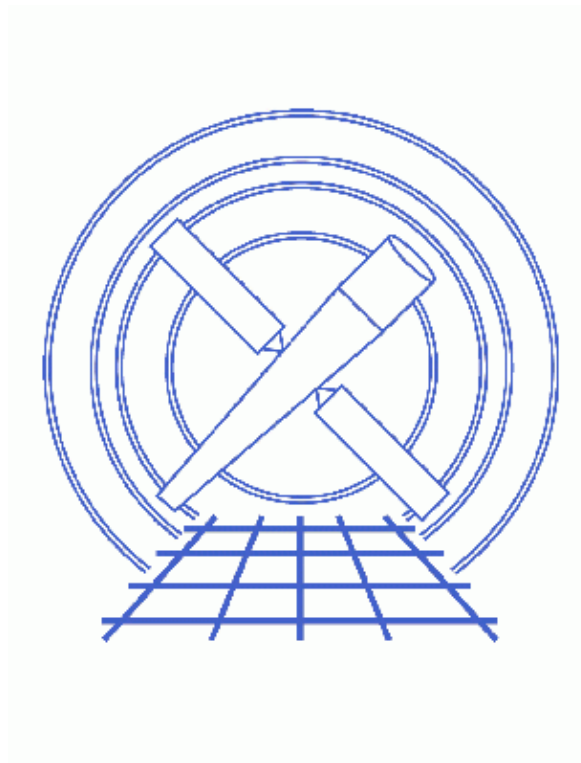


Slew Tax and Constrained Observations for Grids



POG Threads

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Slew Tax and Constrained Observations for Grids

Proposal Threads for

Grid (or Raster) Basics

A grid (or raster) consists of several contiguous, or nearly contiguous, observations. The term "grid" or "raster" is slightly misleading in that

- 1. The region can be irregular
- 2. The pointings will not "line up" in a grid unless a roll or group constraint is applied (see the [Grids thread](#) for further discussion)

A "slew tax" of 1.5 ks is added to each observation at the Chandra peer review. This represents the the average slew, settle and set-up time required for an observation. Because some or all of the pointings in a grid can often be done consecutively, the average slew time is less than the nominal 1.5 ks and is calculated differently. To qualify for the reduced slew tax, the observations in a grid must satisfy the following conditions:

- 1. Maneuver from one observation to the next must be less than or equal to one degree
- 2. There can be no change in instrument configuration.
- 3. Individual exposure times must be less than 15 ks.

Programs which qualify for reduced slew tax also qualify for a reduced "time constrained count". Time constrained observations impact Chandra's observing efficiency (see the [FAQ for constrained observations](#)). Short, closely spaced observations which can be scheduled as a group have less of an impact on Chandra's efficiency than the same observations spread over the sky. Please note that grid programs are ***unconstrained unless the proposer specifically requests a constraint***.

In this thread, we show how to calculate the slew tax and time constrained constrained count for observations in a grid.

Slew Tax and Constrained Observations for Grids

The rules for calculating the slew tax and constrained observations for a grid are as follows:

- 1. Pointings will be assembled into one or more groups with a maximum of 30 ks per group, ***including slew tax***.
 - 2. The slew tax for the first observation in a group will be 1.5 ks. Subsequent observations in the same group are charged at a rate of 0.5 ks.
 - 3. The first observation in a group is assessed as ONE constrained observation. Subsequent observations in the same group are counted as 1/3 of a constrained observation.
-

Example

Consider a survey with 10 pointings each of 4 ks. The first six pointings can be assembled into a group with a total time (exposure plus slew) of 28 ks. The slew tax is 1.5 ks for the first observation plus 5x0.5 ks for subsequent observations in that group. The remaining 4 exposures form a group of 19ks (slew plus exposure), with a total slew of 1.5+3x0.5 ks. The total slew tax is therefore 7 ks.

The number of constrained observations is 1+5x0.333 for the first group and 1+3x0.333 for the second group, for a total count of 4.4. Note that this calculation assumes all the pointings are constrained. The default assumption is that grid observations are NOT constrained. The proposer must explicitly impose a constraint in the RPS forms for these observations to count as constrained.

The breakdown is as follows:

Group	No exp	Total Time	Group Tax	Group Exp	Group Const	Total Const
1	1	5.5	1.5	4.0	1.0	1.0
1	2	10.0	2.0	8.0	1.3	1.3
1	3	14.5	2.5	12.0	1.6	1.6
1	4	19.0	3.0	16.0	1.9	1.9
1	5	23.5	3.5	20.0	2.2	2.2
1	6	28.0	4.0	24.0	2.5	2.5
2	7	5.5	1.5	28.0	1.0	3.5
2	8	10.0	2.0	32.0	1.3	3.8
2	9	14.5	2.5	36.0	1.6	4.1
2	10	19.0	3.0	40.0	1.9	4.4

Number of pointings 10
 Expo per pointing 4
 Number of groups 2
 Total exposure 40
 Total slew tax 7
 Total Constrained Count 4.4;
 (assumes all targets constrained)
 Total exposure + tax 47

Look-Up Table for Slew Tax and Constrained Observations for Grids

Below is a look-up table giving slew tax and number of constrained observations for different values of the number of pointings and the exposure time per pointing. The number in parentheses is the number of constrained observations, assuming all observations in the grid are constrained. Proposers can use the look-up table, calculate the tax using the rules described above or submit a query to the [CXC Helpdesk](#).

<i>Exp Time in ks</i>	<i>No. of pointings (# of constrained observations)</i>						
	<i>3</i>	<i>5</i>	<i>10</i>	<i>20</i>	<i>30</i>	<i>40</i>	<i>50</i>
<i>1</i>	2.5 (1.67)	3.5 (2.33)	6.0 (4.00)	12.0 (8.00)	17.0 (11.34)	23.0 (15.34)	28.0 (18.67)
<i>2</i>							

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	2.5 (1.67)	3.5 (2.33)	6.0 (4.00)	12.0 (8.00)	18.0 (12.00)	24.0 (16.00)	30.0 (20.00)
3	2.5 (1.67)	3.5 (2.34)	7.0 (4.67)	13.0 (8.67)	19.0 (12.67)	25.0 (16.67)	32.09 (21.33)
4	2.5 (1.67)	3.5 (2.33)	7.0 (4.67)	14.0 (9.33)	20.0 (13.33)	27.0 (18.00)	34.0 (22.66)
5	2.5 (1.67)	3.5 (2.33)	7.0 (4.67)	14.0 (9.33)	21.0 (14.00)	28.0 (18.67)	35.0 (23.33)
6	2.5 (1.67)	4.5 (3.0)	8.0 (5.33)	15.0 (10.00)	23.0 (15.33)	30.0 (20.00)	38.0 (25.33)
7	2.5 (1.67)	4.5 (3.00)	9.0 (6.00)	17.0 (11.33)	25.0 (16.67)	34.0 (22.67)	42.0 (28.00)
8	2.5 (1.67)	4.5 (3.00)	9.0 (6.00)	17.0 (11.33)	25.0 (16.67)	34.0 (22.67)	42.0 (28.00)
9	2.5 (1.67)	4.5 (3.00)	9.0 (6.00)	17.0 (11.33)	25.0 (16.167)	34.0 (22.67)	42.0 (28.00)
10	3.5 (2.33)	5.5 (3.67)	10.0 (6.67)	20.0 (13.33)	30.0 (20.00)	40.0 (26.67)	50.0 (33.33)

History

10 Feb 2007 Initial Version

URL: <http://cxc.harvard.edu/pog/threads/slewtax/>

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