

The Impact and Resolution of “Collision Bands” on Tracking Targets at Various Ranges

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Symmetric SLR and LLR systems that adopt a spinning disk to multiplex transmit and receive laser pulses need to address the problem of losing signal due to transmit and receive pulses being coincident at the spinning disk when targets are at certain “collision band” ranges. These collision bands occur with increasing frequency at larger target ranges and can interrupt tracking of distant targets (> 6,000 km) for significant periods.

A general solution to minimize the impact of collision bands based on disk frequency adjustment is presented. Depending on the design of the disk and system requirements, it is possible to eliminate the effect entirely or reduce the impact to a few narrow range bands by applying a relatively simple disk frequency control algorithm.

- Power upgrade
 - T/R disk with 2 transmit holes
 - Higher disk frequency
- Collision Band Analysis
- Proposed Frequency Shift Algorithm
 - LEO-Lunar target range
 - Use minimum information
 - Minimize frequency shifts