Description and Objectives:
• Develop the 16 megapixel H4RG-10 near-IR detector array to TRL-6 for WFIRST in time for the Astrophysics Mid-Decadal Review
• WFIRST Science Definition Team identified the H4RG-10 as the critical enabling technology that is needed for achieving the aims of the Astrophysics Decadal Survey New Worlds, New Horizons
• Mature this technology to minimize risk, cost, and schedule
• Reduce the persistence and noise of large format high resolution infrared array detectors

Key Challenge/Innovation:
• Hybridization improvements to meet WFIRST pixel operability requirements in 4K x 4K, 10 µm/pixel format
• Pixel design improvements to meet WFIRST read noise requirements and reduce persistence

Approach:
• Teledyne study to improve pixel interconnect yield
• Teledyne study to optimize process and improve read noise
• Fabricate lot splits of H4RG-10s at Teledyne
• Characterize H4RG-10s vs. WFIRST requirements in Goddard Detector Characterization Laboratory (DCL) and Teledyne
• Characterize H4RG-10s for WFIRST weak lensing and persistence at JPL/CalTech
• Environmental testing for TRL-6

Key Collaborators:
• Jason Rhodes (JPL: Institutional PI)
• Donald N.B. Hall (University of Hawaii)
• Bryan Dorland (U.S. Naval Observatory)
• Ed Cheng (WFIRST)
• Roger Smith (CalTech)

Development Period:
• FY13 – FY15

Accomplishments and Next Milestones:
• Demonstrate pixel interconnect operability yield >98%: Sept 2013
• Demonstrate an H4RG-10 that meets WFIRST performance requirements: Dec 2013
• Demonstrate an H4RG-10 that meets WFIRST environmental requirements: Dec 2014
• Complete TRL-6 demonstration: End of performance period

Application:
• WFIRST
• Explorer class near-IR missions
• Ground and space based astrophysics programs
• This is a broadly enabling technology for astrophysics

\[ TRL_{in} = 4 \quad TRL_{current} = 4 \quad TRL_{target} = 6 \]