Validation of Radar propagation model: the PREDEM experiment

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In order to supply the French Navy with a new radar performance prediction tool, the DGA/SPN has selected CS SI and DCN to achieve the project until the end of 2006. Based upon a former study of the different existing softwares, a solution including the US hybrid Parabolic Equation code APM and the French Refractivity model PIRAM has been proposed to and accepted by SPN. This future software, called PREDEM, will be able to simulate various tactical situations, implying the determination of radar performances. Concerning the refractivity profiles or the rough surface effects, some improvements of the propagation models have been studied (Claverie et al., BACIMO 2005 Conf.).

A specific measurement campaign, associated with the PREDEM project, was conducted at the end of June 2005. It took place on the French Mediterranean coast. The experimental setup is summarized as follows:

Radioelectrical measurements:

- One VHF link about 50 km long,
- 2 radars (S band and C band) following different targets :
  - A reflector horn mounted on a boat (height 5 m above the sea level and maximum distance of 40 km from the radars),
  - Airborne Lüneberg lens with different flight altitudes (maximum distance of 100km from the radars, in a direction parallel to the boat trajectory).

Meteorological measurements:

- 1 meteorological buoy measuring the bulk parameters,
- 1oceanographic buoy measuring the wave heights and the wave periods,
- 1 instrumented meteorological aircraft measuring the horizontal refractivity profiles,
- 3 sites for radiosondes launching (km 0, km 40, km 80 along the aircrafts trajectory)

The PREDEM campaign consisted in 3 complete sets of measurements, each one during a half-day. We were lucky enough to encounter various atmospheric stability conditions, various wind velocities and consequently various sea states. The complete analysis of the different measurements and the comparison with the model results will be presented during the conference.