

Comparison of NASA Great Observatories & Next Generation missions

	Hubble May 2006	Hubble Post-SM4	Chandra	Spitzer	Herschel	JWST	Constellation-X
	UV/Optical	UV/Opt/NIR	X-ray	Infrared	FIR/sub-mm	Infrared	X-ray
Imaging							
Waveband	0.3 – 2.5 μm	0.3 – 2.5 μm	0.3 – 7 keV intrinsic multiband photometry	3.5-160 μm [3.5 – 8 μm IRAC 24-160 μm MIPS]	60 - 670 μm	0.6 - 28 μm	0.3-100 keV
Angular res'n HPD	0.1" ACS	0.1" ACS	0.5 arcsec on- axis	1.2"x1.2" IRAC	3.4" pix, PACS 17"-35" SPIRE	0.06" @2 μm	15", 5" goal <10keV
Sensitivity	V=27.8 ACS S/N=5, 1hour H=25.6, NIC3 S/N=5, 1hour	V=27.8 ACS S/N=5, 1hour H>26?, WFC3 S/N=5, 1hour	1e-15 in 30ks ~0.1 nJy 1e-17 in 1Ms ~1pJy	~3 μJy S/N=5, 3.6 μJy , 100s	~3mJy SPACS ~15mJy SPIRE [S/N=5, 1hour]	10 nJy 2 μm 104s 700 nJy 10 μm [S/N=10]	~1e-15 cgs ~0.1nJy
Field of view	3.4'x3.4' ACS 0.85'x0.85' NIC3	3.4'x3.4' ACS 2.1'x2.3' WFC3 0.8-1.7 μm	16'x16'	~5'x5' IRAC, 24 μm ~5'x0.3', 160 μm	1.8'x3.6', PACS 60-200 μm 4'x8' SPIRE 250-500 μm	2 x 2'x2" NIRCcam 1.9' x 1.4' MIRI	2.5'x2.5' 10'x10' goal
Spectroscopy							
Waveband	0.2-1.7 μm	0.11-0.32 μm	0.1 – 7 keV	5-38 μm IRS	PACS 157-625 μm HIFI	1-5 μm NIRSspec 5-28 μm MIRI	0.3-10 keV
Spectral res'n	~100 ACS prism 200 NIC prism	20,000 COS 10 ⁵ STIS	400	~100 5-38 μm ~600 9-37 μm	~1500 PACS 10 ⁶ HIFI	100, 1000, 3000 NIRSPEC 100, 2000 MIRI	300–1500, 0.3- 10keV >10, >10keV
Sensitivity	V=24.4 ACS H=21.1 NIC3	COS ~1e-14 erg/cm ² /s/A S/N=30/res, 104s	1e-12 cgs	~0.5mJy S/N=5, 5-13 μm ,500s ~5mJy S/N=5, 13- 30 μm ,500s	~250mJy [S/N=5, 1 hour]	120nJy, 3 μm NIRSspec/low, cont	~1e-15 cgs in 30ks ~1e-16 cgs in 1Ms
Multiplex	many	1	1	1	19, 37 SPIRE 1 HIFI	>100	~ 64, 0.5-10keV
Other							
Time res'n	Integration time	32msec COS	3.2 s ACIS 10 msec HRC	Integration time		Full NIRCcam 11s <100 ms subarrays	100 ms, count rate < X ct/s

Polarimetry	ACS	ACS	No	No	No	No	No
Coronagraphy	ACS	NIRCam, ACS	No	No	No	No	No

Sources:

HST: ACS, NICMOS, WFPC2: <http://www.stsci.edu/hst/proposing/docs/proposing/documents/cp/primer.pdf>

HST post-SM4:

COS: http://www.stsci.edu/instruments/cos/documents/handbook13/cos_cy13.html

WF3: <http://www.stsci.edu/hst/wfc3/design/>

STIS: <http://www.stsci.edu/hst/stis/>

Chandra: 'POG' Proposers Observatory Guide, <http://cxc.harvard.edu/proposer/POG/index.html>

Spitzer: pocket guides,

IRAC: <http://ssc.spitzer.caltech.edu/irac/documents/pocketguide.pdf>

MIPS: <http://ssc.spitzer.caltech.edu/mips/documents/pocketguide.pdf>

IRS: <http://ssc.spitzer.caltech.edu/irs/documents/pocketguide.pdf>

Herschel: http://www.rssd.esa.int/Herschel/Publ/2004/dusty04_Paris0_Flyer.pdf

PACS: <http://www.rssd.esa.int/Herschel/pacs.html>

SPIRE: <http://www.rssd.esa.int/Herschel/spire.shtml>

<http://www.rssd.esa.int/Herschel/pacs.html>

JWST: 'fast facts' <http://www.jwst.nasa.gov/FastFacts/>

ISIM 'fast facts' http://www.jwst.nasa.gov/resources/isim_fast_facts.xls

NIRCam: <http://ircamera.as.arizona.edu/nircam/features.html>

NIRSpec: <http://www.stsci.edu/jwst/instruments/nirspec/>

MIRI: <http://www.stsci.edu/jwst/instruments/miri/>

Constellation-X: <http://constellation.gsfc.nasa.gov/mission/overview/index.html>