TITLE: BOLT - The Balloon Originating Lightning Trigger
AUTHORS: Phillip M. Bitzer and Hugh J. Christian, University of Alabama in Huntsille
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A rocket fired toward a cloud is the typical method of intentionally triggering lightning. The rocket may have a trailing wire to direct the strike to a particular location, such as an instrumented site. The rocket induces a locally enhanced electric field with a maximum near its tip and moves with sufficient speed to escape any corona induced space charge cloud that shields the rocket from the ambient field. In this manner, the local electric field is greatly enhanced, and a leader is initiated that can propagate toward the cloud.

We introduce an alternate method to trigger lightning. This method uses a device named the Balloon Originating Lightning Trigger (BOLT). Nominally, BOLT (patent pending) is a spherical superpressure balloon that is tethered to the ground. The device can be instrumented, providing valuable in situ measurements at the point of initiation.

Typically, the geometrical enhancement of the electric field provided by a spherical balloon is too low to to produce corona, much less a leader. Even if the ambient field were large enough for the balloon to go into corona, the local space charge would effectively shield the balloon, thus inhibiting leader initiation.

To overcome this issue, the balloon houses a conducting rod that serves as an initiation point for a leader. This rod is housed inside the balloon and, upon remote command, is propelled out the top of the balloon. It moves at sufficient speed as to escape from any local space charge shielding. In this manner, the rod effectively serves as an equivalent initiation point as would a rocket or airplane. If lightning fails to trigger, the rod returns to the initial state and can be deployed again. An additional feature of BOLT is that the ambient electric field can be measured before, during and after each trigger. In this manner, the electric field strength required to sustain leader propagation can be studied.

We present initial results using BOLT. Further, practical applications and benefits of an instrument such as BOLT will be discussed.