**DRAFT**

**Overview of Current GTDS Pass Dependent Biases**

**With Sample Use Cases and Batch Definition**

**Overview:**

GTDS can solve for pass dependent biases via the Station 5 card. This card can be set up to solve for any pass dependent bias as well as specifying an a priori bias value.

**Example – Use of Station 5 card, estimating Doppler bias on all passes:**

Cols. 15-17: # of bias passes to solve for

Station 5 card declaration:

/bbbbbbbb – for station name (cols. 1-8)

5 – col. 9 specifying pass dependent biases

0---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8----+

DCOPT

/WS1S 5 10 99

Cols. 10-11

= blank for obs. bias

=1 for transponder delay

Cols. 12-14: Obs. type, from Table A-2.

The trigger for GTDS to estimate biases is a blank in cols. 10-11, with a non-zero number of passes defined in cols. 12-14. This tells GTDS to solve for observation biases and to estimate them for as many passes as defined in cols. 12-14. Setting the passes higher than the number of passes allows GTDS to solve for all of the passes if that is what the user wants.

In this example above, in this DC run the pass dependent biases for the Doppler data type from the station WS1S (White Sands 18 m antenna) will be solved for. In this example, no defined a priori bias is set so it will start with the default value. GTDS will solve for as many biases as the user allows. Since this is a 3-digit field the maximum number of biases from this one site in an OD run is 999 though the practical limit is much lower due to orbit period and station view periods in one OD run.

**Example – Use of Station 5 card with a PASSTIME card, a priori Doppler bias, estimating biases on all passes, and applying a pass definition (other than GTDS internal estimate of pass duration):**

Cols. 15-17: # of bias passes to solve for

Station 5 card declaration:

/bbbbbbbb – for station name (cols. 1-8)

5 – col. 9 specifying pass dependent biases

0---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8----+

DCOPT

/WS1S 5 10 99 2.0

PASSTIME 0 1800.

A priori bias value

Cols. 10-11

= blank for obs. bias

==1 for transponder delay

User selectable pass time in seconds.

Cols. 12-14: Obs. type, from Table A-2.

Cols. 9-11 (PASSTIME):

= 0, pass-dependent biases

= 1, specified length from start of observation

In this example, a priori bias value of 2.0 cm/sec is used. A PASSTIME card is used to instruct GTDS to solve for pass dependent biases on every pass starting with the a priori value given. If this column were specified as a ‘1’ instead of a ‘0’, then the length of each pass as defined by the user could also be given. In this case the user would define a pass length as shown in cols. 18-38. In this example, the pass has been defined to be 1800 seconds long. It is a good idea to define a pass length for a typical pass on a mission to fit its orbit period and tracking profile. If it were a low Earth orbiter and received ground based tracking, a typical pass length would be no longer than 15 minutes. So choosing 15 minutes (converting to seconds) would be a good choice for a pass length. A satellite with a deep space orbit would have passes that could potentially be hours long. Here, it might be good to define several hours as a pass length.

**Definition of Passes in GTDS:**

GTDS defines passes based on many common parameters but each is tailored to data type:

* Tracking station
* Data type
* Measurement type
* Time differences between measurements
* Timespan of the batch
* No. of measurements in batch (C-Band is truncated at 498 observations/batch)
* Equipment mode depending on tracker type
* Data rate depending on tracker type
* Vehicle identification code depending on tracker type
* Object number depending on tracker type
* Range ambuigity depending on tracker type
* Multifunction receiver number depending on tracker type
* Frequency band (for some types)
* Carrier frequency ID (TDRSS)
* User bit rate (TDRSS)
* Multiple access TDRS ID (TDRSS)
* Forward link TDRS ID (TDRSS)
* Return link TDRS ID (TDRSS)
* Ground transponder ID (TDRSS)
* Doppler compensation (TDRSS)
* SGLT number (TDRSS)
* ID of Doppler and range extractor (TDRSS)
* Differenced Doppler (TDRSS)
* NORAD Object Number (NORAD)
* NORAD Data type (NORAD)
* NORAD Sensor number (NORAD)
* Frequency changes within batch, start new batch
* Local oscillator handling, bias and drift, USO and TCXO

**The measurement types still valid in GTDS:**

SRE

USB

NORAD

CBAND

TDRSS (TT&C, STGT, BRTS)

VHF

DSN

LASER

PCE (batched separately from others)

X, Y

**Appendix A2. GTDS User’s Guide Observation Type Indicators**









