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Recording sonic booms with the Romanian infrasound arrays

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Two infrasound stations are currently in operation on the Romanian territory: IPLOR 4-element array of 0.6 km aperture, in the central part, and BURARI 6-element array of 0.7 km aperture, in the northern region.

Automatic processing of continuous data recorded by the two arrays has revealed many impulsive signals generated by repeating sources confined in certain directions, i.e., sonic booms induced by supersonic aircraft activity. The approximate origins of the infrasound found by cross bearing the detections of IPLOR and BURARI arrays are typically pointed to the military air bases located in Romania and across Europe and Near East region. In some cases, the observed azimuths need to be corrected for the deviating effects of zonal cross-winds as the direction of stratospheric winds changes seasonally.

The distances to the sources of sonic booms range from 140 km (Romania) to 2200 km (North Sea, Northern Norway, Germany, France, Ukraine-Russia border, Aegean Sea, Turkey etc.). The signal characteristics varies when time and spatial distance increase: from short-spiked to long-pulsed shape, from higher amplitudes (1 Pa) to lower ones (0.01 Pa). In case of short-range propagation, high frequencies (above 1 Hz) predominate, while for long-range propagation, the lower frequency drops below 1 Hz and higher frequency components are attenuated.