

ENGINEERING MEMORANDUM**990505****From:** Roel van Bezooijen (650) 424-2225**To:** Richard Vassar**Subject:** Tiles for the FAME Star Catalog

The objective of this memo is to specify the tiles into which the 45,000,000 stars of the FAME catalog are to be organized. The 40,910 tiles, which are defined relative to the J2000 coordinate system, are located in 110 declination bands. Band 1 represents the south polar cap, extending south of and including a declination of - 89.1 deg. Band 110 represents the north polar cap, extending north of and not including a declination of 89.1 deg. Each of the 108 declination bands between the south polar cap and the north polar cap cover a declination of 1.65 deg. Each of these bands excludes the southern boundary but includes the northern boundary. The number of tiles in each declination band and the RA dimension of the tiles in the declination band is provided in the table below.

Declination Band(s)	# of Tiles per Band	Δ RA per Tile (deg)	Area per Tile		Tile Number(s)
			Min (deg ²)	Max (deg ²)	
110	1	360	2.56		40,910 (NP cap)
109	18	20	1.00		40,892-40,909
108	36	10	0.98		40,856-40,891
107	48	7.5	1.09		40,808-40,855
105-106	72	5.0	0.96	1.20	40,664-40,807
102-104	120	3.0	0.87	1.14	40,304-40,663
98-101	180	2.0	0.85	1.13	39,584-40,303
94-97	240	1.5	0.91	1.11	38,624-39,583
90-93	288	1.25	0.98	1.13	37,472-38,623
83-89	360	1.0	0.94	1.16	34,952-37,471
72-82	480	0.75	0.90	1.11	29,672-34,951
56-71	576	0.625	0.93	1.04	20,456-29,671
40-55	576	0.625	0.93	1.04	11,240-20,455
29-39	480	0.75	0.90	1.11	5,960-11,239
22-28	360	1.0	0.94	1.16	3,440-5,959
18-21	288	1.25	0.98	1.13	2,288-3,439
14-17	240	1.5	0.91	1.11	1,328-2,287
10-13	180	2.0	0.85	1.13	608-1,327
7-9	120	3.0	0.87	1.14	248-607

5-6	72	5.0	0.96	1.20	104-247	
4	48	7.5	1.09		56-103	
3	36	10	0.98		20-55	
2	18	20	1.00		2-19	
1	1	360	2.56		1	(SP cap)

The first tile in each band has a lower RA limit of 0, while the upper limit of the last tile in each band has an upper RA limit of 360. Each tile includes the lower RA limit of the tile but excludes the upper RA limit of the tile.

The size of the declination bands is such that the diagonal of the rectangular local star database region, which has a width of 1.1 deg, can be up to 1.65 deg using the constraint that it can only extend into two declination bands. This implies that the other side of the local star database region can be up to 1.2 deg. Hence, assuming a rotation rate of 0.15 deg/s, it is necessary to generate a local star database at least once per $1.2 / 0.15 = 8$ seconds.