

## **Charter for ASTRO-1 Requirements Team (ART)**

### **July 31, 2015**

#### **Purpose**

The ASTRO-1 Requirements Team (ART) is chartered by the BoldlyGo Institute to provide science and technology evaluation, analysis and recommendations during the preliminary conceptual design phase of the ASTRO-1 space telescope.

#### **ASTRO-1 Space Telescope**

The strawman concept for the ASTRO-1 space observatory is a 1.8-meter off-axis (unobscured) ultraviolet-visible telescope to be located in a Lagrange point or heliocentric orbit with a wide-field panchromatic camera, medium- and high-resolution spectrograph, and high-contrast imaging capabilities, such as with an internal coronagraph. ASTRO-1 is intended for the post-Hubble Space Telescope era in the 2020s, enabling unique measurements of a broad range of celestial targets, while providing vital complementary capabilities to other ground- and space-based facilities. Such an observatory would impact a wide variety of scientific programs, addressing topics across space astronomy, astrophysics, fundamental physics, and solar-system science, as well as being technologically informative to future large-aperture programs. It is expected to serve a broad national and international community through various science investigation programs, and as a vessel for impactful public engagement.

#### **ART Study**

The ART will identify high-impact science topical areas and goals for ASTRO-1. The goals will be achieved by meeting the specific objectives of scientific investigations pursued by observers requiring the use of a space-based observatory. Representative science observing programs and measurements to be made using the data obtained from the on-board instruments will be described in a Design Reference Mission (DRM) to be included in the ART study report. The DRM observing plan will drive the observatory and instrumentation capabilities and performance requirements in subsequent mission development phases.

In crafting the DRM, the ART should draw on the science goals and priorities of recent science community-based documents, such as National Research Council decadal surveys and national/multi-national space agency portfolio and/or mission planning reports, that can be carried out by a 1-2 meter class space telescope facility in the ultraviolet-visible spectral range, covering the core region from 115 – 1050 nm and possibly an extended region from 90 – 1800 nm. The representative investigations should be cast in the context of other extant or planned international ground and space facilities, emphasizing the unique measurements to be made with ASTRO-1. Approaches to crowdsourcing and citizen science should be explicitly considered in the formulation of scientific programs. Modeling the performance of the observatory and assessing possible technical implementations, including examples of analogous space observatory concepts and applicable state-of-the-art technologies, should also be included in the ART report, bearing in mind that cost control will be a central tenet of the mission development.

#### **Membership**

The ART will comprise approximately 10 members plus the Chair(s). ART members will be selected by the BoldlyGo Institute from the respondents to the Call for Letters of Interest. Member selections will strive to achieve breadth among scientific topics, with emphasis on experience implementing impactful scientific programs on space and ground telescopes. ART members will have demonstrated proficiency at observation planning and execution; data reduction, pipeline processing, and archiving; and analysis, interpretation, modeling and dissemination of results. Members may also have expertise in mission development and technology pertinent to observatory and instrumentation design. Scientific areas may include, but not be limited to: Solar System science; exoplanets & astrobiology; star & planetary

formation; stellar astrophysics, evolution & populations; interstellar & intergalactic medium; origins of the elements; galactic structure & feedback; galaxy clusters & interactions and black holes; large-scale structure, dark matter, dark energy & cosmology.

### **Structure**

The ART Chair(s) will be selected from the pool of ART membership Letters of Interest by the BoldlyGo Institute. The ART Chair(s) will act as the official point of contact between the ART members and the BoldlyGo Institute for any programmatic, technical, or budgetary issues.

ART members may interact with external scientists, observers and technologists during the study period. ART members should consider forming International Science & Technology Working Groups to augment the interests they represent and to aid in evaluating observatory performance.

### **Period of Performance**

The ART will convene for approximately one year, operating until it has delivered its final study report to the BoldlyGo Institute and its partners. Some or all members of the ART may be requested to continue their service to disseminate the ART report's contents to broad scientific and general audiences, such as at scientific and non-professional conferences, or via media interviews.

### **Meetings and Logistics**

Meetings will be called by the ART Chair(s). The Chair(s) will coordinate the agendas and logistical arrangements with the BoldlyGo Institute. A phone-in organizational meeting is expected to take place shortly after the ART members are announced in late 2015. The first in-person meeting is expected in early 2016, possibly contemporaneous with or adjacent to the American Astronomical Society winter meeting in Kissimmee, FL, in January 2016. ART members can expect to meet in-person approximately one or two additional times during 2016, and to conduct phone-in meetings as needed. Travel expenses for attending ART meetings will be supported by BoldlyGo Institute upon request, particularly for those who do not have other means of travel support.

### **Dissemination of Information**

The ART study report is expected to be made widely available, to BoldlyGo Institute and its partners/supporters, the astronomical sciences community and industry, the broader space community, and to the public. Discussion or disclosure of ART study results or status shall be coordinated with BoldlyGo Institute prior to any communication beyond the ART and its working groups.

### **Contact**

Information about the ART will be posted to <http://astro-1.org/art>. Questions about the ART, ASTRO-1 space telescope or BoldlyGo Institute can be sent to [ART@boldlygo.org](mailto:ART@boldlygo.org).

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