Operational Status of China Loran-C Chains in 2014 | **China** |
|  | | 2 | | JCG\_Operational situation of D chain | **Japan** |
|  | | 3 | | The operation status of Korea Loran-C chain(GRI 9930) | **Korea** |
|  | | 4 | | The results of operational analysis of the Russian stations in chains B and C | **Russia** |
|  | | 5 | | eNavigation – the role of IALA | **IALA** |
|  | | 6 | | eLoran Briefing | **UK** |
| **CS23/4** | | | | **Operational matters for FERNS cooperating chains** |  |
| **CS23/4.1** | | | | **Scheduled off-air for 2015** |  |
|  | | 1 | | Scheduled off-air for Loran-C system in China | **China** |
|  | | 2 | | Proposed Off-air for Maintenance Periods in 2015 | **Japan** |
|  | | 3 | | The scheduled off-air of Loran-C station in 2015 | **Korea** |
|  | | 4 | | Scheduled off-air in 2015 | **Russia** |
| **CS23/4.2** | | | | **Other operational matters** | **None** |
| **CS23/5** | | | | **Technical matters for FERNS cooperating chains** |  |
|  | | 1 | | Demodulation and decoding method of enhanced Loran-C signal | **China** |
|  | | 2 | | A Modification in Implementation Plan of Korea eLoran System (2014) | **Korea** |
|  | | 3 | | The Russian-Korean Chain | **Russia** |
|  | | 4 | | RTCM-SC-127-Background | **UK** |
| **CS23/6** | | | | **Coordination of other radionavigation services in the Far East** |  |
|  | | 1-1 | | The Construction of CSSA Based Maritime Service Platform in China | **China** |
|  | | 1-2 | | Report on Development of E-NAV Test Bed of Yangshan Port of Shanghai | **China** |
|  | | 2 | | Development\_and\_Operation\_Status\_of\_DGNSS\_Software\_RSIM | **Korea** |
|  | | 3-1 | | Automatic Identification System in RUSSIA | **Russia** |
|  | | 3-2 | | Status and Future Development of the Russian Maritime Differential Subsystem in the Far East | **Russia** |
| **CS23/7** | | | | **Discussion of amendments to the FERNS Agreement** |  |
|  | | 1 | | Draft Revised FERNS AGREEMENT - Proposed by China 2014 | **China** |
|  | | 2 | | Opinions\_on\_the\_amendments\_to\_the\_FERNS\_agreement | **Japan** |
|  | | 3 | | Draft Revised FERNS AGREEMENT - Proposed by Korea 2014 | **Korea** |
| **CS23/8** | | | | **Report of the 9th Technical Working Group meeting** |  |
|  | 1 | | | Report of the 9th TWG meeting to the 23rd FERNS Council session | **TWG** |
| **CS23/9** | | | | **Other business** |  |
|  | | 1-1 | | Radionavigation in member-countries of the CIS | **Russia** |
|  | | 1-2 | | Cooperation in the field of navigation and synchronization technologies | **Russia** |
|  | | 1-3 | | NAVIS Inc. GLONASS/ GPS/ GALILEO Technologies and Equipment | **Russia** |
| **CS23/10** | | | | **Date and venue of the 24th session** |  |
|  | | 1 | | Date and venue of the 24th session |  |
| **CS23/11** | | | | **Session report** |  |
|  | | 1 | | Report of the 23rd session of the FERNS council | **IALA** |