



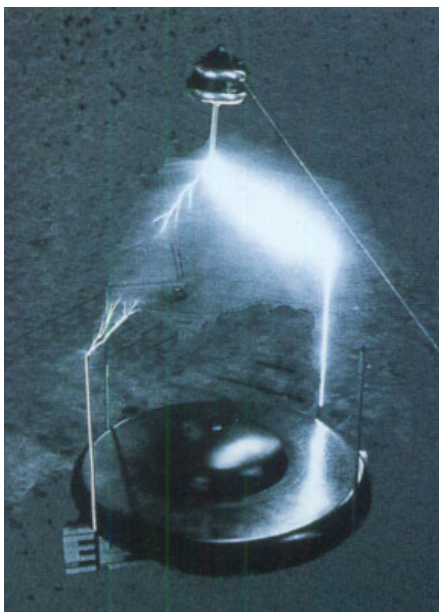
« TRANSRAD » A lightning rod dedicated to radar antennas

Near an antenna (radar or radio frequencies ...), set-up of a metallic lightning protection system may create troubles due to its metallic frame which may disturb the field emitted or received by the antenna.

In most of the cases, this disturbance is negligible if the lightning protection systems is far enough from the antenna. It is not always the case for some radar antennas with narrow angle detection for which the sole presence of the down-conductor (which becomes even more obvious if the conductor is supported by a mast or a pole) brings enough disturbance to prevent the user to install lightning protection means.

To solve this problem a new lightning protection system has been developed which is "transparent" to electromagnetic waves called "TRANSRAD". It is made of a fiber glass rod on which is deposited a "sparkover" band (also called lightning protection band) which is a semiconductor substrate with some metallic elements.

This new lightning protection system has been tested in depth especially in the high voltage laboratory of CEAT (Centre d'Études Aéronautiques de Toulouse, testing lab depending from Government, making especially test for the aircraft industry namely in our case, high voltage impulse and the high energy lightning strike used by the aircraft industry – today named DGA TA).



The area protected by this system is the same than the one given by a metallic lightning rod and all the standard rules have to be observed (NF EN 62305-3).

Experience has shown that many impacts have been collected on these systems (a system of 4 rods is installed per antenna, one being a spare). In a 7 years large scale field experiment a single strike has been recorded on the antenna itself in spite of the rods, which has been attributed to a low magnitude current, in accordance with the electro-geometric model.

Regarding other applications, comparison of the RCS (radar cross section) of a TRANSRAD and a metallic mast has been performed. RCS is a measure of how detectable an object is by radar. This comparison of the RCS of the two types of mast is valid for a plane wave: the mast is in the far field with respect to the antenna. The RCS depends on the height of the mast: in this case the height intercepted by the beam coming out of the antenna (1.50m) was considered.

