

Preliminary Baseline Design (v1) Sensitivity Modeling
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1 Introduction

This note describes the investigation of PBDR_v1 sensitivity modeling, including the impact of varying representative input parameters. We use bolo-calc as the calculation engine for these investigations.

The model starts with a prescription for the optical components of each telescope, including losses and temperatures of each component. These, along with a band specification and atmospheric emission profile specified by the site, elevation pointing, and precipitable water vapor (pwv), are used to calculate the optical loading on the detector.

That optical loading is used to set the target saturation power of the detectors in each band, for each telescope. Those, plus some additional input parameters, are used to calculate the per-detector NETs.

The inputs for each telescope are in the associated yaml files. In this iteration we are using square (flat) detector bandpasses, which are designed to approximate the centers and widths of those designed by Jeff McMahon for Act/SO.

2 Baseline Results

Insert tables of $P_{optical}$, P_{sat} , NEPs (photon, detector, and total) and NETs.

3 Parameter Variations

Varying a single input parameter at a time tells us how strongly it affects any outputs of interest. We are mostly interested in $P_{optical}$ and the NET. For each such study, we need to decide whether we are holding any other parameters constant; for example, when varying the T_c , we can either have it affect P_{sat} , or keep P_{sat} constant. The former is relevant if we are asking about how T_c impacts sensitivity for a detector that is already built, while the latter tells us how T_c impacts sensitivity if haven't built the detector yet and can design the leg lengths and/or cross-sections to keep P_{sat} constant.

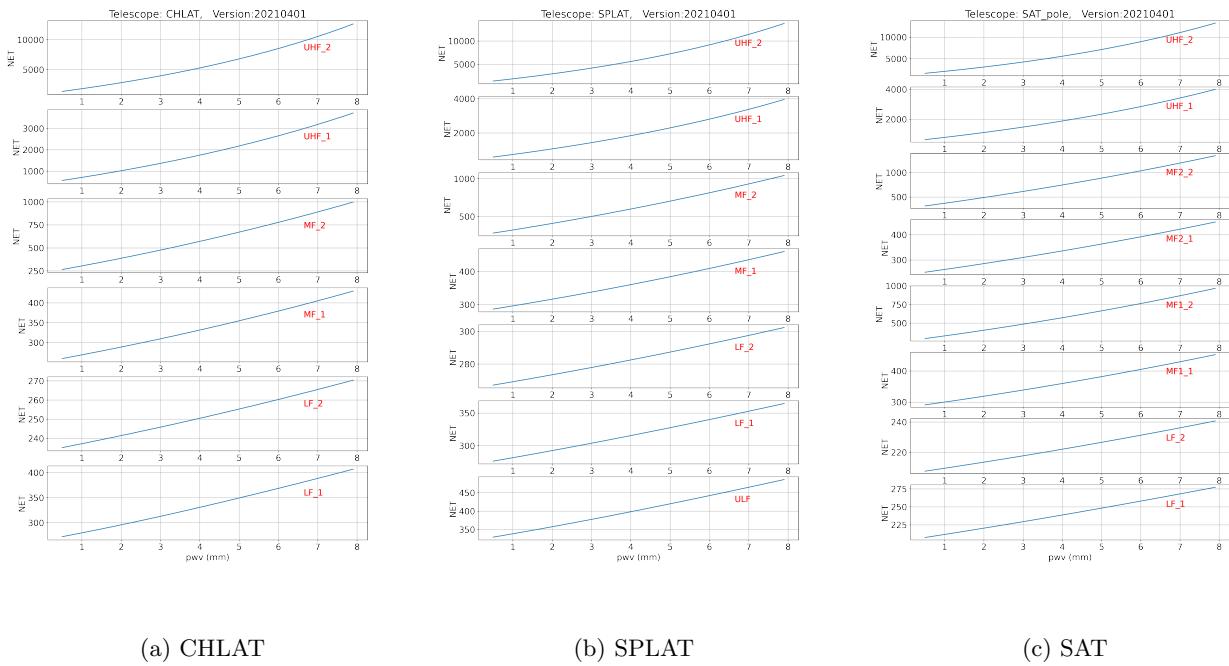


Figure 1: NET vs PWV

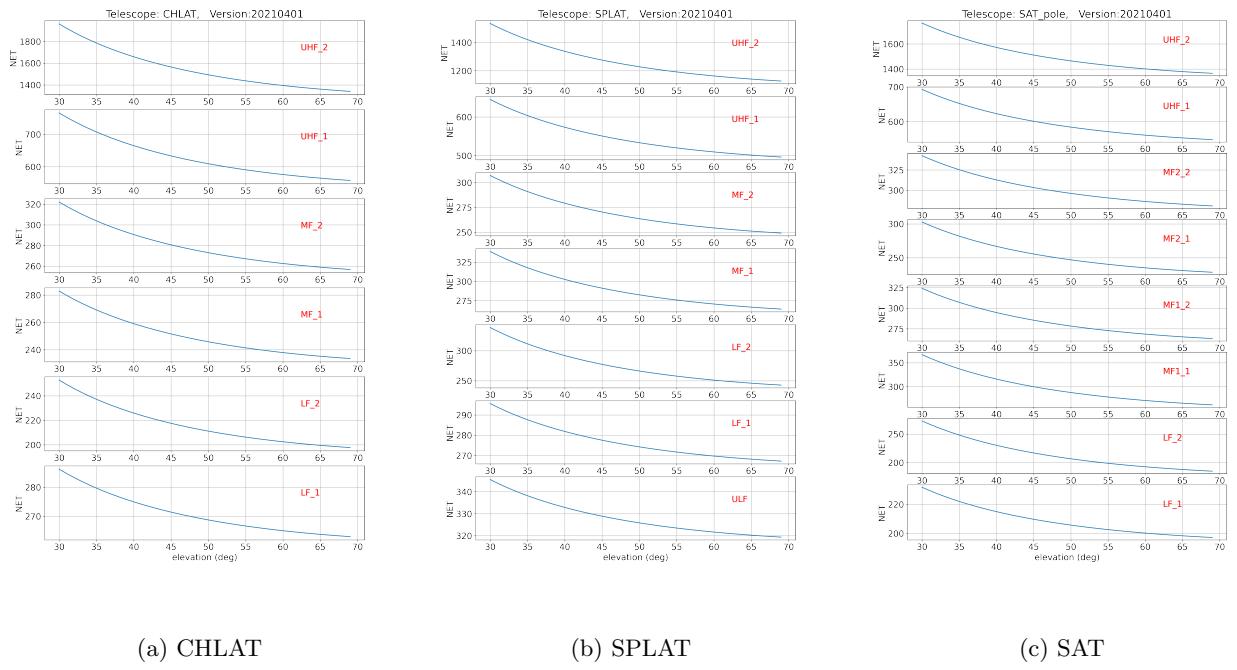


Figure 2: NET vs Elevation pointing

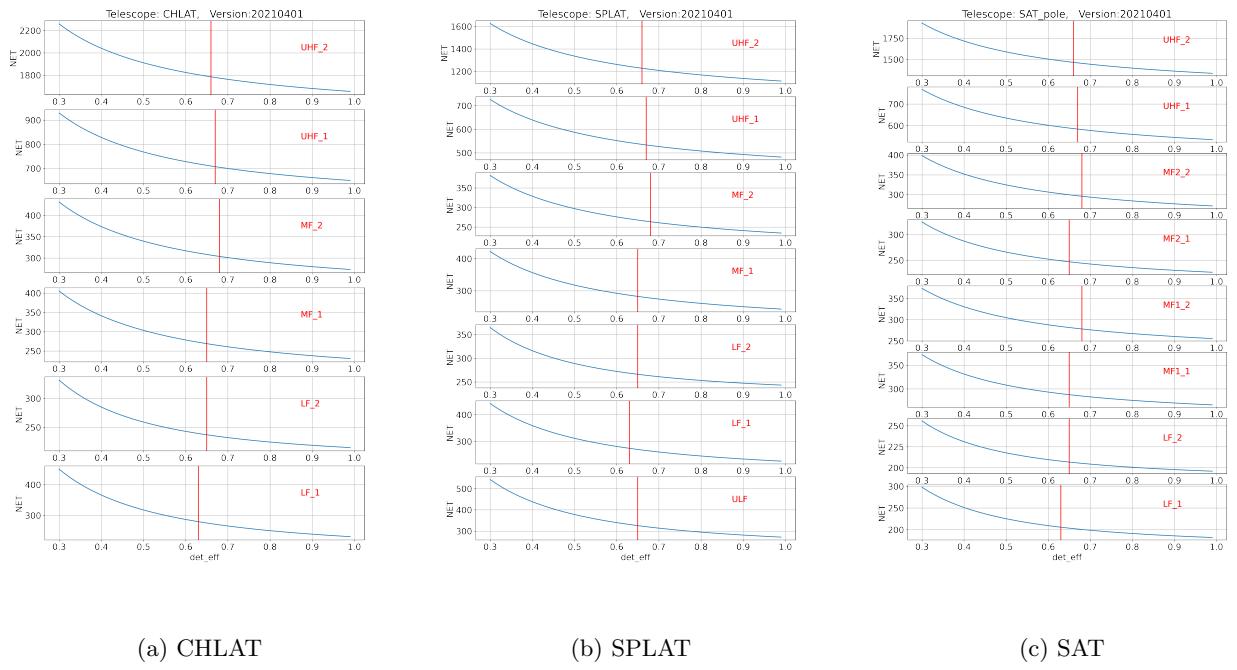


Figure 3: NET vs Detector Efficiency