



# WFC3

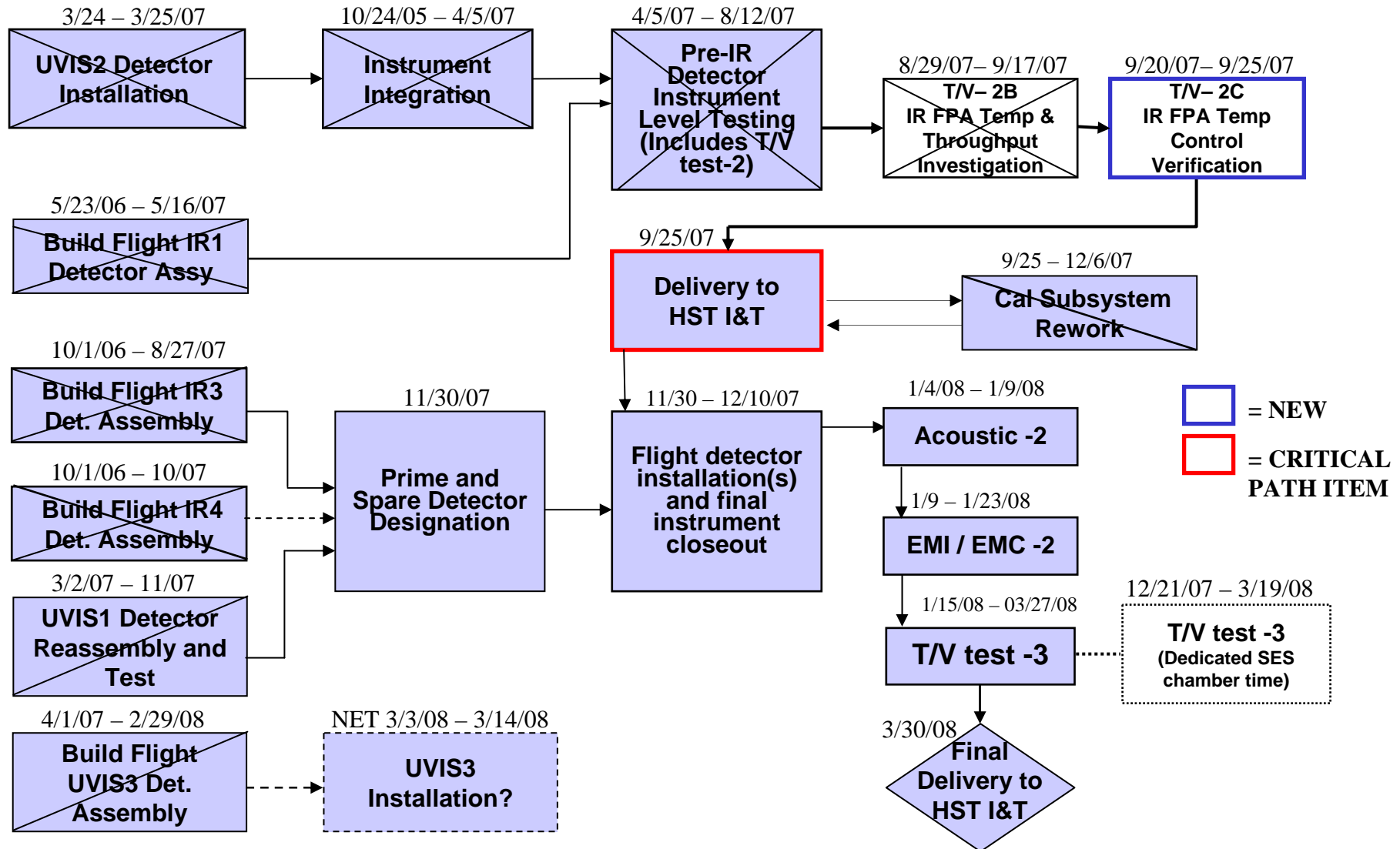


- Instrument Testing
  - TV2 complete: working several solvable issues
  - TV3 starts in February with flight detectors
- UVIS Detectors
  - Continuing problems with conductive particles and TECs
- IR Detectors
  - Two excellent flight detectors assembled
- STScI work
  - ETC/APT ready
  - Handbook in process for end October review
  - SMOV planning underway
  - SM4 SIM and SMGT work progressing well



# WFC3 Schedule

## 08/08 Shuttle Launch





# TV2 Summary



- Statistics
  - 127 days in SES Chamber with 93 days of 24/7 operations
  - Over 15,000 images from >350 SMS runs
  - 25 STScI scientists and data analysts supported this effort
- Validated many issues from prior testing
  - Electronics and detector heatpipes worked well
  - Detector crosstalk fixed in both channels
  - UVIS optical filter ghosts resolved and SOFA working well
  - Internal flat field illumination uniformity much improved
  - IR grisms properly aligned (and IR backgrounds correct)
  - Detector alignment transfers worked very well
  - CCD charge injection working properly
  - Line-of-sight stability looks much better (but still 2x specification)



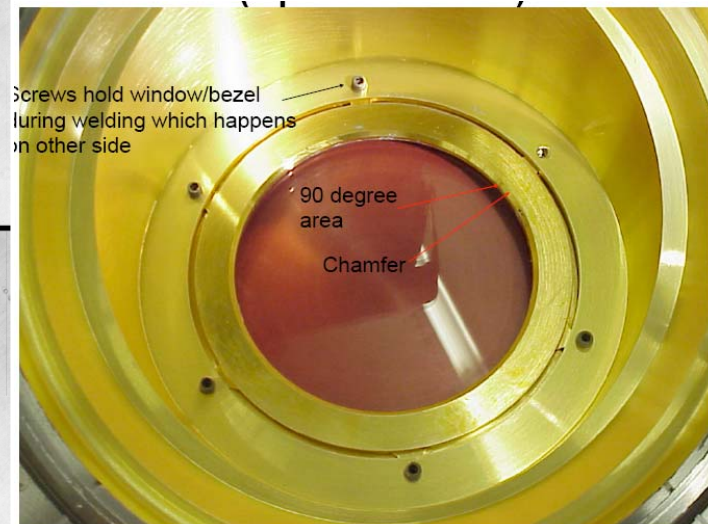
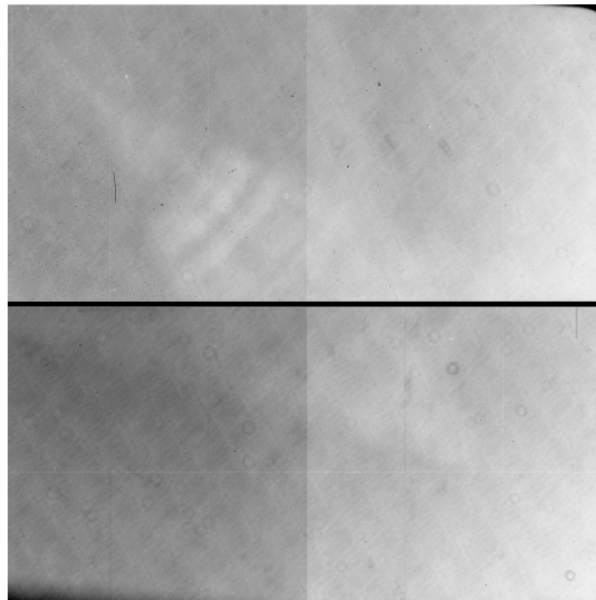
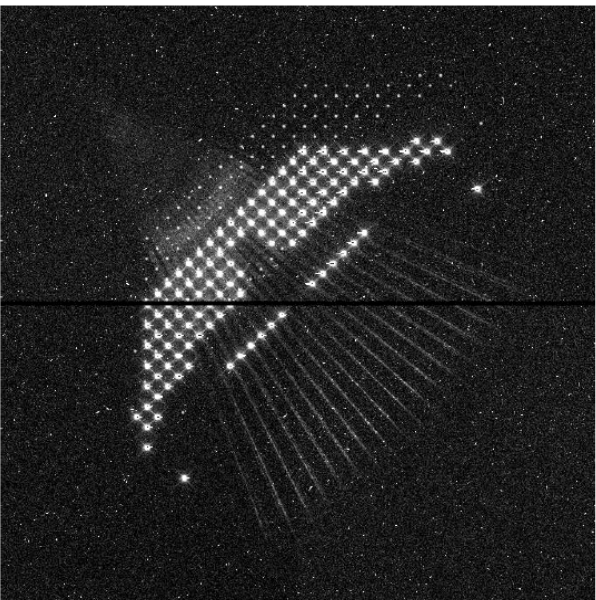




# UVIS Glint

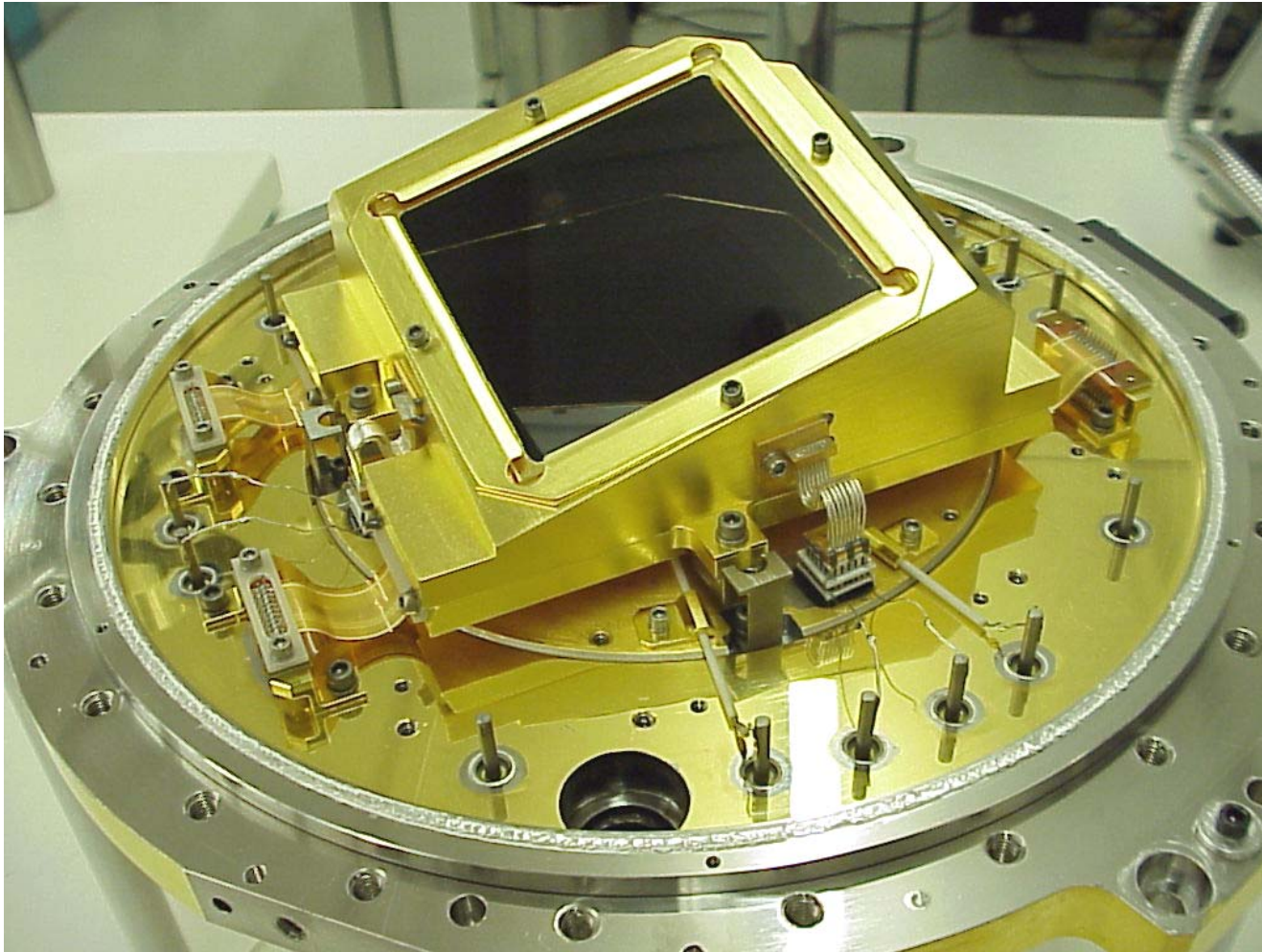


- Large area effected with up to 20% of energy into a 10,000 pixel glint feature
- Present by design in both UVIS1&2
- Cause of flat field “flare” feature
- Fixed by addition of mask behind outer window (UVIS vacuum enclosure)
- UVIS2 (deep spare) not fixed





# UVIS Detectors







# UVIS Detector Status



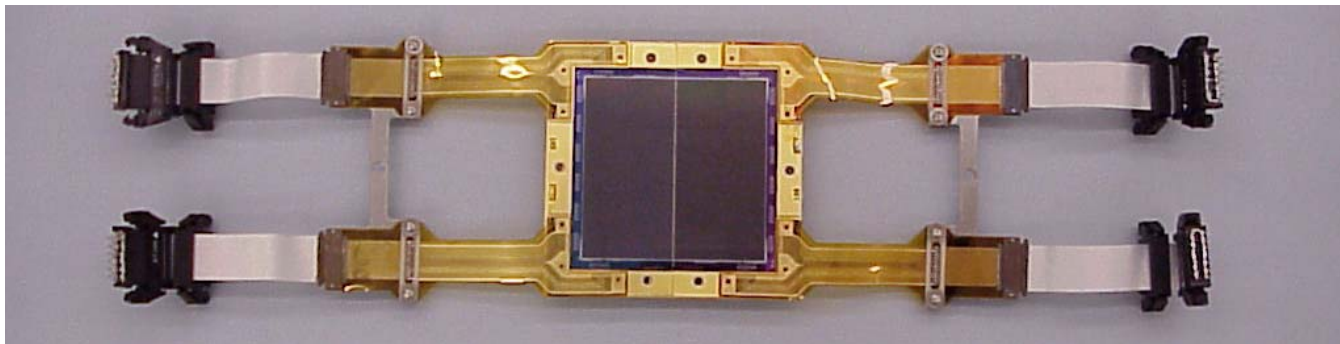
- UVIS1 (Prime flight detector)
  - Used in TV#1 and has best science performance
  - Developed short on AmpB due to metal particle on flex lead
  - Re-assembled but TEC performance declined during re-testing at Ball
  - TEC removed – column was cracked probably due to thermal stress
    - Continuing uncertainty between over-testing or anneal ramp methodology
    - Moving towards modification to MEB boards in instrument to soften ramp
  - TEC replaced, reassembled, disassembled to fix glint, found more particles
  - Proceeding now to protect flex leads
- UVIS2 (Spare flight detector)
  - Acceptance testing deferred in 2004 for cost reasons
  - TEC lost 10 degrees of cooling capability after acceptance testing
  - Used for TV2 but serious lien against TEC (probably cracked)
- UVIS3 (Backup flight detector – new start)
  - Improved TEC and Flex Leads
  - Delivered CCDs to Ball with science performance between UVIS1 and UVIS2
  - Current estimate is delivery of acceptance tested assembly to GSFC late March 08



# UVIS-3



- In March we started a UVIS-3 detector build using existing CCD die inventory (~12 devices) to protect against particulate risks seen in the current UVIS design.
- Changes to the UVIS-3 flex lead designs (encapsulated traces) were made to mitigate the risk of conductive particles.
  - Multiple sets of Flex Leads from two different vendors have not been acceptable.
  - e2v can deliver a device on carrier roughly 6 weeks from receipt of carrier
- CCDs 136 and 044 (old-style flex cables) delivered to BATC for incorporation into ceramic carrier as a candidate UVIS 3 device.
- Designs for protecting leads on existing assets (old-style flex cables) are being evaluated.
  - Now baseline plan for UVIS1 (and probably UVIS3)



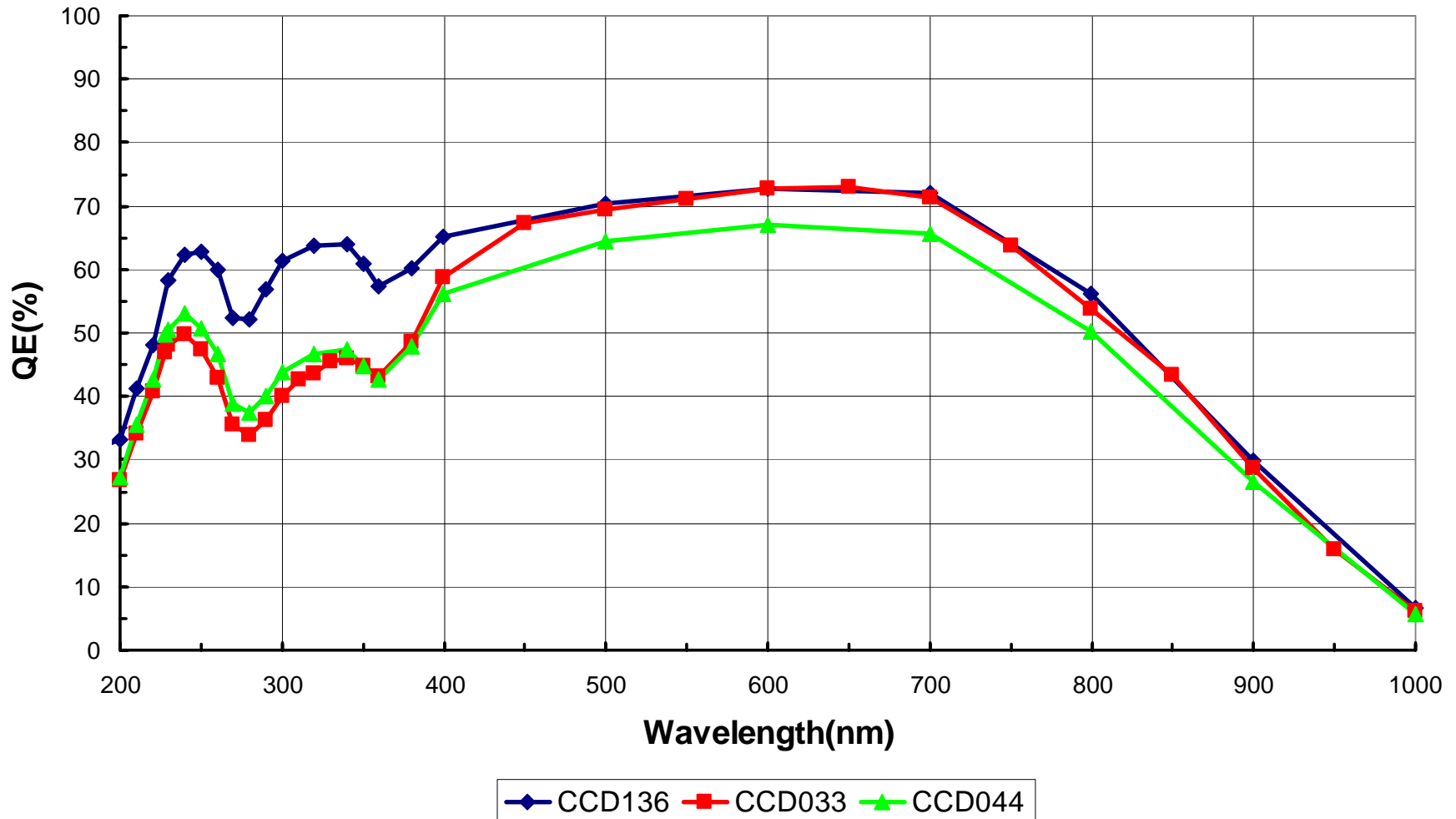




# QE Comparison For UVIS3 Candidates



## UVIS3 Candidate QE Comparison





# CCD Performance Comparison



	Units	Spec	UVIS Build #1		UVIS Build #2		#136	#033	#044
			#018	#178	#040	#050			
Read Noise (A)	e <sup>-</sup>	3	<2.7	2.2	2.1	2.1	2.3	2.4?	2.4
(B)	e <sup>-</sup>	3	<2.7	2.3	2.2	2.2	2.6	2.4?	2.5
Dark Current	e <sup>-</sup> /pix/hr @-83C	20	0.43	<5	0.13	0.1	0.11	0.22	0.38
CTE Serial (A)		0.999995	0.999997	0.999999	0.999999	0.999997	0.999999	0.999997	0.999997
Serial (B)		0.999995	0.999996	0.999999	0.999999	0.999999	0.999999	0.999999	0.999997
Parallel		0.999995	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999	0.999999
QE @250nm	%	40	65*	56*	56*	45*	63	47	51
@500nm	%	60	68	66	63	62	70	69	64
@900nm	%	23	27	27	31	32	30	29	27
Full Well	ke <sup>-</sup>	50	92	85	99	99	70	95	92

\* UV QE adjusted up by 10% to account for systematically low original DCL QE measurements

CCD136 & CCD044 have been delivered to Ball

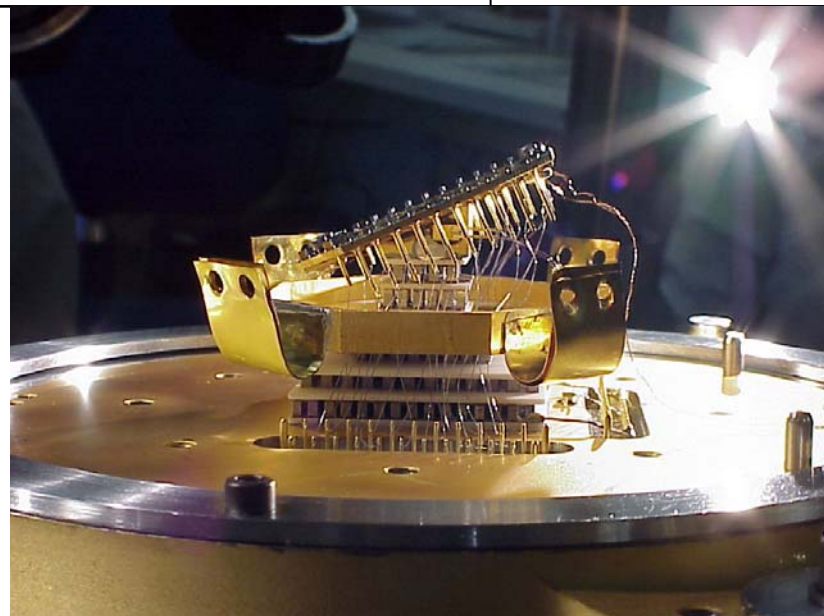




# IR Detector Status

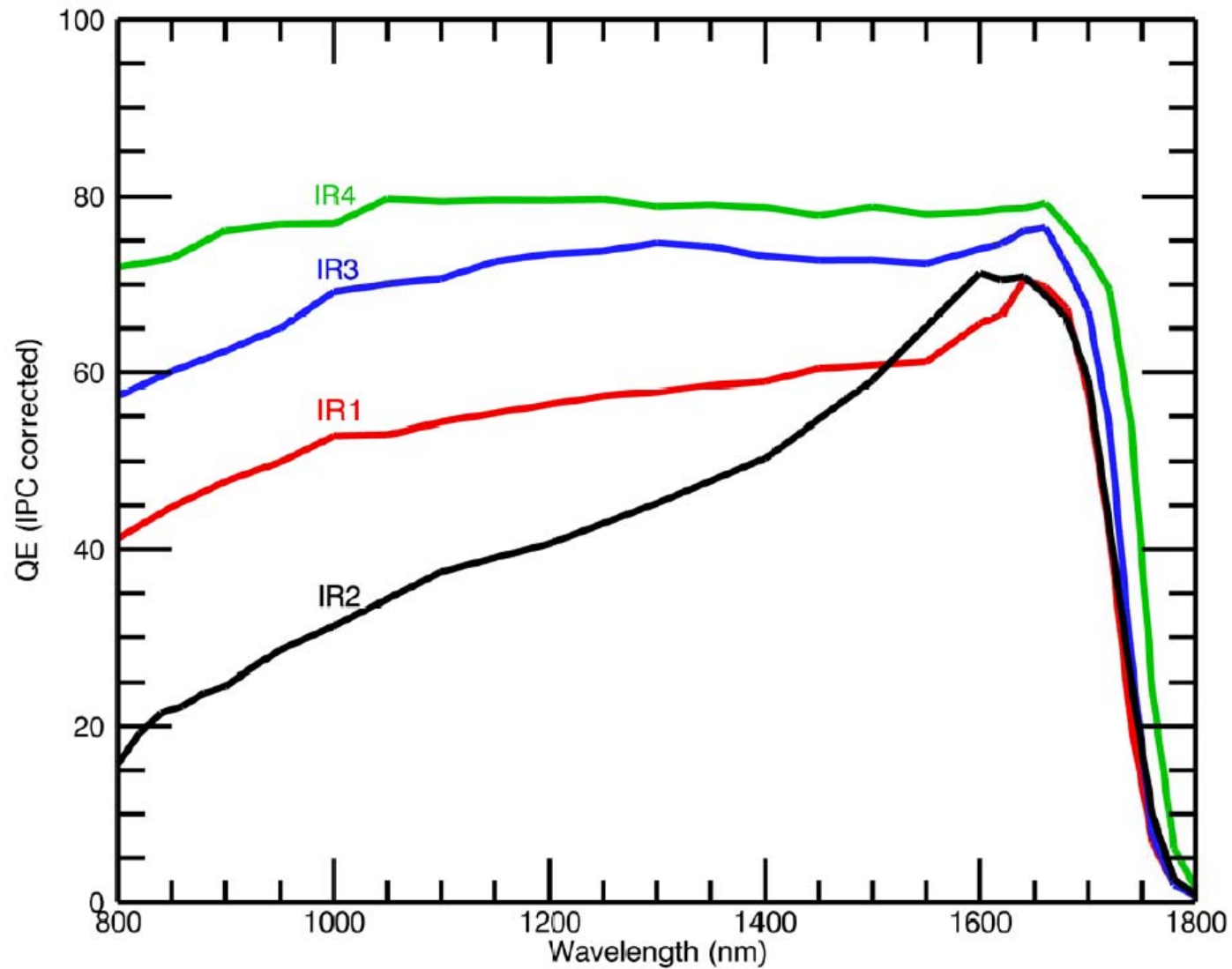


- IR2 (FPA 64) was used for TV1. This substrate ON detector has proton induced glow performance concern but is otherwise healthy.
- IR1 (FPA129) is now in WFC3 for TV2. This device has 10-12% hot pixels but good QE and could be flown.
- IR3 (FPA150) is assembled and has passed acceptance testing at Ball Aerospace. [Shown as right during assembly.] – FLIGHT SPARE
- IR4 (FPA165) is assembled and passed acceptance testing at Ball. While performing some additional tests, a vacuum lead was discovered in its external vent tube. This is being replaced. The detector assembly will be re-tested and then installed into WFC3 in early December. – FLIGHT DETECTOR





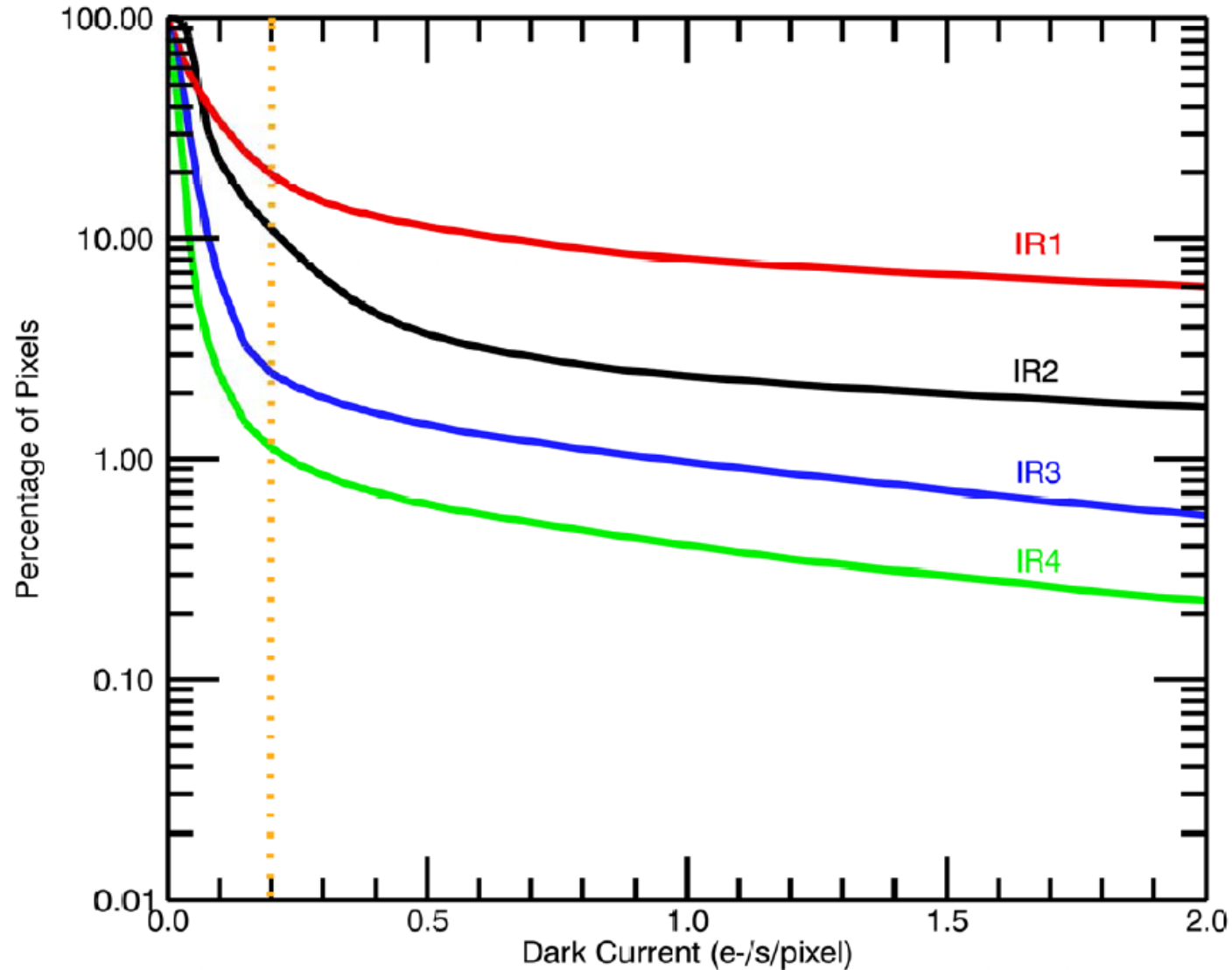
# IR Detector QE







# IR Detector Dark Current





# Performance and Depth in IR

## Focal Plane Inventory



Discovery Efficiency relative to FPA64  
Point sources - Average zodi - 2400s

