Telescope for a Space GW Mission

PI: Jeff Livas/GSFC

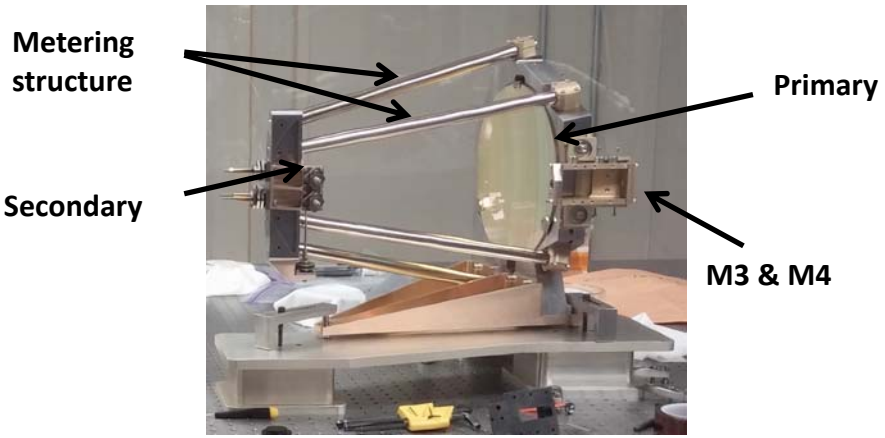
Objectives and Key Challenges:

- Establish a complete telescope design meeting optical, mechanical, thermal, and manufacturability requirements for the US contribution to the eLISA L3 mission
- Fabricate and test a prototype
- Validate stray light model

Significance of Work:

- First demonstration of a validated scattered light model combined with a previous demonstration of dimensional stability provides a firm basis for a realistic engineering model design for a flight-qualifiable off-axis telescope with low scattered light and high dimensional stability.

Off-axis Prototype as Delivered



Approach:

- Use SGO-Mid reference and the ESA eLISA
- "Yellow Book" to generate requirements
- L3/SSG for basic design (off-axis SiC recommended)
- Fabricate a prototype from the design
- Verify for compliance with specifications
- **Concentrate on stray light model validation**

Key Collaborators:

- Code 551: Joe Howard/Garrett West/Peter Blake/Len Seals/Ron Shiri/
- Code 543: John Crow/Justin Ward

Currently Funded Period of Performance:

- Oct 2012 – Sept 2014
- Oct 2014 – Sept 2015 no cost extension

Recent Accomplishments:

- Jun 2014: Prototype model contract signed
- Oct 2014: Prototype CDR
- Jun 2015: Prototype Telescope delivery to GSFC

Next Milestones:

- Jul 2015: Prototype Telescope aligned at GSFC
- Aug 2016: System-level scattered light model validated

Application:

- Flagship gravitational wave missions (eLISA)
- Laser ranging; precision metrology applications
- Laser communications

$TRL_{In} = 2$ $TRL_{PI\text{-}Asserted} = 3$ $TRL_{Target} = 3+$