

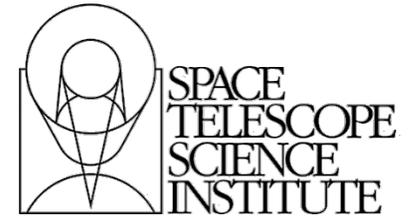
# WFIRST SCIENCE STUDIES

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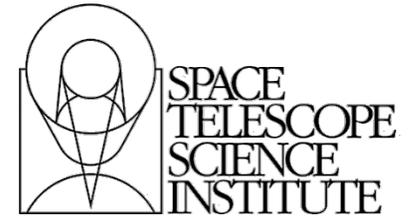
## WFIRST-AFTA Science Studies



- Joint effort of the Infrared Processing and Analysis Center and Space Telescope Science Institute
- Leverage combined strengths and experience with science operations, data processing, archiving for NASA's Great Observatories, and major UVOIR sky surveys
- Work closely with WFIRST-AFTA project science office to support ongoing mission definition and initial Science Center design and implementation
- Identified high priority tasks for FY2014 – FY2015.



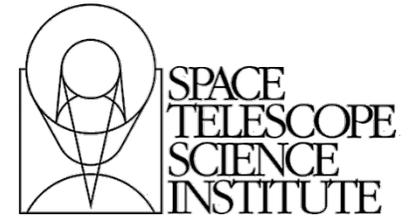
# High Priority Tasks



- Data simulation support and framework for unifying instrumental signatures on simulated sky scenes
- Community engagement
- Guide star network and calibration support
- Science instrument modes / reduction software
- Telescope scheduling efficiency study
- Ground system architecture support



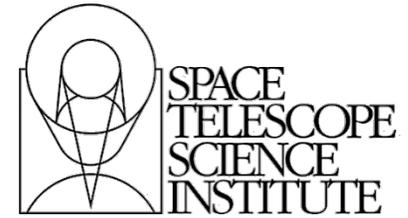
# Implementation



- One institution will coordinate each task, but staff from IPAC and STScI will work on ***all*** tasks
  - IPAC: Simulation support; community engagement
  - STScI: Instrument modes; Guide Star network study; Telescope scheduling efficiency
  - GSFC: Ground system architecture
- Work to be conducted in FY14 and FY15
  - Detailed schedules for each task being finalized now.



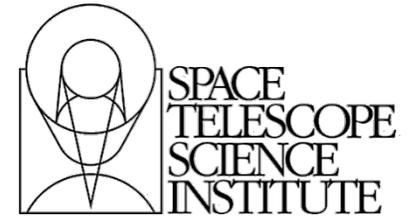
## Data Simulation Support



- Establish a repository for simulation information, tools and results
- Develop a common framework for AFTA WFI, Grism and Coronagraph simulation, focusing on robust instrument modules
- Develop spectral simulations to feed AFTA Grism simulator module
- Work with SDT and other simulation teams to support static and dynamic celestial scene simulations
- Develop prototype analysis pipelines to assess simulated performance



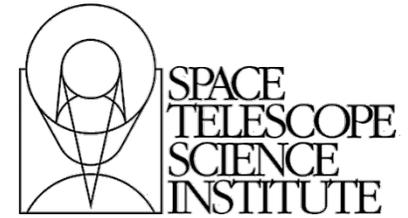
## Work With GSFC on WFIRST-AFTA Community Engagement



- Organize AFTA-based science workshops and conferences
  - e.g., 2014 IR Survey Science & Techniques Meeting in Pasadena; Summer 2015 “Mocking the Universe” Workshop in Baltimore
- Maintain presence at AAS Meetings through dedicated sessions and workshops
- Establish collaborative WFIRST-AFTA website with basic information, news, slide sets, and access to tools and simulation framework
  - Single point-of-access for latest information for the community
- Provide support to Project Science Office on WFIRST-AFTA Science Book



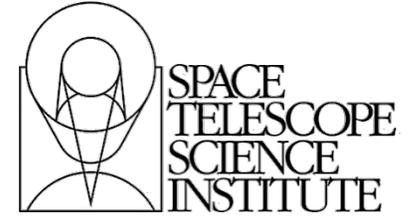
# Guide Star Network Study



- Define the WFIRST/AFTA requirements for Guide Star (GS) surface density, limiting magnitude, astrometric and proper motion knowledge.
- Compare these requirements with the existing and planned GS catalogs for HST, Spitzer and JWST, and new datasets provided by WISE and GAIA
- Are additional GS data and/or enhanced astrometric precision required by WFIRST/AFTA? If so, develop plan to acquire such data and/or reach such precision.
- Prepare report on compatibility of the existing or planned GS catalogs for use with WFIRST/AFTA.



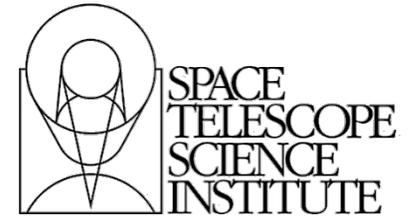
# Instrument Modes / Data Reduction Software



- Study the options for the WFIRST/AFTA Grism observing mode & data reduction software.
- Determine if existing grism packages (e.g., aXe) can be modified to meet the WFIRST/AFTA needs.
- Study the options for the Coronagraph observing mode & post-processing analysis software.



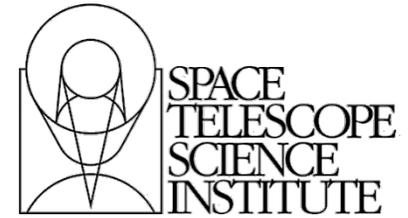
# Telescope Scheduling Efficiency Study



- Study telescope on-target efficiency using proven space telescope optimized scheduling tools (based on HST, Spitzer, JWST, GALEX).
- Develop a preliminary model for the science data products and the archive ingest volume as a function of time since launch.
- Perform a trade study on the feasibility of any on-board data processing tasks vs. extra processing capabilities in the ground segment systems.



# Ground System Architecture Support



- Work in collaboration with the GSFC WFIRST/AFTA Project office to:
  - Assist with overall science implementation concept
  - Prepare the initial layout of an end-to-end concept of how the WFIRST/AFTA ground-segment element will operate.
- Assist with development of a model for the overall science center operations to improve the precision of resource and schedule estimates.
  - Investigate re-use strategies from other SOC models