The Southern Argentina Agile Meteor Radar (SAAMER): A platform for comprehensive meteor observations and studies

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The Southern Argentina Agile Meteor Radar (SAAMER) is a new generation system deployed in Rio Grande, Tierra del Fuego, Argentina (~53^0 S) in May 2008. SAAMER transmits 10 times more power than regular meteor radars, and uses a newly developed transmitting array, which focuses power upward instead of the traditional single-antenna-all-sky configuration. The system is configured such that the TX array can also be utilized as a receiver. The new design greatly increases the sensitivity of the instrument enabling the detection of large number of particles at low zenith angles. The more concentrated transmitted power enables additional meteor studies besides those based on the detection of specular reflections, such as routine detections of head echoes and non-specular trails, previously only possible with High Power and Large Aperture radars. In August 2010, SAAMER was upgraded to a system able to determine meteoroid orbital parameters. This was achieved by adding two remote receiving stations approximately 10 km away from the main site at nearly perpendicular directions. The upgrade significantly expands the science that is achieved with this new radar enabling us to study the orbital properties of the interplanetary dust environment. Because of the unique geographical location, SAAMER also allows for additional inter-hemispheric comparisons with measurements from the Canadian Meteor Orbit Radar, which is geographically conjugate. Finally, SAAMER is ideal for the deployment of complementary instrumentation in both permanent and campaign modes. Results from various meteor investigations as well as radar/optical observation campaign will be presented in this paper.