

HST/GSFC Project Report

Presentation to: **STUC**

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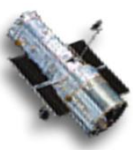
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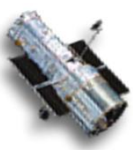
Kevin Hartnett
HST Science Operations Manager

12 April 2012



Topics

- **Science Highlights, AAS mtg and beyond**
- **Mission Operations**
 - Spacecraft Performance
 - Automated Operations
 - Sustaining Engineering Activities
- **Upcoming Science Center Review**
- **Senior Review Results**

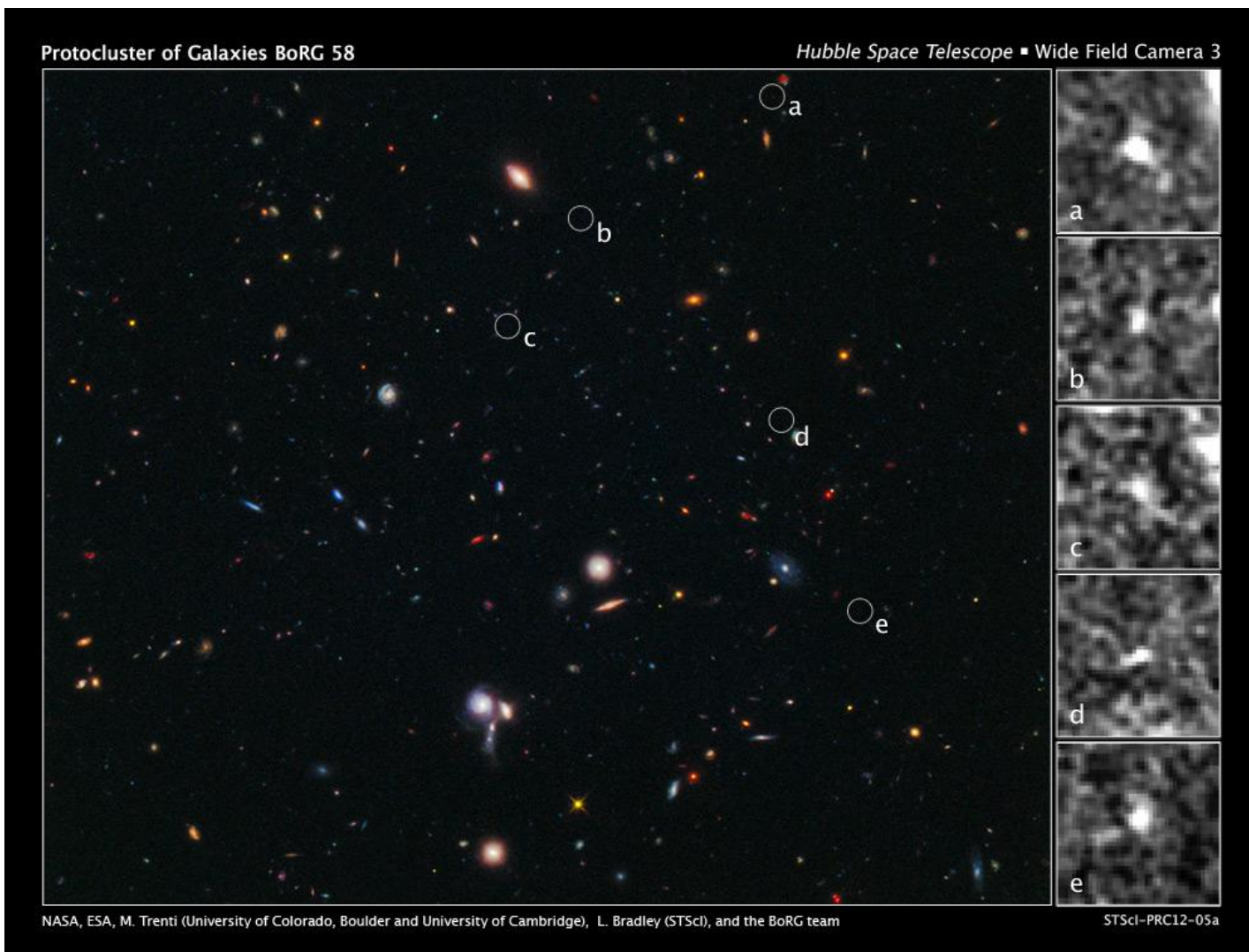


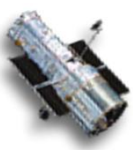
HST at the 2012 January American Astronomical Society Meeting, Austin TX

- Hubble Science was a very strong presence at the meeting in many talks, posters, and exhibits (and an independent film!)
- Five press conferences:
- Protocluster of Galaxies at $z=8$ (Trenti) "HUBBLE PINPOINTS FARTHEST PROTOCLUSTER OF GALAXIES EVER SEEN"
- Andromeda blue stars (Dalcanton) "RARE ULTRA-BLUE STARS FOUND IN NEIGHBORING GALAXY'S HUB"
- Andromeda double nucleus (Lauer) "HUBBLE ZOOMS IN ON DOUBLE NUCLEUS IN ANDROMEDA GALAXY"
- SN Primo (Rodney/Riess) "NASA'S HUBBLE BREAKS NEW GROUND WITH DISCOVERY OF DISTANT SUPERNOVA"
- SNR 0509 Progenitor (Schaefer) "HUBBLE SOLVES MYSTERY ON SOURCE OF SUPERNOVA IN NEARBY GALAXY"



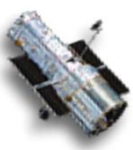
HST Views Farthest Protocluster Ever Seen



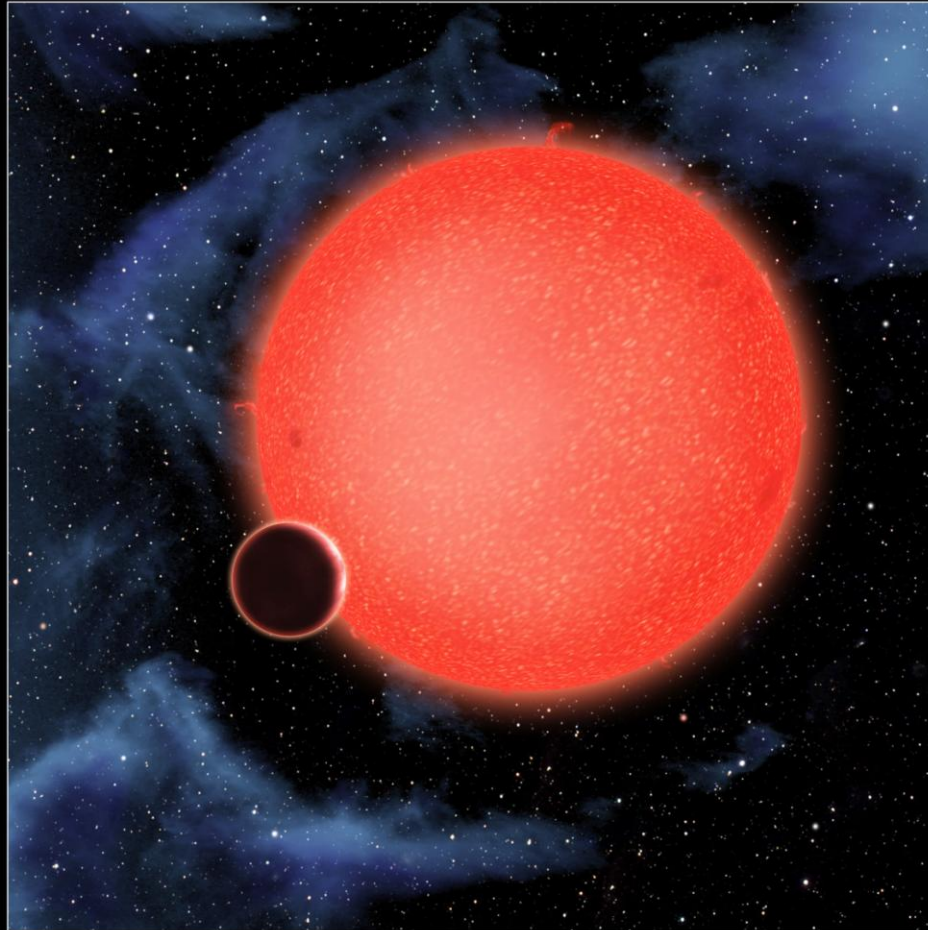


Supernova from merging white dwarfs!





Steamy Waterworld?

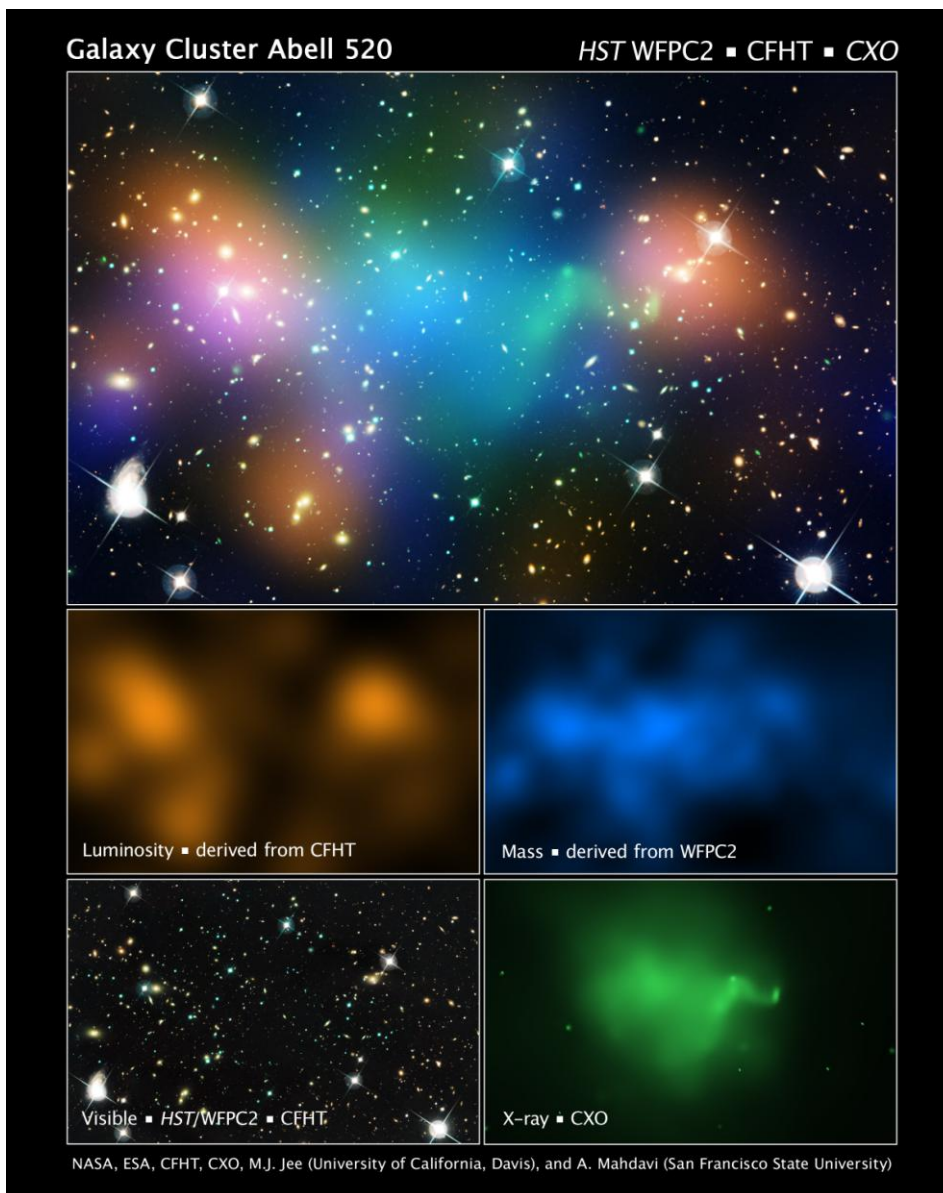


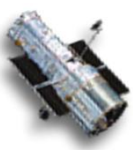
Artist's View of Extrasolar Planet GJ1214b

NASA, ESA, and D. Aguilar (CfA) ■ STScI-PRC12-13



Cluster Collision Mystery: Dark Matter Not Tied to Galaxies?





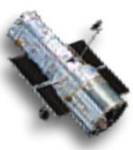
Mission Operations

- **Spacecraft Performance**

- All spacecraft subsystems performing well
- Gyros 4,5,6 currently in use; nominal performance

- **Automated Operations**

- Working as designed
- Flight Operations Team reduced from 35 FTEs to 10; single shift M-F
- Science Data Capture has been 99.9%+
- Solid State Recorder (SSR) automated re-dumps
 - Implemented in mid-December with some known “special case” limitations
 - 100% data capture February
 - 105 packets were lost on March 23rd
 - Period of high volume science data collection (sustained > 60% SSR capacity)
 - Significant number of re-dump requests due to RF interference
 - New science collection treated with higher priority; re-dump requests not serviced
 - PI responded that the science investigation was not adversely impacted
 - Evaluating lessons learned



Mission Operations

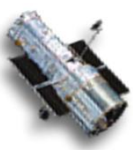
● Sustaining Engineering Activities

- Attitude Observer Anomaly (AOA) mitigation
 - Attitude Observer Initialization (AOI) patch
 - Uses rates derived from Fine Guidance Sensors during target acquisition sequence to accelerate controller convergence and maintain lock
 - Uplinked February 2, 2012
 - Historical Observer
 - Complements AOI patch
 - Algorithm Description Document and Systems Requirements Review completed
 - Populates historical time bins along orbit period with gyro bias values to aid subsequent target acquisitions/re-acquisitions
 - Expect to have available for operations in November 2012
- Reduced Gyro Reduced Wheel (RGRW) Safemode
 - Provides safe pointing control with only two operational reaction wheels
 - Flight Readiness Review on April 10, 2012
- Life Extension Initiatives
 - Reviewing previously identified areas of work
 - Goal is to affirm/update relative priority with resources in mind



Upcoming Science Center Review

- **April 25th at STScI**
- **Will Address two issues**
 1. What activities do each science center feel they are doing well that they want to share with the other centers.
 2. Setting aside budget issues, what does each science center feel are constraints in current policies that impede their ability to do better?
- **Will produce two products:**
 1. A document that summarizes best practices in constituting and running a science operations center for a NASA mission. NASA HQ intends to use this as a reference in defining the characteristics of SOCs for future missions.
 2. A document providing constructive feedback to NASA HQ on potential improvements in policy issues.
- **The latter document should be completed at, or very shortly after, the workshop. The former document has the potential to have long-term impact and therefore requires more time and thought in production, but a consensus summary should be completed within one month of the workshop.**



Results of Senior Review – Project Perspective

- **Written Proposal submitted January 2012**
- **Oral Presentation made February 2012**
- **Senior Review Committee Final Report Delivered April 2, 2012**
- **Major Comments and Recommendations**
 - Recognized HST provides excellent, cutting edge science; earned highest score in “discovery space”, and “critical capability”
 - SRC recommended an extension through 2016 with review in 2014
 - SRC did not recommend any augmentation requests
 - SRC recommended that HST vigorously pursue ways to accelerate cost reduction without compromising mission safety even if some science is not enabled
- **Planned HSTP Actions**
 - PPBE-14 (NASA internal budget process) now in progress
 - Building budget to existing guidelines (no augmentation, but no decreases either, from Senior Review)
 - Plan to “fully fund” GO/AR grants through FY14; FY15 and beyond will require identification of cost reductions in other segments
 - Work diligently to balance performance, risk, and cost goals
- **Discussion (All)**