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Acoustic payload on an aerostat detects and locates transient sources

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The US Army Research Laboratory (ARL) has conducted experiments using acoustic sensor arrays suspended below tethered aerostats to detect and localize transient signals from mortars, artillery, and small arms fire. The airborne acoustic sensor array calculates an azimuth and elevation to the originating transient, and immediately cues a collocated imager to capture the remaining activity at the site of the acoustic transient. This single array's vector solution defines a ground-intersect region or grid coordinate for threat reporting. Unattended ground sensor (UGS) systems can augment aerostat arrays by providing additional solution vectors from several ground-based acoustic arrays to perform a 3D triangulation on a source location. The aerostat array's advantage over ground systems is that it is not as affected by diffraction and reflection from man-made structures, trees, or terrain, and has direct line-of-sight to most events. Helicopter detection and tracking algorithms can also be implemented.