Winter Service Management Systems and Road User Information

Martin Hobbs

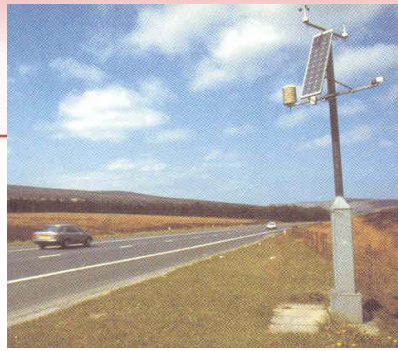
Head of Network Resilience Strategy

Highways Agency - UK

Introduction

- Background
- Why have a WSMS?
- Development and implementation
- Case studies
- What are the benefits and how to ensure they are realised
- Future view
- Conclusions

Background



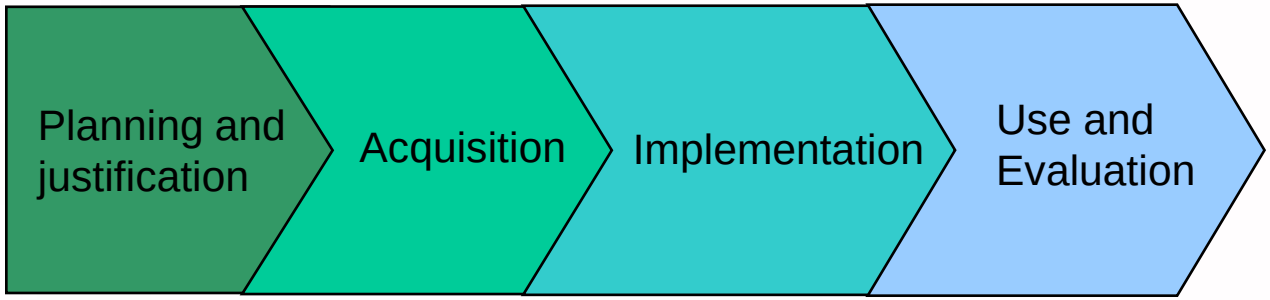
- Winter maintenance is resource intensive
- Developing technology provided opportunities
- 1980’s RWIS, ice detection and prediction
- 1990’s Advanced RWIS upgraded components and better communications
- WSMS – combines the capabilities of RWIS with various integrated systems
- Forefront of current winter maintenance
- Improvements in efficiency and effectiveness
- Most countries can realise the benefits
- Information received from and passed to road users

Why have a WSMS?

- Functionality of the road network
- Increased effectiveness of winter maintenance
- Cost-efficiencies
- Improvements in safety
- Reduced environmental impact

Development & Implementation

- Four phases:



- Proprietary and Non-proprietary systems

System	Advantages	Disadvantages
Off the shelf (Proprietary)	•Ease of procurement •Proven technology	•Compatibility issues •Level of quality and performance •May not meet user requirements •Issues with data types and multi-band communication •Vendor may go out of business
Bespoke (Non-proprietary)	•Much more scope for user requirements and needs to be taken into account and developed around •Increased opportunities, flexibility and control	•Significant effort during development •System maintenance more complex •Product liability rests at feet of developer

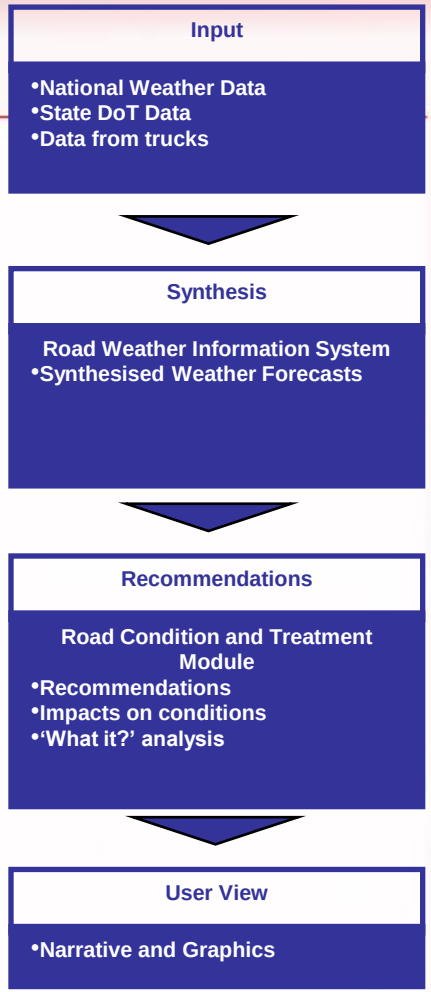
Development & Implementation

Critical activities

- Feasibility study – early identification of requirements
- User identification and consultation
- Selection of commercial provider
- Ensure compatibility in component standards
- Change management programme
- Acquisition and testing
- Continued support and training

Case Study: Maintenance Decision Support System (MDSS)

- Federal Highway Authority (FHWA) commissioned prototype MDSS
- RWIS combined with winter maintenance protocols
- Major benefits include:
  - Reduced labour, materials and equipment
  - Improved public safety
  - Improved mobility
  - Higher levels of on road service achieved
  - Lower environmental impact
- Lessons learnt include:
  - Dealing with institutional barriers
  - High-quality hardware and communications
  - Initial and ongoing training



MDSS process diagram

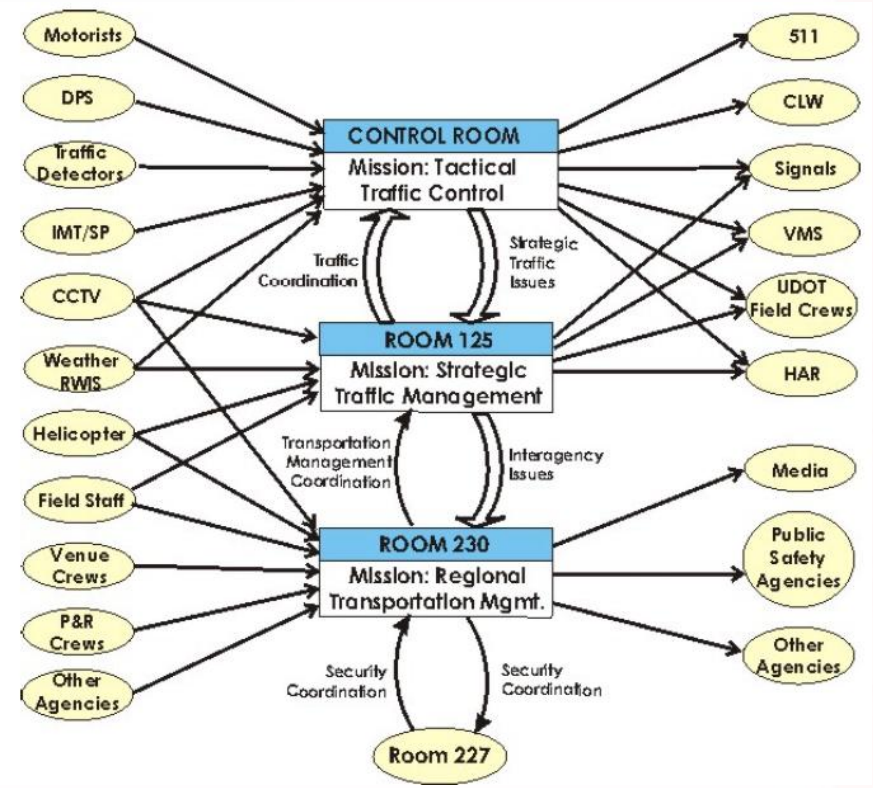
Sharing the Data: Case Study - Lithuania

Road Maintenance Management System

- Aims to improve maintenance quality
  - Standards of road maintenance
  - Economic standards of maintenance
  - Preparation of maintenance programme
  - Road technical control
  - Acceptance and payment for works
- Results have been positive, more economical use of funds for road maintenance
- More cost effective winter maintenance and a tool to solve problems

Sharing the Data: Case Study - Salt Lake City

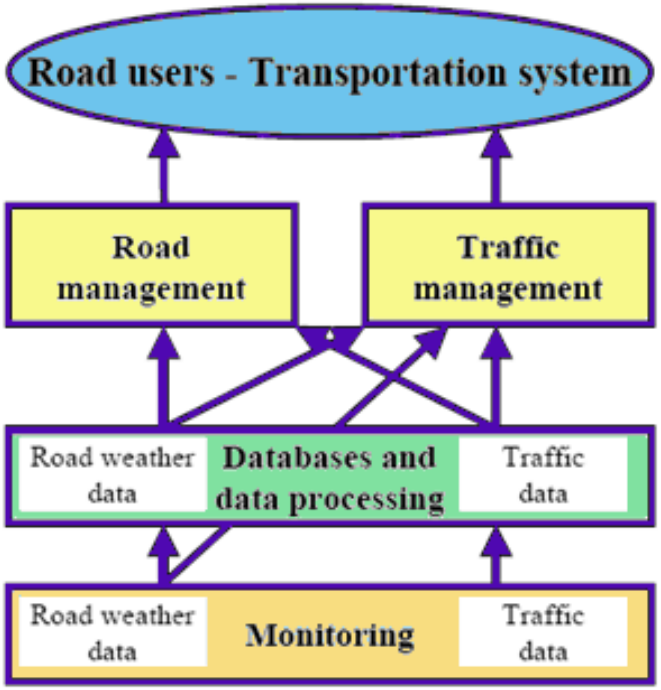
- Intelligent Transportation System used in Winter Olympics
- Three major systems utilised:
  - Advanced Traffic Management System (ATMS)
  - Advanced Traveller Information System (ATIS)
  - Travel Demand Management
- All information via Traffic Operations Centre (TOC)
- System was a success



Information flow in TOC

Sharing the Data: Case Study - Finnish RWIS

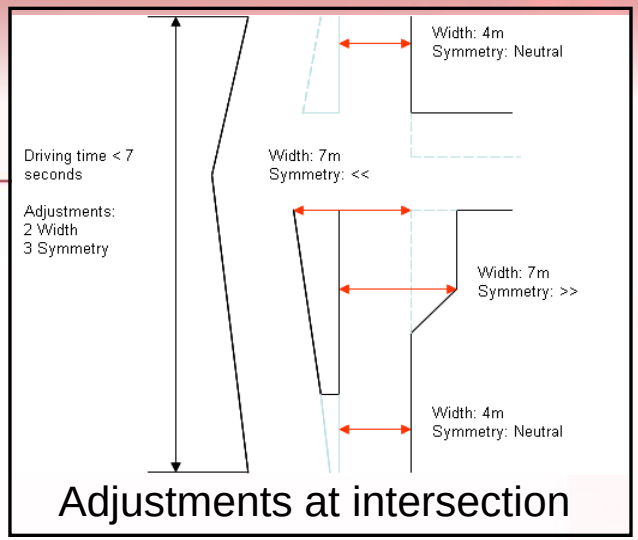
- Traffic management system on E18 road in Finland
- Speed differentials between HGV's and other vehicles, made worse by adverse winter weather
- Traffic control via VMS and warning signs
- Accident rate reduced by up to 25%
- Anticipated cost saving of around 180,000 Euros on E18
- Positive public reaction



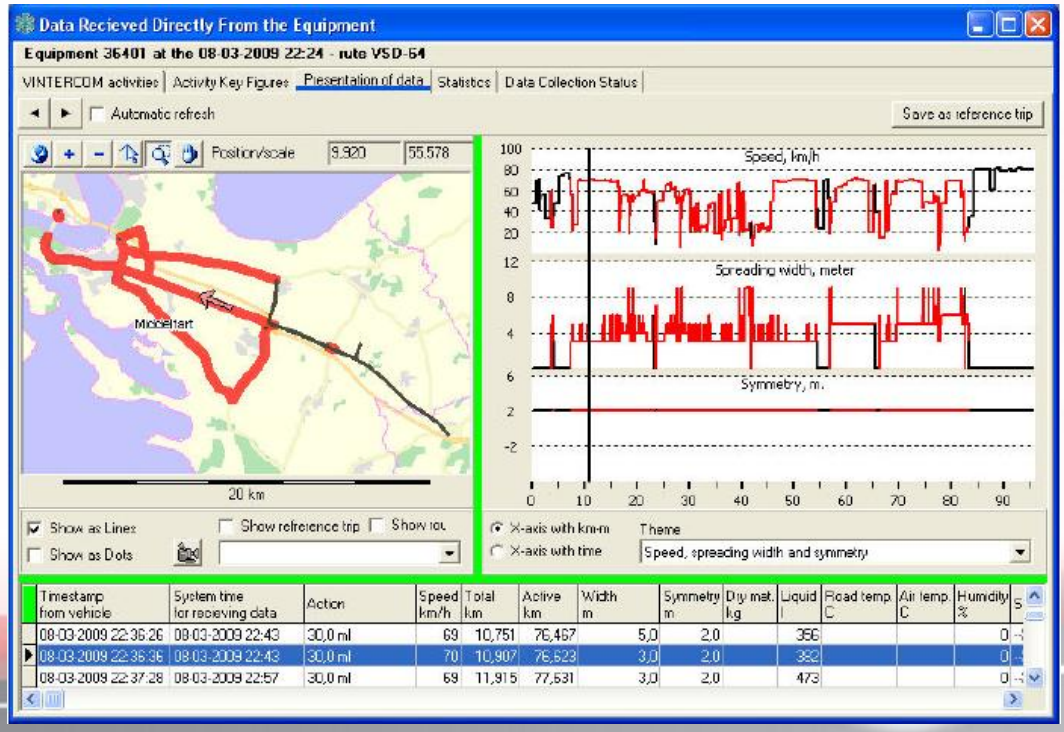
Information flow in RWIS

On the Road: Case Study – GPS Controlled Spreading in Denmark

- Pre-loaded route details control spreading based on GPS location
- Driver adjustments too onerous
- GPS controlled results surpassed those by human control
- Future salt savings expected to be up to 20%

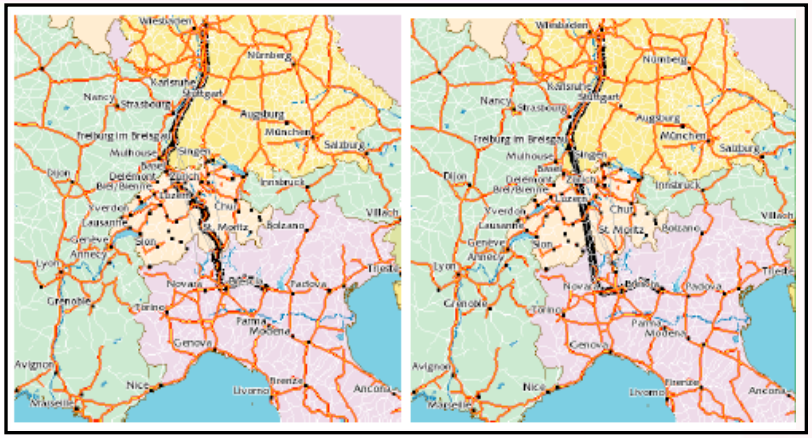


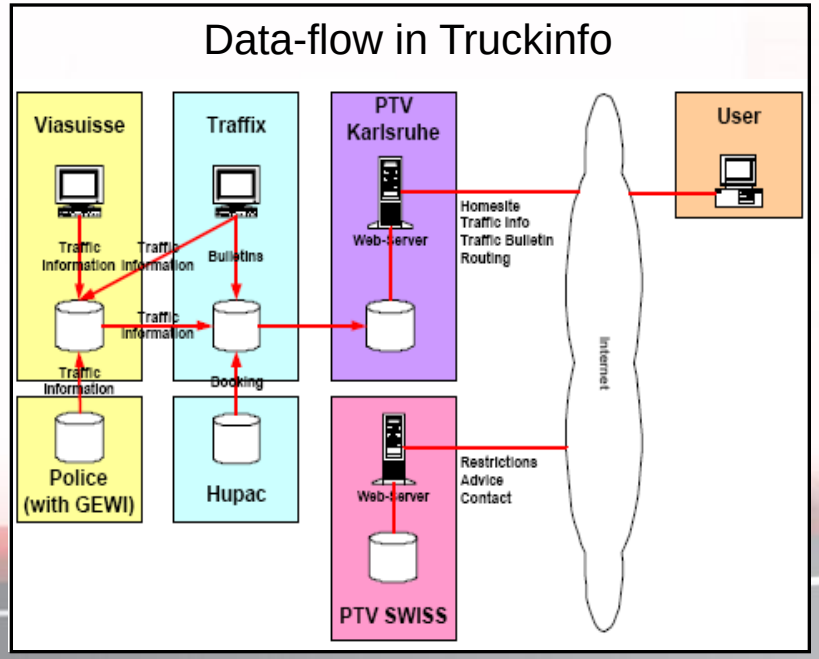
Adjustments at intersection



On the Road: Case Study - Truckinfo in Switzerland

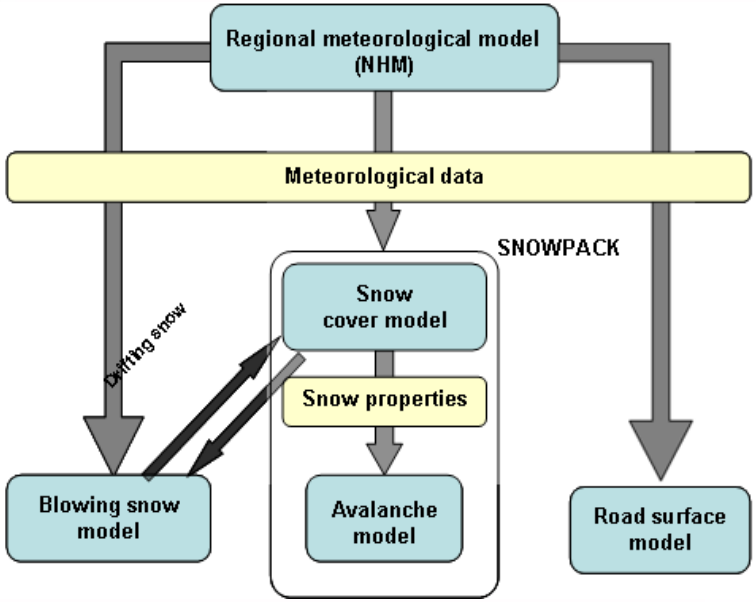
- Web based traffic information system
- Transalpine region in Switzerland
- Swiss Federal Roads Authority (FEDRO)
- Real-time traffic information
- System has been a success
- Inclement weather increases traffic to Truckinfo website significantly





Taking it further: Case Study – Snowstorm and Avalanche Forecasting in Japan

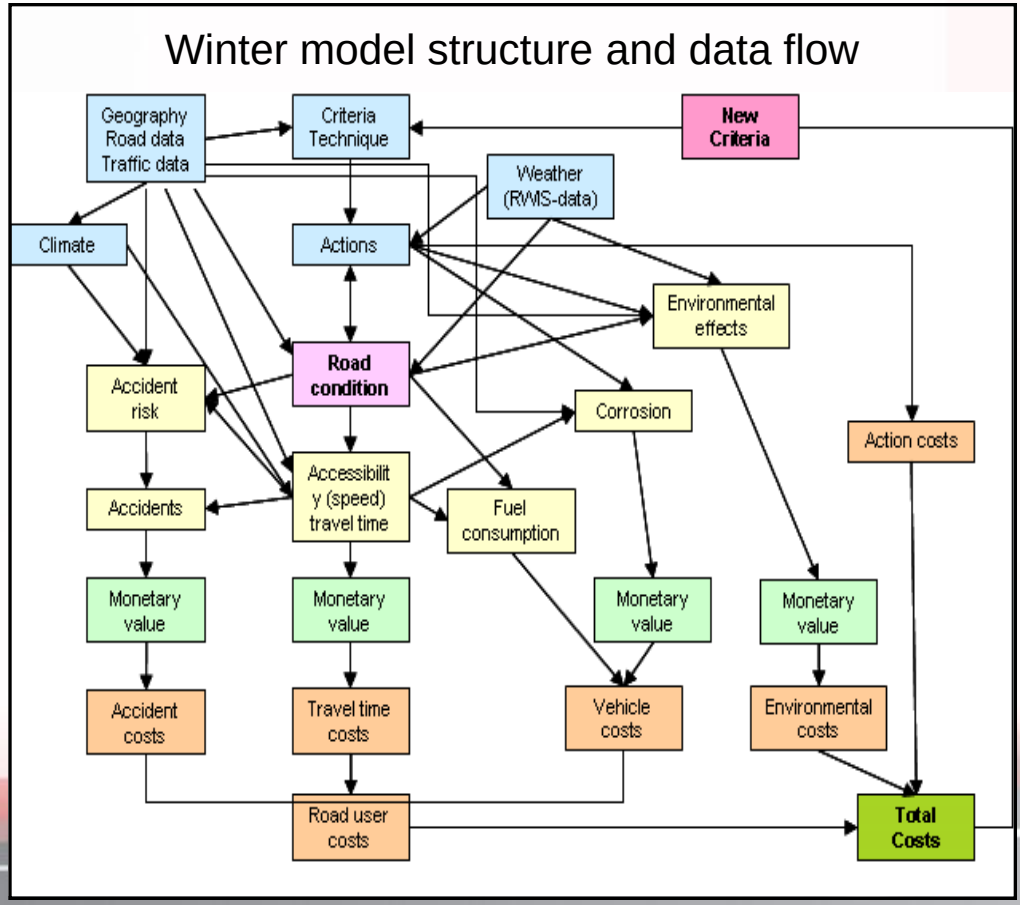
- Under development by the Snow and Ice Research Centre (SIRC) in Japan
- Japan experiences some of the heaviest snowfall in the world
- Early warning for Highway Authorities
- Anticipated benefits include:
  - Improved preparation and forecasting
  - Improved serviceability
  - Improved safety



Forecasting system structure

Taking it further: Case study – Swedish Winter Model

- Developed as part of ‘Vinter 2003’ directive
- Fundamentally based on socio-economic cost
- Four main models:
  - Winter Road Condition Model
  - Accessibility Model
  - Accident Risk Model
  - Environmental Sub-model
- Enables highest level of service at lowest socio-economic cost



The Benefits and How to Get Them

- The potential benefits are:
  - Increased effectiveness of treatments and efficiency savings
  - Reductions in accidents and delays
  - Reduced material usage and staff costs
  - Reduced effect on socio-economics
  - Greater accountability with post event reporting
- How to ensure benefits are realised:
  - Development of systems based on individual requirements
  - Correct scale of system
  - Feasibility study to inform and identify needs
  - Closely managed implementation
  - Post implementation support and development

Future View

- Development of current technologies
- Greatest source of development may lie in system inputs
- Incorporating alternative data sources
- Streamlining of systems
- Performance orientated

Conclusions

- There are changing demands and pressures on Highway Authorities
- Winter Service Management Systems (WSMS) provide the current standard following best practice
- Case studies indicate the range of applications available for developed, developing and transition countries
- All have reported benefits in service and costs
- Marginal and cold winter climates have the most to gain
- WSMS are adaptable for individual needs
- Technological advances will bring further improvements in WSMS and road user information in the future

Thank you