

**Deployment of
ERTMS On-board
equipment in
Sweden 2017-2020**

2016-SE-TM-0140-W

**Presentation ScanMed
Corridor Forum
Brussels 2017-10-17**

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TRAFIKVERKET



Samfinansierat av Europeiska Unionen
Fonden för ett sammanlänkat Europa

Agenda

- ERTMS Implementing in Sweden – challenges for the train operators
- Previous TEN-T- and CEF funding of ERTMS in Sweden
- Implementing plan for ERTMS in Sweden – August 2017
- ERTMS On-board and STM in Sweden
- Project Scope

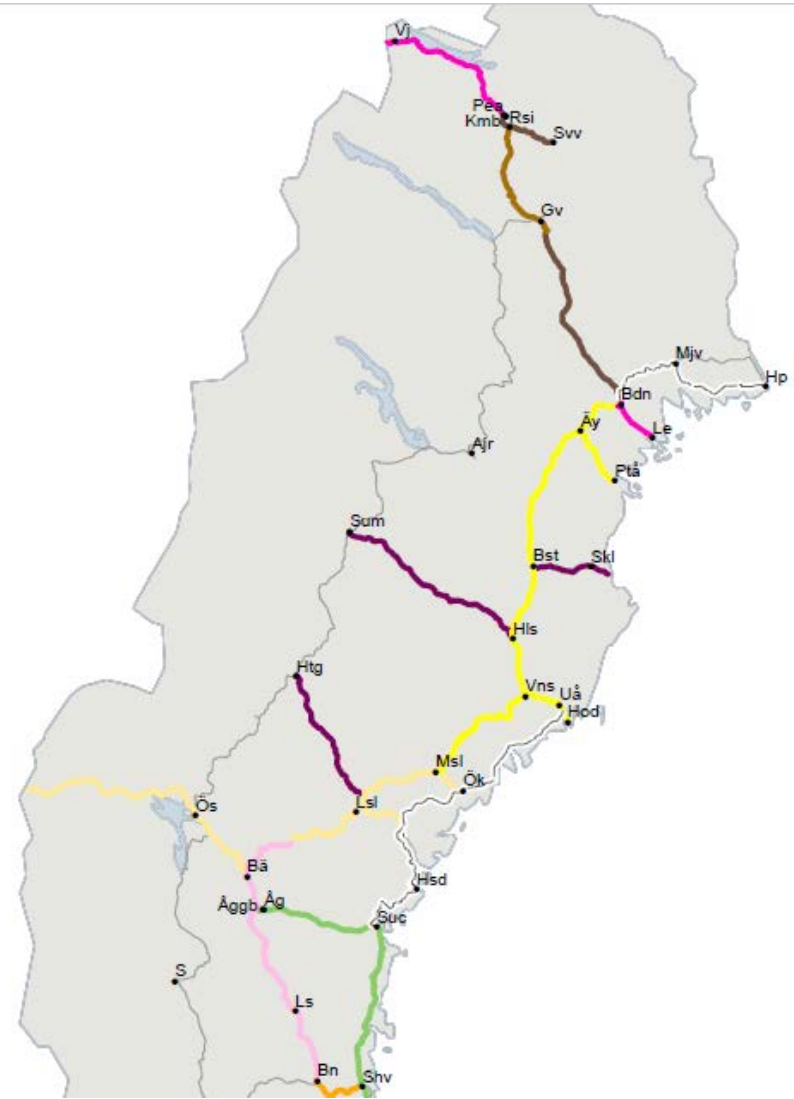
Status of the Global project

- New roll-out plan is decided by Trafikverket
- Finalized implementation of ERTMS year 2035
- Baseline 3.6 to be implemented On-board and Track-side
- No national on-board funding
- Detailed design for Iron Ore line and Corridor B ongoing
- Cooperation with Denmark (Öresund fixed link) and Norway

Implementing plan for ERTMS Northern Sweden

Data per August 21, 2017

- Klar
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030
- 2031
- 2032
- 2033
- 2034
- 2035



Implementing plan for ERTMS Sweden Sweden

Data per August 21, 2017

- Klar
- 2021
- 2022
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- 2032
- 2033
- 2034
- 2035



ERTMS On-board and STM in Sweden

- Framework agreement with Bombardier for ERTMS on-board + internal STM (BL 2.3.0.d)
 - Approx. 200 vehicles equipped
- Framework agreement with Ansaldo for external STM (BL 2.3.0.d and BL 3)
- Siemens OBU and Alstom OBU tested with Ansaldo STM
 - Good performance with minor problems
 - Contractual issues still open

Project Scope

- Installation of ERTMS On-board, including SE-STM, on 204 vehicles
- Two owners of vehicles (co-beneficiaries)
 - Green Cargo (state-owned freight rail operator)
 - LKAB (part of the state-owned mining company)
- Action coordinated by Trafikverket (Swedish Transport Administration)
- Approvals and certification according to TSI CCS Baseline 3
- Operation on Level 2 lines and ATP-lines in Sweden and Norway

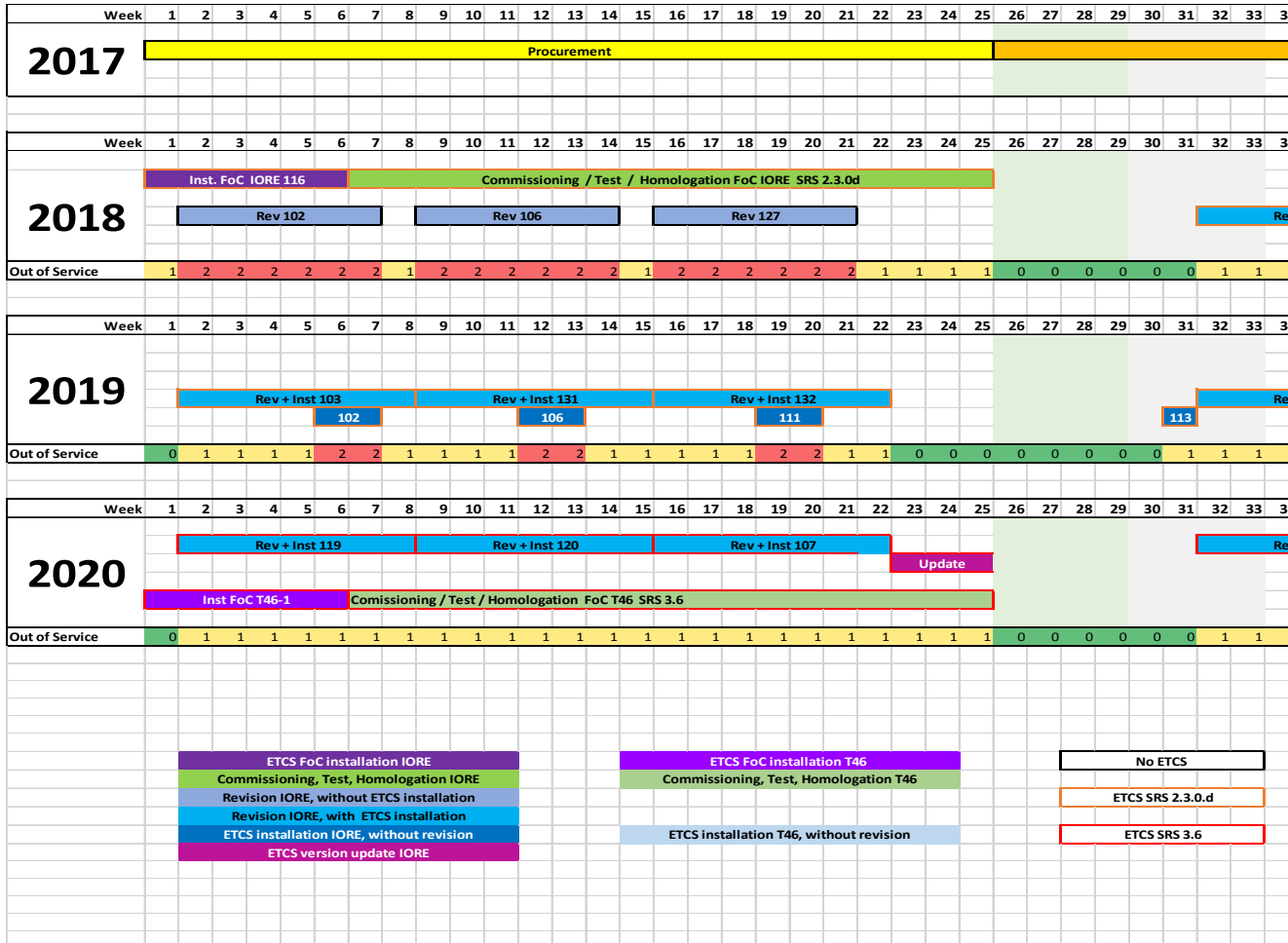
Project Overview

- Purchasing of new ERTMS on-board equipment
- Assignment of NoBo and AsBo
- Prototype installation on GC locos Rc4, BR185 and Re
- Prototypes on Rd, Td, IORE and T46 done in 2015 project.
- Type testing and validation of prototype installation
- Approval and authorisation of prototype by NSA (safety approval and time limited APIS)
- Operational testing of performance and availability (experience operation)
- NoBo, DeBo and AsBo assessment
- Permanent approval and authorisation of putting into service of first of class by NSA
- Serial installation

Compilation of Vehicles and costs in the Action + Funding

Company	Type of vehicle	Upgrade	Retrofit	Serie cost	Eligible max cost	Eligible cost	CEF Funding	2017	2018	2019	2020
Green Cargo AB	Rd		20	4,118	5,000	4,118	2,059	0,536	1,050	1,271	1,261
	Rc4		105	21,412	26,250	21,412	10,706	0,525	5,819	6,895	8,172
	Traxx BR185		6	1,500	1,500	1,500	0,750	0,000	0,530	0,510	0,460
	Td		45	9,059	11,250	9,059	4,529	0,426	2,417	3,046	3,169
	Re (Traxx F140 AC2)		16	3,088	4,000	3,088	1,544	0,431	0,872	1,082	0,704
								1,918	10,689	12,804	13,766
LKAB	IORE		10	1,601	2,500	1,601	0,800	0,000	0,204	0,693	0,704
	T46		2	0,402	0,500	0,402	0,201	0,000	0,000	0,000	0,402
								0,000	0,204	0,693	1,106
Total		0	204	41,179	51,000	41,179	20,590				
Total Vehicles:	204										
Total Cost:	41,179										
Total Funding:	20,590										

Timeplan LKAB



Rev

Revision of IORE Section, no ETCS Onboard installation

Rev + Inst

Revision of IORE Section, including ETCS Onboard installation

Inst

Installation of ETCS Onboard System on IORE Section, independent from revision

Inst T46

Installation of ETCS Onboard System on T46 GPC locomotive, independent from revision

- ETCS FoC installation IORE
- Commissioning, Test, Homologation IORE
- Revision IORE, without ETCS installation
- Revision IORE, with ETCS installation
- ETCS installation IORE, without revision
- ETCS version update IORE
- ETCS FoC installation T46
- Commissioning, Test, Homologation T46
- ETCS installation T46, without revision
- No ETCS
- ETCS SRS 2.3.0.d
- ETCS SRS 3.6