

Title: **Tracking and Navigation of Future NASA Spacecraft with the Square Kilometer Array**

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Abstract: The international radio astronomy community is currently working on the design of an array of small radio antennas with a total collecting area of one square kilometer - more than a hundred times that of the largest existing (100-m) steerable antennas. An array of this size would provide obvious advantages for high data rate telemetry reception and for spacecraft navigation. Among these advantages are a two-orders-of-magnitude increase in sensitivity for telemetry downlink, flexible sub-arraying to track multiple spacecraft simultaneously, increased reliability through the use of large numbers of identical array elements, very accurate real-time angular spacecraft tracking, and a dramatic reduction in cost per unit area. NASA missions in many disciplines, including planetary science, would benefit from this increased ground-based tracking capability. The science return from planned missions could be increased, and opportunities for less expensive or completely new kinds of missions would be created.