
Updates on GRB and AGN Observing Strategies and Operating Modes

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- Brief review of burst and AGN strategies
- New issues: target occultation, other interruptions
- Sky coverage uniformity: all-sky survey uniformity requirements; impacts of pointed observations; tools.

Transients (Bursts)

The SWG has reviewed the observing strategy.

Summary of plan

During all-sky scanning operations, detection of a sufficiently significant burst will cause the observatory to interrupt the scanning operation autonomously and to remain pointed at the burst region during all non-occulted viewing time for a period of 5 hours (TBR). There are two cases:

- 1. The burst occurs within the LAT FOV.** If the burst is bright enough that an on-board analysis provides >90% certainty that a burst occurred within the LAT FOV, the observatory will slew to keep the burst direction within 30 degrees (TBR) of the LAT z axis during >80% of the entire non-occulted viewing period (neglecting SAA effects). Such events are estimated to occur approximately once per week.
- 2. The burst occurs outside the LAT FOV.** Only if the burst is exceptionally bright, the observatory will slew to bring the burst direction within 30 degrees (TBR) of the LAT z axis during >80% of the entire non-occulted viewing period (neglecting SAA effects). Such events are likely to occur a few times per year.

After six months, this strategy will be re-evaluated. In particular, the brightness criterion for case 2 and the stare time will be revisited, based on what has been learned about the late high-energy emission of bursts.

Transients (AGN)

The SWG has reviewed the observing strategy.

PLAN FOR THE FIRST YEAR

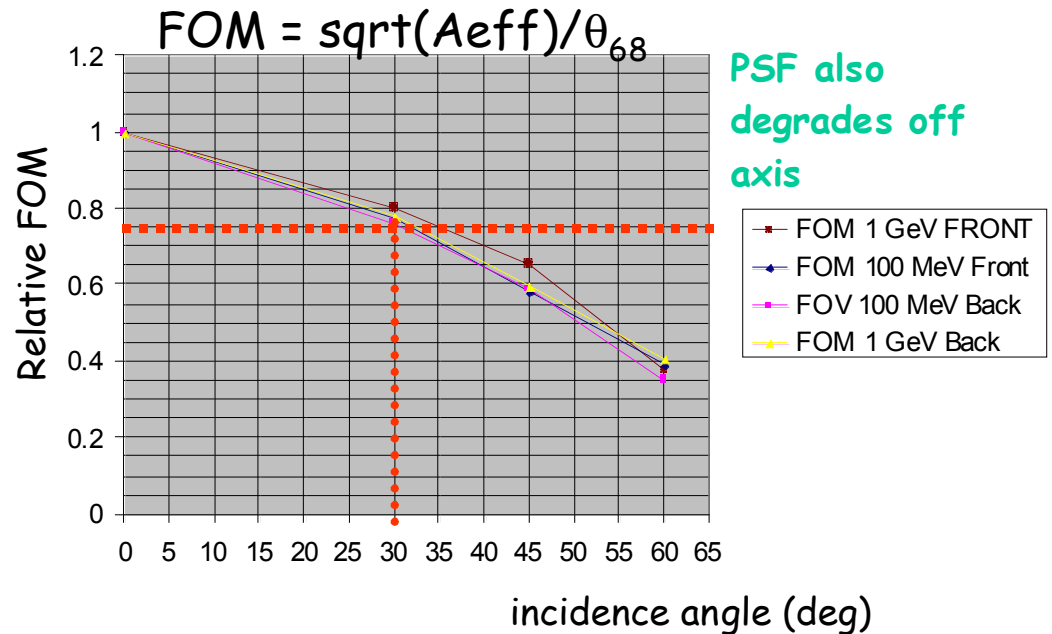
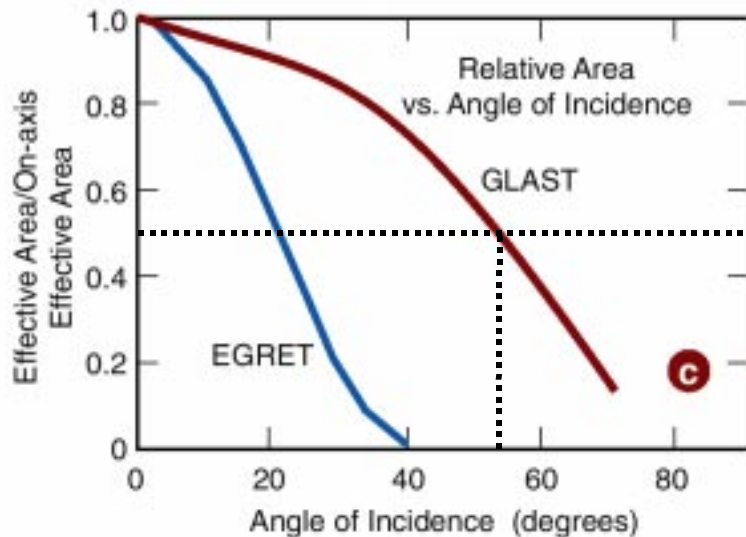
- Most AGN science can be best addressed by the all-sky scan.
- Unusually large flares will be treated as Targets of Opportunity, and studied in a coordinated multi-wavelength campaign.

Thus, autonomous repointing of the spacecraft is not required for AGN science during the first year.

This approach will be re-evaluated after the first year, as new knowledge about AGN might demand a new strategy.

What does “pointing” mean?

The LAT FOV is huge:





For the purposes of setting slew requirements define

- **LAT FOV**: anything within $\pm 55^\circ$ (0.96 radian) (TBR) of normal incidence is within the **LAT FOV**.
- “**Pointing**”: the target is within $\pm 30^\circ$ (0.52 radian) (TBR) of normal incidence. Individual targets may have a different criterion, depending on their characteristics.

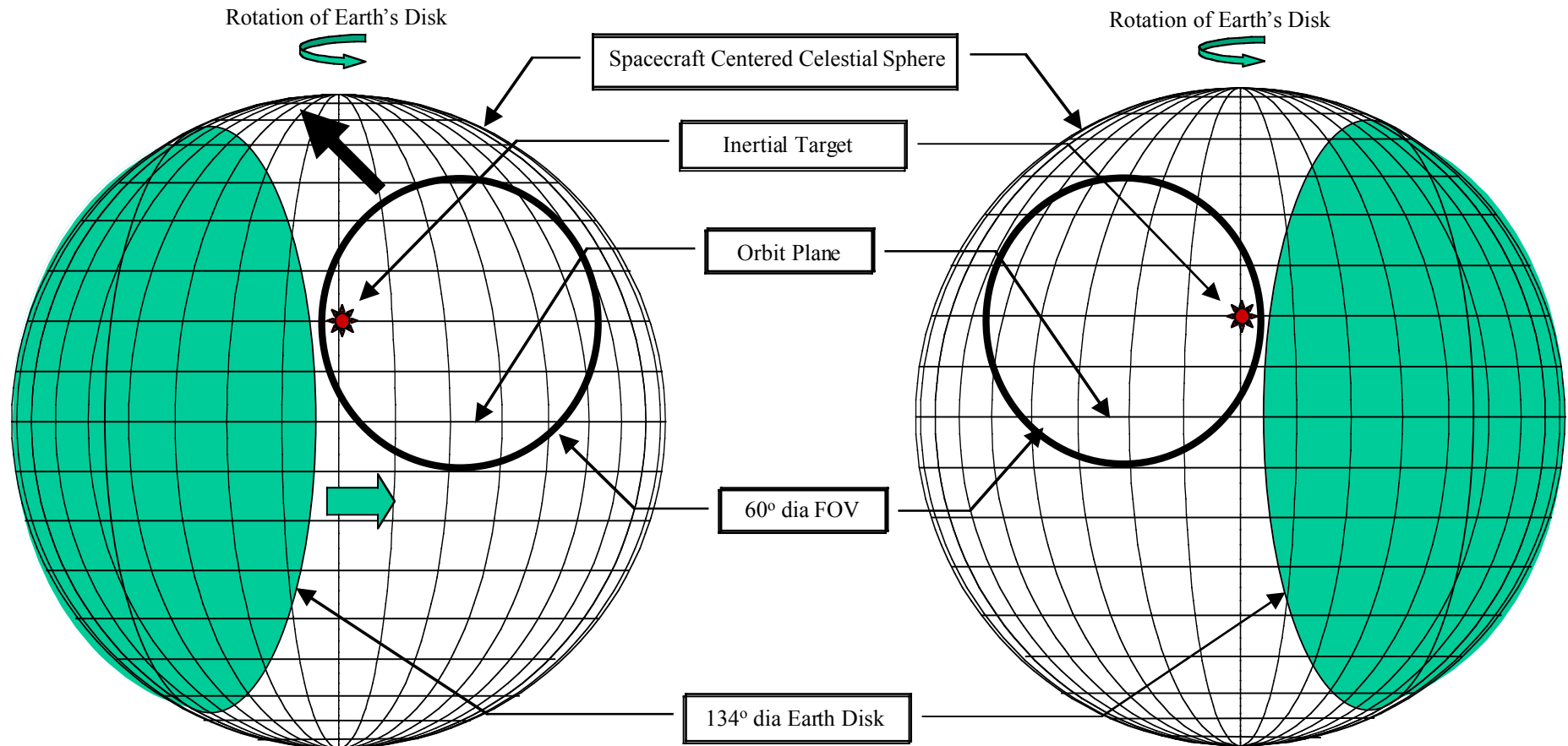
New Issue: Occultation of Targets

Targets will typically be occulted by the earth during some portion of the observation. What do we do? (Staring at the earth wastes observing time!) There are two cases:

- **Planned observations.** An efficient observing plan involving two sources (at least one visible at all times), or single source plus all-sky scan when the single source is occulted, can be planned out in advance. Commands are pre-loaded into the Guidance, Navigation and Control system. 
- **Unplanned observations** (i.e., autonomous slews to track GRBs). Options:
 - Drop into all-sky mode during occultation. **Looks complicated (every case is different).**
 - “Do what was being done before the alert”. **Not well defined, looks complicated.**
 - Eat the inefficiency and stare at the earth. **Not desirable.**
 - Simple roll North or South (depending on orbit position) until the earth’s horizon is not in the FOV, and observe the polar regions until the source is again visible. 



Earth Avoidance for Pointed Observations (B. Maichle)



Before Occultation

- Earth's disk is approaching from the left
- FOV is losing inertial target

After Occultation

- Earth's disk is receding to the right
- FOV is picking up inertial target

New Issue: Downlink Interruption

Should the data downlink be interruptible for extraordinary events, such as repointing to observe an extremely bright burst? [Note that during downlink, alerts will flow through the main data link, not TDRSS.] If so, can the repoint be commandable-only instead of autonomous?