InterMet 5: Private Sector Briefings on Innovations in Technology & Forecasting Services

Automated meteorological observation process – benefits for the societal output of meteorological organizations

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Automated Meteorological Observation Process

Benefits for the societal output
of meteorological organizations

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Value of Meteorology for the Societies

- Early warnings for extreme events, such as floods and storms
  - Protection of life
  - Protection of assets
- Economic benefits
  - Agriculture
  - Energy
  - Transport
  - Construction
  - Tourism
  - Healthcare

23000 LIVES PER YEAR

0.3 – 1.9 B$ PER YEAR

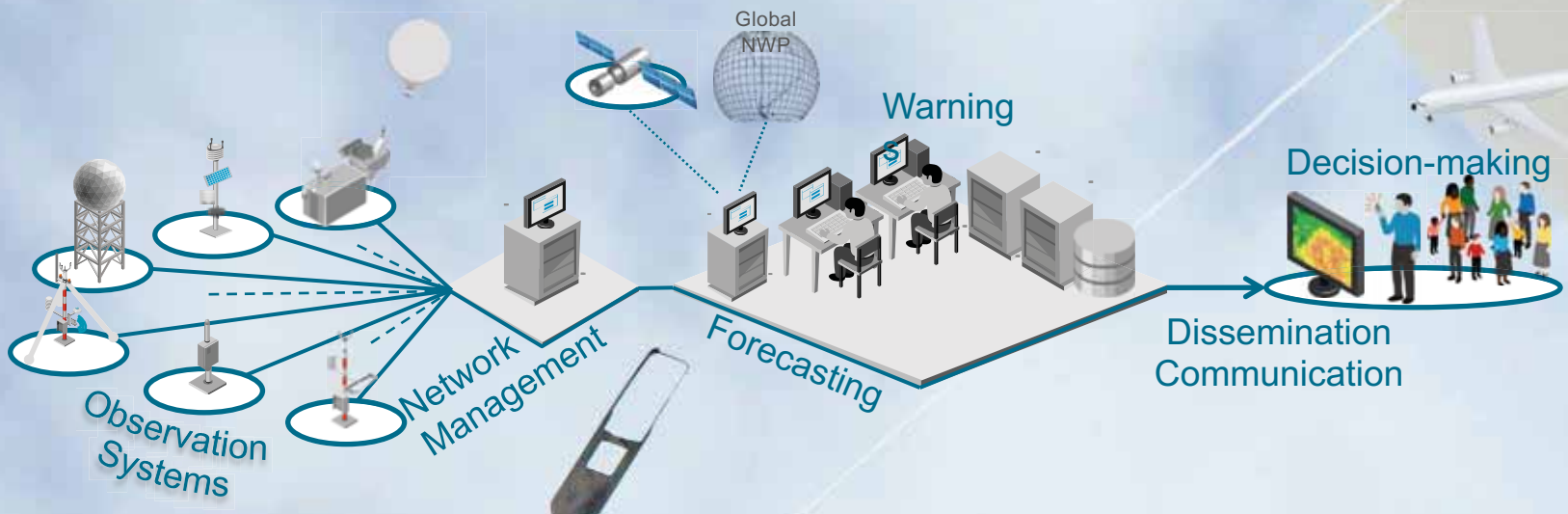
2.9 – 29 B$ PER YEAR

COST FOR IMPROVEMENT
1.0 B$ PER YEAR

GLOBAL IMPROVEMENT POTENTIAL

Main source: World Bank Policy Research Working Paper 6058 "*A Cost Effective Solution to Reduce Disaster Losses in Developing Countries*", Stéphane Hallegatte, May 2012.

The Meteorological Value Chain



1. Observation systems provide the input data
2. Creation of forecasts
3. Translation of forecasts to warnings
4. Dissemination and communication of warnings and forecasts
5. Decision-making by the users of warnings and forecasts

Forecast Creation and the Role of Input Data

RADIOSONDE PROFILES

- Data for global NWP models
- Nowcasting and local NWP – e.g. Thunderstorm indices

WEATHER RADAR DATA

- Realtime awareness of precipitation from large area
- Nowcasting and input data for advanced NWP models

LIGHTNING DATA

- Realtime awareness of thunderstorms
- Nowcasting and lightning threat zones

AUTOMATIC WEATHER STATION DATA

- NWP model selection and verification
- Current conditions and climate information

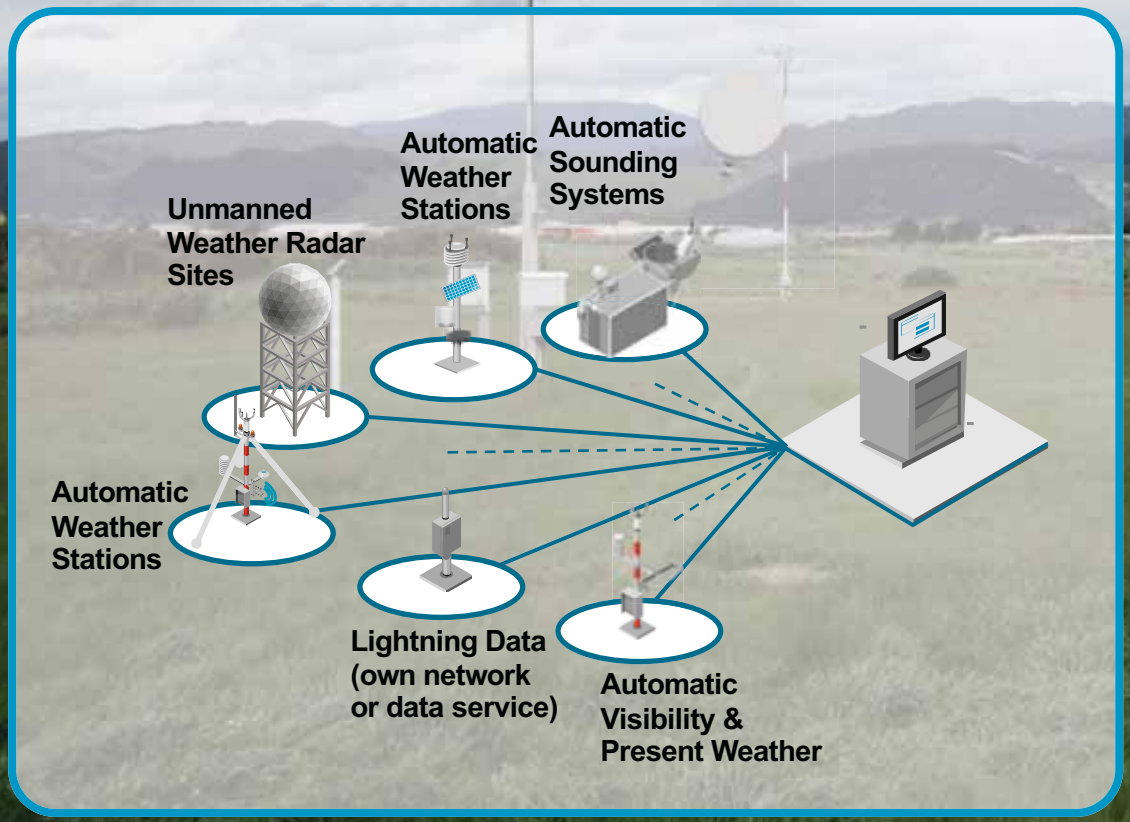
AUTOMATED VISIBILITY AND PRESENT WEATHER DATA

- Aviation needs (runway visibility)
- Precipitation and meteorological visibility

KEY TO SUCCESS

- DATA AVAILABILITY
- ACCURACY AND PRECISION
- TRUST-WORTHINESS

The Role of Automated Observation Process



Why automation?

- Cost savings over the lifecycle of the equipment
- Personnel time savings and reallocation into forecasting and warning activities
- Data quality and availability
- Less weather sensitive observation process
- Avoidance of remote staffed operating locations

See, for example: https://www.noaa.gov/stories/up-up-and-away-6-benefits-of-automated-weather-balloon-launches

Vaisala example of automated observation system:

Autosonde

- 60 fully automatic soundings
- scheduled soundings
- adaptive soundings, remotely initiated
- 84 systems delivered, first ones in 1994
  (still operated by the customer)
- latest model 2018, 15 firm orders in first 5 months

Vaisala example of automated observation system:

Weather Radar

- full automation of the scanning cycles and radar product generation
- no human intervention needed during operation
- proven uptime >99%
- 179 units delivered since 2007

Vaisala example of automated observation system:

Visibility and Present Weather Sensor

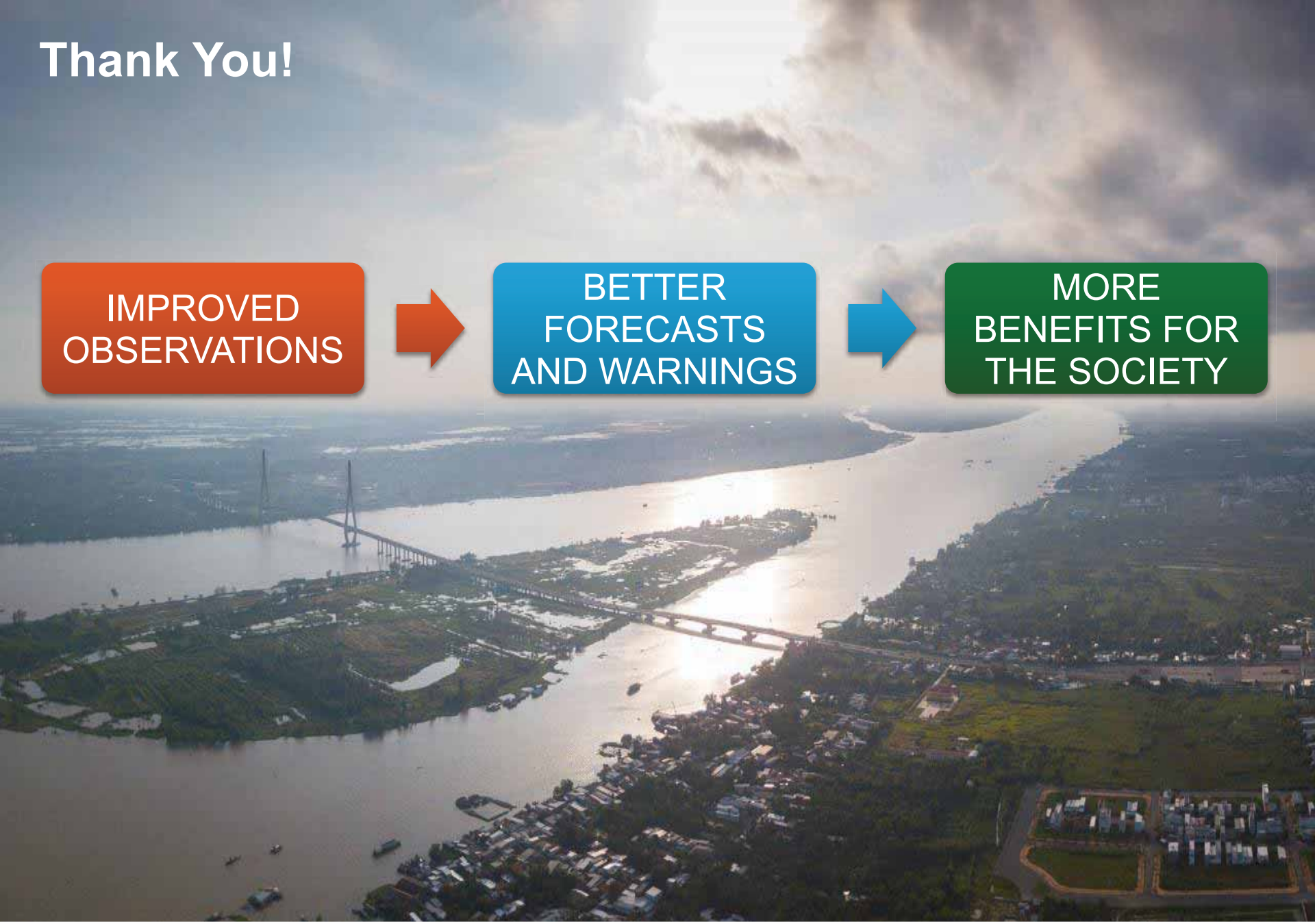
- automatic and reliable visibility measurement; suitable for runway visual range (RVR)
- precipitation intensity and accuracy
- precipitation type identification
- automatic window contamination compensation
- self diagnostics and remote connectivity

Vaisala example of automated observation system:

Observation Network Management Software

- 24/7 automatic monitoring of observation systems
- events and alarms generated automatically
- remote control and metadata management
- remote diagnostic and problem solving
- easy to learn and use

Thank You!


IMPROVED OBSERVATIONS
BETTER FORECASTS AND WARNINGS
MORE BENEFITS FOR THE SOCIETY