



<http://www.astro-f.esac.esa.int/>

ASTRO-F is an infrared sky survey mission from the Institute of Space and Astronautical Science (ISAS) of the Japan Aerospace eXploration Agency (JAXA) with the participation of the European Space Agency (ESA).

ISAS/JAXA's ASTRO-F satellite, due for launch in early 2006, will perform an all-sky survey in six wavebands between 9 and 180 microns, at higher sensitivity, spatial resolution and larger wavelength coverage than IRAS. The resulting catalogues are expected to contain more than a million sources. Deep imaging and spectroscopic surveys with pointed observations will also be performed in selected areas of the sky.

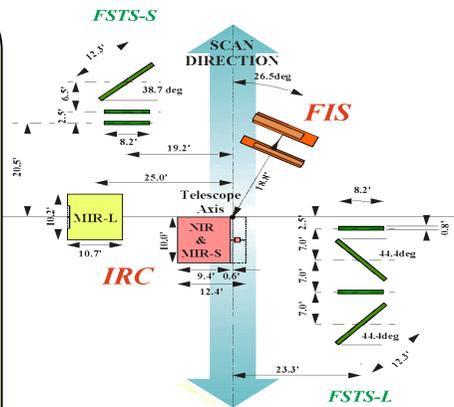
In addition to the surveys, a significant phase of the mission will be dedicated to pointed observations of astronomical targets. 30% of these opportunities are available to the general astronomical community, via the traditional route of Call for Proposals, followed by peer-review. Resulting from ESA's collaboration in this mission, 10% are open to European users, the other 20% are for Japanese and Korean astronomers. These 'Open Time' observations will be scheduled after the survey prioritised part of the mission, starting at about eight months after launch.

Launch	January-February 2006
Orbit	Sun-synchronous polar Altitude: 745 km Period: 100 mins
Telescope diameter	68.5 cm
Telescope temperature	5.8 K
Wavelength coverage	1.8 – 26 μm (IRC) 50 – 180 μm (FIS)
Cryogenic lifetime	1.5 years (Near-infrared observations possible after cryogen loss)

Infrared Camera (IRC)

IRC Camera	NIR	MIR-S	MIR-L
Wavelength [μm]	1.8 – 5.05	5.5 - 13	12.5 - 26
Detector	InSb	Si:As	
Array format	512 x 412	256 x 256	256 x 256
Pixel size [arcsec²]	1.46	2.34	2.51 x 2.39
Field of View (arcmin)	9.5 x 10	9.1 x 10	10.3 x 10.2

- Three independent cameras
- Simultaneous coverage in the NIR–MIR range
- Wide Field-of-View (10' x 10')
- Three filters for each camera
- Two dispersion elements for each camera



Focal Plane configuration

- Three apertures look at different areas of the sky
- The two FIS channels share the same sky area
- IRC NIR and MIR-S share the same sky area

ASTRO-F has the capability for imaging and spectroscopy in 13 infrared wavebands from 2 to 180 microns. It is expected to add significant information on many important astrophysical problems (e.g. evolution of galaxies, formation of stars and planets, brown dwarfs)

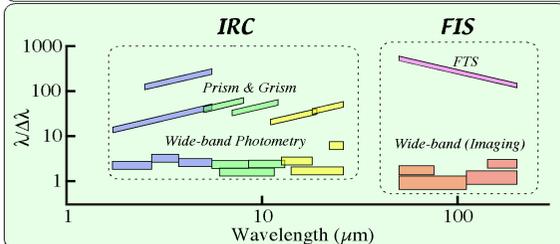
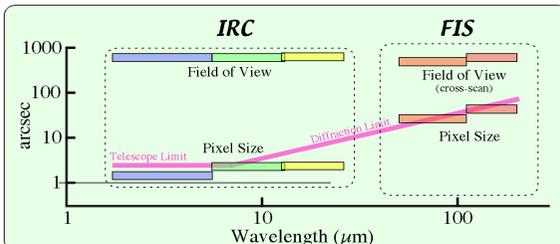
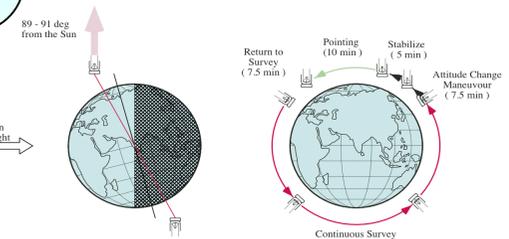
Far-Infrared Surveyor (FIS)

FIS Band	N60	WIDE-S	WIDE-L	N160
Wavelength [μm]	50–75	50–110	110–180	140–180
Detector	Monolithic Ge:Ga		Compact Stressed Ge:Ga	
Array format	20 x 2	20 x 3	15 x 3	15 x 2
Pixel size [arcsec]	27 x 27	27 x 27	44 x 44	44 x 44
Field-of-View [arcmin]	12.5 x 7.5			

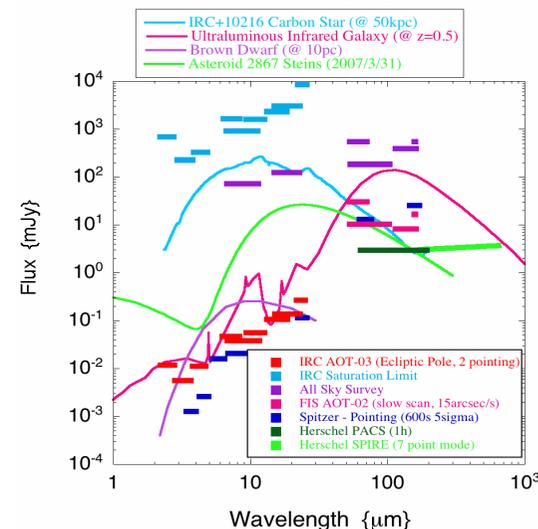
- Simultaneous observation in 4 bands
- Mapping of large areas (60 x 8 arcmin²) possible in one observation

Observation modes

ASTRO-F operates either in survey mode or pointed mode. In survey mode, a continuous scan of the sky is performed while the satellite orbits around the Earth. The whole sky is therefore covered in half a year. In pointed mode, ASTRO-F stares at a defined target, for an effective **observation time of 10 mins**, at a cost of 30 mins operation including manoeuvre and stabilisation. The observation parameters are specified in pre-defined Astronomical Observation Templates (AOTs).



ASTRO-F Detection Limits (Single Pointing 5 σ)



Sky visibility constraints

ASTRO-F's orbit is sun-synchronous polar. The telescope must always be pointed in the plane perpendicular to the Sun, with an allowance of only one degree. Thus the visibility is a function of the ecliptic latitude. Targets near the ecliptic poles are observable in a very large number of orbits, while targets on the ecliptic plane are visible by ASTRO-F only for two days every half-year.