A Prototype High Resolution 3D Radar Reflectivity Mosaic for SESAR

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The Single European Skies Air Traffic Management Research (SESAR) Programme has been tasked with the delivery of a next generation Air Traffic Management (ATM) system, with EU-wide deployment due at the end of this decade. As part of the MET Information Systems Development Work Package (WP11.2), a collaborative effort between Met Office and Météo France has been undertaken to provide a suite of high resolution (1km², 5min) 3D radar reflectivity products to meet the requirements of SESAR.

Recently, work has been completed on a prototype which is able to ingest PPI radar reflectivity scans from the operational radar networks of Météo France and Met Office; it provides a 3D radar reflectivity mosaic and some radar-based indicators of convective storm severity, including the 18 and 45 dBZ echo top (TOP18/45), Vertically Integrated Liquid (VIL) and Probability of Hail (POH). The coverage of the prototype extends over two Terminal Manoeuvring Areas (400km x 400km horizontal, 12km vertical at 24 levels) centred on Charles de Gaulle Airport in Paris and Heathrow Airport in London.

In this paper, the methods that have been developed to extract the 3D products are reviewed. Two main candidates are considered: an adapted version of the French MUSCAT method and a new method which allows more flexibility to select the best data from overlapping radars. Additionally, it is suggested how the parameters of these retrieval methods can be tuned to give the best performance. Finally, examples of the retrieved output are provided for a severe convective event on 28th June 2012 in the UK.

A verification and validation study of the prototype products is presented by al-Sakka et al. (2014).