

Overview of the Vaisala UbiCasting project

UbiCasting Project Workshop 2008-09-10

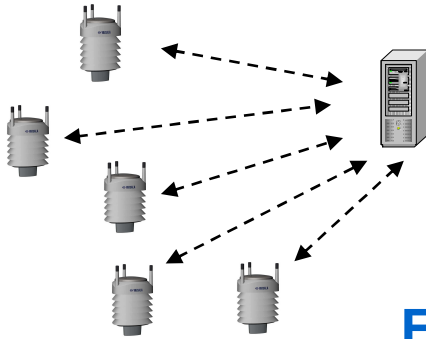
Heikki Turtiainen



Trends in Weather Services

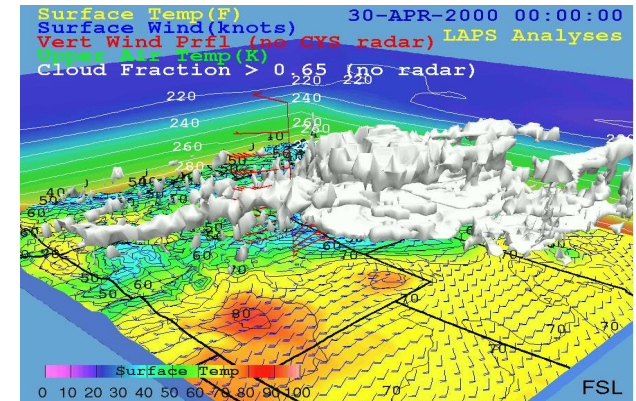
Dense, integrated observation networks

- Instrument miniaturization and integration
- Sensor networks – M2M wireless communication
- New remote sensing instruments



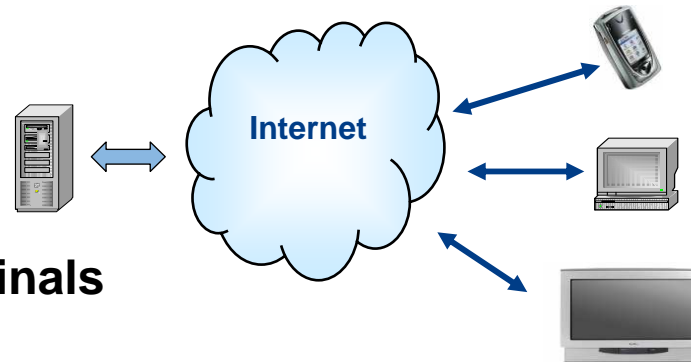
Forecasting performance

- Increasing computing power
- Mesoscale models - nowcasting



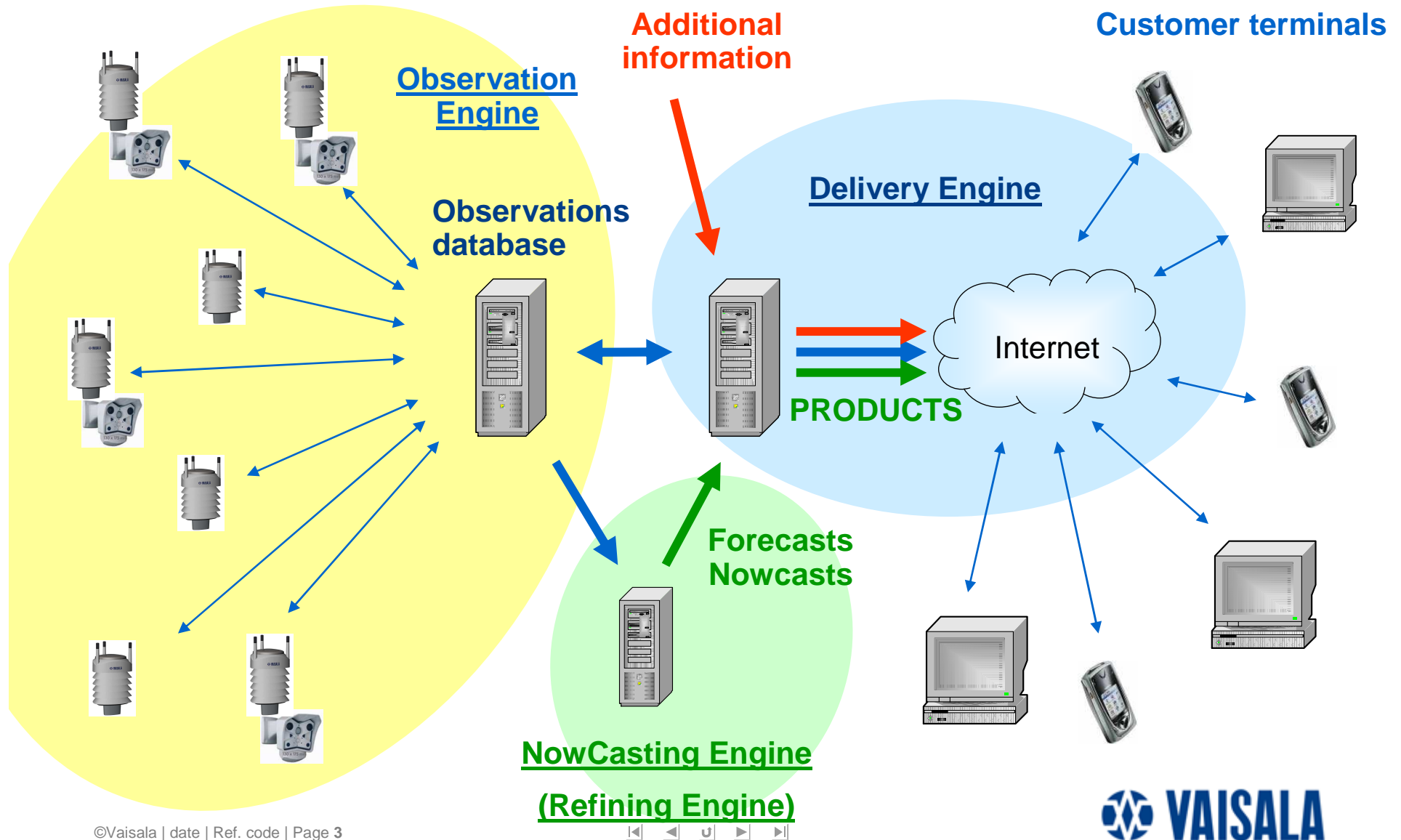
Data distribution

- Internet
- Mobile terminals

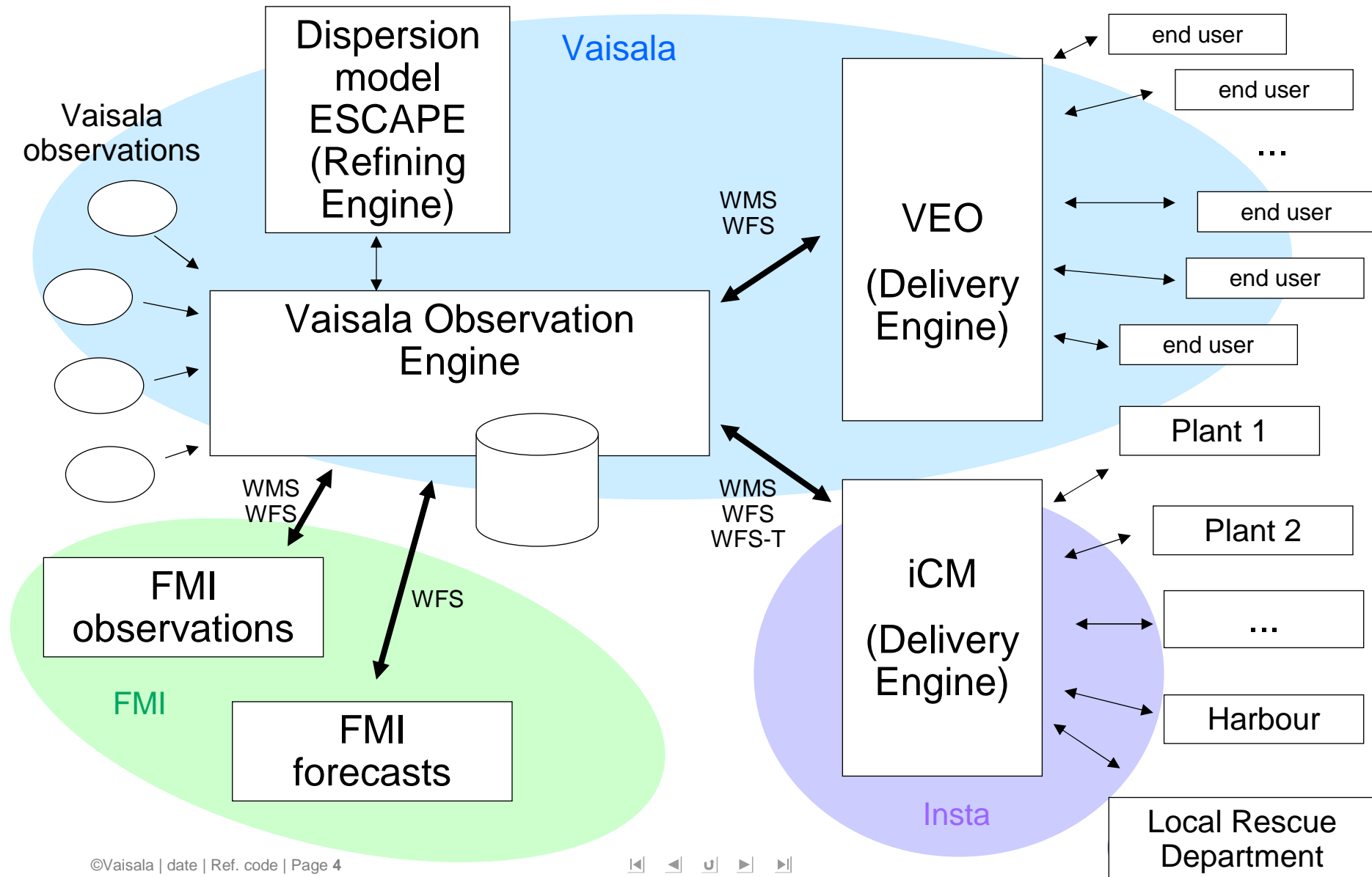


**Real time weather data will be available anywhere, any time.
Ubiquitous weather services will become reality.**

UbiCasting Production Machinery

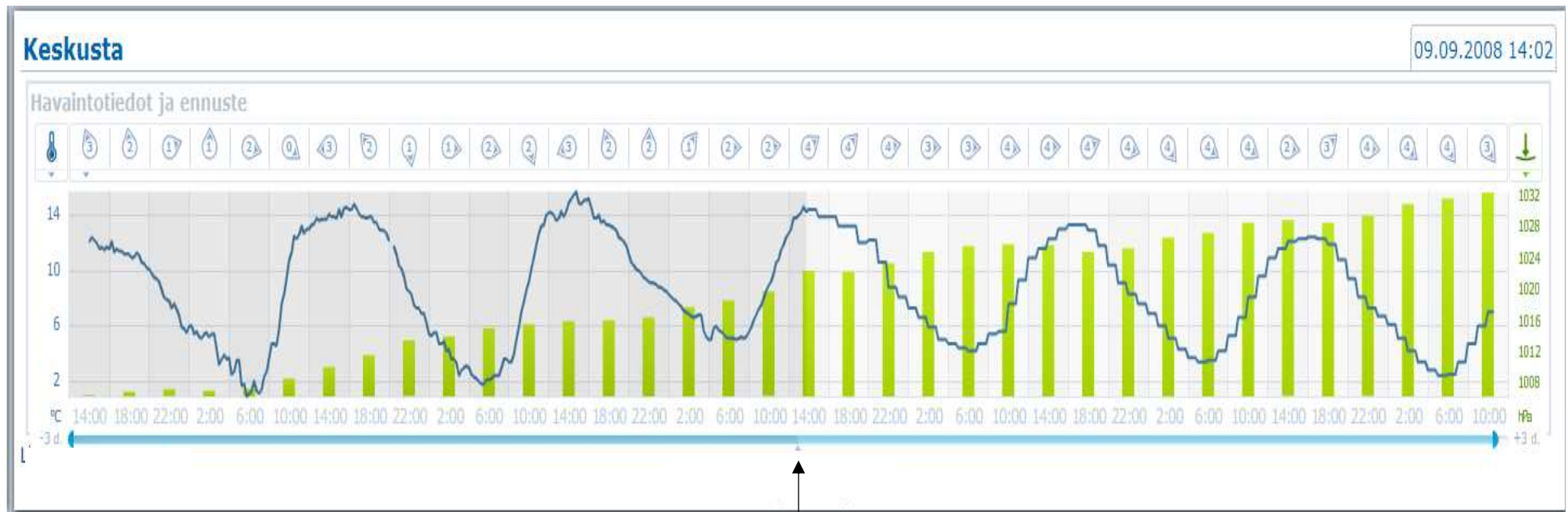


Kokkola Pilot System Components



User interface combines data from several sources

Example: combined observations + forecast graph on Kokkola weather pages



observation

now

forecast

What next?



- UbiCasting phase 2 ?
- Future of Helsinki Testbed ?

OGC® Sensor Web Enablement

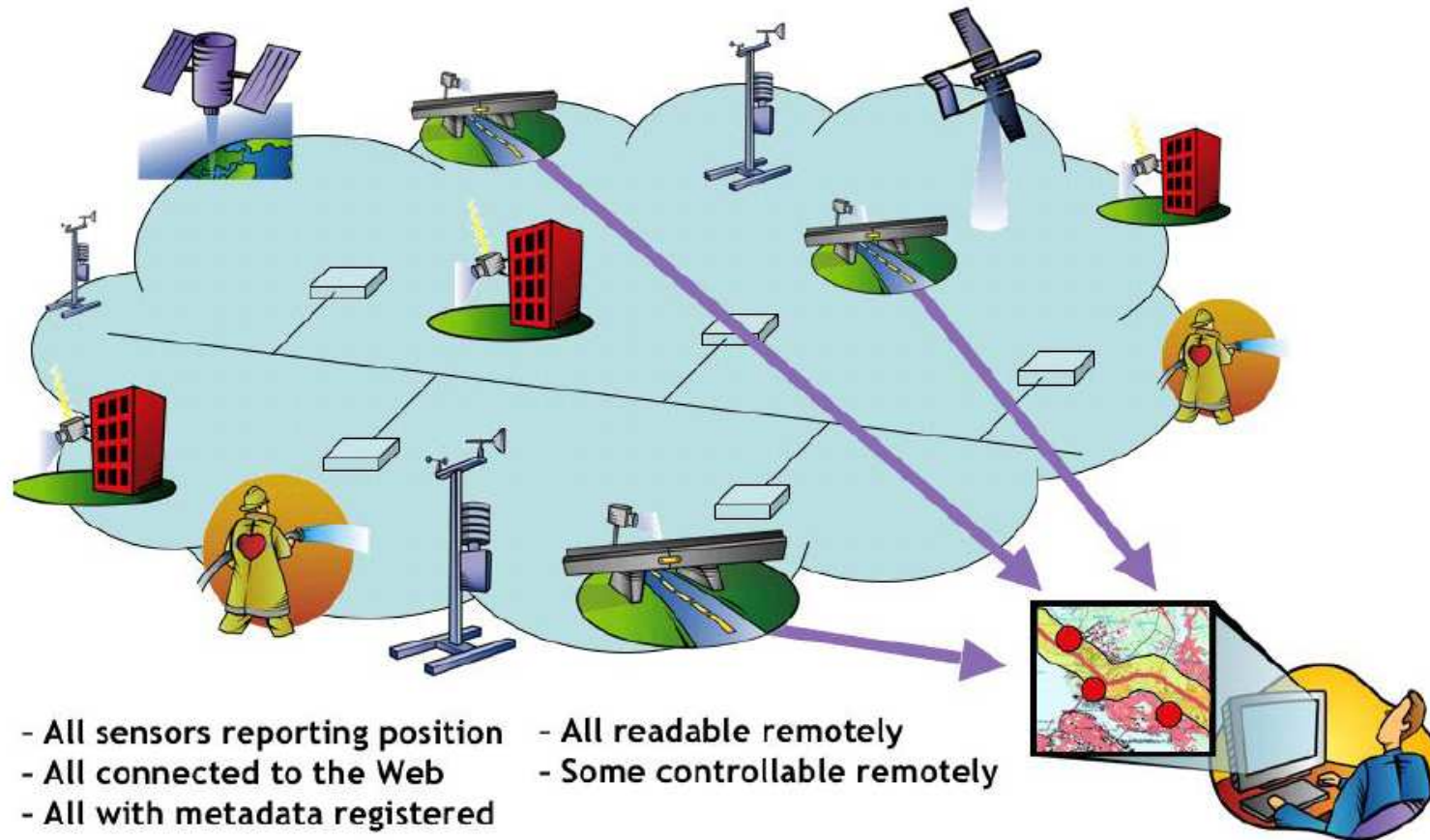


Figure 1: Sensor Web Concept

In an Open Geospatial Consortium, Inc. (OGC)² initiative called Sensor Web Enablement (SWE), members of the OGC are building a unique and revolutionary framework of open standards for exploiting Web-connected sensors and sensor systems of all types: flood gauges, air pollution monitors, stress gauges on bridges, mobile heart monitors, Webcams, satellite-borne earth imaging devices and countless other sensors and sensor systems.

Ilmatieteen laitoksen palveluiden vaikuttavuus [Effectiveness of Finnish Meteorological Institute (FMI) services]. Hautala, Raine & Leviäkangas, Pekka (toim.). VTT Publications 665, 2007.

Table 7.2. Summation of the benefits of meteorological information utilised by different sectors categorised by their time horizons (++ = highly beneficial, + = beneficial).

Sector	Historical data and climatological impacts	Real-time information and warning services	Daily forecast (12 h – 2 days)	Few day forecast (3–5 days)	Medium-term forecast (5–10 days)	Sea-sonal forecast (1–6 m)	Climate scenarios
Road transport incl. pedestrians & cyclists		++	+				
Waterway transportation		++	++	+	+		
Air transportation	+	++	+				
Rail transportation		+	+	++	+		
Logistics	+	++	++	+			
Construction & facilities management	+	++	++			+	+
Energy production		++	++	+	+		
Agricultural production	++	++	+	+	+	+	+

Ilmatieteen laitoksen palveluiden vaikuttavuus [Effectiveness of Finnish Meteorological Institute (FMI) services]. Hautala, Raine & Leviäkangas, Pekka (toim.). VTT Publications 665, 2007.

Table 7.2. Summation of the benefits of meteorological information utilised by different sectors categorised by their time horizons (++ = highly beneficial, + = beneficial).

Sector	Historical data and climatological impacts	<u>Real-time information and warning services</u>	Daily forecast (12 h – 2 days)	Few day forecast (3–5 days)	Medium-term forecast (5–10 days)	Sea-sonal forecast (1–6 m)	Climate scenarios
Road transport incl. pedestrians & cyclists		++	+				
Waterway transportation		++	++	+	+		
Air transportation	+	++	+				
Rail transportation		+	+	++	+		
Logistics	+	++	++	+			
Construction & facilities management	+	++	++			+	+
Energy production		++	++	+	+		
Agricultural production	++	++	+	+	+	+	+

Sector	Principal impacts and benefits of weather and road surface condition information services	Value of current benefits [M€/y] – existing services	Value of potential additional benefits [M€/y] – developed services – FMI's current market shares
Road transport (public roads)	Reduction in number of accidents, more efficient maintenance	11–20 M€ in total – accidents 9–18 M€ – maintenance 2 M€	– accidents 9–18 M€ – maintenance, not calculated
Pedestrians & cyclists	Reduction in number of slipping accidents, more efficient maintenance	– slipping accidents 113 M€ – maintenance, not calculated	– slipping accidents 122–203 M€ – maintenance, not calculated
Waterway transport	Reduction in number of accidents and environmental damage, more efficient operations, reduction in fuel consumption	25–39 M€ in total – accidents 14–28 M€ – oil combating 10 M€ – rescue operations, fuel savings etc. 1 M€	Not calculated
Air traffic	Reduction in number of accidents and emissions, more efficient operations, time savings for travellers	54 M€ in total – accidents 46 M€ – fuel savings 4 M€ – airport maintenance 3 M€ – environmental damage 1 M€	Around 4 M€
Rail traffic	Higher accuracy of train timetables	0.3 M€	0.2 M€
Logistics, supply chain	Higher predictability of deliveries, reduction in storage costs and risks (accidents, damage)	Not calculated	5 M€
Construction & facilities management	Prevention of mould and mildew damage, more efficient maintenance (worksites and courtyards)	15 M€ in total – construction 10 M€ – facilities management 5 M€	15 M€ in total – construction 10 M€ – facilities management 5 M€
Energy production & distribution	Energy production capacity and availability predictions, prevention of damage and production and distribution interruptions	10 M€ in total – prevention of interruptions 2 M€ – production predictions 3 M€ – peat production 5 M€	8–23 M€ in total – prevention of interruptions 3–8 M€ – production predictions 5–15 M€
Agriculture	Crop protection, pest control, harvesting	34 M€ in total – increased crops 12 M€ – crop damage 12 M€ – more efficient cultivation 8 M€ – other benefits 2 M€	3–15 M€ in total – more accurate forecasts 1–5 M€ – seasonal forecasts 2–10 M€
Total	Higher predictability, better planning, more efficient operations, reduction of damage and number of accidents	262–285 M€ in total Note! The monetary value of all benefits has not been calculated	Potential additional benefits 166–283 M€ (428–568 M€ in total for the analysed sectors)

Socio-economic benefits of weather information services provided by the FMI

Potential benefits of advanced weather services for pedestrians & cyclists: 122-203 M€/year

Source: Ilmatieteen laitoksen palveluiden vaikuttavuus [Effectiveness of Finnish Meteorological Institute (FMI) services]. Hautala, Raine & Leviäkangas, Pekka (toim.). VTT Publications 665, 2007.

Future of Helsinki Testbed: how to get the loop running?

- “A working relationship in quasi-operational framework among forecasters, researchers, private-sector, and government agencies aimed at solving operational and practical regional problems with a strong connection to end-users.”

