This presentation and its content is based on the current knowledge and plans about the forthcoming tender process, which might be altered or amended up until the issue of the tender documents. Jernbaneverket reserves its right to make any amendments or alterations to the tender process from what is presented herein, and market suppliers should not base any part of their future requests for qualification or tenders on information in this presentation, but on the proper tender documents issued only.
The purpose of this supplier conference

- Introduce you to the largest ICT program in Norway
- To inform about which parts of the program will be tendered in the market
- Help you to find out if your company fits as a potential contributor
- Bring together companies from different industries and countries to facilitate cooperation
- Not to have a specific dialog on technical solutions
Renewal of signal systems is the key driver for the project

- 80% of Norwegian systems are relay based
- Production of relays is halted
- Challenge to interface new equipment to old relay based
- Lack of resources
- Signal and Telecom (command and control) make up approximately 40% of delays
A modern railway should offer continuous supervision of speed and position.

- No automatic train stop or speed supervision
- Automatic train stop (DATC)
- Automatic train stop and speed supervision (FATC)
In 2012 it was decided that Norway should use the European standard ERTMS for the renewal

- JBV asked to plan the rollout of trackside and vehicles (secure system compatibility and project consistency)
Jernbaneverket’s choice is ERTMS level 2
The task is to renew Oslo by 2026 and the total country by 2030

- Project has priority in National Transportation Plan
- Plan requires contracts signed in 2017
- Contracts for ERTMS in 2017 requires RFQ in first half of 2016
- ERTMS project currently undergoing an external quality audit (KS2)
- Schedule to be adjusted according to starting point
Thank you for your attention...
Goals and opportunities

ERTMS National Implementation

Eivind Skorstad, Project Manager - Oslo 7th of January 2016
Our organisation
The scope
Basis for the ERTMS implementation

• The project is dominated by the signalling system-, Onboard- and TMS contract

• Preparatory works and decommissioning and removal is part of the scope

• Large geographical area, challenging weather conditions and difficult access to locations

• The duration of the project until 2030

• Retrofitting of about 500-600 trains

• Implementation according to the National Signalling Plan
Organisation and competence

- Both Jernbaneverket and the suppliers will be affected by the implementation of ERTMS
- 75% of Jernbaneverkets employees will need some kind of training on ERTMS
- Centralised Operation, Administration and Maintenance
- Remote control of the last 70 stations
- Reducing the number of train control centres
- Keeping expertise and capacity on the existing signalling systems until 2030.
The project’s objectives (samfunnsmål)

Benefit to society (samfunnsmål)

A signalling and interlocking system

• that enables long term train operations on the Norwegian railway network

• that contributes to a more reliable railway infrastructure with reduced delays for passenger and cargo

• that complies with regulations concerning safety levels and cross border interoperability
The project’s objectives

Outcome objectives (effektmål)

- Improved availability of the signalling- and interlocking infrastructure by reducing the number of signalling faults causing delays
- Improved customer satisfaction by enabling less down-time on the signalling infrastructure and improving information services for end customers
- Reduction in the amount of traffic control errors, thus reducing the occurrence of delays
- Enabling future increase in train traffic by increasing the capacity of the signalling infrastructure and allowing a higher utilisation of the infrastructure through automation
Thank you for your attention...
Procurement

ERTMS National Implementation

Charlotte Grøn Therp – Supplier Conference, Oslo 7th of January 2016
Procurements

• TMS
• On board
• Signalling system
• Preparatory works
• Decommissioning
• Services such as consultants, assessors etc.
TMS, On board, Signalling System

- Prequalification issued during 1 half of 2016
- EC tender process via TED
- Utilities directive
- Negotiated procedure
- Design build and maintain contract
- Based on NTK 07 contract with modifications
- Fixed price contract
- Contract award by end 2017
Preparatory works

• First procurement is ongoing with expected award in March 2016
• Next tender is expected in 2017
• Tender process via TransQ
• Is based on standard NS 8407 agreements
Thank you for your attention...
Trackside Signalling Systems

ERTMS National Implementation

Kai-Tore Rønold – Supplier Conference, Oslo 7th of January 2016
The Scope

- Preparatory civil works
- Signalling Systems
- Telecom services (fixed transmission and GSM-R)
- Removal and disposal of infrastructure no longer in use
Preparatory civil works

- Cable paths (ducts and pipes)
- Excavated crossings with man holes
- Preparation of ground for object buildings
- Facilities for central system components
- Facilities for Joint Test lab, training etc.

These contracts are of type “Totalentreprise” and covers detailed design, building and update of documentation to “As built” (one or more contracts pr. section of line).

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Signalling Systems

• Central system components
• Object controllers
• Point machines
• Track vacancy proving system
• Complete level crossing protection
• Signs
• Components to protect vulnerable objects
• Technical object buildings and cabinets
• Interface to all adjacent signalling systems
• Key Management System
• Diagnostic system
• Test facilities and equipment
• Interface to Company’s OAM systems
• Other objects

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Telecommunication services

- Fixed transmission services
  - Completing the fibre network
  - New access
- Improve coverage and capacity in the GSM-R network

This work will be carried out by JBV’s basis organisation under supervision of the ERTMS project.
Removal and disposal

- Removal of equipment no longer in use
  - Signals and signs
  - Cables
  - Foundations
  - Indoor equipment
  - etc.

- Waste must be handled according to regulations

Contract format not yet decided, probably one contract per section of line.
Thank you for your attention...
ERTMS Onboard

ERTMS National Implementation

Gjermund Blom-Hagen – Supplier Conference, Oslo 7th of January 2016
Some “Onboard” terms

- “Onboard” consist of all ERTMS-equipment on the vehicles communicating with trackside equipment, train hardware, and interface with driver.

- “First of Class” (FoC) is the first train in a series that needs to be extensively tested to secure the necessary certificates and approvals on behalf of the rest of the units in its class.

- “Serial Installation” is the continuous installation on vehicles when the FoC is approved.

- “RVO” is the term for Rail Vehicle Owner. There will be separate agreements between RVO’s and a future supplier of the ERTMS-systems Onboard.
ERTMS Onboard “in a nutshell”

- ATC equipped vehicles need to be retrofitted to ERTMS in order to continue operation
- The Jernbaneverket ENIO project (ERTMS National Implementation Onboard):
  - A common project where rail vehicle owners with Norwegian operations are invited to participate
  - will lead the establishment of agreements with a supplier for the procurement of an ERTMS Onboard system
  - will coordinate rollout according to NSP (National Signalling Plan)
  - will finance the development, testing and approval of a Generic Application and secure compatibility between the trackside and the onboard systems

- The rail vehicle owners (RVOs):
  - are responsible for having their vehicles equipped with ERTMS and approved for use
  - will finance First of Class and series installations, as well as documentation, training, support and all other services related to their own vehicles
  - can apply for financial support through a scheme administered by JBV (goes only for freight and passenger vehicles)
ERTMS Onboard System – potential scope

~15 Rail Vehicle Owners, RVO

~50 Types («First of Class»)

~550 Vehicles
Rollout to meet NSP (Nasjonal signalplan)

2021
First line vehicles

2026
All vehicles

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ERTMS Onboard System

TIU  Train Interface Unit
JRU  Juridical Recording Unit
BTM  Balise Transmission Module
STM  Specific Transmission Module
Possible supplier deliverables

- Engineering and design of the ERTMS Onboard system, on a generic level
- Handling integration and interface issues
- Testing of the system on a generic level and on test train(s)
- Engineering and design of the Onboard system on a vehicle specific level ("First of Class")
- Manufacturing, shipment and storing of equipment and materials
- Facilities and tools
- Decommissioning of obsolete existing equipment installed in the rail vehicles
- Equipping the rail vehicles with the Onboard system
- Testing of the equipped vehicles
- Documentation and certification of equipped vehicles
- Training of Client’s (RVO) staff and instructors
- Training simulators and training documentation
- Other deliverables and services
- Support and maintenance
Engineering

- Detailed survey
- Mechanical engineering
  - Positioning of new components (inside and outside)
  - Possible repositioning of existing equipment
  - Cable routing
  - Adaption of driver desk (ergonomic)
    - DMI («display»)
    - Buttons and switches
- Electrical engineering
  - Vehicle interface
  - Power supply
- Vehicle modification
  - Software

Start-up expected soon after contract award
Peak expected? Finishing expected 2023-24
Authorisation

Assessment body
• Safe integration and use of CSM ("common safety method")

Notified body
• Fulfillment of the Technical specification of interoperability

Designated body
• Fulfillment of the National technical rules

Independent safety assessor
• Fulfillment of RAMS requirements: EN50126, EN50128 and EN50129
Workshop facilities (installation facilities)

- Limited capacity on existing workshops in Norway and securing enough capacity will possibly be within supplier scope

- Many of the Norwegian workshops have limitations such as,
  - Shorter tracks, suitable for locos, but not for the longer trains
  - Not possible to work under the trains (lacking pit or lifting devices)
  - No fixed installations for work on the roof.

- Many existing tracks in workshops are presently occupied and utilized in normal maintenance

- Most of the workshops are owned by ROM Eiendom (property). Mantena is the largest contractor of the workshops.

- The project has gathered some info on the workshop situation in Norway (see ERTMS project page on www.jernbaneverket.no)
Installation

- Electrical installation
- Vehicle adaptation, Welding
- Mechanical installations
- Commissioning

Expected startup of installation in 2018-19
Production peak expected in ~2022-24
Finishing ~2026 (before Oslo S is put into ERTMS service)
Performance during installation

- Vehicle time out of service is crucial
  - Limited number of vehicles available for retrofit at a time
  - 24/7, “round the clock” work should be investigated
  - Installation work may have to be combined with ordinary maintenance
Thank you for your attention...
Traffic Management System (TMS)

ERTMS National Implementation

Geir Danielsen – Supplier Conference, Oslo 7th of January 2016
TMS Scope

- A new Traffic Management System for the complete 4200 km railway network.
- Replace the three existing CTC systems
- Integration with both legacy systems and ERTMS Level 2
- Integration with exiting system for Catenary system, Route planning system and Passenger Information System among others
- Services and Maintenance throughout the system’s life time
Proposed structure – future areas for traffic management

- East
- South-West
- North
TMS – High level requirements

- Provide a state of the art TMS based on modern proven technology
- Provide tools that enable flexible and efficient traffic management
- Perform tasks automatically to the greatest extent possible
- Provide full flexibility so that it is possible to operate all train traffic by one or more dispatcher
- Provide an intuitive, flexible and efficient HMI to operate by any modern means such as touch screen, touch pad, mouse, etc.
Easy access to all necessary information
Interactive tools and ways of working
Challenges related to traffic density in the Oslo area
The TMS procurement includes:

• installation in central computer facilities and Traffic Control Centres

• redundant solutions and disaster recovery solutions

• simulator for training and testing purposes

• support agreement for the complete system throughout the system’s lifetime

• interfaces to adjacent systems

• implementation in two phases
  – phase 1 - lines with conventional signalling and replaces existing CTC systems
  – phase 2 - ERTMS lines along with the implementation of ERTMS
Benefits from a new TMS

- Increased customer satisfaction by getting more trains on time
- More robust delivery of the production plan by increased level of automation
- Optimised work process and resources by increased level of automation
- Easier operation due to one system, one user interface and common functionality
- Optimised OAM with only one system and standardised interfaces
- Improved customer information by real time information from trains (ERTMS)
Thank you for your attention...