Compact X-band Dual Polarimetric Doppler Weather Radar

Solid state

World's smallest and lightest!

Model: WR-2100

Usage examples
Compact
X-band Dual Polarimetric
Doppler Weather Radar

Fields of application
Improving aircraft takeoff and landing rates

Helping air traffic controllers decide aircraft takeoffs and landings thanks to accurate snowfall observations.

**Observation Result**

Temporal sequence of precipitation observation history in the immediate past.

Snow detection rate comparison of the FURUNO WR-2100 and C-band radar. FURUNO WR-2100 can detection snow clouds with high reliability.

**System Configuration**
Multi-radar system in urban areas

A joint research project for rainwater management, focused on monitoring heavy rainfalls in urban areas.

1. Multi-radar monitoring in urban area
   - With high-precision predictions, flood damage can be limited

2. Accurate rainfall nowcasting
   - High resolution and high precision
   - Transmission of detailed rainfall and flood prediction information

3. Precise flood prediction
   - Estimated results
     - Optimization of water management operations

FURUNO's Multi-radar system

- In the Japanese cities of Fukui and Toyama, set of 3 Radars have been installed

3 Radar combined images

Joint research team members

- METAWARE Co., Ltd.: Multidisciplinary engineering and integration
- New Nippon Consultants Co., Ltd.: Simulation model for sewage pipelines
- FURUNO ELECTRIC CO., LTD.: Multi-radar system for urban areas
- EMORI & CO., LTD.: Flood prediction analysis system
- Kobe University: Rainfall prediction model
- Fukui City, Toyama City: Field experiments

This system is demonstrated as a government-commissioned research study from the National Institute for Land and Infrastructure Management, which is supported by the Breakthrough by Dynamic Approach in Sewage High Technology (B-DASH) Project of the Ministry of Land, Infrastructure, Transport and Tourism, Japan.
Support of sewer flood management

Flood prediction and risk management in urban area using rainfall observations and sewage model.

Observation Result

WR-2100 radar on roof Artevelde High School at Gent
(extreme summer thunderstorm of 5 June 2015)
X-band signals are more sensitive to rain drop fluctuation than the C-band. On the WR-2100 side, there are some strong small-scale storm cells detected by the X-band but not the C-band. So for that area, X-band data may actually provide better estimates.

System Configuration
Transportable Observation Unit

Small size allows the FURUNO WR-2100 weather radar to easily be mounted on a transportable platform creating a mobile observation unit that can be deployed in desired area.

**Observation Result**

The WR-2100 is a versatile unit which can be used for both meteorological and many other applications. The University of Queensland in Australia has developed a wildfire prediction model using the WR-2100 radar. The WR-2100 small size is perfect for their transportable mobile unit. The WR-2100 provides unique, detailed information of the fire plumes and wind speed/direction within the fire activity to the researchers.

**System Configuration**

- **Digital compass** (acquires North offset)
- **Signal Processing Unit WR-2100-SPU**
- **Power generator**
- **Towing vehicle**
- **Antenna unit WR-2100-ATU**
- **Scissor lift** (raised for observations)

Inclination is fixed at +/- 0.5 degrees using the adjustable trailer logs.
Observation of local urban heavy rain

Monitoring heavy rain storms, producing real-time nowcasts for a city and provides early warning alarms for city departments like waste water management.

Observation Result

The WR-2100 provides outstanding precipitation observation performance for rain, hail and snow. The comparison graph below shows the WR-2100 matches the same dynamics as a disdrometer in a rain event.

High intensity hailstorm over the city of Aalborg. Resolution is 300 x 300 meter. Background map, Google Map, 2015

Comparison between FURUNO WR-2100 and an OTT Parsivel disdrometer

Water damage on construction sites

Rainfall intensity monitoring

Zoom into the area of interest
**Rainfall and Wind Vector Monitoring (Japan)**

Enhanced local observation using three radar systems to monitor a critical area. Using multiple radars and displays wind vectoring can be detected and shown.

**Freeway Observation (Japan)**

The system is dedicated for localization of sudden torrential rain to support highway operations.

**Landslide prevention (Croatia)**

Utilizing high precision rainfall measurements with a ground and water flow model.

**Disaster Prevention (Indonesia)**

Volcano ash and rainfall monitoring.