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Introduction

- Trafikverket recently completed a nationwide deployment of some

  775 Road Weather Stations and new central systems

  - a completely new national RWIS.

- This upgrade replaces the legacy MS4 system - originally developed by Saab in the late 1990s - with the new MS7 system.
- MS7 is primarily supplied by Vaisala, representing one of the largest RWIS delivery contracts in the company's history.
- Overall a very successful project, that kept the time plan - and roughly the budget.

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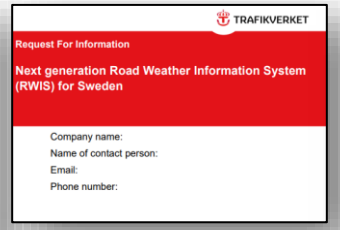
The project at a glance
2016 - 2025

MS4 since late 1990:s

Pre-study 2016

Request for info 2017



Requirements and procurement 2018

Contract February 2019

2019-2020 Acceptance tests

Massive rollout 2020-2024

Last MS7 installed October 2025

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Project management and management

- Project management followed XLPM project model.
- A good project specification as a good foundation
  - Real world adaptations were a success factor
  - Unplanned Logistic hub, Commissioning coordination and Early-life support and a Handover process established.
- Always a straightforward and constructive dialogue between different project activities and parties
- A challenge was late changes in what should be done a certain year (extra work and risk of errors).

- A large cost deviation occurred due to increased requirements on road side installations.
- The project had a close collaboration with different department within the STAs departments (as software and communication departments). Applications were both roadside and central. But also related to other meta data and traffic management systems - sometime a real buzz without direct project benefits.

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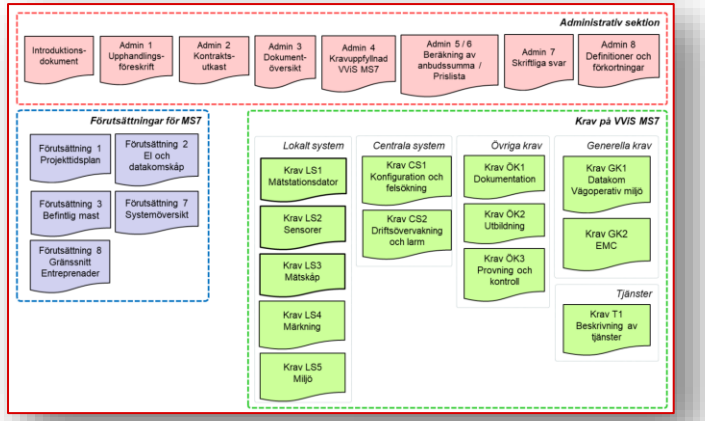
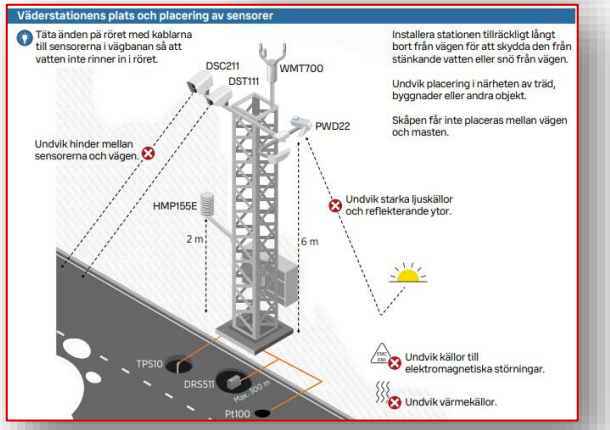
Requirements, contract and testing

- Well worked through requirements formed a good tender and a constructive contract. It also guided the acceptance testing and project follow-ups.
- A detailed acceptance testing to verify the delivery were applied.
- Vaisala had a good delivery quality and quality control, with a few warranty issues solved. A few quality product development issues are discussed after the project.



Sensors

- Replacing the precipitation (present weather) sensor was a challenge. The new PWD22 is a good sensor there are many studies and comparisons that verify it. Improvements needed to deal with fouling (dirt on lens).
- Humidity HMP155E is similar for MS7 as for MS4. A heated version was offered that could be calibrated less frequently (not included in acceptance tests). Consistency *over 3 years time* is discussed.
- WMT700 wind sensor is acoustic and works well in *most weather*.
- Trafikverket use a standard camera with good performance at a good price. Future development potential (as AI for road condition and traffic counting).



Multi dimensional work flow

Installation	Planning procurement Purchasing, Tender and Requirements.	Procure contracts - Installations, - Earthworks, Barriers	Prepare Contractors Planning, Resources, Education, Logistics	Perform Contracts Coordination and construction management	Hand over Contracts - Documentation
Prerequisites	Base road Which stations to be installed when? Winter maintenance contracts. 	Rough Plan	Detail plan Climtatological verification Work site safety	Detail design Mast, guard rails, service pockets Site plan Construction documents	Deployment Contractor call to deployer. Station configuration Data in all systems verification
Delivery	Order material - Weather stations and sensors - Lock cylinders - Routers - Cameras etc	Order Logistichub - Number of stations - Addresses - Nameplates - Delivery planning	Manage metadata Create and prepare component data. Data load templates Scrapping templates	Handover planning Information, meetings Data coordination Environmental plans Manage project sites	Project handover From project to governance. 

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Logistic hub

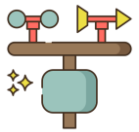
Suppliers

- Vaisala
- Mast
- Cabinets
- Marking signs
- Routers
- Camera
- Locks/Keys

Contractor teams

- North
- Middle
- East
- West
- South

The hub was also assigned commissioning. When new stations were deployed the contractor in field called an operator to check that everything worked as expected (or not).



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Handover process

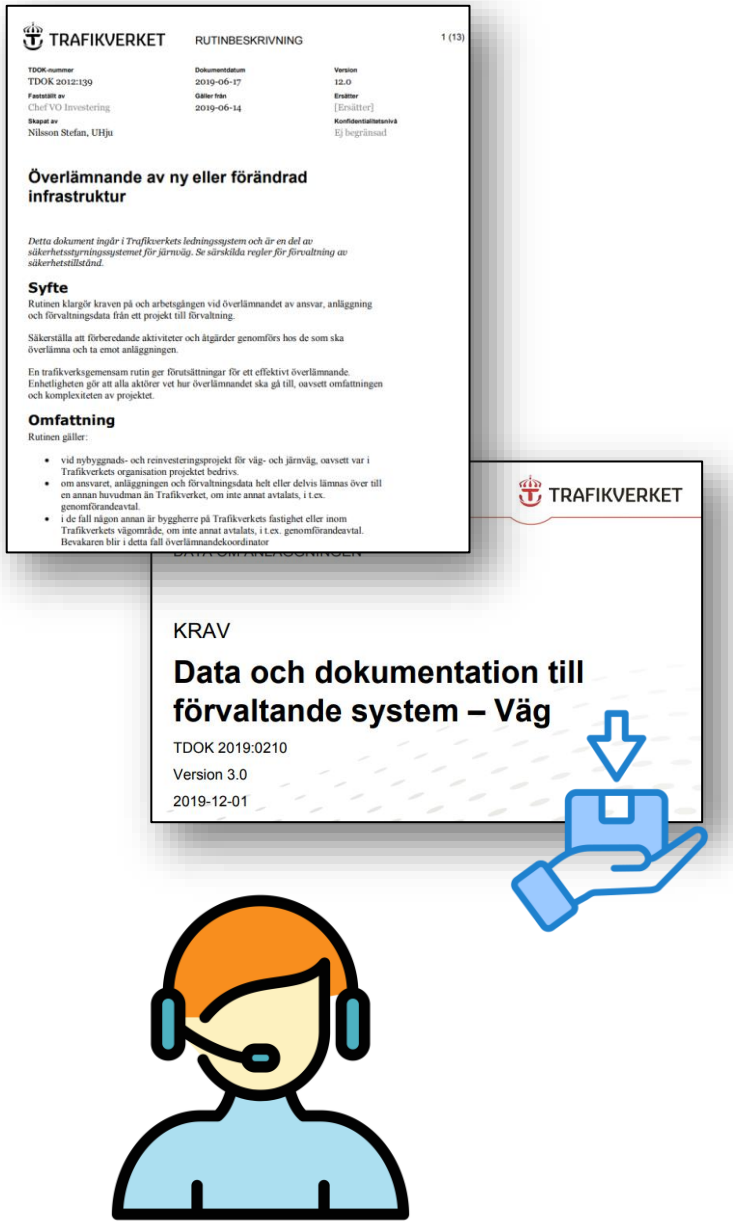
- The handover process (incl. data coordination) was a major challenge with lots of documentation and files. Challenges in different systems, external parties and project portals.

- The process was good and valuable - but resource demanding. The project accumulated a residual list to the final phase of the project.

Early Life Support

- A function to monitor/surveillance the road weather stations was established as Early-Life-Support. Monitoring was carried out via an alarm list, abnormal measurements and the NM10 system.

- Early Life Support transferred to more of a formal VViS Support function autumn 2024.



Final report

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TRAFIKVERKET SLUTRAPPORT 1 (39)

Skapat av
Lars Forslöf
Ärendenummer
[Ärendenummer]

Dokumentdatum
2025-10-28

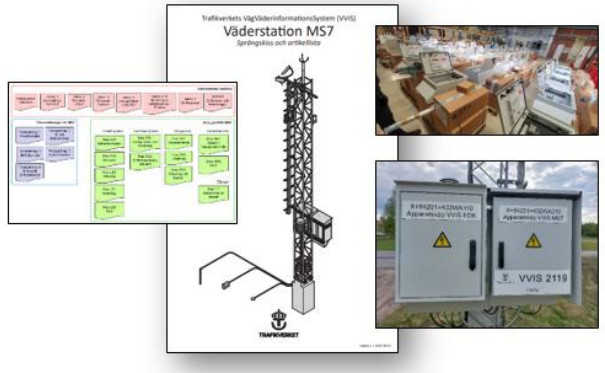
Konfidentialitetsnivå

Version
1.0

Projektslutrapport Genomförandeprojekt Indra VViS MS7)

Korta projektfakta

Uppgifter	Ifyllda data
Omfattning och innehåll	Sammanfattar erfarenheter, iakttagelser och projektresultatet avseende tid, kostnader och slutresultat
Plats	Nationellt
Tider	2017-2025
Projektspecifikation	166379 Genomförandeprojekt INDRA REINV
Uppdragsnummer	14191 UH-plan reinvestering Infrasystem väg



Underskrifter, datum:

datum:

Projektsponsor

Projektledare:

- Bilaga 1 - Projektslutrapport Genomförandeprojekt Indra Datasamordning
- Bilaga 2- Intyg korrektionsfaktor snönederbörd och regnnederbörd smhi
- Bilaga 3 - Projektslutrapport Genomförandeprojekt Indra Vaisalas erfarenh...
- Referens 1- Slutrapport förstudie Indra 2020
- Referens 2- RFI_ny_generation_vvis_sv
- Referens 3- Projektbeställning Leverans VViS MS7 0.99
- Referens 4- Projektspecifikation VViS MS7 Leverans 1.0
- Referens 5- FFU Admin 3 - Dokumentöversikt
- Referens 6- FFU Admin 2 - Kontraktsutkast SIGNED obs tillägg finns
- Referens 7- Rapport VViS MS7 Väderobservationer vid OAT - 1.0
- Referens 8- Rapport VViS MS7 Data från specialsensorer vid OAT - 1.0
- Referens 9- Avvikelser i väderutfall, ver 0.5 210504
- Referens 10- Jämförelse snönederbörd MS4-MS7 v2.0
- Referens 11- Regnnederbörd under sommaren, jämförelse mellan Trafikv...
- Referens 12- Jämförelse regn MS7 PwD22 vs SMHI
- Referens 13- Rapport Nederbörd Bergfors VViS MS4 vs. MS7 Vinter 21-22, ...
- Referens 14- Regnnederbörd under sommaren, jämförelse mellan Trafikv...
- Referens 15- Rapport Nederbörd Bergfors VViS MS7 Vinter 2023 Jan-Mar 2...
- Referens 16- Jämförelser av data från VVIS PWD22 - med och utan smutss...
- Referens 17- Jämförelser av data från VVIS PWD22 - med och utan smutsk...
- Referens 18- VViS Precipitation Data Validation KTH Linnea 2025
- Referens 19- Jämförelser av data från olika puckmonteringar 1.0
- Referens 20- Jämförelser av data från PT100 vs DRS511 1.0
- Referens 21- WORK PACKAGE 1 – OFFICIAL REPORT V1.0 WRIP
- Referens 22- PM Ny kamera för VViS Bosch DINION 7100i IR, v0.8
- Referens 23- Rekommendation fluff-faktor smhi
- Referens 24 - Intyg korrektionsfaktor snönederbörd och regnnederbörd
- Referens 25- Beskrivning av standard för VViS mätplats ver 2.9 241119
- Referens 27- Flöde att göra för ny väderstation
- Referens 27- Rutin - Etablering av ny VViS mätplats_20251027
- Referens 28- Spräng skiss Väderstation 2025-10-06
- Referens 29- LTU analysis PWD22 Snow 20-21 Bergfors
- Referens 30- Vaisala analysis PWD22 Snow 20-21 Bergfors

VViS Presentation

Startsida VViS | TRAFIKVERKET | Karta | Lokal

DFRS - Map of events | Homepage - SENSO... | Nation

Stationinfo - Profil 1 – Microsoft Edge

Ej säker vvis.trafikverket.se/Functions/StationInfo/StationInfoPopup.aspx?Railroad=false&Term=ytter

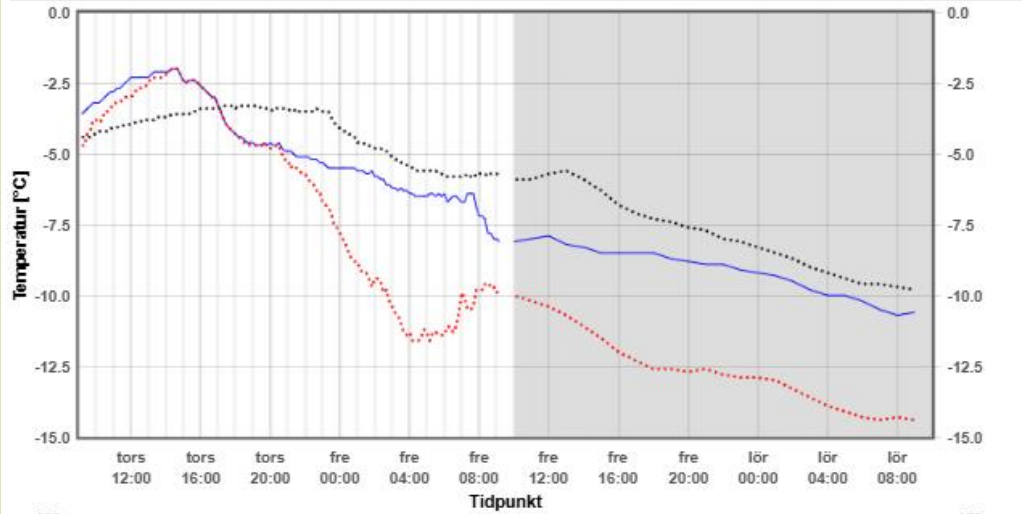
Välj station: 2134 Ljusdal | Term: Temperatur och nederbörd

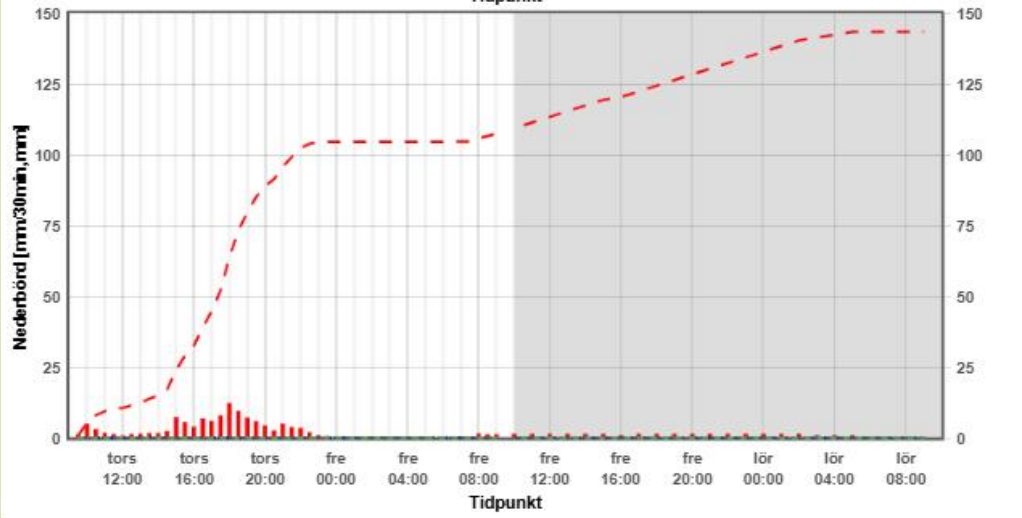
Stationens koordinater: 6854444, 553954

Historik från: -24 | Prognos till: 24 | Välj | Spara användarinställning

Graf | Tabell | Väglagsbilder

2134 Ljusdal





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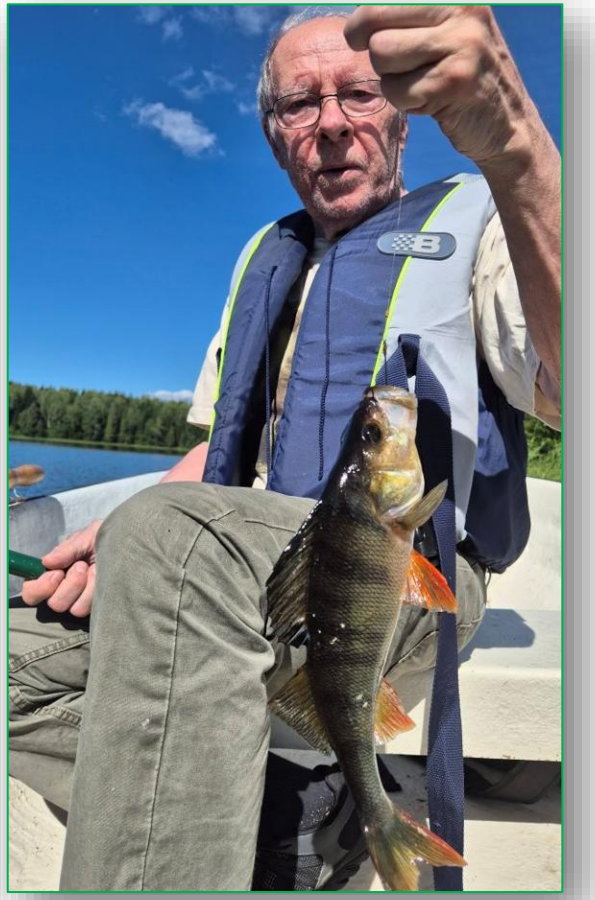
Sweden, Halsingland
Ljusdal, Ramsjo…



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- lars@etex.se
- https://se.linkedin.com/in/lforslof

References within Trafikverket

- Jonas Jonsson, Project manager
- Lars Schillström, Project owner/Sponsor