ELECTRICAL, ELECTRONICS AND COMMUNICATIONS ENGINEERING

DM 630/Thales Alenia Space - Low frequencies noise analysis for scientific missions

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] THALES ALENIA SPACE ITALIA S.P.A. [P.iva/CF:00991340969]
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Context of the research activity	The analysis and control of low and very low frequency magnetic and electric signals is becoming increasingly relevant in various technological and even healthcare sectors. Current regulations, covering the commercial and industrial fields, only partially cover the frequency ranges proposed in this study. The industry and the academic sector, through the proposed study, can apply to be leaders in this technological field which is expected to present huge opportunities developments in the aerospace, automotive and healthcare markets. Progetto finanziato dal PNRR a valere sul DM 630/2024 - CUP E14D24002420004
Objectives	This study aims at developing the analysis and control of low and very low frequency magnetic and electric signals (milli-hertz region also). This topic is becoming increasingly relevant in various technological sectors as automotive and space and even in healthcare sectors. Current regulations, covering the commercial and industrial fields, only partially cover the low frequency ranges. The industry and the academic sector, through the proposed study, can apply to be leaders in this technological field which is expected to present huge opportunities developments in the aerospace, automotive and healthcare markets. Most of the future scientific interplanetary and observation mission, in facts, will implement detector and instruments sensitive to low frequency magnetic and electric fields. The goal will be the development of new simulation methods and testing to cope with low frequency and high frequency issues induced by future scientific space mission. In parallel, the research activity will cover simulations relevant to Telecommunication and EMC at higher frequencies (X-Band and over), with

	a special focus on RF link degradation. In the last few years, the return of the human to the moon became a hot topic, with particular interest on the South Pole and the dark side. Landing in those sites introduces new challenges. The research products will be focus on develop simulation models applicable to the above mentioned scenarios. These research activities will be developed in cooperation with Thales Alenia Space Italia (Torino). Thales will host the PhD candidate for six to eighteen months. To achieve the research activities, Thales will provide to the PhD candidate scientific instruments and software, including scientific laboratories, libraries and databases. A company supervisor will be defined for the selected PhD candidate. Thales will ensure access to the PhD candidate and the academic supervisor to the laboratories and instruments necessary to implement this research program.

Skills and competencies for the development of the activity	Electromagnetic field theory, EMC, CAD software (HFSS ANSYS, Q3D, AWR, CST Studio Suite); Programming languages (C).