

GBT Slew Rate

Some thoughts on the GBT slewing speed, as applied to position switched observations:

Note that if the switching time over a given distance is limited by ACCELERATION, then the switching time goes as the SQUARE ROOT of switched distance. Of course if the limitation is slewing SPEED, then the relationship time/distance is linear.

If acceleration limited, then 15 seconds for 5 degrees translates to 6.7 seconds for 1 degree, which I maintain is too slow for a design goal.

Consider also the following amusing, if biased and not totally meaningful, comparison:

A switching time of 15 seconds, with the usual 30 seconds on/ 30 seconds off integration time (set by instrumental and atmospheric instabilities) is a 50% loss of observing time, or a 22.4% loss of signal-to-noise ratio. If the switching time could be reduced from 15 to 10 seconds, then the 33.3% loss of observing time is only 15.5% loss of S/N. i.e. going from 15 seconds to 10 seconds switching time has improved the S/N by a little over 6%. In terms of dish diameter, 6% of S/N is equivalent to a dish 3% larger. If cost goes as the diameter to the 2.6 power, this is equivalent to 8% of the antenna cost. Taking the antenna cost as 43 M\$, the saving is 3.4 M\$.

i.e. IT IS WORTH SPENDING AS MUCH AS 3 M\$ TO REDUCE THE SWITCHING TIME FROM 15 SECONDS TO 10 SECONDS !

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