INTERNATIONAL UNION
OF RAILWAYS

The spoken word alone prevails

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"Present and future of the CCS, the opportunities and threats of the new supporting technologies worldwide"

Good morning ladies and gentlemen and welcome to the Asia Pacific Workshop for Control Command ad Signaling systems.

It's an honor and also a pleasure for me to be here with you. This is the 3rd edition of this Workshop, and it's a renovated success, at least looking at the participation.

Almost 5 years have passed from the last very successful 2nd workshop hosted by the South-West Jiaotong University of Chengdu – China. Despite the long period, the scope and objectives remain stable and of current importance. The project baseline of the Control-Command and Signalling Development Technologies was initiated established and approved at the UIC Asia Regional Assembly in December 2007; the UIC action line is unchanged since then: to achieve a Global Traffic Management and Control-Command and Signalling development strategy.

This workshop, as well as the future ones, shall provide the rationale for a core set of system requirements, common of the railways' world and be the way to the strong openness of using leading technologies.

It is worth to underline the stable and unavoidable targets of the workshop:

- To identify and promote the basic core concept on common functionalities of the control command and signalling systems in the world;
- To justify the concept on the basis of the information on the structure and requirements of the existing systems, exemplified with the applications in different countries (Japan, Europe, USA, China, Korea, Russia, India, Australia, South Africa and others);
- To address the possibilities of the applicable technologies of the future.

Based on the successful two preceding editions, this workshop will continue to:

- promote and support the technological innovations around the world, while understanding and respecting the various safety thoughts and constraints handed down from their predecessors, as well as the customer needs in the various regional realities;
- respond to the higher and higher quality and performance requirements for the future railway Traffic Management & Control-Command and Signalling systems and play an independent and continuous role in each region for the development, growth and standardization of such systems;
- actively and mutually share information and learned experiences among UIC members

Signalling systems are based on solid basic safety principles that will remain unchanged. Obtaining the track vacancy information (for all the relevant sections), setting up the train route, check the route evolution during the time; release the route/route sections, controlling the spacing between adjacent trains on the same track and the speed of each one so to enforce the respect of the limits imposed by the signalling system (speed and or length of authorised movement) are basic safety functions that will never change in the future.

However, the efficiency and effectiveness of a CCS system can vary as it strongly depends on the availability of precise and timely available safety information (e.g.: Crocodile/PZB other old spot CCS systems can transmit only a few "safety aspects", i.e. very low number of "safety bits" whereas a modern Eurobalise can transmit a corresponding payload of 210 or 830 "safety bits").

The new emerging technologies for track-train communication, especially the new data radio technologies will definitely raise up the performances and cost effectiveness of Signalling systems and Train Control systems and allow a better and better exploitation of the line capacity (this is the positive aspect of the medal).

However, especially when looking at the current trend towards the use of IP protocol in conjunction with open networks (even radio networks), we have to be very careful and use all our skills and knowledge of the rail environment to identify and control the potential threats against the safety since the beginning of any new design.

This scenario is quite new for the Railways but not for other sectors. For instance all the Police / Military forces and in general the Public Protection and Disaster Relief (PPDR) sector have developed and use radio communications systems that intrinsically offer high level end-to-end protection against intrusion, e.g. the well known radio system TETRA. UIC, with the project Future Railway Mobile Communication System (FRMCS) will take in due account such experiences (Note: it's now under discussion the possibility to join the PPDR sector and make a common development)

In general we believe that facing security threats is simpler and especially more effective when using open architectures and clear interfaces between single components of CCS systems (e.g. projects openETCS, UIC-FormalSpecs), as well as known cryptographic algorithms to protect the telecommunications, so that "backdoors" (unwanted and masked entry point to a SW based system) have no room and all the security can be concentrated on the management of a few simple "cryptographic keys", that must remain under the control of the Railways, even when using open telecom networks and the new IT technologies.

Finally, it's already well understood but perhaps not sufficiently received by the Industry side, that the Railways of the 21st century need a better level of standardisation of the CCS systems' components, that could enable a cost effective management of their evolution (especially SW), open and sustain a

worldwide market of spare parts and help the UIC members to optimise the operation and maintenance of their CCS systems.

It is intended that the Workshop will conclude on the vision of a globally justifiable and future oriented baseline for the railway signaling when supporting innovative ideas, use of leading technologies and strongly supporting the common position face to the new challenges, potential threats and rapid changes of technologies and development methods.

I am sure that we'll see a fruitful exchange of experiences, for the common advantage of the Railways in the world. Good work to all of you.