

Report of Survey on follow-up initiatives of the UN/USA GNSS Regional Workshops and International Meeting of Experts 2001-2002

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1. Introduction.

In order to actualize one of the main recommendations of the UNISPACE III on the Global Satellite Navigation System (GNSS), the United Nations Office for Outer Space Affairs (OOSA), within the framework of the United Nations Programme on Space Applications, organized four regional workshops between 2001-2002, and an expert workshop in Vienna, in December 2002. The overall objective of the workshops was “an extended user of the GNSS technology, including networks of experienced and beginner users from Government and academic institutions as well as from the private sector”.

A summary of the recommendations made in the area of transportation applications of GNSS in these previous workshops is presented bellow. To ascertain the extent and status of implementation of the recommendations of these previous workshops by the participants through their initiatives and follow-up actions, a questionnaire was circulated by OOSA to all the participants of the workshops and their responses, as received, are presented in this report. As part of the objectives of the survey, the workshops recommendations where no action has been initiated were identified and suggestion on way forward proposed. Finally, a review of the pilot projects was undertaken in the light of feedbacks from respondents to the questionnaire, and an outline of priority pilot projects and modalities of implementations was suggested.

2. Summary of Recommendations on Transportation Applications of GNSS Technology from the Previous Workshops

2.1 Santiago, Chile, April 2001

The workshop was held in Santiago, from 1 to 5 April 2001, for the benefit of countries in Latin America and the Caribbean. The emphasis of the recommendations in the area of transport was on training and capacity building assistance from OOSA and GNSS services providers for personnel in the transport and aviation industry to acquire the requisite skills and expertise necessary to guarantee the provision of air navigation services.

Toward this end, the need for the establishment of regional GNSS training and research centres that would include the participation of various governments and universities was advocated.

2.2 Kuala Lumpur, Malaysia, August 2001

The workshop was held for the benefit of developing countries in the Asian-Pacific regions and recommended the establishment of a GNSS forum by the International Maritime Organisation (IMO) to address issues such as operational requirements, performance standards, user requirements and interoperability of GNSS.

2.3 Vienna, Austria, November 2001

The Vienna workshop was held for the benefit of countries in Eastern Europe and noted that GNSS, as defined by ICAO, included GPS, GLONASS, SBAS, GBAS, ABAS and GRAS. It also noted that although GPS had significantly raised the platform of Aviation Safety, it was limited in the area of signal integrity of the services. This resulted in the development of Augmentation systems such SBAS, WAAS and LAAS to meet the requirements of the Aviation industry with respect to signal integrity, availability, accuracy and continuity. Also noted was the enhancement of position fixing capabilities of mariners for all stages of voyage under any condition made possible with the availability of GPS and DGPS. Significant areas where the GNSS had been applied in Europe included mapping of road and railway corridors.

2.4 Lusaka, Zambia, July 2002

The workshop held in Lusaka for the benefit of users communities of Africa and Western Asian countries noted the lack of effective regional structures and centralized and institutionalized academic environment where regional expertise developed in GNSS technology could be exploited. ICAO and OOSA were asked to facilitate a GNSS executive-level regional workshop with all African Director-Generals of civil aviation to address the above challenges and to strategize on the concept of one African sky.

2.5 Vienna, Austria, December 2002

Having considered the recommendations of the regional workshops, the 2002 expert workshop in Vienna recommended the need to increase political awareness with respect to GNSS applications for all modes of transportation to politicians and decision-makers, particularly in the developing regions of the world. The programme to this effect involved the production and distribution of basic documentation for decision-makers, the establishment of a National GNSS group and Regional GNSS group, and was developed for consideration and implementation by the UN/OOSA Action Team on GNSS.

3. Response from Previous Workshop Participants on Initiatives and Follow-Up Actions Effected Towards the Implementation of the Workshops Recommendations.

3.1 Marius-Ioan Piso, from Romania, attended the Vienna workshop of November 2001 and reported as a follow-up action to the recommendations of the workshop the development of a GNSS-Galileo application centre, which had been partially supported and coordinated by the Romanian Space and Aeronautics Programme. The project started in 2002 and is expected to be formally established in 2004. The Centre will undertake development and dissemination of GNSS general and professional knowledge, ensuring development and test facilities for GNSS applications. It would also offer consultancy services. The difficulty envisaged in this initiative lied in the need for harmonization of public, commercial and individual developers and users different policies on GNSS technology applications.

3.2 Balota Octavian, from Romania, attended the Vienna workshops of November 2001 and December 2002, and indicated his involvement in promoting the completion of a permanent GNSS network stations (ROMPOS) in Romania, similar to the SAPOS network in Germany. A feasibility study was being carried out in this regard and the difficulties encountered were the absence of reference commercial base line upon which to make realistic projections. This had also implied poor appreciation of the initiative from decision-makers.

3.3 Matej Klobusiak and Katarína Leitmannová of Slovakia, both participants of the Vienna workshop of November 2001, reported that they had developed a project for the establishment of the Slovak

permanent GNSS service (SPGS) which was to be operated on the Slovak Spatial Observation System (SKSOS). This national project awaits financial assistance for implementation. At the international level, the participants indicated that Slovakia had joined in 2002 the activity of Senate Department for Urban Development in Berlin for the establishment of a uniform DGNSS basis infrastructure for navigation, positioning and locating in real-time in Central and Eastern Europe (EUPOS). The project will be submitted to the European Union for financial support from European funds until October 2003. SKPOS is compatible with EUPOS strategy. Two workshops had been held on this subject in Berlin: the first one was held from 4 to 5 March 2002 on "Multifunctional reference station system for Europe", and the second one held between 21 and 22 November 2003 titled "EUPOS – a multifunctional GNSS reference station system for Europe". The problem encountered from this region in promoting the GNSS application initiative involved the lack of awareness and appreciation of Government officials on the importance of building ground base national infrastructure and permanent services for multifunctional utilization.

3.4 Tomáš Hlásny, also from Slovakia, attended the Vienna workshops of November 2001 and December 2002. He reported as a follow-up initiative the establishment of a regional GNSS coordination group (Slovak Republic and Czech Republic) at an institutional level. This coordination group was to enhance the follow-up on the conclusions of the various working groups during the workshops and publish in Czech journal articles summarizing the conclusions of the meetings and the technical perspectives of all the GNSS components in the new millennium. The problem encountered in these initiatives bordered on the terms of reference of the coordination group and collaboration relationship with OOSA.

3.5 William Martínez-Díaz, from Colombia, attended the workshop held in Santiago, Chile, from 1 to 5 April 2002, and reported his participation in the meeting XXI Brazilian Congress of Cartography, which took place from 29 September to 3 October 2003 at Belo Horizonte, Minas Gerais, Brazil. He also made a presentation on the importance of the Geocentric Reference Systems for the Americas (SIRGAS) and its official adoption in Brazil. He further stated that the National Mapping Agency of Colombia (Instituto Geografico Agustin Codazzi) had undertaken the implementation of a National Network of Permanent High Accuracy GPS Stations for Colombia, which involved the installation of 18 stations during 2003-2004. The participant has been in charge of the justification and technical support of the project. He indicated that a National Policy for Spatial Technology was being drafted with the pro-tempore Secretariat in Colombia under the aegis of the Fourth Spatial Conference of the Americas. The goal was to present a document to the National Planning Department and to get assistance for the implementation of activities based on the space.

In addition, the Geocentric Reference Framework for Colombia, based on the Geodetic Space Techniques for Cartography, had been officially adopted to be effective from December 2003.

During the XXIII General Assembly of the International Union of Geodesy and Geophysics, hosted from June 30 to July 11 in Sapporo, Japan, the technical foundations for the determination of a new vertical reference system, based on gravity observations, was presented and discussed. Among other tasks, the connections of the classical leveling networks between Colombia and Venezuela, Colombia and Ecuador, Argentina and Uruguay, Brazil and Venezuela, Argentina and Chile had been carried out. New connections were in the preparation process (SIRGAS Vertical Datum).

Furthermore, GPS campaigns on tide gauges of the SIRGAS area had been realized in order to monitor the mean sea level and the sea topography as a complement of the satellite altimetry observations.

Also, EUREF and SIRGAS had agreed during the meeting in Sapporo on the definition of a vertical datum. This was done under the framework of the Integrated Geodetic Global Observing System.

The participant also made presentations and conducted a short course on subjects such as: “Galileo: the European GNSS, Reference Systems and Global Positioning Systems; Basic Concept of Positioning: Geodesy and Cartography; Geodetic Observation of The Earth System, and the Present state of Reference Systems”. The difficulties encountered in this initiative bordered on the problems of adoption of SIRGAS vertical datum by regions using the national classical datum that were not defined by space technique. Thus, the mixed scheme affected the accuracy of satellite measurements and data interoperability. There was also need for financial assistance to support the training and capacity building initiatives.

3.6 T. Ahmed Rufai, from Nigeria, reported that the National Space Research and Development Agency, after having considered his workshop reports held in Lusaka 2002 and Vienna 2002, developed the Abuja Map using the GNSS technology for geo referencing, which was integrated with a high resolution satellite imagery to cover the capital city of Nigeria (Abuja). The participant also attended both of the meetings. The project was currently test running a “Navaid” for road transport users in collaboration with GEOMATICS of Canada. As a follow-up to this initiative, there was a project for vehicle tracking and fleet management systems that had been developed for implementation. Discussions had been initiated on the technical feasibility of an L-band payload for SBAS on the proposed Nigeria communication Satellite Project to cover the African Continent. Workshops for demonstrations and hands on tool training had also being planned for December 2003. While the Abuja Map had been completed, the rest was at the planning stage. The main impediment towards implementations of this initiative was inadequate funding from the Government, which led to the postponement of the workshop originally planed for October 2003.

3.7 Hassanuddin Z. Abidin, from Indonesia, attended the Kuala Lumpur workshop in Malaysia, August 2001 and reported his undertaking of a research on a GPS-based vehicle tracking systems. He also indicated a collaborative research with a Malaysian colleague on the concept and implementation strategy of WAAS for South East Asian region. Inadequate research funding was reported as the problem encountered in this initiative.

3.8 Dr. Surrendra Pal from India, who attended the two workshops in Vienna submitted that, the Indian Space Research Organization along with the Airports Authority of India is establishing a SBAS-GNSS system called GAGAN (GPS And GEO Aid Navigation), intended to fill the gap between the EGNOS and MSAS-covering area, providing seamless navigation to civilian air traffic over South Asian region and extendable to East Asia and Australia.

He reported that, as part of the GAGAN project, a large network of monitoring stations, reference stations, uplink earth stations , Master & Control Centre is being established.

The project is also envisaged to service the road, railway and waterway GNSS requirements, aside from providing services for GIS, water management, agriculture, mining, town planning agencies. He further indicated that Bilateral talks is going on to explore the possibility of extending services to neighboring countries and a user interaction seminar is being planned to increase the awareness. Training and seminars have been given on this programme to also enhance user community awareness while no difficulty was reported in this programme, a coordination/working group is being advocated"

4.0 Survey Report from Other Sources.

1. Africa

Under the auspices of ICAO, the 14th meeting of AFI planning and implementation regional group on GNSS (RNAV), including procedures development and project implementation in Africa, was held from 23 to 27 June 2003, in Yaoundé, Cameroon. As part of the conclusion at the end of the deliberations, IATA stated its commitment to work with AFI State, Air Traffic Services providers and airspace users to foster application of GNSS in the region. Towards this end, IATA was supported by ICAO, US NIMA, and FAA, and established the GNSS procedures. The development and implementation programme with the following projects outline were being implemented. This included:

- World Geodetic Surveys (WGS-84 Surveys);
- Development of GNSS (RNAV) non-precision approach procedures;
- Development of GNSS (RNAV) standard instrument arrivals (STARs) and departures (SIDs) procedures;
- Modification of airspace structure design to meet the GNSS (RNAV) requirements;
- Development and preparation for publication of all relevant charts;
- Flight verification of GNSS (RNAV) procedures; and
- Drafting of GNSS (RNAV) legislation and regulation.

Regarding training seminars and workshop, a three-day implementation workshop was held in Kenya, in September 2002, with ATS providers from Seychelles, Tanzania, Kenya, IATA, ISI and other stakeholders in attendance. Similarly, an implementation workshop was held in Zambia, also in 2002, with participation from Zambia, Botswana, Malawi, IATA, ISI and regional airlines. Meetings with airspace users took place in Europe in October and December 2002.

Also in November 2002, the Department of Transport of USA (DOT) co-sponsored a Global Navigation Satellite System (GNSS) Implementation seminar with ICAO and the Kenyan Civil Aviation Authority in Nairobi. More than 20 sub-Saharan African countries attended. The seminar resulted in the development of a pilot project outline for regional implementation of Global Positioning Satellite and GNSS technology for the East African community.

Similarly, during the meeting of the Coordination and Monitoring Committee and Council of Ministers for the Implementation of the Yamoussoukro Decision on Air Transport Liberalization in West and Central Africa, Lome, Togo, on 26 February 2003, Ava Wilkerson remarked on the project regarding flight inspection on new Global Navigation Satellite System (GNSS) procedures at major airports in the SADC region, which was supported by FAA in cooperation with the International Air Transport Association.

Wilkerson mentioned further that FAA, in appreciation of the importance of self-sufficiency, had trained a number of operational African specialists under the Safe Skies Initiative, which was intended to be an example of training the concept of the trainers.

The issue of supporting and strengthening training academies in Africa, rather than encouraging training outside of the region, was also articulated. Basic tools and technical know-how on GNSS were being

provided to the African civil aviation authorities to enable them chart their own course for future improvements to their air traffic management systems.

2. Australia

The civil GPS service interface committee, international sub-committee meeting was held from 10 to 11 Feb 2003, in Melbourne, Australia. It was disclosed that the Australian GNSS Coordination Committee (AGCC), established by the Minister for Transport and Regional Services in May 2000, had to date initiated the following work:

- Development of a national strategic policy for GNSS implementation, in which consideration of existing augmentation systems was to be an element. This work was being undertaken by a Policy Development working group;
- Development of a promotional and educational strategy for the purpose of promoting the importance of GNSS coordination and the AGCC's role, and educating the community in the uses and value of GNSS. This work was being undertaken by a Promotion and Education working group;
- Investigation of legal and safety issues associated with GNSS, where two priority issues were liability resulting from damage caused by system failure and protection of signals from jamming or interference; and
- Establishment of strategic links with appropriate forums in Australia such as the Radio Communications Consultative Committee and International Radio Communications Advisory Council, and bodies in other countries such as the Civil GPS Service Interface Committee (CGSIC) in the United States.

3. Europe

As part of the EC/ESA joint effort with UN/OOSA for GNSS applications, EC and ESA had launched about 100 projects and studies aimed at assessing the GNSS applications and services from different points of views. More than 60 M€ had been committed to these projects. As reported by Claudio Mastracci, Director of Applications, European Space Agency, a summary of on-going EC/ESA projects and studies were as follows:

- Road (22 projects): projects aimed to introduce GNSS on car guidance, fleet management, road charging and advanced future technology for intelligent navigation;
- Rail (13 projects): a large effort was made to demonstrate the potentiality of GNSS for safety improvement in this domain and support to European Standards;
- Maritime (14 projects): control and monitoring of dangerous goods transportation, harbor safety critical maneuvers, in-land waterway navigation, and support to IMO standards for vessels Automatic Identification System (AIS);

- Personal Navigation (21 projects): GNSS/Mobile phone integrated solutions for “location-based services”, emergency call, civil protection personnel and assets management, blind support, child and people tracking;
- Aviation (8 projects): classical navigation for aviation, airport ground movement management, helicopters navigation, and support to international standards;
- General: “horizontal” issues like standards, market, regulatory and legal aspects of GNSS services; and
- Others: emerging new applications (precision farming, timing, law-enforcement).

Also at Graz, in Austria, the seventh conference in the GNSS series titled “GNSS 2003” was held under the auspices of the European Group of Institutes of Navigation (EUGIN). The conference was hosted by the Austrian Institute of Navigation (OVN) and took place from 22 to 25 April 2003 at Graz, Austria. It focused on the present status as well as on future developments in navigation systems, with special emphasis on Galileo. The conference was reported as a showcase for state of the art and, more importantly, for innovations in the field of terrestrial and satellite navigation. The implementation of new technologies in navigation was illustrated by the industry exhibition, which ran in parallel to the conference.

4. Asia–Pacific

The 3rd APEC transportation ministerial meeting was reported to have been held from 6 to 9 May 2002, at Lima, Peru. The meeting was titled “Connecting APEC: Pathways to Prosperity” and issued a joint statement noting the progress of its work on safety and security across all modes, including environmental considerations and the adoption of new technologies such as Satellite Navigation and Communications (SN&C) systems as well as Intelligent Transport Systems (ITS). The joint statement also declared the common understanding that SN&C and ITS could contribute much to the Region's most significant transportation needs relating to saving lives, time, money, energy and the environment through more effective use of the existing transportation systems and related infrastructure. The meeting endorsed the continuation and development of that work with emphasis placed on the recognition of the fast pace of technology advancements, taking advantage of the benefits that would accrue to the transportation industry.

In addition, during the ATC conference held on 12 July 2002, in Beijing, China, the Asian-Pacific region GNSS initiatives outlined and deliberated on key issues such as putting in place a GNSS implementation team GIT, whose work programmes are as follows:

- Facilitate an incremental approach for use of GNSS for multimodal transportation, as validated by cost benefit analysis of satellite navigation and communication system components;
- Assist economies to implement GNSS as supplemental and/or primary means of air navigation;
- Assist economies to implement test reference station to encourage data collection and analysis and share the results;
- Provide analysis on the current status of GNSS across all transportation modes and determine opportunities to utilize GNSS technology;

- Encourage the share use of GNSS facilities and services whenever economically and operationally beneficial; and
- Promote collaborative research projects in all areas related to evolving GNSS technology.

5.0 The Recommendation on Transportation from GNSS Workshops yet to be implemented.

The expert meeting of December 2002 in Vienna considered the various recommendations of the regional workshops. It came up with a programme of actions to enhance the awareness level of managers of the transportation industry and establishments of the potential benefits of GNSS application for safe, efficient, reliable and sustainable transportation systems. The outline of the recommendation awaiting implementation by OOSA is presented in appendix-I. The need for skills development and capacity building through an institutionalized and organized training programme, particularly canvassed for by participants from developing countries, had not been addressed.

6.0 Observations

From the survey reports and feedbacks, it was observed that:

1. The regional workshop had stirred up many activities in the area of promoting the applications of GNSS technology to enhance safe and reliable transportation system.
2. The aviation industry remained in the forefront with respect to user segment, followed by the maritime sector with relatively low activities in the road and rail transportation systems. The activities of ICAO, IATA, and FAA in the aviation industry on GNSS applications, as advocated by UN/OOSA had been quite commendable; other similar international organizations could be encouraged to do the same when enhancing GNSS applications in the area of marine, road and rail transportations.

3) Institutional training academies through established structures remained a key demand of the developing countries.

4. Cost constraints had remained a major impediment towards actualization of various initiatives proposed by the participants of the workshops, particularly from the developing countries, where awareness and appreciation of the potential benefit of the technology had been low.
5. The expected spate of activities and communications between OOSA and the workshops participants was not achieved due to the fact that the focal points from each regions were not integrated into one organized committee or action team to enhance the need for a follow-up initiative.

7.0 Suggestions on Pilot Projects Implementations

- 1) The recommendation at the Vienna expert meeting for a national and regional GNSS group on transportation at a proposed cost of \$280,000.00 could be integrated with the proposed IGO, with task and programme managers and coordinators appointed to oversee the implementation of the recommendation. The key mandate of the transportation applications in the proposed IGO should dwell on the need to integrate and harmonize all the national and

regional activities on GNSS applications, in particular in the transportation sub-sector, by standardizing policies and procedures, setting guidelines and monitoring implementations benchmarks and targets on the programmes and activities of the IGO.

2. The need for training and capacity building was a cross-cutting recommendation that should be coordinated by the existing space agencies and UN regional training centres as recommended, and supervised by the proposed national and regional IGO coordinators. An annual grant for training support at regional level in the amount of \$250,000 per region was estimated for consideration.

3) Emphasis should be given to the fleet management systems using the GNSS technology through pilot project support to promote the exploitation of the social-economic benefits accruable to both the user segment and service providers. An estimated grant of \$150,000.00 each was suggested for such pilot projects, with six of such projects being suggested, to be distributed among the African, Asian and South American continents. This fund would be managed and disbursed through IGO to be put in place.

4) WGS-84 was a key and fundamental requirement for transportation application using the GNSS technology. It will be necessary therefore to assist developing countries through counterpart funding of project in this direction. A suggested amount of \$500,000.00 could be set-aside for this purpose. Africa, South America and Asia could be considered as the potential beneficiaries.

Appendix 1

Pilot Project on Transportation Recommended at Vienna Expert meeting:

Strategies	<u>Responsible Party</u>	<u>Time Frame</u>
Introduction document for the decision-makers	UN	1st year
Multi-modal demonstration	UN	
Multimedia products	UN	
Workshops, conferences, seminars,	UN	
Establishing National GNSS group	Member States	2nd year
Define terms of reference	Member States	
Identify team leader	Member States	
Establishing Regional GNSS group *	Member States/UN	3rd year
Define terms of reference	Member States/UN	
Identify team leader	Member States/UN	

Possible funding sources and Budget:

- UN, Service Providers, Manufacturers, US-TDA, European Commission, Member States.
- Informational Brochure/Package: \$20,000
- Multi-media: 10 minute video: \$35,000
- **Technical Exhibit: \$25,000**
- Multi-modal demo (including \$200,000 equipment, promotional materials,

resources, etc.):

Total \$280,000.00

Appendix 2

Completed RTD Projects under the European Commission's Fourth and Fifth Framework Programmes.
(European Commission's Fifth Framework Programme: <http://www.cordis.lu/growth/src/proj-fp5.htm>)

ATOMOS II: Advanced technology to optimize maritime operational safety, integration and interface.

This project brought up the benefits of advanced computer and control technology to the European Fleet in the fastest and most cost-effective manner possible. In addition, the project applied and validate processes and tools related to the successful implementation of control system retrofit. (<http://www.atomos.org/>)

BERTRANC: Methodology of safety in marine operations.

BERTRANC aimed to help develop a common methodology for investigating maritime accidents and reporting of hazardous incidents, and also to improve the understanding of human factors related to those events.

(<http://europa.eu.int/comm/transport/extra/bertrancia.html>)

COMETA: Open Architecture for Onboard Systems used in freight and fleet management

(Completed Project).

The COMETA project was initiated to answer the strong concern regarding the potentially growing proliferation of on board systems for commercial vehicles. The aim was therefore to define and design modular associations of various on board performed functions, allowing for efficient interfacing within a global telematics system.

(<http://www.cometa-project.com/>)

ECOTTRIS: European Collaboration on Transition Training Research for Improved Safety.

This project addressed the problems raised by the increase in automated tasks in the airline cockpit, and the changing in the role of the crew, from an active to an apparently more passive one, supervising and managing automated systems.

(<http://www.europa.eu.int/comm/transport/extra/ecottrisia.html>)

EMERTA: Safety Assessments for Air Traffic Control.

EMERTA aimed to establish the feasibility of using emerging NGSS services in their existing form to meet Air Traffic Service (ATS) and Airline Operation Centre (AOC) requirements. (<http://www.cordis.lu/transport/src/48320.htm>)

EUROSIG: Development of the Complete ERTMS Concept.

The project is a part of a set of interlinked activities aimed at the development of a European common, wide concept for a railway safe signaling system (ERTMS). In particular, the project covered the main industrial activities relating to the system design

and prototyping

(<http://www.cordis.lu/transport/src/eurosig.htm>)

FASS: Fast Ships Safety.

FASS aimed to appraise on a formal and scientific basis the navigation risk factors and the safety level of fast vessel operations.

(<http://www.europa.eu.int/comm/transport/extra/fassia.html>)

FSEA: Concerted Action on Formal Safety and Environmental Assessment of Ship Operations.

The Concerted Action intended to help the harmonization of European activities in regulating shipping transport and to reach a consensus on the necessary further developments for the assessment of safety and environmental impacts from shipping.

(<http://europa.eu.int/comm/transport/extra/fseaia.html>)

FV-2000: Quality of freight village structure and operations.

The FV-2000 project will aim at the development of user-oriented guidelines and simulation tools for the evaluation of the FV structure and organisation, in order to increase the attractiveness of intermodal transport for industrial and transport operators.

(<http://www.freight-village.com/fv2000>)

HEROE: Harmonization of the European Rail Operating Rules.

The HEROE Project aimed at harmonizing the rules and regulations for the new European Rail Traffic Management System (ERTMS) control-command system and determine its safety problems.

(<http://europa.eu.int/comm/transport/extra/hero.html>)

HUSARE: Human Safe Rail in Europe

(Managing the Human Factor in Multicultural and Multilingual Rail Environments)

HUSARE aimed to establish a common method for evaluating and improving human management in order to increase safety and reliability for European cross-border railway lines.

(<http://www.cordis.lu/transport/src/husare.htm>)

INCARNATION: Efficient inland navigation information system.

INCARNATION aimed to develop a River Information System (RIS) that would improve the on-board information available to skippers as well as the information available to parties involved in logistics.

(<http://europa.eu.int/comm/transport/extra/incarnationia.html>)

INTRA-SEAS: Integrated Management of Multimodal Traffic in Port Terminals.

The project is dealt with the safety and economic assessment of the performance of port-related intermodal transport management. The development of software simulation tools to assist in assessment was a major aim of the project.

(<http://www.necl.ie/html/projects.html>)

MASIS II: Human Element in Man/Machine Interface and Interaction to Improve Safety and Effectiveness Transport for the European Fleet.

The project aimed at improving human behaviour on board ships with special attention to emergency situations, by providing practical tools and solutions which can be readily implemented in order to enhance on-board and on-shore management and improve the working condition of shipboard personnel (<http://www.isl.org/>)

MBB: Maritime Black Box.

MBB aimed to develop and demonstrate a standardized maritime voyage data recording system similar to black box systems employed in the aviation sector.

(<http://europa.eu.int/comm/transport/extra/mbbia.html>)

MUSSST: Multimodal Safety Satellite System for Transport.

MUSSST aimed to help the different user communities that are considering the use of GNSS for their specific applications to authorise its operational use. The project aimed at developing a service offering improved performance in terms of accuracy, availability and integrity.

<http://europa.eu.int/comm/transport/extra/mussstia.html>

Parcelcall: Open architecture for intelligent tracing solutions in transport and logistics (Completed Project)

This project aimed at creating a scalable real-time, intelligent, end-to-end tracking and tracing system for transport and logistics applications in order to operate across all border, carriers and transportation modes. (<http://www.parcelcall.com/>)

Rolling Stock (Completed Project): To supply chain visibility by dynamic consolidation of rolling stock information.

The objective of this project was to accelerate the wider adoption of innovative mobility management systems by the manufacturing, distributing and logistics services providing industries, both in SMEs and larger companies. (<http://http://www.eu-rollingstock.org/>)

SAFE Tunnel (Completed Project): Innovative systems and frameworks for enhancing of traffic safety in road tunnels.

This project aimed at reducing the number of accidents inside road tunnels through the application of preventive measures. (<http://www.crfproject-eu.org/>)

SAFECO II: Safety of Shipping in Coastal Waters.

SAFECO aimed to increase the safety of shipping in European coastal waters by demonstration of risk assessment techniques for communication and information

exchange. (<http://europa.eu.int/comm/transport/extra/safecoiia.html>)

SAFECO: Safety of Shipping in Coastal Waters.

SAFECO aimed to increase the safety of shipping in European coastal waters by analyzing the underlying factors that contributed to the maritime accident risk level.

(<http://europa.eu.int/comm/transport/extra/safecoia.html>)

SAMS: Advanced Surface Movement Guidance and Control System

SAMS aimed to design and develop an evaluation platform for Advanced Surface Movement Guidance and Control Systems (A-SMGCS), which are intended to improve ground handling capacities of airports.

(<http://europa.eu.int/comm/transport/extra/samsia.html>)

S-CCB: Secured Cargo Black Box system for Preventing Fraud in Maritime Transportation with an Automatic and Tamper Proof System (Completed Project).

This project accelerated the adoption and use of telematics applications for preventing fraud in export activity, aiming at completing and implementing a former project called Cargo Black Box (DISCII).

(http://dbs.cordis.lu/fep-cgi/srchidadb?ACTION=D&SESSION=73832003-5-26&DOC=1&TBL=EN_PROJ&RCN=EP_RCN_A:61282&CALLER=PROJ_FP5)

SEALOC: Assessing Concepts systems and tools for a Safer more Efficient And Lower Operational Cost of the maritime transport of dangerous goods.

SEALOC aimed to provide recommendations for the improvement of safety in maritime transport of dangerous goods in Europe, using cost effectiveness analysis. To achieve this objective, the project relied on three case studies using the Formal Safety Assessment (FSA) methodology. (<http://www.cordis.lu/transport/src/sealoc.htm>)

WORKFRET: Working Cultures in the Face of Intermodal Freight Transport Systems.

WORKFRET aimed to contribute to the development of an efficient freight transport system in Europe, taking into account the interests and requirements of the work force.

(<http://europa.eu.int/comm/transport/extra/workfretia.html>)