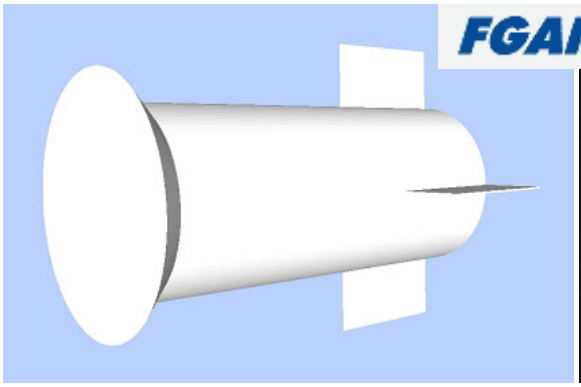
March 2007

OKTAL SYNTHETIC ENVIRONMENT & FGAN-FHR
Metallic target RCS measurement / simulation at 35 GHz

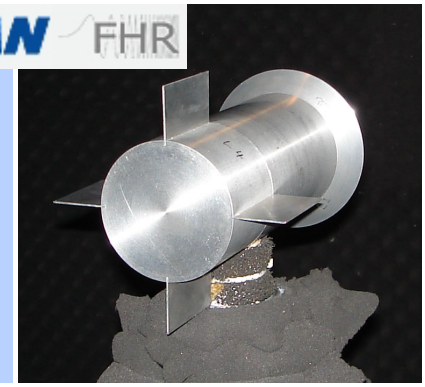
The OKTAL-SE company in France and the FGAN-FHR research institute in Germany are proud to present the results of a common case study on high frequency RCS computation. A metallic object made of a cylinder and 4 winglets was measured at 35 GHz in the measurement facility of FGAN-FHR. The 3D virtual mockup of the same object (made of 20.000 polygons) was used to compute the RCS under the same conditions at 35 GHz with the SE-RAY-EM software developed by OKTAL-SE in partnership with ONERA in France.

Simulation setup:

Distance:	**5 m**
Frequency:	**35 GHz**
Polarization:	**Phi (H)**
Angle steps:	**0,2 deg**
Rotation:	**360 deg**
EM formulations:	**nGO – PO**
EM option:	**PTD**
CPU Time / point:	**2 sec**



3D virtual mockup, with edges definition at both ends and on the winglets.



Real object placed in the measurement setup.

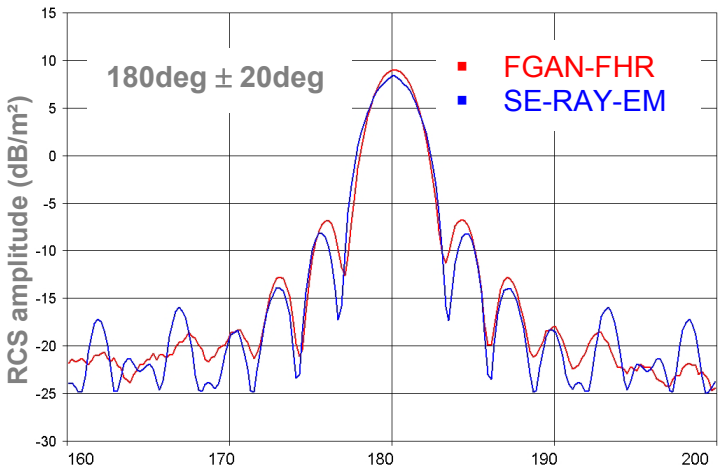
Results:

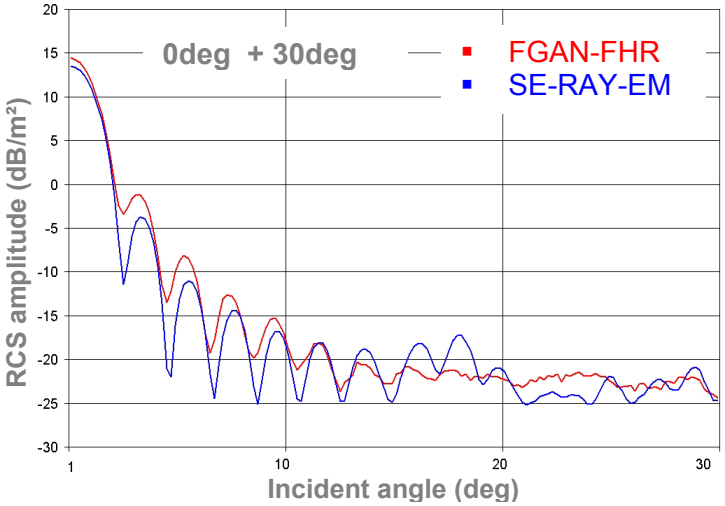
The mean values over the frequency band (34 – 36 GHz) of measurement are presented in red. The simulation results are presented in blue after addition of a continuous background noise of –25 dB/m² to the row signal (radar sensor sensitivity).

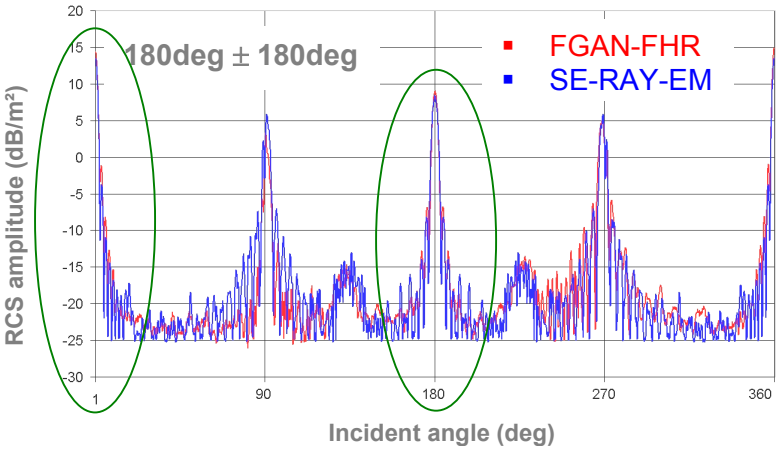
The overall shapes of the two curves are very close to each others as one can see from the full range curve, “180 deg ± 180 deg” graph.

The two main maximums at 0deg and 180deg are very well reproduced with an error less than 2 dB/m². The details can be seen on the “0 deg + 30 deg” graph and “180 deg ± 180 deg” graph respectively.

It has been noticed that the introduction of the edge diffraction (PTD) in the simulation, improves the low level amplitudes and does not affect the peak values.







OKTAL SYNTHETIC ENVIRONMENT
2 impasse Boudeville, 31100 Toulouse, France
Phone : +33 (0)5 62 11 50 14, Web : www.oktal-se.com