





**Request for quotation (RFQ)  
Norwegian ERTMS pilot line  
Appendix A  
to the ETCS/IL contract  
Scope of Work**

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## ATTACHMENTS TO APPENDIX A

- 1 Attachment A.1 Abbreviations and definitions
- 2 Attachment A.2.1 Schematic line drawing Ski-Spydeberg
- 3 Attachment A.2.2 Schematic line drawing Spydeberg-Mysen
- 4 Attachment A.2.3 Schematic line drawing Mysen-Sarpsborg
- 5 Attachment A.3 The Norwegian ERTMS pilot line project

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## **1. INTRODUCTION**

### **1.1 GENERAL**

The reader shall be familiar with the document “Instructions to Tenderer” in order to relate this document to the entire RFQ.

### **1.2 PURPOSE AND CONTENTS**

#### **1.2.1 Purpose**

This document, with references, gives the Contractor an overview of all items and services to be delivered under the ETCS/IL Contract.

#### **1.2.2 Contents**

This document states requirements to Contractor’s main responsibility as well to the RAMS process. Further the main delivery, the options and the Customer’s deliverables are described.

Please note that there are many references in this document. On principal, requirements stated elsewhere in the RFQ are not repeated in this document.

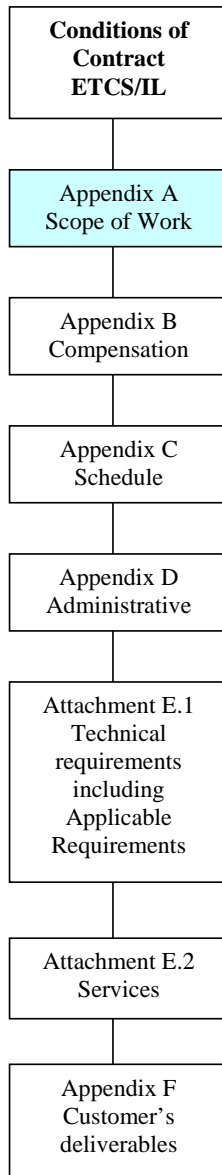
Attachment A.1 is a list of abbreviations and definitions.

Attachments A2.1, A2.2 and A2.3 are schematic line drawings of the pilot line.


Attachment A.3 is a description of the Norwegian ERTMS pilot line project.

### **1.3 DEFINITIONS**

Please see list of abbreviations and definitions, attachment A.1.



**Figure 1 Document overview**

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## 2. CONTRACTOR'S MAIN RESPONSIBILITY

### 2.1 TURN-KEY RESPONSIBILITY


Contractor shall take full system turnkey responsibility. This system turnkey responsibility is further specified in requirements below.

- Services 2.1.1.1.1 Contractor is carrying the responsibility for project accomplishment of a fully operational ETCS/IL System, as specified in this Contract, entered into service.*
- Services 2.1.1.1.2 Contractor is responsible for providing all documentation with the quality level required to ensure the ETCS/IL System being approved to enter into service by the National Safety Authority (NSA). Customer will issue the formal application for entering the ETCS/IL System of ØØL into service, but all necessary documentation shall be provided by Contractor.*
- Services 2.1.1.1.3 All necessary personnel, resources, procedures, systems, tools, facilities, competency, capacity, etc needed to complete the Work under the Contract with the required quality and within the defined time schedule is Contractor's fully responsibility.*
- Services 2.1.1.1.4 Contractor shall consequently, with regard to the undertakings mentioned in this document unless otherwise specifically stated, bear the responsibility for providing all engineering, labour, materials, equipment, software, services, tools and instruments, documentation, information, manufacture, assembling, labelling, packing, transportation, unloading, installation, inspection, testing, commissioning, delivery, training and operation and maintenance support up until Delivery of the ETCS/IL System.*

### 2.2 INTEGRATION

Contractor will be responsible for the system integration of the ETCS/IL System.

- Services 2.2.1.1.1 Contractor shall undertake the end-to-end responsibility for the delivery of a fully operational ETCS/IL System based on the requirements set forth by Customer.*
- Services 2.2.1.1.2 Contractor is responsible for performing and managing all processes and activities needed to integrate the individual parts of the ETCS/IL System, in order to make the ETCS/IL System a functioning and integrated system.*
- Services 2.2.1.1.3 Contractor is responsible for performing and managing all processes and activities needed to integrate the ETCS/IL System with the surrounding and adjacent infrastructure.*
- Services 2.2.1.1.4 Contractor is responsible for performing and managing all processes and activities needed to integrate the ETCS/IL System with relevant on-board units.*
- Services 2.2.1.1.5 Contractor's integration responsibility comprises, but is not limited to, all process management, RAMS process, planning, coordination, specification, analyses, integration testing, verification, validation, commissioning, etc.*

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## 2.3 STANDARDS AND REGULATIONS

### 2.3.1 General

Several standards and regulations apply to the Work to be performed by Contractor, covering international standards, national laws and regulations, and Customer's internal regulations.

*Services 2.3.1.1.1 When performing the Work under the Contract, Contractor is responsible for complying with all relevant standards, laws and regulations.*

### 2.3.2 Norwegian laws and regulations

*Services 2.3.2.1.1 Contractor is responsible for identification of all Norwegian laws and regulations relevant to the Work, and ensuring the Work complying with the identified Norwegian laws and regulations.*

### 2.3.3 RAMS standards

*Services 2.3.3.1.1 Contractor is responsible for ensuring the Work complies with the CENELEC standards and guidelines EN 50126 [1], EN 50128[2], EN 50129[3], EN 50506 [5], CLC/TR 50126 [6], CLC/TR 50451 [7], etc.*

### 2.3.4 Teknisk regelverk

As a general rule "Teknisk Regelverk" always apply. However, when found necessary in order to be precise, a specific reference is made to "Teknisk Regelverk". Contractor shall note that whenever a reference is not made to "Teknisk Regelverk", "Teknisk Regelverk" still apply.

*Services 2.3.4.1.1 Contractor shall familiarize himself with Customer's Teknisk regelverk [8] and is committed to follow these requirements during project execution.*

### 2.3.5 Other relevant standards

*Services 2.3.5.1.1 Contractor is responsible for ensuring the Work complies with the CENELEC standards EN 50159 [4], EN 50121 [9], EN 50125 [10] and EN 50459 [11].*

## 2.4 FACILITIES


As part of the turn-key responsibility, Contractor shall provide all facilities needed to complete the Work:

*Services 2.4.1.1.1 Contractor shall provide, mobilise, maintain, operate and demobilise the facilities required to complete the Work*

*Services 2.4.1.1.2 The facilities provided shall meet statutory and Customer HES requirements.*

*Services 2.4.1.1.3 The facilities shall include, but not be limited to, the following:*


- Offices, accommodation, workshops and storage areas (including heated storage).*
- All necessary services and utilities required for all phases of the Work.*
- Plant equipment, tools and consumables.*
- Temporary protection against weather and other likely causes of damage to the ETCS/IL System and to ensure that Materials and Customer deliverables are suitably protected up to the delivery*

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*of the Work.*

- *Temporary safety and fire fighting equipment.*
- *All other temporary works including protection against environmental conditions.*



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### 3. RAMS PROCESS

#### 3.1 GENERAL

This chapter states the RAMS process requirements of the ETCS/IL System. The requirements cover implementation of the RAMS standard including responsibilities.

Contractor's RAMS implementation processes, both generic and specific, shall be based on international RAMS standards, as well as Norwegian legislation and regulations:

- Services 3.1.1.1.1 Contractor's RAMS processes shall comply with all relevant international standard and guidelines, being EN 50126 [1], EN 50128[2], EN 50129[3], EN 50506 [5], CLC/TR 50126 [6], CLC/TR 50451 [7], etc.*
- Services 3.1.1.1.2 The Norwegian regulation for interoperability shall be fulfilled. The TSIs are implemented via the Norwegian regulation for interoperability. Contractor shall comply with the TSIs.*
- Services 3.1.1.1.3 The Norwegian regulation for (railway) safety shall be fulfilled, if applicable.*
- Services 3.1.1.1.4 The Norwegian regulation for Common Safety Methods (CSM) shall be fulfilled.  
(The Norwegian regulation for CSM is based on the Commission Decision 2009/460/EU, dated June 5<sup>th</sup> 2009.)*

#### 3.2 CONTRACTOR PROJECT SPECIFIC RAMS IMPLEMENTATION PROCESS DESCRIPTION


Contractor's project specific processes related to implementation of EN 50126 [1] and other related normative standards, shall comply with the below stated requirements.

- Services 3.2.1.1.1 Contractor shall provide a project specific RAMS implementation plan within 4 weeks after Contract Award.  
The RAMS implementation plan is subject for Customer approval.*
- Services 3.2.1.1.2 The RAMS implementation plan shall be fully implemented in Contractor's project organisation within 4 weeks after Customer's approval of the RAMS implementation plan.*
- Services 3.2.1.1.3 Contractor's RAMS implementation plan shall include all implementation activities to be performed in order to fully comply with EN 50126 [6] and other related normative standards.*
- Services 3.2.1.1.4 All the relevant phases in the system life cycle shall be included in Contractor's RAMS implementation plan.*
- Services 3.2.1.1.5 Contractor's RAMS process shall be kept separated from Customer's project internal RAMS process and shall not be based on Customer's project specific RAMS plans and programs.*
- Services 3.2.1.1.6 Contractor shall, within 4 weeks after Contract Award, provide an assessment*

Merknad [lokr1]: Knut, ta vekk denne?

Merknad [lokr2]: Ta vekk

Merknad [lokr3]: Ta vekk

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*process description, including all tasks involving independent assessment of safety (ISA), the RAMS process, software customisation and design, hardware design, safety cases, etc.*

*The assessment process description is subject for Customer approval.*

Services 3.2.1.1.7

*The assessment process shall be fully implemented in Contractor's project organisation within 4 weeks after Customer's approval of the assessment process description.*

**Merknad [lokr4]:** Ta vekk

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## 4. MAIN DELIVERY

### 4.1 GENERAL

The description does not provide details of each operation necessary to complete the SoW. The outline below shall be read in conjunction with all other documents which comprise the Contract.

The technical specifications are split into two parts with one part stating requirements to the ETCS/IL System and the other part stating requirements to services related to the ETCS/IL System. By services is meant all processes or activities necessary to deliver the system.

### 4.2 MAIN DELIVERY ETCS/IL SYSTEM

Requirements to ETCS/IL System can be found in Attachment E.1 Requirement specifications. Customer's generic signalling requirements specification (SGRS) is part of E.1; SGRS applicable requirements for this delivery are clearly marked.

ETCS/IL System is a term used throughout this Contract. By ETCS/IL System is meant ETCS signalling system and interlocking system, and in this Contract the items listed below are defined to be part of the ETCS/IL system. This includes all hardware and software needed:


- 1 RBC/IL
- 2 Local Operator Panel (LOP)
- 3 Diagnostic system
- 4 Axle counters
- 5 Eurobalises
- 6 Crank cabinet
- 7 Boards
- 8 Power Supply
- 9 Civil Works (CW)
- 10 Adaptation to adjacent IL
- 11 Key-lock
- 12 WA Key lock

### 4.3 MAIN DELIVERY SERVICES

Requirements to services can be found in Attachment E.2 Services requirements.

Requirements are stated within the following areas:

1. Project phases and operational phase
2. Adaptation to Customer's deliverables
3. Design and engineering
4. Manufacturing, shipping and installation
5. Acceptance tests
6. Commissioning
7. Safety approval
8. Delivery and completion
9. Documentation
10. Training
11. OAM during roll-out
12. Decommissioning of existing equipment

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OAM during roll-out is included as a service here. Note however that all OAM services requested for the period after delivery is described in the Support Contract.

#### 4.4 MAIN DELIVERY ADMINISTRATIVE

Requirements to the administrative delivery can be found in Appendix D Administrative requirements.

Customer is describing administrative requirements for the execution of this Contract within the following areas:

1. Quality assurance
2. Health, environment and safety
3. Organization and key personnel
4. Procurement
5. Reporting
6. Communication and information
7. Meetings
8. Document management
9. Project control
10. Security

#### 4.5 MAIN DELIVERY DOCUMENTATION (KNUT LIMER INN)

<dokliste>

#### 4.6 MAIN DELIVERY LOCATIONS

##### 4.6.1 General

This section describes the specific work that will be performed on the entire line of ØØL including the following stations:

- Ski (border station)
- Kråkstad
- Tomter
- Spydeberg
- Askim
- Mysen
- Rakkestad
- Ise
- Sarpsborg (border station)

Contractor shall closely study the schematic line drawings attached to this Appendix A in order to get input on placement of different types of equipment.


##### 4.6.2 Kråkstad station

The following specifications apply for Kråkstad station but shall not be regarded as a complete list:

*The point machines at point 1 and 2 shall be replaced with new point machines.*

*There shall be installed a key lock in track 3*

*There shall be installed a crank cabinet in track 3*

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*There shall be installed WA key lock cabinet in*

- *each of the tracks at*
- *by each of the points*

#### **4.6.3 Tomter station**

The following specifications apply for Tomter station but shall not be regarded as a complete list:

*The point machine at point 1 shall be replaced with a new point machine.*

#### **4.6.4 Spydeberg station**

The following specifications apply for Spydeberg station but shall not be regarded as a complete list:

*The point machines at point 1 and 2 shall be replaced with new point machines.*

#### **4.6.5 Askim station**

The following specifications apply for Askim station but shall not be regarded as a complete list:

*The point machine at point 2 shall be replaced with a new point machine.*

*There shall be installed a key-lock in track 3.*

*There shall be installed a crank cabinet by point 3.*

#### **4.6.6 Mysen station**

The following specifications apply for Mysen station but shall not be regarded as a complete list:

*The point machines at point 1, 2, 3, 4 and 5 shall be replaced with new point machines.*

*There shall be installed a machine for derailer at the derailer in track 4.*

*There shall be installed a key-lock in track 4.*


*There shall be installed a crank cabinet by point 4.*

#### **4.6.7 Rakkestad station**

The following specifications apply for Rakkestad station but shall not be regarded as a complete list:

*The point machines at point 1 and 2 shall be replaced with new point machines.*

*There shall be installed one temporary LOP, alternatively at Sarpsborg station, (in the level transition area for the ERTMS line) for testing purposes.*

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*The Contractor shall establish necessary cable ducts/tubes in the station area.*

*The Contractor shall establish foundation for the ETCS/IL shelter in the station area.*

*The Contractor shall establish all foundations and poles for boards in the station area.*

#### **4.6.8 Ise station**

The following specifications apply for Ise station but shall not be regarded as a complete list:

*The point machines at point 1 and 2 at Ise station shall be replaced with new point machines.*

*The Contractor shall establish necessary cable ducts/tubes in the station area.*

*The Contractor shall establish foundation for the ETCS/IL shelter in the station area.*

*The Contractor shall establish all foundations and poles for boards in the station area.*

#### **4.6.9 Level crossings**


Level crossings are

*There shall be installed complete level crossing at the following stations:*

1. *Kråkstad station*
2. *Spydeberg station*
3. *Tomter station*
4. *Askim station*
5. *Mysen station*
6. *Rakkestad station*
7. *Ise station*

*There shall be installed complete level crossing at the following locations along the line:*

- *Skotbu*
- *Knapstad*
- *Tornerud*
- *Løken*
- *Solsletta*
- *Hotvedt*
- *Heia*
- *Botten*
- *Bodal*

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## 5. OPTIONS

The pricing of all options is described in Appendix B. The schedule for options, including time limits for exercising options, is described in Appendix C.

Requirements to options are described in different Appendices. References are made for each option.

### 5.1 OPTION 1 - UPGRADE TO ETCS BASELINE 3

A delivery of an upgrade to ETCS baseline 3 is an option. Requirements are stated in Attachment E.1.

### 5.2 OPTION 2 - SOME OF THE FUNCTIONS FOR LOCAL OPERATOR PANEL (LOP)

Some of the functions for LOP are optional. Requirements are stated in Attachment E.1.

### 5.3 OPTION 3 - JURIDICAL RECORDER

A delivery of juridical recorder is an option. Requirements are stated in Attachment E.1.

### 5.4 OPTION 4 - LEVEL CROSSINGS

This is described as a Customer's deliverable. However, as an option Contractor is asked to deliver level crossing solutions. Requirements are stated in Attachment E.1.

### 5.5 OPTION 5 - POINT MACHINES AND MACHINE FOR DERAILER

This is described as a Customer's deliverable. However, as an option Contractor is asked to deliver point machines and machine for derailer. Requirements are stated in Attachment E.1.

### 5.6 OPTION 6 - COMPLETE KEY MANAGEMENT SYSTEM (KMS) SOLUTION

This is described as a Customer's deliverable. However, as an option Contractor is asked to deliver a complete KMS. Requirements are stated in Attachment E.1.

### 5.7 OPTION 7 - HANDHELD TERMINAL (HHT)

A delivery of HHT is an option. Requirements are stated in Attachment E.1.

### 5.8 OPTION 8 - OPTICAL SIGNALS


A delivery of some types of optical signals is an option. Requirements are stated in Attachment E.1.

### 5.9 OPTION 9 – INTERFACE WITH EXISTING TRAIN CONTROL SYSTEM (TCS)

A delivery of interface with existing TCS is an option. Requirements are stated in Attachment E.1.

### 5.10 OPTION 10 – INTERFACE TO ADJACENT RBC

Merknad [lokr5]: Tatt ut nå???

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## 6. CUSTOMER'S DELIVERABLES

Customer's deliverables are described in Appendix F.

Obviously, Customer's deliverables as such are not within Contractor's SoW. However, Contractor is responsible for a turn-key delivery, and this means that all activities concerning planning/coordination and adaptation/integration to Customer's deliverables are within Contractor's SoW.

Customer is delivering the point machine and derailer machine on site. All installation and integration activities are within Contractor's scope.

Customer is delivering a complete level crossing solution, including installation.

Customer has frame agreements on point machines and machine for derailer as well as on level crossings. It's Customer's intention to assign these frame agreements to Contractor. However, this is not finally decided at the date of RFQ issue.


Please note that if options number 4, 5 and 6 are exercised the Customer delivered level crossing solution , point machines and machine for derailer as well as Key Management System respectively will be non-applicable.

The Customer's deliverables are:

	<b>Item</b>	<b>Description</b>
1	Civil works items	Customer will provide civil works items at locations along ØØL as well as at central locations
2	External power source	Customer will provide external power source at locations along ØØL as well as at central locations.
3	GSM-R	Customer will provide GSM-R services at ØØL.
4	Transmission circuits	Customer will provide transmission circuits for ETCS/IL internally as well as external interconnections.
5	Train Control System (TCS)	Customer will provide the TCS system for controlling ØØL
6	ERTMS Onboard System (EOS)	Customer will provide EOS in defined trains.
7	Central Operation, Administration and Maintenance (OAM) system	Customer will provide central OAM systems.
8	Point machines and derailer machine	Customer will provide point machines and derailer machine
9	Level crossing solution	Customer will provide complete level crossing solutions
10	Key Management System (KMS)	Customer will provide complete KMS
11	Adjacent systems	Customer will provide a level crossing solution between Ski station and the level transition area and modification of the ATC and IXL at border stations Ski and Sarpsborg

**Table 1 Customer's deliverables overview**



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## Reference list

- [1] CENELEC EN 50126, Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS), revision September 1999
- [2] CENELEC EN 50128, Railway applications - Communications, signalling and processing systems. Software for railway control and protection systems, 15.05.2001
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