

August 10, 2011



To: MSFC/ K. Hefner, Project Manager, Chandra  
GSFC/ J. McEnery, Project Scientist, Fermi  
GSFC/ J. Wiseman, Project Scientist, Hubble  
AMES/ R. Hunter, Project Manager, Kepler  
JPL/ C. Lawrence, Principal Investigator, Planck  
JPL/ S. Dodd, Project Manager, Spitzer  
GSFC/ N. Gehrels, Principal Investigator, Swift  
GSFC/ S. Snowden, Project Scientist, XMM-Newton

From: Jaya Bajpayee, Program Executive for Operating Missions, Astrophysics Division, Science Mission Directorate, NASA HQ

Subject: Call for Proposals- Astrophysics Division Senior Review of Operating Missions 2012

**Background:**

NASA's Science Mission Directorate (SMD) periodically conducts comparative reviews of its Operating Missions to maximize the scientific return from these projects within finite resources. NASA uses the findings from these comparative reviews to define an overall implementation strategy and give programmatic direction to the missions and projects concerned for the next two fiscal years.

NASA will host the next Astrophysics Division Senior Review for its operating missions in late February-early March, 2012. This Call for Proposals describes the objectives and process for the review, and contains instructions for the submission of proposals and in-person presentations to the review panel.

**Purpose of the Senior Review:**

The purpose of this comparative review is to assist NASA in maximizing the scientific productivity from its Operating Missions. NASA will use the findings from the Senior Review to:

- Prioritize the operating missions and projects;
- Define an implementation approach to achieve astrophysics strategic objectives;
- Provide programmatic direction to the missions and projects concerned for 2013 and 2014; and
- Issue initial funding guidelines for 2015 and 2016 (to be revisited in the 2014 Senior Review).

The Senior Review, held every two years, complements the standing working groups and other peer reviews by conducting an independent, comparative evaluation of missions in extended operations. The Senior Review evaluates proposals for funding, usually involving additional resources in upcoming years, to continue operations of missions in extended operations phase. The execution of the FY 2011 and 2012 Astrophysics Division's Operating Missions follows the assessment and prioritization from the Senior Review held in 2010 (see previous senior review reports at [http://nasascience.nasa.gov/astrophysics/Senior Review](http://nasascience.nasa.gov/astrophysics/Senior%20Review)).

Multi-mission data archives are reviewed in a process separate from the Senior Review described here for the operating missions.

The 2012 Senior Review will assess the scientific merits of eight astrophysics missions – Chandra, Fermi, Hubble, Kepler, Spitzer, and Swift and the U.S. components of participation in Planck, and XMM-Newton. Performance factors include scientific productivity, future scientific potential, data dissemination, technical status, and cost.

### **Instructions to the Senior Review Committee (SRC):**

In the following descriptions, “project” denotes a full mission or project in the traditional sense or U.S. participation on a mission led by an international partner. NASA HQ will instruct the Senior Review panel to:

- (1) Rank the scientific merit of each project on a “science per dollar” basis (based upon expected returns during 2013 and 2014) in the context of science goals, objectives and research focus areas described in the SMD Science and Strategic Plans.
- (2) Assess the cost efficiency, technology development and dissemination, data collection, archiving and distribution, and education/outreach as secondary evaluation criteria, after science merit/usefulness.
- (3) Based on (1) through (2), provide findings to assist with an implementation strategy for Astrophysics Division missions in extended operations for 2013 and 2014, including an appropriate mix of:
  - Projects continued as currently baselined;
  - Projects continued with either enhancements or reductions to the current baseline;
  - Project terminations.

### **Funding Environment:**

Missions proposing to the Astrophysics Division Senior Review will compete for a pool of funds assembled for the period under review. However, this pool may not be sufficient to support all the missions under review. In maximizing science per dollar, the SRC may recommend terminating aspects of a project that do not return optimum science and use its associated funding to enhance the senior review pool of funds. Additionally, in the current fiscal environment hard choices are required and some missions may be terminated based on the assessments and prioritizations of this Senior Review.

## **Proposal Guidelines**

For the period under consideration in this Senior Review, please provide descriptions and a cost summary (in the mandatory summary form provided in Appendix) of an “In-Guide” Scenario and an “Augmented” Scenario.

Each project must propose an in-guide plan, which follows the NASA budget guideline for the period under review. Projects may propose additional tasks or science products and request a budget augmentation specifically for those activities. Each proposal must provide a clear description of the expected science outcome of the in-guide plan and enhancements yielded by the augmented budget. The budget guideline, to be used for the in-guide proposal, will be communicated to each project separately.

The proposed cost must represent the entire value of the project, including project expenditure, expenses paid by the Center, tracking networks (DSN, TDRSS, etc), tail circuits, and multi-mission infrastructure projects such as the Advanced Multi-mission Operations System (AMMOS) at JPL and the Space Science Mission Operations (SSMO) Project at GSFC.

## **Schedule for the Senior Review**

<b>2012 Senior Review Schedule</b>	
Draft Call for proposals	July 1, 2011
Call for Proposals	August 10, 2011
EPO SR Proposals Due	Dec 15, 2011
SR Proposals Due	Jan 18, 2012
EPO Section Review	Jan 23 – 25, 2012
SRC Meets	Feb 28-March 2
Final Report	March 30
Guidance to Projects	April 3
Projects respond	April 23

## **Proposal Instructions**

The written proposal shall consist of a science section, a technical/budget section, and an education/public outreach (E/PO) section. Missions that were reviewed by the 2010 Senior Review Committee must explicitly discuss how they addressed recommendations of the 2010 SRC.

The page limitations for proposals are in the table below. Not included in the page limits are the cover page, table of contents, budget spreadsheets, on-line bibliography of publications, and list of

acronyms.

Page Limitations for Proposals			
	HST, Chandra	Spitzer, Fermi, & Kepler	Swift, Planck, XMM-Newton
Science, Technical & budget	30	20	15
Education & Public Outreach Appendix	15	10	8

Proposal page is defined as 8.5x11-inch paper size with character (font) size not less than 11 points. The entire proposal, except budget spreadsheets, must be submitted electronically in .pdf format; the budget spreadsheets must be submitted in Excel. Detailed instructions for this will be provided at a later date.

If your institution requires signatures, please place them on a separate submittal letter and forward them directly to Jaya Bajpayee; copies of this submittal letter are not needed and will not be used in the review but will be retained within the Division. The project name and names of key writers or presenters at the top of the first page will suffice for review purposes. Letters of endorsement and support from prominent community members or institutions, testimonials, and other similar additional materials are not solicited and should not be included with your proposal submission.

**Instructions for the Science Section:**

The emphasis of the science section should be on how the proposed science program will discover and communicate new scientific knowledge in line with NASA’s strategic goals, objectives, and research focus areas. The science proposal should list the current science objectives for the mission, and a summary of what has been accomplished to date, focusing principally on advances accomplished in the past two to three years. The reporting of results to the scientific community via refereed journal articles and other means should be summarized in a way that makes it possible to assess the productivity over the last few years. The scientific merit of the program is the chief criterion used to determine ranking.

**Instructions for the Technical Section:**

The technical section should begin with a discussion of the overall technical status of the components of the mission. These should include the spacecraft, instruments, and ground system including spacecraft control center and science center(s). The discussion should summarize the health of each component and point out limitations as a result of degradation, aging, use of consumables, obsolescence, etc.

The technical description of the in-guide scenario should provide a description of the program along with science return that can be achieved within the in-guide scenario. The technical description of the augmented scenario should address the added scope and expected benefits

compared to the in-guide scenario. The added science return should be clearly connected to the budget augmentation requested so that the Senior Review can recommend none, some, or all of the added science return and estimate the budget required for partially funding the proposed increases.

### **Instructions for the Budget Section**

The budget section should provide detailed budget for the in-guide and augmented scenario. For both scenarios, the budget must be provided by the project's work breakdown structure. Labor, major equipment, and other expenses for both the in-guide scenario and the augmented scenario must be explained in sufficient detail to determine the cost of each proposed task. Any funding to instrument teams or other groups must be described and justified in detail.

The budget must include all project-specific costs including in-kind contributions rendered by the Center (GSFC, JPL, MSFC, etc) or by NASA's networks such as the Deep Space Network (DSN), the Ground Network (GN), the Space Network (SN), or by the NASA Integrated Network Services (NISN). Often these services are provided free of charge by other NASA sources. These types of anticipated 'in kind' support from other NASA sources must be identified.

Representations of direct or in-kind funding from international partners or from other US Government agencies need not be provided.

For the "Augmented" Scenario, you may describe a funding level that leads to a higher science return, while recognizing the very tight fiscal constraints that NASA faces. In other words, the augmented scenario should be a carefully considered request for specific tasks or science products, not a maximum request. If the current budget guideline for your project for any of the fiscal years is zero, and you propose operations during that year, then describe a minimal program at an acceptable risk level. This minimal scenario should indicate the minimum viable funding level for your project to the Senior Review and to NASA.

Appendix A provides the mandatory budget summary form with instructions and definitions of the 5-way breakdown. This form will serve as a standard budget summary for all proposals; each proposal may include additional details in a format determined by each project.

### **Instructions for the Education/Public Outreach (E/PO) Section**

The E/PO section shall be an appendix to the SR 2012 call for proposals, to be submitted on December 15.

The E/PO section should summarize accomplishments of previous years, a description of planned activities for the period under review, and an E/PO implementation plan. An expenditure of 1-2% of the total budget should be assumed in the budget for E/PO activities for the period under review.

The E/PO implementation plan should describe the objective(s), target audience(s), assessment of audience needs, methods for implementation (including timeline and milestones) and expected outcome(s) of the E/PO effort. You are encouraged to focus on activities meaningful to the target

audience(s). Proposers are also encouraged to pursue common interests realized during and/or since the retreat of SMD Astrophysics Science Education and Public Outreach Forum (SEPOF), and coordinate activities with the Astrophysics SEPOF. Collaboration across the Centers and/or the missions is highly encouraged.

The implementation plan should list a point of contact to interact with the Astrophysics Science E/PO forum (SEPOF), which is integrating existing on-going activities in Astrophysics Division.

The E/PO implementation plan must incorporate the following reporting requirements:

- Monthly reports through SEPOF
- Annual performance data call to fulfill requirements from the Office of Management and Budget through NASA Office of Education data system

The budget section of the E/PO implementation plan should include a detailed breakout for each planned E/PO activity. Projects with new ideas or initiatives beyond what the budget can support are encouraged to propose to the annual opportunities for Education and Public Outreach in Earth and Space Sciences (EPOESS) in ROSES.

NASA's plan for education and public outreach can be found at <http://education.nasa.gov/about/strategy/>

Background information and SMD E/PO resources are found at <http://science.hq.nasa.gov/research/epo.htm> and <http://science.hq.nasa.gov/education>

## **Required Appendices**

The following appendices are required and do not count against the page limit:

- Standard budget in the mandatory format. The spreadsheet template in Appendix A provides the mandatory summary format for your budget and supplies a spreadsheet template.
- Education & Public Outreach
- Acronym list. Include a full list of all acronyms used, with their designations spelled out.
- On-line bibliography of publications

## **Proposal Submission**

Proposal submission will be electronic, by means of uploading to a secure drop-box. Detailed information on the process will be provided at a later date. There will be ample opportunity to test and gain confidence in the system (i.e., by submitting a test .pdf file and spreadsheet, etc., and receiving confirmation of its receipt) prior to the proposal due date.

## **Further Information Required for the Senior Review Deliberations**

After submission of proposals, members of the Senior Review panel may have further questions or requests for clarification. If that is the case, identical requests for further information will be sent to all projects prior to the review.

As part of your proposal submission we request that you provide an on-line bibliography of recent publications. Your proposal should contain the URL/web address to the bibliography. The bibliography may list all papers for the lifetime of the mission, or contain as a minimum the most recent papers over the past two or three years. It is acceptable to also list PhD theses and papers presented to conferences and workshops etc, but these should be listed separately from the refereed papers.

## **Panel Review Process**

We anticipate that the Senior Review panel will meet for four days, as detailed in the table below.

<b>Senior Review Panel Agenda</b>		
<b>Time</b>	<b>Date</b>	<b>Agenda</b>
Day 1 – Morning	Feb 28	Charter; discussion of conflicts of interest and procedures to minimize their impacts; logistics (writing assignments, etc.), background, comparisons, metrics and criteria.
Day 1 – Afternoon	Feb 28	Project presentations, plus questions and answers
Day 2	Feb 29	Project presentations, plus questions and answers
Day 3	Mar 1	Project presentations, plus questions and answers
Day 4 - Morning	Mar 2	Panel prepares preliminary report
Day 4 – Afternoon	Mar 2	Senior review panel presents findings to Astrophysics Division
Four weeks later	Mar 30	Senior review panel submits final report to Astrophysics Division

## **Presentations to the SRC**

Representatives of Hubble and Chandra will be allotted 90 minutes for a formal presentation to the SRC. To minimize the burden on projects but also allow for adequate expertise and support to be present, no more than a total of six persons may represent any of the projects. During each presentation, the project representatives should plan on using one hour for their prepared presentations, and reserving the remaining 30 minutes for questions and answers.

Representatives of Spitzer, Kepler and Fermi will be allotted 60 minutes for a formal presentation to the SRC. To minimize the burden on projects but also allow for adequate expertise and support

to be present, no more than a total of four persons may represent any of the projects. During each presentation, the project representatives should plan on using one 40 minutes for their prepared presentations, and reserving the remaining 20 minutes for questions and answers.

Representatives of the other missions will be allotted 30 minutes for their formal presentation to the SRC. To minimize the burden on projects but also allow for adequate expertise and support to be present, no more than a total of three persons may represent any one of the projects. During each project presentation, the project representatives should plan on using 20 minutes for their prepared presentation, and reserving the remaining 10 minutes for questions and answers.

Mission representatives should note that:

- The primary purpose of the oral presentations is to provide a forum for questions from committee and answers from the projects.
- Secondly, this is an opportunity for projects to provide any significant updates, e.g. science results obtained since proposal submission.
- Lastly, it is an opportunity to repeat highlights of the proposals, which have of course been read by all committee members.

### **After the SRC meeting**

By the end of the meeting of the SRC, there should be a good first draft of the panel's report. The key findings and conclusions should be well drafted and reviewed prior to dismissing the panel. At the end of the fourth day, the panel will present their report to the Astrophysics Division Director and staff. The panel may then take an additional 1-2 weeks to complete and submit their final report. On or before April 3, HQ will contact each of the proposing missions/projects and relay any new direction resulting from the Senior Review. The decisions may include revised budget guidelines and/or other specific instructions resulting from the Senior Review process, possibly including notices of intent to terminate. Following such communications, HQ will post the report of the Senior Review panel to the public NASA HQ web site. Each of the projects may then be required to submit back to HQ their plan for complying with the new guidelines and direction.

### **Further Information**

For further information, please contact:

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## **APPENDIX A**

### **Mandatory Budget Summary and Instructions**

<b>Project Name</b>					
<b>I. FY10 - FY14 NASA Full-cost Guideline (\$K)</b>					
	FY12	FY13	FY14	FY15	FY16
NOA					
<b>II. FY10 - FY14 '5-way' Functional Breakdown (\$K)</b>					
	FY12	FY13	FY14	FY15	FY16
1. Development					
2.a Space Communications Services					
2.b Mission Services					
2.c Other Mission Operations					
3. Science Operations Functions					
4.a Science Data Analysis					
4.b Guest Observer Funding					
5. E/PO					
Total*					
(Note: Totals for Table II should be identical to totals in Table I)					
<b>III. FY10 - FY14 Instrument team breakdown (\$K)</b>					
	FY12	FY13	FY14	FY15	FY16
1. Instrument A					
2. Instrument B					
3. Instrument C					
4., etc., [Repeat for all instrument teams]					
Other science teams					
Other mission expenses					
Total**					
(Note: **Totals for Table III should be identical to totals in Table I.)					
<b>IV. FY10 - FY14 '5-way' Breakdown for in-Kind contributions (\$K)</b>					
	FY12	FY13	FY14	FY15	FY16
1. Development					
2.a Space Communications Services					
2.b Mission Services					

2.c Other Mission Operations					
3. Science Operations Functions					
4.a Science Data Analysis					
4.b Guest Observer Funding					
Total					
<b>V. FY10 - FY14 '5-way' Breakdown for Augmented Budget (\$K)</b>					
	<b>FY12</b>	<b>FY13</b>	<b>FY14</b>	<b>FY15</b>	<b>FY16</b>
1. Development					
2.a Space Communications Services					
2.b Mission Services					
2.c Other Mission Operations					
3. Science Operations Functions					
4.a Science Data Analysis					
4.b Guest Observer Funding					
5. E/PO					
Total					

## **Instructions for the Budget Summary Spreadsheet**

Please provide all budget figures in terms of New Obligation Authority (NOA) for that fiscal year. Do not include any unobligated or uncosted carryover budget figures.

### **I. FY12- FY16 NASA Full-cost Guideline**

Replicate your NASA budget guideline supplied in the N2 database. If the budget guideline is zero for a given FY, and you propose to conduct MO&DA activities in that FY, then provide a 'minimum acceptable' budget.

### **II. FY12- FY16 '5-way' Functional Breakdown**

Provide a break down of the project's budget by function according to the 5-way functional breakdown definitions provided later in this appendix. Note that totals for Table II should be identical to totals in Table I.

### **III. FY12- FY16 Instrument team breakdown**

Instruments - Provide a break down budget by instrument team. Identify the instrument budget line with the instrument's name.

Other Science Teams - Please provide budget estimates for participation of scientists and investigators who are funded out of your project's account, but not assigned to a specific instrument team.

Other mission expenses - this should account for all other project expenses such as management, mission operations, mission-wide science or data analysis centers, E/PO, etc.

Totals for Table III should be identical to totals in Table I.

### **IV. FY12- FY16 '5-way' Breakdown for in-Kind contributions:**

Show the cost contribution of other mission directorates at NASA, such as:

NASA tracking services (DSN, Ground Network, TDRSS)

JPL AMMOS project

GSFC/SSMO multi-mission support not directly charged to your project's account.

Do not include any costs that are included in the Project's NOA.

Representations of direct or in-kind funding from international partners or from other US Government agencies are not required and should not be included.

### **V. FY12- FY16 '5-way' Breakdown for Augmented Budget:**

If you request funding different from the guideline or minimal scenario, show breakdown of the proposed program. The incremental science value of adopting the optimal budget should be described in the science proposal.

## **Definitions of the Five-Way Work Breakdown for NASA Operating Missions**

This Five-Way Breakdown is a modification of that used by the Astrophysics Division (or predecessor organizations) since 1998 for Program Operating Plan (POP) guidelines, Programming, Planning, Budget and Execution (PPBE) documents, and senior reviews.

It is not possible to create a general functional breakdown that can apply to the work-breakdown structures of every project. This is intended as a guide for the purpose of identifying funding activities. Projects may modify the breakdown below to fit the project's particular situation.

### **1. Development**

Instrument Development for future instrument replacements.

Astronaut training for servicing missions.

Development of MO&DA elements for "Great Observatory" class missions prior to launch.

Development of multi-user ground segments for planetary missions.

Development of post-launch flight software and ground systems.

For science data archives and services: development of new capabilities, software tools, technology enhancements, improved services, etc.

### **2. Mission Operations: "Control Center" and communications functions**

#### **2a. Data Services**

Antenna operations for:

Prepass and postpass tracking operations;

Spacecraft commanding and telemetry tracking, including radiometric data;

TDRSS support;

Telecommunication services such as the use of dedicated circuits (tail circuits) or the use of local area networks.

#### **2b. Mission Services**

Command generation and telemetry monitoring.

Health and performance monitoring of the spacecraft, instruments, and ground system.

Spacecraft trajectory or orbit, and attitude planning and determination.

Resource constraints analysis (spacecraft power, data storage, telemetry rates, TDRSS, DSN, etc.)

Mission analysis and planning/scheduling activities.

#### **2c. Other mission operations functions**

Project management and accounting functions.

Mission system engineering.

### **3. Science Center functions - Sequence Generation, Science Planning & Data Processing**

Science events planning, integration, and optimization.

Science and engineering activity integration.

Instrument and observation performance analysis.

Mission science center.

Services for guest observers/guest investigators.

Science data calibration/physical unit conversion.  
Validation and certification of processed data.  
Data products distribution to investigators for analysis.  
Science teams products for science data processing.  
Generation of quick-look and common pool data sets.  
Standard data processing.  
Mission data archiving (performed by mission science center).  
Multi-mission data centers.

4. **Science Data Analysis**

**4a. Science Functions**

Customized Data Processing.  
Analysis activities.  
Writing and editing documentation.  
Presentation and publication of scientific results.  
Data archiving (performed by PI teams).

**4b. Guest Observer Funding**

5. **Education and Public Outreach**