

Weather ITS - Managing Weather in Transportation

June 18, 2014

ITS in Logistics in the Northern Dimension, Barents and Arctic Area
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VAISALA

100,000,000,000 €++

The annual cost of weather in ground transportation



Vaisala



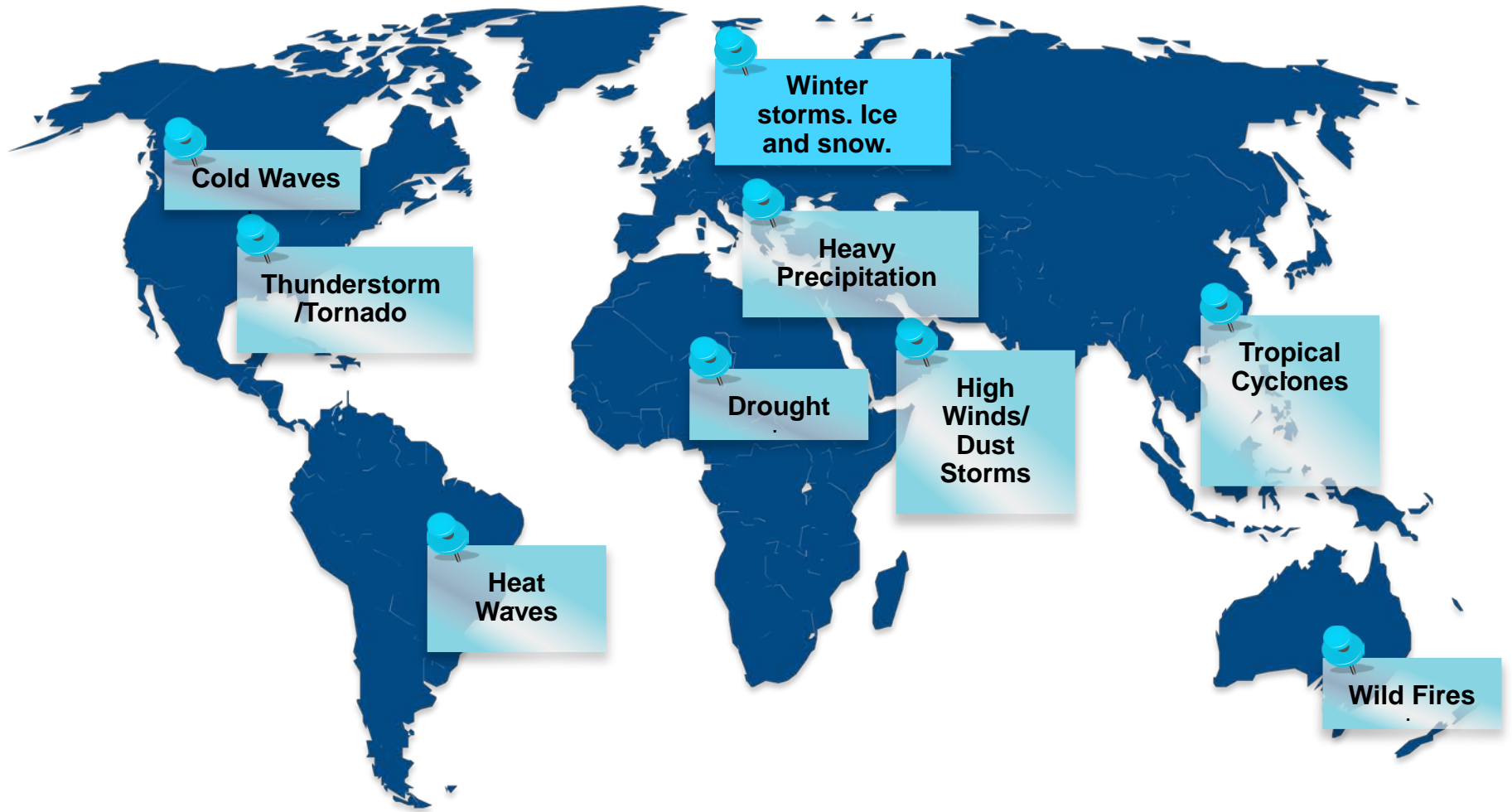
- A true pioneer in measuring weather - established in 1936
- A global leader in environmental and industrial measurement
- Weather and Controlled Environment Business Areas
- Present in over 150 countries, with 30 offices in 16 countries
- Net sales of 273 million euros (2013)
- Americas (39%), EMEA (36%), APAC (24%)
- Shares traded in NASDAQ OMX Helsinki stock exchange

Weather Business Area

- We provide measurement technology and information solutions to help with operational decision making
- Where accurate, real-time, and reliable weather data is needed to run efficient operations
- Market segments
 - Meteorological institutes
 - Airports
 - Roads and rail authorities
 - Defense forces
 - Energy
 - Maritime customers



Types of Extreme Weather



Extreme Weather Impacts



Safety

Protecting Life and Property



Mobility

Enabling the movement of people and goods



Efficiency

Minimizing time, effort



Cost

Reducing expense



The Costs...over 100B€ annually

- > \$50 billion in the U.S. roads alone
- Winter Road Maintenance ~ \$3 billion
- Safety > \$40 billion
 - 24% or 1.6 million of accidents are weather-related
 - 7,400 fatalities; 690,000 injuries
- Mobility > \$3 billion
 - Cost of congestion due to adverse weather
 - 550 million vehicle-hours of delay per year from snow, ice, and fog
- Productivity > \$3 billion
 - Added freight costs annually due to weather related delays
 - Fighting snow and ice
- Environment
 - Air pollution from slow traffic
 - De-icing chemicals harmful to ground water



Source: U.S. Department of Transportation – “ITS Benefits, Costs, Deployment, and Lessons Learned: 2008 Update – Road Weather Management”

- US economic growth slowed sharply in the first quarter of 2014 - An unusually cold and disruptive winter, coupled with tumbling exports, contributed to the decline, the US Commerce Department said

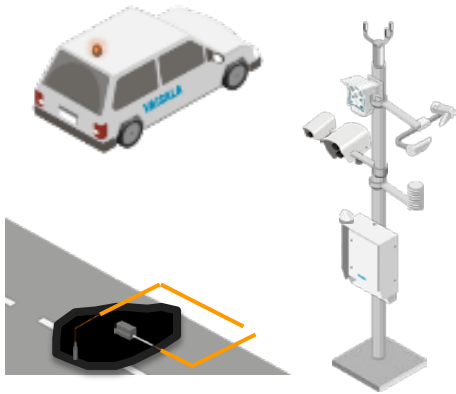
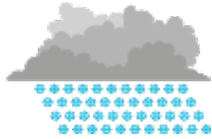
	<u>Present costs due to extreme weather, including all phenomena</u>				
	(ca. 2010)				
	Accidents	Time costs	Infrastructure		Freight & logistics
Physical infra			Maintenance		
Road	>10 bill.	0.5-1.0 bill.	ca. 1 bill.	ca. 0.2 bill.	1 – 6 bill.
Rail	>0.1 bill.	>10 mill.		>0.1 bill.	5 – 24 mill.
IWT	ca. 2 mill.	na	na	na	0.1 - 0.3 mill.
Short sea	>10 mill.	na	na	na	0.2 - 1 mill.
Aviation	na	>0.6 bill.	na	na	0.5 – 2.3 mill.
Light traffic	>2 bill.	-	na	na	-
TOTAL	>12 bill.	>1 bill.	ca. 1 bill.	>0.3 bill.	1-6 bill.

The EU-27 grand total more than 15 bill. €p.a.

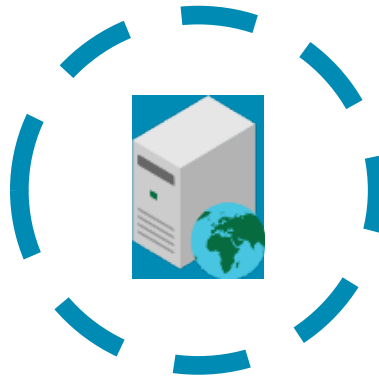
Copyright: P.Leviäkangas / VTT / EWENT consortium

Weather ITS

Observations



Data management



Applications



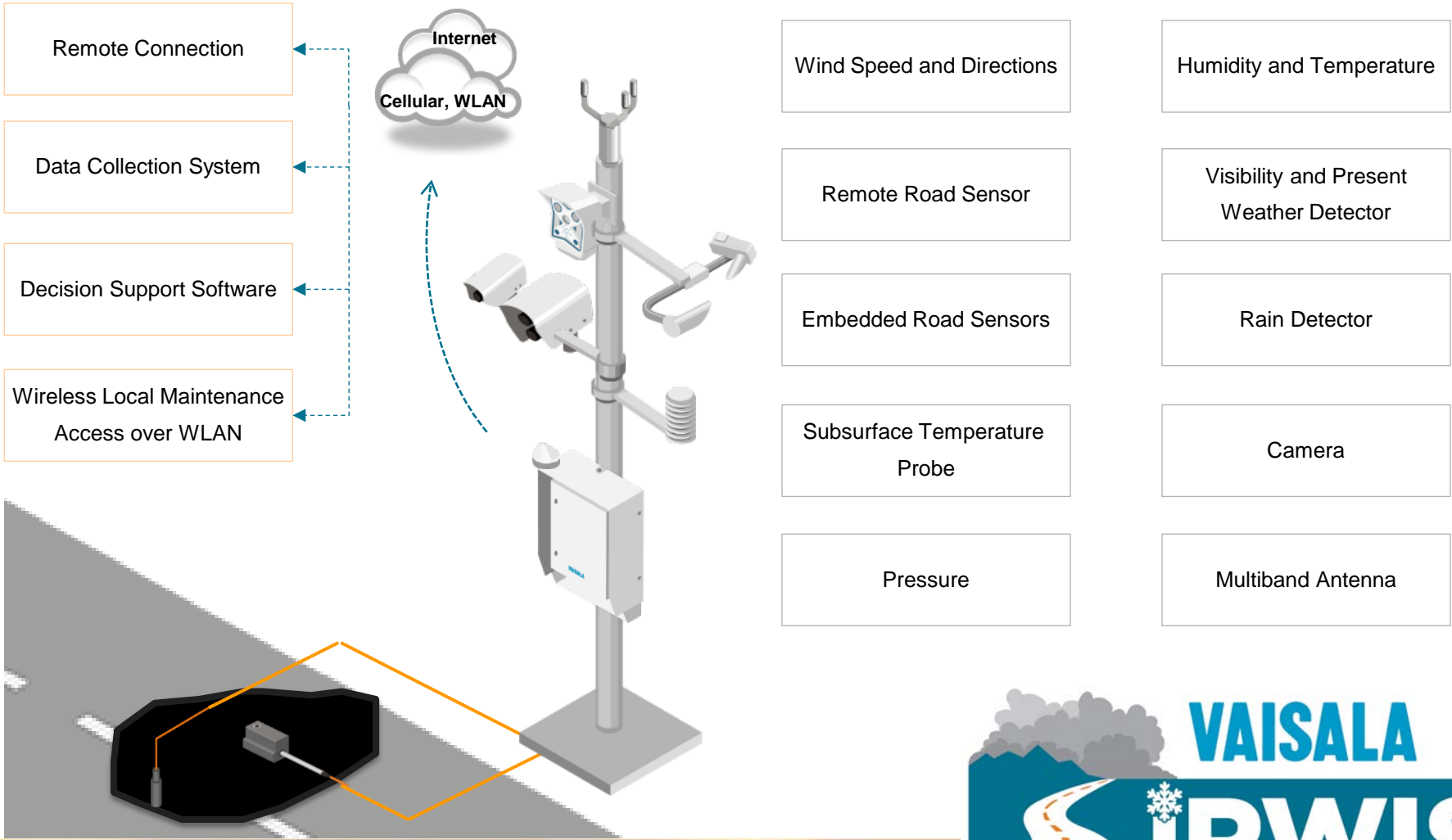
Services



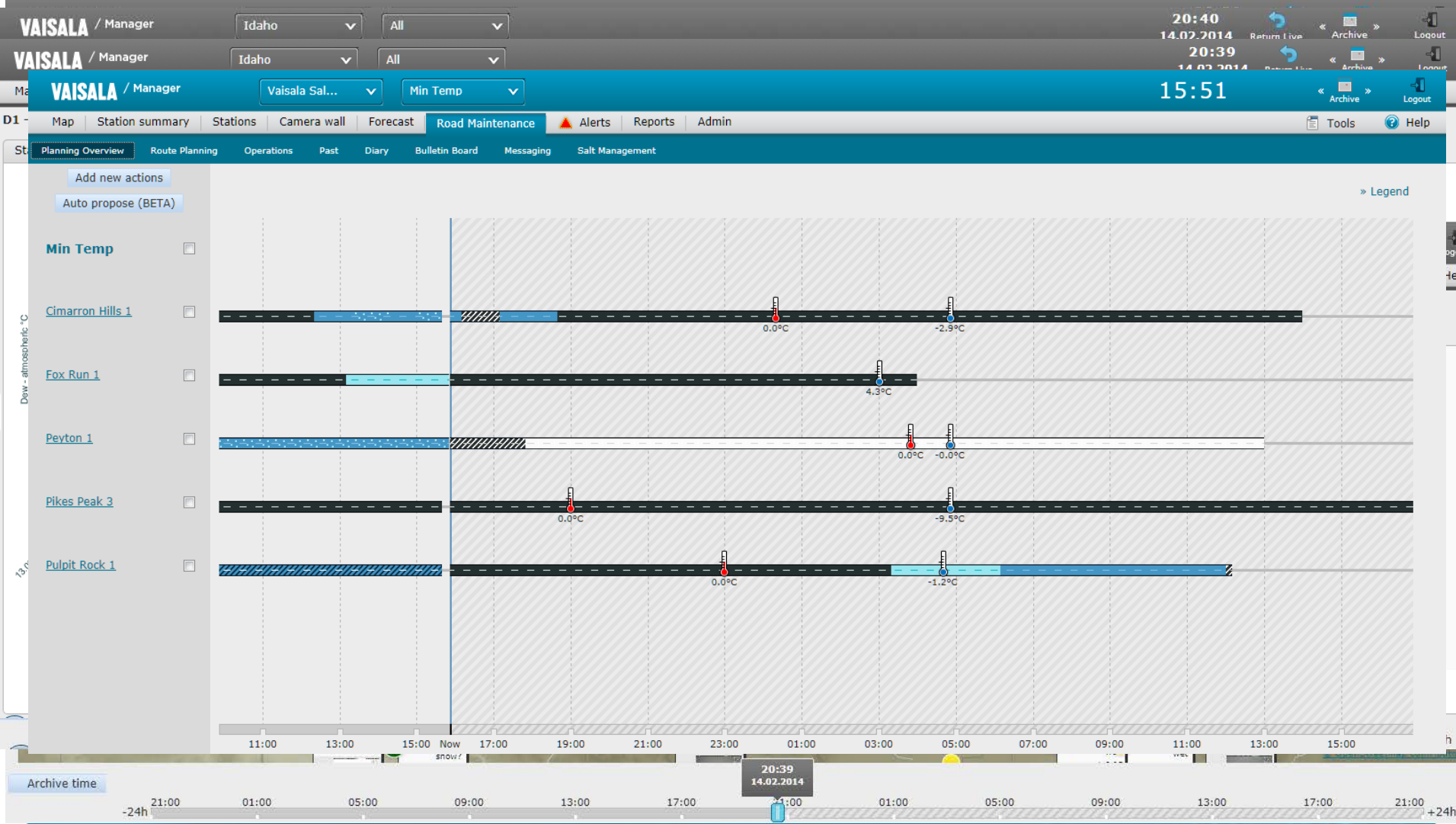
Forecasting

Accurate, Reliable Observations

Assess, Alert, Forecast and Verify



Operational Planning and Decision Support Tools



The RWIS ROI – A DOT's Experience



- Better winter maintenance practices
- Treatment timing
- Material selection
- Scenario review and critique
- Performance Measurement-Mobility Index
- Higher quality road condition traveler information
- Automated road condition reporting on 511 websites

Winter Maintenance Cost Reductions

- 2011-2012 \$30M
- 2012-2013 \$25.5M
- 2013-2014 \$21.5M
- ROI on RWIS deployment through crash reduction
 - 2011-12: 9 new RWIS segments; 75 less crashes, ROI 34x
 - 2012-13: 29, 74, ROI 13x

The study will be presented at NRITS Aug 26, 2014 in Branson, Missouri

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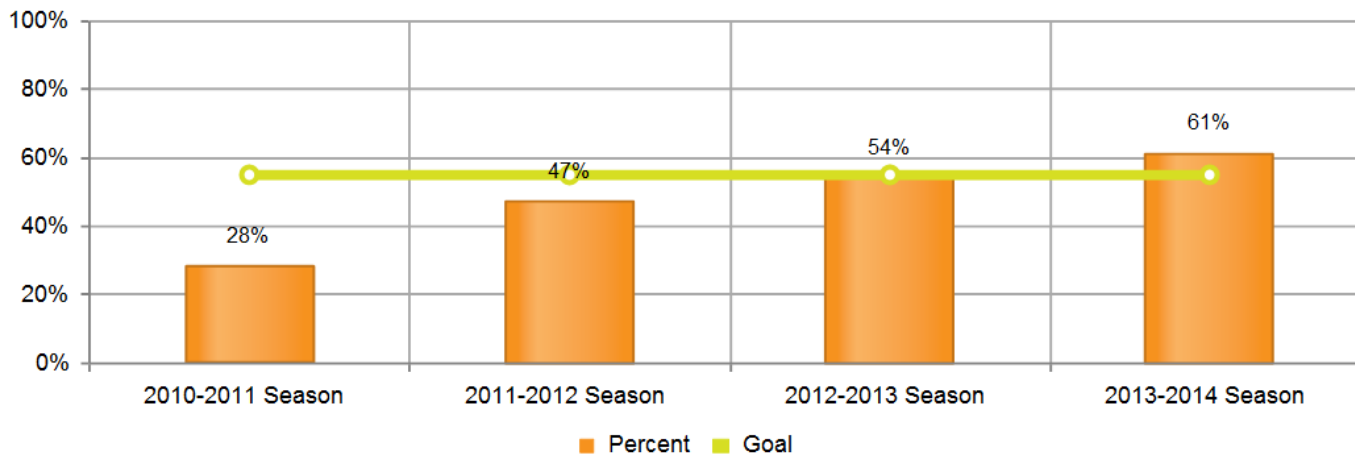
Managing Performance and Sharing Information with Road Users

<http://itd.idaho.gov/dashboard/>



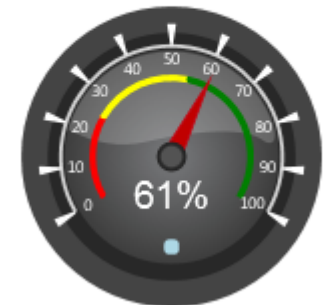
Percent of Time Highways Clear of Snow/Ice During Winter Storms

Target: Maintain at least 55% unimpeded mobility during winter storms.



Percent of Time Highways Clear of Snow/Ice During Winter Storms

-- 2013/2014 --



Benefits – weather information services

- Providing weather and road weather information to **road users** in Finland reduced the number and severity of accidents:
 - **€16 - €32 million benefits** with current services
 - Additional €16 - €32 million with more advanced services
- Benefits in **maintenance**:
 - **€2.7 million total** consisting of reduced need for materials, less unnecessary operations, and fewer belated operations
- **Weather information to pedestrians and bicyclists** would provide significant benefits:
 - Savings of €49 - €73 from reducing slipping accidents by services targeted to end-users
 - Savings of €120 million from reduced slipping accidents by services targeted to maintenance operators

In Finland up to 35 M€ savings annually, with potential to 250 M€

Alerting and Adaptive Signal Control

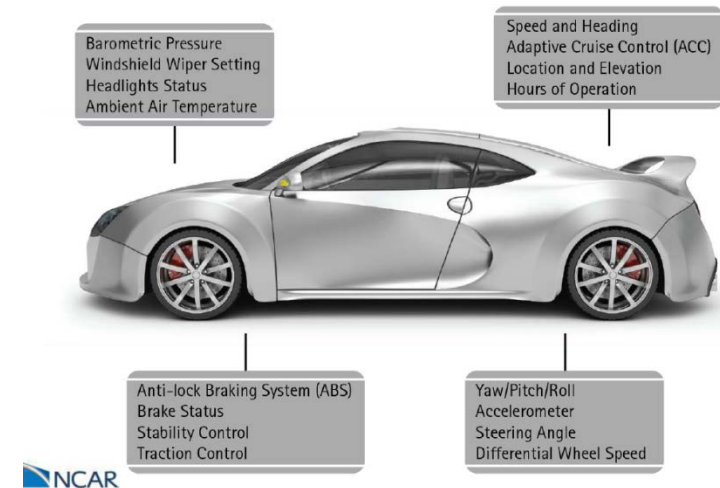
Snowmass Canyon, Colorado, USA: prior to 2009 20+ accidents.
No accidents since install



The Future – Potential for Improvement

- The adverse weather impact on ground transportation is significant
- Many DOTs are not utilizing the latest technology efficiently resulting in
 - Wasted material and other resources
 - Limited mobility and accidents that could be prevented
 - Manual work instead of automated reporting and communication
- Performance management and process development

- New products and services
 - Observation technologies
 - Information management tools incl. merging various data e.g. traffic and weather
 - Climatological research of historical data to help with operational planning
 - Improved forecasting models and verification development
 - Location based consumer services
- Connected vehicles: V2V and V2I communication
 - Vehicles as sensors
 - Crowd sourcing



<http://www.its.dot.gov/presentations/roadweather/pdf/Chapman20-20VDT.pdf>

The background is a vibrant blue-toned abstract composition. It features numerous bright, white-to-cyan light streaks and rays that radiate from the left side towards the right, creating a sense of motion and energy. In the lower right quadrant, there is a faint, semi-transparent image of a globe or a similar spherical object, partially obscured by the light effects. The overall aesthetic is clean, modern, and high-tech.

Thank You