

EENA webinar

Reforms and projects in Sweden



8th June, 2021

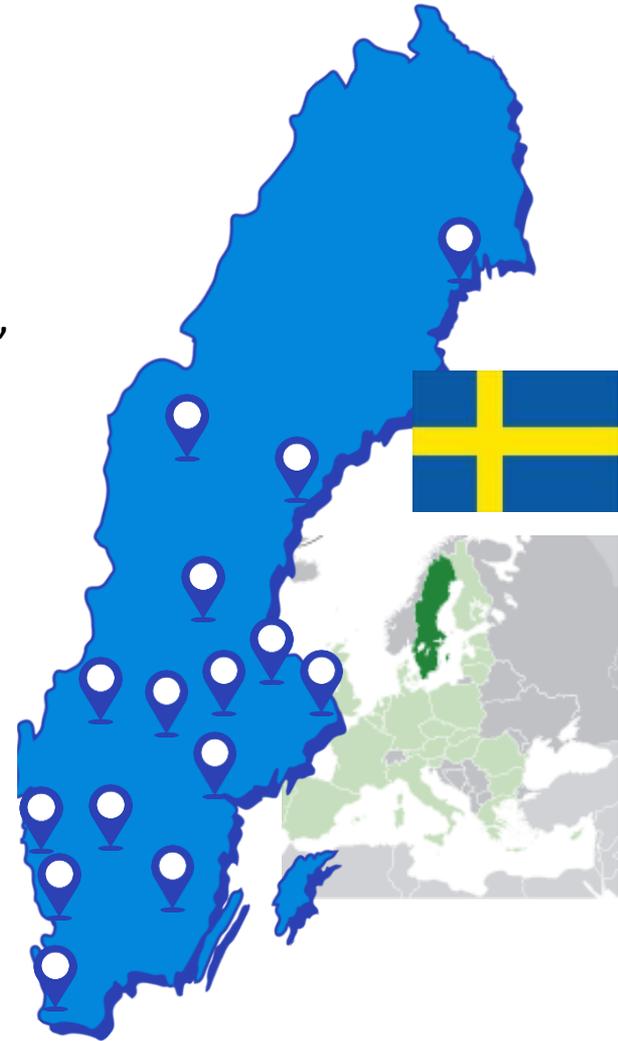


Upcoming/ongoing reforms and projects

- New Medical decision support – STEP (Security, Safety, Efficiency, Precision)
Ronald Krantz, SOS Alarm
- AI – Proof of Concept on the use of Artificial Intelligence
André Malm, SOS Alarm
- Upgrading CAD-system to NG112 – TOP-project (Technical Operational Platform)
Håkan Wedin, SOS Alarm
- Public Warning – Swedish set up
Håkan Marcusson, MSB
- Digital TETRA-radio – upgrade to gen 2.0, and some other facts about Sweden
Björn Skoglund, SOS Alarm

Sweden – some facts

- Population: ~ 10,4 million
- 25 inhabitants/km², more dense in the southern parts, less in the northern
- Area: 407 284 km² , fifth largest country in Europe
- Appx 85 % of the population lives in urban areas
- Single emergency number since 1956, 112 since 1996
- SOS Alarm runs 112 on agreement with the government
- Answered appx 3,4 million 112 calls in 2020



PSAP model

- SOS Alarm answers all 112 calls
- Doing interview for most of EMS and all FRS
- Dispatching for most of EMS and FRS
- Trend: FRS managing dispatching on their own
- Forwarding calls to the Police
- Very little regulation concerning 112



PSAP Stage 1/2

- All of SOS Alarms PSAPs interconnected with each other and with all FRS
- Transmission of data between SOS Alarm and:
 - EMS
 - JRCC (Sea/Air Rescue)
 - Police (due in September 2021)

<i>PSAPs Stage 1</i>	SOS Alarm	15
<i>PSAPS Stage 2</i>	SOS Alarm	All 15 (for FRS and/or EMS)
	Fire Rescue Services	6
	Emergency Medical Services	3
	Police	7
	Sea/Air Rescue (JRCC)	1
	Coast Guard	1

New Medical Decision Support

Ronald Krantz,



Facts

- SOS handles about 920 000 medical emergency calls by 112 / year (2020)
- The emergency calls are handled by trained calltakers, supported by nurses
- All are assessed in our present medical decision support, "medical index"
- The present "index" is basically a digitized version of a product from mid nineties, and does not support effectively



Work in progress

- In 2018 we decided to develop a new medical index support
- We analyzed which improvements we needed compared to the present "index"
- We scanned the market, could we find a system which was the answer of our needs?
- The answer was "No!" and we started developing our own modern system, "STEP"



What we need

- STEP is constructed to quickly define life threatening conditions
- STEP is constructed to be safe and with high precision define if the medical need calls for an ambulance of priority 1 (a/b), 2 (a/b), 3 or if it is no need for ambulance support at all.
- STEP is constructed for as much automation as possible, and in future version (2022) the calltaker will be supported by Artificial Intelligence



Partner's involvement and influence

References among our co partners

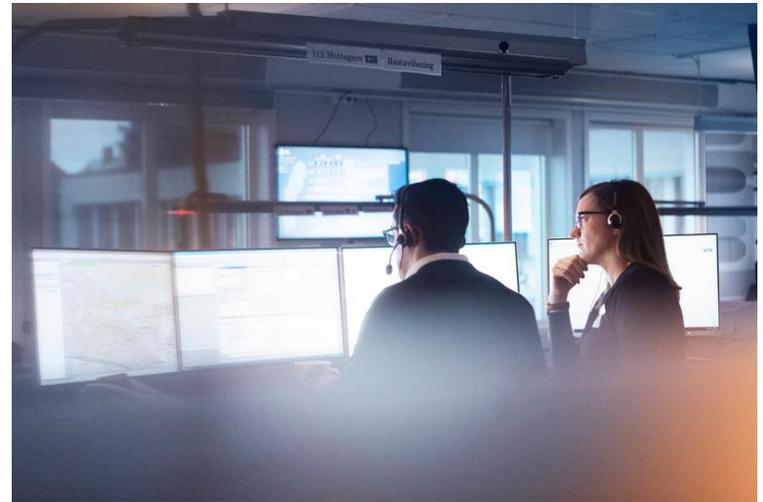
- External reference team involving county medical authorities and medical experts
- Implementation in the county Jämtland/Härjedalen, a county in mid Sweden, in full cooperation with the county medical authorities. They are also important to feed back the operativ functionality experienced by the ambulance organisation

Technical partners

- Corti, specialized in artificiell intelligence
- Carmenta, the supplier running our operational platform "CoordCom"

Implementation

- After ambitious tests, both technically and operationally, we have used STEP in our dispatch center in Östersund.
- We started in a small scale under high supervision, initially only a few hours/day, successively increasing to 24/7
- The summer will be used for adjustments before the great implementation during autumn, one dispatch center after the other



SOS Alarm, TOP* and the future

Håkan Wedin, Director Application Management

* Technical Operations Platform (CAD-system)



SOS Alarm is operating in a complex and ever changing world, with many factors which both facilitate and limit our future endeavours

➤ Today, SOS Alarm plays a crucial role in the emergency chain, but there are many indications that changes in society and higher demands will create new conditions for our operations.

➤ To guarantee that we will keep true to our vision in the future, a safer Sweden for all, a 10 month pilot study was conducted in order to review our operations and identify a number of mission-critical needs.

➤ The purpose of TOP is to create better security for our employees and citizens in need of help, using new technological solutions. It will also lay the foundation for new business and extend the value chain.

In the pilot study, a number of needs were identified which the TOP program was tasked with meeting to create the best emergency chain in the world

Driving factors

External

- Increasing amounts of data
- Changing customer expectations
- Increased demands on operators
- Increasing expectations of cooperation

Internal

- Stable, but monolithic and inflexible technological platform
- Large amounts of unstructured data

Future possibilities

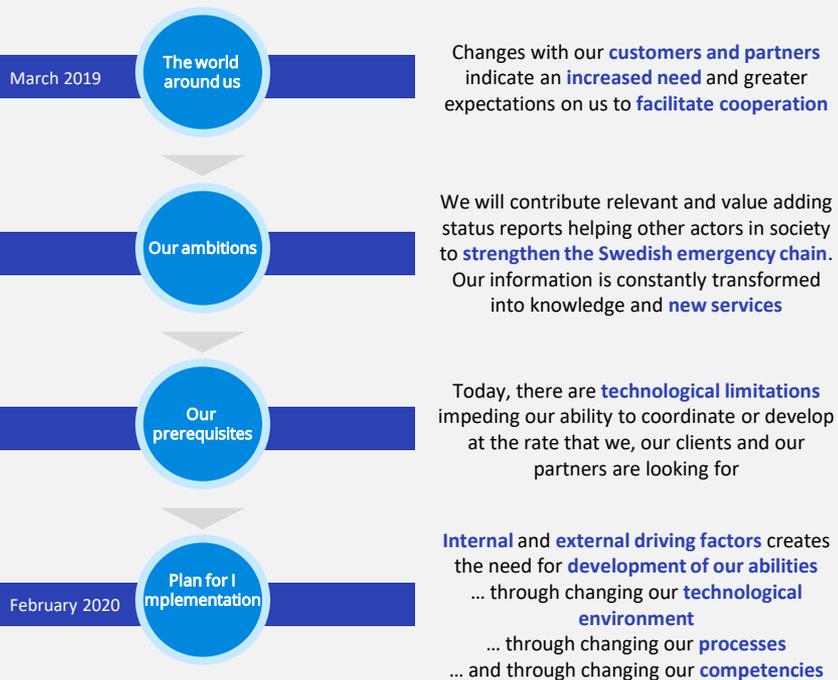
- Increasing our competitiveness by taking advantage of growing amounts of data, for us and for our customers and partners
- Increasing competitiveness and making it easier for operators in day to day operations by utilizing modern technology, such as AI and decision making
- Increasing flexibility through modular processes and modern safety
- Improved robustness and availability

Consequences if nothing is done

- Reduced quality
- Increased vulnerability and poor agility
- The robustness of the system will be at risk
- Increased complexity puts higher demands on employees
- Increased management costs with no major improvements in system support

The TOP pilot study resulted in a starting point for the program, with a high degree of involvement for customers, partners and our own employees

The 4 phases of the pilot study



Participants in the pilot study

Adam Sears	Erik Felin	Linda Klint	Peter Åkerberg
Alexander Trygg	Eva Bekkevik	Louise Brask	Philip Söron
Amina Berg Wadsten	Freddy Hansson	Lucinda Chan	Ronald Krantz
Anders Carlsson	Fredrik Andersson	Rundström	Samuel Bågfors
Anders Fredriksson	Fredrik Jansson	Magnus Dahl Zetterlund	Samuel Koelega
Anders Tessem	Fredrik Pilo	Magnus Forsberg	Sandra Kjellin
André Malm	Gabriel Hansson	Malin Cohn	Sandra Öhnstedt
Andreas Höglund	Göran Bertilsson	Marcus Björkander	Shahram Koulahi
Andreas Norrby	Gunnar Bergström	Marie-Louise Lorén	Shamala Samuelsson
Anna Hoff	Hannes Lind	Martin Olofsson	Sofia Håkansdotter
Anna Magnusson	Håkan Wedin	Martin Thell	Sonie Rudenschöld
Anna Lindberg	Henrik Persson	Mattias Regnell	Therese Ledel
Ann-Marie Berg	Johan Holmberg	Michael Ancoff	Thomas Georgsson
Björn Johansson	Isabelle Grebäck	Michael Zantelid	Thomas Nohre
Björn Skoglund	Iuliana Huchiu	Mikael Sandh	Tobias Dock
Camilla Nylén	Jakob Åkerlind	Mikael Sjögren	Tobias Svensson
Carl Ekdahl	Jannice Mattsson	Mona Bergström-Ling	Tor Swartling
Carl-Johan Stenmalm	Johan Abrahamsson	Niclas Cholodov	Torgil Tillberg
Christian Larsson	Joakim Green	Ola Henricsson	Ulrich Boyer
Christine Bejrums	Johan Wirf	Ole Lomstedt	Victorica Sydow
Dan Svensson	Jonas Carlsson	Oscar Sigtrydsson	Yasemin Skarp
Daniel Mukka	Jonas Lind	Oskar Nirblad	Åsa Hamberg
Daniel Storey	Jörgen Dahlberg	Per Eriksson	Åsa Stridsman
David Dankiewicz	Katarina Jonsson	Per Palm	
David Ångell	Katja Johansson	Peter Bergström	
Emma Raae	Kenny Lorentzon	Peter Löfgren	
Eriana Nyberg	Lars Thomsen		

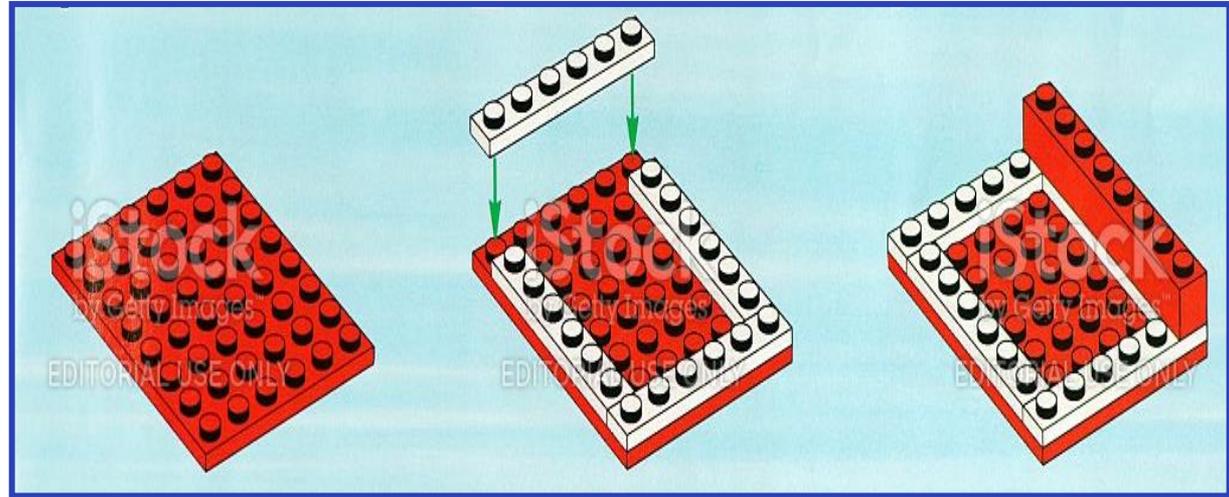
Internal staff / External staff

Our technology platform was like a ball of spaghetti



For a long period of time we added technological solutions related to CoordCom, which has created several interdependencies making effective development a challenge. It is **hard to** follow the individual spaghettis. If you tug on one piece of spaghetti **all the rest will follow**.

We want our future platform to be more of a LEGO factory

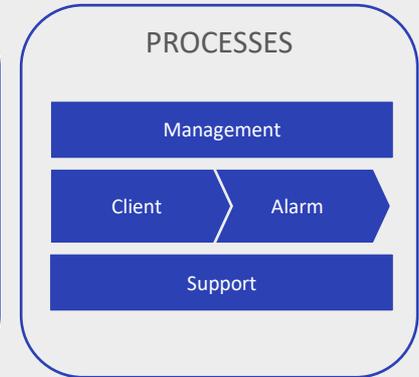
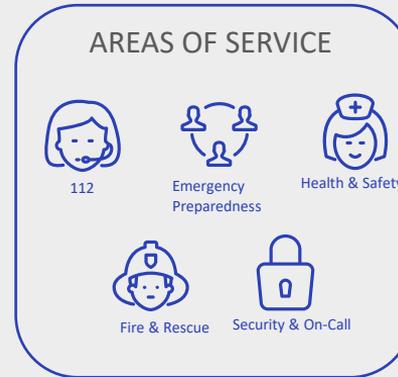
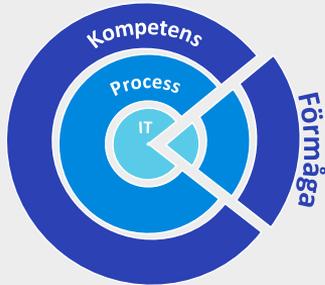


If the spaghetti is transformed into pieces of LEGO on a board we will get a **better overview**. It will also be **easy to change** one piece of LEGO **without affecting** the other pieces.

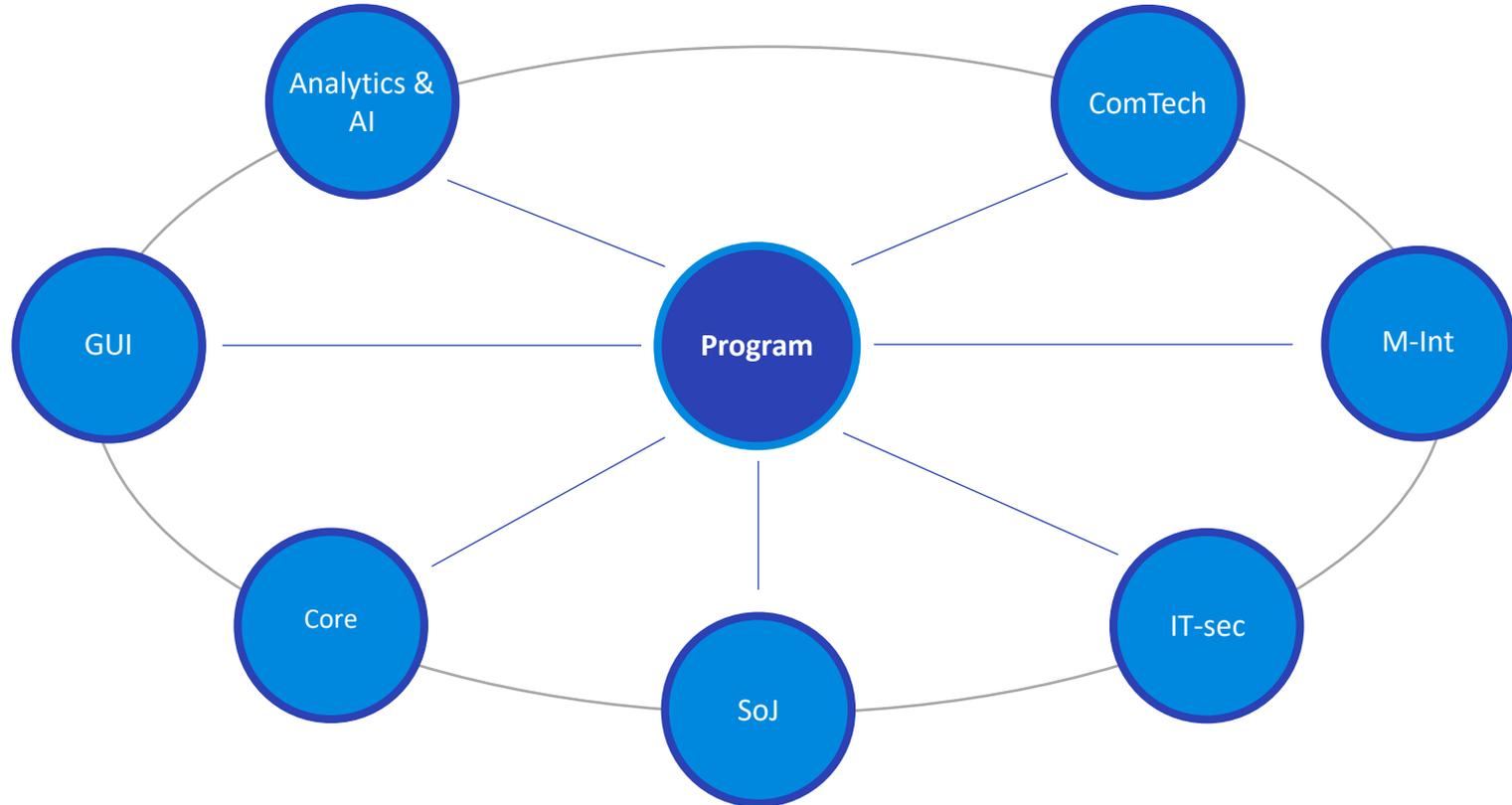
TOP – Technical Operations Platform

Lays the foundation for becoming the best emergency chain in the world

The purpose of the TOP program is to strengthen our ability to deliver. This will be achieved through a combination of Competence, Process & IT



The TOP program consists of 7 sub-projects, all contributing to the goal of the program



Better cooperation through better skills



Acquirement

We can see that there is a trend towards **increased amounts of data**, flowing ever faster. The amount of data creates opportunities for **more comprehensive status reports**, better and more objectively based decisions. In order to benefit from this, we need to greatly increase our ability to **receive and collect information**



Execution

There are increasing demands from our clients and partners for **making correct and objectively based decisions** for the relevant actions in a cost-effective manner, which places higher demands on our ability to **manage and process** all the available information



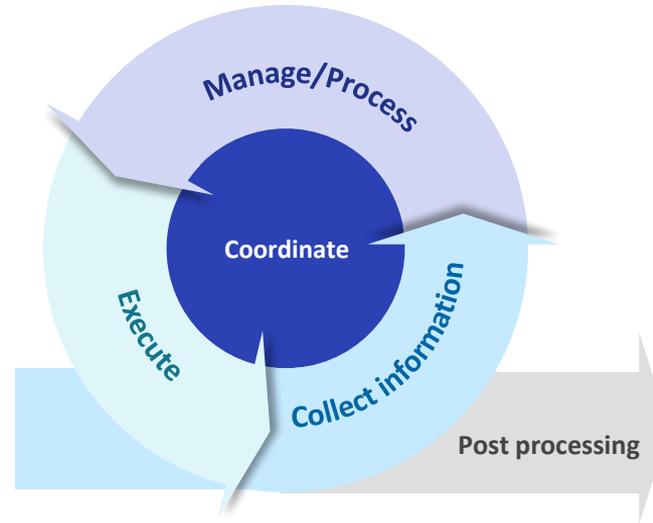
Manage/process

We see an increased need for optimizing the use of our clients and partners resources, which places high demands on our ability to **allocate the right resources to the right place at the right time** and **share the relevant information** to all our stakeholders



Post processing

There is a clear direction to **follow up and improve the quality** of our services, and quickly **learn** from events in our continued operations, which means we need to greatly improve our ability to follow up events and manage anomalies



Analytics & AI

André Malm, SOS Alarm



About the project – Analytics & AI

What will the project do?

- Analytics & AI is a project within the TOP-Program that examines **how** we can **use data** to **make everyday life easier** for our **employees, customers, partners, and citizens**
- Examples include AI-based decision support systems, optimized resource management, or predictive analyzes



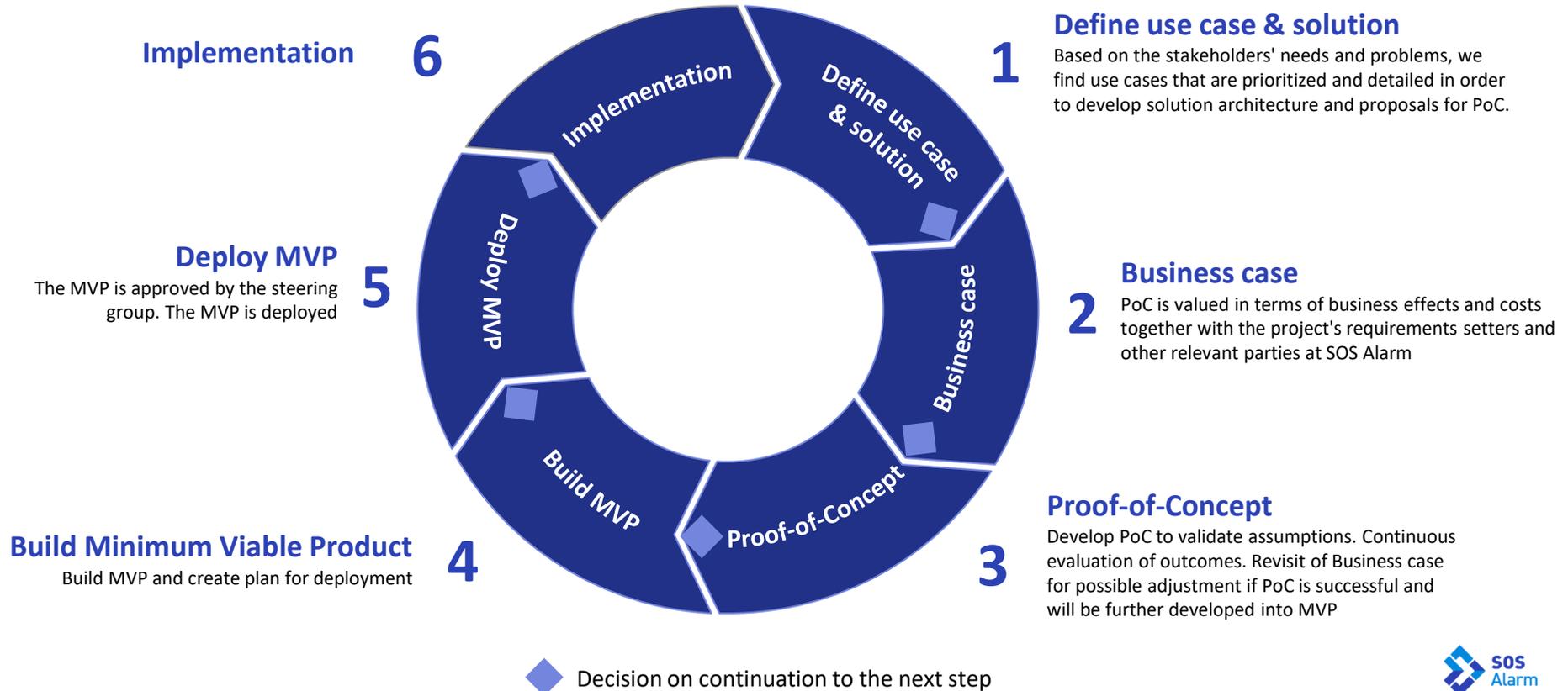
For how long?

- The project launched in 2020 and is planned to run through 2025
- It will **deliver capabilities** on an **ongoing basis**



Work process from need to complete solution

Many parts of the business are involved in designing appropriate solutions in an iterative process



A balanced selection of Proof-of-Concepts to investigate potential obstacles

- Verify that an **idea can be transformed** into a **workable solution** at all
- A PoC is usually **very limited**
- The purpose is to **test the difficult parts**, not all features
- For us, it is often a matter of **showing that the critical functions for** one or several **use cases can be built** with IT and in our organization
- Example: verify that we can use weather data to predict the need for staffing, not to build a working application
- Balanced choice of PoCs based on our use cases, such that the candidates:
 - Are in line with business goals
 - Involve different areas of the organization
 - Test different types of technologies and solutions
 - Involve data with different levels of sensitivity
- Early investigation of potential obstacles:
 - Legal
 - Agreements
 - Organizational
 - Technical
 - Data related



Examples of PoC candidates – 2021

	Chatbot for HR payroll	Faster answers to questions about HR, staffing and education for employees
	Live transcribing of calls	Displays transcribed text from conversations on-screen and fills in relevant fields
	Analyse video from caller	Helps operators or nurses who receives video from help seekers to assess injuries and risks
	Safe rejection of “pocket calls”	Assess calls and reject those that are determined to be “pocket calls”, “purse dials” etc
	Staff planning and scheduling in the short, medium and long term	Helps schedulers who plan staffing nationally and at the local PSAP to optimize staffing in the short and long term
	Detect ongoing deadly violence and manage situation picture	Based on incoming calls, detect ongoing deadly violence, and assist operators and KBA to understand and handle the situation
	Translate and conduct dialogue in another language	Helps the operator to identify the language being spoken, connect an interpreter, and continue the interview
	Detect “call wave”	Detects a “call wave” from an area even before the calls have been answered and early detection of the probable cause
	Extend information about event	Provide extended information about a case based on other related cases, as well as other relevant information sources
	Optimize placement of resources	Provide recommended standby positions for resources, such as ambulances, based on drive times

CALL WAVE DETECTED

07:01:25 59°19'29.9"N 18°04'24.6"E

NUMBER OF CALLS: 4
DEGREE OF SUSPICION: VERY HIGH



Swedish Public Warning System

Håkan Marcusson, MSB



Outdoor public warning

- ▶ 4200 sirens in 234 of 290 municipalities,
 - Exchanging old air pressure type to electronic, approx. 50% done
- ▶ Covers >70% of the population
- ▶ GIS-system for operating the system
 - Municipalities controls there own system
- ▶ Possible to alert sirens from Swedish PSAP, SOS Alarm



Radio and Television

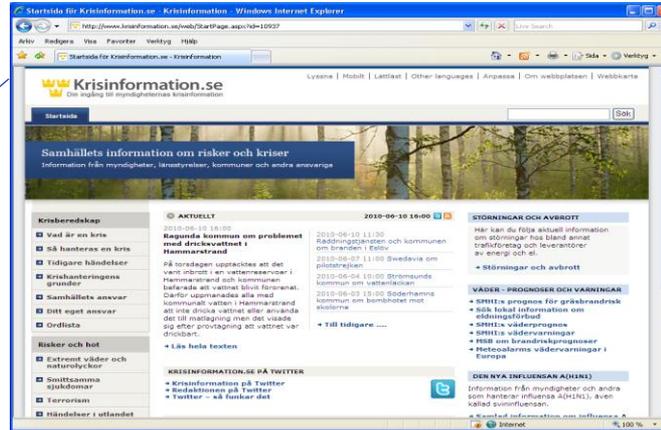
- Radio is the primary channel for alerting messages
- Equipment for private local radio, that will interrupt the normal broadcasting and send the public service Swedish Radio channel 4



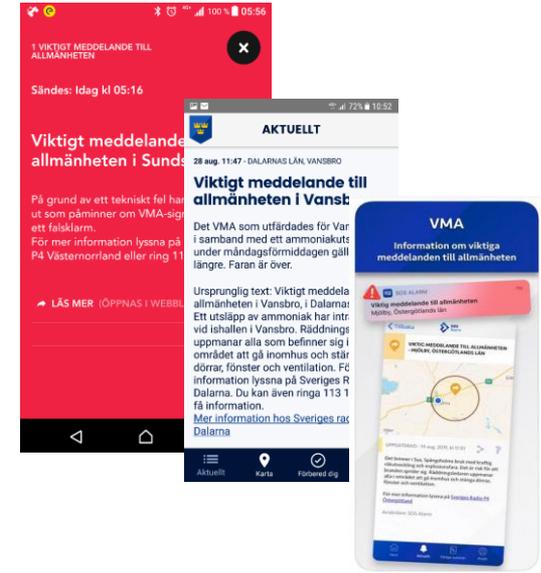
- Information in the all major TV-channels sending from Sweden
 - Text banner in the screen, and page-TV 599

Information on Internet by CAP server

Swedish Radio



- CAP-server at Swedish Radio
 - Open API
 - Same message as Radio announcement



Alert through mobile phones

- Location based SMS and applying to Article 110 reversing 112
- Operated by SOS Alarm (Swedish PSAP)
- Only together with an IPA on the Radio
- The concerned official decides if SMS will be used

Nuclear Power Plant alerting

- Outdoor warning in strategic places
- Special designed RDS-receivers, that only alerts for Nuclear warnings and test
- 23 000 handed out within 15 km radius around the 3 NPP



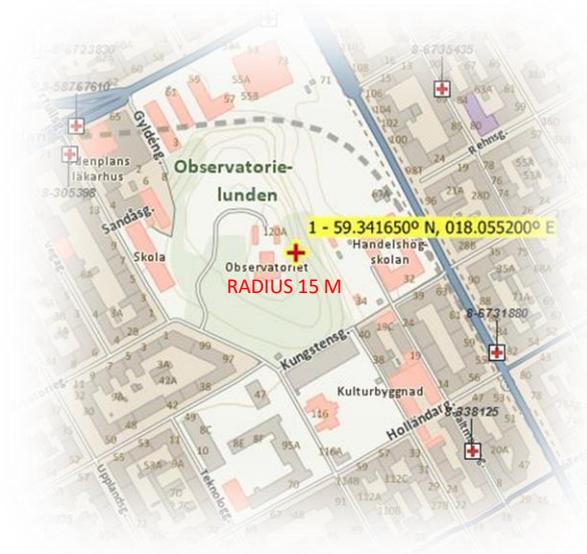
New gen digital tetra radio system, AML, transnational database, eCall

Björn Skoglund, SOS Alarm



Handset derived caller location

- AML on both Android and iOS since 2019
- Appx 65% of mobile calls comes with AML location
- Ongoing analysis together with MNO's
- Target: increase number to (theoretical) 85%
- Many success stories where AML location has been essential!



Transnational database - PSAP Directory

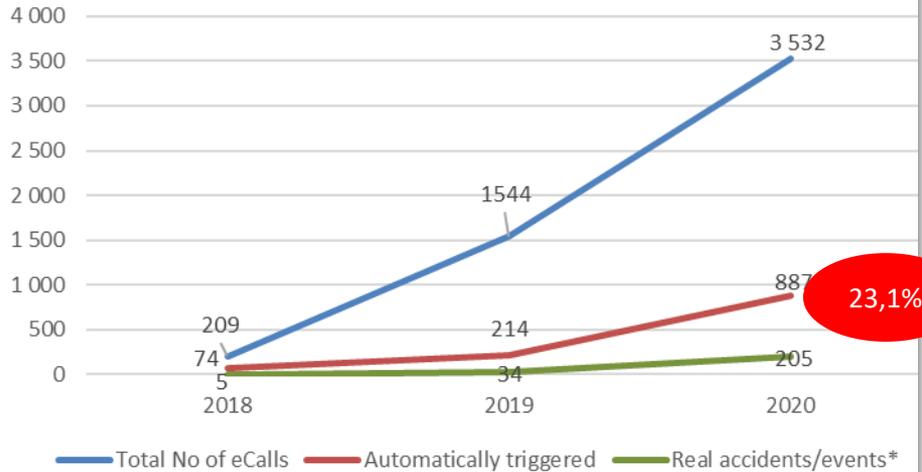
- › Sweden is one out of 17 countries participating
- › Has also gathered numbers to several other countries
- › 1 075 calls were transferred to PSAP in another country in 2020 (whereof 696 to neighbouring countries)
- › Some success stories known (Lithuanian woman in Sweden)
- › Consequences when not being able to transfer (suicide in USA 2018)
- › **Why are not more/all PSAPS participating?!**

Austria
Belgium
Bulgaria
Denmark
Estonia
Finland
Hungary
Iceland
Ireland
Lithuania
Luxembourg
Netherlands
Poland
Romania
Slovakia
Sweden
United Kingdom

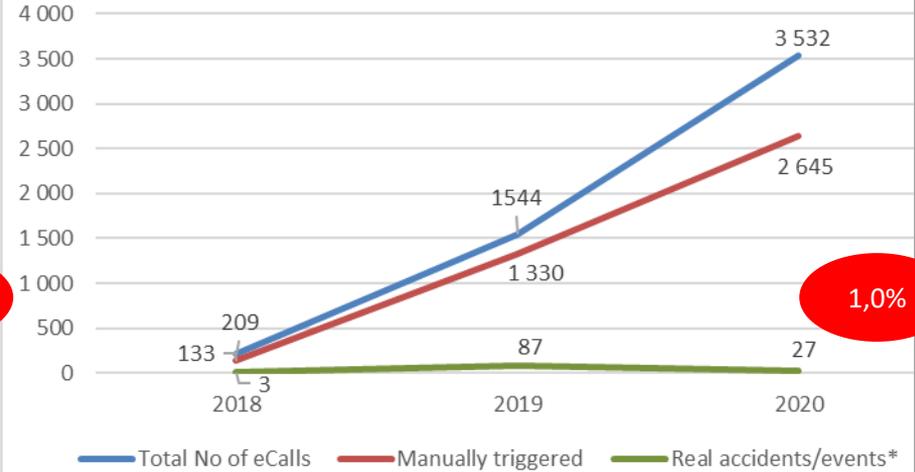
eCall

- All eCalls received at three of SOS Alarms PSAPs
- Very few real accidents or events, contrary to prognosis before start of eCall in 2017

eCalls, automatically triggered



eCalls, manually triggered



TPSP eCall

- Agreements with three TPSP
- TPSP eCalls from these to SOS Alarm: 1 157
- No stats on share of real accidents available
- No technical transfer of data - all is exchanged mouth-to-mouth
- Pros: TPSP filters many unnecessary calls
- Cons: risk of delaying urgent help



Q & A panel

Björn Skoglund, SOS Alarm
Ask Björn about new digital tetra radio
or about general questions
concerning 112, like AML and eCall
bjorn.skoglund@sosalarm.se



André Malm, SOS Alarm
Ask André about how AI &
Analytics could be used in the future
andre.malm@sosalarm.se



Ronald Krantz, SOS Alarm
Ask Ronald about the development
and implementation of a new Medical
Decision Support
ronald.krantz@sosalarm.se



Håkan Marcusson, MSB
Ask Håkan anything about
Public Warning
hakan.marcusson@msb.se



Håkan Wedin, SOS Alarm
Ask Håkan about upgrade
of the CAD-system to NG112
– the TOP project
hakan.wedin@sosalarm.se

