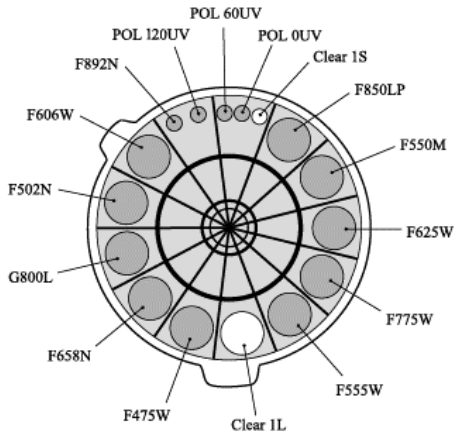
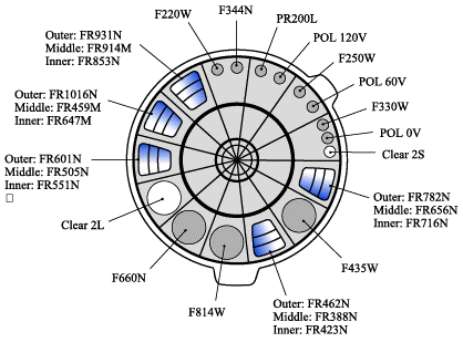
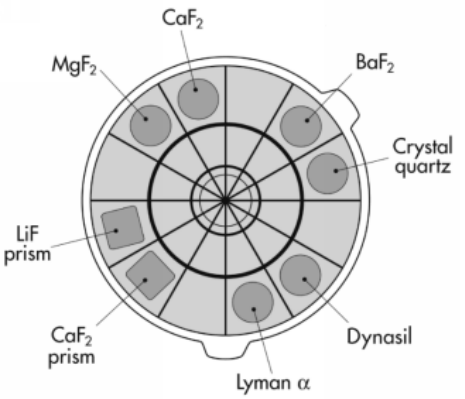
WFC/HRC Filter Wheel 1



WFC/HRC Filter Wheel 2



SBC Filter Wheel



WFC/HRC Filter Wheel 1

Name	Description	Wavelength (Å)		Camera
		λ_c	$\Delta\lambda$	
F555W	Johnson V	5346	1193	WFC/HRC
F775W	SDSS i	7764	1528	WFC/HRC
F625W	SDSS r	6318	1442	WFC/HRC
F550M	Narrow V	5580	547	WFC/HRC
F850LP	SDSS z	9445	1229	WFC/HRC
POL0UV	UV polarizer 0°	2000-6000	...	HRC[/WFC][a]
POL60UV	UV polarizer 60°	2000-6000	...	HRC[/WFC][a]
POL120UV	UV polarizer 120°	2000-6000	...	HRC[/WFC][a]
F892N	Methane (2%)	8917	154	HRC[/WFC][a]
F606W	Broad V	5907	2342	WFC/HRC
F502N	[OIII] 1%	5022	57	WFC/HRC
G800L	Grism	5800-11000	R~100	WFC/HRC
F658N	Hα (1%)	6584	78	WFC/HRC
F475W	SDSS g	4760	1458	WFC/HRC

a. [/WFC] indicates that polarizer filters (designed for HRC), yield a vignetted WFC field of 72” x 72”.

SBC Filter Wheel

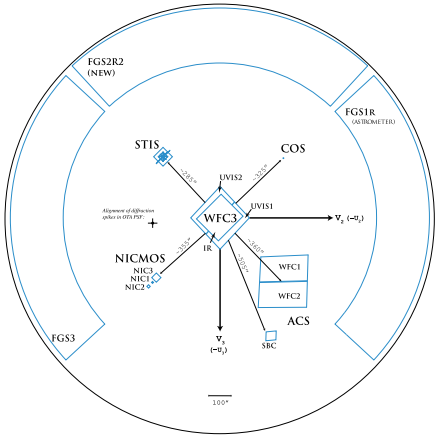
Name	Description	Wavelength/Resolution
F115LP	MgF_2	1150 Å (longpass)
F125LP	CaF_2	1250 Å (longpass)
F140LP	BaF_2	1400 Å (longpass)
F150LP	Crystal Quartz	1500 Å (longpass)
F165LP	Fused Silica	1650 Å (longpass)
F122M	Ly α	λ_c=1200 Å; $\Delta\lambda$=60 Å
PR110L	LiF Prism	R~100
PR130L	CaF_2 Prism	R~100

WFC/HRC Filter Wheel 2

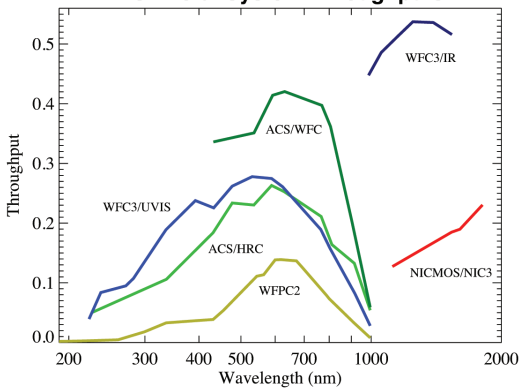
Name	Description	Wavelength (Å)		Camera
		λ_c	$\Delta\lambda$	
F660N	[N II] (1%)	6602	40	WFC/HRC
F814W	Broad I	8333	2511	WFC/HRC
FR388N	[O II] ramp (middle)	3710-4050	2%	WFC/HRC
FR423N	[O II] ramp (inner)	4050-4420	2%	WFC
FR462N	[O II] ramp (outer)	4420-4820	2%	WFC
F435W	Johnson B	4297	1038	WFC/HRC
FR656N	Hα ramp (middle)	6270-6850	2%	WFC/HRC
FR716N	Hα ramp (inner)	6850-7470	2%	WFC
FR782N	Hα ramp (outer)	7470-8160	2%	WFC
POL0V	Visible Polarizer 0°	4000-8000	...	HRC[/WFC][a]
F330W	HRC U	3354	588	HRC
POL60V	Visible Polarizer 60°	4000-8000	...	HRC[/WFC][a]
F250W	Near-UV broadband	2696	549	HRC
POL120V	Visible Polarizer 120°	4000-8000	...	HRC[/WFC][a]
PR200L	NUV prism	2000-4000	R~100 @ 200 nm	HRC
F344N	NeV (2%)	3434	60	HRC
F220W	Near-UV broadband	2228	485	HRC
FR914M	Broad ramp (middle)	7570-10710	9%	WFC/HRC
FR853N	IR ramp (inner)	8160-8910	2%	WFC
FR931N	IR ramp (outer)	8910-9720	2%	WFC
FR459M	Broad ramp (middle)	3810-5370	9%	WFC/HRC
FR647M	Broad ramp (inner)	5370-7570	9%	WFC
FR1016N	IR ramp (outer)	9720-10610	2%	WFC
FR505N	[O III] ramp (middle)	4820-5270	2%	WFC/HRC
FR551N	[O III] ramp (inner)	5270-5750	2%	WFC
FR601N	[O III] ramp (outer)	5750-6270	2%	WFC

a. [/WFC] indicates that polarizer filters (designed for HRC), yield a vignetted WFC field of 72” x 72”.

HST focal plane after SM4



HST Total System Throughputs



The plotted quantities are end-to-end throughputs, including filter transmissions calculated at the pivot wavelength of each broadband filter.

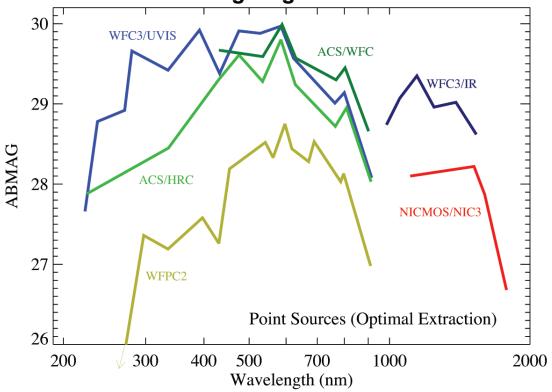
The Advanced Camera for Surveys was built through a collaborative effort between Johns Hopkins University, Ball Aerospace, & Goddard Space Flight Center.

For more information visit the ACS web page:
http://www.stsci.edu/hst/acs
or send email to: help@stsci.edu

SPACE TELESCOPE SCIENCE INSTITUTE
Operated by AURA for NASA

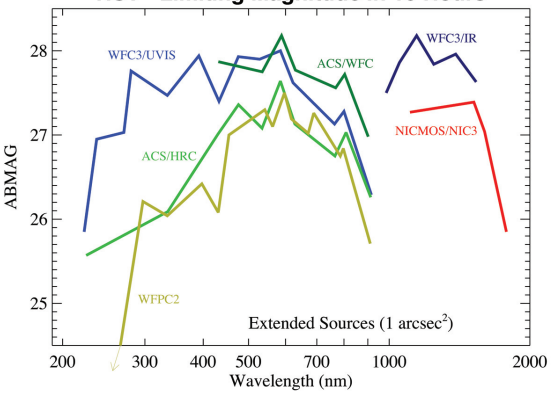
January 2010

HST - Limiting Magnitude in 10 Hours



Limiting magnitudes for point sources in 10 hours.

HST - Limiting Magnitude in 10 Hours



Limiting magnitudes for extended sources in 10 hours.

V-band detection limits for WFC, HRC, and SBC

Camera	Filter	V limit (S/N = 5, exposure time = 1 hour)		
		O5 V (Kurucz model)	A0 V (Vega)	G2 V (Sun)
WFC	F606W	27.8	27.8	28.0
WFC	F814W	26.7	27.0	27.7
HRC	F330W	26.8	24.8	24.1
HRC	F606W	27.3	27.3	27.5
SBC	F125LP	27.8	23.2	13.5

ACS
Advanced Camera for Surveys

The ACS Wide Field Channel was fully restored to operation during Servicing Mission 4 (SM4). The High Resolution Channel was not recovered during SM4 and is unavailable for science. The Solar Blind Channel was unaffected by the repair and remains available for far-ultraviolet imaging and spectroscopy.

Wide Field Channel (WFC)

- 3 mirror design, overcoated silver on mirrors
- Two 2048 x 4096 15 µm/pixel CCDs optimized for I-band
- 202” x 202” field of view
- 0”.05 pixels; critically sampled at 8000 Å

Solar Blind Channel (SBC)

- 1024 x 1024 CsI 25 µm/pixel MAMA
- 2 mirror design, MgF_2 on Al
- FUV imaging and spectroscopy (1150 - 1700 Å)
- 2 prisms, 5 long-pass filters, 1 Lyman α filter
- 35” x 31” field of view, ~0”.032 pixels

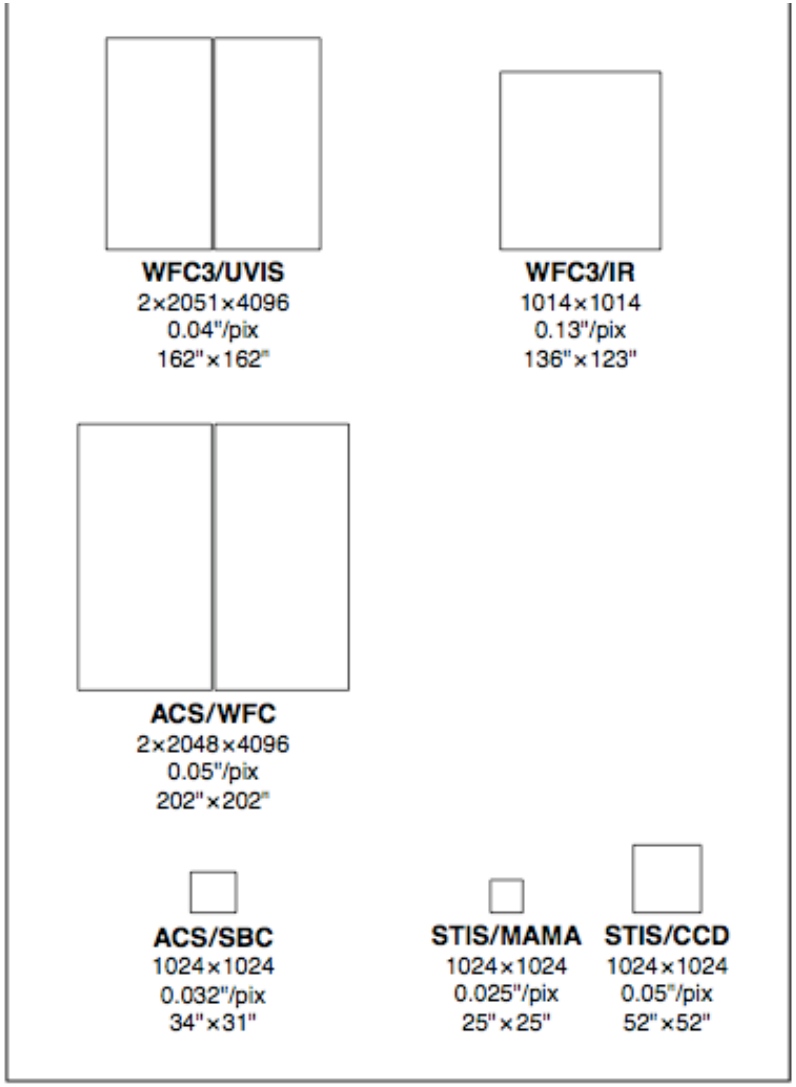
High Resolution Channel (HRC)

(inoperative)

- 3 mirror design, MgF_2 on Al
- 1024 x 1024 21 µm/pixel near-UV enhanced CCD
- 29” x 26” field of view
- 0”.025 pixels; critically sampled at 5000 Å
- Aberrated beam coronagraphy from 2000 to 11000 Å

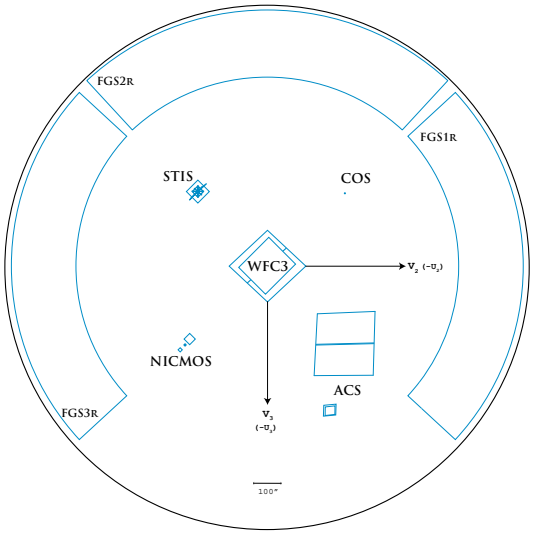
WFC Performance Summary

Characteristic	January 2007 (pre-SM4)	May 2009 (post-SM4)
Read noise (e^-; gain=2)	5.5	3.9-4.7
Dark current (e^-/pix/hr)	10.7	20-25
Hot pixels (%)	0.68	1.1
Full well depth (e^-)	84,000	> 80,000
Non-linearity (%)	< 0.1	< 0.2
CTE (1620 e^-; EPER)	< 0.999949	0.99989
Cross-talk (50,000 e^- source)	$4x10^{-5}$	$(5 \pm 4) \times 10^{-5}$



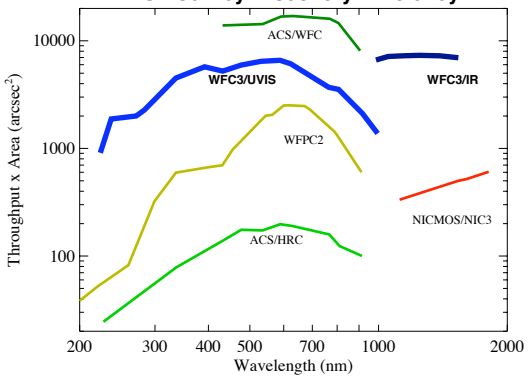
The pixel scale of the WFC3 UVIS channel is 20% finer in comparison to the ACS/WFC, obtained at the cost of covering only about 66% of the area of the ACS field of view.

Table 3.1 presents a comparison of the wavelength coverage, pixel scale, and field of view of WFC3 and of the other *HST* imaging instruments that are currently available.



The HST focal plane, showing the instrument complement after Servicing Mission 4. The WFC3 UVIS and IR channels view the same patch of sky, but not simultaneously. All instrument apertures are shown to scale, except for COS, which has been enlarged by a factor of five for clarity.

HST Survey Discovery Efficiency



The discovery efficiency of the HST cameras. Here, the discovery efficiency is proportional to the total system throughput at the pivot wavelength of the broadband filters and proportional to the field of view.

IR Channel Filters

Name	Description	Wavelength (nm) pivot	width
F105W	Wide *Y*	1058	292
F110W	Wide *YJ*	1159	503
F125W	Wide *J*	1249	302
F140W	*Wide JH* gap & red grism ref.	1396	399
F160W	WFC3 *H*	1544	288
G102	Blue grism high resolution	1025	250
G141	Red grism low resolution	1410	600
F098M	Blue grism reference	988	169
F127M	H_2O/CH_4 continuum	1274	69
F139M	H_2O/CH_4 line	1384	65
F153M	H_2O & NH_3	1532	69
F126N	[FeII]	1259	11
F128N	Paschen β	1283	14
F130N	Paschen β continuum	1300	13
F132N	Paschen β redshifted	1319	13
F164N	[FeII]	1641	17
F167N	[FeII] continuum	1665	17

Science Oversight Committee

WFC3

Wide Field Camera 3

Ultraviolet-Visible (UVIS) Channel

- Two 2k x 4k CCDs
- 162 arcsec x 162 arcsec field of view
- 62 filters, 1 grism
- 200 - 1000 nm spectral coverage
- 0.039 arcsec pixels

Infrared (IR) Channel

- 1k x 1k HgCdTe array with 1.7 µm cutoff
- 123 arcsec x 136 arcsec field of view
- 15 filters, 2 grisms
- 800 - 1700 nm spectral coverage
- 0.13 arcsec pixels

NASA's new Wide Field Camera 3 has been built for installation during HST Servicing Mission 4. Equipped with state-of-the-art detectors and optics, WFC3 will provide wide-field imaging with continuous spectral coverage from the ultraviolet into the infrared, dramatically increasing both the survey power and the panchromatic science capabilities of HST.

For further information, visit:
http://www.stsci.edu/hst/wfc3

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January 24, 2008

UVIS Channel Filters - Broad

Name	Description	Wavelength (nm) pivot	width
F200LP	Clear	516	800
F218W	ISM feature	224	35
F225W	UV Wide	238	55
F275W	UV Wide	272	48
G280	UV Grism	278	185
F300X	Extremely wide UV	285	75
F336W	*U*, Stromgren *u*	336	55
F350LP	Long Pass	592	450
F390W	Washington *C*	393	95
F438W	WFPC2 *B*	432	68
F475W	SDSS *g'*	478	149
F475X	Extremely wide blue	496	220
F555W	WFPC2 *V*	532	160
F600LP	Long Pass	751	400
F606W	WFPC2 Wide *V*	588	230
F625W	SDSS *r'*	622	158
F775W	SDSS *i'*	766	149
F814W	WFPC2 Wide *I*	807	254
F850LP	SDSS *z'*	916	150

UVIS Channel Filters - Medium

Name	Description	Wavelength (nm) pivot	width
F390M	CaII continuum	390	21
F410M	Stromgren *v*	411	18
F467M	Stromgren *b*	468	22
F547M	Stromgren *y*	545	71
F621M	11% passband	621	63
F689M	11% passband	688	71
F763M	11% passband	761	80
F845M	11% passband	844	89

UVIS Channel Filters - Narrow

Name	Description	Wavelength (nm) pivot	width
F280N	MgII 2795,2802	284	3
F343N	[NeV] 3426	344	14
F373N	[OII] 3726/3728	373	4
F395N	CaII 3933/3968	395	7
F469N	HeII 4686	469	4
F487N	Hβ 4861	487	5
F502N	[OIII] 5007	501	6
F631N	[OI] 6300	630	4
F645N	Continuum	645	9
F656N	Hα 6562	656	1
F657N	Wide Hα+[NII]	656	10
F658N	[NII] 6583	658	2
F665N	z (Hα+[NII])	665	11
F673N	[SII] 6717/6731	676	10
F680N	z (Hα+[NII])	688	32
F953N	[SIII] 9532	953	8

UVIS Channel Filters - Quad

Name	Description	Wavelength (nm) pivot	width
FQ232N	CII] 2326	246*	3
FQ243N	[NeIV] 2425	250*	3
FQ378N	z ([OII] 3727)	379	9
FQ387N	[NeIII] 3868	387	2
FQ422M	Continuum	422	11
FQ436N	Hγ+[OIII] 4363	437	4
FQ437N	[OIII] 4363	437	2
FQ492N	z (Hβ)	493	10
FQ508N	z ([OIII] 5007)	509	12
FQ575N	[NII] 5754	576	1
FQ619N	CH_4 6194	620	6
FQ634N	6194 continuum	635	7
FQ672N	[SII] 6717	672	1
FQ674N	[SII] 6731	673	1
FQ727N	CH_4 7270	727	6
FQ750N	7270 continuum	750	7
FQ889N	CH_4 25/km-agt	889	9
FQ906N	CH_4 2.5/km-agt	906	9
FQ924N	CH_4 0.25/km-agt	925	9
FQ937N	CH_4 0.025/km-agt	937	9

*Pivot wavelength falls outside of bandpass due to red leak.