Project no. TSA6-CT-2006-044709

Project acronym: GLOBAL VIEW

Project title: Strengthening Rail Research Cooperation between Europe and Emerging International Markets for an Integrated International Research Area - GLOBAL VIEW

Instrument: Specific Support Action

Thematic Priority: 6.2 Sustainable Surface Transport

Final report

Period covered: from 01/12/2006 to 30/11/2008
Date of preparation: 28/02/2009

Start date of project: 1/12/2006 Duration: 2 years

Project coordinator name: Dennis Schut
Project coordinator organisation name: UIC

0 Executive Summary

European Commission project "Global View" or in full "Strengthening Rail Research Cooperation between Europe and Emerging International Markets for an Integrated International Research Area" has been launched at UIC HQ in Paris on 04 December 2006.

It was the first and thus pioneer project of this type in rail sector fully funded by International Cooperation Programme of European Commission. The major objectives of project were to disseminate the results of selected EU projects carried out within the FP5 and FP6 RTD Framework Programmes and to learn from similar projects of the international partners in order to identify needs and priorities for joint future international rail research projects, with a particular focus on the participation within the FP7.

An Expert Database was planned to compile rail research experts, networks and institutions interested and involved in international cooperation. In addition to a listing of all resources, the contacts will be put into a web-based database. The link to existing networks shall ensure a lifespan of this information source beyond the lifespan of the project. The database will be presented on the website.

Global View project brings together the key players from the European Research Area, clustered in the Technology Platform for Rail sector - ERRAC (European Rail Research Advisory Council), namely operators represented by UIC, manufacturing supply industry represented by UNIFE, and others ERRAC and EURNEX stakeholders represented by Manuel Pereira as Vice Chairman of ERRAC and Chairman of EURNEX (European Rail Network of Excellence) Council with their international counterparts outside EU namely from India , Russia and South Africa. There were three major milestones workshops in Russia, India and South Africa .

The three project partners worked closely together in organising the workshops and setting up the database with the 3 international partners, being VNIZHT from Russia
RDSO from India and Transnet from South Africa .

The first workshop was held in Moscow, 20 –21 June 2007 along the industry exhibition supported by UNIFE and General Assembly of UIC held at the same time in Moscow .

The second workshop was organised in cooperation with the RDSO, the research institute of the Indian Railways and was held at the RSDO premises in Lucknow on 26 and 27th of March 2008.

The 3rd and last regional workshop was organised in cooperation with Transnet, the biggest South African railway operator and was held on June 30th and July 1st 2008 in Johannesburg in South Africa.

The subjects for the program of the workshops differed per workshop and depended on the priorities of each region. More information was given in the Global View Periodic Activity Reports 1 and 2 and this information can also be found on the project's website.

For the Moscow workshop these priorities were: Innovation for Low Cost & Attractive Passenger Services (high speed), Modularity & Production Technology (MODTRAIN) , Active & Passive Safety (SAMNET) TRAINSAFE and long distance freight. Also there was a focus on the European Rail Research Area (ERA) and its international dimension in FP7 and on ERRAC (European Rail Research Advisory Council) .

For workshop held in India, these priorities were mainly rolling stock (MODTRAIN & EUROPAC), long distance freight (CREAM), infrastructure (INNOTRACK), and safety (.SAFETRAIN, SAFETRAM, SAFEINTERIORS).

For the South African workshop, the focus was mainly on such items as safety (SAFETRAIN, SAFETRAM and SAFEINTERIORS), freight logistics (CREAM), wheel and rail stress as well as train & track condition monitoring .

Within all of the regional workshops, there was also a focus on the European Rail Research Area (ERA) and its international dimension in FP7 and on ERRAC (European Rail Research Advisory Council).

During the final workshop all results from the regional workshops flowed together and possible follow up and future research cooperation possibilities was discussed.

The regional workshops were coupled to technical visits to railway sites and/or research laboratories. The final concluding workshop was held in connection with the INNOTRANS international railway conference and exhibition, and place on September 22nd, 2008 in Berlin, Germany.

A Global view website has been developed and is regularly updated. The address is as follows: http://globalview.uic.asso.fr/

Contact Information:	Mr Dennis Schut UIC - International Union of Railways 16, Rue Jean Rey - F- 75015 Paris Tel : +33 (0) 1 44 49 20 92 Fax : +33 (0) 1 44 49 20 99 E-mail : schut@uic.asso.fr

1 Project Summary

European railways and industry, within the Fifth and Sixth Framework Programme (FP5/FP6), have been focused on integrating and building -up their research resources and competences for strategic priorities of the rail sector vision. They have benefited from the strengthening of the European research Area as clustered in the Railway Technology Platform – ERRAC (European Rail research Advisory Council). That has resulted in flag projects like MODTRAIN or EURNEX among others numerous and valuable EC -funded projects and initiatives. Some non - EU partners are participating, but with limited impact. **There is the need to bring railway international co-operation into a sustainable practice**. GLOBAL VIEW Specific Support Action aims to address this need.

Global View was a pioneer project. It was aimed to be a first step for railway international co - operation, bringing to the international scene jointly the European Railway Undertakings, Supply Industry and Academia to work together with their international counterparts. Therefore, GLOBAL VIEW was focused in the first place on **dissemination** of previous and ongoing railway research projects from FP5 and FP6 as well as from the participating countries and organisations, paving the way for concrete **joint international railway research projects in FP7**.

GLOBAL VIEW clearly targeted specific emerging regions relevant to the European Railway stakeholders, as being China, India and Russia. The end result should be to pave the way for an Integrated International Railway Research Area.

To get there, GLOBAL VIEW proposed a dissemination campaign based on two axes:

1. **Dissemination of railway research project from FP5 and FP6 and learn from similar activities done so far within the identified emerging regions.**
2. **Identification of needs and priorities fort he joint international cooperation on railway research in view of FP7.**

With this, GLOBAL VIEW went further than a dissemination action, already addressed by the FP5 and FP6 projects. It actually provided immediate results on:

1. **Cross-fertilisation** between international rail researchers and industry for a rapid option and transfer of European technologies and gain knowledge on the research results in those emerging markets;
2. **Define jointly international research priorities and future cooperation areas**, suitable for application in those emerging regions;
3. **Increase visibility of European industry technology solutions,** aiming at wider acceptance European standards and support the industry to respond to emerging markets needs.
4. **Implementing the European Commissions research ambitions on international cooperation in rail research.**

GLOBAL VIEW derived from the shared need of the key partners in those projects of FP5 and FP6 clustered in **UIC** (Railway Undertakings), **UNIFE** (Supply Industry) and **EURNEX** (Academia). It started with specific actions bringing together international **Networks of Excellence** in **three workshops in emerging markets** (Russia, India and South Africa) and an **on-site visit** in Europe with support of a **communication website and a contact database**. These activities have been tailored to the needs of the participating countries.

2 Project objectives and major achievements during the reporting period

The following part of the report contains:

- an overview of general project objectives, show the project's current relation to the state-of-the-art
- the objectives for the reporting period, work performed, contractors involved and the main achievements in the period
- comments on the most important problems during the period including the corrective actions undertaken

The objectives for the work to be performed during the project were as follows:

- Project coordination activities such as Project Coordination Meetings and frequent contacts with the regional project partners about their contributions to the project database as well as about the planning of the regional workshops, setting of the agenda for the workshops and the actual organisation thereof.
- Minutes of Project Kick-off Meeting
- Minutes of Project Coordination Meetings
- setting up and upgrading of the Global View website and Communication Platform
- Briefings on Political Framework for Rail Innovation in Europe and Emerging Railway Markets
- Clustering Contact Data Base of International Rail Research Experts and Facilities
- Programme for International Workshops in Russia
- Programming and organising the International Workshop in India
- Programming and organising the International Workshop in South Africa
- Programming and organising the final concluding Workshop in Berlin
- Preparing the different presentation on EU funded railway research projects for the regional workshops as well as for the concluding workshop. For this workshop, a series of presentations were given to the project partners as well as to other interested parties during the course of several days of the INNOTRANS exhibition

The work carried out in the EC project Global View by the project partners can be described as follows:

Project management and Steering Committee

Although the project management (as described in WP1 as being a transversal function) it is involved in the whole GLOBAL VIEW project activities and contribution to the outputs of the other WP's, deliverables are made of reports and minutes.

In the project management the following persons were involved: former project manager Dr. Imrich Korpanec. He left the UIC organisation during the first half year of the project. He was replaced by senior research advisor Mr. Dennis Schut a project manager. Mr. Schut is chairing

the UIC's Research Coordination Group (RCG) which is focussed on EU research projects within the European Commission's Framework Program. Besides that he is also a member of the UIC's International Rail Research Board (IRRB) which has a global membership and dimension. These two dimensions reflect the focus of the Global View project. Mr. Schut was ably assisted by Mrs. Maria Lafont of the World Department of the UIC and worked in close relation with Mrs. Helene Lebreton who bears the financial responsibility for all UIC's European research projects and activities.

Besides these persons, the Steering Committee of the project is also made up of Prof. Manuel Pereira of the IST in Lisbon and Giorgio Travaini of UNIFE. Whenever possible, the international partners to the projects, being the representatives of Russia, India and South Africa, took part in the meetings.

WP 1/ D.1 Minutes of Project Kick-off Meeting

The kick-off meeting for the Global View project was held in the UIC premises in Paris on December 4th 2006. The report of the kick-of meeting was submitted to all the members of the Steering Committee. The Minutes of the meeting that took place December 4, 2006 are published on the Global View website www.globalview.uic.asso.fr.

WP1/ D.2 Global View Steering Group meeting

The Project Coordination Meeting / Steering Group meetings, where held in connection with the regional workshops in Moscow, Lucknow and Johannesburg. =

WP 2/ D.3 The Global View Website

The Global View Website as described in WP 2 is in place and was an ongoing activity. The website was regularly updated with current events, activities and reports.

The website address is: http://globalview.uic.asso.fr/

WP 2/ D.4 Communication and Newsletters on Global View

The Communication Platform / Newsletters have been prepared and published as planned and were widely distributed to stakeholders. Articles have been regularly published in UIC e-News digital newsletters.

WP2/ D.5 Political Framework for Rail Innovation in Europe and Emerging Railway Markets

The planned briefings on the Political Framework for Rail Innovation in Europe and Emerging Railway Markets had to be prepared on the basis of the feedback the UIC should have received from the international partners through the specially for this purpose prepared questionnaires. The partners have been requested to provide existing documents describing the policy determining Rail Innovation (transport policy documents etc). A template has been provided to the international partners that covers investment and legal framework. The participating parties were also invited to add the relevant points that might not yet be mentioned in the draft template. However, despite repeated requests, the contributions of the regional partners have been minimal

or non-existent. Nevertheless, project partner IST has prepared an interesting presentation which was used and discussed during the Global View final Workshop in Berlin on September 21 2008. The report/presentation is published on the Global View website

WP 2/ D.6 International Rail Research Contact Database

This activity concerned the clustering of the Contact Data of International Rail Research for the benefit of the database. Three especially designed questionnaires have been sent out to the associated international partners. These are: Questionnaire 1 - Research projects and Researchers, Questionnaire 2 - Characterization of Railway Sector General Questionnaire and Questionnaire 3 - Railway Infrastructure Management, Operators and Manufactures. Complete results of the questionnaires have been received from VNIIZhT (Russia) and RDSO (India). The International partners in China (CARS) have not responded to any of the questionnaires and this was quite disappointing. This is one of the reasons that the decision had to be taken, after discussing with the project partners and the Global View scientific officer at the European Commission, Mrs. Susana Martins, to ask the Chinese partners to withdraw from the project. As soon as it became clear that the Chinese partner CARS were not at all prepared to organize the regional workshop in Beijing as planned, the cooperation with CARS for the project has been terminated. Finally, China was replaced as regional partner in the project by Transnet from South Africa. However, the cooperation matured in a rather late stadium of the project. Whatever the reason was, despite many repeated requests and contacts about the matter, Transnet did not return any of the questionnaires. Finally, the International Rail Contact database has been set up, using the data presented by the remaining project partners A final report has been written by IST and is published on the Global View website

WP 3/ D.7,8,9,10 Programme for International Workshops in Russia, India and South Africa and reporting

The 1st of the three milestone workshops took place on June 20 -21 in Moscow and was planned along the International Railway Industry Conference and Exhibition supported by UNIFE and General Assembly of UIC held at the same time in Moscow.

The 2nd workshop was held in Lucknow in India on March 26 and 27 2008 . The third workshops should have taken place, but after a long period of waiting, the Chinese railway finally informed the project partners that they were not interested in participation.. After discussions with the EC project officer, South Africa was taken aboard as third regional partner. Finally, the third workshop was held in Johannesburg in South Africa on 30 June and 1 July 2008. Each of the workshops was quite successful and each of them incorporated a technical visit to a railway site or research facility.

On the request of the European Commission, the original program for the Moscow workshop was shortened. This had as disadvantage that beside for a great number of presentations from both sides, there was hardly any time left for a discussion about research priorities for Russia. The plan was to gather these and send them to the project partners later, but this never happened. Only during the concluding workshop in Berlin, some of the research priorities were mentioned.

Reports on the workshops were widely distributed on CD -ROM together with all presentations and other information as well as published on the projects website.

WP 4/ D.11 Concept for the On-site visit of Third Country Experts to Europe

In order to make the final workshop in Europe during the second half of the projects' second year as productive as possible for the visiting international partners, these partners were invited to propose ideas for the type of technical railway sites they would like to visit. The idea was to then incorporate these visits in the program for the concluding Conference on International Rail Research of the Global View project, which was planned for September 2008.
However, this activity has been slightly changed in accordance with the Project Manager, Mr. Dennis Schut, and the European Commission, Mr. Claus Seibt, during the Steering Committee meeting held in India – Lucknow – at the end of the 2nd workshop. One of the reasons for this change of program was the fact that the International Conference and Exhibition (Trade Fair) INNOTRANS was held in Berlin in month 21 of the project. Every aspect of European as well as of global railway research excellence was present there as well as world's innovative experts representing all areas of the "rail business". Another reason was that the limited budget would never permit such an extensive 3 day program of technical on-site visits.

The On-site visit to the European Research Area has been held during the entire International Rail Conference and Exhibition INNOTRANS Berlin. This choice has been made in order to facilitate the Global View partners and stakeholders to access to the up-to-date state of art R&D. To this aim UNIFE and UIC also organized the 23-26 September 2008 in Berlin a Research Stand at Innotrans and invited all the Global View partners and stakeholders to attend to the R&D presentations.

Mr. Michael Clausecker, the UNIFE General Director, and Mr. Eric Fontanel, the UNIFE general Manager, were strongly involved in the preparation of this extensive program. Mr. Clausecker has been responsible for approving the costs of this activity not foreseen in Global View and he directly participated to this program answering questions raised during the presentations. Mr. Fontanel also provided some PowerPoint presentations,

Mr. Travaini of the UNIFE helped the project manager to organise the event and took care of selecting the best location for the event. In this occasion the preliminary results of the thee "regional" Workshops were presented as well as results from questionnaires sent out for the set-up of the database, with a wide participation of European and non-European rail stakeholders.

At this occasion, the R&D priorities of the Global View partner were reviewed and possibilities for future international/global research cooperation were shortly discussed in order to take this information in into account in the preparation of the future R&D projects within the FP7 calls.

The report of the final workshop and on-site visit as well as all presentations used during the final workshop and the technical project presentations have all been downloaded to the Global View website

WP 5/ D.3 Web-based Knowledge Management System

The information gathered from the questionnaires - The characterization of the railway sectors of Europe and the participating countries India and Russia, Institutional framework for research development, Research activities and relevant projects – sent out and completed by the international partners from Russia and India. No information has been received by the Chinese partners. China was replaced by South Africa and the questionnaires were also sent to them for

completion. For some unknown reason and despite some repeated requests, South Africa never provided any information or feedback.

WP 5/ D.4 Web-based Communication Platform

As described above, the Global View website has been created and it was an ongoing activity throughout the duration of the project as well as the communication platform.

Comments on the most important problems during the period including the corrective actions undertaken:

Planning of the international workshops in China, India and Russia

Soon after the start of the project, still under the responsibility of the original Project Coordinator, Dr. Imrich Korpanec of the UIC, it became clear that the initial planning and order of the 3 international Workshops had to be adjusted. It appeared not to be feasible to organize the first workshop together with the Chinese partners during the period as planned. It proved however possible for the Russian partners to cooperate on setting up the program for the 1st workshop in Moscow in June 2006. It was fortunate that this planning coincided with the planning of two major rail event, the UIC General Assembly and the International railway Conference in Moscow. The 1st Global View workshop thus proved to be a quite successful event (see description above).
During this Moscow workshop, 3 representatives from the Chinese international partner organization CARS were present. They also take part in the Global View Steering Committee meeting in Moscow. During this meeting, provisional dates were set for the 2nd Global View workshop to be held in Beijing in early September 2007. However, it appeared that the official consent was needed from the Chinese Minister of Higher Education to enable the CARS organization and the Chinese Railways to organize the workshop as planned and foreseen in the Global View Description of Work.
Directly following the Global View Steering Committee meeting, a letter was drafted by the representatives of CARS and the officers of the UIC. The official letter, requesting the cooperation of the Chinese Minister, was sent out directly. However, apart from a belated acknowledgement of receipt of the letter, no answer was ever received. At first the planned date was postponed and the assistance of the European Commissions official representatives in China was requested and received. However, this did not result in any solution. Finally, in close coordination with the project partners and the European Commission services, it was decided to ask China to withdraw from the project and to replace them by another suitable partner, without changing the general objectives of the Global view project.
The proposal was made to invite the South African major freight railway operator Transnet. This proposal was supported by the project partners as well as the Commission services. Following this decision, contacts have been taken up on several levels between the UIC and Transnet officials. Also the representatives of the European Commission in South Africa will be informed and involved in the process.
Soon a Transnet delegation visited the UIC project coordinator in Brussels and details of the project and expectations for the workshop were discussed. Following this meeting, the Transnet

delegation as well as the project coordinator was invited to the South African Embassy where, among other things, the Global View project was presented.
A positive decision about the future cooperation was soon received from the South African partners and the 3rd Global View workshop was indeed held and took place on June 30th and July 1st 2008 in Johannesburg.
Contractual and financial issues concerning the wor kshops in India and South Africa
India
The organization of the 2nd regional workshop in Lucknow in India at RDSO went very well. A very interesting program was prepared by RDSO and all logistics were excellent. However, as appeared later, due to some mis understanding on the side of the RDSO, no contract has been signed before the end of the project. On the other hand the view of RDSO is that participation in the project has been interesting to them and there are good ideas for future cooperation, so the funding for the workshop as well as some travels is not that important.
South Africa

The 3rd regional workshop in Johannesburg also was a very interesting and rewarding event. In the first place, the participation of South Africa was not foreseen in the project. Luckily South Africa (Transnet) came into the picture at about the right time (in December 2007 the first contacts were made).
However, it took a while before the decision was made by Transnet to really go ahead and get involved. Initially the wo rkshop was planned for May, but then this deadline could not be kept. Then a new date was planned for the end of June and all attention was focused toward the organization of the workshop itself. The fact that a contract between the project coordinator and the new regional partner had to be drawn up and signed – in order to be able to be reimbursed – was not the first priority. Then, after the successful workshop, talks started about the contract. For some reason Transnet did initially not agree with a cont ract under French law but demanded a contract under Belgian law. Transnet and UIC lawyers tried to sort out the differences but the project was drawing to an end. Also by that time, IST, the responsible partner for the information database / the "web based knowledge management centre" had not received any of the requested information or any completed questionnaires, despite many requests from IST, the UIC or the UIC project coordinator. Finally it was decided to work with out a contract and as with India, South Africa was happy to pay for the very good workshop they have organized for the project. Their views and ideas for future research cooperation remain very positive.
A proposal for the re-distribution of the unused funding for the two workshops has been sent to the European Commission's project officer.

Results and lessons learned

Regional workshops

As described above, the 3 workshops and technical visits held in Moscow, Lucknow and Johannesburg were quite successful. Besides learning from each other a nd discussion, many bilateral contacts were made for exchange of information and possible future research cooperation. Also – except for the Moscow workshop – at least a start was made to come to research priorities of the region. These research priorities were finalized in a later stadium of the project. However time prevented to compare all regions

priorities and discuss them. This had to be limited to a “paper” exercise. But, nevertheless, we arrived to these research priorities which could lead to commo n future research projects on a number of issues and problem we all have in common. On the other hand it also became clear that where for example in Europe we need much further technical development, other regions sometimes have systems in place, we only wish for. One of the reasons for this could be that the organization of a railway system in a certain area is completely different from the way we handle this in Europe with the many borders and many different systems and the many different authorities wit h power of decision. Some regions have separate rail systems for freight and passenger transport, which also make quite a difference. Concluding we can say that there are a number of options for future research cooperation but also many issues where we can learn a lot from each other. Within the UIC – which is a global organization – we plan to organize a global research database for the railway undertakings. This issue came up recently in one of the meetings of the UIC IRRB (International Railway Research Board).

International Rail Research Contact Database

This activity concern ed the clustering of the Contact Data of International Rail Research for the benefit of the database. Three especially designed questionnaires have been prepared during the project and sent out to the associated international partners. These are: Questionnaire 1 - Research projects and Researchers, Questionnaire 2 - Characterization of Railway Sector General Questionnaire and Questionnaire 3 - Railway Infrastructure Management, Opera tors and Manufactures. Complete results of the questionnaires have been received from VNIIZhT (Russia) and RDSO (India). There were no results from South Africa despite many repeated requests and promises.
Finally, using the information that was made avail able, the International Rail Contact database has been set up, using the data presented by the remaining project partners A final report has been written by IST and is published on the Global View website . No doubt this information will in the future form a part of the UIC based Knowledge Management System. Developments are going which might lead to a connection to the future ERRAC ROADMAP research data base.

Common research priorities for possible future cooperation

Apart from during the regional works hop in Moscow - where the full program and limited time left no possibility for further discussion – regional research priorities were discussed during the India and South African workshops. Unfortunately, because of the absence of the Indian partners during the final workshop in Berlin, no discussion took place about possible common future research priorities. These had to be distilled from the research priorities from the 3 regions. Russia, India as well as South Africa are very positive and motivated abo ut future research cooperation on a global level with each other and with the EU rail stakeholders and the European Commission.

Below you find the research priorities from Russia, India and South Africa:

a. Research priorities as given by VNIIZhT – Moscow - Russia:

1. Control system of transportation process

- Creating a system of simulation transportation process

2. Infrastructure

- Uses new materials and structures,
- The system of integrated diagnostics infrastructure,
- The normative-methodical base for ensuring the quality of consumed products
- Creating new designs for ways to speed, high-speed and heavy traffic.

3. Rolling-stock

- The normative-methodical base for vital cycle management,
- Increase in axle load,
- The problem of interaction in the "wheel-track",
- Alternative sources of energy for locomotives and special self-propelled rolling stock.

4. The system management and ensuring the safety of train traffic

- End-to-end solution problems of security (functional, information, environment, fire safety).

5. Enhancement economic efficiency of transportation process

- resources-economy:
  1. Lowering of fuel and energy resources rate,
  2. Material resources saving.
  3.

b. Research priorities as given by the RDSO, the research and standards institute of the Indian Railways – Lucknow - India:

1. Sustainability

- Hybrid power for Diesel & electric locos in the 1200 – 1600 hp range
- Cleaner Diesel engines; new design of combustion chambers
- The use of bio-diesel
- Noise reduction for locos (esp. Diesel locs)

2. Infrastructure

- Railway station design (salient features, specifications and design criteria for "world class" stations; small, medium, large; including security issues)
- Condition monitoring methodology for porcelain insulators
- Pantograph and contact line in teraction study for speed > 200 km/h
- Use of high speed on existing bridges (analysis, strengthening and inspection)
- LCC and RAMS of various track and bridge components

- High speed track monitoring > 200km/h (how to record, what to record and ◊ maintenance

Infrastructure (2)

- Turnouts on high speed routes
- Rolling contact fatigue issues
- Track maintenance standards for high speed routes
- Signaling arrangements for speeds over 200 km/h
- Point operation arrangements for speeds of 160 km/h and above
- Landslide monitoring systems
- Fail/safe mode for optic fibers as replacements for copper
-

3. Rolling stock and traction

- Study on locomotive hauled Vs EMU type (distributed power) train - (e.g. for a train with 26 coaches)
- Cab design
- Bogie design for high speed operation (300 km/h)
- Train control and monitoring systems (TCMS)
- LCC & RAMS for rolling stock and traction installation equipment
- Rolling stock passive safety; bio -mechanics
- Longitudinal train dynamics
- Coach and bogie design for 300+ km/h

4. Miscelaneous

- Suicide issues
- Level crossing accidents
- Design criteria for toilets
- Cost revenue models for freight corridors

a. Research priorities as given by Transnet – South Africa - Johannesburg VNIIZhT – Moscow:

1. Operations and Information Technology:

- Technology on locomotives to support operations
- Technology to support train control
- Technology to support safety
- Standardization of technology specifications that can allow the operators in future to enter the networks of each others network.
- Determine a joint set of safety standards and Key Performance indicators to be used to measure improvement

Transformation of railway condition data into operational information .

Many measurements systems are being deployed in today's railways in order to gen erate early warning alarms with operational staff, to prevent catastrophic incidents. Examples of such measurement systems are:

- Hot Bearing Detectors (HBD),
- Defective and Binding Brake Monitors,
- In-motion Weighing Systems,
- Wheel Impact Monitors,
- Acoustic Bearing Evaluators,
- Wheel Profile Monitors,
- Ultrasonic Broken Rail Detectors,
- Points Condition Monitors,
- Electrical substation monitors, etc.

2. Infrastructure and Equipment

Electromagnetic condition monitoring

Background:
All subsystems/components of a locomotive, track circuit, traction supply, etc. have their own electromagnetic "footprint" that changes under fault conditions. By measuring this electromagnetic footprint with antennas or measuring voltages and currents, a lot of information can be ob tained as to the condition of these subsystems. Research must be conducted into using new technologies to analyze, model, measure and process these signals to achieve condition monitoring.

Possible application areas and outputs:

a. Condition monitoring of t rack circuits while on moving track vehicle. This would involve research areas such as:

i. Mathematical modelling of multi-wire, distributed and lumped parameter, non - homogenous transmission lines, including correct termination of such models. Iterative solu tion methods to the models mentioned.

ii. Calibration of such models with field measurements.

iii. Intelligent embedded implementation methods for real -time condition monitoring.

b. Monitoring tractive-effort of different electric motors in the same locomotive and bet ween locomotives in a consistent way.. This will ensure better usage of assets and easier calculation of maintenance schedules.

c. Monitoring the condition of the overhead catenary -pantograph interaction by measuring the electromagnetic waves emitted from (f or example) pantograph bounce.

d. Characterizing transient disturbances such as pantograph bounce to evaluate or model the influence on track-side equipment.

Railway Dynamics Certification

- Safe commissioning of new rolling stock.

Human Resources

Academy with the following agenda items:

- Evaluation of training in Africa
- Evaluation of training centers in Africa
- Process to agree on common competence assessment tools and standards for the railways in Africa
- Cooperation in Training

The potential to use secondme nts as a tool for training and exposure

It is expected to achieve the following:

- Agreement on Centers of Excellence on a regional base for specific and specialized training
- Agreement on Standardization of training material and assessment tools for the following critical grades to allow for mobility of personnel;
    - Train Drivers
    - Assistant Train Drivers
    - Train Control Officers

Conclusions

We can very well conclude that the global interactions worked very well during and after the 3 regional and the final wo rkshops. Both interesting research initiatives and projects were presented from the side of the European stakeholders as well as from the side of the global participants. Many contacts were made to exchange further information on certain issues.

It also seemed that certain research priorities we in Europe deal with have already lead to solutions in one or more of the "regions' and vice versa. We can and will learn a lot from each other through further and strengthened cooperation. (for instance High speed issues in Europe, higher axle loads and monitoring systems in the "regions)
On the other hand there are a number of problems which could be solved through future common research, such as operations issues, environmental issues – cleaner diesel engines and noise reduction, HR training issues etc.

For future cooperation we have to keep in mind very clearly that the "rail world' in these regions is organised in a completely different manner than in Europe. For instance there are differences in the responsibil ities for investments, responsibilities for research to be undertaken and the funding thereof, cooperation schemes with universities etc. Universities in many cases seem to play the role of suppliers to the needs of the operators; even the industry is some time very closely related

to the operators. Infra structure managers are many times the same organisation as the operators or even both are governmentally led.

Form the side of the project participants, we will certainly keep the research priorities given by the “regions” in mind and see how and where we can best cooperate. On the other hand we would like to ask the transport research experts and especially the rail transport experts to take note of the regional research priorities which exist in Russia, I ndia and South Africa and to investigate where it would make sense to emphasise the possible cooperation with one or more of these regions in the future Calls for Proposals of the European Framework program for Research.

All project partners and regional participants wish to extend their gratitude to the services of the European Commission and especially DG Research Directorate H for making this project possible, help bringing these global players together and assist their communication.

.

ANNEX 1

Declaration from the Russian Railway research Institute VNIIZhT:

Russia

Information on the project EU and IUR “Global View”

The workshop “Global View”, whose goal is to strengthen cooperation in railway research between Europe and developing international markets for integrated international space research is among the most attractive projects EU, so as to unite and use of research for further development of railways in various parts of the world and improving its competitiveness.

VNIIZhT is the oldest research organization in the field of railway transport and this year celebrated its ninety jubilee.

With long experience in organizing and conducting research, practically, all areas of railway technology, VNIIZhT appreciates the idea of establishing a single international space research and is open to cooperation with research organizations in various countries in projects EU and IUR. Institute cooperates with the railways, industrial firms and research centres and firms twenty countries in Europe, America, Asia, is an associate member of the International Union of Railways (IUR), official representative of Russian railways in the International Association for heavy traffic (IHHA), scientists and technicians involved in the work of the Organization of Railways Cooperation (ORC). Typing experience of cooperation in projects EU, institute is taking its first steps and this year finished work on the workshop EU “SELCAT” “The analysis and classification of technological solutions aimed at improving the safety of railway crossings”.

The Institute expressed interest in further cooperation in projects EU and IUR, and at the first seminar on the workshop “Global View”, held in Moscow in June last year, VNIIZhT along with detailed information on key research presented problems that might be interesting to study the project “Global View”. The work under this project institute is not implemented for various reasons, one of which is the process of reform VNIIZhT, who is currently the Open Joint Stock Company, “the Scientific Research Institute of Railway Transport”.

Highlighting the importance of working towards strengthening cooperation between Europe and developing international markets for the creation of integrated international space research, VNIIZhT has the following suggestions for possible participation in the project.

1. **Control system of transportation process**
   - Creating a system of simulation transportation process

2. **Infrastructure**
   - Uses new materials and structures,
   - The system of integrated diagnostics infrastructure,
   - The normative-methodical base for ensuring the quality of consumed products
   - Creating new designs for ways to speed, high-speed and heavy traffic.

3. **Rolling-stock**
   - The normative-methodical base for vital cycle management,
   - Increase in axle load,
   - The problem of interaction in the "wheel-track",
   - Alternative sources of energy for locomotives and special self-propelled rolling stock.

4. **The system management and ensuring the safety of train traffic**
   - End-to-end solution problems of security (functional, information, environment, fire safety).

5. **Enhancement economic efficiency of transportation process**
   - resources-economy:
     4. Lowering of fuel and energy resources rate,
     5. Material resources saving.

ANNEX 2

Declaration from Transnet – South Africa

South Africa

EU-GLOBAL VIEW PROJECTS FOR AFRICA

1. **Introduction:**

   The items below indicate a summary of the activities planned by the UIC Africa team for 2009/10. The items are at these stage only proposals and it requires some finance in order to implement it.

2. **Objectives:**
   The overall objective is to highlight the projects that need to be executed in order to establish a perfect environment within the railways industry. It is important to note that due to a lack of investment and skills in the Africa continent there was has been a less or non investment towards; infrastructure and equipment, Human resource development and operational and information Technology.

3. **Projects:**
   We are proposing and requesting some help in the following projects:

b) Operations and Information Technology:
Focus: The focus will be on the following items;

- Technology on locomotives to support operations
- Technology to support train control
- Technology to support safety

The safety improvement of the railways will be paramount and the event will include a site visit to see the On board computers installed by Botswana Railways. The deliverable that we would like to see from the event includes the following:

- Working committee working on standardization of technology specifications that can allow the operators in future to enter the networks of each others network.
- Determine a joint set of safety standards and Key Performance indicators to be used to measure improvement

c) Human Resources
Academy with the following agenda items:

- Evaluation of training in Africa
- Evaluation of training centers in Africa
- Process to agree on common competence assessment tools and standards for the railways in Africa
- Cooperation in Training

The potential to use secondments as a tool for training and exposure

It is expected to achieve the following:

- Agreement on Centers of Excellence on a regional base for specific and specialized training
- Agreement on Standardization of training material and assessment tools for the following critical grades to allow for mobility of personnel;
  - Train Drivers
  - Assistant Train Drivers

  Train Control Officers

d) Infrastructure and Equipment

1. Electromagnetic condition monitoring

Background:
All subsystems/components of a locomotive, track circuit, traction supply, etc. have their own electromagnetic "footprint" that changes under fault conditions. By measuring this electromagnetic footprint with antennas or measuring voltages and currents, a lot of information can be obtained as to the condition of these subsystems. Research must be conduct into using new technologies to analyze, model, measure and process these signals to achieve condition monitoring.

Possible application areas and outputs:
a. Condition monitoring of track circuits while on moving track vehicle. This would involve research areas such as:
i. Mathematical modeling of multi-wire, distributed and lumped parameter, non-homogenous transmission lines, including correct termination of such models. Iterative solution methods to the models mentioned.
ii. Calibration of such models with field measurements.
iii. Intelligent embedded implementation methods for real-time condition monitoring.
b. Monitoring tractive-effort of different electric motors in the same locomotive and between locomotives in a consist. This will ensure better usage of assets and easier calculation of maintenance schedules.
c. Monitoring the condition of the overhead catenary-pantograph interaction by measuring the electromagnetic waves emitted from (for example) pantograph bounce.
d. Characterizing transient disturbances such as pantograph bounce to evaluate or model the influence on track-side equipment.

Transformation of railway condition data into operational information.

Many measurements systems are being deployed in today's railways in order to generate early warning alarms with operational staff, to prevent catastrophic incidents. Examples of such measurement systems are:

- Hot Bearing Detectors (HBD),
- Defective and Binding Brake Monitors,
- In-motion Weighing Systems,
- Wheel Impact Monitors,
- Acoustic Bearing Evaluators,
- Wheel Profile Monitors,

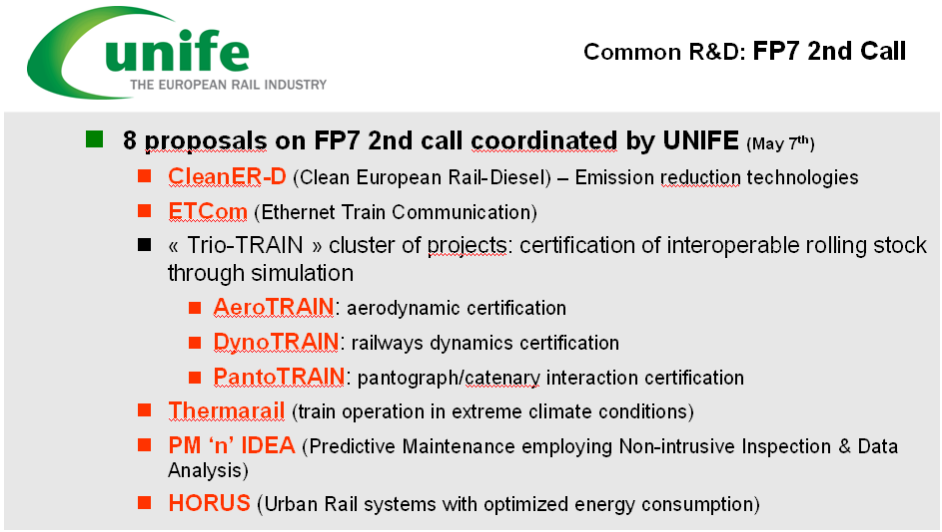
- Ultrasonic Broken Rail Detectors,
- Points Condition Monitors,
- Electrical substation monitors, etc.

Apart from generating alarms the data from these systems, when combined with other sources of data, can provide extremely useful operational information. The analysis of

e) Railway Dynamics Certification

The deliverables will include:

- Active participation in **DynoTRAIN** as shown in the slide below.
- This will assist Transnet Freight Rail to ensure the safe commissioning of new rolling stock.



4. Recommendation

It will be highly appreciated if these projects can be approved and financed so that work can start. African Railways needs to overcome the problems it faces when comes to Infrastructure, human resource development.