# GLAST Monthly PSR

## GBM

***Bill Browne***
*GBM Instrument Manager*

# Accomplishments

- ***Completed the GBM Power Supplies & Detectors CDR, December 10-11, 2003, Munich, Germany***
- ***Held GBM Science Team meeting December 12, 2003, Munich, Germany***
- ***NSSTC received an Arbitrary Wave Form Generator to simulate pulses from the PMTs***
- ***NSSTC delivered a revised GBM schedule to GLAST, GBM I&T Complete – August 30, 2005, GBM delivery to Observatory I&T - November 30, 2005; currently under review by Germany***
- ***GLAST reviewed and accepted proposed GBM funding increases for FY04&05, out year details requested from NSSTC***
- ***Hamamatsu successfully re-ran the shock test (GBM IRD shock spectrum) on a reinforced PMT; MPE awaiting official report***
- ***NSSTC has successfully uploaded telecommands from the SIIS and written software to the EM DPU EEPROM***
- ***NSSTC confirmed that the EM DPU meets GBM noise requirements***

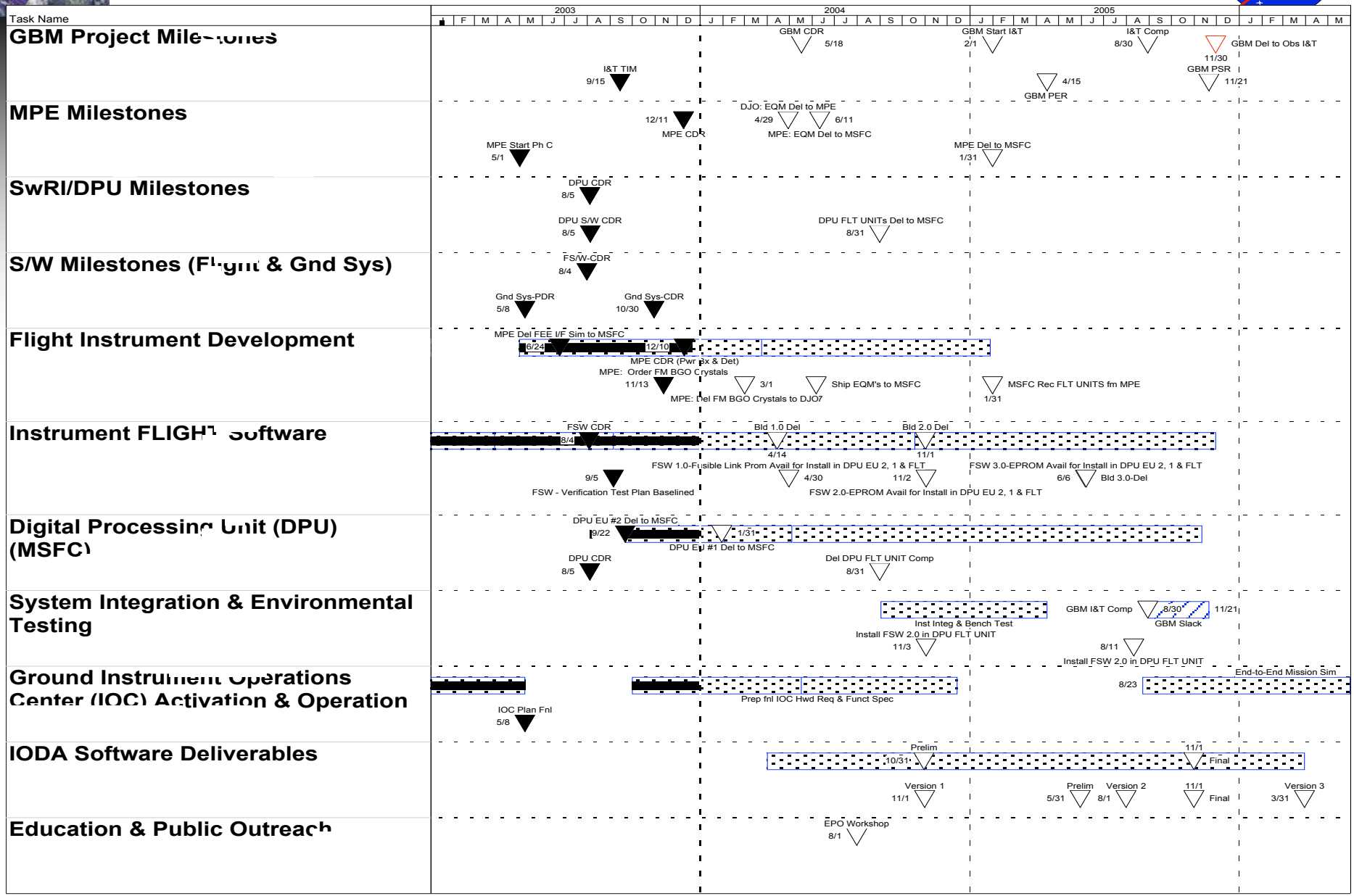
# Issues/Problems

- ***SAI coupled thermal model analysis results indicate that the GBM IRD NaI & BGO detector operational and survival temperature requirements are not being met. NSSTC has now reconfirmed that the detector models used by SAI are correct and proposes to perform a detailed detector drawing-thermal model comparison for further confidence. NSSTC has agreed to run the SAI coupled thermal model and iterate the detector thermal design with the Germans in an attempt to arrive at a satisfactory detector thermal solution which meets the environmental constraints of the present SC accommodation. NSSTC plans to conduct EQM TB testing at MSFC to validate the detector thermal models.***
- ***DJO reported a mass increase during the CDR; NSSTC to formally request an increase in the GBM mass allocation***

# Upcoming Events

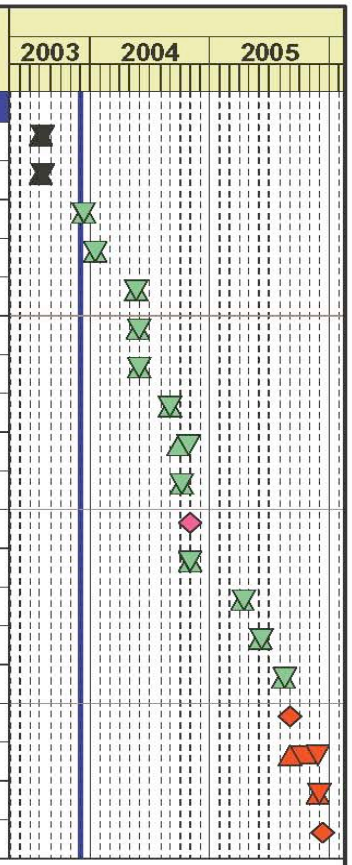
- ***Astrium (Germany) to submit a proposal to provide GBM dual channel power box GSE and flight power box thermal model, January 2004***
- ***SwRI to deliver DPU EU #1 (with updated FPGA), early February 2004***
- ***DPU Acceptance Review, mid February 2004***
- ***Build-1 FSW delivery, mid February 2004***
- ***GBM System Level CDR, May 16, 2004, Huntsville, AL,***

# GBM Master Schedule



# GBM Top Level Schedule

| Activ ID | Activity Description | Current Start | Current Finish |
|---|---|---|---|
| GBM Instrument | | | |
| 0304 | GBM DPU CDR | 05AUG03A | 06AUG03A |
| 0310 | GBM Flight Software CDR | 06AUG03A | 07AUG03A |
| 6033 | GBM H/W CDR (MPE) | 10DEC03* | 11DEC03 |
| 0313 | GBM CDR (Combined Systems) | 15JAN04* | 15JAN04 |
| 0098 | GBM FSW Build 1 Delivery | 19MAY04 | 19MAY04 |
| 5036 | MPE: Ship NaI & BGO EQM Detectors to MSFC | 24MAY04 | 28MAY04 |
| 5038 | MSFC: Receive NaI & BGO EQM's | 28MAY04 | 28MAY04 |
| 0101 | SwRI Delivers DPU Flight Unit to MSFC | 31AUG04 | 31AUG04 |
| 0131 | MPE Science Test (Calib) (Last Test in MPE Flow) | 29SEP04 | 26OCT04 |
| 0215 | MPE Pre-Ship Review (MPE PSR) | 08OCT04* | 08OCT04 |
| 0137 | MPE Deliver Flight Unit to MSFC Complete | | 01NOV04 |
| 0107 | GBM FSW Build 2 Delivery | 01NOV04 | 01NOV04 |
| 0028 | GBM PER | 11APR05 | 15APR05* |
| 0389 | GBM FSW Build 3.0 Delivery | 06JUN05 | 06JUN05 |
| 0031 | GBM PSR | 15AUG05* | 15AUG05 |
| 0164 | I&T Complete @ MSFC/GBM Rdy for Obs I&T | | 30AUG05 |
| 0174 | GBM Instrument FLOAT @ MSFC ( 75 Calendar Days) | 31AUG05 | 26NOV05 |
| 0298 | MSFC Ships GBM to Spectrum for Observatory I&T | 28NOV05 | 30NOV05 |
| 0034 | GBM Ready for Observatory I&T @ S/C Vendor | | 09DEC05 |

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|---|---|
| Start Date | 03APR00 |
| Finish Date | 18MAY07 |
| Data Date | 01DEC03 |
| Run Date | 08JAN04 15:24 |

Early Bar
Progress Bar
Critical Activity

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GLAST GBM Project Schedule
Top-Level Schedule
Status as of 11/1/03

| Date | Revision | Checked | Approved |
|---|---|---|---|
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# Rolling Wave Schedule

| Activ ID | Activity Description | Current Start | Current Finish | 2003 OCT | 2003 NOV |
|---|---|---|---|---|---|
| **GBM Instrument** | | | | | |
| **GBM Top-Level Development/Milestones** | | | | | |
| 6033 | GBM H/W CDR (MPE) | 10DEC03* | 11DEC03 | | |
| 0313 | GBM CDR (Combined Systems) | 15JAN04* | 15JAN04 | | |
| 0344 | GBM FSW Build 1.0 Validation Test Description | 29MAR04 | 01JUL04 | | |
| **GBM Subsystem Milestones** | | | | | |
| 5069 | MSFC Deliv FLT Connectors to MPE | 01DEC03* | 01DEC03 | | |
| 0638 | SwRI Deliver DPU EU #1 to MSFC | 01DEC03 | 01DEC03 | | |
| 6091 | MSFC Deliver Thermal Math Models to GSFC | 01DEC03* | 01DEC03 | | |
| 6092 | MSFC Deliver Structural Math Models to GSFC | 01DEC03* | 01DEC03 | | |
| 7025 | MSFC Receives GBM FLT Connectors from Spectrum | 01DEC03* | 01DEC03 | | |
| 5070 | MPE Deliver PwrBox EEE Parts to Astrium | 19DEC03* | 19DEC03 | | |
| 6063 | MPE: Deliv PwrBox Mechanical Parts to Astrium | 19DEC03* | 19DEC03 | | |
| 7019 | MSFC Rec Dtr Location&Cable Length from Spectrum | 14JAN04* | 14JAN04 | | |
| 0659 | MPE: Deliver STM Units to MSFC | 26JAN04 | 03FEB04 | | |
| 8051 | MPE Deliver EEE Parts to DJO | 30JAN04* | 30JAN04 | | |
| 8053 | MPE Deliver BGO Crystals to DJO | 02FEB04* | 02FEB04 | | |
| 6071 | MSFC Deliver STM Units to Spectrum | 20FEB04* | 20FEB04 | | |
| 8055 | MPE Deliv Connectors, PMTs, Heaters&Thermostats | 01MAR04* | 01MAR04 | | |
| 7021 | MSFC Receives GBM Test Cables from Spectrum | 01MAR04* | 01MAR04 | | |
| 6075 | Detector FEE's Ready for Integration | 15MAR04* | 15MAR04 | | |

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| Start Date | 03APR00 |
| Finish Date | 18MAY07 |
| Data Date | 01DEC03 |
| Run Date | 08JAN04 14:38 |

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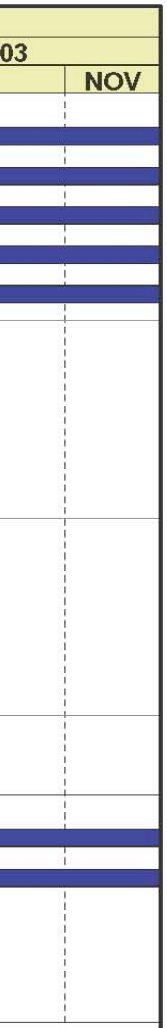
GLAST GBM Project Schedule
Rolling Wave
Status as of 11/1/03

| Date | Revision | Checked | Approved |
|---|---|---|---|
| | | | |

# Rolling Wave Schedule

| Activ ID | Activity Description | Current Start | Current Finish |
|---|---|---|---|
| GBM Flight Instrument Development | | | |
| 0647 | DPU BB @ MSFC for Testing | 08JUL02A | 23DEC03 |
| 0305 | NaI EQM Detector Component Development | 01MAY03A | 15MAR04 |
| 0302 | BGO EQM Detector Component Development | 01MAY03A | 15MAR04 |
| 6064 | Develop DPU-Test & Evaluation System Software | 02JUN03A | 23DEC03 |
| 6070 | Develop Ground Supt Sys (GSS) SII-1 Hardware | 01JUL03A | 23DEC03 |
| 5043 | DPU EU #2 used for FSW 2.0 Verification Testing | 01DEC03 | 01DEC03 |
| 0297 | MPE: Manufacture STM Units | 01DEC03 | 23JAN04 |
| 6073 | Develop Ground Supt System (GSS-1) Software | 01DEC03* | 27SEP04 |
| 0653 | DPU EU #1@ MSFC for Testing-1 | 02DEC03 | 17MAY04 |
| 0158 | MPE: PowerBox Proto FM Manufacturing | 08DEC03 | 17FEB04 |
| 0335 | Detector Module FM Redesign/Update Manufact Docs | 11DEC03* | 06JAN04 |
| 0179 | GSE's For PwrBox MAIT | 12DEC03* | 15JAN04 |
| 6067 | Conduct DPU-Test & Evaluation System Testing | 02JAN04 | 09JAN04 |
| 0170 | PwrBox ProtoFlt Model Assembly | 18FEB04 | 15MAR04 |
| 6051 | BGO EQM Detector Testing @ DJO | 16MAR04 | 13APR04 |
| 0311 | NaI EQM Detector Testing @ DJO | 16MAR04* | 15APR04 |
| 0176 | PwrBox ProtoFlt Model Acpt Test(Incl Vibe/TVAC) | 16MAR04* | 19APR04 |
| GBM Instrument Flight Software | | | |
| 0323 | GBM FSW Design & Code Build 1.0 | 17MAR03A | 11FEB04 |
| 6018 | GBM FSW Verification Test Description-Build 1.0 | 07JUL03A | 11FEB04 |
| 0332 | GBM FSW Unit Test Build 1.0 | 01DEC03 | 24FEB04 |
| 0347 | GBM FSW 1.0 Validation Test Plan | 01DEC03 | 25MAR04 |
| 0338 | GBM FSW Verification Testing Build 1.0 | 25FEB04 | 06APR04 |

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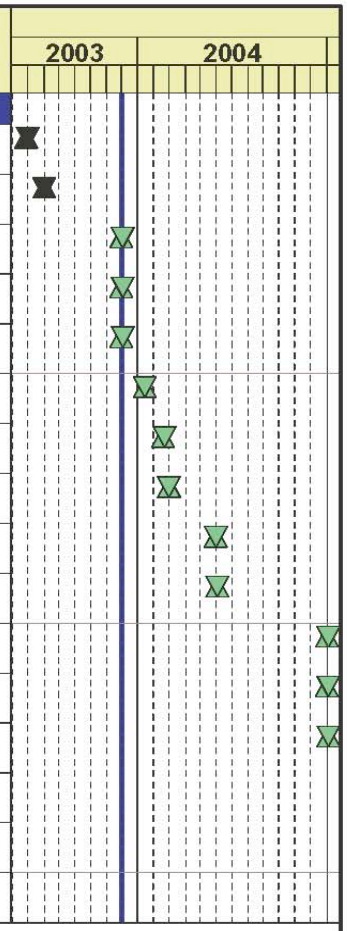
# Deliverable Schedule

| Activ ID | Activity Description | Current Start | Current Finish |
|---|---|---|---|
| GBM Instrument | | | |
| 7023 | MSFC Receives SC Simulator (SIIS) from Spectrum | 30MAY03A | 30MAY03A |
| 7017 | MSFC Div Final Cable&Connector Specs to Spectrum | 03JUL03A | 03JUL03A |
| 6091 | MSFC Deliver Thermal Math Models to GSFC | 01DEC03* | 01DEC03 |
| 6092 | MSFC Deliver Structural Math Models to GSFC | 01DEC03* | 01DEC03 |
| 7025 | MSFC Receives GBM FLT Connectors from Spectrum | 01DEC03* | 01DEC03 |
| 7019 | MSFC Rec Dtr Location&Cable Length from Spectrum | 14JAN04* | 14JAN04 |
| 6071 | MSFC Deliver STM Units to Spectrum | 20FEB04* | 20FEB04 |
| 7021 | MSFC Receives GBM Test Cables from Spectrum | 01MAR04* | 01MAR04 |
| 7027 | MSFC Deliver LV PowerBox Load Sim to Spectrum | 01JUN04* | 01JUN04 |
| 6055 | MSFC Deliver GIS to Spectrum | 03JUN04 | 03JUN04 |
| 7013 | MSFC Rec Final SC Math Mass Density Mod from SA | 04JAN05* | 04JAN05 |
| 7015 | MSFC Rec Final LAT Math Mass Density Mod fr SLAC | 04JAN05* | 04JAN05 |
| 7011 | MSFC Del Final GBM Math Mass Density Mod to SLAC | 05JAN05* | 05JAN05 |
| 7020 | MSFC Deliver Final GBM Test Procs to Spectrum | 19JUL05 | 19JUL05 |
| 0298 | MSFC Ships GBM to Spectrum for Observatory I&T | 28NOV05 | 30NOV05 |
| 7029 | MSFC Deliver GSE to Spectrum (Elect & Mech) | 30NOV05 | 30NOV05 |

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| Start Date | 03APR00 |
| Finish Date | 18MAY07 |
| Data Date | 01DEC03 |
| Run Date | 08JAN04 14:43 |

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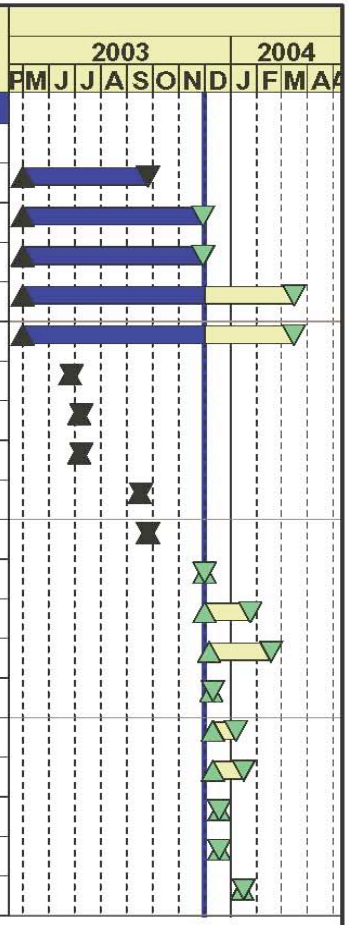
GLAST GBM Project Schedule
MSFC-Spectrum-SLAC
Status as of 11/1/03

| Date | Revision | Checked | Approved |
|---|---|---|---|
| | | | |

# MPE Schedule

| Activ ID | Activity Description | Current Start | Current Finish |
|---|---|---|---|
| GBM Instrument | | | |
| 0320 | FEE/NaI/BGO/PwrBox BB Dev/Phase B Complete | 03JAN03A | 03JAN03A |
| 6083 | Structural & Thermal Mathematical Modeling | 01MAY03A | 25SEP03A |
| 0185 | Develop STM Manufacturing Drawings | 01MAY03A | |
| 6059 | Prepare Detailed Design & Drawings of PwrBox | 01MAY03A | |
| 0305 | NaI EQM Detector Component Development | 01MAY03A | 15MAR04 |
| 0302 | BGO EQM Detector Component Development | 01MAY03A | 15MAR04 |
| 0167 | Mechanical GSE (MPE w/MSFC Input as Requested) | 26JUN03A | 26JUN03A |
| 6042 | MPE Delivers FEE Interface Simulator to MSFC | 07JUL03A | 07JUL03A |
| 6045 | MPE Delivers Power Box Simulator to MSFC | 07JUL03A | 07JUL03A |
| 0402 | MPE Deliv Struct Math Mods of Detectors to MSFC | 16SEP03A | 16SEP03A |
| 6087 | MPE Deliv Thermal Math Mods of Detctrs to MSFC | 25SEP03A | 25SEP03A |
| 5069 | MSFC Deliv FLT Connectors to MPE | 01DEC03* | 01DEC03 |
| 0297 | MPE: Manufacture STM Units | 01DEC03 | 23JAN04 |
| 0158 | MPE: PowerBox Proto FM Manufacturing | 08DEC03 | 17FEB04 |
| 6033 | GBM H/W CDR (MPE) | 10DEC03* | 11DEC03 |
| 0335 | Detector Module FM Redesign/Update Manufact Docs | 11DEC03* | 06JAN04 |
| 0179 | GSE's For PwrBox MAIT | 12DEC03* | 15JAN04 |
| 5070 | MPE Deliver PwrBox EEE Parts to Astrium | 19DEC03* | 19DEC03 |
| 6063 | MPE: Deliv PwrBox Mechanical Parts to Astrium | 19DEC03* | 19DEC03 |
| 0313 | GBM CDR (Combined Systems) | 15JAN04* | 15JAN04 |

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| Start Date | 03APR00 |
| Finish Date | 18MAY07 |
| Data Date | 01DEC03 |
| Run Date | 08JAN04 14:48 |

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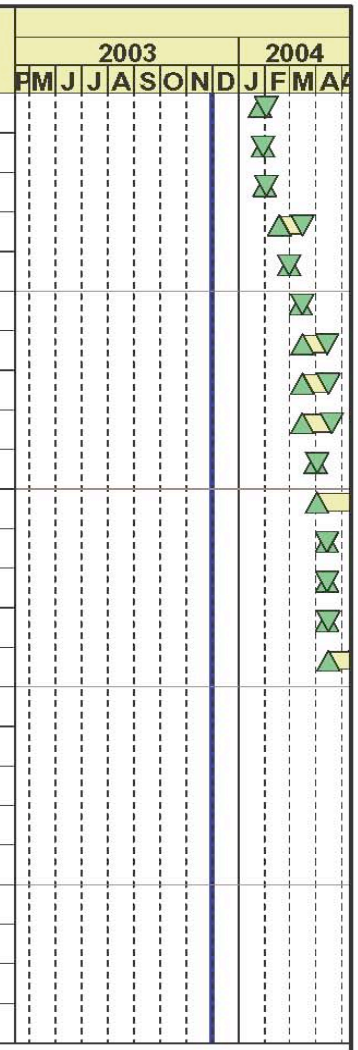
GLAST GBM Project Schedule
MPE Tasks
Status as of 11/1/03

| Date | Revision | Checked | Approved |
|---|---|---|---|
| | | | |

# MPE Schedule

| Activ ID | Activity Description | Current Start | Current Finish |
|---|---|---|---|
| 0659 | MPE: Deliver STM Units to MSFC | 26JAN04 | 03FEB04 |
| 8051 | MPE Deliver EEE Parts to DJO | 30JAN04* | 30JAN04 |
| 8053 | MPE Deliver BGO Crystals to DJO | 02FEB04* | 02FEB04 |
| 0170 | PwrBox ProtoFlt Model Assembly | 18FEB04 | 15MAR04 |
| 8055 | MPE Deliv Connectors, PMTs, Heaters&Thermostats | 01MAR04* | 01MAR04 |
| 6075 | Detector FEE's Ready for Integration | 15MAR04* | 15MAR04 |
| 6051 | BGO EQM Detector Testing @ DJO | 16MAR04 | 13APR04 |
| 0311 | NaI EQM Detector Testing @ DJO | 16MAR04* | 15APR04 |
| 0176 | PwrBox ProtoFlt Model Acpt Test(Incl Vibe/TVAC) | 16MAR04* | 19APR04 |
| 8057 | MPE Deliver NaI Crystals to DJO | 01APR04* | 01APR04 |
| 0119 | Detector Module FM Manufacturing | 02APR04 | 24JUN04 |
| 0155 | MSFC Deliv DPU BB(Analog Protoflight) to MPE | 14APR04* | 14APR04 |
| 0641 | MSFC Deliver DPU BB to MPE | 14APR04* | 14APR04 |
| 0314 | Deliv EQM Detectors(BGO & NaI) to MPE from DJO | 15APR04* | 15APR04 |
| 5039 | EQM Testing @ MPE | 16APR04 | 21MAY04 |
| 5036 | MPE: Ship NaI & BGO EQM Detectors to MSFC | 24MAY04 | 28MAY04 |
| 0173 | MPE Deliv NaI Crystal in Sealed Housings | 28MAY04 | 28MAY04 |
| 0122 | Detector Module FM Assembly | 25JUN04 | 29JUL04 |
| 0125 | Detector Module FM Acpt Test(incl Vibe&TVAC) | 30JUL04 | 24AUG04 |
| 6023 | DJO Deliv Detctr Mod FM & ProtoFlt PwrBox to MPE | 24AUG04 | 24AUG04 |
| 0128 | Performance Test on Subsystem (Detctrs&PwrBx) | 25AUG04 | 28SEP04 |
| 0131 | MPE Science Test (Calib) (Last Test in MPE Flow) | 29SEP04 | 26OCT04 |
| 0215 | MPE Pre-Ship Review (MPE PSR) | 08OCT04* | 08OCT04 |
| 0137 | MPE Deliver Flight Unit to MSFC Complete | | 01NOV04 |

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# GBM Mass Estimates

**Current Project Estimates**

| | | | Total | Contingency | | N.T.E. |
|---|---|---|---|---|---|---|
| | M[kg] | Number | M[kg] | % | M[kg] | Mass |
| NaI Detector | 3.25 | 12 | 39.0 | 10% | 3.90 | 4.5 |
| | | | | | | |
| BGO Detector | 18.5 | 2 | 37.0 | 10% | 3.70 | 21.0 |
| | | | | | | |
| DPU: | 8.09 | 1 | 8.1 | 8% | 0.65 | 9.0 |
| | | | | | | |
| Power Supply: | 9.3 | 1 | 9.3 | 10% | 0.93 | 10.0 |
| | | | | | | |
| Thermal Hardware: | 0.5 | 16 | 8.0 | 50% | 4.00 | * |
| (Heater, radiator) | | ========== | | | ==== | |
| Total Mass | | | 101.4 | | 13.18 | |
| Contingency | | | 13.2 | | | |
| Total with Contingency. | | | 114.6 | | | 115.0 |

Total of 97 Kilograms allocated to GBM

N.T.E. Mass is the "not to exceed" mass for each unit in kgs.

* Added in for each detector in the N.T.E. column