



# Seminar og PhD forsvar

Fredag den 20. december 2013 afholdes seminar i urban hydrologi med særlig vægt på nedbørsestimering og vejradar teknologi. Alle med interesse inden for området er velkommen til at deltage. Af hensyn til receptionen bedes du indikere din deltagelse senest d. 18. december via mail til [jen@civil.aau.dk](mailto:jen@civil.aau.dk)

Sted: Lokale F-108, Aalborg Universitet Sohngaardsholmsvej 57, Aalborg

## Dagens program:

9:30 – 9:40	Velkomst Lektor Michael R. Rasmussen
9:40 – 10:40	Application-driven requirements on radar data - a subjective view Director Dr. Thomas Einfalt, Hydro & Meteo GmbH & Co. KG, Lübeck, Germany
10:40 – 11:00	Kaffe pause
11:00 – 12:00	Climate variability and change in rainfall extremes, and its impacts on urban drainage Professor Patrick Willems, Hydraulics Laboratory, Katholieke Universiteit Leuven, Belgium
12:00 – 13:00	Frokost pause – for egen regning
13:00 – 13:45	PhD Forelæsning Combining C- and X-band Weather Radars for Improving Precipitation Estimates over Urban Areas Jesper Ellerbæk Nielsen
13:45 – 14:00	Kaffe pause
14:00 – 16:00	PhD Forsvar Jesper Ellerbæk Nielsen
16:00	Reception med let buffet i kaffestuen (C-119)



# Combining C- and X-band Weather Radars for Improving Precipitation Estimates over Urban Areas

## PhD lecture and defence by Jesper Ellerbæk Nielsen

Department of Civil Engineering, Aalborg University, Aalborg, Denmark

December 20<sup>th</sup> 2013, at 13.00, room F-108

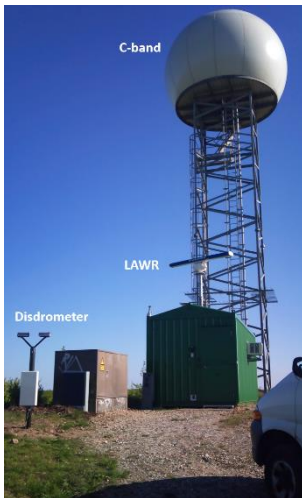
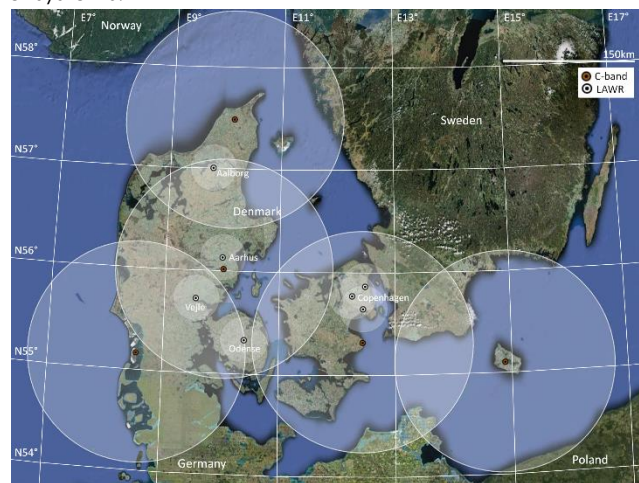
Spatial and temporal distributed weather radar measurements of precipitation facilitate numerous applications within urban drainage, which cannot be achieved by traditional point measurements from rain gauges. Knowledge of how the precipitation is distributed between the rain gauges is highly valuable for retrospective analysis of the urban drainage system. Moreover, the knowledge of how the precipitation propagates temporally and spatially in real-time is a valuable necessity for intelligent real time control of sewer and wastewater systems.

Denmark has a unique weather radar coverage. Five meteorological C- band radars with long range cover the whole country and in addition, most larger cities are covered with high resolution X-band LAWR radars. The C-band radars serves mainly meteorological purposes, whereas the LAWR radars are dedicated urban drainage applications.

Preferring one radar network over the other for will result in a trade off between the strengths and weaknesses of the two systems. The perfect weather radar for urban hydrology is a

radar with long range and high resolution in both time and space. In addition, it is also a radar which is located close to the catchment of interest, with optimal view for the rainfall measurement. An obvious solution is to use the two radar types together, combining the individual strengths. If it is possible to extend the range of the LAWR system by mean of the meteorological C-band radar and at the same time utilise the higher resolution of the LAWR system over the catchment. This will result in a radar based precipitation product with the optimal value in urban hydrology.

Motivated by this potential, the objective of the PhD project was to improve precipitation measurement for urban drainage applications by combining weather radar measurements from meteorological C-band radars and LAWRs. The focus of the research was to investigate the differences and similarities between the two radar systems, in order to gain knowledge about how they are individually functioning and to analyse both the potentials and the challenges of combining the two radar systems.



The PhD study is part of the Storm and Wastewater Informatics project (SWI) partly financed by the Danish Agency for Science, Technology, and Innovation. [www.swi.env.dtu.dk](http://www.swi.env.dtu.dk)

### Assessment committee:

Professor Jes Vollertsen (Chairman), Department of Civil Engineering, Aalborg University, Denmark

Director Thomas Einfalt, Hydro & Meteo GmbH & Co. KG, Lübeck, Germany

Professor Patrick Willems, Hydraulics Laboratory, Katholieke Universiteit Leuven, Belgium

### Moderator:

Associate Professor Thomas Ruby Bentzen, Department of Civil Engineering, Aalborg University, Denmark

### PhD supervisor:

Associate Professor Michael R. Rasmussen, Department of Civil Engineering, Aalborg University, Denmark

Reception in the room C-119 after the public defence at 16:00