



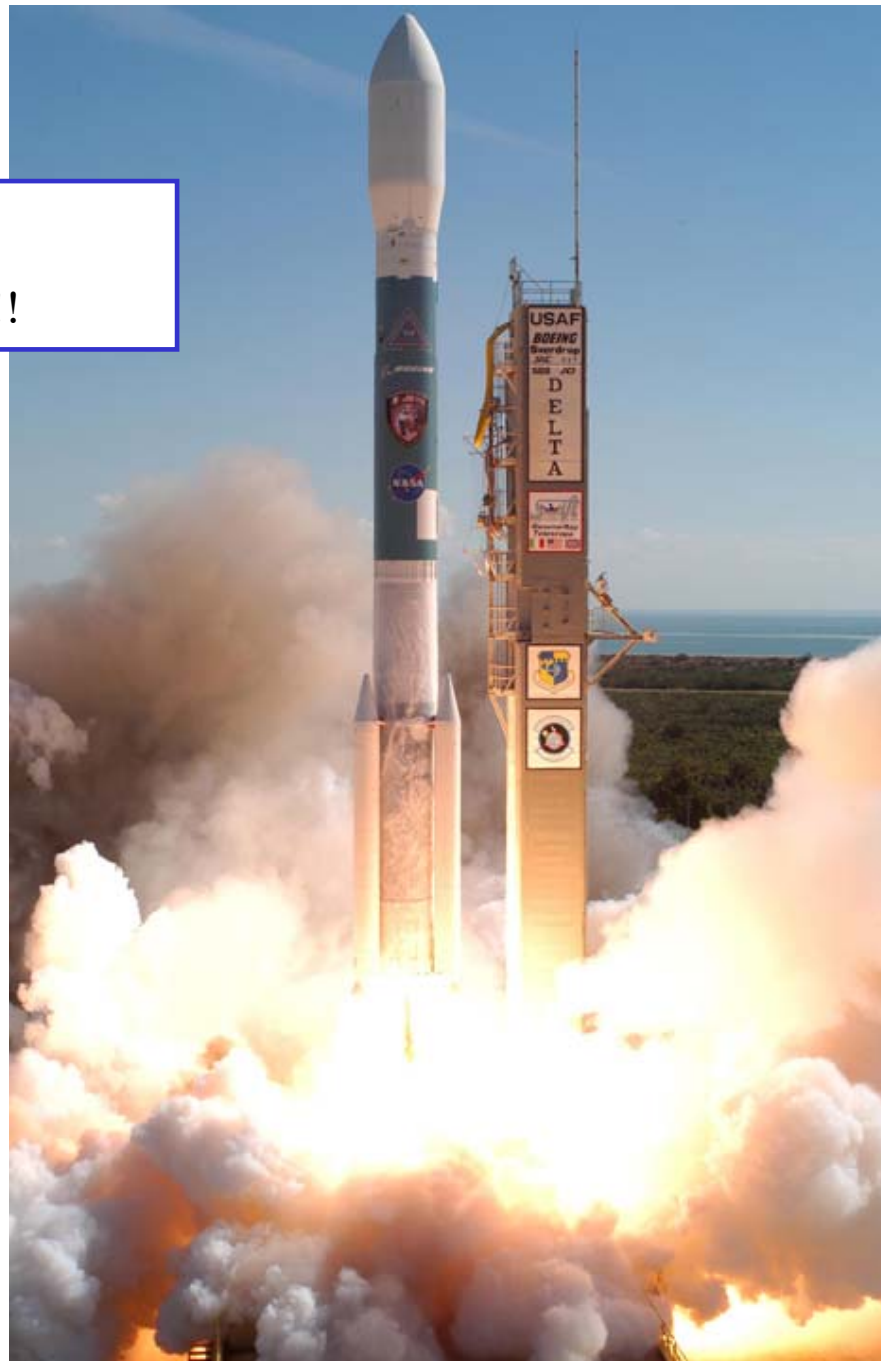
Gamma-Ray Burst Explorer: *Swift Operations Status and Future Plans*

John Nousek (Penn State University)



Swift Mission Conference - State College, PA – 18 Nov. 2009

Swift launch:
20 Nov 2004 !!



Swift Observatory Status



Swift continues to run smoothly after nearly five years!

- ❑ **Observatory Science Up-time: 97.5%**

- ❑ **Ground Station Status: Nominal**
 - Malindi 18454 passes since Launch, 98.8% successful
 - USN 1532 passes since Launch, 94.3% successful
 - TDRSS currently providing 99.5% success rate

- ❑ **Observatory Status: Nominal**
 - ACS: executed 152811 slews, >99% within 3' accuracy

- ❑ **Observatory Lifetime: Above prediction**

- ❑ **Flight Operations Team Response: Excellent**
 - After hours response once every four days

- ❑ **Science Operations Team Response: Excellent**
 - ❑ Respond to 1.6 ToO requests per day, conduct ~4-8 ToO obs. per day

Evolution of Swift Operations

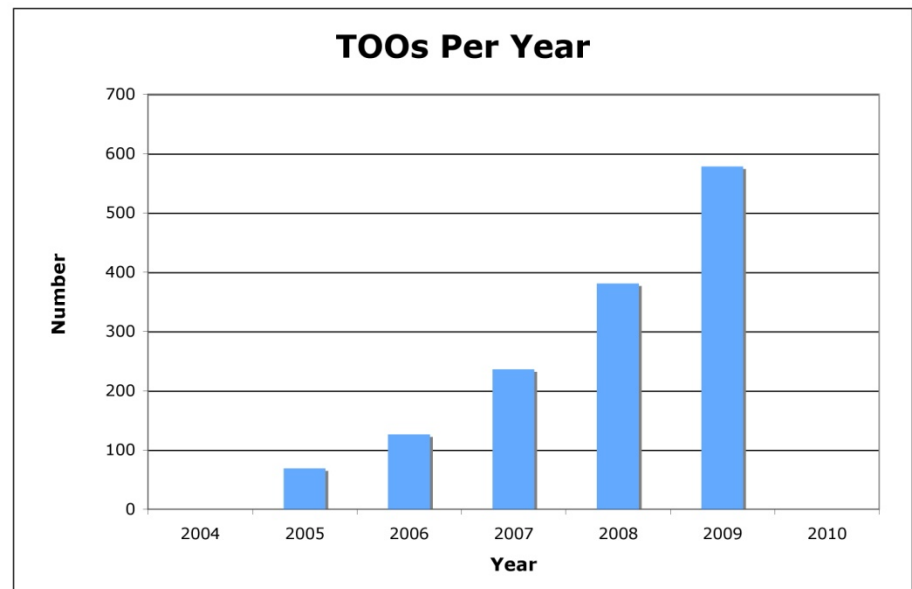


- Original prime mission: 2004-2006 – Swift the GRB Explorer
- Up to Nov. 2004 – Pre-launch:
 - Swift primarily a GRB detection and afterglow followup mission
 - Ground-breaking operations design allows immediate response to GRBs
 - Automated follow-up allows introduction of new GRB without new schedule
 - Targets of Opportunity limited to new non-Swift GRBs or rare events
 - Expected schedule re-plans only once / month; ToO once / week
 - Planning using TAKO software / five times a week
- Prime mission – 2005-2006:
 - Execution closely follows plans, except:
 - XRT TEC power supply fails, forcing operations to passively maintain XRT below -50 C
 - Automated target process is great success allowing highly flexible and rapid ToO response

Swift Operations Currently



- 1st mission extension: 2006-2008 – High-z GRBs and the GI Program
 - Swift reduces time on late afterglow followup and increases effort on finding high redshift GRBs
 - Swift introduces GI targets, followed by pressure for increased ToO and monitoring campaigns
 - TAKO planning software modified to incorporate XRT temperature control; other ancillary software improves ACS reliability
 - Improved ToO automation allows multiple ToOs in short period without new schedule (including nights and week-ends)
- Targets of Opportunity and Monitoring Campaigns occur every day
 - Typical load of 4-8 ToO or Monitoring observations every day



Swift Operations Ahead



- 2nd mission extension: 2009-2011 – Swift: the ToO Observatory
 - Swift executes ~70-75 separate pointings per day
 - Each pointing is planned, although significant labor by human science planner to have each pointing a different target
 - Under an initiative approved by 2008 Senior Review, MOC has conducted an Automation Initiative to streamline science planning
 - Elements include:
 - Target management database – MySQL database to automatically ingest target information from ToO requests, target lists from GI approved proposals and GRB information from GCN circulars
 - More highly automated TAKO software – will allow higher automation to XRT temperature control and ACS slew behavior
 - Goal is to allow faster, easier science planning, with capability to increase GI monitoring campaigns and rapid ToO response to large numbers of targets

Conclusions



- Swift has delivered a remarkably successful science mission to date, powered by an innovative operations concept that has continued to evolve as driven by scientific interest
- The latest changes will enable an even more responsive observatory, giving more GI monitoring and ToO responsiveness
- For Senior Review 2010, we can present yet another important increase in Swift capability – Can you suggest ways to make this ability into a ‘killer app’?