

# **ROTTERDAM –development of an operational X-band radar observation framework dedicated to urban weather research and smart-city applications**

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## **GENERAL BACKGROUND:**

Heavy rainfall and severe storms are a major cause of economic and social losses, and society faces every year several failures of facilities due to the lack of warning, wrong use and misinterpretation of precipitation data. After several years of test and development, an FMCW, quad-pol X-band radar, The Rijnmond radar, will be deployed this summer in the centre of Rotterdam, the Netherlands. SkyECHO, a young start-up focused on weather application in cities, has been contracted by TU Delft and the Rotterdam public authorities to develop an operational framework using the Rijnmond radar as a core instrument. The aim is to achieve the monitoring of rainfall in the city, in real-time and full operation in order to improve the radar data usage for urban water management applications and atmospheric research in cities, that demands high spatial and temporal resolutions.

## **WHAT CAN BE EXPECTED IN THE PRESENTATION:**

An operational framework is paramount to optimise the X-band radar data usage and properly reaches a wide range of potential end-users. In this presentation, we will describe SkyECHO’ s key steps to setup the framework that consist of:

The description and advantages for city environment of the real-time processing, by GPU-card, of the Rijnmond radar that will be capable to measure rainfall cells with a spatial resolution of 100-by-100 meter and a temporal resolution of 1 minute. The intended real-time management of the radar data to satisfy both research and future potential commercial applications using API endpoint technology. The integration of the Rijnmond radar data within the new Dutch weather and climate research observatory, The Ruisdael observatory. The network and composite development potentials of the Rijnmond radar with the MESEWI radar, a very similar radar system located 10 km far from Rijnmond and deployed in the Delft university of technology for research purposes. The additional research activity planned for additional clutter filtering algorithm development to adapt to urban clutter environments. The description of a new weather app from SkyECHO, called ‘Weatherlse’ , built upon the Rijnmond radar processing and integrating radar-based nowcasting information which will be used for public awareness and new smart-city applications

This presentation will be illustrated with some preliminary observational data collected by the Rijnmond radar, with a comparison to the conventional radar-network data from C-band radars that are operated by the royal Dutch meteorological society (KNMI). Nowcasting and data merging techniques will be used to extrapolate the radar measurements into useful rainfall predictions for the next hour.

Keywords: City rainfall observation, X-band radar, Nowcasting

