

DSN Transient Observatory

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Detection of radio transients, in particular those transients with time scales of less than a second, provide a window into some of nature's most extreme conditions and are typically associated with the highest energy density events in the Universe.

There are now several dedicated transient search programs underway or in planning phase around the globe. One of the key challenges shared by many of these programs is the ability to distinguish astrophysical signals from terrestrial and manmade signals. The Deep Space Network (DSN) with its multitude of antennas spread across three complexes around the globe, offers a unique capability to search for such short-lived events. Additionally, downlink tracks of planetary orbiters offer an opportunity to search for planetary emissions, such as electrostatic discharges.

In this talk, we will describe our efforts to make use of the DSN antennas at the Goldstone Complex to search for radio transients including those associated with planetary emissions, with no impact to spacecraft downlink tracks. We will describe the system architecture, detection algorithms, and strategies for vetoing non-astrophysical events. We will also describe our future plans in terms of expansion of the program to other DSN complexes and will compare and contrast the DSN Transient Observatory with other transient survey programs underway.