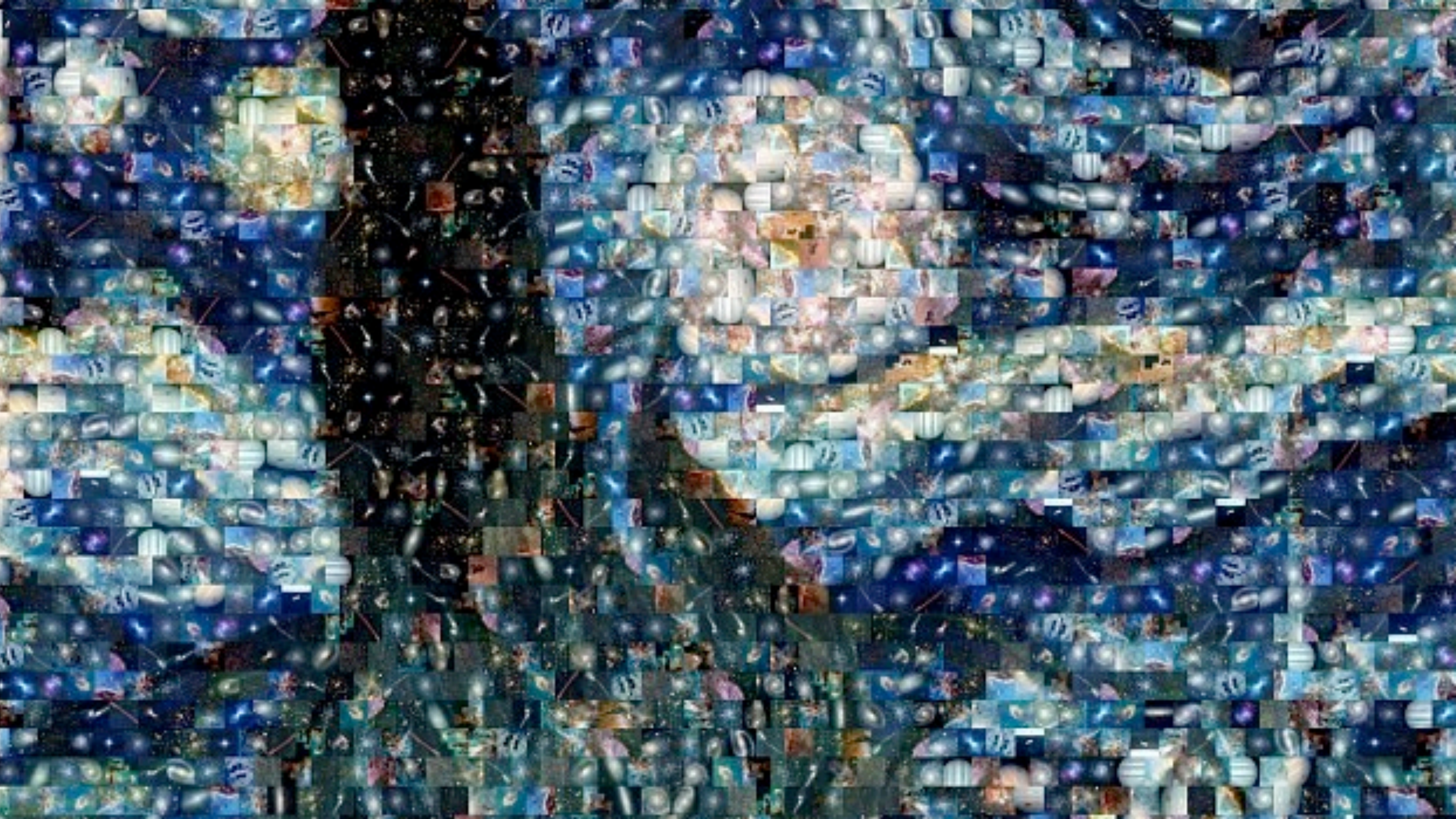
STUC (November 2012)

New Leadership

Science highlights

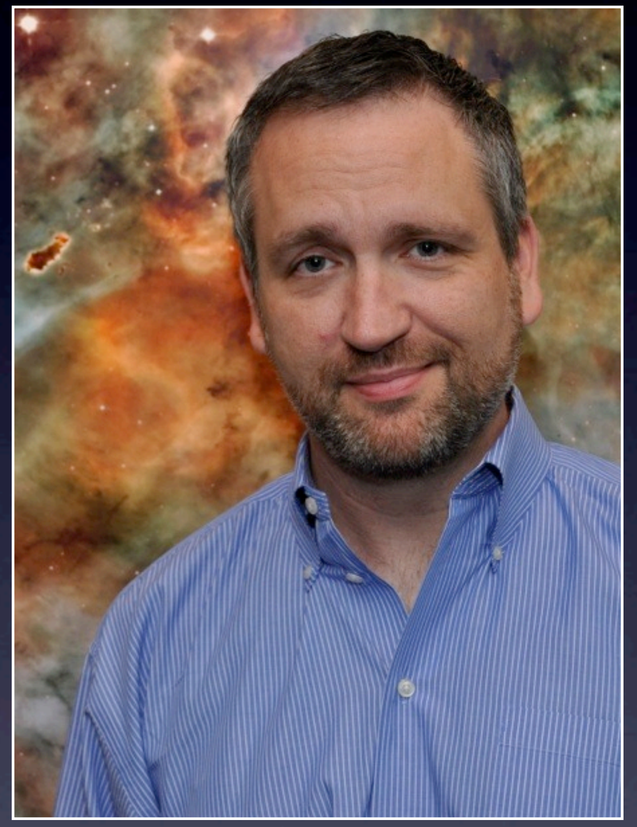
Budget issues

NRO telescope
(if we have time)



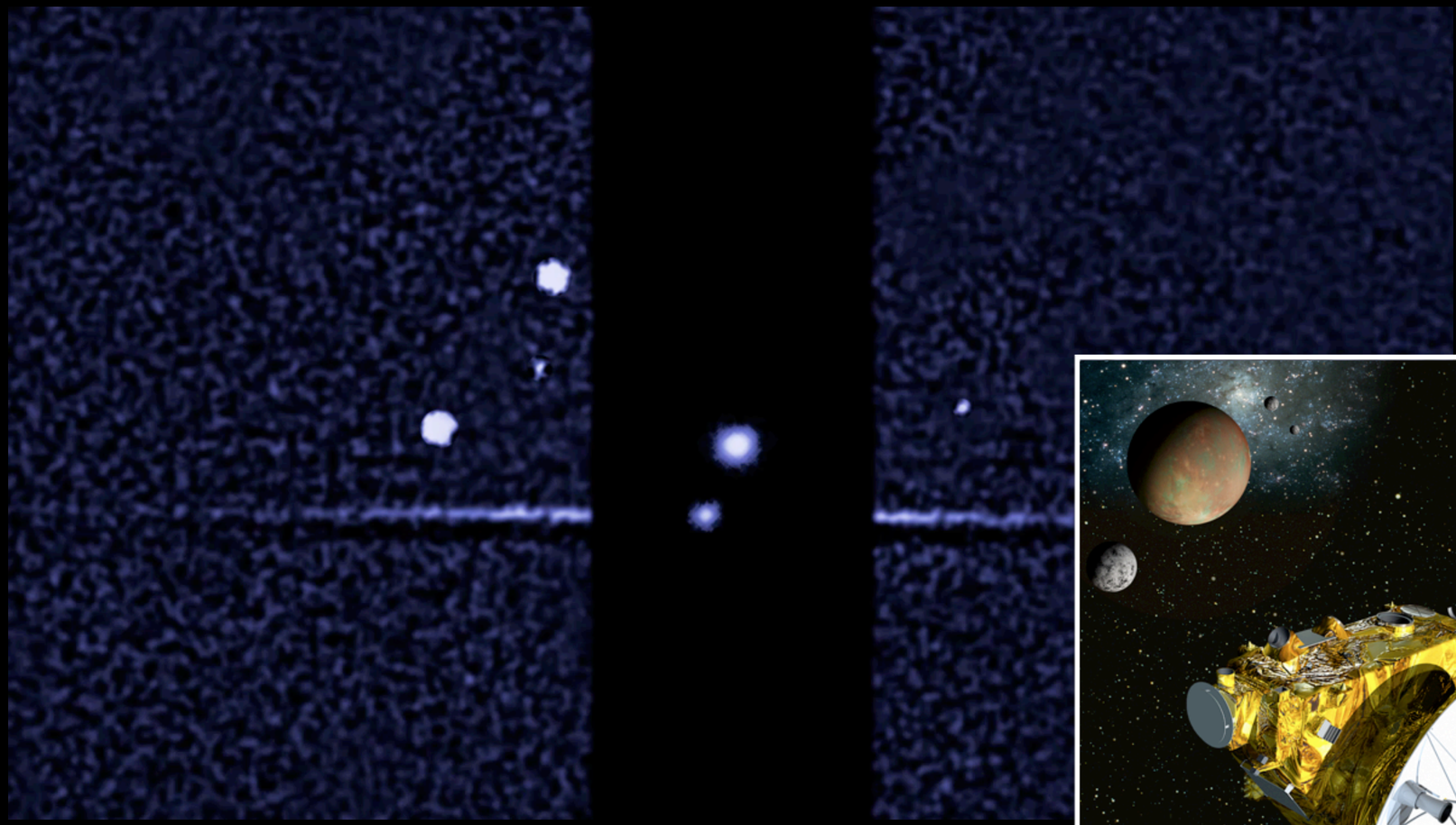
Kathy Flanagan
Deputy Director

Hussein Jirdeh
Office of Public Outreach

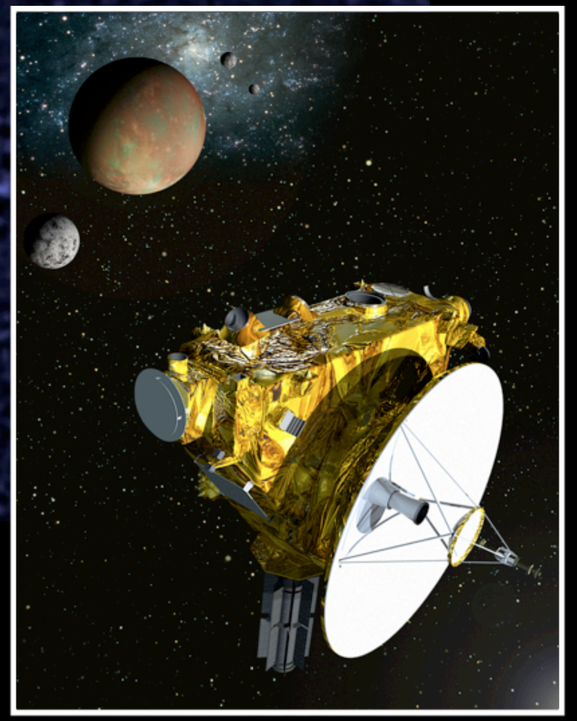


David Liska
Information Technology Services

In support of New Horizons, Hubble discovers a fifth moon orbiting Pluto



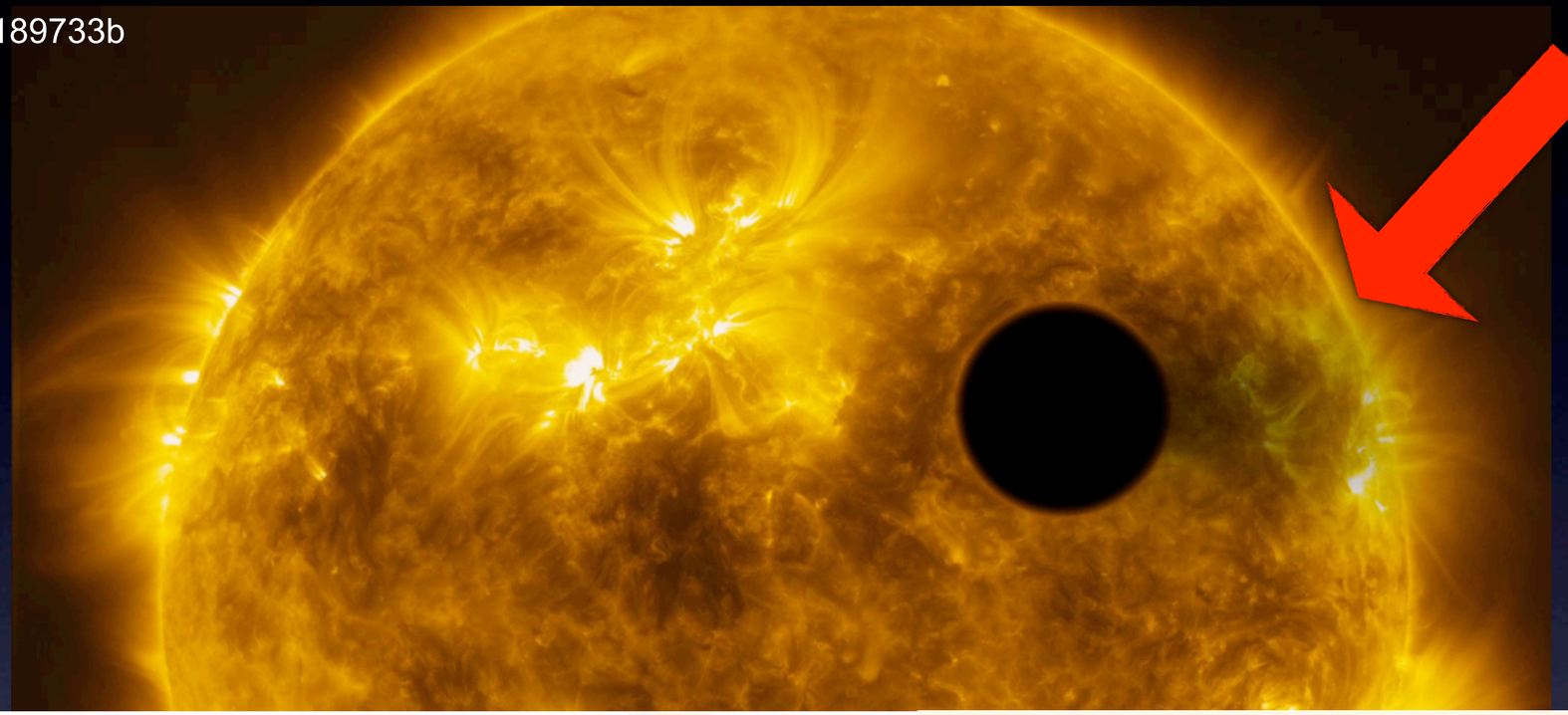
New Horizons Pluto encounter July 2015

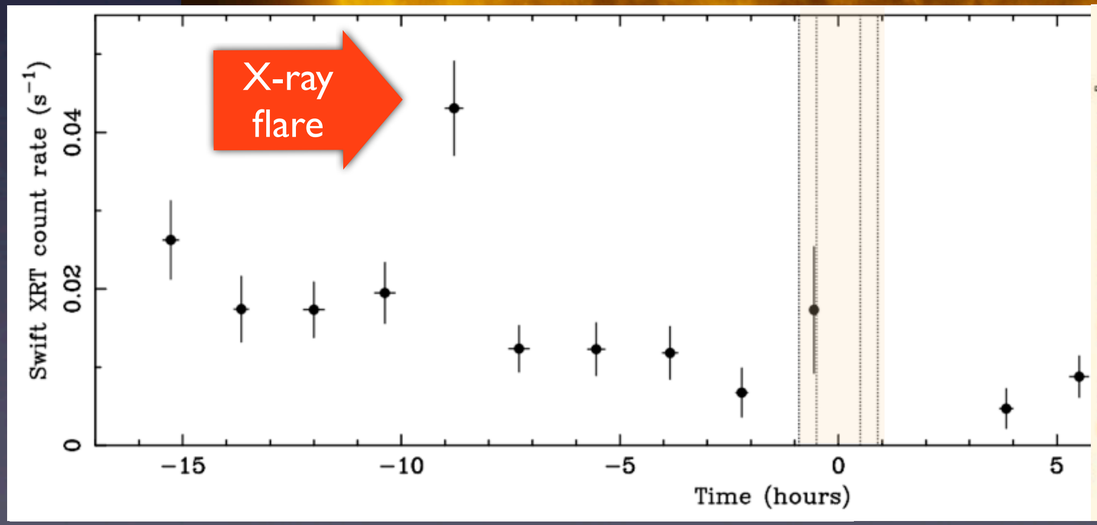


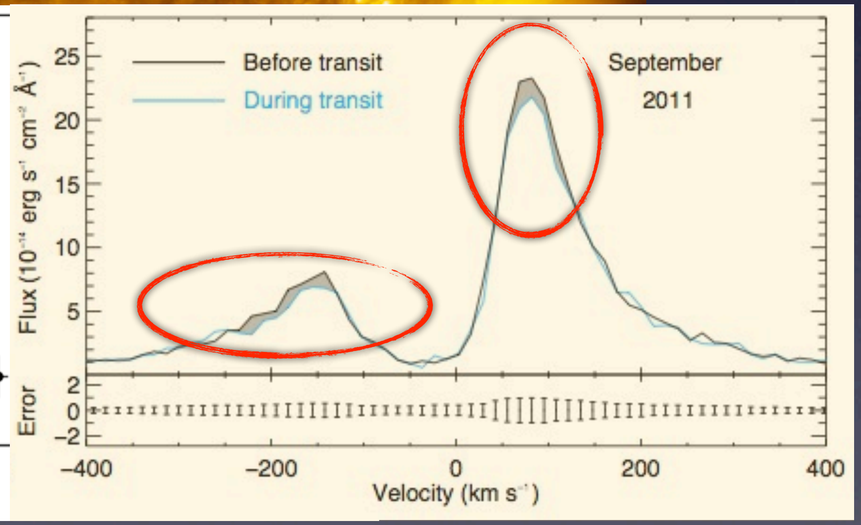
significant trajectory adjustments now required

Atmospheric evaporation in exoplanet due to a stellar flare

Simulation of HD 189733b





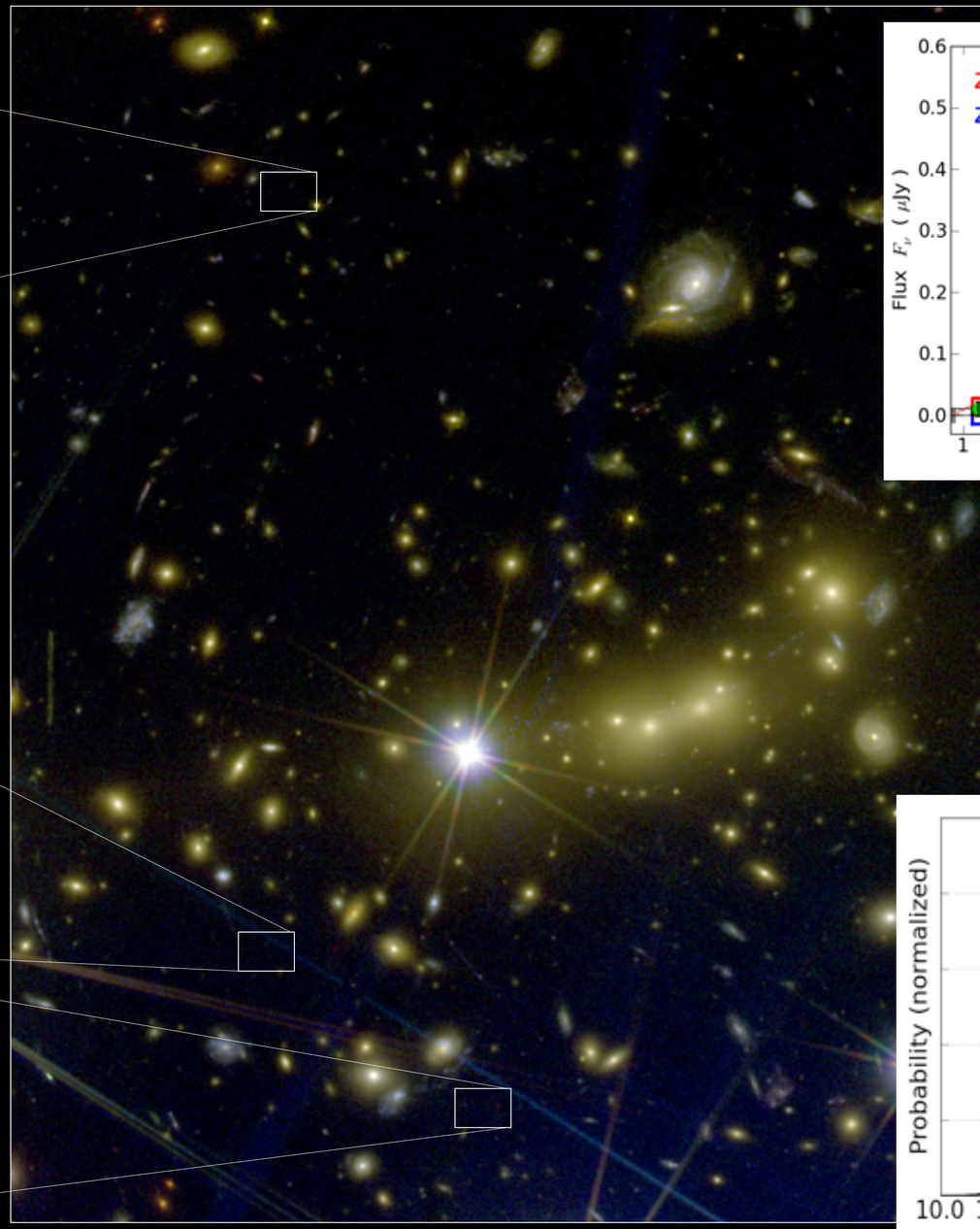


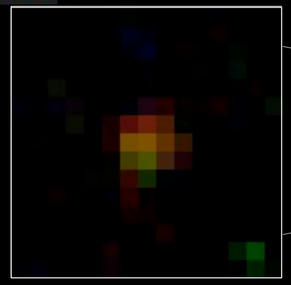
Swift & HST/STIS

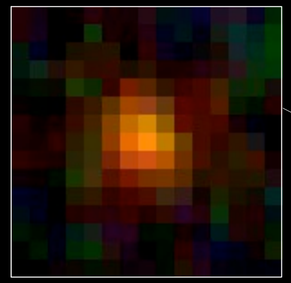
Lecavalier des Etangs et al 2012

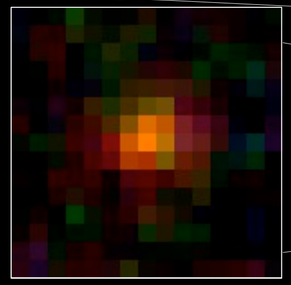
Simulation: NASA, ESA, L. Calçada, Solar Dynamics Observatory

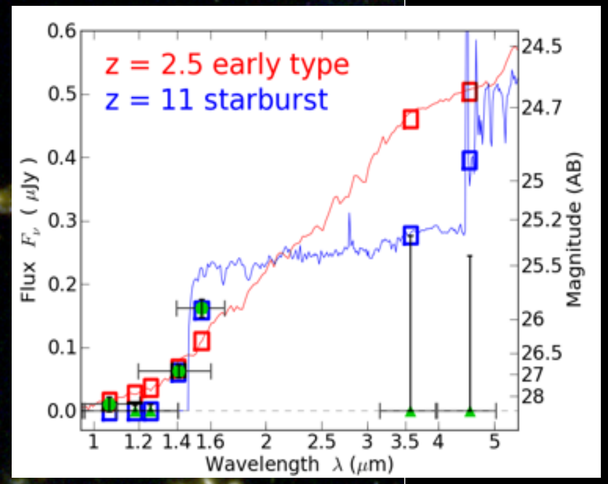
Lensed images of a candidate z ~ 11 galaxy

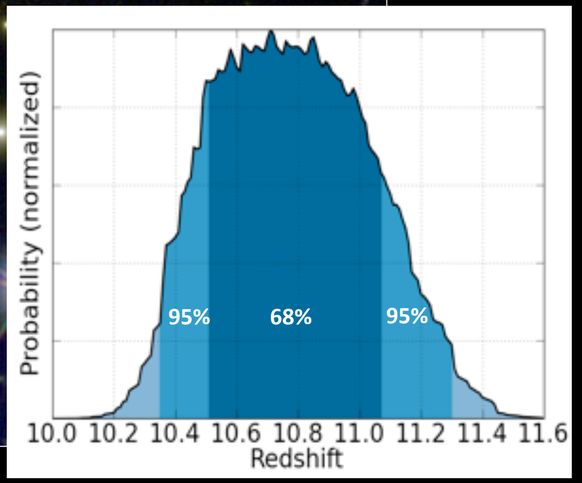






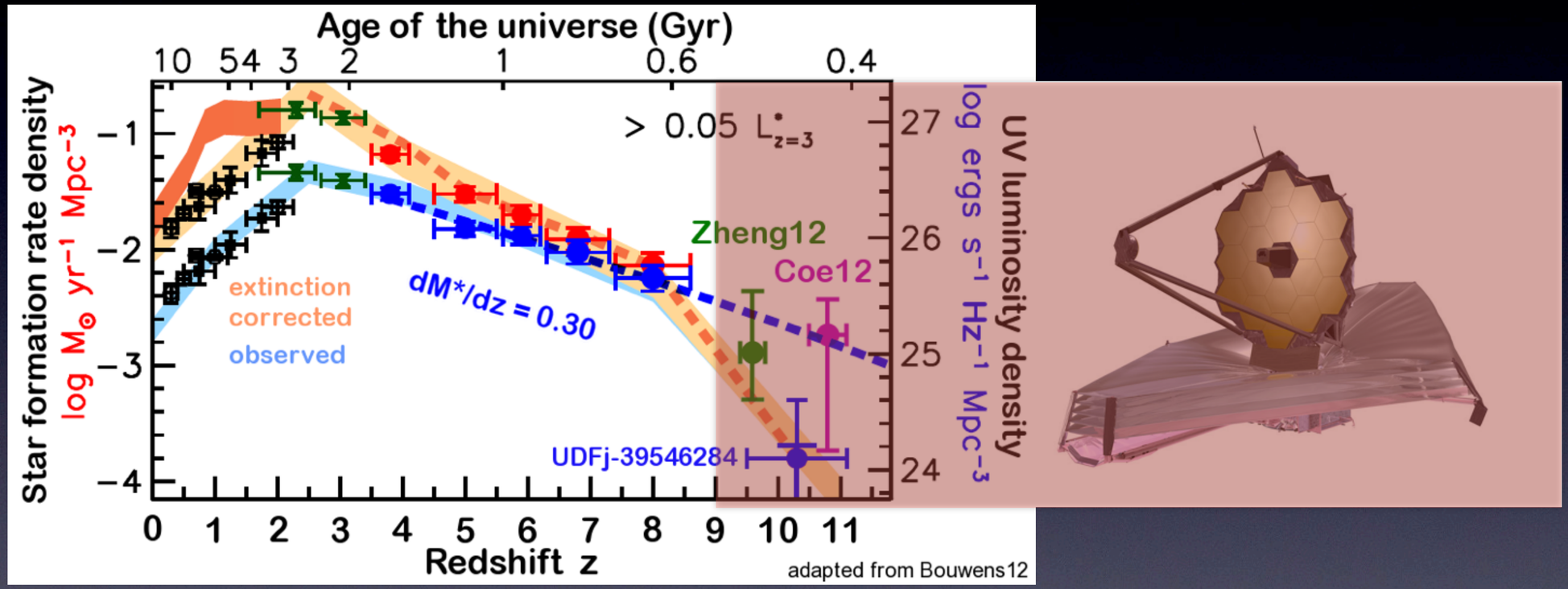






Coe et al. submitted to ApJ

CLASH candidates at z ~ 9.6 and 10.7 in 78 arcmin^2 are consistent with observed z ~ 8 luminosity function (Bradley12) lensed and extrapolated to higher redshifts.

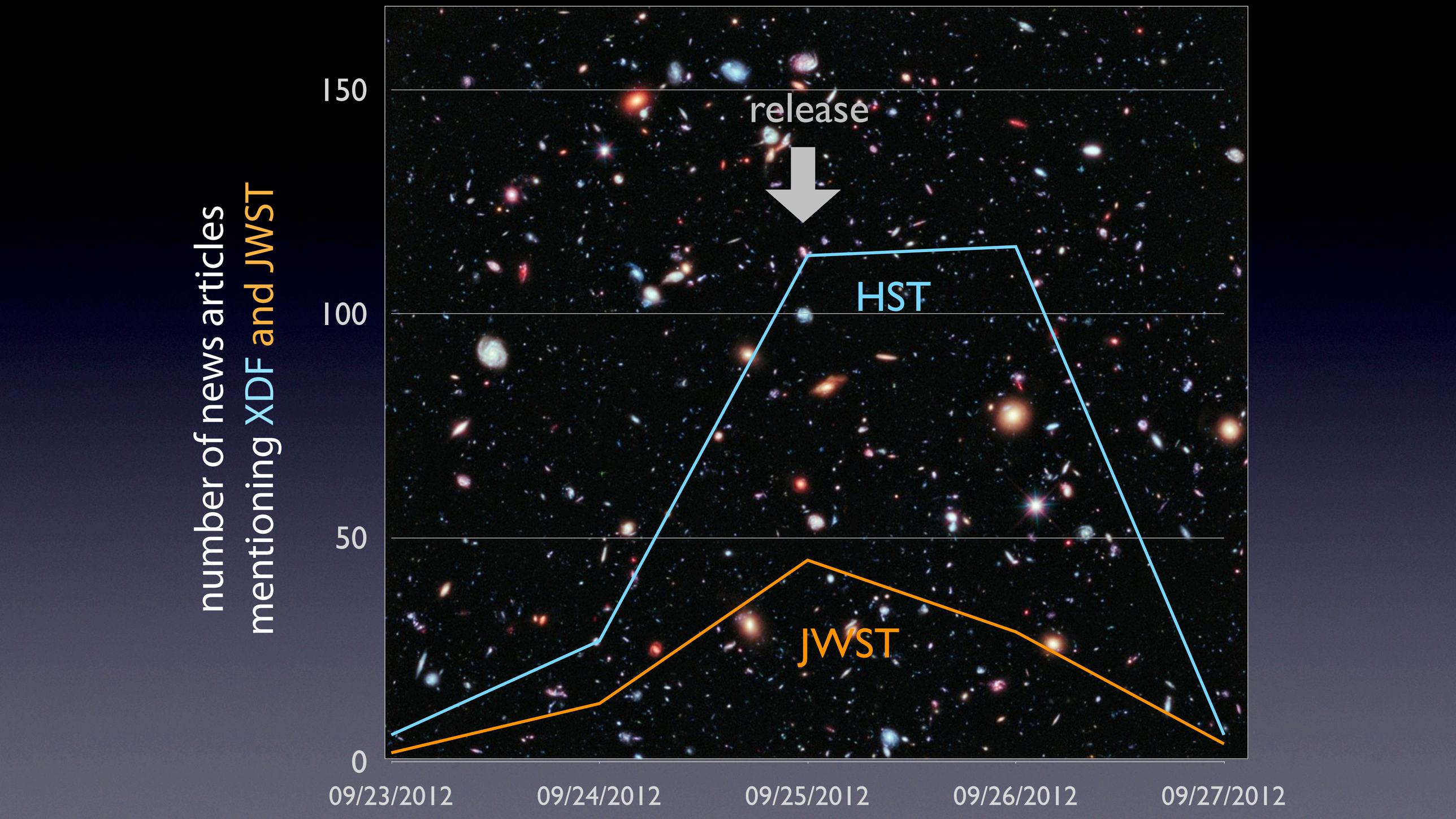


But in ‘tension’ with field results which suggest a sharp drop off in star formation rate density in the < 200 Myr between z ~ 8 and 10

- could be an even richer Universe for JWST

Hubble Extreme Deep Field
ACS & WFC3/IR
courtesy G. Illingworth

Hubble Extreme Deep Field
ACS & WFC3/IR
courtesy G. Illingworth


number of news articles
mentioning XDF and JWST
150
100
50
0
release
HST
JWST
09/23/2012
09/24/2012
09/25/2012
09/26/2012
09/27/2012

1st Annual
CITIZEN ENGAGEMENT

Hubble for the people!

JAMBOREE!

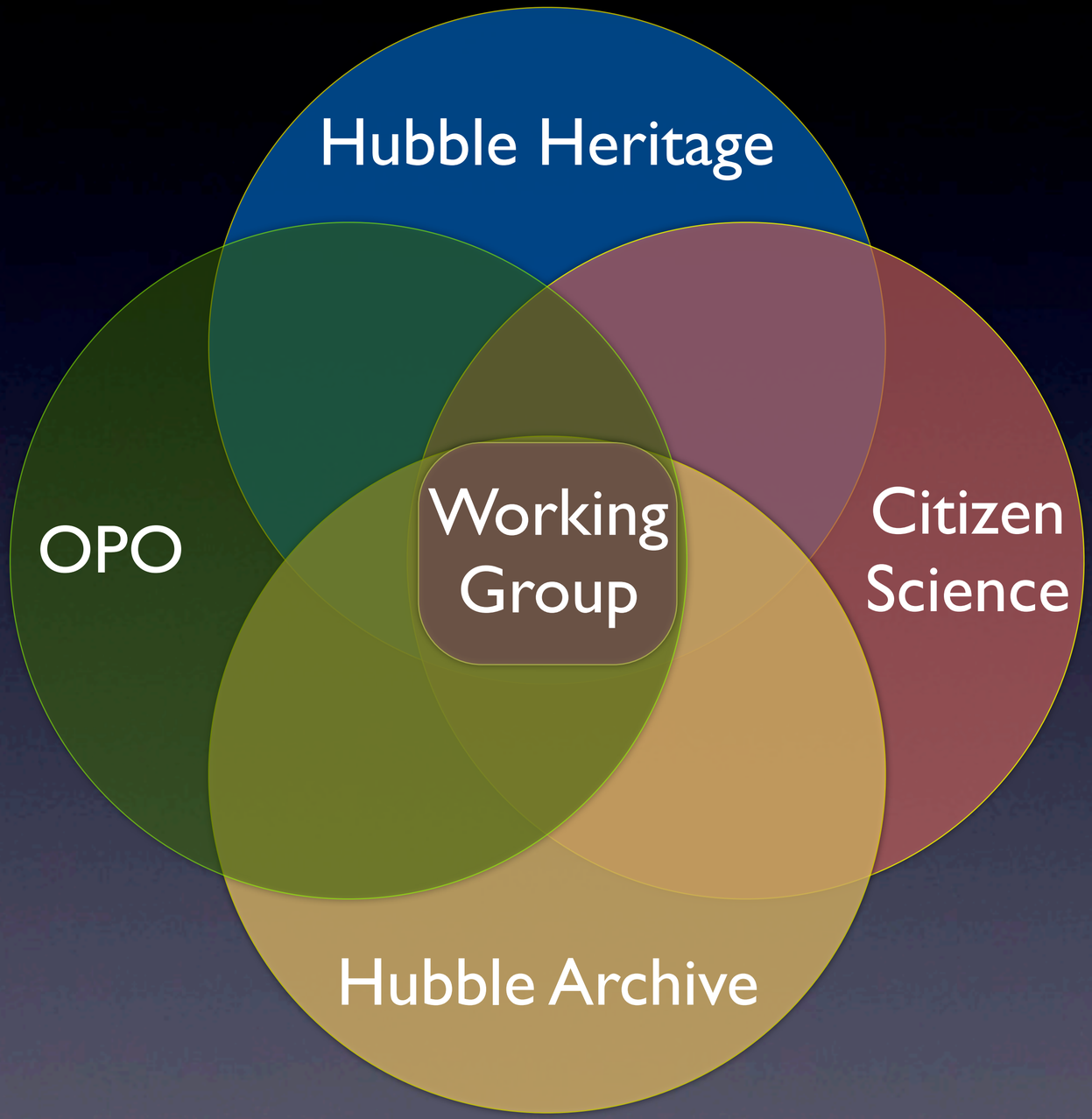
Monday, July 16
11 AM - 1 PM

EXPLORING THE SYNERGY BETWEEN THE:

OFFICE OF PUBLIC OUTREACH
HUBBLE HERITAGE
CITIZEN SCIENCE
& THE HUBBLE ARCHIVE

- Watch the creation of a Hubble Heritage image!
- Make your own color image using the Hubble Legacy Archive!
- Watch the creation of a 3-D image!
- Try your hand at one of the Citizen Science Projects!
- Consider submitting an E PO grant associated with your cycle 20 Hubble proposal!

LIGHT REFRESHMENTS WILL BE SERVED!
starting at 10:30
http://hla.stsci.edu/citizen_science/Citizen_Science.html



“ At this stage, we're looking at Hubble telescope-length distances between campaign ads and reality”.

GM Spokesman Greg Martin
- 30th Oct 2012

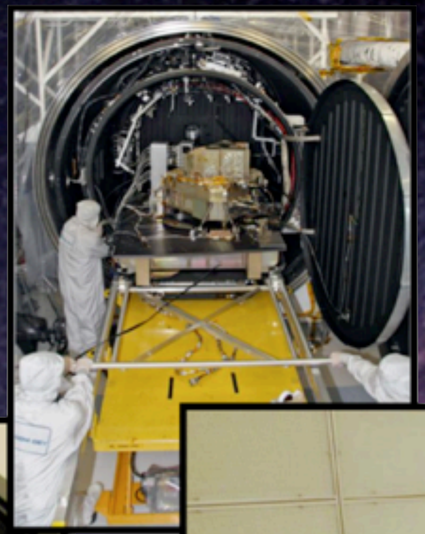
Instruments operating normally

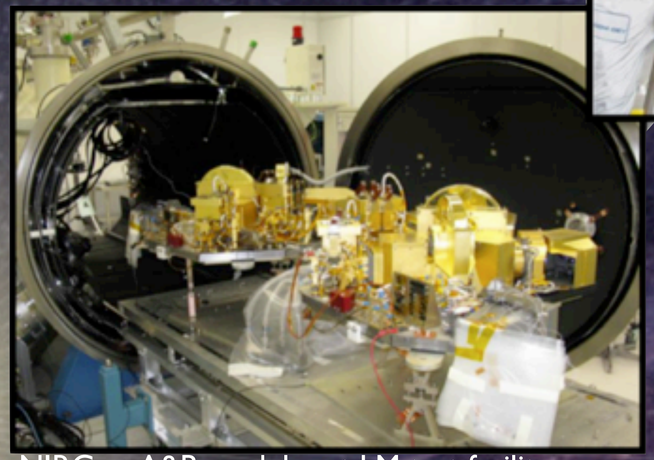
(see Ken Sembach's presentation)

Instruments and ISIM integration and test under way

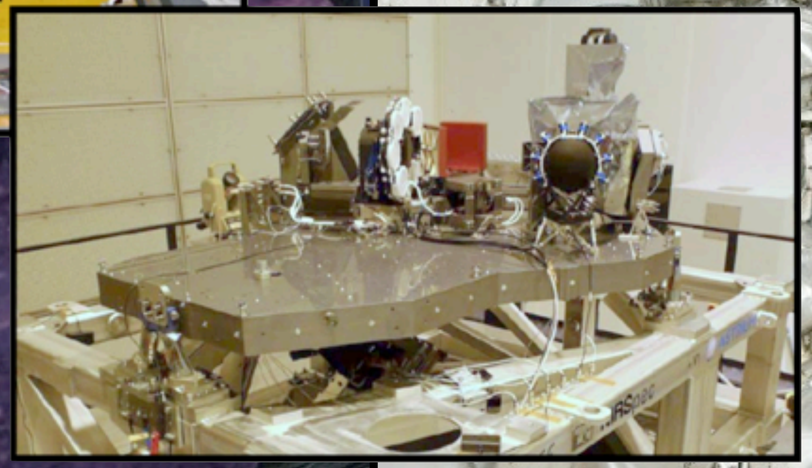
MIRI now at GSFC

FGS/NIRISS completing its CV testing





NIRCam A&B modules at LM test facility



NIRSpec instrument being reassembled

primary mirrors complete and ready for shipping

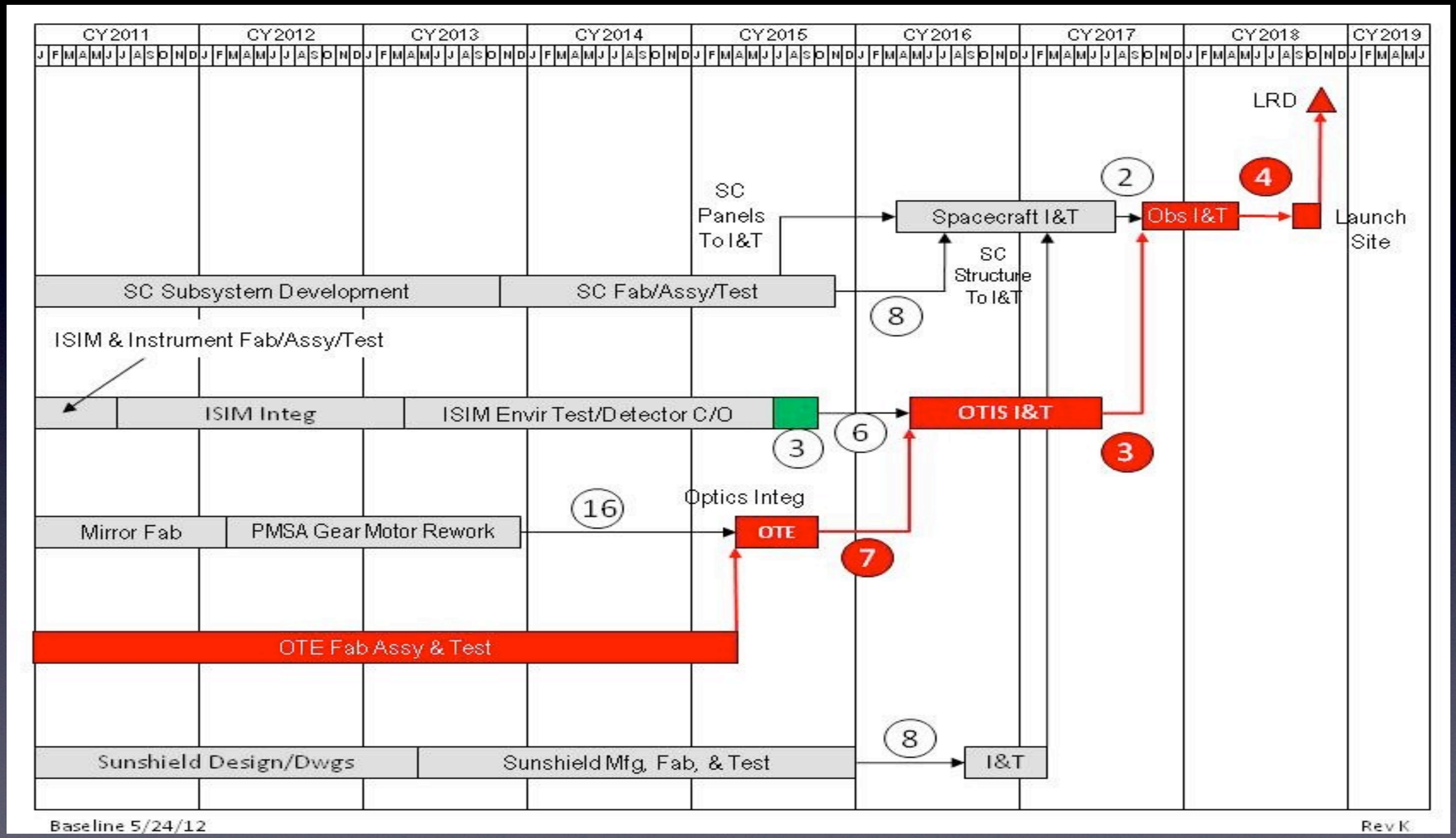
Credit: Ball Aerospace

James Webb Space Telescope Program FY12 Milestones

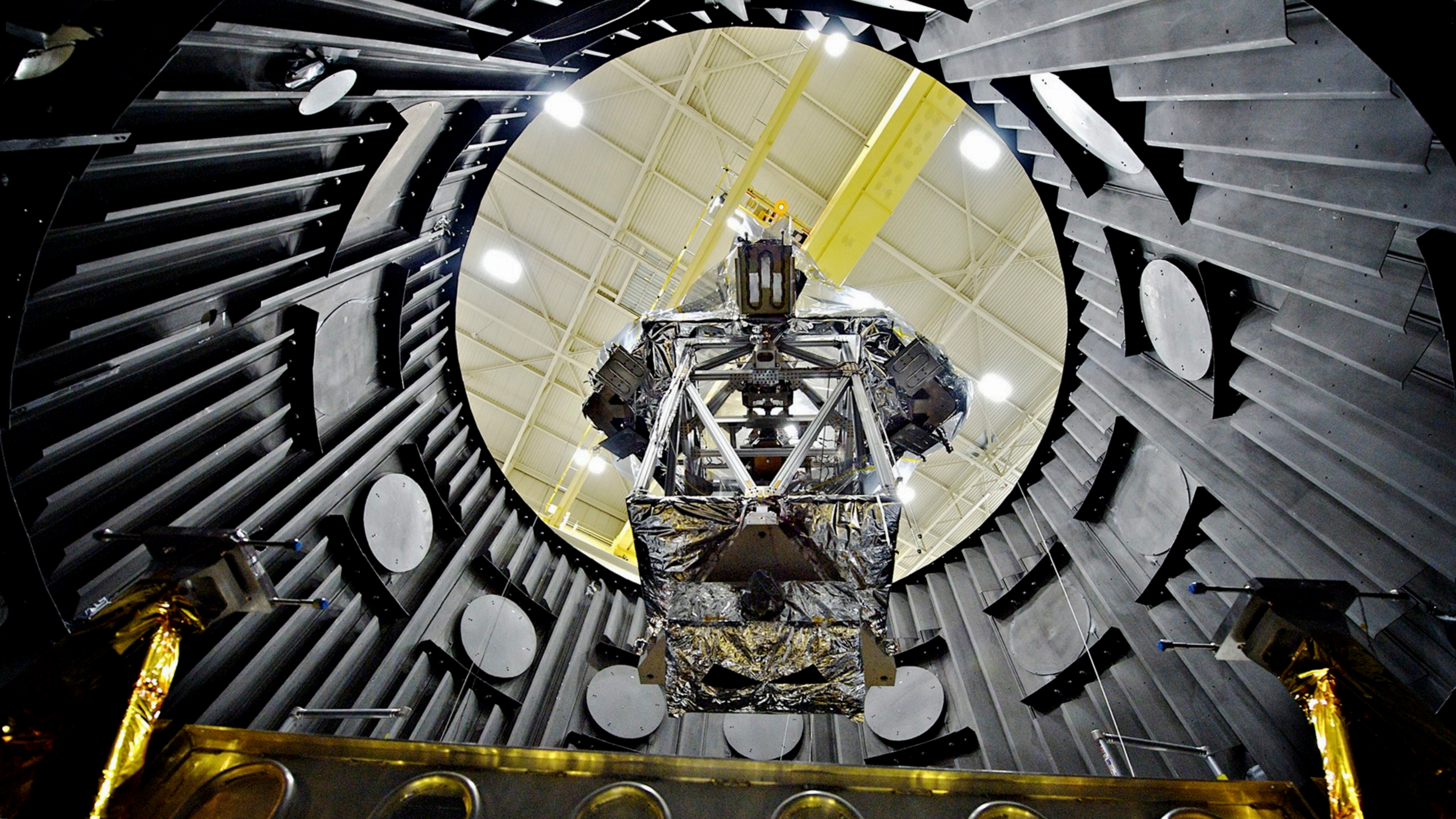
Apr '12	Receive Flight Mid-infrared Instrument (MIRI) from Europe, first of the telescope's four science instruments	Received 5/29
	Complete Critical Design Review for Sunshield Support Structure Complete all composite parts for mechanism that lifts telescope away from spacecraft after launch (Deployable Tower Assembly)	Completed 3/21 Completed 2/28
May'12	Finish testing the COCOA Measure Sunshield template layer 5 shape to confirm its accuracy Conduct budgetary and schedule review of initial program and project performance since completing the 2011 replan	Completed 3/9 Completed 4/23 Completed 5/30
Jun '12	Complete modifications of JSC TVC Complete Critical Design Review for telescope-ground communications system Complete designs for structures that will hold telescope inside JSC TVC Complete Preliminary Design Review for equipment that tests Sunshield deployment	Completed 6/30 Completed 6/13 Completed 6/21 Completed 6/28
Jul '12	Reach agreement with Program Office on FY13 spending plan Deliver Flight Fine Guidance Sensor ~~Deliver flight software to ISIM Integration and Testing ("ISIM I & T")~~ Complete Solar array Preliminary Design Audit Deliver MIRI Cryo Cooler "Cold Head Assembly" (critical component of MIRI cooling) to ISIM I&T Complete fabrication of end fitting for Secondary Mirror Support Structure	Completed 7/10 Completed 7/30 ~~Completed 5/11~~ Completed 6/14 Flight CHA to be delivered in June 2013. No schedule, impact, work around in place. Completed 7/13
Aug '12	Order remaining JSC thermal vacuum chamber vibration isolators	Completed 8/9
Sep '12	Deliver NIRCam Deliver telescope simulator for ISIM I&T Start testing of cryogenic camera system, used for subsequent JSC I & T Complete center section of Backplane Support Structure for main mirror Deliver NIRSpec	Moved to 12/2012, work In progress Completed 8/9 Completed 3/28 Delivery date 4/2013.

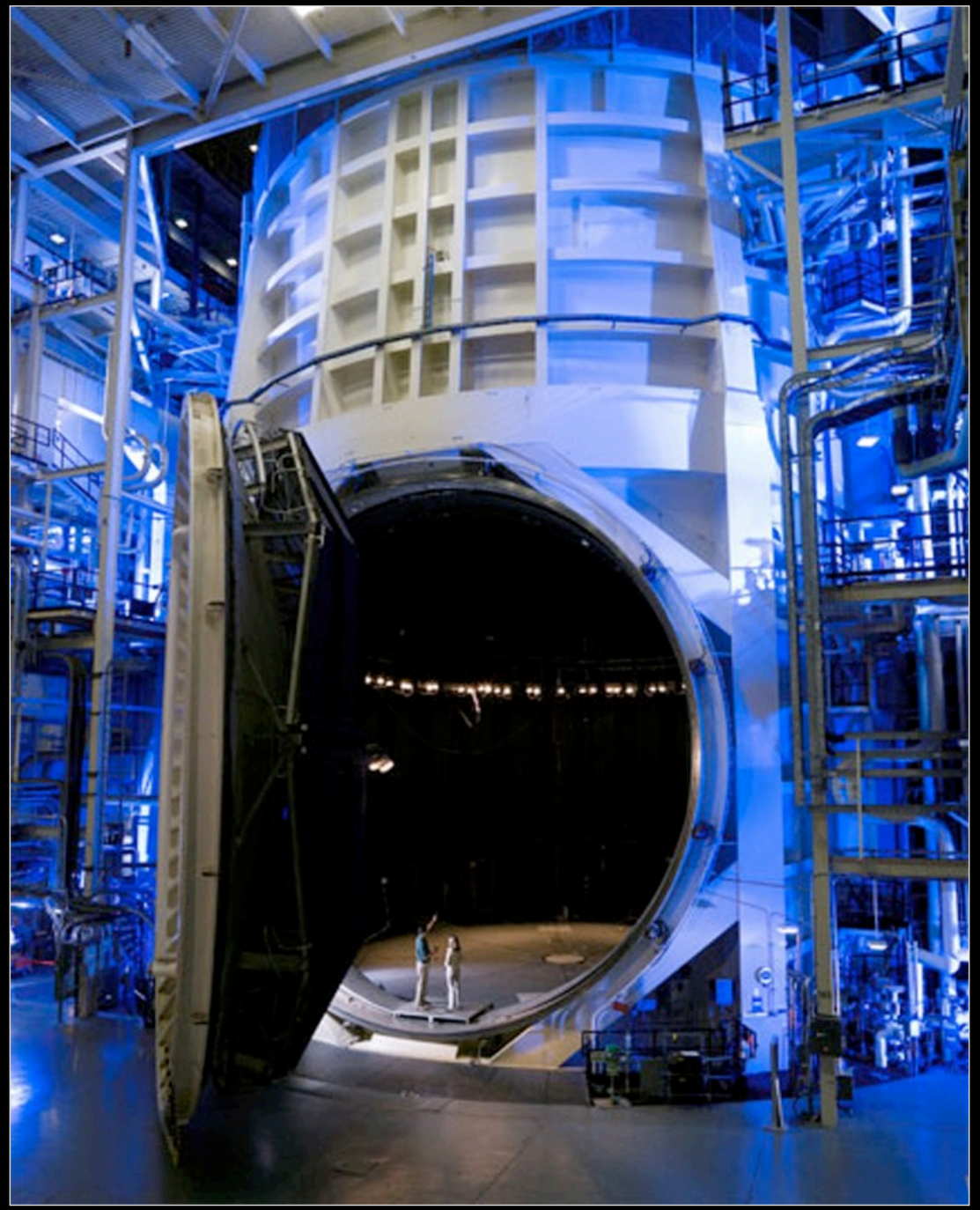
Blue font denotes milestones accomplished ahead of schedule, orange font denotes milestones accomplished late.

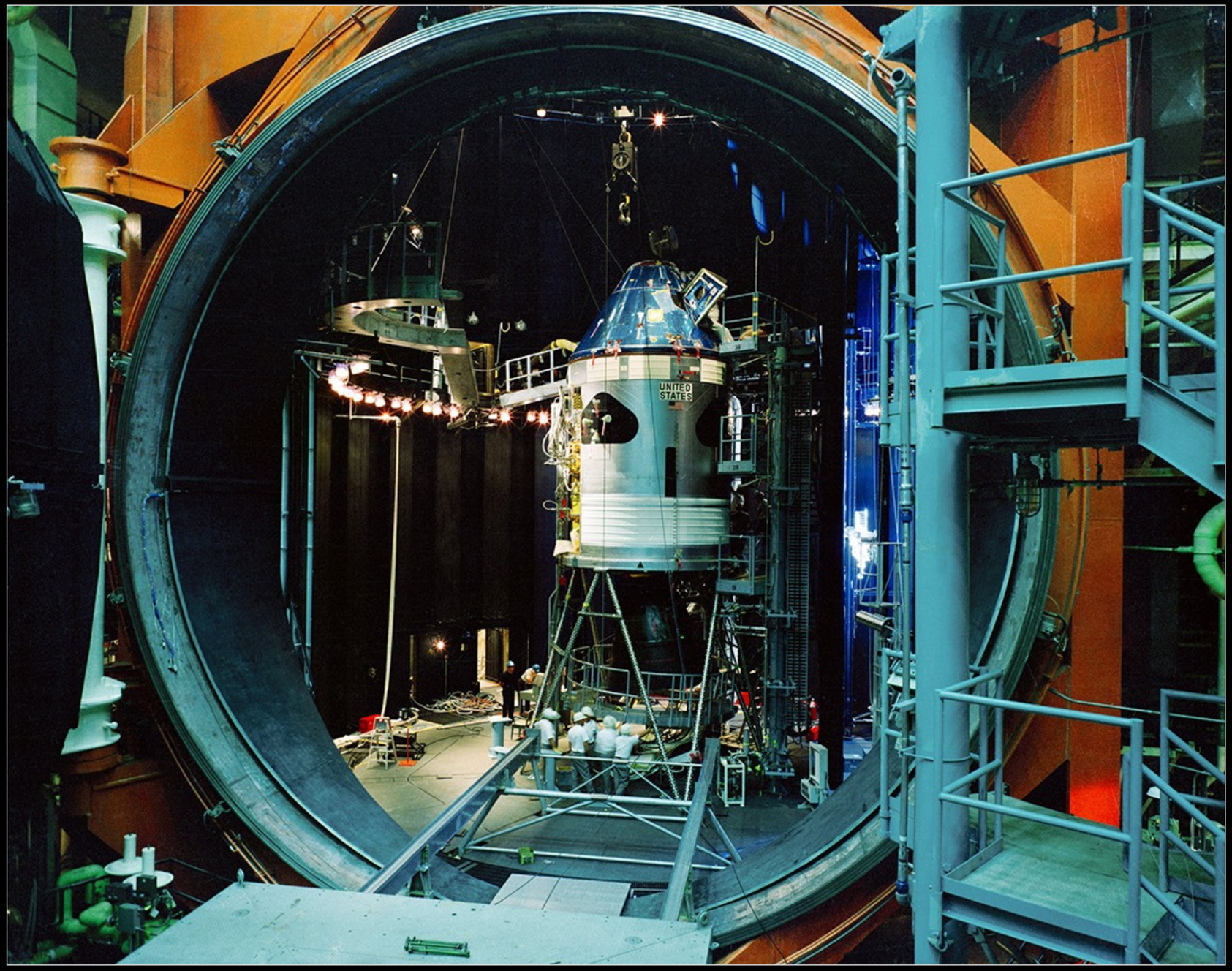
JWST Schedule (May 2012)



Program still has 14 months of funded schedule slack






UNITED
STATES

Short term THREATS

to HST

➡ Senior Review confirmed expected OPS budget ✓

but pressure to reduce to GO program

pressure to reduce the Hubble Fellows program

to JWST

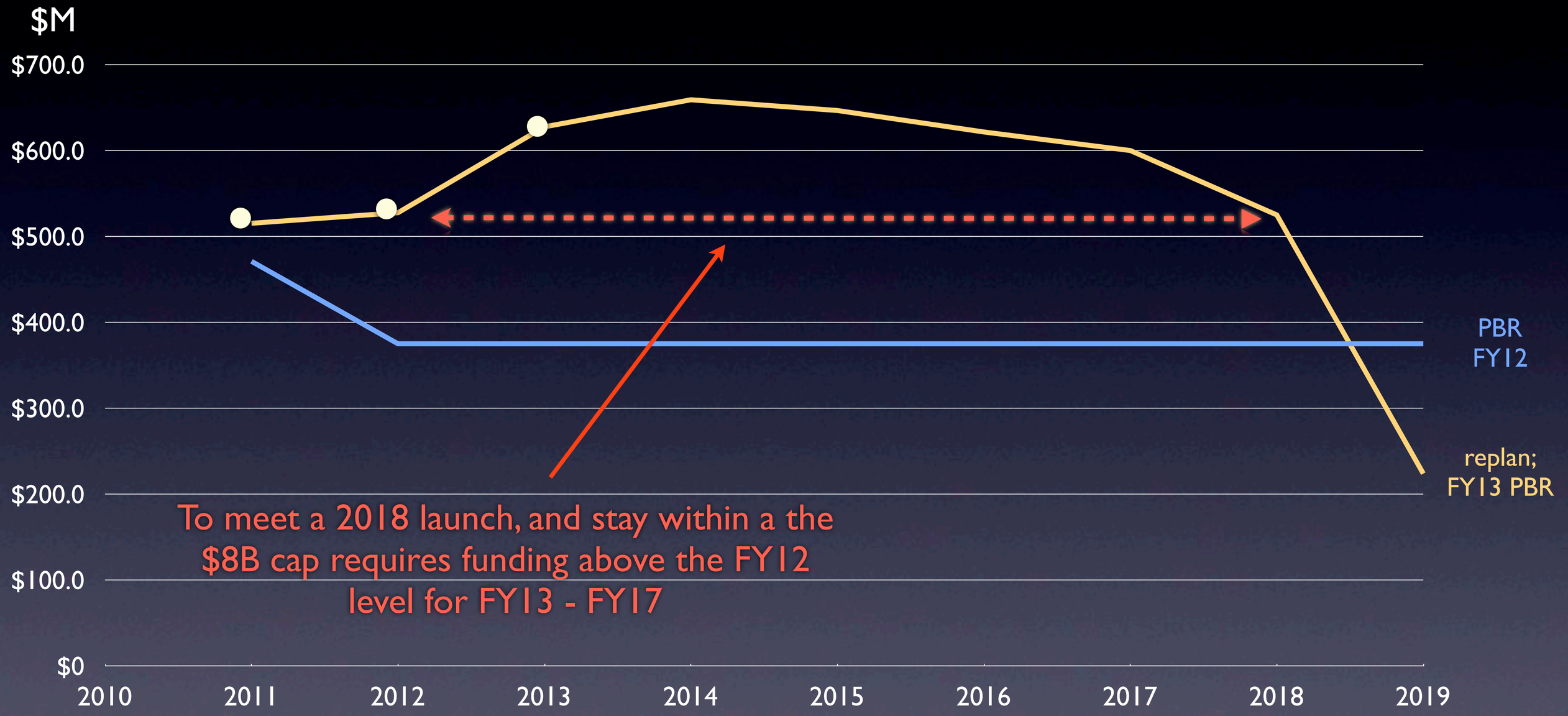
➡ President's FY13 Budget Request gives ideal profile ✓

➡ House and Senate are supportive ✓

sustaining the budget, schedule the $8B cap under a CR ✓

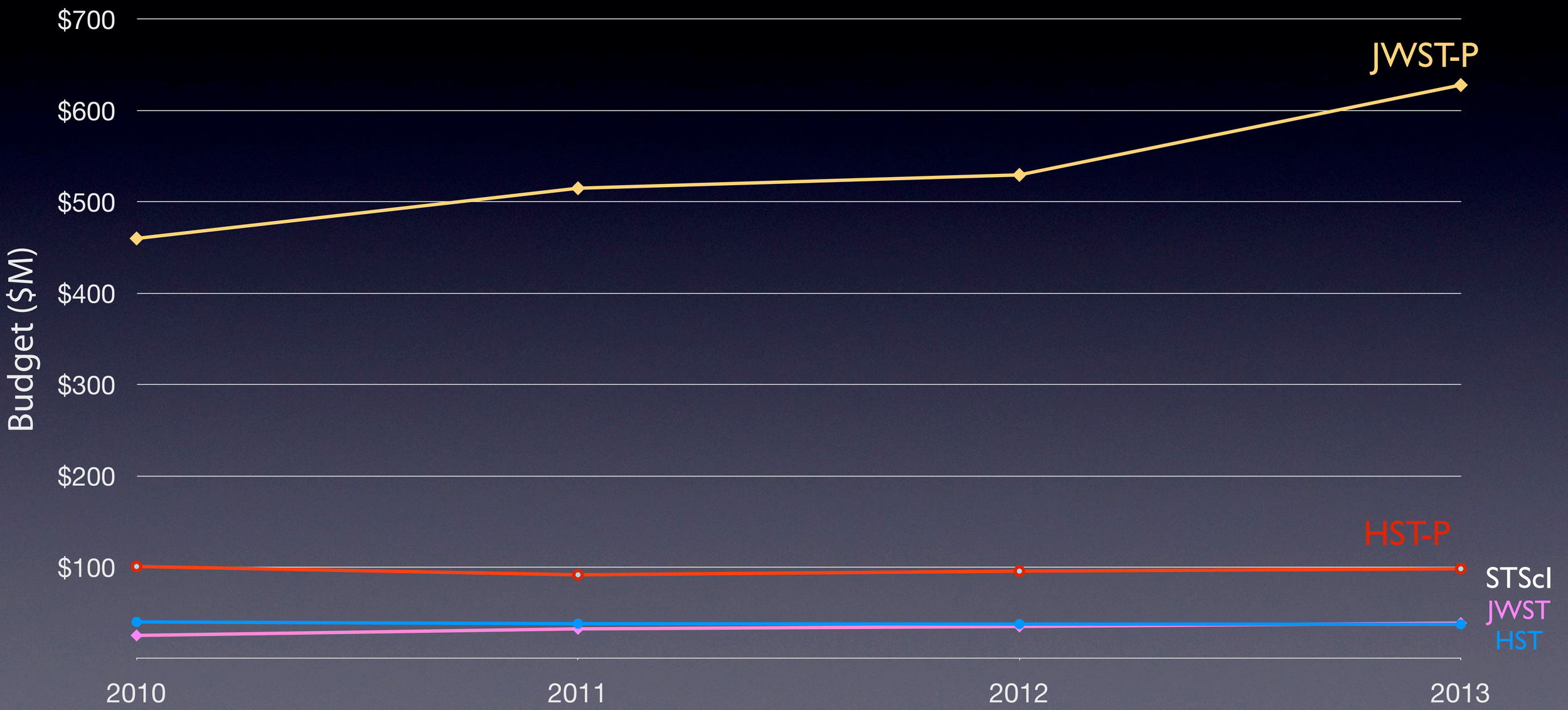
but Sequestration

JWST budget enabling a 2018 Launch



Note: NGAS total $1.8B, NASA's internal cost models estimate $4.9B to launch Contains ~ $1B of uncommitted reserves

HST & JWST Budgets



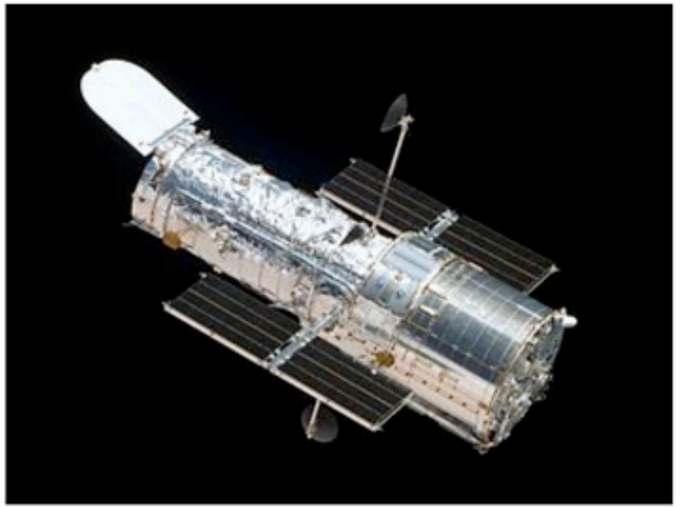
Events & Conferences
New Telescope Meeting
Accommodations
Travel
Program
Participants
Calendar/Schedule
Events Archive
Seminar Archive
News Archive

New Telescope Meeting

September 4–6, 2012 Princeton, NJ

The NRO has gifted NASA two "Hubble class" telescopes. How should the astronomy community best use these facilities?

What is the most compelling science that can be done with these facilities at a reasonable cost? This workshop will explore opportunities for WFIRST science, UV astronomy, exoplanet searches and other astronomical applications.



Hubble Space Telescope

Live Webcast

Go to: www.princeton.edu/webmedia and it will be listed there about ½ hr. prior to start of event.

User name: NRO

Password: NEW

» Registration
» Travel & Directions
» Princeton Accomodations

Downloads

- Campus Map (PDF)
- Peyton Room Layout
- Parking Pass (Lot 21)

External Links

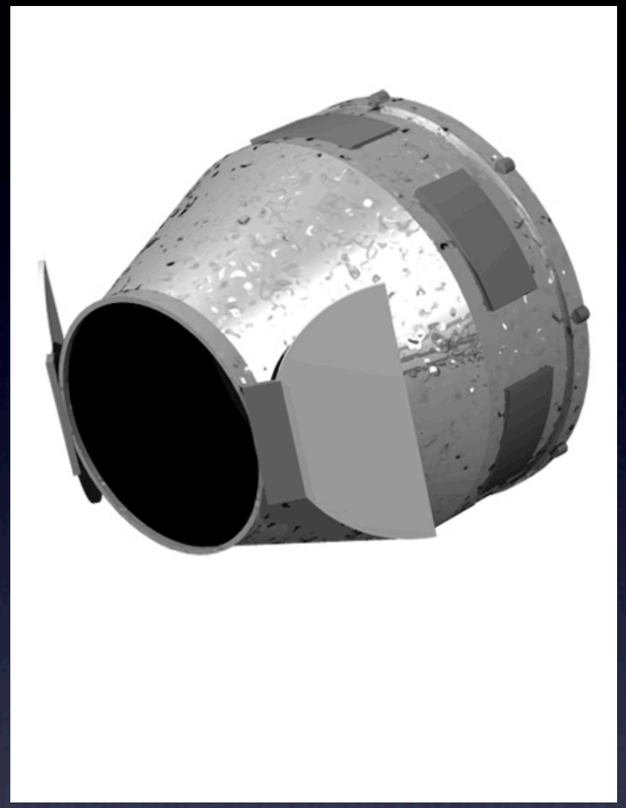
- Princeton Home Page
- Getting to Campus
- Visitor Information
- Campus Map (Interactive)
- Visitor Parking
- Astrophysical Sciences

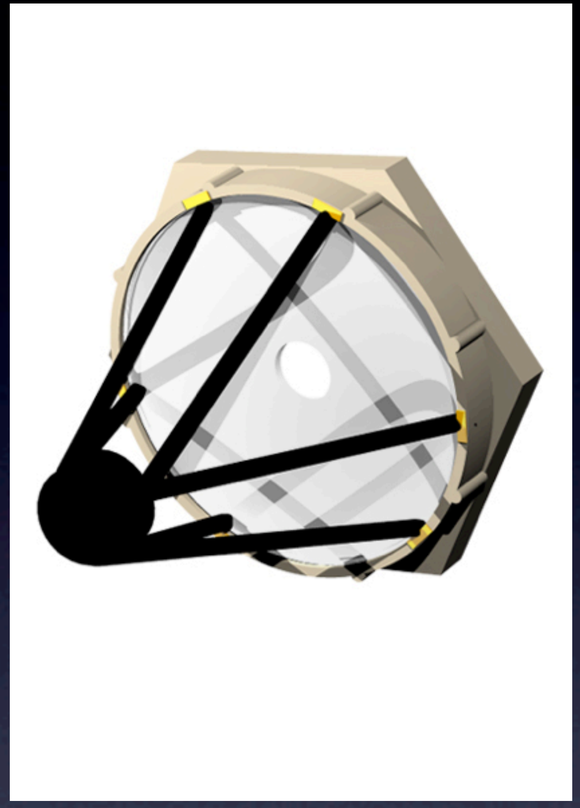
Local Organizers

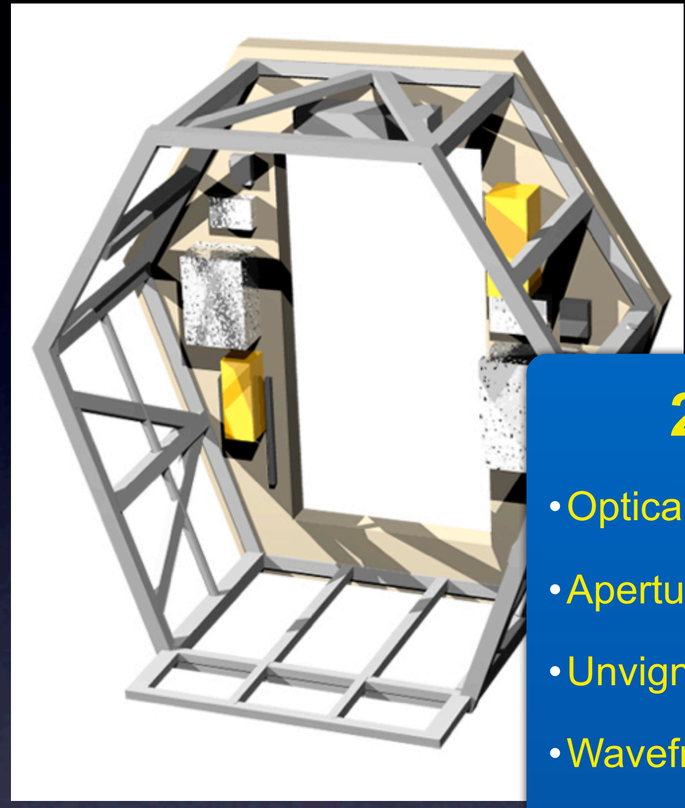
Keren Fedida (Logistics)
kerenf@astro.princeton.edu
Phone: (609) 258-6890

David Spergel
dns@astro.Princeton.EDU
Phone: (609) 258- 3808

What Is the Hardware Being Considered?





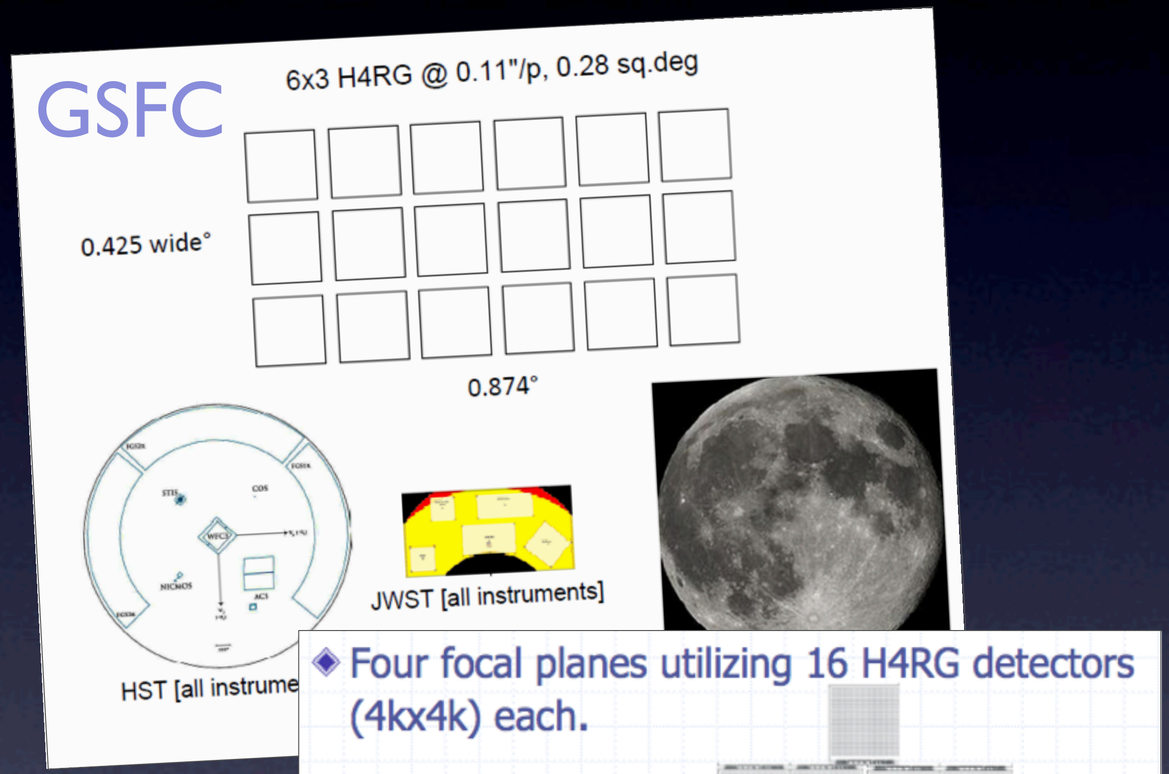


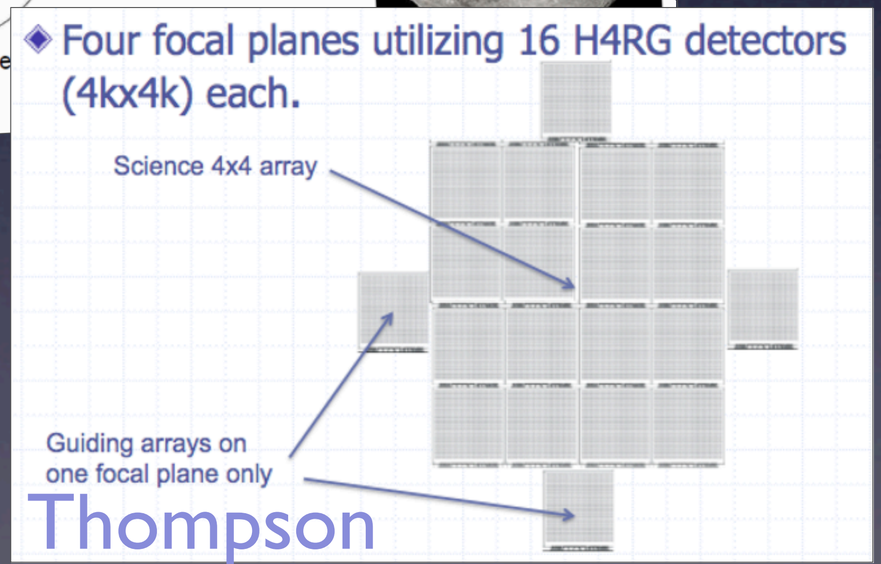
- Available Flight Hardware
  - Two, 2.4m, two-mirror telescopes
  - Two outer barrel assemblies
  - One hardware radiator/electronics bays
- All ground support equipment for alignment, integration, and test
- Robust traceability has been retained for all flight hardware

2.4 m Telescope

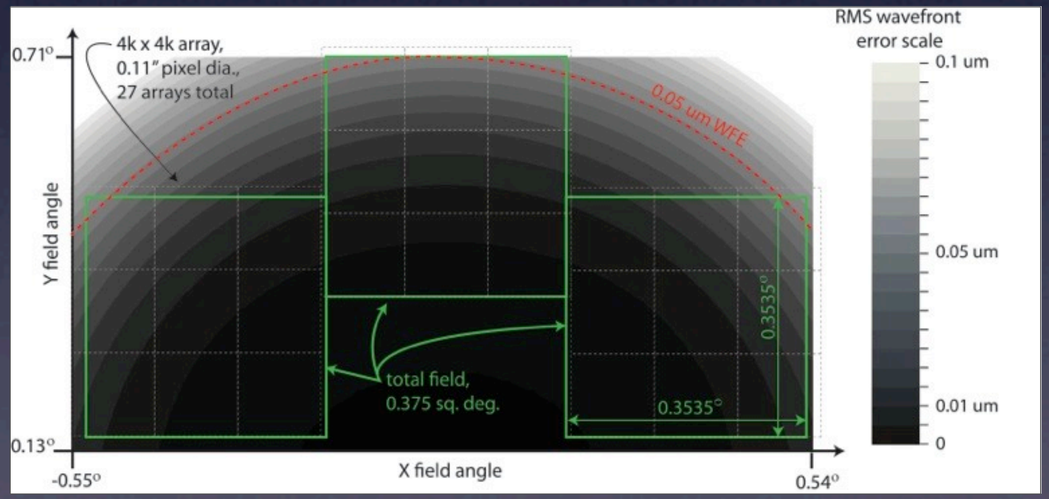
- Optical Form: 2 Mirror, f/8
- Aperture: 2.37m
- Unvignetted Field of View: ~ 1.8^0 Dia.
- Wavefront Quality: <60 nm rms
- Secondary Mirror Assembly Control –
  - 6 DOF plus fine focus
  - *6 DOF Actuators are at the base of the secondary struts*
  - *Focus actuator is behind the SMA*
- Mass: 840kg
- Back Focus: 1.2m behind PM Vertex

An NRO 2.4m telescope should provide a better DE survey program, if we could get the same FOV as DRM2, and we already have at least 3 "as is" concepts for the large imager array.



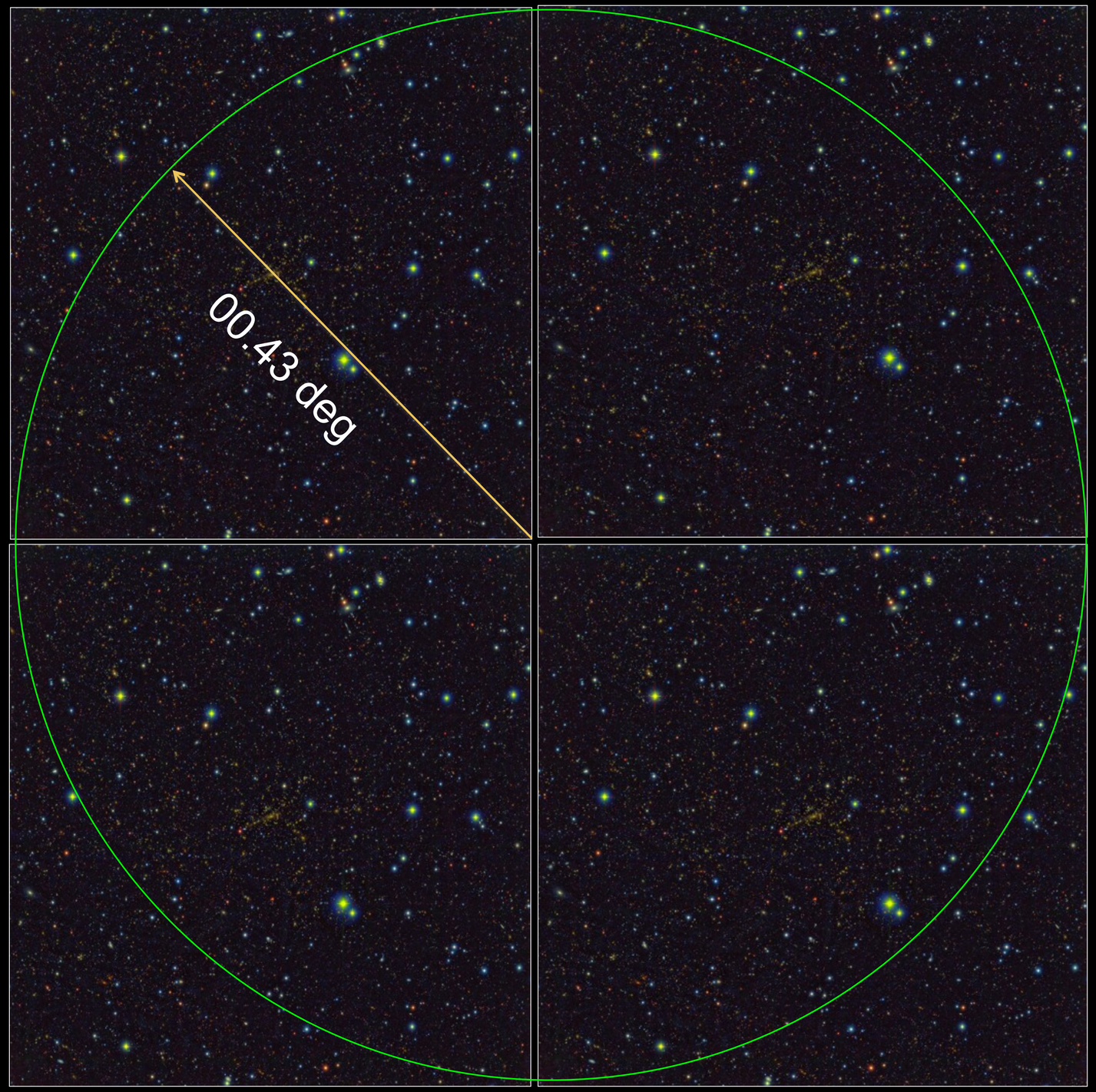


on Kepler focal plane
~ 10% of mission cost,
so halving or doubling
the number of arrays
changes the mission cost
by +/- 5%



Total field of 0.375 degrees square.
27 4k x 4k arrays with 0.11 arcsec pixels

STScI



STScI

camera design
(E. Elliot, 2012)
Hubble-like resolution
across
2 x 0.375 sq. degees
0.75 square degrees
(0.7 - 2.0 microns)

HST
WFC3

Alan Dressler said,

"One more time: what was the idea behind WFIRST?

Was it really just a dark energy probe with a few bones thrown to exoplanet research, and to the astronomers who were mucking about in their gardens --- oblivious to the search for truth?

No, it was not. The EOS, and the Decadal Survey committee, embraced the notion that GO science was the key feature of the WFIRST program, recognizing that a modest-aperture wide-field near-IR telescope opened new opportunities across diverse fields of astronomy and astrophysics.

It would have been much simpler for the EOS to choose a couple of probe missions (in addition to enhancing the Explorer program) and be done with it, and the obvious candidates were dark energy and exoplanets. Why didn't this happen?"

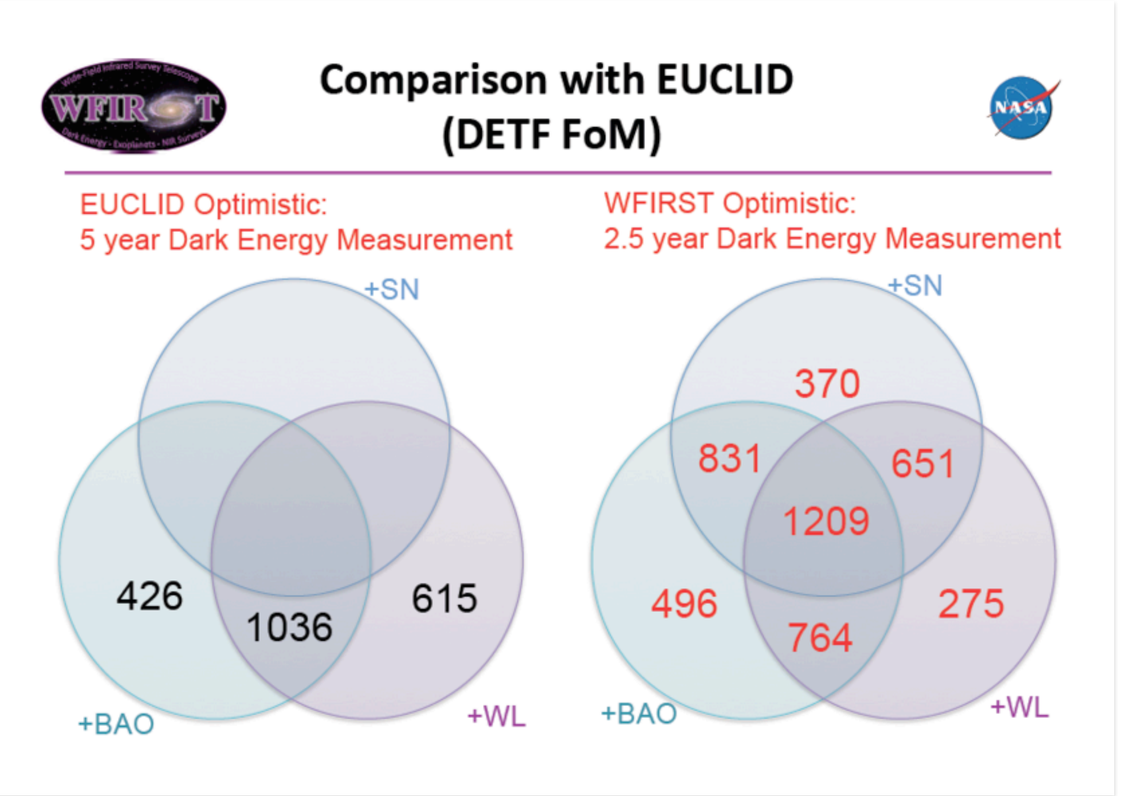
WFIRST should be driven by the need for a broad GO program

The EOS Panel of NWNH agreed with this assessment. Nevertheless, the Panel did not decide to dedicate a space mission --- like JDEM ---- to this endeavor. In some part, this was because of the limited benefit to the broad astronomical community if most (all) of the new-mission funding went to a "dark energy probe."

However, this was not the only reason. The Panel agreed that two other factors prevented the proposal of a dedicated dark energy mission as the highest priority:

(1)BALANCE: Already many other facilities engaged in this program: DES, PanSTARRs, BOSS, CFHT, Boss, Big-Boss, HET-DEX, Euclid, LSST… to name some major ones. How much of the available research resource should be allotted to this one program?

And don't forget Subaru….



U.Tokoyo, IPM
Caltech, Princet
JHU...

Table 5: Parameter Forecasts

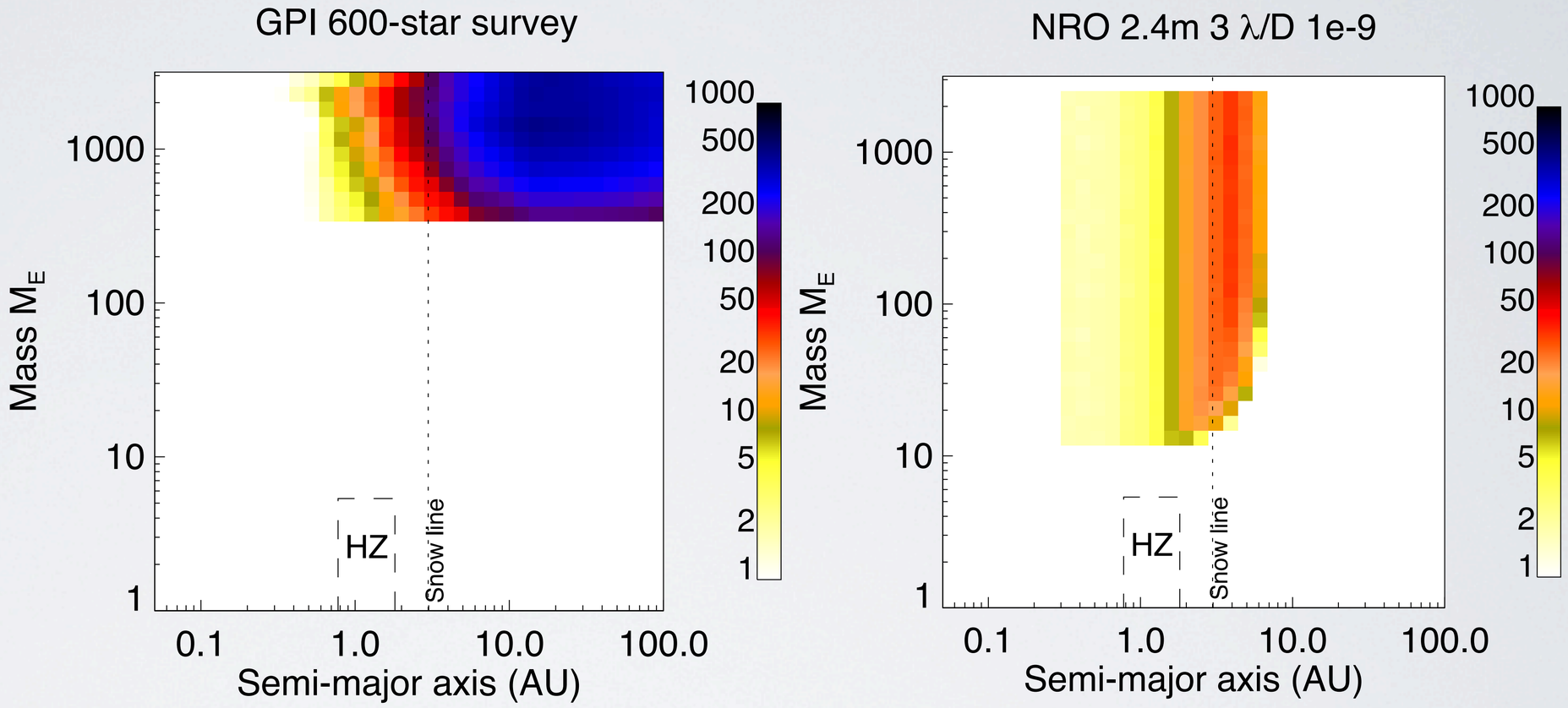
	BOSS	PFS(+BOSS)	SuMIRe (BOSS+PFS+HSC)
Redshift	$0.2 < z < 0.65$	$0.6 < z < 1.6$	$0 \lesssim z \lesssim 1.6$
Sky Coverage	10000 deg^2	2000 deg^2	2000 deg^2
$\sigma(w_0)$	0.083	0.046	0.028
DETF FoM	13	33	217
Growth: $\sigma(\gamma)$	-	-	0.032
$\sigma(\sum m_\nu)$ [eV]	-	-	0.06 eV
$\sigma(f_{\rm NL})$	-	-	$\sim$5

courtesy Takada & Silverman

A multiplicity of coronagraphs - a lot of progress

10^{-8} today in lab

10^{-9} test on-orbit



a high-quality, stable 2.4m space telescope enables new Exo-planet science
- no Explorer or Probe-class mission can reach this level of performance

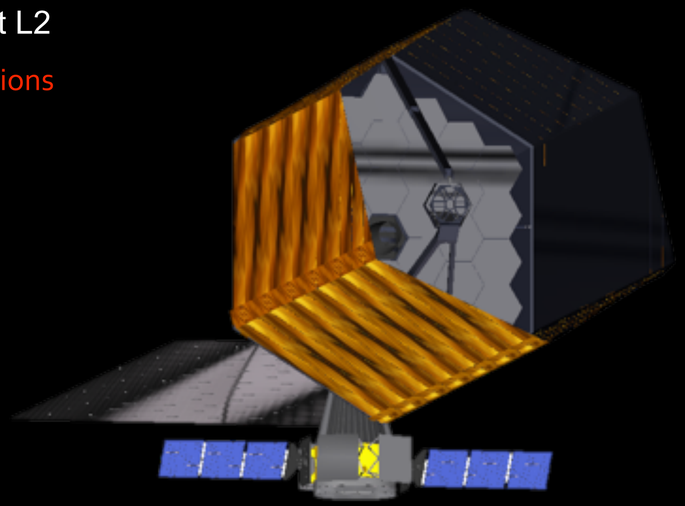
Astrophysics Focused Telescope Assets Science Definition Team

- NASA has selected members of the Astrophysics Focused Telescope Assets SDT.
- 75 applications received from community, 17 people selected.
- Co-chairs are David Spergel (Princeton) and Neil Gehrels (GSFC).
- Charter is to develop baseline DRM for one of the telescopes to use “as is” and is technically viable for launch by CY 2022 (if funding starts at beginning of FY2017).
- And to include consideration of a coronagraph
- Overall mission cost is to be kept as low as possible while still achieving all or part of the science priorities for WFIRST.
- SDT will present their findings no later than April 30, 2013.

The Path towards Finding Earth 2.0

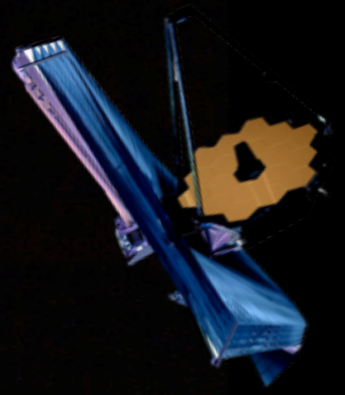
2030+: ATLAST at L2

Full Science Operations



2017: TESS ?
in HEO

Archive, GI program, E/PO



2018: JWST at L2

Full Science Operations

2021: NRO 2.4m in HEO (WFIRST+)

Shared Science Operations

Now: HST in LEO

Full Science Operations

2016: OpTIIX on ISS

Planning, E/PO, Calibration, WFS&C

SPACE TELESCOPE SCIENCE INSTITUTE
Operated for NASA by AURA