

Day 3 (Thursday, 27 October) 11:15 - 12:45, Hall B

Organized Session 1 Electromagnetic Analysis on Aeronautics

O1-1

The Difference between Conventional and Doppler VOR – Some Missing Issues

Robert Geise (Leipzig University of Applied Science)

Multipath propagation for VHF omnidirectional radio range systems, i. e. the conventional and the Doppler VOR can lead to bearing errors, which are widely discussed in the community, especially in the context of wind turbines. According to numerous publications, the DVOR is supposed to be less sensitive to multipath propagation compared to the conventional VOR. This short contribution addresses some missing aspects regarding the assessment of possible bearing errors, that should be considered for a complete analysis of multipath propagation and associated bearing errors.

O1-2

Large-scale Numerical Evaluation of Cabin-to-Exterior Propagation Characteristics for Sub-6GHz/5G Using Small Aircraft Model

Takashi Hikage, Manabu Omiya (Hokkaido University)

To estimate precise radio wave propagation characteristics for designing a newly developed wireless link system inside and outside aircraft, we investigate the applicability of large-scale FDTD analysis. Interference pass loss characteristics from the cabin to an external altimeter's vicinity are numerically predicted using a small aircraft model in the 5G sub-6 GHz frequency bands. Applicability of path loss models, namely alpha beta gamma (ABG) or floating intercept (FI) models with their parameters derived from simulation data, are discussed.

O1-3

Hybrid Electromagnetic Analysis Methods Suitable for Airport Surfaces in the VHF Band

Atsushi Kezuka (Electronic Navigation Research Institute, MPAT), Ryosuke Suga, Megumi Watanabe, Osamu Hashimoto (Aoyama Gakuin University)

The Ground-Based Augmentation System (GBAS) is a navigation system to support precision approaches and landings using GNSS, which is being implemented worldwide. A VHF Data Broadcast (VDB) antenna of GBAS is installed on the ground and broadcasts augmentation information to an aircraft. The VDB coverage should be constructed, including throughout runway surfaces to support the auto-landing. The VDB antenna installation positioning should desirably be determined by electromagnetic simulations, because experimental means are so time-consuming. However, precise full-wave analyses of airport surfaces, including buildings, require considerable computational memory and time. Accordingly, the authors have suggested various hybrid methods using the ray-tracing, Aperture Field Integral Method (AFIM) and full-wave analyses to calculate the electromagnetic fields on the airport surfaces, including buildings and land shapes. This paper shows three hybrid methods suggested by authors.