Roadmap to the Future

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Deputy Chief Scientist: Susan Neff
Program Executive: John Gagosian
Program Scientist: Mike Garcia
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• “Astrophysics Implementation Plan has been prepared by the Astrophysics Division of NASA’s Science Mission Directorate... to respond to the decadal survey recommendations within the current budgetary constraints.”
# Mission Concepts

<table>
<thead>
<tr>
<th>Strategic Mission Concepts</th>
<th>Derived from Recommendation</th>
<th>Status of Studies</th>
<th>Candidate Plan(s) for Future Mission</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFIRST: Large Strategic Mission (DRM1)</td>
<td>Large 1st : WFIRST</td>
<td>Completed in 2012</td>
<td>Large mission for mid-decade</td>
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<tr>
<td>WFIRST: Probe-size Strategic Mission (DRM2)</td>
<td>Large 1st : WFIRST</td>
<td>Completed in 2012</td>
<td>Probe for mid-decade</td>
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<tr>
<td>Use of 2.4m telescope assets to advance science of WFIRST</td>
<td>Large 1st : WFIRST (Medium 1: New Worlds Technology)</td>
<td>Started in 2012</td>
<td>Large mission for mid-decade</td>
</tr>
<tr>
<td>Gravitational Wave missions to advance science of LISA</td>
<td>Large 3rd : LISA Technology</td>
<td>Completed in 2012</td>
<td>Large mission for next decade; international partnership</td>
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<tr>
<td>X-ray missions to advance the science of IXO</td>
<td>Large 4th : IXO Technology</td>
<td>Completed in 2012; under consideration for study in 2014</td>
<td>Probe for mid-decade; Large mission for next decade; international partnership</td>
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<tr>
<td>Exoplanet probes to advance the science of a planet characterization and imaging mission</td>
<td>Medium 1st : New Worlds Technology</td>
<td>Planned for 2013; SDT opportunity just announced</td>
<td>Probe for mid-decade; large mission for next decade</td>
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<tr>
<td>Cosmic Microwave Background Polarization Probe</td>
<td>Medium 2nd : Inflation Probe Technology</td>
<td>Study under consideration for study in 2015</td>
<td>Probe or large mission for next decade</td>
</tr>
<tr>
<td>Science + technology drivers for a UV/Visible mission</td>
<td>Small: (Definition of) a future UV-optical space capability</td>
<td>Started in 2012</td>
<td>Probe or large mission for next decade</td>
</tr>
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</table>
• Guided by other Decadal Survey prioritized recommendations, identify mission concepts that can be developed within a probe-class budget while addressing the science objectives of Decadal Survey prioritized recommendations.

• For the mission concepts thereby identified, develop a technology development plan so that the schedule and cost of maturing the technologies to TRL-6 [by] the three Astrophysics Division focused program offices.

• Map the technology funding requirements from the above exercise to the available funding in this decade.
Mission in 2017

- **FY2012**
  - Study WFIRST options
    - DRM1 completed
    - DRM2 completed
    - AFTA study continuing

- **FY2013**
  - Study other options for astrophysics missions
    - Moderate mission concepts that address Decadal Survey priorities have been identified (see Table 6)
    - Establish Study Teams for mission concepts
    - Initiate mission concept studies within the programs
    - Use community analysis groups to inform process

- **FY2014**
  - Complete mission concept studies
    - Bin mission concepts
      - Large mission candidates
      - Probe-class mission candidates

- **FY2015**
  - Conduct prioritization and decision for new strategic mission based on:
    - Decadal Survey priorities
    - The existing budget wedge
    - Mission life cycle cost
    - Mission technology investment needs
    - Advances in science
    - Community input

- **FY2016**
  - Complete NRC Mid-Decade Review

- **FY2017**
  - Formulation new start for strategic mission

- **2013 Jan 6 COPAG Workshop**

- Directed Technology investments for prime candidate

- Technology Investments through SAT for prioritization

- Technology Investments through SAT for 2020 Decadal Survey

- Continuing advice from the Committee on Astronomy and Astrophysics on decadal survey implementation
• Identify the detailed science drivers for a future ultraviolet/visible space telescope that could considered in the 2020 decadal survey
• Then, identify the technology drivers necessary & invest
• RFI process (cf. Paul Scowen’s summary) to determine science requirements
• Current plans are for second RFI to be released in FY 2013 to solicit mission concepts and mission enabling technologies. Second workshop will be held to identify notional mission concepts & technology requirements
• Mission trade studies envisioned to inform technology investment decisions during latter half of decade
• Is a mission/instrument RFI necessary?

• Would it generate anything new?
Long-Term?

• Approaching time to leave previous decadal and work towards next decadal

• What technologies are needed to be ready?
• Which mission concepts must be prepared?
One path: design around limited experiments, but make generally available

COR
Probe
Suite of
Experiments
• One path: design around limited experiments, but make generally available

• Idea: set of reference investigations
  Tool to calculate performance
  Evaluate each investigation parametrically
  Build probes from good matches
  Develop each probe as separate study
Deliverables?

- **SAG #1**: Science objectives for a 4m–8m UV/Optical mission
- **SAG #2**: Technologies for a 4m-class monolithic telescope UV/Optical mission w/internal coronograph.
- **SAG #3**: Technologies for an 8m-class segmented telescope UV/Optical mission w/external occulter.
- **SAG #4**: Technologies for a future far-IR mission
- **SAG #5**: Science objectives & technology requirements for a series of Cosmic Origins Probes.
• Participation envisioned by decadal survey unlikely

• How to fulfill science promise in its absence?