

# Forecasting Services Transport – Roads

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Solutions Engineer / Transportation

# Who we are

MeteoGroup is the global weather authority.  
We combine accurate science with advanced technology and local expertise with global reach.

MeteoGroup is trusted by hundreds of government agencies, thousands of companies and millions of consumers.  
With offices in 12 countries around the world, MeteoGroup is perfectly placed to provide local services to a global audience.



# Our sector expertise

We serve more than 40 airports across Europe and North America.



We help 1000+ municipalities make more confident decisions to ensure safe travel and cost efficient road treatments.



We help businesses prepare for potentially hazardous weather, reduce the risk of environmental disasters and prevent unsafe working conditions.



We produce weather shows and visuals for Europe's biggest broadcasters, reaching millions of people every day.



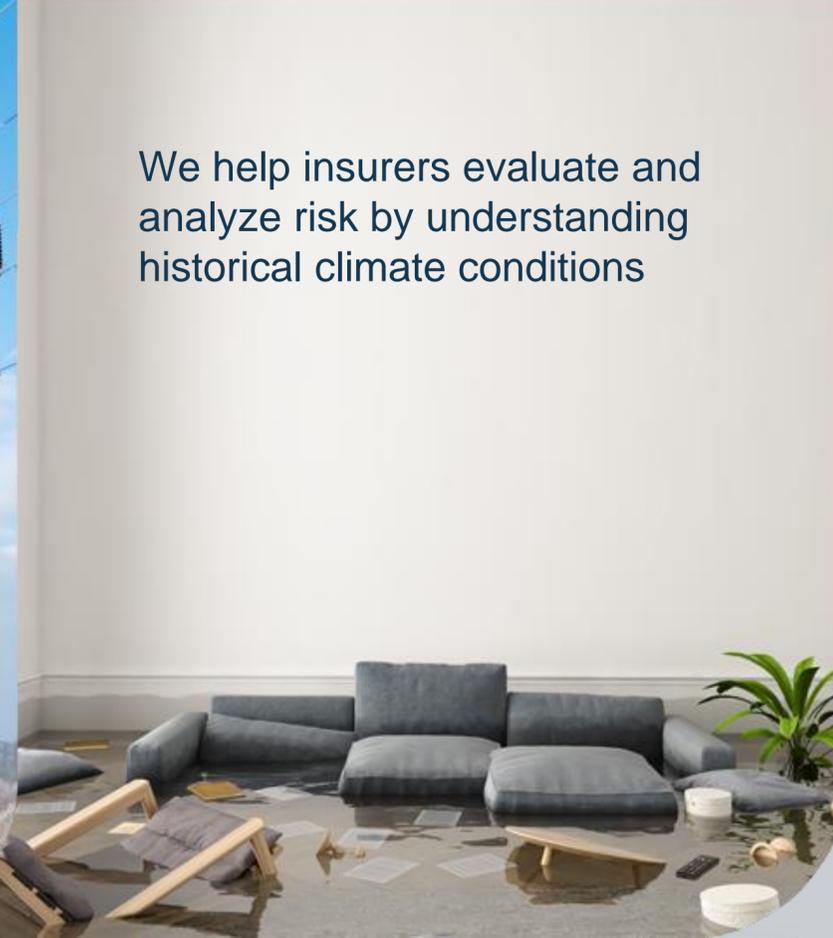
Our meteorologists interpret and fine-tune the best weather data in the world, generating forecasts of unprecedented quality and accuracy.



Our weather solutions optimize efficiency, minimize risk and support profitable decision-making.



We help insurers evaluate and analyze risk by understanding historical climate conditions



We push the boundaries in meteorological research and pioneer innovation in technology and visualization.



# Weather Forecasting Most Reliable Forecasts

## Expert Weather Room team

- Highly qualified Meteorologists
- Extensive road-specific experience
- Integration with your systems

## Mature, road-specific weather models

- Multi-model approach feeding our proprietary Road Weather Forecast model
- Based on more than 20 years of road forecasting and modeling experience

## Constantly monitored for quality

- Monitored and improved by meteorologists as needed 24/7
- Exceeds industry accuracy & quality expectations
- Scientifically verified against competition



# Weather Forecasting Most Reliable Forecasts MOS and Meteobase

The blending of all the model data and observations creates what we call the MOS output (Multiple Output Statistics).

Our experienced meteorologists then use our application called Meteoguard 2.0 to quality control the data by making edits where appropriate, further increasing accuracy.



# Weather Forecasting Performance in UK\* based on critical nights at or below +3dec C

UK  
95%  
Correct

- < 5% misses
- over 500 road weather stations

THE NETHERLANDS  
97%  
Correct

- < 5% misses

FRANCE  
94%  
Correct

- up to 150 critical nights

GERMANY  
93%  
Correct

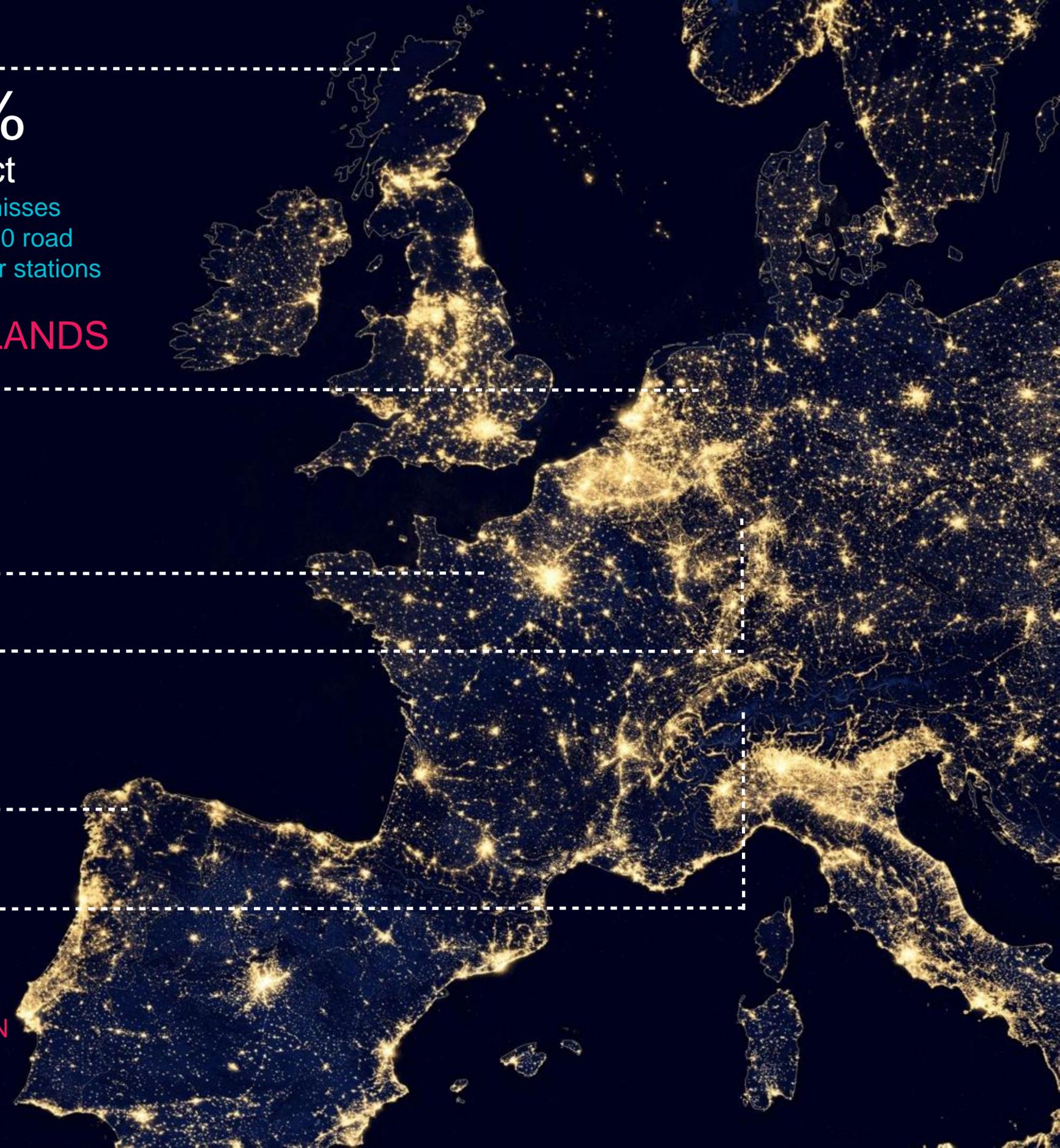
- < 3% false alarms

SPAIN  
94%  
Correct

- up to 150 critical nights

SWITZERLAND  
93%  
Correct

- < 6% false alarms
- Road weather stations up to 600 m above NN



\* These accuracy stats compare to a target of 90% set by the Institute of Highways engineers

# Route Based Forecasting

- Domain forecasts entire domain is treated in the same way .
- Using Domain forecasts on marginal nights a number of routes may be treated that are not required.
- Others will be over treated for route hazard.
- In times of Austerity with Authorities looking for savings without compromising safety.
- Route Based Forecasting- Solution



# Route Based Forecasting

- Specific to a gritting route.
- Temperature coefficient calculated at 20m-100m intervals.
- RWIS sites used to calibrate forecasts.
- Variable treatment possible (spread rates and timing).
- Identifies very localised cold spots/ hazards.



# Route Based Forecasting

MeteoGroup takes into account a number of factors when refining its road physics model that produces the RBF. What do we need?

Detail of the Gritting routes

- In Shape file format

Information about incoming and outgoing radiation

- Skyview measurements
- Solar view

Meteorological information

- Detailed weather forecast
- RWIS site data

Environmental information

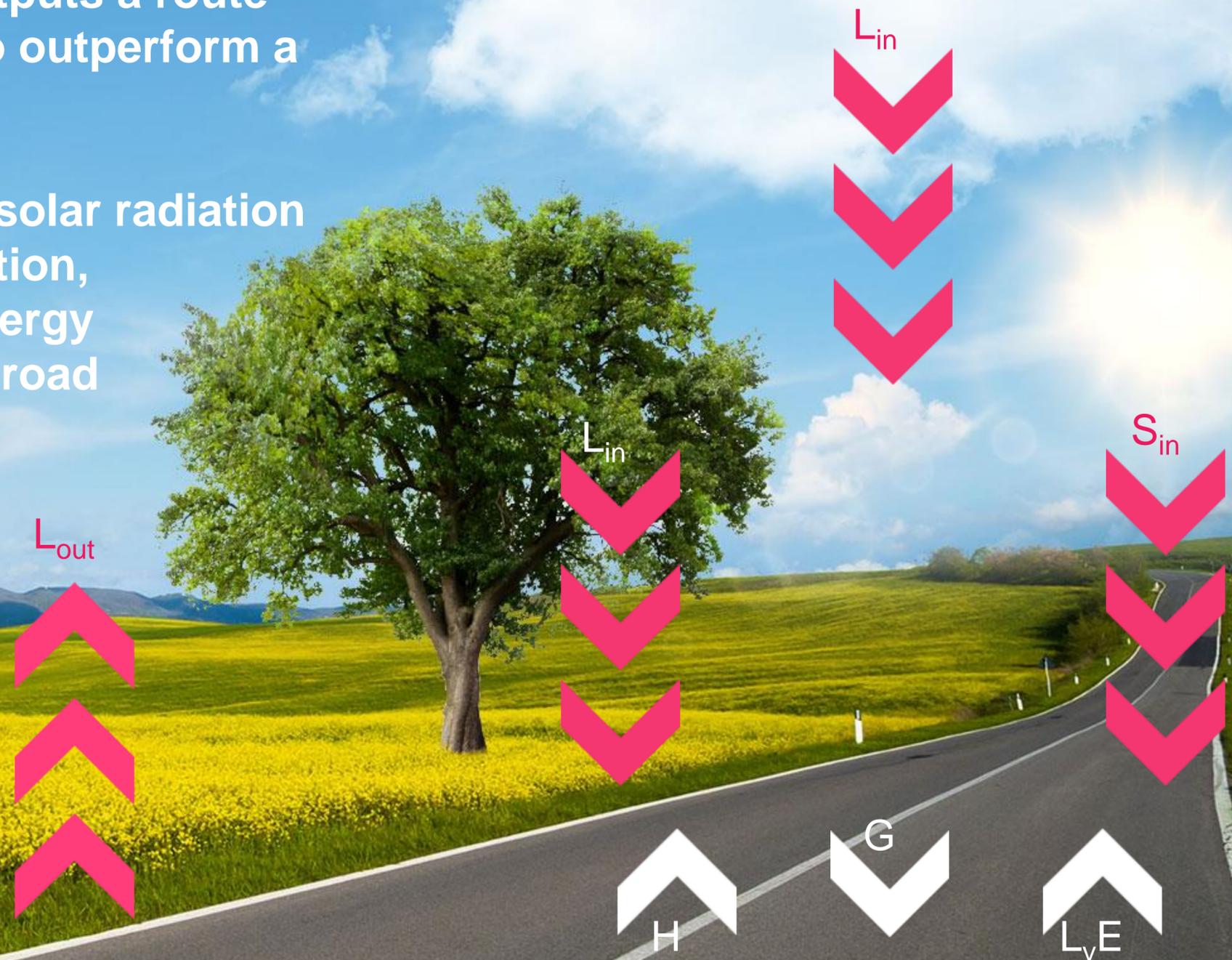
- Thermal map- if available
- Air temperature measurement



# Scientific approach underpinning the RBF

## system

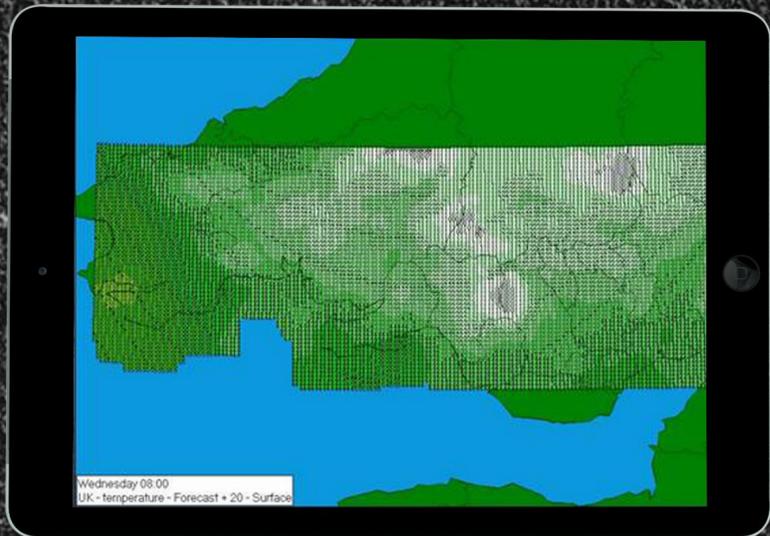
- MeteoGroup uses the detailed weather forecast our roads physics model to process sky view data and thermal mapping, which ultimately outputs a route based forecast that has been shown to outperform a domain forecast.
- By taking into account both incoming solar radiation and outgoing long-wave infrared radiation, MeteoGroup is able to calculate the energy transfer between the atmosphere and road surface, and vice versa.



# Route Based Forecasting



RWIS



High resolution weather forecast on a grid up to 1 km forecasts every 20m-100m



Thermal map, TT measurement



Database with for all routes: sky and solar view factor

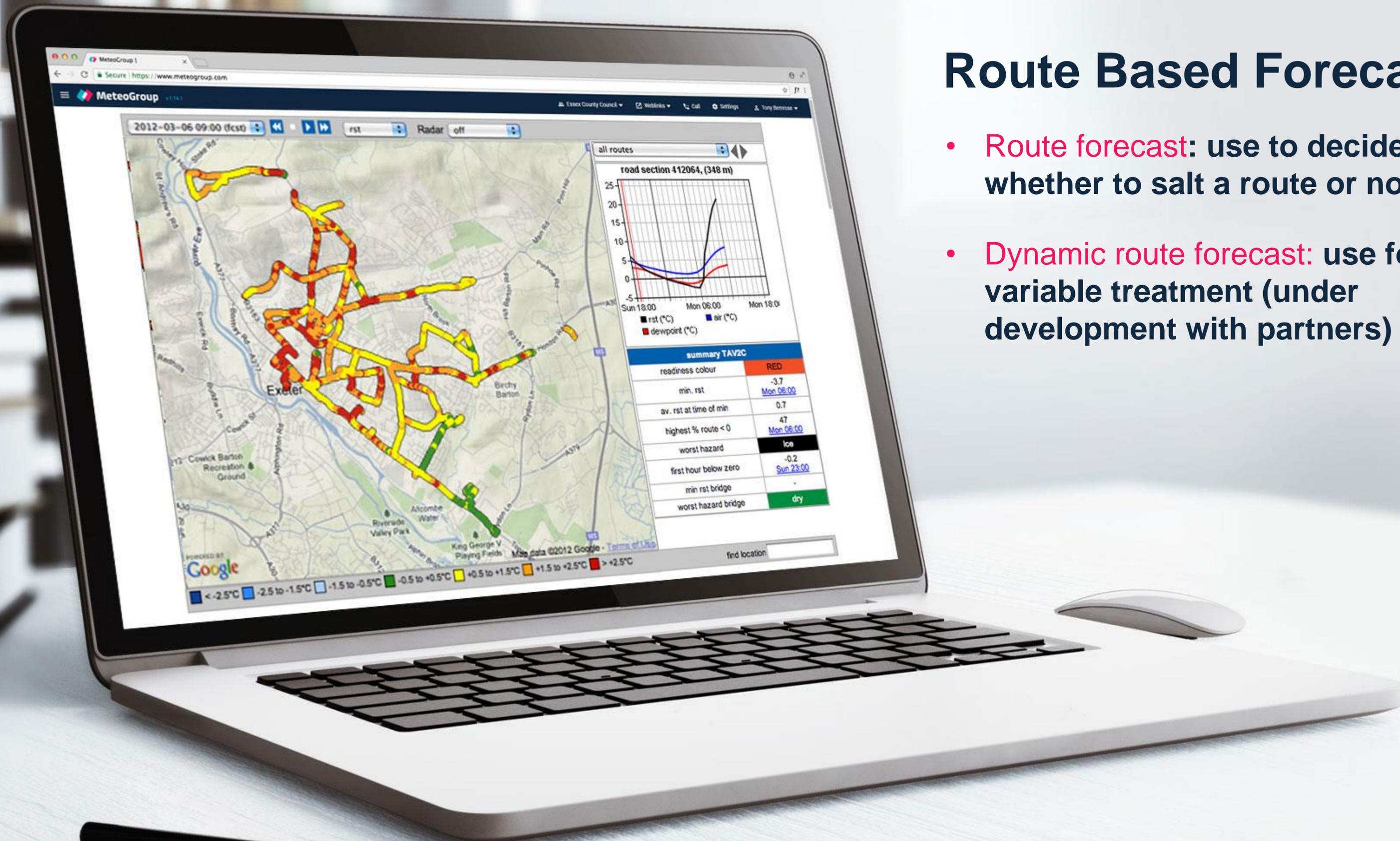
RBF Model for calculating road surface temperatures



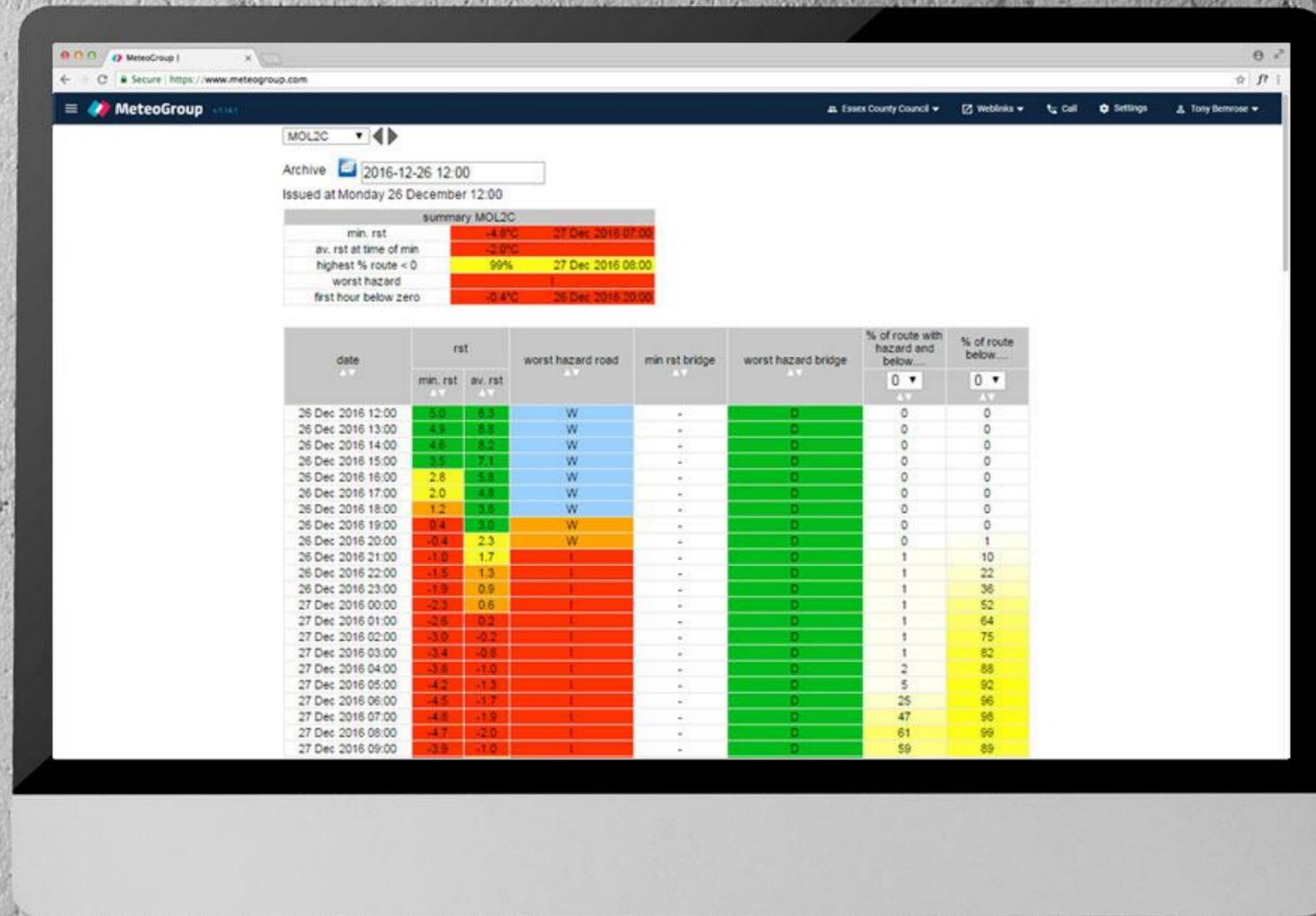
Route based forecast

# Route Based Forecasting

- **Route forecast:** use to decide whether to salt a route or not
- **Dynamic route forecast:** use for variable treatment (under development with partners)



# Examples - Route Based Forecasting



# Case Study (2012-2013) Highland Council

Case study comparing the number of likely route treatments based on a Domain forecast with the number of likely treatments based on a Route forecast and any associated variable cost savings from using a Route based approach.

At the time of the study Highland council had 93 routes in 8 Domains



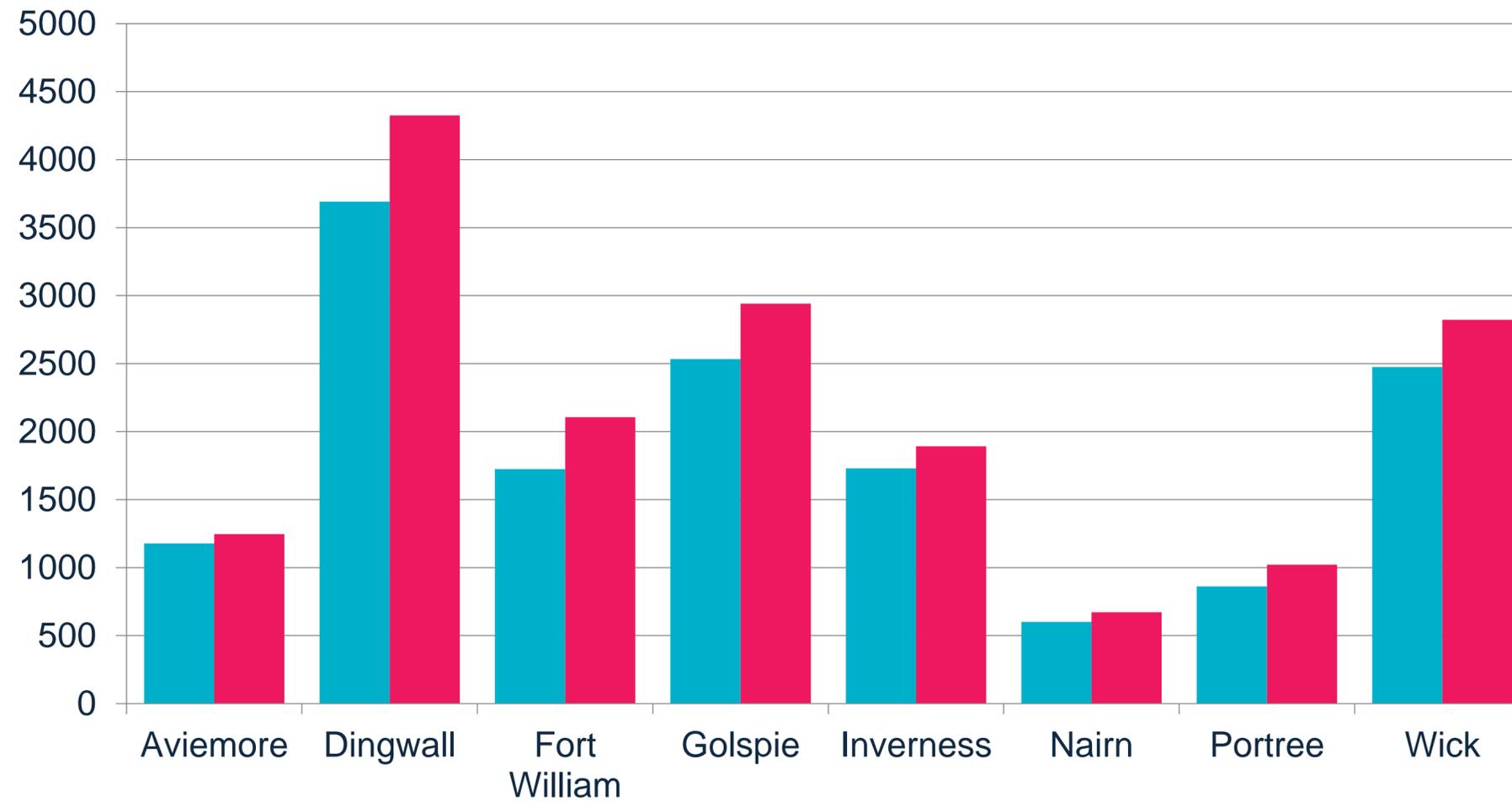
# Assumptions

- Treatments based on lunchtime forecast
- Treated on all Amber and Red RBF forecasts
- Used worst case route forecast as the forecast for the domain
- Averaged route lengths within each domain
- Savings based on 15g/sm, 4.5m spread width £30/tonne, £0.40/km fuel

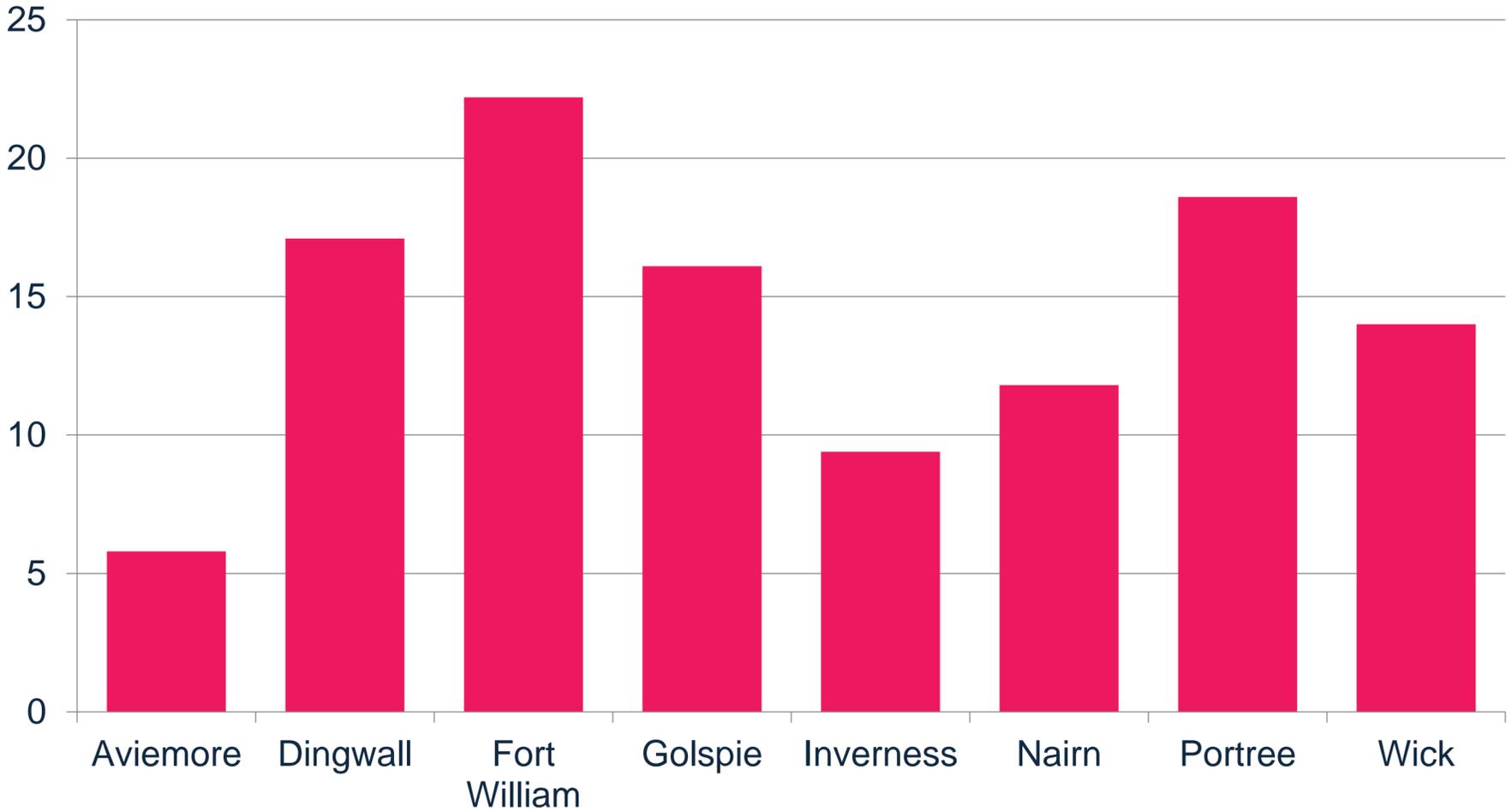


# Number of route treatments done

(Domain 15,240 v RBF 9,900) 35% reduction of treatments



# % Reduction in Route Treatments by using RBF



## Assumptions

Spread rate: 15 g/m<sup>2</sup>

Spread width: 4.5 m

Salt cost: £30/tonne

Gritting vehicle cost: £0.40/km

Total cost savings: **£511,435**

**10.8%** of customer's budget

Other potential savings  
not included above:

- Drivers: **est £75/action**
- Follow on time (Drivers regulations: **£30/action/driver**)
- Variable treatment (salt saving:
  - 8t to treat 15g/m<sup>2</sup> @ £40/tonne  
= £320/gritter/treatment
  - 5t to treat 8g/m<sup>2</sup> @ £40/tonne  
= £200/gritter/treatment
- **Est £120/gritter/treatment saving**



A large orange snowplow blade is shown clearing snow on a road. The blade is curved and has a black metal edge. The background shows a yellow snowplow truck and a snowy environment.

# RBF Guide Savings estimate

## Assumptions

- Estimated at 5% and 8% reduction of route treatments.
- 75 actions full treatment equivalent and 30 routes or 2250 route treatments
- Treatment cost £500 / per route per action (driver, salt and fuel)
- 8% reduction in treatments = 180 treatments
- 5% reduction in treatments = 120 treatments
- Variable treatment, salt savings £120/route/action, savings are assumed the same as route reduction .
- Follow on time savings £30/route/action.

# RBF Guide Savings Estimate

- Route Savings
- Variable Treatment
- Follow on time

8%

$$180 \times \text{£ } 500 = \text{£ } 90,000$$

$$180 \times \text{£ } 120 = \text{£ } 21,600$$

$$180 \times \text{£ } 30 = \text{£ } 5,400$$

$$\text{£ } 117,000$$

5%

$$112 \times \text{£ } 500 = \text{£ } 56,000$$

$$112 \times \text{£ } 120 = \text{£ } 13,400$$

$$112 \times \text{£ } 30 = 3,360$$

$$\text{£ } 72,000$$



Thank you

# Forecaster Support

- Consultation with decision support meteorologists 24/7
- All clients inform us of proposed actions – we monitor 24/7 and can proactively update in the unlikely should conditions necessitate
- Nearly 20 years' experience in UK highways forecasting – Hertfordshire first client 1996
- Central London HQ; most meteorologists live within M25

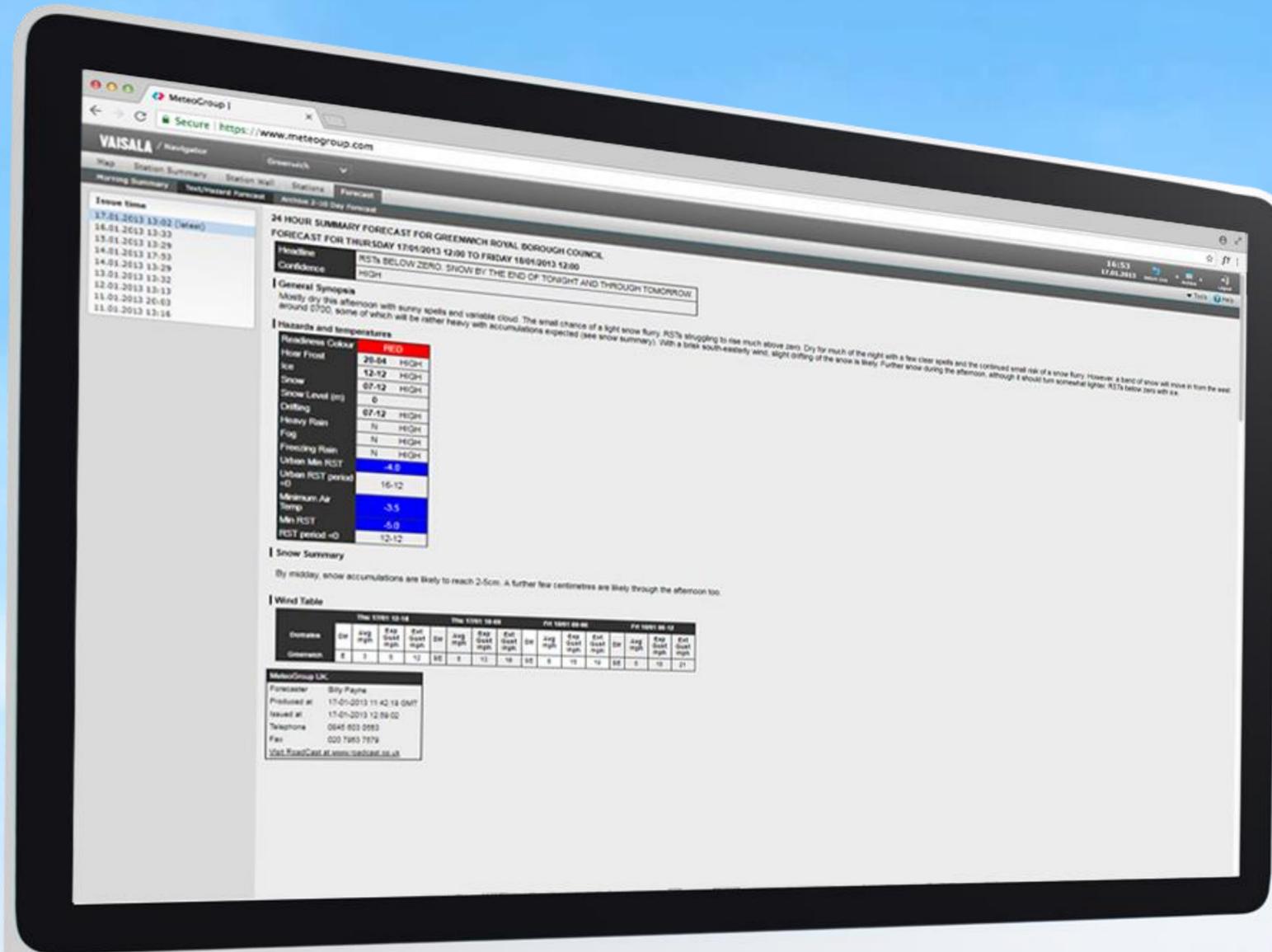


# Unrivalled Local Knowledge

- Intimate knowledge of London's climate – e.g. Thames Estuary snow streamers in north-easterly air-flows (February 2018 and 2009)
- Preferred forecast provider for 7 out of 8 surrounding Local Authorities, along with 5 London Boroughs
- Preferred forecast provider for numerous other non-LA / HE London clients e.g. UK Power Networks, SSE, National Grid, Scotia Gas, Thames Water, Southern Water, private gritting contractors



Local authority clients in London



# Best Platform

## Roadcast

- 1995 to 2015

## RoadMaster

- 2015 onwards

## Customer-driven development

- Powered by thousands of customer interactions

## Clear, to-the-point user interface

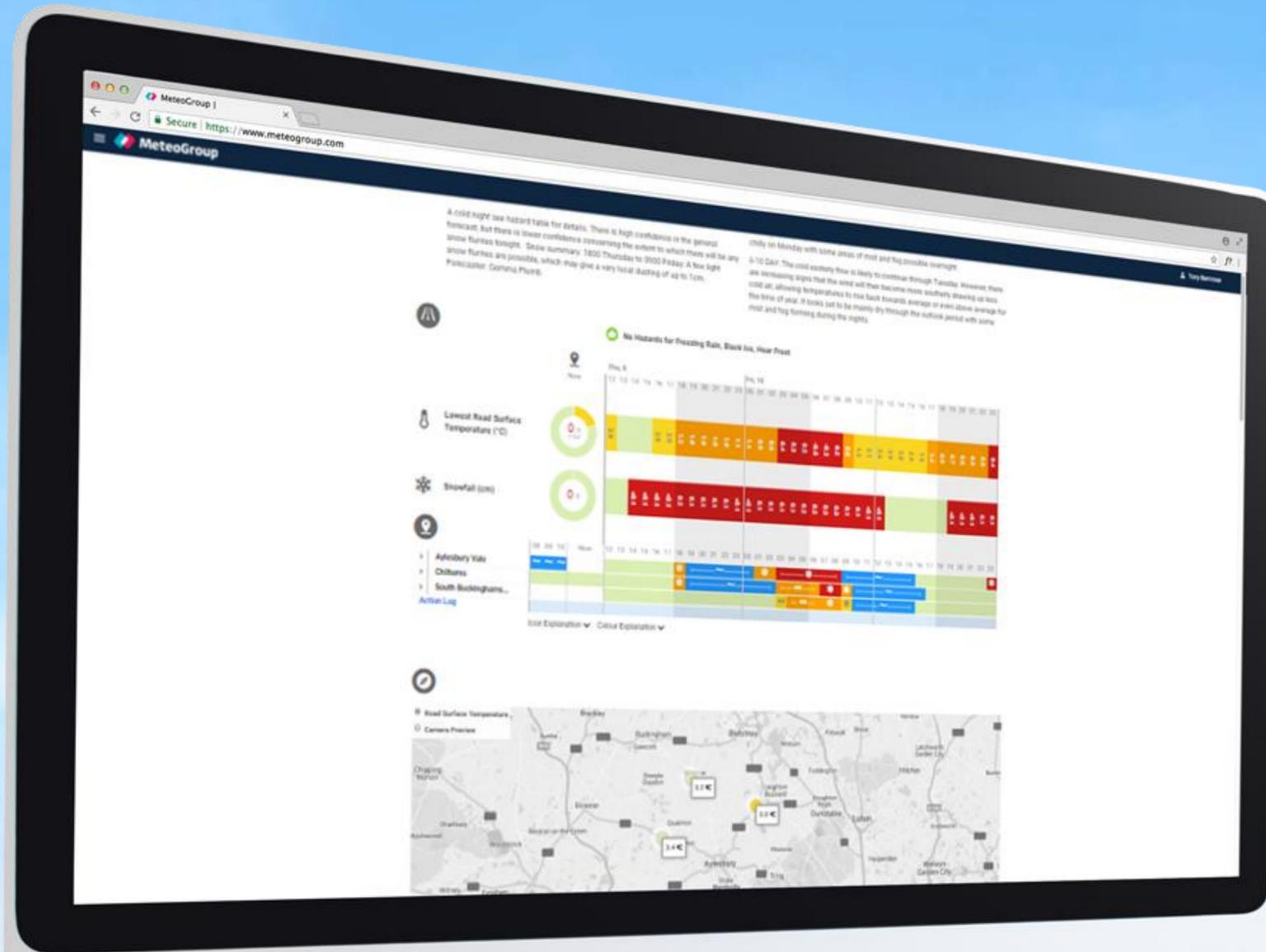
- Gives you the most relevant information first with drill down to details

## Integration with your systems

- API access surfaces road weather data directly within your existing systems

# RoadMaster

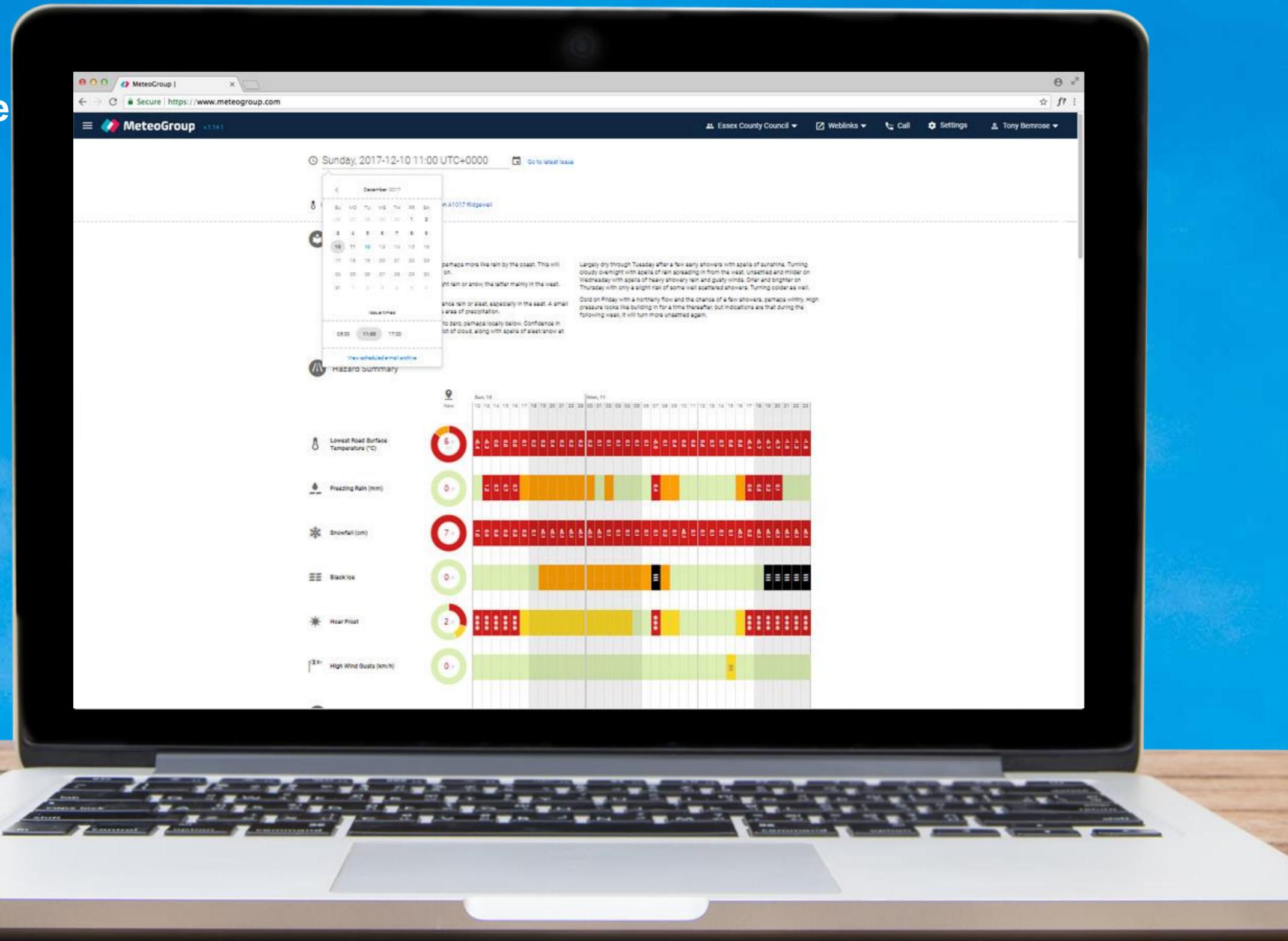
- Clear Dashboard unlimited secure access for staff
- RWIS forecast graphs and tables
- Neighbouring authority access, including access to see actions posted by other members (subject to agreement)
- Action log email facility / record.
- Web links to other web sites added at your request
- Radar and Satellite
- EPS graphs for 15 / 30 day and model maps covering key weather parameters i.e. snowfall, precipitation, temperature, windspeed etc
- Archive accessible via web site up to min 21 years 9 months



# RoadMaster

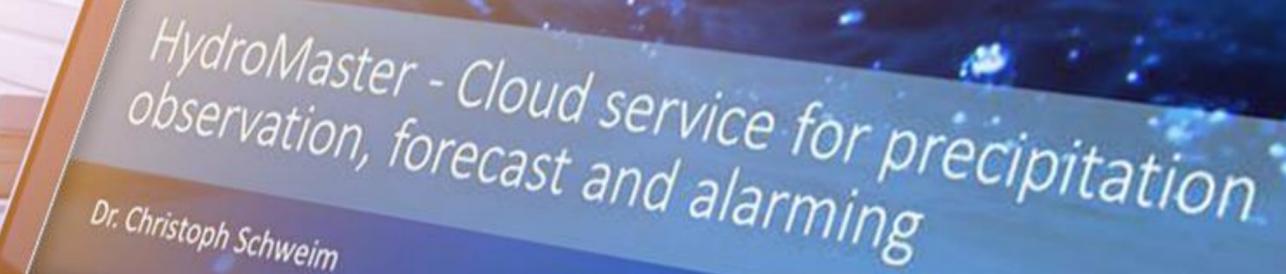


- RWIS Graphs
- 36 hour and 8 days forecast table
- Radar Map
- Satellite
- Action Logs and Notes
- Email Action logs
- Neighbour Access
- Web links setup
- Release notes
- Probabalistic graphs (15/30 day)
- Forecasting model maps
- Archive functionality



# Innovation & continuous improvement - meteorological R & D

- ScaDo
- Decision support tool
- Hydromaster



HydroMaster - Cloud service for precipitation observation, forecast and alarming  
Dr. Christoph Schweim

# Training

**Training delivered by operational meteorologists**

**Accredited QCF assessment centre**

**Geographic Knowledge and Experience**

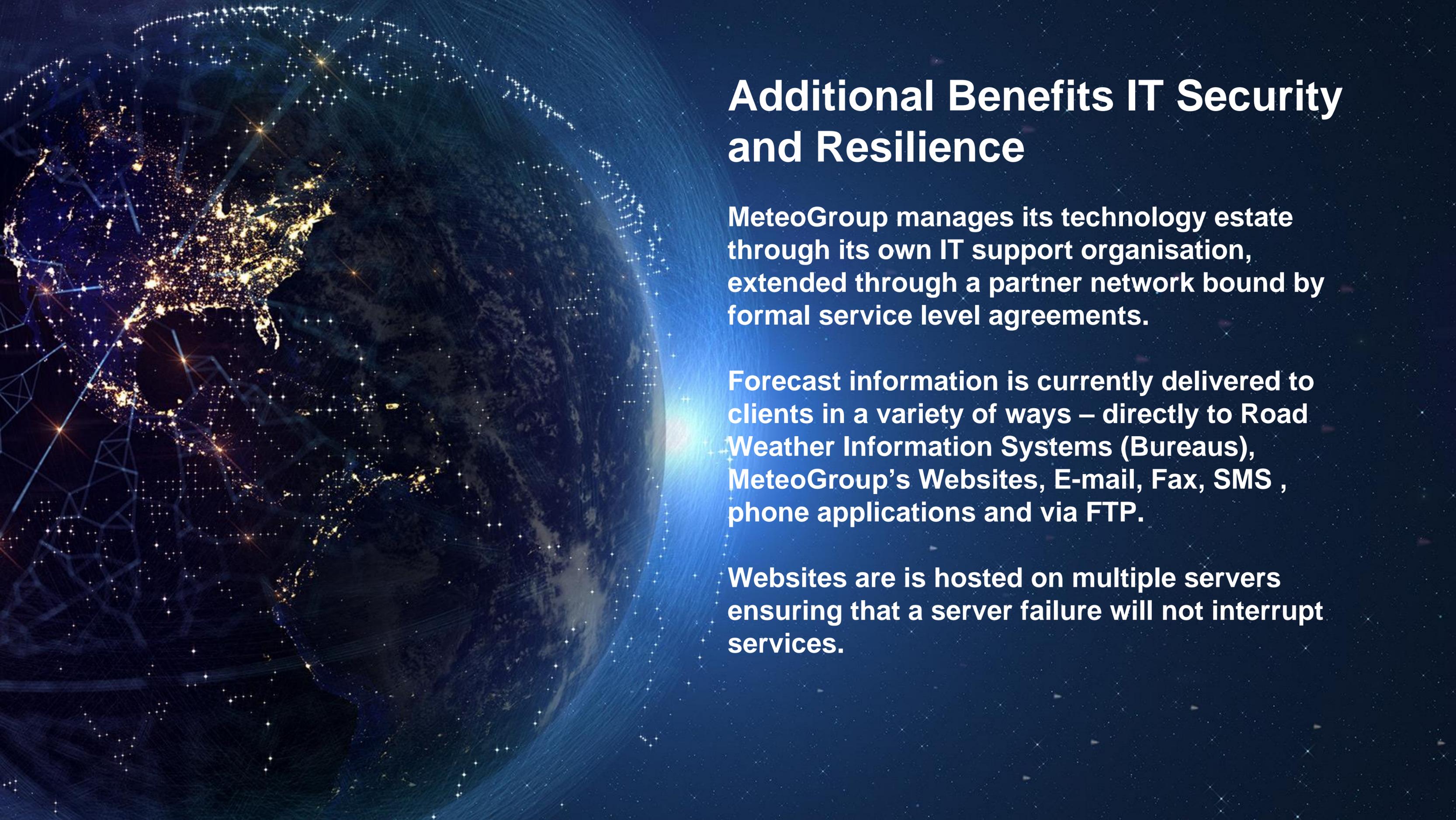
**UK Training Centre Available (London)**

**Flexibility on location, duration and content**

**Bespoke training including scenario training available to suit needs**

**Meteogroup system familiarisation**





## **Additional Benefits IT Security and Resilience**

**MeteoGroup manages its technology estate through its own IT support organisation, extended through a partner network bound by formal service level agreements.**

**Forecast information is currently delivered to clients in a variety of ways – directly to Road Weather Information Systems (Bureaus), MeteoGroup's Websites, E-mail, Fax, SMS , phone applications and via FTP.**

**Websites are hosted on multiple servers ensuring that a server failure will not interrupt services.**

# How customers see us

**“The Met Office was our bespoke winter weather forecasting provider. But we find MeteoGroup’s RoadMaster to be a better system and like the functionality. We now have a 3 year contract with them.**

Paul Wilson, Group Manager Area Operations  
Oxfordshire County Council

**“We selected MeteoGroup, because they can best meet our ambitions for innovative and high quality weather services both in the UK and around the world.”**

Nigel Charters,  
Project Director, BBC Weather

**“Reliable claims forecast reports enable us to react more quickly and efficiently.”**

Uta Buchholz,  
Gothaer Schaden-Service-Center GmbH



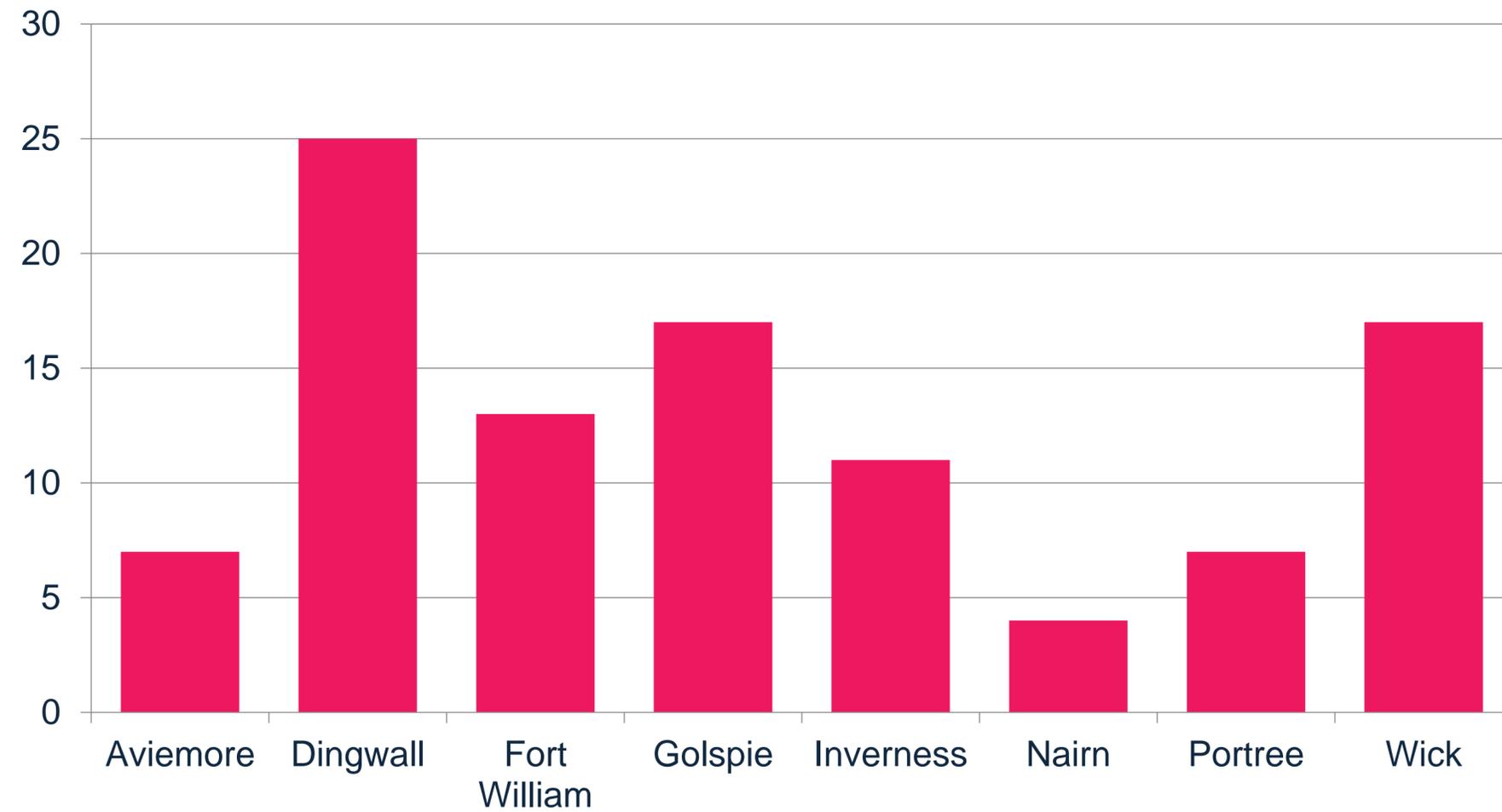
**BBC WEATHER**  
In association with MeteoGroup



# Our customers

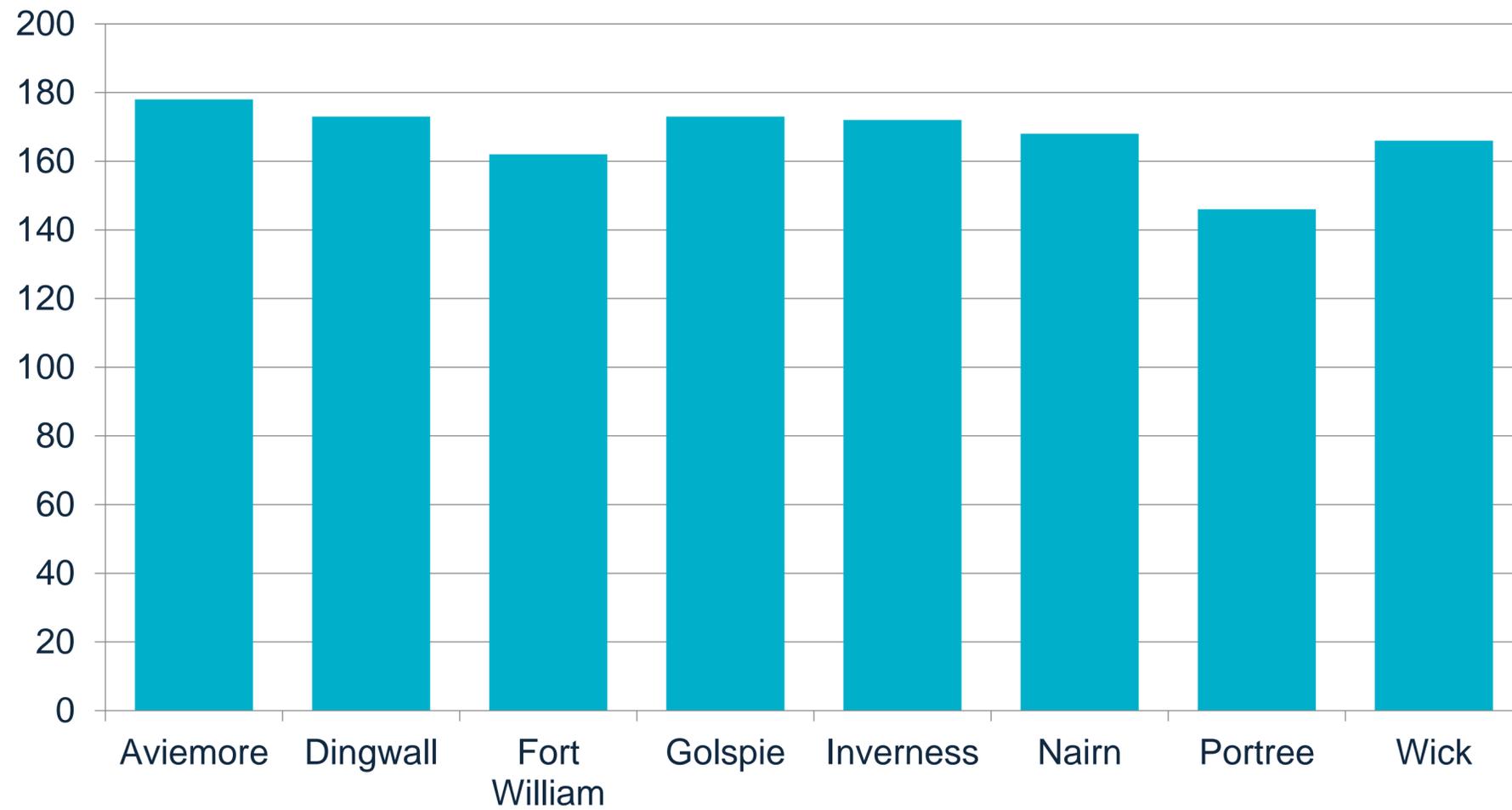
Media								
Transport								
Shipping								
Offshore								
Energy								
Hydro & Agri								
Insurance								
Other								

## Number of routes in each domain (93 total routes)



# Number of treatment actions per domain (180 days)

Treatment Days 1 October 2012 – 16 April 2013



# The Global Weather Authority

## Accurate science with advanced technology

- Proprietary physical and statistical weather models
- Enriched by in-house meteorologists and weather research team
- Delivered through market-leading platform and cloud services

## Local expertise with global reach

- Hyper-local weather expertise
- Global geographic coverage
- Industry-specific products and experience

## Trusted by the best

- Hundreds of government agencies
- Thousands of companies
- Millions of consumers

# Quality assurance

ISO 9001

ISO 14001

ISO 22301

ISO 27001

OHAS 18001

## SERVICE LEVELS



# RBF Guide Pricing

- Network of 1800 km's treated Network
- Approximately 30 Gritters (60 km/gritter)
- RBF Route Design – £2600 (one off fee)
- RBF Annual Forecasting - £21,267





# RoadMaster is the World's leading winter road weather solution

## Accurate science with advanced technology

- Expert Weather Room team
- Mature, road-specific weather models
- Constantly monitored for quality

## Best platform

- Customer-driven development
- Clear, to-the-point user interface
- Integration with your systems

- Lower operating costs
- Lower liability costs
- Lower environmental costs

## Most cost-effective

