

## ***Interactive comment on “Radar observability of near-Earth objects using EISCAT 3D” by Daniel Kastinen et al.***

### **Anonymous Referee #1**

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The manuscript investigates the expected detectability of near-Earth objects using EISCAT 3D. The manuscript specifically studies the detectability of "new" NEOs, extrapolated from the fireball population, known NEOS that come within a lunar distance, and temporarily captured NEOs. The manuscript adequately discusses the methods to extrapolate the expected number of NEOs to be observed by EISCAT 3D. As such, the manuscript is of value to motivate studies that are currently outside of the primary object of EISCAT 3D. Further, the manuscript makes the case that EISCAT 3D will be able to not only detect, but also discovery NEOs. I suggest publication and provide some minor technical corrections below.

Line 173: Equations 2 and 3 are currently not numbered. Line 171: Note that equation 1 is missing the  $\cos(\theta)$  factor for the pole location, such that if you observe

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the object parallel to the pole, the bandwidth is near 0, but if you observe the object perpendicular to the pole the bandwidth is maximized. Line 205: For equation 6, is epsilon an alpha level / test statistic? I would caution using epsilon here as the variable since on line 192 it is also used for permittivity, as is typical in radar. Line 245: "transmitter bandwidth of  $\leq 5$  Hz; transmitter bandwidth of  $\leq 30$  Hz", whats the difference here? Line 246: This is the first mention of the operating frequency of the radar. I would suggest to mention this much earlier, potentially in the abstract. It would also be valuable in the introduction to compare this with the operating frequencies of Arecibo and Goldstone. Line 312: "for a radar for a radar" - repeat Line 332: "discovery was investigated" - should be "were" investigated

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