Swift Science Workshop

Neil Gehrels
NASA-GSFC

HEAD Meeting
September 7, 2004
Swift Observatory is complete!!

Launch from KSC in Oct. 2004
Flight-ready observatory with solar panels installed in cleanroom at KSC
Florida Becomes Hurricane Alley

Hurricane Charley Aug. 13

Hurricane Frances Sept. 4

Hurricane Ivan Sept. 11?
Launch Status Report as of Sept 7

- Swift observatory and GSE support equipment survived Frances with no damage
- Swift prep building A has a torn roof on one side, but the Swift part of the building including offices and clean rooms are safe
- KSC sustained damage to Vehicle Assembly Building (Shuttle program) and Cocoa Beach has significant flooding, breached sewer system and no power
- If Hurricane Ivan misses KSC, launch date is approximately October 16
- If Hurricane Ivan hits KSC, launch date is no earlier than October 22
Swift Instruments

**Instruments**

- **Burst Alert Telescope (BAT)**
  - New CdZnTe detectors
  - Most sensitive gamma-ray imager ever

- **X-Ray Telescope (XRT)**
  - Arcsecond GRB positions
  - CCD spectroscopy

- **UV/Optical Telescope (UVOT)**
  - Sub-arcsec imaging
  - Grism spectroscopy
  - 24\textsuperscript{th} mag sensitivity (1000 sec)
  - Finding chart for other observers

**Spacecraft**

- Autonomous re-pointing, 20 - 75 s
- Onboard and ground triggers
Swift Instruments
Swift Mission

Payload
- BAT
- XRT
- UVOT

Spacecraft
- Spectrum Astro
- Rapid Autonomous Slews

Malindi

Mission Operations Center (MOC)

Malindi

TDRSS

GCN

PSU

Science Center

HEASARC
- UK
- Italian Archives

User Community

GCN & Web

Launcher
- Delta 2320
- 600 km × 22° inclination
Mission Features

- Multiwavelength observations on all time scales
- >100 GRBs per year of all types
- BAT sensitivity 2 - 5 time better than BATSE
- Arcsec positions & counterparts for 100’s GRBs
- Rapid GRB notifications via GCN
- Identification of host galaxies offsets
- X-ray and UV/optical spectroscopy
- Orbital lifetime > 8 years
- Upload capability to slew to GRB and transients detected by other observatories
- All data public as soon as processed
Partner Follow-up Telescopes

- AEOS Telescope (Hawaii)
- ARAGO Telescope (Antarctica)
- ARC Telescope (New Mexico)
- Brera Observatory (Italy)
- Chandra
- ESO (La Silla, Paranal, VLT)
- ESA’s INTEGRAL mission
- Fast Alert MachinE (Italy)
- Faulkes Telescopes (Hawaii & Australia)
- Galileo National Telescope (La Palma)
- Hubble Space Telescope
- Hobby-Eberly Telescope (Texas)
- INTEGRAL
- Isaac Newton Telescopes (La Palma)
- KAIT (California)
- W. M. Keck Observatory (Hawaii)
- Large Binocular Telescope (Arizona)
- LIGO (Louisiana and Washington)
- Liverpool Telescope (La Palma)
- McDonald Observatory (Texas)
- Milagro Gamma-ray Obs. (New Mexico)
- NASA (IRTF, Hubble & Spitzer)
- NOAO (CTIO, KPNO)
- Nordic Optic Telescope (La Palma)
- Okayama Observatory (Japan)
- Rapid Eye Mount Telescope (Chile)
- ROTSE-II (New Mexico)
- SARA Observatory (Arizona)
- SIRTF
- South African Large Telescope
- Super-LOTIS (Arizona)
- TAOS Telescope (Taiwan)
- TAROT Telescope (France)
- Tenerife Observatory
- U.S. Naval Observatory (Arizona)
- VERITAS Observatory (Arizona)
- WASP Telescope (La Palma)
- WIYN Observatory (Arizona)
- Wyoming Infrared Observatory
- XMM Newton
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<tr>
<th>Time</th>
<th>Session Title</th>
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<td>08:00</td>
<td>Registration</td>
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<tr>
<td>08:30</td>
<td>Introduction</td>
<td>Gehrels</td>
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<td>08:45</td>
<td>Swift operations overview</td>
<td>Nousek</td>
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<td>09:05</td>
<td>BAT instrument operations</td>
<td>Barthelmy</td>
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<td>XRT instrument operations</td>
<td>Burrows</td>
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<td>09:35</td>
<td>UVOT instrument operations</td>
<td>Mason</td>
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<td>Ground system overview</td>
<td>Marshall</td>
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<td>Data access from HEASARC/SDC</td>
<td>Angelini</td>
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<td>Break</td>
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<td>BAT data analysis software</td>
<td>Markwardt</td>
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<td>XRT data analysis software</td>
<td>Tagliaferri</td>
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<td>UVOT data analysis software</td>
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<td>Data centers in the UK and Italy</td>
<td>Osborne</td>
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<td>Swift Science Center</td>
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<td>01:45</td>
<td>Swift in the context of GRB understanding</td>
<td>Meszaros</td>
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<td>02:15</td>
<td>Ability of Swift to detect &amp; locate GRBs</td>
<td>Fenimore</td>
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<td>02:35</td>
<td>Follow-up team interfaces to MOC</td>
<td>Hurley</td>
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<td>INTEGRAL results &amp; interaction with Swift</td>
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<td>HETE-2 results &amp; interaction with Swift</td>
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<td>GRACE collaboration and JANET</td>
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<td>ROTSE-III</td>
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<td>Super-LOTIS</td>
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<td>Swift and the GTN</td>
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<td>Swift Follow-up at ESO &amp; REM</td>
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<td>The Robotic Palomar 60&quot; Telescope</td>
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<td>Robonet</td>
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<td>Rice U. CCD Imager for AEOS</td>
<td>Ian Smith</td>
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<td>The Burst Populations Swift Will Detect</td>
<td>Band</td>
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<td>05:45</td>
<td>An Improved Standard Candle for GRBs</td>
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