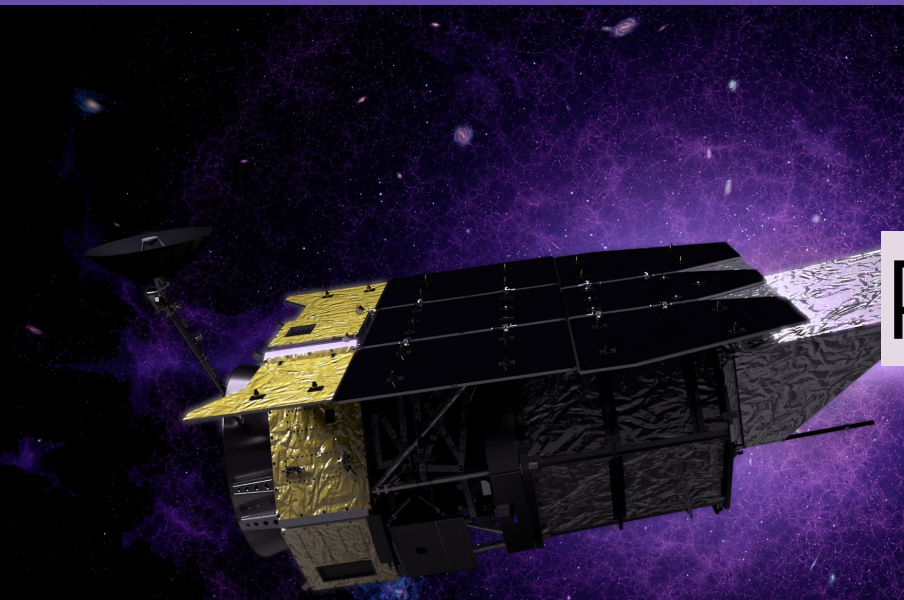
Science Recommendations for Pilot Surveys of the Nancy Grace Roman Space Telescope (Part 1 of the workshop organised by the Cosmology with the HLS SIT, Sep 16 2020)



Report on the Pilots Workshop

Dida Markovic & Olivier Doré
JPL/Caltech

Roman Science Interest Group Meeting, Feb 5, 2021

Roman Pilots Workshop(s)


Amelia Earhart

- Pilot surveys under consideration for Roman
- Half-day workshop on Sep 16, 2020 with 50 invited participants to:
  - Define what is a pilot survey (c.f. commissioning, science verification, baseline survey)
  - Formulate explanatory set of prototype pilot surveys
- Not part of top-level process - workshop purpose is to:
  - Inform top-level how to design the process
  - Gather ideas and make some science recommendations
- Hoping to hold another workshop (2-3 days) to produce a detailed document as a menu of options
- *Here's a summary...*
  (might say same thing multiple times coming from different people)

Definitions (from Project Office)

- It was not clear where commissioning ended and Pilots started.
- Commissioning:
  - In Orbit Checkout = observatory activated and brought to state of readiness for nominal science operations
  - In-flight:
    - Observatory verification (technical checks)
    - Science Verification (noise levels and “dry-run”)
    - Baseline calibrations (to define!)

- ***Project Perspective*** *(Jeff Kruk & Julie McEnery)*
- ***What Could We Aim For?*** *(moderated by Claudia Scarlata and David Spergel)*
- ***What Should We Measure?*** *(moderated by Olivier Doré and Dida Markovic)*
  - ***HLSS*** *by Anahita Alavi & James Colbert*
  - ***HLIS*** *by Ami Choi & Jenna Freudenburg*
  - ***HLTDS*** *by Rebekah Hounsell*
  - ***GBTDS*** *by Jessica Lu & Matthew Penny*
  - ***GO: Extragalactic*** *observations by Sangeeta Malhotra & Brant Robertson*
  - ***GO: Nearby Galaxies*** *by Ben Williams*
- ***How Do We Optimise Collaboration within the Roman Community?*** *(Anton Koekemoer, Harry Ferguson, Lee Armus)*

Definitions (from Project Office)

- Pilots
  - Pilots should provide additional science-enabling tests
  - Part of baseline mission
  - After commissioning
  - As part of surveys
    - no more than few percent
    - no extra time allocated!
  - Informing full survey planning:
    - Optimize strategy: providing minimal dataset to finalize survey implementation
    - Evaluation by Project
  - Address unique needs of individual surveys

This was then discussed and elaborated in the workshop.

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Pilot Aims (workshop discussion summary)

testing

- Pilots as a “Beta test” of
  - Observing modes
  - Software pipelines
  - Community use of Roman
- Demo that instruments can conduct planned surveys
  - Instrument check
  - Performance of strategy
  - Performance of pipelines
- Test community interaction
  - Show off Roman capabilities to get engagement
  - Test technicalities of data and code releases early

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Pilot Aims (workshop discussion summary)

Science

- Early groundbreaking science
  - Great press releases to get early public engagement
  - Competitiveness with parallel experiments
- Early Ultra Deep Field with overlaps with existing data
  - discovery potential
  - calibration
  - useful for all (⇒ *Roman Key Project?*)
  - vs cluster surveys (e.g. eRosita…)
- GO pilots motivated by science as regular (competed) GOs? (*legacy survey pilots from legacy survey time anyway*)
  - Could also be informed by legacy survey pilots

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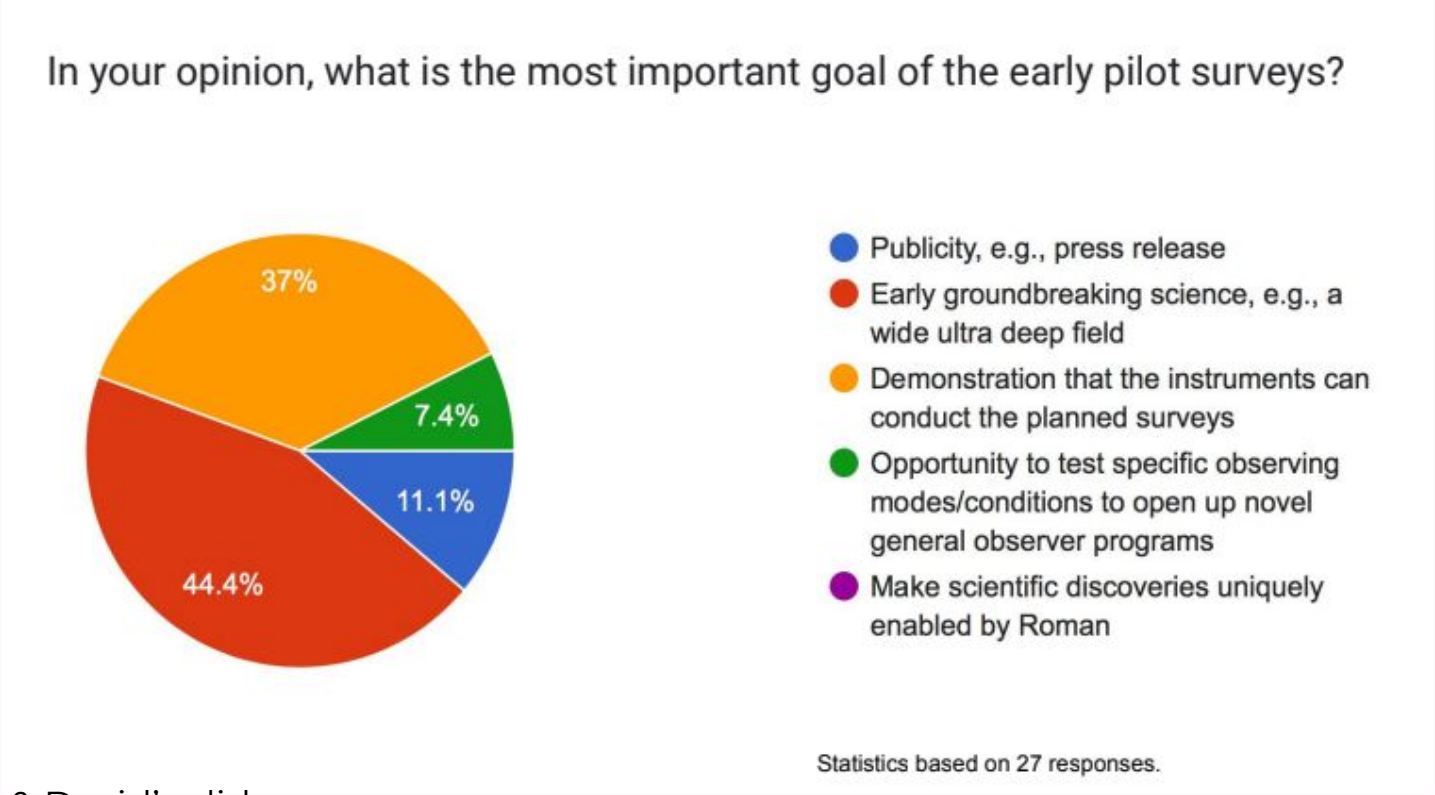
Summary of Workshop 1: Survey Results



Claudia & David's slide

Common goals

- Calibration and understanding uncertainties
  (*completeness, purity, detector characterisation, systematics…)*
- Science validation
  (*target number density, target properties…)*
- Testing and optimization
  (*survey depth vs area, pipelines, data analysis methods verification, joint analysis, community involvement…)*
- Discovery
  (*overlaps with existing data, early science, unique science from depth…)*

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Form of pilots (depends on survey)

- Mini-survey (e.g. the TDS)
  vs
- Aim to test specific aspects & pushing further

- In one chunk
  vs
- Spread out

- One-at-a-time
  vs
- Interleaving

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Summary

- Productive discussions:
  - **strong interest** in pilots!
  - could be very impactful in many ways (science, publicity, etc..)
- Progress in defining pilots vs commissioning and SV
- With help from other groups need to define:
  - boundary conditions for pilots more precisely in future (*Project*)
  - available SOC/SSC products/tools (*SOC-SIT WG*)
  - detailed example pilots (*in document and a second workshop, community?*)

Action Items (towards Workshop 2)

- Refine plans:
  - Identify time sensitive observations (RGES, SNe)
  - Identify needed ground based observations
  - Be agile in their planning (time constraints for RGES) or community results (HLS)
  - ...
- Consolidate (if possible):
  - calibration work across surveys and SOC/SSC
  - consolidate pipeline work across surveys
  - preliminary observing campaigns across teams
- How do we identify new ideas not presented, i.e. not thought of by the current SITs? (several good propositions from workshop already)