

# **GEMMA**

## **Public Information and Outreach Project Execution Plan**

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A - PIO - 005

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## List of Acronyms

Acronym	Definition
AAS	American Astronomical Society
AURA	Association of Universities for Research in Astronomy
CAS	Central Administrative Service
CTIO	Cerro Tololo International Observatory
CSA	Cooperative Support Agreement
GEMMA	Gemini in the Era of Multi-Messenger Astronomy
LIGO	Laser Interferometer Gravitational-Wave Observatory
LSST	Large Synoptic Survey Telescope
MMA	Multi-Messenger Astronomy
MTCS	MMA-TDA Communications Summit
MTMW	MMA-TDA Media Workshop
NSF	National Science Foundation
PIO	Public Information & Outreach
TDA	Time Domain Astronomy

# 1 Introduction

## 1.1 Scientific Objectives

All communications and educational activities and results from this project will meet the highest standards for scientific accuracy and must engage internal and external scientific participants at many levels. The resulting products will present Multi-Messenger Astronomy (MMA) and Time Domain Astronomy (TDA) in an accessible manner while conveying the thrill of scientific discovery to lay audiences. Gemini scientific staff are included (with salary commitments) in the plan and will carefully review all publicly distributed materials as part of this project's procedures to assure compliance and scientific accuracy and quality assurance.

## 1.2 Scientific Requirements

The Public Information & Outreach (PIO) elements of the *Gemini Observatory in the Era of Multi-Messenger Astronomy* (GEMMA) program involve public communication of the ideas and results of Multi-Messenger Astronomy and the development of related educational materials, as detailed below in the sections on Broader Societal Impacts and Project Development. In the execution of this plan, scientific accuracy and accessibility of all materials are the primary overarching requirements.

## 1.3 Facility/Infrastructure

Only office space for interns is required, as well as computer hardware and software. Use of facility infrastructure is available for meetings, video conferencing, interviews etc.

## 1.4 Scientific & Broader Societal Impacts

This PIO component of the GEMMA award addresses the aspect of broader societal impact in a multi-faceted manner. The key requirement of GEMMA's broader impact is to convey the concepts of multi-messenger and time-domain astronomy and the role of Gemini and other facilities in this new astronomical discovery space. Ultimately, the story told is of a new era in astronomy and space exploration – enabled by cutting edge technologies, instrumentation and methodologies supported largely by National Science Foundation (NSF) funding.

Broader impacts in this award are organized into two domains: Professional Workshops/Summit and educational resources.

### **Professional Workshops/Summit:**

A pivotal workshop supported by this award is actually better described as a summit. This MMA-TDA Communications Summit (MTCS) will convene scientists, communications and education professionals to work together over a period of two days with the goal of developing a roadmap for effectively communicating the concepts of MMA & TDA to non-scientists. The Summit will target participants who are leaders from major MMA & TDA facilities such as Gemini, LSST, LIGO. The event is planned for 2 days at a central location (possibly NSF headquarters) and is nominally scheduled for the third quarter of 2019.

Informed by the aforementioned MTCS, a half-day MMA-TDA Media Workshop (MTMW) for journalists is planned and will likely be held in conjunction with the January 2020 meeting of the American Astronomical Society (AAS) in Honolulu. During this workshop up to eight invited scientists will share their ideas and insights on MMA & TDA and provide journalists with story leads and contacts for future coverage of MMA & TDA events.

Media training workshops (one each in Hawai'i and Chile) for staff will follow later in 2020. The goal of this training will be to better prepare AURA staff for interactions with the media and learn more effective ways of presenting MMA & TDA and related technologies with journalists and the public.

### **Educational Resources:**

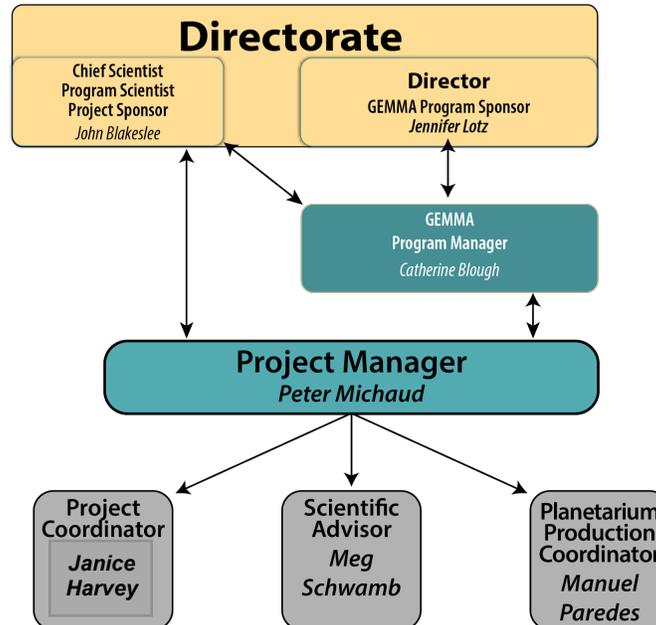
Presenting MMA & TDA to educators, K-12 and university students is a key goal of this award's broader impact. To that end, the production of a full-dome, video-based, planetarium program is planned. Discussions with planetarium educators reveal a dearth of quality programming for small, and portable, planetaria which target K-12 students and universities. This award provides funding for the production of a planetarium program focusing on the era of MMA & TDA and the new discovery space these fields present. Partnerships are also being explored which will leverage this program with existing efforts such as the NSF-funded BIG-Act planetarium production featuring the science and people of observatories in Chile (including Gemini, LSST and CTIO).

Finally, materials for K-12 and university classrooms on MMA & TDA constitute another key element of this award. Central to the development of these materials are a proposed four 6-month full-time internship opportunities for education students at the undergraduate level. It is envisioned that each intern will develop and test one activity and demonstrate a lesson during their internship period. We have kept it open-ended so the intern can develop a unique idea with guidance from staff. Examples include a deformable mirror demonstration, a video on time domain observations and process or even an adaptation of the Gemini observing card game to include TDA and MMA.

It is expected that these will run consecutively from the second half of FY 2019 through the first half of 2021 and result in classroom tested resources. Integration into existing Gemini outreach programming possibly the annual Journey Through the Universe will be a critical element of the development of these educational resources. Ultimately these materials will be made available to classrooms around the world using "open-source" translations by educators.

## 2 Organization

### 2.1 Internal Governance & Organization and Communication



*PIO project management structure*

- John Blakeslee: Project Sponsor
  - Secure necessary resources
  - Provide scientific review of plans/content
  - Monitor progress of GEMMA PIO subprojects
  - Assess quality of deliverables
- Peter Michaud: Project Manager
  - Lead internal and external team-members to accomplish goals of GEMMA PIO programming
  - Oversee all elements in GEMMA PIO and track for schedule and quality
  - Monitor and address issues regarding resource availability
  - Serve as primary contact for team members and some external participants
  - Monitor budget and use of resources including staff
  - Provide reports and status updates as required
  - Work with team to ensure that all required documents are current
  - Lead communications with team and outside stakeholders
- Janice Harvey: Project Coordinator
  - Support Project Manager in development of required documents
  - Provide logistical support for implementation of workshops, summit and educational programming
  - Assist in communications to internal and external stakeholders
  - Oversee interns (including providing HR with documents for hiring) and work with PM to develop appropriate activities for interns to pursue
  - Support contract development as necessary
- Manuel Paredes: Planetarium Production Coordinator

- Initiate partners/contractors in program production
- Oversee script and visuals development with input from PM
- Coordinate contract development for program production
- Provide status reports as necessary
- Coordinate communications with contractors/partners
- Meg Schwamb: Scientific Advisor
  - Review and provide input on workshops/summit program and scientific goals
  - Engage in planning for workshops/summit and direct scientific content
  - Provide input/recommendations on workshop/summit invited science participants
  - Participate actively in workshops/summit events (two trips required during entire program)
  - Engage with interns in determining appropriate projects
  - Review project's distributed materials (planetarium program, educational materials etc.) for scientific accuracy and relevance
- Interns:
  - Develop and test educational content and materials for formal and informal science education environments
  - Assist in other duties related to the success of GEMMA PIO programming
  - Initiate new projects based on perceived needs which support GEMMA PIO programming

Please refer to the PIO Internal and GEMMA External Communication Plan listed in Appendix A.

## **2.2 External Organization and Communication**

Please refer to the GEMMA Program Execution Plan for External Organization and Communication.

## **2.3 Partnerships**

Throughout the implementation of the GEMMA PIO programming there are multiple instances where partnerships are necessary for success. Each major project element is listed below with key partnerships envisioned.

MTCS: This summit would be most appropriate at a venue such as NSF headquarters and will require an agreement with the NSF for the use of this venue. In addition, up to 20 participants will be asked to participate as “partners” (with travel provided from the award) with flexible terms of commitment.

MTMW: This workshop will likely be held in conjunction with the January 2020 AAS meeting in Honolulu and it is expected that the AAS will be a partner in this event. Additionally, speakers at the workshop will be considered “partners” and are expected to volunteer to participate (although travel is available as necessary for speakers).

MMA/TDA Planetarium Programming: The development of this program is expected to engage partners from the professional planetarium community to advise on content and production techniques. Other partnerships are also possible to provide adaptations of

existing content such as the NSF-funded BIG-Act planetarium program slated for release in 2020.

Internships and Educational Resources Development: It is anticipated that as interns develop educational materials for the GEMMA PIO program, they will partner with the Gemini Observatory's Journey Through the Universe educational network in Hawai'i. This will provide opportunities for educators and students to test and evaluate the effectiveness of materials.

## **2.4 Roles and Responsibilities**

Please refer to the Program Execution Plan for external organization roles and responsibilities.

## **2.5 Community Relations and Outreach**

The MMA/TDA Internships: These four, 6-month full-time internships will provide a remarkable opportunity for students to experience MMA/TDA in a real observatory experience and share what they learn with students through activities and other educational materials, which may include social media and other deliverables such as video streaming. Projects may be limited by the intern's imagination. They will serve as community "ambassadors" through online portals and other community educational approaches.

# **3 Design and Development**

## **3.1 Project Development Plan**

The five primary GEMMA PIO sub-projects are divided into two categories: Professional Workshops/Summit, and Educational Resources. There are interdependencies within all five of these projects with the MMA-TDA Communications Summit (MTCS) significantly informing all of the remaining four projects. Because much of the success of the remaining four elements of the GEMMA PIO work is at least partially dependent upon the results from the MTCS, time is of the essence in completing the MTCS. Descriptions of each of the five subprojects' plans and milestones follow:

MTCS: To realize the objectives of the MTCS in a timely manner, the following sequence of events and milestones must occur:

- Development of MTCS key objectives, outcomes and venue options: early-January 2019
- Initial participants list developed: mid-January 2019
- Invitations to participants and venue request sent: early-February 2019
- Program development begins: late-February 2019
- Venue confirmed: March 2019
- Program development completed: April 2019
- Travel arrangements for participants initiated: May 2019
- Final program and participants list announced: June 2019
- Buffer (contingency) period: July 2019
- Venue logistics, program and document printing, dining/catering, etc completed: August 2019

- Summit executed: September or October 2019
- Develop MTCS final report, including results and recommendations (November 2019)

MTMW: To realize the objectives of the MTMW, the following sequence of events and milestones must occur:

- Draft development of MTMW key objectives, outcomes and venue options (discussions are already underway for the MTMW to be held as part of, or pre/post of the January 2020 AAS meeting in Honolulu, HI): April 2019
- Discussions with possible science presenters, securing informal commitments to participate: April 2019 - July 2019
- Promotion to media through AAS mailing, social media etc. and sign-up list created: August - December 2019
- Speaker commitments: August 2019
- Program finalized: October 2019
- Development of presentation on results of MTCS for MTMW: November 2019
- Buffer (contingency) period: December 2019
- Workshop executed: early January at AAS meeting

Staff Media Training: To realize the objectives of the Staff Media Training the following sequence of events and milestones must occur:

- Development of Media Training objectives, outcomes, scope and venues of training: February 2020
- Solicitation of Media Trainer(s) (Hawai'i/Chile) initiated: March 2020
- Selection of Media Trainer(s) completed: May 2020
- Convergence of date(s) for training: June 2020
- Selection of staff participants (Gemini and other AURA centers): July-September 2020
- Target execution of training: October/November 2020

MMA/TDA Planetarium Programming: To realize the objectives of the MMA/TDA Planetarium Program development the following sequence of events and milestones must occur:

- Research production/distribution partnerships and contractors: Jan. 2019 - Sept. 2019
- Draft potential storyboards and visuals: October 2019 - January 2020
- Issue call for proposals/bids to potential production contractor(s): Feb 2020
- Select production contractor(s): April 2020
- Program production: May 2020 - January 2021 (production timeline/details pending)
- Target audience assessment: February 2021 - April 2021
- Modifications to program based on assessment: May 2021 - June 2021
- Promotion and digital distribution of program: July 2021 - September 2021 (distribution continues until demand goes to zero)
- Web version of program available: August 2021
- Relevant animations and visuals made available digitally to media: September 2021

MMA/TDA Internships: To realize the objectives of the MMA/TDA Interns the following sequence of events and milestones must occur:

- Create MMA-TDA Intern job description: January 2019

- Initiate necessary HR paperwork to establish position: January 2019
- Advertise first internship position: February 2019
- Begin interviews of candidates for first intern position: March 2019
- Begin first internship: May 2019
- Repeat above every six months for a total of 4 iterations

## 3.2 Development Budget and Funding Sources

### 3.2.1 Budget Summary

<b>PIO Spend Plan</b>	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	-Total Fiscal Years
010 Salaries Wages - Regular	95,213	98,069	0	0	0	0	193,282
-TOTAL SALARY & WAGES	95,213	98,069	0	0	0	0	193,282
0FB Fringe Benefits	29,716	30,607	0	0	0	0	60,323
-TOTAL EE BENEFITS	29,716	30,607	0	0	0	0	60,323
-TOTAL WAGE & BENEFITS	124,929	128,677	0	0	0	0	253,605
500 Travel - Domestic - Operations	14,584	11,858	0	0	0	0	26,442
525 Travel - Domestic - Others	36,720	2,591	0	0	0	0	39,311
-TOTAL DOMESTIC TRAVEL	51,304	14,449	0	0	0	0	65,753
600 Travel - Foreign - Operations	5,800	8,176	0	0	0	0	13,976
625 Travel - Foreign - Others	12,023	3,346	0	0	0	0	15,369
-TOTAL FOREIGN TRAVEL	17,823	11,522	0	0	0	0	29,345
<b>-TOTAL TRAVEL</b>	<b>69,127</b>	<b>25,971</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>95,098</b>
100 Office & Materials Supplies	0	7,000	0	0	0	0	7,000
-TOTAL SUPPLIES	0	7,000	0	0	0	0	7,000
113 Page Charge/Printing	0	5,000	0	0	0	0	5,000
-TOTAL PUBLICATION	0	5,000	0	0	0	0	5,000
750 Contracted Services	251,000	52,000	0	0	0	0	303,000
-TOTAL OTHER - SERVICES	251,000	52,000	0	0	0	0	303,000
-TOTAL OTHER DIRECT COSTS	251,000	64,000	0	0	0	0	315,000
-TOTAL EXPENSE	445,056	218,648	0	0	0	0	663,703
<b>-GRAND TOTAL</b>	<b>445,056</b>	<b>218,648</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>663,703</b>

### 3.2.2 Resource Plan

Staff/Resource	Total FTE	FY-2019 Q1	FY-2019 Q2	FY-2019 Q3	FY-2019 Q4	FY-2020 Q1	FY-2020 Q2	FY-2020 Q3	FY-2020 Q4	FY-2021 Q1	FY-2021 Q2	FY-2021 Q3
Peter Michaud/Project Manager	0.8	0.3				0.3				0.2		
Janice Harvey/Program Coordinator	0.65	0.3				0.20				0.15		
Manuel Paredes/Planetarium	0.35					0.15				0.2		

Production Coordinator												
Meg Schwamb/Science Advisor	0.15	0.05				0.05					0.03	
Interns (4 internships)	2			0.5		0.5		0.5		0.5		

### 3.2.3 Procurement Plan

This overview of the Procurement Plan will be updated with the next iteration of the PEP.

Expense	FY-2019 Q2	FY-2019 Q3	FY-2019 Q4	FY-2020 Q1	FY-2020 Q2	FY-2020 Q3	FY-2020 Q4	FY-2021 Q1	FY-2021 Q2	FY-2021 Q3
MTCS Travel Expenses (27 total w/staff)		~\$81,000								
MTCS Meeting Expenses			\$16,000							
MTMW Travel Expenses (10 total w/staff)				~\$30,000						
MTMW Meeting Expenses					\$5,000					
Staff Media Training Facilitator(s) (w/travel)						\$20,000				
Planetarium Production Contract(s)						\$200,000				
Planetarium Program Assessment									\$35,000	
Planetarium Distribution Hardware										\$10,000

### 3.3 Development Schedule

Stage	Main activity	Sub task	Start	End	Status
1	MTCS	Development of MTCS key objectives, outcomes and venue options	1/1/19	1/15/19	Open

		Initial participant's list developed	1/15/19	2/15/19	Open
		Invitations to participants and venue request sent	2/7/19	3/10/19	Open
		Program development begins	2/25/19	4/30/19	Open
		Venue confirmed	3/20/19	4/30/19	Open
		Program development completed	4/20/19	6/30/19	Open
		Travel arrangements for participants initiated	5/15/19	8/31/19	Open
		Final program and participants list announced	6/15/19	8/31/19	Open
		Buffer (contingency) period	7/1/19	7/30/19	Open
		Venue logistics, program/document printing, catering complete	8/1/19	8/31/19	Open
		Summit executed	9/1/19	10/30/19	Open
		Development MTCS final report, results/recommendations	11/1/19	11/30/19	Open
					Open
<b>2</b>	MTMW	Draft MTMW key obj, outcome and venue, AAS 2020 pre/post	4/1/19	5/10/19	Open
		Discuss w/science presenters, informal commitments	4/1/19	7/31/19	Open
		Promotion to media/AAS mailing, social media, sign-up created	8/1/19	12/31/19	Open
		Speaker commitments	8/1/19	8/31/19	Open
		Program finalized	10/1/19	10/30/19	Open
		Develop presentation on results of MTCS for MTMW	11/1/19	11/30/19	Open
		Buffer (contingency) period	12/1/19	12/31/19	Open
		Workshop executed	1/5/19	1/10/19	Open
					Open
<b>3</b>	Staff Media Train.	Development of objectives, outcomes, scope and venue	2/1/20	2/28/20	Open
		Solicitation of media trainers (Hawaii/Chile)	3/1/20	5/31/20	Open
		Selection of media trainers	5/15/20	5/30/20	Open
		Convergence of dates for media training (Hawaii and Chile)	6/1/20	6/30/20	Open
		Selection of staff participants (Gemini/AURA centers)	7/1/20	9/30/20	Open
		Target execution of training	11/1/20	11/30/20	Open
					Open
<b>4</b>	MMA/TDA Planet.	Research production/distribution partners and contractors	1/1/19	11/30/19	Open
		Draft potential storyboards, draft script and possible visuals	10/1/19	1/1/20	Open
		Issue call for proposals/bids to potential production contractors	2/1/20	4/1/20	Open
		Select production contractor(s)	4/1/20	4/30/20	Open
		Program production and script finalization	5/1/20	1/31/21	Open
		Target audience assessment	2/1/21	4/30/21	Open
		Program modifications based on assessment	5/1/21	6/30/21	Open
		Promotion and digital distribution	7/1/21	9/30/21	Open
		Web Version of Program available	8/1/21	8/31/21	Open
		Relevant animations and visuals available digitally to media	9/1/21	9/30/21	Open

					Open
5	MMA/TDA interns	Create MMA-TDA intern job description	1/1/19	1/30/19	Open
		Initiate necessary HR paperwork to establish positions	1/1/19	1/31/19	Open
		Advertise first internship position	2/1/19	2/1/19	Open
		Begin interviews of intern candidates for first intern	3/1/19	3/30/19	Open
		Begin first internship	5/1/19	5/31/19	Open
		Repeat every six months for total of 4 iterations	1/1/20	7/1/21	Open

## 4 Construction Project Definition

### 4.1 Summary of Total Project Definition

Scope: See PIO Scope Management Plan listed in Appendix A.

Cost: See Section 3 above.

Schedule: Sections 3.3 above.

### 4.2 Work Breakdown Structure (WBS)

WBS #	WBS Title	Deliverable	Responsible Organization
1.5.1	MTCS	Science/Communications Summit Proceedings	Gemini Observatory
1.5.2	MTMW	Media Workshop Event Summary	Gemini Observatory
1.5.3	Staff Media Training	Staff Training Event and evaluation	Gemini Observatory
1.5.4	MMA-TDA Planetarium Program	Completed Program, evaluation results	Gemini Observatory
1.5.5	MMA-TDA Internships	Four completed internships with completed and tested projects	Gemini Observatory

### **4.3 WBS Dictionary**

<b>WBS #</b>	<b>WBS Title</b>	<b>WBS Description</b>
1.5.1	MTCS	The MMA/TDA Communications Summit will be limited to 20 participants consisting of working scientists and communications professionals. Results from the summit will focus on effective communication with the public and students of MMA/TDA, and related technologies.
1.5.2	MTMW	The MMA/TDA Media Workshop will be limited to 8 working MMA/TDA scientists or related technology professionals and working journalists, and focus on the MMA/TDA and related topics and anticipated future directions of MMA/TDA research.
1.5.3	Staff Media Training	Staff media training will be limited to staff most likely to interact with journalists on topics related to MMA/TDA topics. Training will involve general media training as well as training specific to MMA/TDA and will be offered in Hawaii and Chile.
1.5.4	MMA/TDA Planetarium Programming	Planetarium programming will focus on topics related to MMA/TDA topics, technology and people. Production will be appropriate for K-12 audiences (or some subset) and appropriate for video-based portable planetaria.
1.5.5	MMA/TDA Interns	Interns will develop at least one project each that addresses teaching MMA or TDA with K-12 (or some subset) of students and test materials with students at an appropriate grade level.

### **4.4 Scope Management Plan and Scope Contingency**

Please refer to the PIO Scope Management Plan listed in Appendix A.

### **4.5 Cost Estimating Plan, Cost Reports and Baseline Budget**

This is covered in section 4.5 of the GEMMA Program Execution Plan.

### **4.6 Complexity Factor**

This is covered in section 4.6 of the GEMMA Program Execution Plan.

### **4.7 Cost Book, Cost Model Data Set and Basis of Estimate**

**Not Applicable**

This is not a large facility project and PIO projects are an addition to an existing observatory, this section is not applicable.

## **4.8 Funding Profile**

This is covered in section 4.8 of the GEMMA Program Execution Plan.

## **4.9 Baseline Schedule Estimating Plan and Integrated Schedule**

Please refer to the PIO Stage Plan listed in Appendix A.

## **4.10 Schedule Contingency**

Gemini requires contractors to maintain a baseline schedule and include schedule contingency beyond the baseline of a reasonable amount (at least 15% beyond the critical path). The schedule, including contingency, shall not exceed the required project completion date. For internal work, we will update our baseline schedule with appropriate contingency at each stage end.

# **5 Staffing**

## **5.1 Staffing Plan**

Please refer to the PIO Staffing Plan listed in Appendix A. This plan covers:

- Goal evaluation
- Identify Influencers
- Analyze the Current State of the Function
- Envision Needs
- Conduct a Gap Analysis
- Develop a Solution Plan

In addition, Gemini uses the Resources Allocation System (RAS) to track allocations, as well as over-allocation and allocation load of all applicable employees across the board.

## **5.2 Hiring and Staff Transition Plan**

Please refer to the PIO Resource Allocation Plan listed in Appendix A. It lists the resource, their role, their location, the cost associated with the resources and the duration of the deployment. The hours per week/month are listed as well as the requirements and training.

# **6 Risk and Opportunity Management**

## **6.1 Risk Management Plan**

Please refer to the Risk Management Plan template listed in the GEMMA Program Execution Plan Resource Documents. This plan covers:

- Project Risk Process
- Other Roles and Responsibilities
- Budgeting
- Timing
- Risk Register Scoring and Interpretation, with Impact and Likelihood scoring
- Reporting Formats
- Tracking

## **6.2 Risk Register**

Please refer to the PIO Risk Register listed in Appendix A. This register includes:

### **Part I - Risk Identification**

1. Categorization & Description
2. Impact, Likelihood & Total risk scores

### **Part II - Existing controls, per risk:**

1. Effectiveness
2. Residual risk score

### **Part III - Risk Response, per mitigation strategy:**

1. Effectiveness
2. Residual risk score
3. Contingency Plan
  - a. Cost
  - b. Owner
  - c. Review schedule
  - d. Status

## **6.3 Contingency Management Plan**

Please refer to the Part III columns in the Risk Register for Contingency Management information. The risk Register is listed in Appendix A.

# **7 Systems Engineering**

## **Not Applicable**

Since this is not a technical development project.

# **8 Configuration Control**

## **8.1 Configuration Control Plan**

This is covered in section 8.1 of the GEMMA Program Execution Plan.

## **8.2 Change Control Plan**

This is covered in section 8.2 of the GEMMA Program Execution Plan.

### **8.3 Documentation Control Plan**

This is covered in section 8.3 of the GEMMA Program Execution Plan.

## **9 Acquisitions**

### **9.1 Acquisition Plans**

Acquisition Plans will be developed as decisions are made regarding the proposed procurements during the project lifecycle.

### **9.2 Acquisition Approval Process**

Gemini follows the AURA CAS procurement policies that can be found [here](#).

## **10 Project Management Controls**

### **10.1 Project Management Control Plan**

Gemini has a Portfolio Management Office which provides guidance to the project management process by providing:

- Methodology for the Project Life Cycle
- Project Management and Systems Engineering Templates.
- Reporting and resource allocation tools
- Training

Please refer to the Project Methodology documents listed under the Program Execution Plan Reference Documents. This methodology and the applicable templates are used throughout this project.

### **10.2 Earned Value Management System (EVMS)**

This is covered in section 10.2 of the GEMMA Program Execution Plan.

### **10.3 Financial and Business Controls**

This is covered in section 10.3 of the GEMMA Program Execution Plan.

## **11 Site and Environment**

## **11.1 Site Selection**

### **Not Applicable**

This is not a large facility project and the PIO efforts is an addition to existing observatory operations, this section is not applicable.

## **11.2 Environmental Aspects**

### **Not Applicable**

This is not a large facility project and the PIO efforts is an addition to existing observatory operations, this section is not applicable.

# **12 Cyber Infrastructure**

## **12.1 Cyber-Security Plan**

This is covered in section 12.1 of the GEMMA Program Execution Plan.

## **12.2 Code Development Plan**

This is covered in section 12.2 of the GEMMA Program Execution Plan.

## **12.3 Data Management Plan**

Please refer to the Program Execution Plan.

# **13 Environmental Safety and Health**

## **13.1 Environmental Safety and Health Plans**

The GEMMA PIO activities are not expected to have any significant impact on the environment, safety or health.

# **14 Review and Reporting**

## **14.1 Reporting Requirements**

Gemini is required by the CSA to provide quarterly financial reports and an annual report in September. The reports are to coincide with other observatory reports required for the governance committees and Board.

## **14.2 Audits and Reviews**

Audit and Reviews still have to be established for PIO.

## 15 Integration and Commissioning

### **Not Applicable**

Since this is not a technical development project.

## 16 Project Close-out

### **16.1 Project Close-out Plan**

When the project nears the final product delivery a Project Close-out plan will be developed. Please refer to the Project Methodology documents listed under the GEMMA Program Execution Plan Reference Documents.

### **16.2 Transition to Operations Plan**

The PIO programs will not continue beyond the period of performance outlined in the schedule given the end of the funding from NSF.

## 17 Appendix A: Support Documents

1. Communication Plan External
2. Communication Plan Internal
3. Project Plan
4. Resource Allocation Plan
5. Risk Register (Projects)
6. Scope Management Plan
7. Stage Plan

## 18 Reference Documents

(PMO templates not included in the PEP submission)

1. Acceptance Test Plan
2. Acquisition Plan
3. Change Request
4. Closure Report (Programs)
5. Risk Management Plan (Programs)
6. Staffing Plan

# **GEMMA**

# **Public Information and Outreach**

# **Project Plan**

**December 20, 2018**

A – PIO - 005

<b>Issued By:</b>	Peter Michaud
<b>Sponsored By:</b>	John Blakeslee
<b>Approved By:</b>	Catherine Blough

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# 1 Plan Description

This PIO component of the GEMMA award addresses the aspect of broader societal impact in a multi-faceted manner. The key requirement of GEMMA's broader impact is to convey the concepts of multi-messenger and time-domain astronomy (MMA & TDA) and the role of Gemini and other facilities in this new astronomical discovery space. Ultimately, the story told is of a new era in astronomy and space exploration – enabled by cutting edge technologies, instrumentation and methodologies supported largely by NSF funding.

Broader impacts in this award are organized into two domains: Professional Workshops/Summit and educational resources.

## Professional Workshops/Summit:

A pivotal workshop supported by this award is actually better described as a summit. This ***MMA-TDA Communications Summit (MTCS)*** will convene scientists, communications and education professionals to work together over a period of two days with the goal of developing a roadmap for effectively communicating the concepts of MMA & TDA to non-scientists. The Summit will target participants who are leaders from major MMA & TDA facilities such as Gemini, LSST, LIGO etc. The event is planned for 2 days at a central location (possibly NSF headquarters) and is nominally scheduled for the third quarter of 2019.

Informed by the aforementioned MTCS a half-day ***MMA-TDA Media Workshop (MTMW)*** for journalists is planned and will likely be held in conjunction with the January 2020 meeting of the American Astronomical Society in Honolulu. During this workshop up to eight invited scientists will share their ideas and insights on MMA & TDA and provide journalists with story leads and contacts for future coverage of MMA & TDA events.

Media training workshops (one each in Hawai'i and Chile) for staff will follow later in 2020. The goal of this training will be to better prepare AURA staff for interactions with the media and more effectively presenting MMA & TDA and related technologies with journalists and the public.

## Educational Resources:

Presenting MMA & TDA to educators, K-12 and university students is a key goal of this award's broader impact. To that end, the production of a full-dome, video-based, planetarium program is planned. Discussions with planetarium educators reveal a dearth of quality programming for small, and portable, planetaria which target K-12 students and universities and will be adaptable for larger planetaria in a school programming environment. This award provides funding for the production of a planetarium program focusing on era of MMA & TDA and the new discovery space these fields present. Partnerships are also being explored which will leverage this program with existing efforts such as the NSF-funded BIG-Act planetarium production featuring the science and people of observatories in Chile (including Gemini, LSST and CTIO).

Finally, materials for K-12 and university classrooms on MMA & TDA constitute another key element of this award. Central to the development of these materials are four 6-month full-time internship opportunities for education students at the undergraduate level. It is expected that these will run consecutively from the second half of FY 2019 through the first half of 2021 and result in classroom tested resources. Integration into existing Gemini outreach programming like

the annual Journey Through the Universe will be a critical element of the development of these educational resources. Ultimately these materials will be made available to classrooms around the world using “open-source” translations by educators.

## 2 Plan Pre-requisites

Use of existing staffing for the GEMMA PIO work requires re-distribution of workloads within the existing Gemini PIO program. This will result in increasing several (3) part-time staff to expand their role by fractional FTEs in order to continue with existing baseline Gemini PIO programming. This is also described in the Staffing Plan.

## 3 Planning Assumptions & External Dependencies

It is expected that existing staffing of the Gemini PIO program will remain constant throughout the period of this project (until Q3 FY 2021) with some increases in overall staffing FTEs as described in the previous section. During this period the transition into NCOA is planned and this could have a significant impact on the management of this program and will need to be monitored carefully throughout the period of this award.

## 4 Lessons Incorporated

Gemini’s PIO department has a 20-year history of effective communications, education and conference/workshop and outreach programming coordination which are applicable to the success of this plan. Highlights in these areas include:

**Communications:** Gemini’s communications efforts include effective engagement with the media, scientists and other stakeholders. These experiences are critical to the successful coordination of content for the planned media workshop, MMA/TDA summit and staff training.

**Education:** Gemini’s outreach programming includes the use of several portable planetaria for K-12 audiences in Hawai’ and Chile. This experience is critical to the development of programming on MMA/TDA content which is relevant to all audiences and educators in a portable planetarium environment. Additionally, the coordination of workshops for educators and students provides a foundation for the development of educational materials in concert with the planned internships funded in the GEMMA award.

**Conference/Workshop and Outreach Programming Coordination:** Gemini PIO staff have led or assisted in multiple workshops and meetings/conferences for staff, scientists and educators. Through Gemini’s flagship outreach programs, Journey through the Universe (Hawaii) and Viaje al Universo (Chile), GEMMA supported staff have coordinated and conducted workshops for astronomers/scientists/engineers, Department of Education teachers and leaders, and most recently in the implementation of Next Generation Science Standards into K-12 classrooms.

## 5 Monitoring & Control

The process of tracking, reviewing, and reporting the overall progress to meet the performance objectives is primarily completed by the project manager. The project manager is responsible

for keeping the project on schedule, resourced, on budget, within scope, and maintaining quality using decision trackers, issues register and other PMO tools. The project manager is also responsible for communicating project progress to stakeholders, escalation, and decision making. The following RACI matrix may be used to monitor and control the project.

## 6 Budget & Schedule

### 6.1 Summary

<b>Investment in non-labor (K\$):</b>	\$476,845
<b>Investment in Gemini labor (FTE<sup>1</sup>):2.05</b>	\$258,000
<b>Investment in external labor FTE and K\$):2 FTE interns</b>	\$66,747
<b>Other Costs in Operations/ Maintenance (K\$):</b>	\$0
<b>Project Duration:</b>	<b>12/1/2018 - 9/1/2021</b>
<b>Benefits Realization:</b>	<b>5/1/2019 - TBD (until educational materials and planetarium program are no longer being utilized)</b>

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<sup>1</sup> Full-Time Equivalent. 1 FTE = 1720 hours

## 6.2 Resource Plan

Staff/Resource	Total FTE	FY-19 Q1	FY-19 Q2	FY-19 Q3	FY19 Q4	FY-20 Q1	FY-20 Q2	FY20 Q3	FY-20 Q4	FY-21 Q1	FY-21 Q2	FY-2021 Q3
Peter Michaud/Project Manager	0.8	0.3				0.3				0.2		
Janice Harvey/Program Coordinator	0.65	0.3				0.20				0.15		
Manuel Paredes/Planetarium Production Coordinator	0.35					0.15				0.2		
Meg Schwamb/Science Advisor	0.15	0.05				0.05				0.03		
Interns (4 internships)	2			0.5		0.5		0.5		0.5		

## 6.3 Acquisition Plan

Acquisitions planning is still under development as of this writing.

Expense	FY-2019 Q2	FY-2019 Q3	FY-2019 Q4	FY-2020 Q1	FY-2020 Q2	FY-2020 Q3	FY-2020 Q4	FY-2021 Q1	FY-2021 Q2	FY-2021 Q3
MTCS Travel Expenses (27 total w/staff)		~\$81,000								
MTCS Meeting Expenses			\$16,000							
MTMW Travel Expenses (10 total w/staff)				~\$30,000						
MTMW Meeting Expenses					\$5,000					
Staff Media Training Facilitator(s) (w/travel)						\$20,000				

Planetarium Production Contract(s)						\$200,000			
Planetarium Program Assessment								\$35,000	
Planetarium Distribution Hardware									\$10,000

## **6.4 Milestone/Product Plan**

The five primary PIO sub-projects are divided into two categories: Professional Workshops/Summit, and Educational Resources. There are interdependencies within all five of these projects with the MMA-TDA Communications Summit (MTCS) significantly informing all of the remaining four projects. Because much of the success of the remaining four elements of the GEMMA PIO work is at least partially dependent upon the results from the MTCS, time is of the essence in completing the MTCS. Descriptions of each of the five program element’s plans and milestones follow.

MTCS: To realize the objectives of the MTCS in a timely manner, the following sequence of events and milestones must occur:

- Development of MTCS key objectives, outcomes and venue options: early-January 2019
- Initial participant’s list developed: mid-January 2019
- Invitations to participants and venue request sent: early-February 2019
- Program development begins: late-February 2019
- Venue confirmed: March 2019
- Program development completed: April 2019
- Travel arrangements for participants initiated: May 2019
- Final program and participant’s list announced: June 2019
- Buffer (contingency) period: July 2019
- Venue logistics, program and document printing, dining/catering etc. completed: August 2019
- Summit executed: September or October 2019
- Develop MTCS final report, including results and recommendations (November 2019)

MTMW: To realize the objectives of the MTMW, the following sequence of events and milestones must occur:

- Draft development of MTMW key objectives, outcomes and venue options (discussions are already underway for the MTMW to be held as part of, or pre/post of the January 2020 AAS meeting in Honolulu, HI): April 2019
- Discussions with possible science presenters, securing informal commitments to participate: April 2019 - July 2019
- Promotion to media through AAS mailing, social media etc. and sign-up list created: August - December 2019
- Speaker commitments: August 2019

- Program finalized: October 2019
- Development of presentation on results of MTCS for MTMW: November 2019
- Buffer (contingency) period: December 2019
- Workshop executed: early January at AAS meeting

Staff Media Training: To realize the objectives of the Staff Media Training the following sequence of events and milestones must occur:

- Development of Media Training objectives, outcomes, scope and venues of training: February 2020
- Solicitation of Media Trainer(s) (Hawai'i/Chile) initiated: March 2020
- Selection of Media Trainer(s) completed: May 2020
- Convergence of date(s) for training: June 2020
- Selection of staff participants (Gemini and other AURA centers): July-September 2020
- Target execution of training: October/November 2020

MMA/TDA Planetarium Programming: To realize the objectives of the MMA/TDA Planetarium Program development the following sequence of events and milestones must occur:

- Research production/distribution partnerships and contractors: Jan. 2019 - Sept. 2019
- Draft potential storyboards and visuals: October 2019 - January 2020
- Issue call for proposals/bids to potential production contractor(s): Feb 2020
- Select production contractor(s): April 2020
- Program production: May 2020 - January 2021 (production timeline/details pending)
- Target audience assessment: February 2021 - April 2021
- Modifications to program based on assessment: May 2021 - June 2021
- Promotion and digital distribution of program: July 2021 - September 2021 (distribution continues until demand goes to zero)
- Web version of program available: August 2021
- Relevant animations and visuals made available digitally to media: September 2021

MMA/TDA Internships: To realize the objectives of the MMA/TDA Interns the following sequence of events and milestones must occur:

- Create MMA-TDA Intern job description: January 2019
- Initiate necessary HR paperwork to establish position: January 2019
- Advertise first internship position: February 2019
- Begin interviews of candidates for first intern position: March 2019
- Begin first internship: May 2019
- Repeat above every six months for a total of 4 iterations

## 7 Project Tolerances

The project tolerances are yet to be defined.

Project Resource	Baseline value	Proposed Project Tolerance

Whenever the tolerance for one of these baseline values is exceeded (or expected to be exceeded), the Directorate will be alerted of the exception.

## **8 Applicable Reference Documents - Associated Products**

None.

# **GEMMA**

## **Public Information and Outreach**

### **Scope Management Plan**

**December 20, 2018**

A - PIO - 005

<b>Issued By:</b>	Peter Michaud
<b>Sponsored By:</b>	John Blakeslee
<b>Approved By:</b>	Catherine Blough

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# 1 Introduction

The purpose of this document is to provide an easy to understand summary of the project scope that can be used to help project team members understand why the project is being done, the scope and related boundary conditions of the project, and how they will be managed. The document should focus on the product or service being delivered by the project.

## 2 Scope Statement

### 2.1 Project Purpose

The GEMMA PIO project is aimed at improving communications with, and public/student understanding of, MMA and TDA.

### 2.2 Product or Service Goals & Objectives

1. MTCS: Identify needs and best practices for the effective communication of MMA/TDA with the public and students
2. MTMW: Inform journalists about MMA and TDA, the technologies involved and the scientific horizons ahead in these areas
3. MMA/TDA Planetarium Program: Present the excitement of MMA and TDA to K-12 students in an engaging and understandable and accurate manner using video technologies available in portable planetaria
4. MMA/TDA Staff Media Training: Provide staff likely to interact with the media with skills to improve their communications with the media and more effectively tell the story of MMA and TDA to the public through the media
5. MMA/TDA Internships: Provide an environment where undergraduate-level interns can develop effective and tested educational materials for K-12 students

### 2.3 Scope Summary

Using the methodologies listed in section 2.2, these programs will promote the effective communication of MMA and TDA to student and public audiences through workshops and summits, staff training and K-12 educational materials.

### 2.4 Scope Boundary Conditions

- Workshops, summit and training will be limited to the funding available to support travel to the selected venues. When possible, venues will be selected based and ease/cost of travel or jointly with other meetings to encourage efficiencies.

- MMA-TDA planetarium program will need to interface with existing video-base portable planetaria and utilize existing resources whenever possible.
- Interns will be required to relocate to the Gemini Observatory Hilo Base Facility to interact with observatory staff.

## **2.5 Scope Details**

<i>In Scope</i>	<i>Out of Scope</i>
MMA-TDA Planetarium Program	Traveling Planetarium

## **3 Change Management**

All changes to the project are requested through a Change Request Form and submitted to the Project Manager. The Project Manager will assess the benefit of the change and the impact on cost, timeline and resources available and decides if the change can be implemented. If the scope of the change is outside of the tolerances for the Project Manager, the Program Manager and Project Sponsor will be asked to consult.

PIO Risk Register A - PIO - 005

PIO Risk Register A - PIO - 005																
Part I. Risk Identification						Part II. Risk Analysis for Existing Controls			Part III. Risk Response							
Name	Project Risk Category	Risk Description (ignoring controls)	Impact 1-5 (ignoring controls)	Likelihood 1-5 (ignoring controls)	Total Risk Score Low = 1 - 8 Med = 9 - 16 High = 17 - 25	What Controls (if any) are currently in place?	Control Effectiveness 1-5	Residual Risk Score Low = 1 - 8 Med = 9 - 16 High = 17 - 25	Control or Risk Mitigation Strategy	Control effectiveness based on mitigation strategy 1-5	Residual Mitigated Risk Low = 1 - 8 Med = 9 - 16 High = 17 - 25	Contingency Plan	Cost of contingency plan	Owner	Review Due Date	Status
Limited MTCS Participant Availability	Quality	If key Summit participants are unavailable or unable to participate then the quality of the summit's results will be adversely impacted.	4	3	12	n/a	5	12	Early communications and commitments with desired participants and providing travel expenses	3	6	Select from back-up candidates	Additional staff time ~\$5,000	PM	May 2019	Open
Venue Availability for MTCS	Resources	If first choice of venue (NSF HQ) is not available for summit another location will need to be selected.	3	2	6	n/a	5	6	Early communications with NSF staff and engagement with NSF as a partner in workshop	2	2	Pay for venue	~\$5000	PM	March 2019	Open
Venue Availability for MTMW	Quality	If first choice of venue (AAS January 2020) is not available for workshop an alternate, less optimal venue will need to be selected.	4	2	8	n/a	5	11	Early communications with AAS Press Office and engagement with AAS as partner in workshop	2	6	Pay for venue	~\$2000	PM	June 2019	Open
MMA/TDA Planetarium Program Production Costs	Scope	If contractors cannot deliver planetarium program with all scripted elements within existing budget program's scope will have to be reduced.	4.5	2.5	11.25	n/a	5	11	Develop program script to utilize known existing and partnership resources wherever possible.	3	6	Expand partnerships to share production costs for animations related to featured facilities (LSST, LIGO etc.)	Up to 6-month delay with increased staff time required ~\$20k	PM	June 2020	Open
Limited Staff Resources	Resources	If one or more existing staff leave the project because of illness, turnover or internal opportunities then the project will be impacted.	4	4	16	n/a	5	16	1) Monitor staff employment situations 2) Offer monetary incentive to keep staff	2	4	1) Execute contract for temp employees 2) Execute staff monetary incentive	Hourly rates and incentives TBD ~\$5,000	PM	Quarterly	Open

# **GEMMA**

# **Public Information and Outreach**

# **Staffing Plan**

**December 20, 2018**

A – PIO - 005

<b>Issued By:</b>	Peter Michaud
<b>Sponsored By:</b>	John Blakeslee
<b>Approved By:</b>	Peter Michaud

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# 1 Evaluate Goals

The PIO elements of the GEMMA award consist of multiple programs with each consisting of variations on the common goal of improving (and realizing innovations) in the communication and teaching of MMA and TDA to students and the public. To accomplish this we will utilize approximately 2.0 FTE of existing staff skills and expertise to coordinate workshops and a summit, establish a contract to produce planetarium resources, and hire 2.0 FTE intern positions (four positions at 0.5 FTE) over the course of the program (2.75 years, interns starting in mid-2019).

# 2 Identify Influencers

Existing staff have been identified who can fulfill the needs of the PIO elements of the GEMMA award. Influencers which could impact this include future availability of staff due to health or personal issues.

The four full-time/six-month intern positions are influenced by availability of qualified students on the planned schedule of the project and ability of students to relocate on the salary provided.

# 3 Analyze the Current State of the Function

With the exception of four interns and an external contract for the production of key elements of a planetarium program, the GEMMA PIO project will utilize existing staff exclusively. These staff, and their skills are summarized in the following overview:

**Peter Michaud (Project Manager):** Michaud has managed the Gemini PIO department for over 20 years and has experience and education in science communications and education. He will bring his management, communications and education experience to bear in all elements of the program, including the planetarium program since prior to coming to Gemini he worked as a planetarium manager and producer.

**Janice Harvey (Program Coordinator):** Harvey has coordinated and overseen the Gemini North outreach programming for over 18 years and most significantly managed the flagship outreach program Journey Through the Universe which is going on its 15th year. Harvey excels in organization of events and logistics and will play an integral role in coordination of the GEMMA PIO summit and workshops, as well as the implementation and oversight of the internship program.

**Manuel Paredes (Planetarium Production Coordinator):** Paredes has led or assisted in educational programming at Gemini South in Chile for over ten years and has a background in video production and broadcasting. His production and communications skills make him well-qualified to oversee the GEMMA PIO planetarium production in conjunction with Michaud's background in planetaria.

Meg Schwamb (Scientific Advisor): As a Gemini North staff astronomer, Schwamb brings her experience as a research astronomer and her passion for engaging the public in astronomy to the project. Schwamb was instrumental in establishing the successful international Astronomy on Tap program and also heavily involved in the citizen science project Galaxy Zoo.

John Blakeslee (Project Sponsor): Blakeslee serves as Gemini's Chief Scientist, and in addition to his role as Project Sponsor, he will act as a secondary scientific advisor for the GEMMA PIO program.

## 4 Envision Needs

Section 3.6 of the Program Execution Plan presents the GEMMA PIO quarterly staffing plan for the duration of this program. The budget presented in Sections 3.5 covers this level of staffing from existing staff as well as the four intern positions.

In addition to existing staff resources, it is expected that planetarium production will be contracted to an external production company. While many options exist for this type of work, a planetarium production funded by the NSF is under development with the California Academy of Sciences and a possible collaboration will be explored which could strengthen both programs as a result of this partnership. Additionally, video animations are planned which highlight several MMA and TDA facilities such as LIGO, LSST and other and partnerships will be explored for cost sharing of animations highlighting these facilities.

Contractor(s) for the planetarium production will be hired starting in mid-2019 and is budgeted at \$200,000.

## 5 Conduct a Gap Analysis

Existing staffing are expected to cover all of the needs for execution of this plan, with the exception of the production of planetarium programming. Because the yet-to-be-developed planetarium program storyline could require additional resources to meet the visualization needs of the project it could be necessary to explore alternate solutions as described in section 6.

## 6 Develop a Solution Plan

Because existing staff will be utilized to perform a significant role in the GEMMA PIO elements of this award, some existing part-time staff will be expanded to fill these roles. Discussions have already confirmed that these expanded positions are agreeable to part-time staff and an assessment of their skills reveals good alignment to the needs vacated by existing staff engaged in the GEMMA PIO program.

To address the potential gap in resources that could occur in the production of visuals to match the MMA-TDA storyline, partnerships are being explored which could provide existing and/or shared content to realize the goals of the project. This is the highest risk element of the GEMMA PIO programming and could require creativity in partnerships, storyline development and scripting to address this potential issue.

