TEO KAI WEN

COUNTRY OF ORIGIN: SINGAPORE

EDUCATIONAL BACKGROUND:
- BSc(Hons) in Environmental Engineering, Nanyang Technological University, Singapore

I have been working with the Public Utilities Board (PUB), Singapore's national water agency, since 2011 after graduating from school. In the first 4 years of service, I have worked on drainage related projects such as drainage design, projects planning and detailed design. In 2015, I was rotated to the hydraulic modelling/R&D team. As part of PUB's key domain expertise development program, I was given the opportunity to study MSc with IHE-Delft. As a young engineer, while I am heartened that I could bring meaningful projects to fruition, it is also imperative to stay vigilant and up-to-date as our work has direct impact to people's lives.

WHY I CHOSE HYDROINFORMATICS:

Singapore, just like the rest of the world, is **not insulated from the impact of climate change**. Coupled with the challenges of being **highly urbanized,** conventional drainage design knowledge may no longer be sufficient to **address the complexity of future challenges**. I hope to look into areas of Hydroinformatics in search of mitigation measures to curb with flood impacts attributed by climate change.

PREVIOUS RESEARCH AND RESEARCH INTERESTS:

(1) Designing and protecting Singapore against Climate Change
- Scenario analysis using **1D2D MIKE Flood**
- Identification of **flood risk assessment** and **mitigation measures**
- Determination of **pumping capacities** and **sea barrier crest levels**
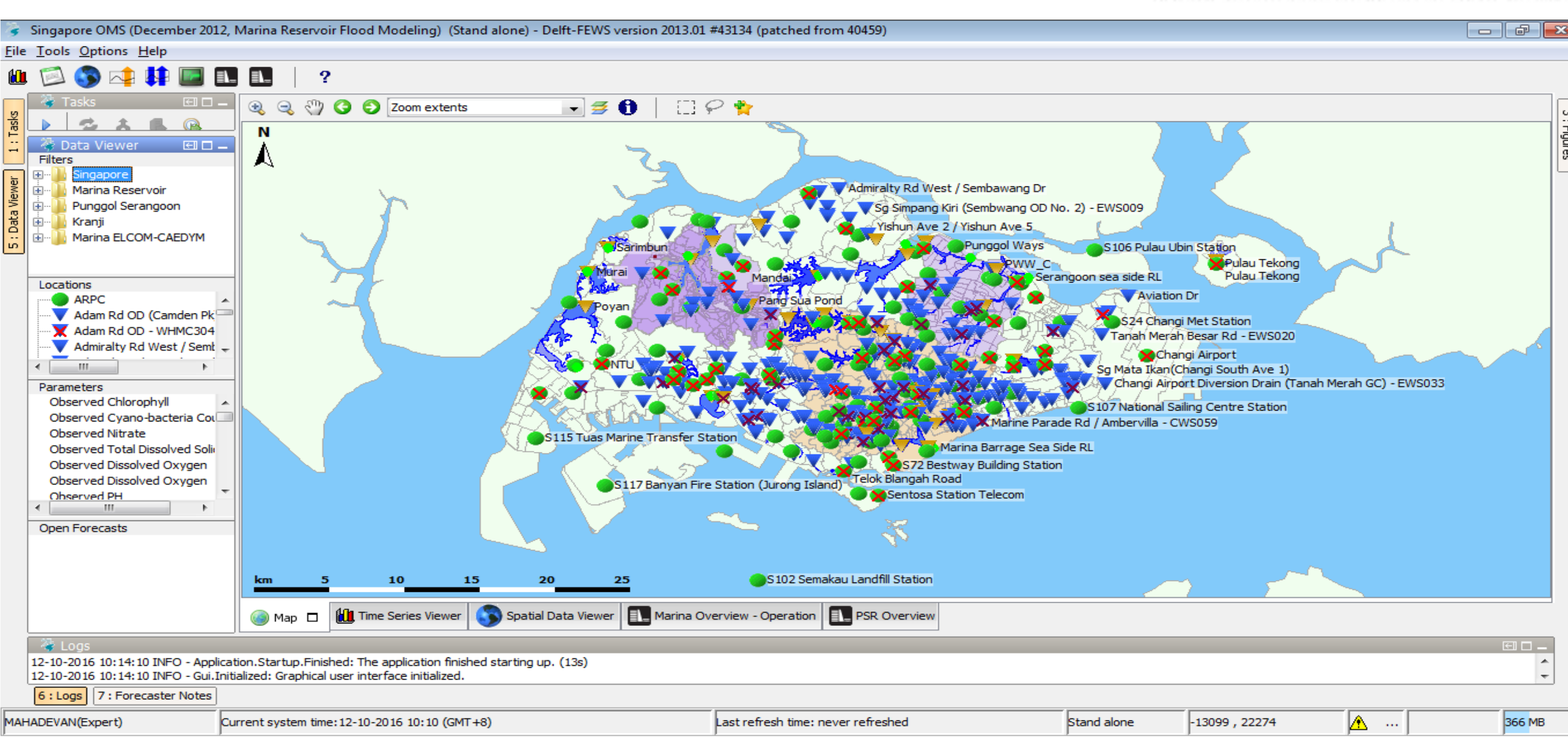- **Optimization of operation regimes** for pumps and gates

(2) Radar Rainfall Nowcasting System for Flood Forecasting
- Use of a network of **X-band radars** with **Doppler system** for nowcasting
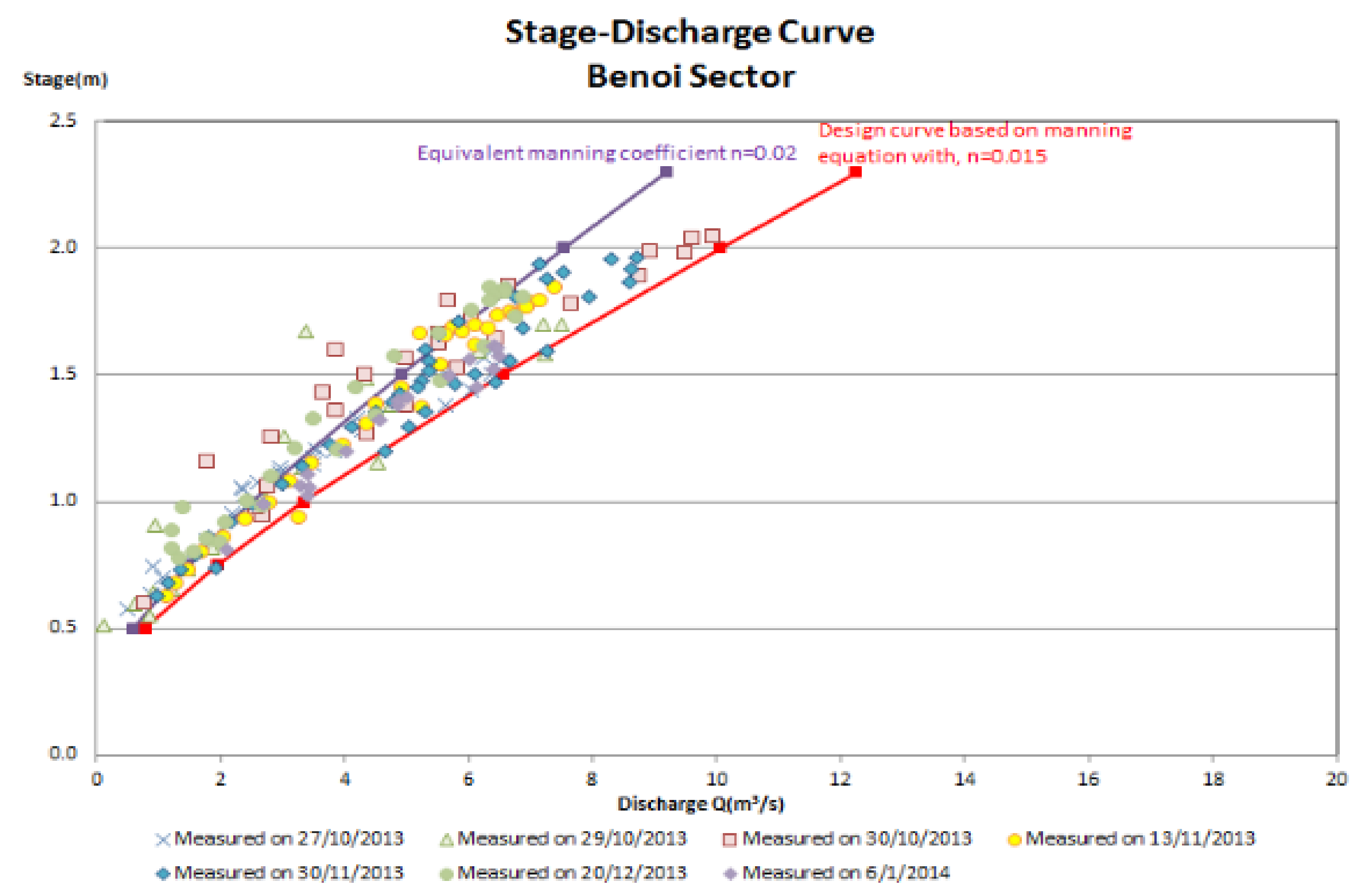- Development of a radar **rainfall nowcasting model** for a lead time of 1 hour
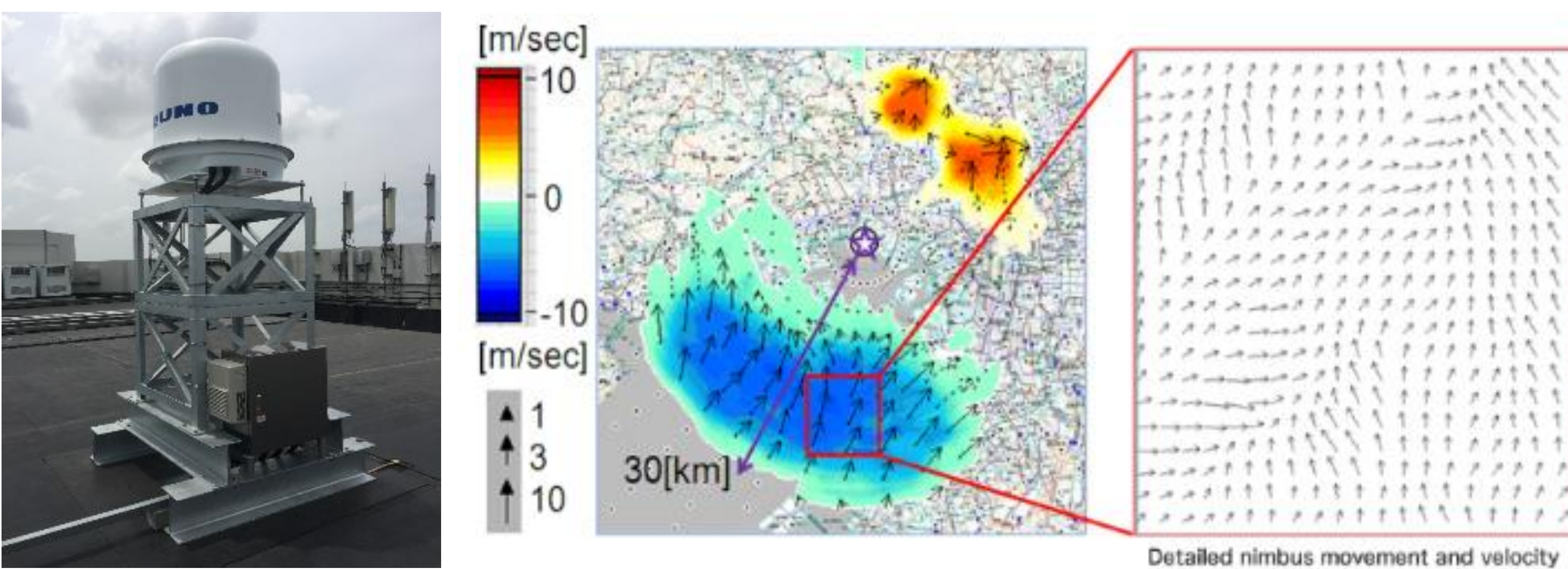
(3) Smart Drainage Grid System (SDG)
- A hydrometric network comprising some **270 water level sensors** and **90 flow gauges** have been set up since 2009.
- Also, real-time **rainfall data, radar images, tidal data** are also available.
- Moving beyond simple alerts, we want to **utilize these data** in **an integrated manner** to generate **engineering insights beyond rudimentary monitoring.**

Stage-Discharge Curve Benoi Sector

Based on flow measurement installed at Benoi Sector outside Keppel Logistic

• One of the Studies in SDG:-
- In drainage design, Manning's n for reinforced concrete lies typically between 0.013 and 0.015.
- Using years of collected data and by plotting the stage-discharge curve, the equivalent Manning's n is found to be more than 0.015.
- Attributed by contractor's poor workmanship and even accumulation of siltation.

- A **paradigm shift** as to how we design, operate and maintain our drainage system.
- Moving forward, SDG wants to look into the application of data driven models to **identify anomalies**, **set operational thresholds** and **verify planning parameters** so we make learned decisions over the functionality of the drainage system.