BRAMS — the Belgian RAdio Meteor Stations

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BRAMS is a new radio observing facility developed by the Belgian Institute for Space Aeronomy (BISA) to detect and characterize meteors using forward scattering. It consists of a dedicated beacon located in the south-east of Belgium and in 25 identical receiving stations spread over the Belgian territory. The beacon transmits a pure sinusoidal wave at a frequency of 49.97 MHz with a power of 150 watts. A complete description of the BRAMS network and the data produced will be provided.

The main scientific goals of the project are to compute fluxes, retrieve trajectories of individual objects, and determine physical parameters (speed, ionization, mass) for some of the observed meteor echoes. All these goals require a good knowledge of the radiation patterns of the transmitting and receiving antennas. Simulations have been made and will be validated with in-situ measurements using a UAV/drone equipped with a transmitter flying in the far-field region. The results will be provided.

Each receiving station generates around 1 GB of data per day with typical numbers of sporadic meteor echoes of 1500–2000. An automatic detection method of these meteor echoes is therefore mandatory but is complicated by spurious echoes mostly due to airplanes. The latest developments of this automatic detection method will be presented and compared to manual counts for validation. Strong and weak points of the method will be presented as well as a possible alternative method using neural networks.