Finnra Traffic Centres
Reference model and main functions

Finnish National Road Administration
Traffic Services

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VIKING
Finnra Traffic Centres
Reference model and main functions
ABSTRACT

The Finnish National Road Administration (Finnra) Traffic Centre network consists of eight regional Traffic Centres and the National Traffic Information Centre (NTIC). The NTIC operates jointly with the regional Traffic Centre of Uusimaa in Helsinki.

Finnra aims to integrate the functions, procedures and information systems of the Traffic Centres so that they can operate as a network, replacing one another when needed (during rush hours, at night times etc). The network operates 24 hours a day.

In 1996, Finnra initiated a multiphase development process to identify the actors, analyse their needs, define the functions and system design for the Traffic Centres. This analysis consists of the following phases: 1A) Reference model, 1B) Functional analysis and 1C) System architecture definitions. The reference model was completed in 1997 and functional analysis in 1998. The objective of the functional analysis was to define main functions of the Traffic Centres. System architecture definition study has been started in August 1998. The core of the system is an integrated information system for Traffic Centres. The information system definition was completed in December 1998.

The reference model includes actors and interest groups in traffic management, the needs and expectations for co-operation and data exchange, and also jointly accepted vision on data exchange principles. Data and information to be exchanged between actors is classified into three priority groups: 1) Instantly sent information, 2) short time delay for information sending and 3) fixed communication interval, or when the information has changed.

The operation of Traffic Centre has been divided into 7 main functions and a number of support functions. Main functions are applied in every Traffic Centre, even though their emphasis, extent and selection of included services may vary regionally. The variation is based on differences in the road network services, traffic flow, user needs and forms of regional co-operation. Main functions of the Finnra Traffic Centre are:

- Collecting data of current traffic and ambient conditions. Traffic Centres monitor the traffic and ambient conditions (weather etc.) using regional monitoring systems and in addition to this observations and reports from external actors.
- Maintaining and processing the collected data. Traffic Centres reprocess the collected data and store it using in the future the integrated information systems. The centres monitor the reliability and sufficiency of the information and update it by being actively in contact with its partners.
- Distributing the information including Traffic Centres distribute regional information on the road and traffic situation to the road users and the internal and external partners. Internal partners include e.g. other Traf-
fic Centres, the National Traffic Information Centre, Finnra management, PR-information and road maintenance management centres and other Finnra units. External partners are e.g. police, regional alarm centres, rescue forces, municipalities and contractors used by Finnra. In addition to this, Traffic Centres take care of data exchange with control and information centres of other transportation modes, service providers and companies.

- Traffic control including Traffic Centres controls variable speed limits, warning and information signs and operation of traffic signals. Traffic Centres take active part in traffic control during incidents such as accidents, congestion or roadwork. The need for special traffic control is evaluated using the collected data and control requests from other actors.
- Incident clearance including Traffic Centres actively participate in incident clearance in co-operation with other partners.
- Demand management measures, which include operating and controlling demand management systems and services such as park & ride and passengers information systems, will be implemented mainly after the year 2000.
- Co-operation within the traffic sector including Traffic Centres take care of the services agreed on with e.g. contractors, municipalities, other authorities and transport modes. Co-operation can be arranged with e.g. municipalities on traffic signal monitoring.

In Traffic Centres a large amount of support functions is required. Traffic Centres maintain large information databases and descriptive rules, such as event lists, location databases, client and contract registers, plans for traffic control and information distribution regulations. Traffic Centres monitor the operation of traffic monitoring and control systems and evaluate their maintenance needs. Traffic Centres are also responsible for quality control and quality assurance of their own work.

For managing the main functions of the Traffic Centre the most essential incidents on the road network were classified into 10 groups. Preliminary objective action procedures for Traffic Centre operation during incidents were prepared. On the basis of these procedure descriptions more detailed action plans for different incidents will be prepared in the next phase.
FOREWORD

In 1996, Finnra initiated a multiphase development process to identify the actors, analyse their needs, define the functions and system design for the Traffic Centres. The analysis consists of the following phases:

1A: Reference model
1B: Functional analysis
1C: System architecture definitions

The reference model was completed in 1997 and functional analysis in 1998. The objective of the functional analysis was to define main functions of the Traffic Centres. System architecture definitions has been initiated in August 1998. The core of the system is an integrated information system for Traffic Centres. The information system definition was completed in December 1998.

This report presents the main results of the phases 1A (reference model, reference groups of the Traffic Centres) and 1B (functional analysis).

The studies resulted here has been granted European Community financial support in the field of Trans-European Networks - Transport.

In Helsinki in December 1998,

Finnish National Road Administration
Central Administration
Traffic Services
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1 INTRODUCTION

The Finnish National Road Administration (Finnra) Traffic Centre network consists of eight regional Traffic Centres and the National Traffic Information Centre (NTIC). The NTIC operates jointly with the regional Traffic Centre of Uusimaa in Helsinki (Appendix 1).

Finnra aims to integrate the functions, procedures and information systems of the Traffic Centres so that they can operate as a network, replacing one another when needed (during rush hours, at night times etc). The network operates 24 hours a day.

In 1996, Finnra initiated a multiphase process to identify the actors, analyse their needs, define the functions and system design for the Traffic Centres. This analysis consists of the following phases:

1A: Reference model
1B: Functional analysis
1C: System architecture definitions

The reference model and functional analysis have already been completed. In October 1998, Finnra management group approved the traffic management service vision for the Finnra Traffic Centres. The vision of the services Finnra Centres will produce is based on the functional analysis (phase 1B). The organisation of Traffic Centres, e.g. how many centres are needed, will be decided at some later phase.

Phase 1C, System architecture definitions, has been started in August 1998. The core of the system is an integrated information system for Traffic Centres. The information system definition has been completed by December 1998. In addition to this, a number of questions concerning architectures of various "closed" traffic control systems have to be solved separately.

In practise, the development of a traffic centre is never completed. Its functions and systems are constantly being developed and new ones will be employed. The analysis and architectural definitions phases aim at the creation of an open and generally applicable environment. Such environment would simultaneously enable the use of present systems, start-ups of new technical solutions, phase-by-phase realisations and competing equipment suppliers for different stages of the realisation.

This report presents the results of the phases 1A (reference model, reference groups of the Traffic Centres) and 1B (functional analysis). The analysis and definition phases (1A-1C) do not take a stand on the technical solutions.
2 REFERENCE MODEL

2.1 General

In the first phase of the developing process in 1996-1997 the Finnra Uusimaa Region developed a reference model for their Traffic Centre. The reference model includes:

- Actors and interest groups in traffic management
- The needs and expectations for co-operation and data exchange
- Jointly accepted vision on data exchange principles

The actors in traffic management require data from several information sources for their duties and in supplying additional information. In addition to the reference model the information and data to be exchanged between actors is classified into three priority groups:

1. Instantly sent information
2. Short time delay for information sending
3. Fixed communication interval, or when the information has changed

2.2 Actors in traffic management

Finnra Traffic Centre

The Traffic Centre is responsible for monitoring, processing and distributing information on traffic situation, road weather and incidents within the regional traffic system. Monitoring the public road control systems and supervising the strategic actions (i.e. changing traffic signal control program during special events) is taken care of by the Traffic Centre – and if necessary together with local authorities. The Traffic Centre co-operates in the area of incident management with other actors (police, rescue forces) in order to minimise the effects of incidents on traffic. The main role of traffic centre is informing the road users within affected area.

Information, monitoring and control tasks on municipal street networks can also be taken care of by the Traffic Centre according to local agreements.

Monitoring and control systems

The monitoring and control systems include e.g. traffic signals, traffic signal monitoring systems, traffic monitoring systems, road weather systems, warning and information systems and variable message signs control systems.
Road users

Road users consists of the private road users, the professional drivers, the industry and the freight traffic. The road users is the main target group for the Traffic Centre services. The information exchange with other actors aims at maintaining the quality of the road user services.

National traffic information centre (NTIC)

The National traffic information centre is in charge of distributing the traffic information to the national media and developing of the data exchange in Finland and internationally. The National traffic information centre maintains the information systems and is in charge of their development.

Foreign traffic information centres

Data exchange with foreign TICs is carried out according to separately agreed principles. The most important contacts are the TICs of the other VIKING countries (Sweden, Norway, Denmark and Germany) and in the future also the other neighbouring countries (Russia, the Baltic countries).
Technical system maintenance

The Traffic Centre is responsible for maintaining and developing the systems and equipment used in its operation. External contractors are used for the maintenance. Maintenance includes technical services (e.g. changing light bulbs in traffic signals), small functional modifications requested by the users (e.g. small changes in green-time in a signalised intersection). Maintenance monitoring is based mainly on the use of automatic systems.

Road maintenance management centres

The road maintenance management centre of the Finnra production unit supervises the actions and the status of the equipment belonging to the maintenance contractor and gives necessary assistance to the contractor. It regularly informs the Traffic Centre of the current and expected road weather condition and maintenance operations.

Road Construction Projects

The constructors are required to inform the Traffic Centre on their operational stages. All construction sites must report on their activities at least once a week, apart from city area sites and projects on roads with heavy traffic, whose information must be updated daily.

Private Motorways

At present Finland has no privately funded motorways. The first one will be built between Järvenpää and Lahti and it will be taken fully into use in 1999. The information exchange procedures have not yet been defined.

Regional Alarm Centres

When an emergency call to 112 is registered, the regional alarm centre alarms the rescue forces, police units and possibly the medical helicopter service. An information exchange system between the Uusimaa region Traffic Centre and Helsinki alarm centre has been developed.

The first version of the system has been tested during this year. The system enables the Traffic Centre to obtain first-hand information on alarms that might affect the traffic situation. Information is sent automatically when the alarm centre is dispatched.

Rescue Forces

Rescue forces are mainly municipal and include also medical helicopter services. Rescue forces are responsible for handling the situation in the scene of an accident including removal of vehicles, staying in the scene until it has been cleared, conducting the towing of vehicles. All work is assisted by the police and after the dismissal of rescue forces, the activity in the scene is operated by the police.
Police

Improving traffic safety is one of the primary targets in police work. The police seeks to prevent accidents and improve fluency in advance by affecting the traffic environment, drivers and vehicles. In addition to traffic supervision the police takes part in manual traffic control during i.e. accidents and malfunctions of controlling equipment and provides traffic and incident information to other actors including the Traffic Centre.

Actors within the police include the police alarm centres, the municipal patrol police and the mobile police forces.

Municipal Traffic Signal Control Centres

Municipal traffic signal supervision and control centres are usually manned only during normal office hours. Therefore in some cities e.g. in Tampere the cities’ traffic signals are supervised by the Finnra Traffic Centre.

Street Maintenance

Street maintenance is regarded as either an actor or a system that contains information on main street network maintenance operations. Traffic Centres must possess information of main street network maintenance operations. At present nothing street maintenance database exists.

Other Operators

Other operators include such actors as public transport service providers (State Railways, Helsinki City Transport, other transportation companies, their information and control systems), taxi centres and carrier cargo monitoring systems.

Other Information Providers

Other information providers include such actors as the Automotive Association, the Helsinki Metropolitan Area Council (public transport operator in Helsinki metropolitan area), the Finnish Meteorological Institute (weather information and forecasts), the municipal air quality surveyors, the army, the frontier guard etc.

Public Media

Duties of the Traffic Centre include informing the road users via a public media such as the press, radio, TeleText and the Internet. In the future, information e.g. on various road-side services could be given via local media.

Other Service Providers

Other service providers include private sector actors offering added value information on traffic situation using e.g. GSM-technology or the Internet. H-
formation can be on e.g. preferred travelling routes, journey times, public transport schedules. NTIC and traffic centres give such data if it is of general interest and the benefit and does not conflict with the Finnra objectives.

2.3 Data exchange between actors

2.3.1 Interface definitions

The general principles for data exchange are the foundation for co-operation development. The objective is developing a decentralised information exchange and co-operation network utilising the existing monitoring, control and information systems from different actors.

The co-operation is based on the following principles:

- Co-operation aims at satisfying road user service needs
- The actors benefit from mutual free of charge information exchange
- Creating conditions for accessing existing information provided by other actors
- Enabling real-time information distribution and data exchange with the help of integrated traffic information system, which bases on the Transport Information System for All Modes of Transport (KALKATI)\(^1\)
- Actors that benefit from developing monitoring systems and data exchange participate in system developing and maintaining expenses

Information and data exchange between Traffic Centre and other actors is based on the principle that a message of the incident must be sent if the incident is presumed to be lasting more than 5...30 minutes depending on incident type and condition (location, traffic conditions etc.)

The information is classified into three priority groups:

1. Instantly sent or updated information is sent 0...5 minutes after the incident has been observed / reported. Used on emergency and alarm situations.
2. Short time delay sent or updated information is sent 5...15 minutes after the incident has been observed / reported
3. Low-priority information is exchanged or updated on agreed fixed intervals e.g. once an hour or daily or when the previous information or situation has changed.

\(^1\) KALKATI will be developed in Research and Development Programme on Transport Telematics Infrastructures (TETRA) funded by the Ministry on Transport and Communications.
2.3.2 Case - Data exchange between the Traffic Centre and the police

The police alarm centre is responsible for providing information to the scene of the incident and to different police units. Most of the alarms are launched either by emergency calls to the police alarm centre or observations by the police field units. The actions in the scene are led by a field director. In order to distribute the support information during the incident, a reliable and direct connection between traffic management centres and police is required. Police is assisted by the Traffic Centre in distributing the traffic and incident information.

The Traffic Centre negotiates with the police on traffic control methods in the scene of an incident especially if the incident may cause major congestion.

One of the objectives for the immediate future is developing a regular information exchange link between the Traffic Centre and the police. At least the following functions should be implemented:

**Traffic Centre provides information on:**

- Unforeseen incidents like sudden road works and maintenance operations which might produce disturbance in traffic
- Information on sudden weather changes
- Foreseen incidents such as road works, transportation of hazardous goods and temporary speed limitations
- Control suggestions and orders during incidents in co-operation with the police

**Police supplies information on:**

- First-hand information on alerts that are given via the police alarm centre and are affecting the traffic, accidents and other incidents that reduce the capacity of the carriageway or its close neighbourhood
- First-hand update on alert situation at the scene after the incident evaluation including clarification on incident type, affected area, and an estimate on duration
- Information updates on situation progress from the scene of incident is important on long duration incidents. The last police unit leaving the scene transmits an “incident over” message
- Traffic, road weather, road status monitoring information such as abnormal congestion, defective control equipment, sudden and local road slipperiness
- Pre-known events including convoys, mass events, military marches, usage limitations due to the preceding, transportation of hazardous goods
- Information on temporary road section/area closure or usage limitations
Via the Traffic Centre the police can request the road authority to supply assistance to the scene of incident for necessary arrangements in i.e. removing broken traffic control equipment or setting up alternate route guidance.

During special event in the Helsinki area - such as mass events and state visits - the police has a regular interest to affect the traffic signals and the traffic monitoring camera system functions outside the Helsinki city limits.
3 THE MAIN FUNCTIONS OF A TRAFFIC CENTRE

3.1 Overview

The operation of Traffic Centre is divided into 7 main functions and a number of support functions. Main functions are applied in every Traffic Centre, even though their emphasis, extent and selection of included services may vary regionally. The variation is based on differences in the road network services, traffic flow, user needs and forms of regional co-operation. Main functions of the Finnra Traffic Centre are:

- Collecting (monitoring) data of current traffic and ambient conditions and other relevant information
- Maintaining and processing the collected data
- Distributing the information
- Traffic control
- Incident clearance
- Demand management includes operating and controlling demand management systems and services such as P&R and passengers information systems
- Local and regional co-operation within the traffic sector
- Support functions

![Picture 3: Main functions of the Finnra Traffic Centres.](image-url)
Collecting data of current traffic and ambient conditions

Traffic Centres collect data of the traffic and ambient conditions (road weather etc.) using regional monitoring systems and observations and reports from external actors. Observations and reports from external actors.

Maintaining and processing the collected data

Traffic Centres store and - if necessary - reprocess the collected data and information into integrated traffic information systems. Traffic centres monitor the reliability and sufficiency of the information and update it by being actively in contact with its partners.

Distributing the information

Traffic Centres distribute regional information on the traffic and ambient conditions to the road users and the internal and external actors.

The distributed information covers road weather, traffic situation, traffic incidents, road works, bad state of the road during frost damage period. Internal actors include e.g. other Traffic Centres, the national traffic information centre, Finnra management, information units and road maintenance management centres and other Finnra units. External actors are e.g. police, regional alarm centres, rescue forces, municipalities and contractors used by Finnra.

In addition to this, Traffic Centres exchange information with control and information centres of other transportation modes, service providers and companies. Traffic Centres take part in providing national services and international information exchange by collecting the necessary data.

Traffic control

Traffic Centres control variable speed limits, warning and information signs and operation of traffic signals. Traffic Centres also take active part in traffic control during incidents such as accidents, congestion or road work.

The need for special traffic control is evaluated using the collected data and control requests from other actors.

Incident clearance

Traffic Centres actively take part in incident clearance in co-operation with other actors. The Traffic Centre actions include forwarding the tasks requests from officials and other actors to Finnra production unit and external contractors, monitoring and co-ordinating the process of the tasks and informing road users and other actors. During an accident Traffic centre takes care of executing the final clean-up of the scene, after which the scene is restored to the state it was before the accident. The scene is returned to a similar situation as it was before the incident.
Demand management

Demand management measures will be implemented only after the year 2000. At the moment, some pilot projects are in operation in the capital area. These pilots include Espoo and Länsiväylä Passenger Information (on waiting times at bus stops), roadside information including schedules for public transport for park and ride facilities.

Co-operation within the traffic sector

Traffic Centres take care of the services agreed on with e.g. contractors, municipalities, other authorities and transport modes. Co-operation can be arranged with e.g. municipalities on traffic signal operations monitoring.

Support functions

In addition to the main functions of Traffic Centres a large amount of support functions is required. Traffic Centres maintain large information databases and descriptive regulations, such as event lists, location databases, client and contract registers, plans for traffic control and information distribution regulations. Traffic Centres monitor the operation of traffic monitoring and control systems and evaluate their maintenance needs. The Traffic Centres are responsible for making contracts required for the Traffic Centre functions with data suppliers, other interest groups and media. The Traffic Centres monitor, report and make statistics of their own work in order to maintain high efficiency and to be able to make improvements. Traffic Centres are responsible for quality control and quality assurance of their own work.

3.2 Procedures for incident management

3.2.1 Incident categories and actions plans

For managing the main functions of the Traffic Centre the most essential incidents on the road network were classified into 10 categories.

1. Traffic accidents consist accidents of two or more parties and such single party accidents that have major effect on the traffic and road user actions.

2. Obstruction on roadway includes vehicles stopped in the carriageway (due to running out of fuel or a defect), fallen trees, fallen power cables, flooding, structural damages in the road surface etc. An obstruction on the road is a sudden incident and can therefore be danger to traffic. Usually an obstruction reduces capacity, which during high traffic may result in congestion.

3. Event known in advance. The events known in advance or scheduled events are large mass events such as sporting events, concerts and pa-
rades. Usually these events result in higher traffic volumes and require traffic restrictions and rearrangements.

4. **Congestion due high traffic volume** not including congestion due to accidents or other incidents. When the traffic volume approaches the capacity of the road section or intersection, queues lengthen, delays and journey times increase.

5. **Up to date road weather and road conditions.** The road weather during winter causes problems in Finland. This conceivably constant road weather monitoring and evaluation using various indicators.

6. **Bad road conditions during frost breaking period in springtime** includes the lowering of road load capacity and limitations due to it which inconvenience mobility of local inhabitants and commercial and industrial transports.

7. **Road works and other maintenance operations** include road works, road, bridge and tunnel environment and equipment maintenance such as cleaning of traffic signs and mowing of sideslopes. Road work and maintenance operations reduce capacity since the road can be only partially utilised. Temporarily the lanes can be narrowed, the machinery can block the road, or the traffic must be stopped. During high traffic such restrictions usually result in congestion.

8. **Equipment malfunction.** Equipment malfunctions include such malfunctions and faults of road environment equipment that result in partial or complete absence of the system. During high traffic volume such malfunctions usually result in congestion and might reduce traffic safety.

9. **Ferry traffic incidents.** In 1988 about 60 ferries operated on public roads in Finland. This category includes both incidents known in advance, such as maintenance operations and sudden incidents such as temporary changes and limitations in ferry traffic caused by technical problems.

10. **Hazardous and special transport** include transports of hazardous goods and over-height and over-weight cargo.

Preliminary objective procedures for Traffic Centre operation during incidents were prepared. The accident event was described on more detailed level including flowcharts of actions.

On the basis of working procedure descriptions and flowcharts more detailed action plans for different incidents will be prepared. The incident-level action plans include tasks and responsibilities for the Traffic Centre operator and for the other actors, timings and dependencies for the tasks, and define the required information and launching criterion for different tasks. The tasks or phases which can be modelled beforehand will be as much automated as much as possible. The tasks described in the action plan are partly manda-
The main points in the action plan are:

1. Verifying the incident state and information
2. Listing the usable control and information systems
3. Evaluating and defining the needed tasks
4. Starting and realisation of the tasks
5. Verifying the realisation of the tasks
6. Monitoring the state of the incident and the effect of the new tasks
7. Restoring the state to normal

The action plans should assist the Traffic Centre operator in coping with situations demanding rapid decisions and tasks. However, each incident is different and modifying the action plan to suit the incident has to be done by the operator. Therefore the action plans are constantly updated to be more detailed and versatile memos for the operators. Anyhow the operator will be responsible for decisions on incident-based modifications.

### 3.2.2 Case - Accident

**Data processing and maintaining (Appendix 2)**

Data processing and maintaining during an accident includes the following sub-functions and tasks (flowchart of the actions have bee presented in Appendix 2):

- The operator receives an accident report directly from a road user or acquires it from public media or suspects of an accident on the basis of data collected by a monitoring system. The operator on duty registers the preliminary information to the integrated information system and verifies the information from police or regional alarm centre.
- When the operator receives the verified accident report from police, regional alarm centre, rescue forces or a trained traffic reporter, he registers the verified data to the information system.
- When the Traffic Centre information system receives an accident report from regional alarm centre, the operator approves the information for database update or updates the information himself.
- The police or the rescue forces can request Finnra assistance on the clear-up of the scene of the accident. After receiving the request for official assistance the operator on duty initiates the incident clearance task.
- After the Traffic Centre has acquired reliable basic information on the accident (location and preliminary accident description), the operator initiates the tasks described in the action plan on necessary extent.
- The operator follows the development of the incident and verifies, that the Traffic Centre has up to date information on the accident, enabling
quick reactions to the changes in the situation. New / updated information is mostly received from the police forces on the scene or the police alarm centre. Additional information can also be obtained from the personnel of Finnra or a contractor, road users and various monitoring systems. Operator assesses reliability and validity of the information before distributing them. The operator adjusts and updates the accident information and the action plan on the basis of new information.

- The “accident over” announcement is usually received from an authority present at the scene of the accident. The message can also be generated by the Traffic Centre when the operator decides according to the monitoring data and information that the situation has returned to normal state.
- The incident is registered over when the operator has verified the action has returned to its normal state.

Informing road users (Appendix 3)

The operator or an integrated information system initiates information distribution function when the Traffic Centre has reliable basic information on the accident. The information becomes more detailed when new information on the state has been received. The system processes a message of the accident according to specifications of each recipient or receiving system. The operator edits, approves and forwards the information and verifies that the information has been delivered and received.

The operator of Traffic Centre provides RDS-TMC messages of all accidents on the main road network and on essential regional roads.

Traffic Centre informs about accidents in the main road network that have effects on traffic lasting longer than 30 minutes

- providing RDS messages to the national radio channels,
- providing accident messages to the local radio stations within the influenced area and
- updating traffic information www-pages in Internet

The operator of the Traffic Information Centre provides a new TeleText message on accidents having especially long lasting (more than 4 hours) or wide area effects on traffic.

Using the Road Users information phone line road users are able to obtain more specific information on accidents mentioned in the public media.

The media receives updated information every time the situation has changed, or at least once an hour even if the situation remains the same. The system must be monitoring the time limits. The system must also present a list of valid messages. The information function ends in an “accident over” message.
Informing internal and external partners and data exchange (Appendix 4)

The objective is to offer the Finnish National Road Administration management and the Ministry of Transportation and Communications adequate background information enabling flexible communications with the public media. The information is distributed using an agreed interface. The contents and updating routines of the messages are similar to the RDS-messages. The partners will later be able to monitor the incidents using their own user interfaces.

Traffic Centre sends information on all severe accidents that are presumed to be of general interest to

- the communication units of Finnra
- the communication units of Ministry of Transportation and Telecommunications
- Finnra Director General

Traffic Centre sends information on severe accidents in the road region that are presumed to be of general interest or on accidents in which the road operator has been part of

- to a road region director and communication unit and
- to production director

Traffic Centre sends information on all accidents in the region to the

- road region master
- road weather centre

The Finnra Traffic Centres send accident information to municipal traffic control centres, taxi dispatch centres, private service providers and carrier cargo management systems according to bilateral data exchange agreements.

The Traffic Centres in Nordic and other countries are sent information of accidents on the main road network in agreed extent. Information on an accident in Lapland region is sent to Swedish and Norwegian Traffic Centres if the accident leads to long closures of road sections.

Traffic control (Appendix 5)

The traffic control function for an accident is initiated when the data processing and maintaining function sends an initiation alert on the accident. The alert includes an event log of the presently known information on the accident. The operator receives the alert and accesses the preliminary traffic control action plan for an accident. The system will be equipped with an automated procedure for opening the correct action plan for the operator.
According to the basic information of the accident and with the help of integrated traffic information system the operator scans and defines:

- Road network in the region for alternate route planning
- Pre-planned local and regional detours
- Fixed and variable speed limits and the status of variable message signs and traffic signals in the affected area and on alternate routes
- Current and forecasted traffic and ambient conditions in the affected area and alternate routes

If a rescue forces fire officer or a police field officer is present at the scene of the accident, the operator negotiates and agrees on the traffic control actions. If the accident has taken place near the region of another Traffic Centre, or if the accident range includes urban street network, the operator negotiates the traffic control tasks with the operator of another Traffic Centre or municipal traffic centre.

On the grounds of the obtained information and the discussions with other actors the operator decides on control actions such as:

- Changes in speed limits
- Control modes of variable message signs
- Alternate routes and guidance to them in co-operation with the police. Detour information is delivered to the police present at the scene.
- Lane closures and changes in driving directions
- Temporary changes in traffic signal operation if the accident has taken place within or near a signalised intersection
- Temporary changes in fixed control or guidance if the incident is predicted having long-lasting effects

The operator initiates the control tasks and actions. Some tasks e.g. installing temporary traffic signs in accident site / re-routes requires that the operator redirects the tasks with the instructions to the executing partners.

The operator actively monitors the execution and effects of the defined tasks and the tasks he has forwarded to the partners. According to the operator assesses whether the controls has to be changed, or whether new control actions has to be done. Information on executed control actions is forwarded to partners using data exchange functions.

When an “accident over” message has been received from the scene, the operator defines and initiates tasks by which the controlling equipment and the situation at the scene including the carriageway and controlling equipment is returned to the normal mode. Some control systems can also return to normal mode automatically according to the instructions defined in the action plan.
Incident clearance (Appendix 6)

During an accident the operator initiates the incident clearance when:

- The police or rescue forces request official assistance for clearing the scene of the accident or for removal of wrecked vehicles
- The accident has caused damage to the road structure
- The traffic centre has received information on broken traffic control equipment

The operator negotiates with the fire officer or police officer at the scene and assesses the priorities for various incident clearance tasks. The operator also verifies possible control equipment damages with the help of monitoring system. The traffic control systems or other equipment are damaged due to the accident may require rapid repairing to prevent further damages. If necessary the operator alerts the trained traffic control persons, traffic control vans and maintenance contractors.

When the Traffic Centre has received an “accident over” message, the operator verifies, that the obstructions have been removed before returning to the normal mode. The traffic centre operator verifies that a final clean-up will be executed and the scene will restore to the state it was before the accident. The final clean-up includes cleaning the carriageway, equipment repairing or renewal and in some situations broken-down vehicles towing. The operator calls for necessary assistance from partners such as the Finnra production unit, contractors and control system maintenance operators.
Finnra National
Road Administration
Traffic Services
### Finnra Traffic Centres – Reference model and main functions

#### MAIN FUNCTIONS

<table>
<thead>
<tr>
<th>Role in the System</th>
<th>Main Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road user</td>
<td>Informs of an accident</td>
</tr>
<tr>
<td>AA etc.</td>
<td>Receives information on accidents from a radio listener and broadcasts it.</td>
</tr>
<tr>
<td>Local radio stations</td>
<td>Verifies the information. Gives information about the accident and its consequences with telephone / from own system</td>
</tr>
<tr>
<td>Police Alarm Centre or police on the scene</td>
<td>Receives updated information on the accident from either the operator on duty or the system</td>
</tr>
<tr>
<td>Alarm centre Operator on duty</td>
<td>Follows the development using co-operation network and monitoring systems, updates information into the system</td>
</tr>
<tr>
<td>Traffic Centre Operator on duty</td>
<td>Reports changes, defines control actions, requests Finnra assistance on clean-up on the accident site.</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Informs of an accident</td>
</tr>
<tr>
<td>Traffic control system</td>
<td>Observes an abnormal incident / Distributes updated information</td>
</tr>
<tr>
<td>Other TC functions</td>
<td>Processing and maintaining accident data</td>
</tr>
</tbody>
</table>

#### Traffic Control System

- Follows the development using co-operation network and monitoring systems, updates information into the system
- Observes any abnormal incident / Distributes updated information

#### Accident Analyses

- Reports changes, defines control actions, requests Finnra assistance on clean-up on the accident site.
Finnra Traffic Centres – Reference model and main functions

**Finnra Traffic Centres - Reference model and main functions**

**Informing internal and external partners and the data exchange during an accident**

<table>
<thead>
<tr>
<th><strong>Traffic Centre Operator on duty</strong></th>
<th>System / operator observes a change in input data. Operator starts up information and also accepts and sends the report.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supervises the information distribution</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Generates reports to be verified.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receives information on accident.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receives information on severe accidents in main road network.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receives information on remarkable accidents and incidents of general interest.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receives information on accidents of general interest and accidents including Finnra.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receives information on all accidents within their district.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Receives information on all accidents within their district.</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Finnish National Road Administration**

Traffic Services

**Version Date**

IN, MPo 31.12.98

Appendix 4
Finnra Traffic Centres – Reference model and main functions

Main Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receives an initiative alert on an accident</td>
<td>Scans and defines the control equipment, road weather and traffic status within the influenced area</td>
</tr>
<tr>
<td>Assesses the need for traffic control at the scene</td>
<td>Evaluates the effect of current control tasks. Assesses the need for changes.</td>
</tr>
<tr>
<td>If actor at the scene: Negotiates and decides the control tasks if none pre-planned</td>
<td>Registers executed and later to be executed tasks</td>
</tr>
<tr>
<td>Negotiates and decides control tasks</td>
<td>Initialises tasks according to instructions</td>
</tr>
<tr>
<td>Executes agreed controls</td>
<td>Initialises control changes</td>
</tr>
<tr>
<td>Informs on executed tasks</td>
<td>Informs of changes in control mode</td>
</tr>
<tr>
<td>Informs on normal control mode</td>
<td>Returns to normal control</td>
</tr>
</tbody>
</table>

Other TC functions

Processing and maintaining the monitoring data