2003-11-24
Issue 3.1
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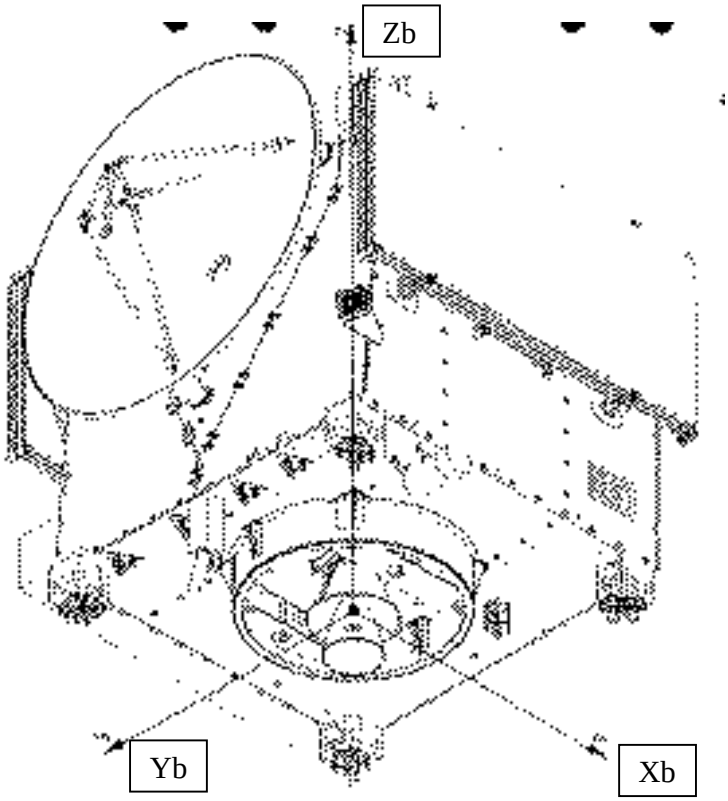
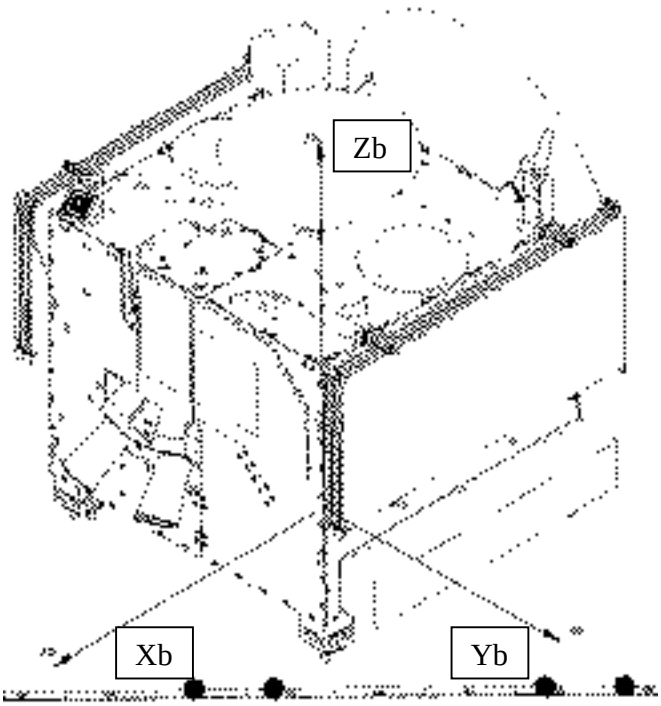
ASPERA-3 sensor numbering

Change record

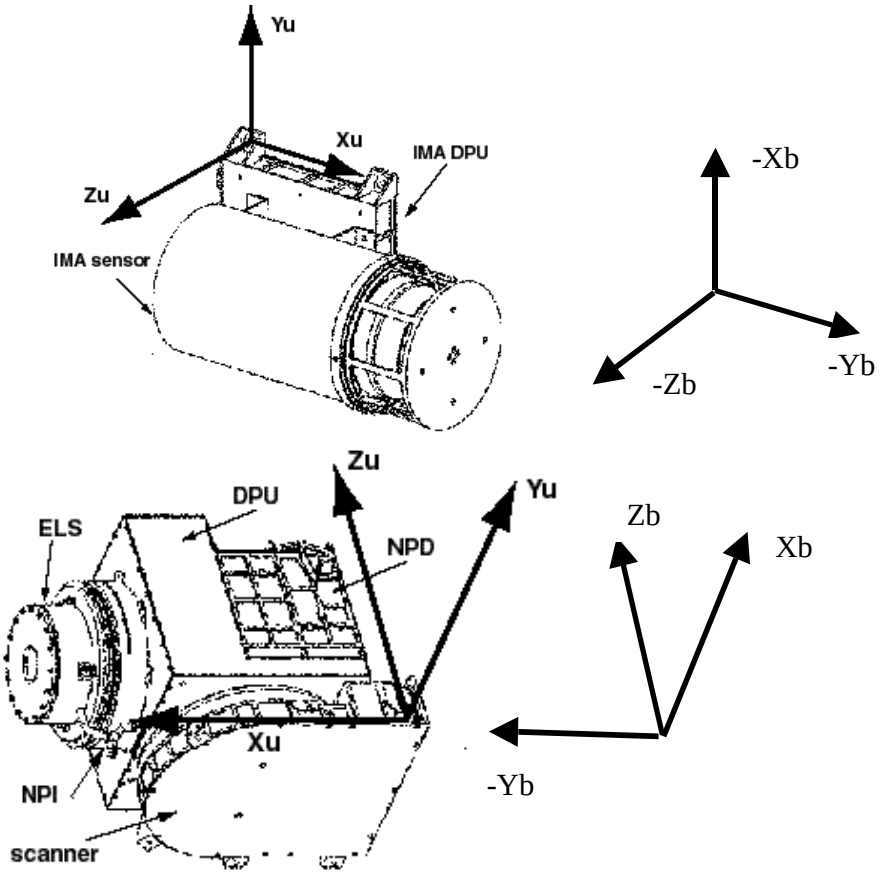
Issue	Date	Changes
1.0	2003-06-19	New document
2.0	2003-08-26	ELS numbering corrected
3.0	2003-11-21	ASPERA SPICE frame definitions (2003-08-30) added
	2003-11-21	Solar sensor figure in Sensor Numbering section
3.1	2003-11-24	Misprint in Figure Solar sensor 1 and 2 frames, p.8, fixed

Frame of references. Spacecraft basic frame



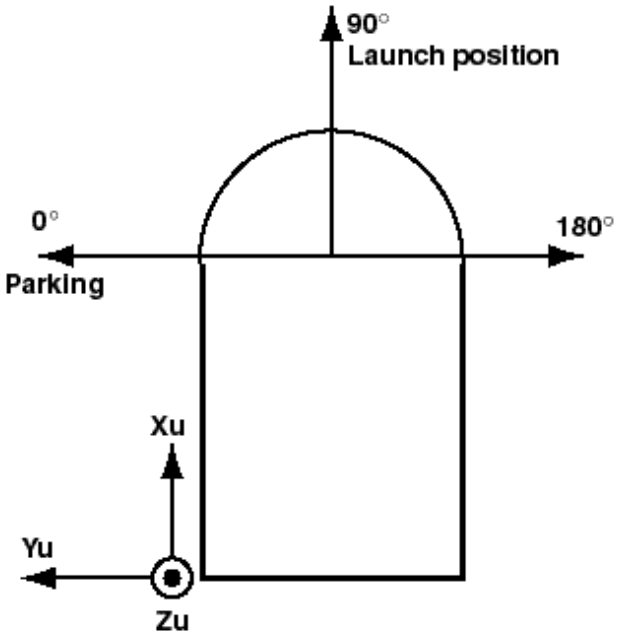


Frame of references. Unit reference frame



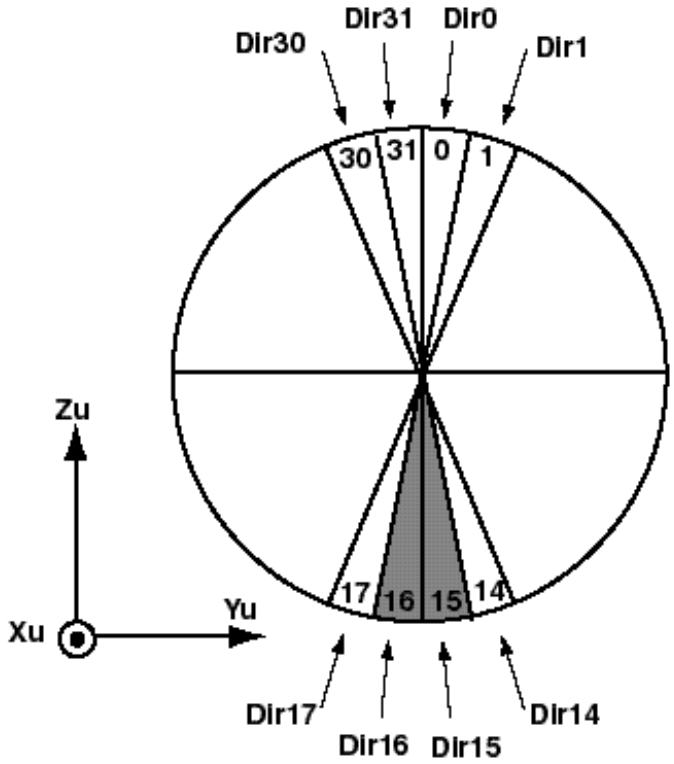
Zu (or Zb) is the spin axis of the scanner.

Position of the Sensor assembly central line.



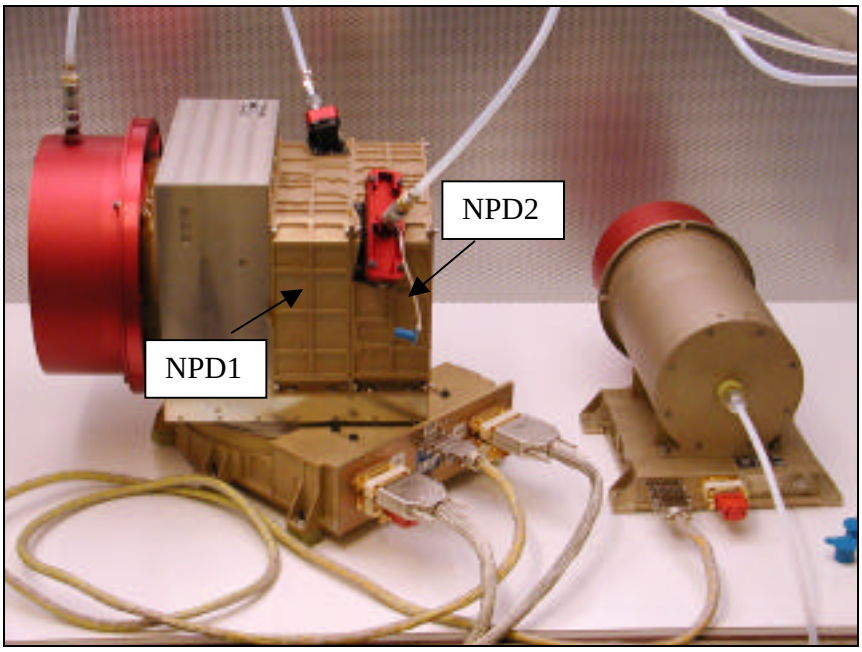
The Sensor Assembly includes ELS, NPI, DPU, and two NPDs. It is a movable part of the instrument. The sketch above shows the position of the Sensor assembly central line during scans. The scans are performed from 0° to 180° and back.

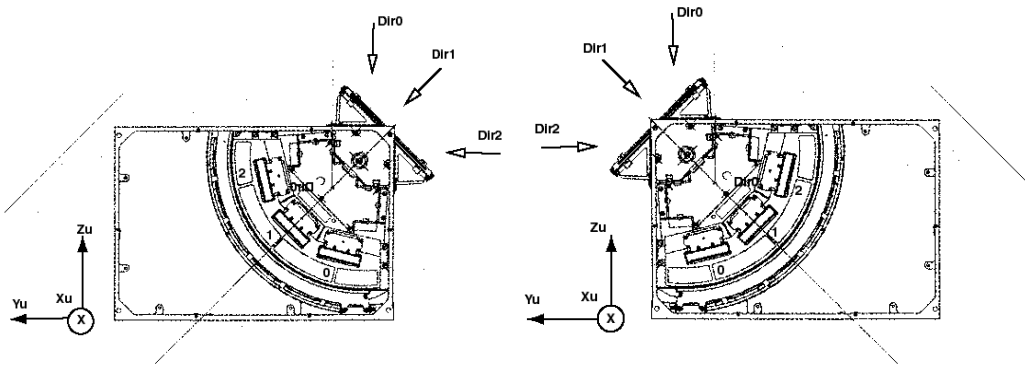
NPI sector numbering



Sectors 15 and 16 are mechanically blocked.
Sectors 0 – 7: MOCAD0
Sectors 8 – 15: MOCAD1
Sectors 16 – 23: MOCAD2
Sectors 24 – 31: MOCAD3

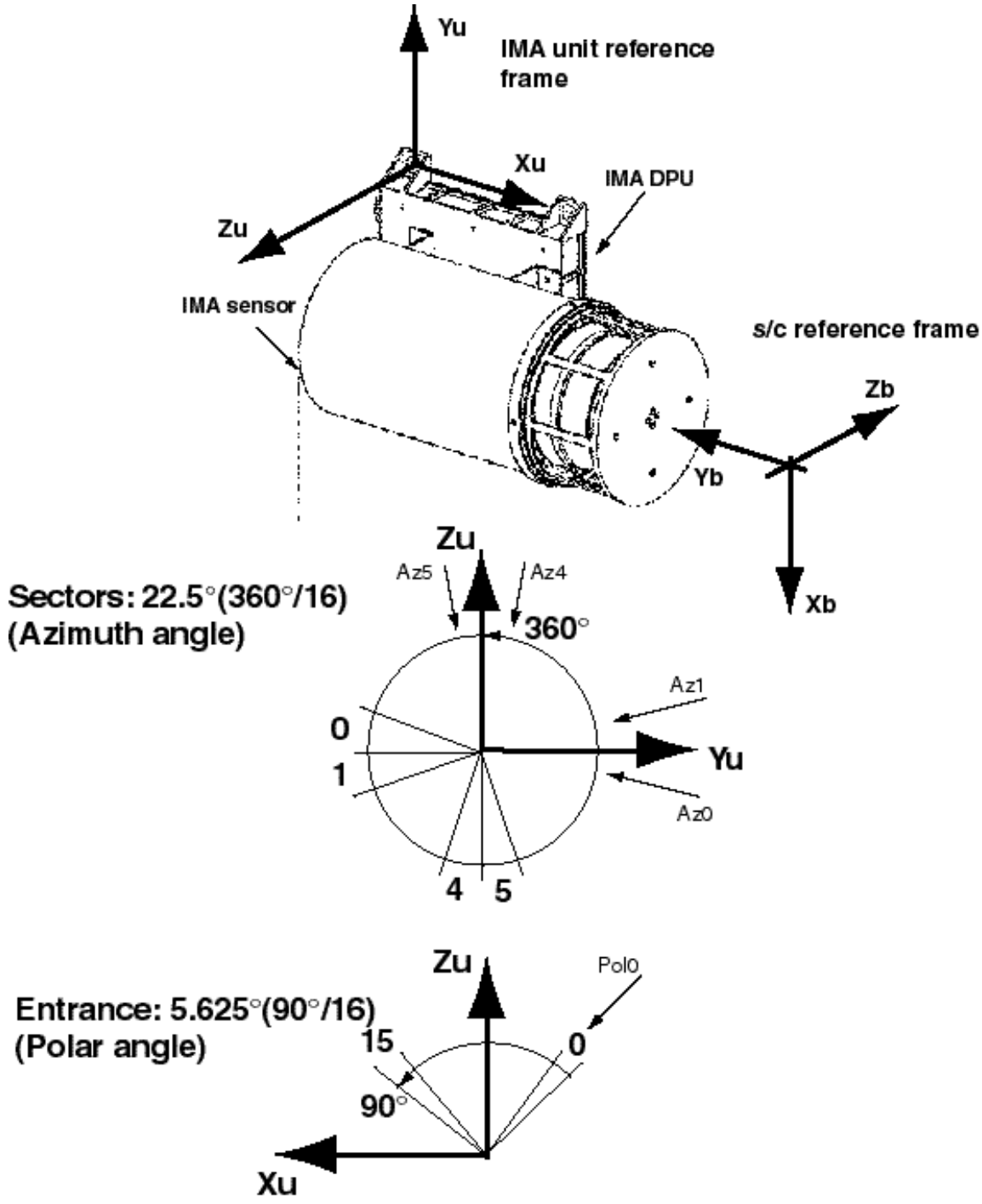
NPD sector numbering



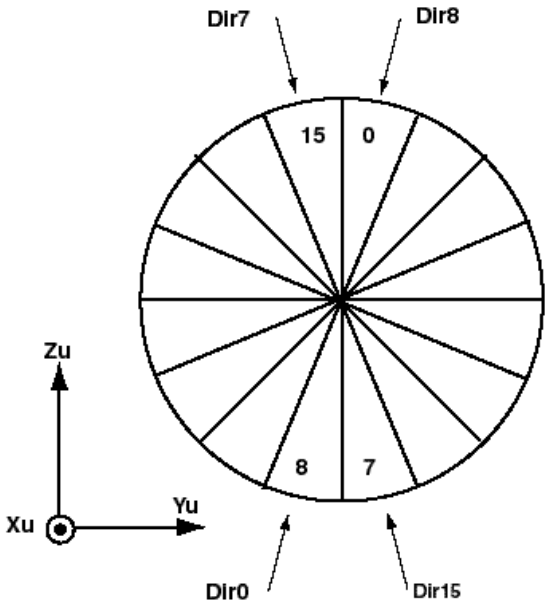


NPD1 **NPD2**

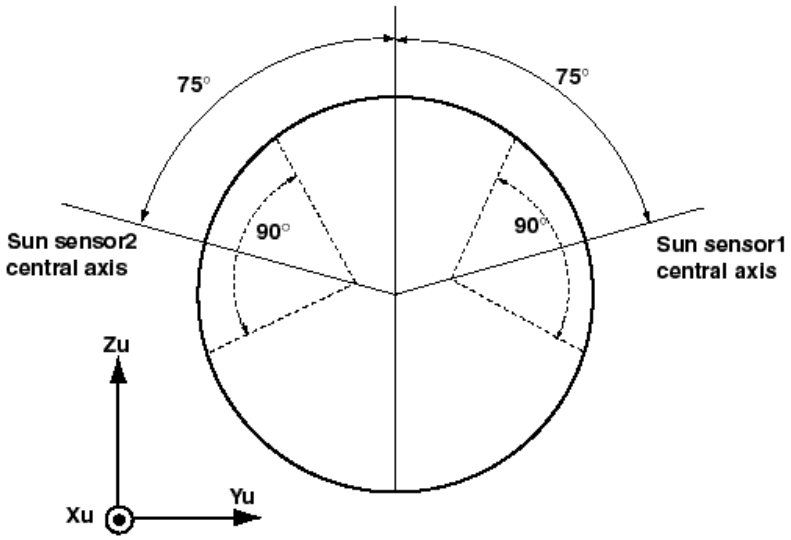
IMA sector numbering



ELS sector numbering



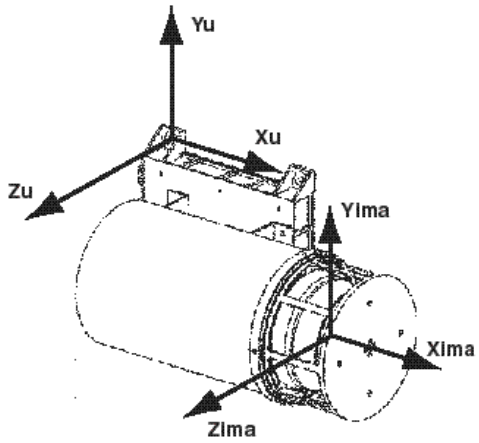
Solar sensor position



Sun sensor field of view is ±45° around the central axis (elevation) and ±1° (azimuth)

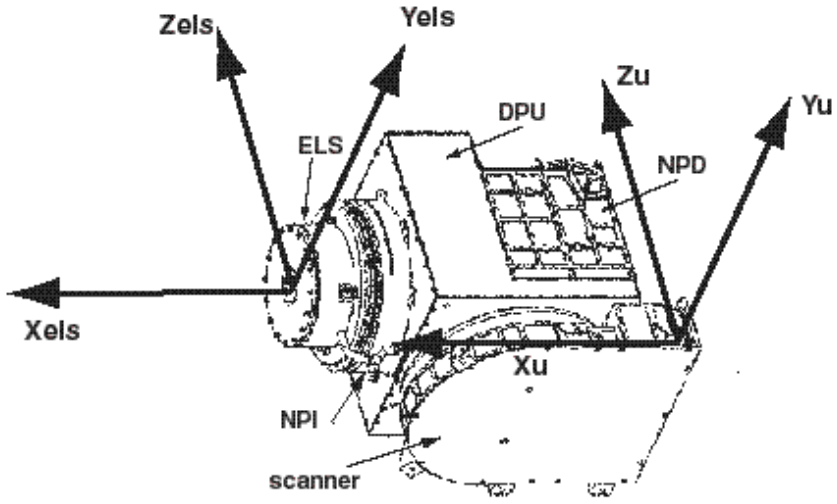
ASPERA-3 SPICE frame definitions of 2003-08-30

IMA frame
Name "MEX_ASPERA_IMA"
Axes: All three axes (Xima, Yima, Zima) are co-aligned with the respective axes of the IMA URF (Xu, Yu, Zu).
Origin: The origin is the intersection of the IMA central symmetry line with the central plane of its field of view. This plane is defined as a plane right in the middle of the gap between upper and lower deflectors.



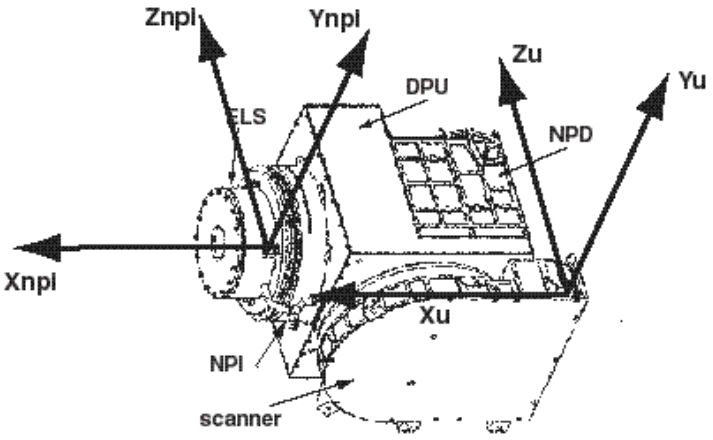
IMA frame

ELS frame
Name "MEX_ASPERA_ELS"
Axes: All three axes (Xels, Yels, Zels) are co-aligned with the respective axes of the ASPERA Main unit URF (Xu, Yu, Zu).
Origin: The origin is the intersection of the ELS central symmetry line with the central plane of its field of view. This plane is defined as a plane right in the middle of the gap between two disks defining the field of view.



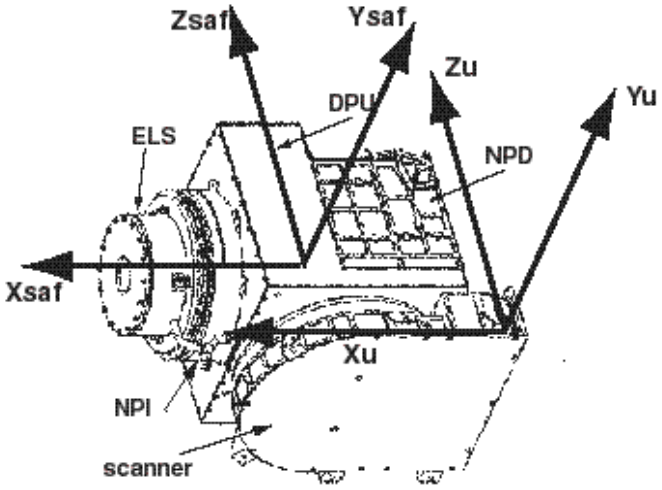
ELS frame axes

NPI frame
Name "MEX_ASPERA_NPI"
Axes: All three axes (Xnpi, Ynpi, Znpi) are co-aligned with the respective axes of the ASPERA Main unit URF (Xu, Yu, Zu).
Origin: The origin is the intersection of the NPI central symmetry line with the central plane of its field of view. This plane is defined as a plane right in the middle of the aperture.



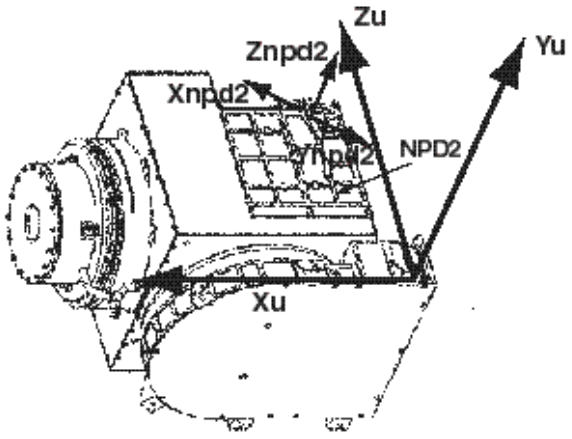
NPI frame axes

Sensor assembly frame
Name "MEX_ASPERA_SAF"
Axes: All three axes (Xsaf, Ysaf, Zsaf) are co-aligned with the respective axes of the ASPERA Main unit URF (Xu, Yu, Zu).
Origin: The origin is the intersection of the ELS and NPI central symmetry line with the scanner spin axis.



Sensor assembly frame axes

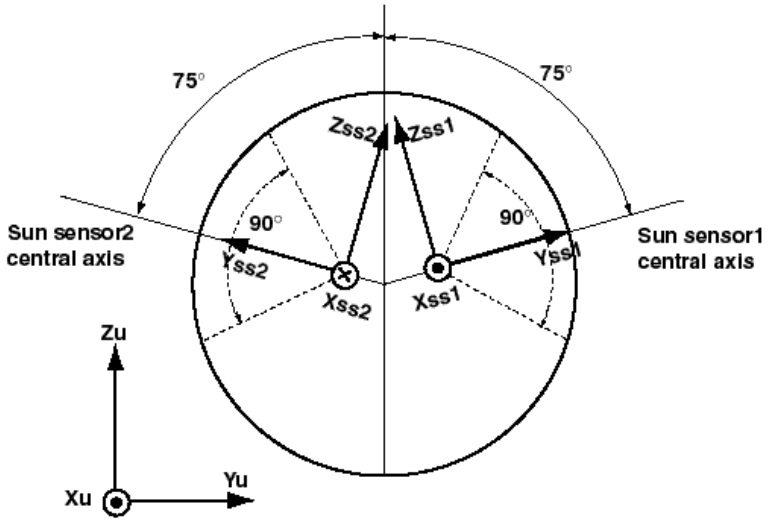
NPD2 frame
Name "MEX_ASPERA_NPD2"
Axes: Znpd2 and Ynpd2 axes are in the plane of the NPD2 field of view (Note, it is titled with respect to URF). Znpd2 is co-aligned with the central axis of the NPD2 field of view. Xnpd2 completes the right-hand system. Note, that Znpd2 points towards -Xsaf
Origin: NPD2 focal point



NPD2 frame

NPD1 frame
Name "MEX_ASPERA_NPD1"
Axes: Znpd1 and Ynpd1 axes are in the plane of the NPD1 field of view (Note, it is titled with respect to URF). Znpd1 is co-aligned with the central axis of the NPD1 field of view. Xnpd1 completes the right-hand system. Note, that Znpd1 points towards +Xsaf.
Origin: NPD1 focal point

Solar Sensors 1 and Solar Sensor 2 frames
Name "MEX_ASPERA_SS1" and "MEX_ASPERA_SS2"



Solar sensor 1 and 2 frames

Coordinates of origins

Frame	**With respect to**	**X**	**Y**	**Z**	α	β
IMA_URF	S/c base frame	*	*	*	NA	NA
MEX_ASPERA_IMA	IMA_URF	+237.9	-84.0	+87.5	NA	NA
MU_URF	S/c base frame	*	*	*	NA	NA
MEX_ASPERA_SAF	URF	+121.0	-109.0	+153.0	NA	NA
MEX_ASPERA_ELS	SAF	+302.4	-109.0	+153.0	NA	NA
MEX_ASPERA_NPI	SAF	+252.6	-109.0	+153.0	NA	NA
MEX_ASPERA_NPD1	SAF	+98.8	-206.2	+215.8	+15.0	-45.0
MEX_ASPERA_NPD2	SAF	+53.3	-11.8	+215.8	-15.0	+45.0
MEX_ASPERA_SS1	SAF	+239.4	-33.0	+173.4	-75.0	0.0
MEX_ASPERA_SS2	SAF	+239.4	-185.0	+173.4	+75.0	0.0

(*) provided by Astrium

α - angle between Znpd1/Znpd2 and plane Yu/Zu, positive angles in direction +Xu
angle between Yss1/Yss2 and plane Xu/Zu, positive angles in direction +Yu

β - angle between Znpd1/Znpd2 and plane Xu/Zu, positive angles in direction +Yu