Results of the IMO Video Meteor Network – September 2012

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September 2012 was not a record-breaking month, but it still presented a nice outcome to the IMO network. Spells of clear skies between September 6 and 11, and on September 20/21, interleaved with periods of poor weather conditions. Other than usual, the observers in northern central Europe enjoyed better weather conditions than the southern European observers, which are typically preferred. Two third of all camera systems obtained twenty and more observing nights. Compared to the previous year, the overall effective observing time increased by 200 to 8,850 hours, whereas the number of meteors decreased by 4,000 to overall 32,000. With 3.6 meteors per hour, the average was as low as hardly ever before in September.

September has no major meteor showers to offer. Beside the upcoming Orionids and the Antihelion/Taurids, there are only three minor showers which belong to the Perseid / Aurigid complex.

The Aurigids (206 AUR) reach their maximum at the begin of September. Figure 1 shows the activity profile of that shower in 2012. We obtained an almost constant flux density of 1.5 meteoroids per 1,000 km^2 and hour without a clear maximum.

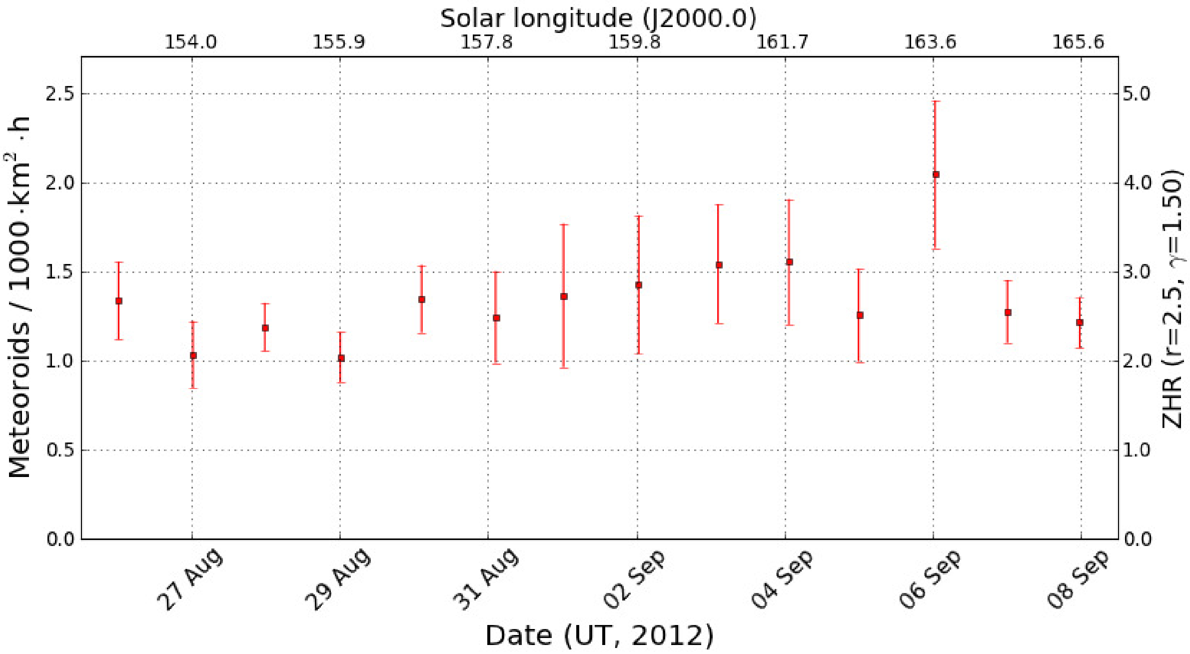

Figure 1: *Flux density profile of the Aurigids from data of the IMO Network in 2012, calculated with a zenith exponent of γ=1.5.*

According to the IMO working list, the September epsilon Perseids (208 SPE) reach their peak on September 9. Our 2012 activity profile shows a weak plateau between September 8 and 14 with a peak flux density of almost three meteoroids per 1,000 km^2 and hour (figure 2).

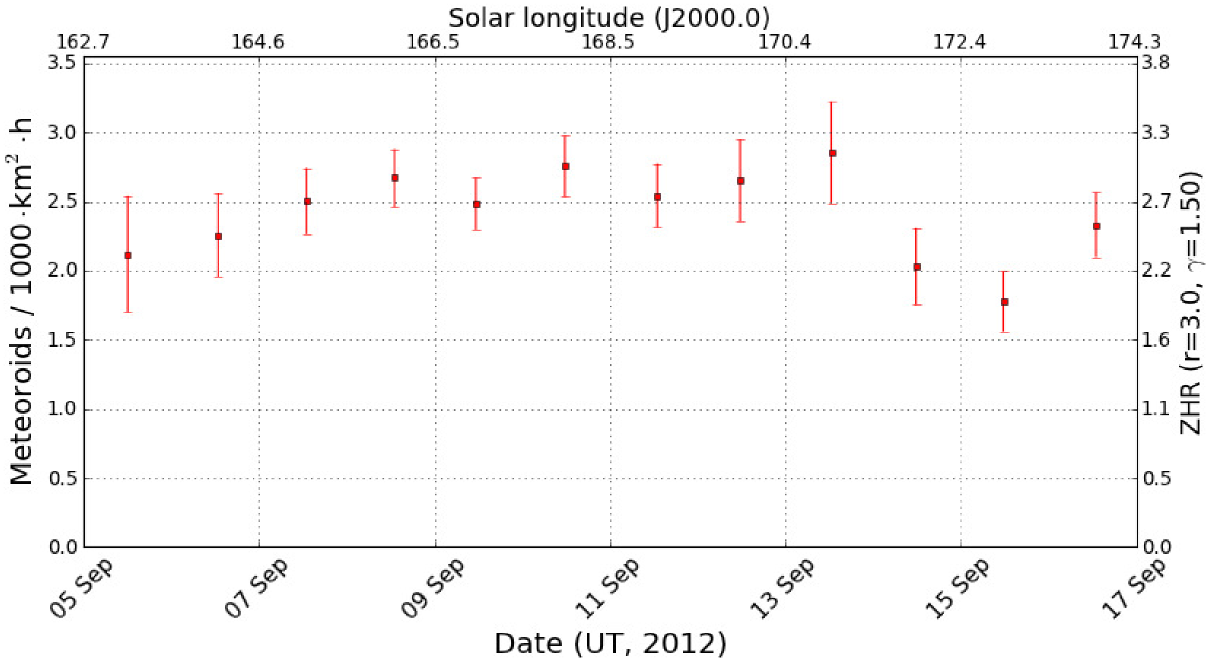

Figure 2: *Flux density profile of the September epsilon Perseids from data of the IMO Network in 2012, calculated with a zenith exponent of* γ*=1.5.*

In the last meteor shower analysis from spring 2012, we could trace the September epsilon Perseids with almost 5,000 shower members all month long, and almost all the time they were the strongest source of meteors in the sky. Only few showers are that dominant! The radiant position shows only little scatter, whereas the variations in velocity are a little higher. Overall the parameters fit excellently to the values from the MDC shower list (Table 1).

Table 1: *Parameters of the September epsilon Perseids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	170	-	50.2	-	+39.4	-	65.5	-
IMO 2012	167	162-185	47.9	+1.19	+39.6	+0.06	65.5	-

Then there are the delta Aurigids (224 DAU), which begin in the second half of September and reach their peak early October. Our 2012 activity profile shows slightly higher rates between September 28 and October 3 with peak flux densities of above three meteoroids per 1,000 km^2 and hour (figure 3).

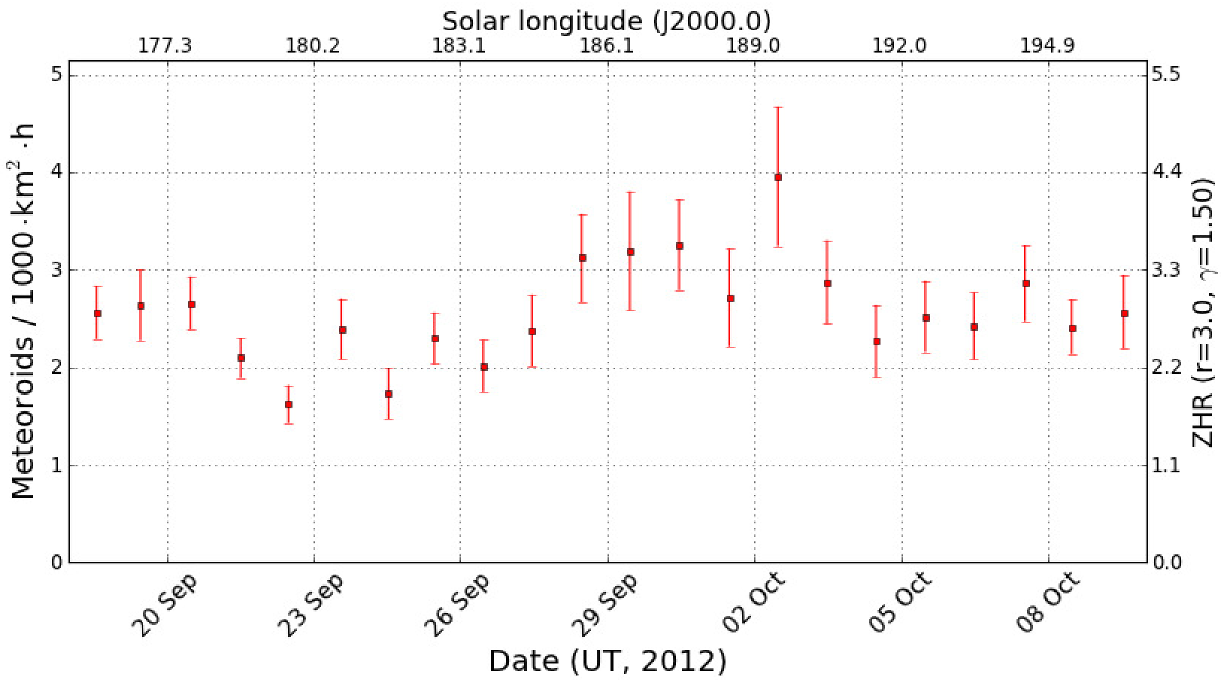

***Figure 2:** Flux density profile of the delta Aurigids from data of the IMO Network in 2012, calculated with a zenith exponent of γ=1.5.*

In our 2012 analysis, this shower cannot be identified without doubt. There is a candidate with almost 1,000 shower members, but it is only active for five nights and ends well before the peak date given in the MDC list. The scatter in the shower parameters is mediocre. If the radiant position is extrapolated to the peak solar longitude of 191° given by MDC, there is good agreement in declination, but the right ascension differs by almost 10° from the MDC value (table 2).

***Table 2:** Parameters of the delta Aurigids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	191	-	83.5	-	50.4	-	65.9	-
IMO 2012	184	182-186	76.6	-0.9	56.7	-1.0	62.4	-

As September is rich in minor meteor showers, we could identify a number of further showers in our spring 2012 analysis.

The most interesting candidate starts directly at the begin of September and can be traced in our data set until early December (!). 21,000 meteors are assigned at that time to the southern October delta Arietids (28 SOA). Even though the name of this shower is not really well-known, it belongs to the strongest three meteor sources in the full activity interval and end of September / early October it is even stronger than any other meteor shower.
The picture is getting still more interesting, if the meteor shower parameters are analysed in detail. Then it becomes clear, that there are in fact two independent meteor showers. The second one starts at the same time, when the first one ends, and if there wasn't a displacement by 8° in right ascension and 5° in declination, both showers could be regarded as one (just as the analysis software did).
The first shower can be traced between 161 and 177° solar longitude. The peak is reached on September 11 at 168° solar longitude, and there is only little scatter in the meteor shower parameters.

The second shower is active between 179 and 246° solar longitude. Peak activity of that shower occurs mid-October at 201° solar longitude. Whereas right ascension increases linearly at that time, the declination describes a parabola shaped curve over solar longitude. First it grows by half a degree per day, then the growth is getting smaller and in the end it is zero. At the same time, the meteor shower velocity decreases significantly from 30 to 25 km/s. Table 3 shows the average values for the full activity interval.
If both showers are compared with the values from the MDC list, we find a very good agreement between the second shower and the southern October delta Arietids – both with respect to the time of maximum and the meteor shower parameters (table 4). So the first meteor shower is obviously a hitherto unknown meteor shower. As the scatter in the shower parameters is low and the shower belongs to the most active meteor sources in the sky at that time, we reported it directly to the MDC. There it was found, that only recently a new meteor shower with similar radiant position was found. Even though there is no velocity given for the omega Piscids (504 OPI), the radiant position agrees so well (table 3) that it is most probably the same meteor shower.

Table 3: *Parameters of the omega Piscids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	166.8	-	2.1	-	+2.4	-	-	-
IMO 2012	168	161-177	3.3	+0.85	+5.1	+0.25	30.8	-0.02

Table 4: *Parameters of the southern October delta Arietids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	199	-	33.1	-	+10.6	-	27.9	-
IMO 2012	201	179-246	35.7	+0.74	+8.9	+0.18	29.2	-0.09

The September Lyncids (81 SLY) are detected between 165 and 192° solar longitude in our meteor shower analysis. The detailed analysis, however, shows once more that there are in fact at least two sources. The first interval between 165 and 175° solar longitude with almost 1,000 meteors is well-defined and agrees nicely to the values from the MDC list (table 5). In the interval thereafter, the radiants show a different position, drift and higher velocity. The scatter from one day to the next is so big, that they cannot be regarded as an own meteor shower.

Table 5: *Parameters of the September Lyncids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	Interval [°]	Mean [°]	Drift [°]	Mean [°]	Drift [°]	Mean [km/s]	Drift [km/s]
MDC	167	-	107.4	-	+55.0	-	62.0	-
IMO 2012	167	165-175	107.5	+2.0	+55.7	+0.1	59.7	-

Also the case of the September pi Orionids (430 POR) is not clear. The meteor shower analysis of spring 2012 yields two showers that fit roughly to the MDC values. Here we give only the values for the first shower, derived from well above 400 meteors (table 6). The radiant is located 15° east of the MDC position. At 178° solar longitude, the second shower lies south-west, but also here the scatter in the meteor shower parameters is so big, that it cannot be regarded as a safe identification.

Table 6: *Parameters of the September pi Orionids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	**Interval [°]**	**Mean [°]**	**Drift [°]**	**Mean [°]**	**Drift [°]**	**Mean [km/s]**	**Drift [km/s]**
MDC	178	-	74.9	-	+8.4	-	68.9	-
IMO 2012	176	174-177	62.1	-0.4	+6.4	+0.5	66.6	-

The detection of the beta Aurigids (210 BAU) is close to the limits. This shower is found between 178 and 182° solar longitude with over 1,100 meteors. Even though the beta Aurigids are one of the strongest meteor sources in the second half of September with a rank of three to four, their radiant position shows quite some scatter from one day to the next. The agreement with the MDC list values is reasonable (table 7).

Table 7: *Parameters of the beta Aurigids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	**Interval [°]**	**Mean [°]**	**Drift [°]**	**Mean [°]**	**Drift [°]**	**Mean [km/s]**	**Drift [km/s]**
MDC	179	-	86	-	43	-	67.4	-
IMO 2012	180	178-182	87.6	-0.2	47.9	-0.1	70.0	-

Finally, there are the northern delta Piscids (215 NPI) with more than 900 meteors between 180 and 184° solar longitude. The quality of the shower parameters is mediocre – in particular the declination values scatter significantly. There is, however, a very good agreement with the MDC values (table 8). Only the velocity is a little smaller than expected.

Table 8: *Parameters of the northern delta Piscids from the MDC Working List and the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	**Interval [°]**	**Mean [°]**	**Drift [°]**	**Mean [°]**	**Drift [°]**	**Mean [km/s]**	**Drift [km/s]**
MDC	184	-	9.2	-	+7.7	-	33.1	-
IMO 2012	182	180-184	9.9	+0.8	+6.5	+1.0	27.8	-

Further minor showers from the MDC list like the nu Eridanids, September iota Cassiopeiids, September mu Arietids and sigma Orionids have been detected partly in our data, but only with large scatter in the meteor shower parameters. So at this time their identification is questionable. Maybe the picture changes in one or two years time, when even more data are available for analysis.

As in the previous months, there were a few candidates for new meteor showers (table 9).
The first candidate is based on 760 shower members. The radiants show only little scatter between 166 and 171° solar longitude. The slow shower has a rank of almost 10 and reaches peak activity on September 9 at 166° solar longitude.
The second candidate is even slower. Between 168 and 173° solar longitude, about 370 meteors are assigned to it, reaching a rank of 6. Highest activity is observed in mid-September.
More than 1,100 meteors are assigned to the third candidate between 177 and 185° solar longitude. It is at the upper end of the velocity scale and the rank is all the time above 15, which hints rather on a chance alignment of radiants than on a true meteor shower. However, as the scatter in the individual parameters is quite low, we still report it as a possible new meteor shower with maximum on September 23.

Table 9: *Parameters of three possibly new showers from the analysis of the IMO network in 2012.*

Source	Solar Longitude		Right Ascension		Deklination		Vinf	
	Mean [°]	**Interval [°]**	**Mean [°]**	**Drift [°]**	**Mean [°]**	**Drift [°]**	**Mean [km/s]**	**Drift [km/s]**
IMO 2012	168	166-171	346.8	+0.3	+0.4	+1.5	23.9	-
	171	168-173	302.3	-0.0	+32.1	+0.9	17.7	-
	180	177-185	112.7	+0.8	+30.3	+0.0	70.6	-

1. Observers

Code	Name	Place	Camera	FOV [°²]	St.LM [mag]	Eff.CA [km²]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG1 (0.8/8)	1488	4.8	726	9	58.2	83
BERER	Berko	Ludanyhalaszi/HU	HULUD1 (0.95/3)	2256	4.8	1540	18	118.7	949
			HULUD2 (0.75/6)	4860	3.9	1103	17	112.2	272
			HULUD3 (0.75/6)	4661	3.9	1052	16	104.4	212
BIRSZ	Biro	Agostyan/HU	HUAGO (0.75/4.5)	2427	4.4	1036	25	153.6	421
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5794	3.3	739	24	142.7	579
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	699	26	145.0	397
			MBB4 (0.8/8)	1470	5.1	1208	27	160.3	374
BRIBE	Brinkmann	Herne/DE	HERMINE (0.8/6)	2374	4.2	678	29	178.4	551
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2286	4.6	1080	28	152.7	630
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2350	5.0	1611	16	84.4	294
			BMH2 (1.5/4.5)*	4243	3.0	371	16	76.0	253
CRIST	Crivello	Valbrevenna/IT	BILBO (0.8/3.8)	5458	4.2	1772	24	147.8	773
			C3P8 (0.8/3.8)	5455	4.2	1586	23	142.1	505
			STG38 (0.8/3.8)	5614	4.4	2007	22	134.5	891
CSISZ	Csizmadia	Zalaegerszeg/HU	HUVCSE01 (0.95/5)	2423	3.4	361	17	104.6	250
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5631	4.3	2151	17	111.2	415
GONRU	Goncalves	Tomar/PT	TEMPLAR1 (0.8/6)	2179	5.3	1842	24	191.4	794
			TEMPLAR2 (0.8/6)	2080	5.0	1508	25	208.5	672
			TEMPLAR3 (0.8/8)	1438	4.3	571	27	202.6	609
			TEMPLAR4 (0.8/3.8)	4475	3.0	442	23	193.4	614
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1447	5.5	1841	23	155.3	652
			ORION3 (0.95/5)	2665	4.9	2069	18	119.6	282
			ORION4 (0.95/5)	2662	4.3	1043	22	152.3	436
HINWO	Hinz	Brannenburg/DE	ACR (2.0/35)*	557	7.4	4954	13	71.7	711
IGAAN	Igaz	Baja/HU	HUBAJ (0.8/3.8)	5552	2.8	403	26	159.3	423
		Debrecen/HU	HUDEB (0.8/3.8)	5522	3.2	620	25	126.8	390
		Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	20	164.0	442
		Budapest/HU	HUPOL (1.2/4)	3790	3.3	475	22	15.0	93
JONKA	Jonas	Budapest/HU	HUSOR (0.95/4)	2286	3.9	445	22	154.3	384
KACJA	Kac	Kostanjevec/SI	METKA (0.8/8)*	1372	4.0	361	5	36.9	211
		Ljubljana/SI	ORION1 (0.8/8)	1402	3.8	331	17	58.7	130
		Kamnik/SI	REZIKA (0.8/6)	2270	4.4	840	10	65.3	601
			STEFKA (0.8/3.8)	5471	2.8	379	10	62.9	288
KERST	Kerr	Glenlee/AU	GOCAM1 (0.8/3.8)	5189	4.6	2550	29	229.0	915
KOSDE	Koschny	Izana Obs./ES	ICC7 (0.85/25)*	714	5.9	1464	21	167.8	1242
		Noordwijkerhout/NL	LIC4 (1.4/50)*	2027	6.0	4509	22	85.6	298
LERAR	Leroy	Gretz/FR	SAPHIRA (1.2/6)	3260	3.4	301	15	57.9	62
MACMA	Maciejewski	Chelm/PL	PAV35 (1.2/4)	4383	2.5	253	21	149.6	302
			PAV36 (1.2/4)*	5732	2.2	227	26	166.5	630
			PAV43 (0.95/3.75)*	2544	2.7	176	21	160.0	282
MARGR	Maravelias	Lofoupoli/GR	LOOMECON (0.8/12)	738	6.3	2698	22	142.3	578
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1776	6.1	3817	8	41.4	569
			MINCAM1 (0.8/8)	1477	4.9	1084	22	167.2	558
		Ketzür/DE	REMO1 (0.8/8)	1467	6.0	3139	27	171.8	1557
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	2522	3.5	532	17	134.8	324
OCAFR	Ocana Gonzales	Madrid/ES	FOGCAM (1.4/7)	1890	3.9	109	20	87.2	99
OCHPA	Ochner	Albiano/IT	ALBIANO (1.2/4.5)	2944	3.5	358	16	19.3	114
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	3837	3.8	460	27	194.0	608
PERZS	Perko	Becsehely/HU	HUBEC (0.8/3.8)*	5498	2.9	460	24	161.6	938
PUCRC	Pucer	Nova vas nad Dra./SI	MOBCAM1 (0.75/6)	2398	5.3	2976	25	127.0	577
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2366	4.5	911	20	129.4	245
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2362	3.7	381	25	190.0	329
			RO2 (0.75/6)	2381	3.8	459	23	187.6	335
			SOFIA (0.8/12)	738	5.3	907	22	183.1	271
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4152	4.5	2052	16	83.8	231
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	4900	3.0	409	29	172.5	708
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	563	6.2	1294	15	70.5	182
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5566	4.8	3270	21	118.1	825
			NOA38 (0.8/3.8)	5609	4.2	1911	20	108.9	397
			SCO38 (0.8/3.8)	5598	4.8	3306	24	134.8	835
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2362	4.6	1152	24	154.4	243
			MINCAM3 (0.8/12)	728	5.7	975	27	162.1	339
			MINCAM4 (1.0/2.6)	9791	2.7	552	22	130.4	152
			MINCAM5 (0.8/6)	2349	5.0	1896	26	153.2	447
TEPIS	Tepliczky	Budapest/HU	HUMOB (0.8/6)	2388	4.8	1607	22	154.7	662
TRIMI	Triglav	Velenje/SI	SRAKA (0.8/6)*	2222	4.0	546	18	118.0	230
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2337	5.5	3574	18	80.2	391
Sum							30	8859.5	32056

* active field of view smaller than video frame

2. Observing Times (h)

September	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	-	8.6	7.0	-	4.9	-	8.7	9.1	-	-	-	5.7	-	-
BERER	2.5	3.2	-	-	-	8.8	8.3	9.2	9.2	9.2	9.2	-	-	-	3.7
	2.6	3.2	-	-	-	8.8	8.1	9.2	9.3	9.3	9.3	-	-	-	3.5
	2.9	-	-	-	-	8.8	5.3	8.9	9.3	9.3	9.3	-	-	-	3.7
BIRSZ	-	4.8	3.2	2.6	0.6	9.0	8.8	9.2	9.2	9.3	8.8	-	-	-	9.3
BOMMA	2.0	1.0	-	0.2	1.1	8.9	9.7	9.7	8.2	9.8	9.8	-	-	2.1	10.1
BREMA	5.1	-	8.6	3.8	2.5	8.7	6.8	9.0	7.9	4.1	2.5	4.9	5.8	8.3	-
	4.1	-	8.5	3.3	-	8.1	6.1	9.1	8.3	4.8	1.6	5.2	5.4	8.3	9.2
BRIBE	8.1	2.7	8.8	5.0	1.9	9.0	9.0	9.1	8.8	1.2	4.0	7.5	6.1	2.4	9.6
	6.0	3.5	8.7	3.8	4.2	9.0	8.9	8.1	9.0	0.9	1.6	6.1	6.2	1.8	8.5
CASFL	-	-	-	-	-	-	9.9	7.4	7.9	7.6	0.8	-	4.1	7.7	3.3
	-	-	-	4.1	1.7	3.7	6.4	6.3	-	6.3	2.3	-	3.5	7.2	0.9
CRIST	0.7	-	1.2	0.3	4.0	9.3	8.8	8.9	8.9	8.4	-	8.4	9.0	9.0	9.0
	3.0	-	1.8	0.3	2.0	9.0	9.1	9.2	8.5	1.9	-	6.8	9.6	9.7	9.8
	-	-	-	-	-	0.2	6.9	9.4	9.4	8.3	-	8.6	9.5	9.6	9.7
CSISZ	-	2.2	0.2	2.3	-	5.3	-	7.1	7.4	8.9	8.3	-	-	-	-
ELTMA	-	-	-	-	6.2	4.1	9.3	9.7	7.1	9.7	6.9	-	-	9.1	3.5
GONRU	5.9	7.9	6.6	7.7	9.2	6.9	9.1	6.9	-	9.5	9.5	8.6	9.7	9.8	9.8
	9.0	9.2	8.9	9.3	9.3	7.2	9.2	7.3	-	9.7	9.6	7.8	9.7	10.0	10.0
	9.4	9.2	9.2	9.2	9.2	6.0	8.7	6.3	4.7	8.9	9.5	8.7	10.0	9.9	9.9
	8.9	9.3	8.8	7.4	9.4	6.4	7.4	6.9	-	9.6	9.6	8.1	9.7	10.0	10.0
GOVMI	-	8.6	-	1.3	1.4	8.8	8.8	8.8	8.8	9.0	8.9	-	-	-	1.1
	-	1.3	-	0.7	-	-	-	8.0	7.8	9.0	9.0	-	-	-	-
	-	6.8	2.0	2.0	0.2	8.9	8.9	8.9	9.1	9.1	9.1	-	-	-	1.1
HINWO	-	-	-	-	-	-	3.3	4.8	5.6	-	-	-	-	4.3	-
IGAAN	1.3	6.2	0.7	7.0	-	6.2	7.7	7.9	9.0	9.4	9.5	4.6	-	-	9.0
	8.8	6.7	5.5	8.5	1.7	6.1	0.7	8.7	9.3	9.4	9.4	8.5	2.4	-	0.8
	-	8.4	-	7.7	-	7.3	7.9	8.9	9.0	9.1	9.2	9.0	-	-	9.3
	0.8	0.7	0.5	0.5	-	1.2	0.7	1.1	1.0	0.7	0.5	-	-	-	1.1
JONKA	2.8	9.0	3.3	6.6	-	9.2	6.0	8.4	9.4	9.5	9.6	4.6	-	-	6.1
KACJA	-	-	-	-	-	3.8	-	-	8.6	8.7	-	-	-	-	-
	-	2.7	-	-	-	1.8	9.0	3.1	9.3	8.1	6.1	-	-	-	0.5
	-	-	-	-	-	-	9.3	9.5	9.5	8.8	5.4	-	-	-	-
	-	-	-	-	-	-	8.6	9.3	9.4	8.9	5.4	-	-	-	-
KERST	10.2	10.2	10.2	7.9	7.6	7.2	9.2	10.1	3.9	7.4	9.7	10.0	8.9	10.0	9.8
KOSDE	-	8.5	-	9.5	9.9	9.9	9.9	9.7	2.0	10.0	-	-	-	10.1	10.1
	2.2	2.3	4.7	1.7	1.7	8.6	7.1	8.1	4.1	1.7	3.1	-	2.3	3.0	7.5
LERAR	-	-	-	-	-	-	-	-	0.5	1.2	0.5	-	1.7	0.7	9.7
MACMA	-	0.4	3.3	8.9	3.7	9.0	1.2	8.7	9.2	9.5	9.5	9.4	-	-	5.5
	0.6	0.7	3.4	8.8	5.0	8.9	1.0	7.9	9.2	9.4	9.4	9.4	-	-	5.7
	-	1.4	3.0	8.7	3.4	6.0	-	8.1	9.4	9.5	9.6	9.6	-	-	6.6
MARGR	7.1	8.2	8.0	8.8	8.1	8.0	3.4	8.1	4.8	6.0	3.7	7.0	9.5	-	-
MOLSI	-	-	-	-	-	7.3	-	-	5.7	0.3	-	-	8.1	-	-
	-	-	-	0.5	3.3	9.2	9.2	9.3	8.0	9.0	-	-	9.6	6.9	9.4
	8.2	3.3	8.5	8.2	0.8	5.2	-	8.3	8.9	9.1	0.9	8.1	9.4	4.4	-
MORJO	-	8.0	3.5	8.1	-	9.2	8.0	8.4	9.4	9.3	9.3	-	-	-	6.9
OCAFR	3.1	5.4	7.7	9.5	7.7	5.7	7.7	1.0	1.9	3.9	5.8	4.1	4.7	4.7	4.2
OCHPA	-	0.3	-	-	-	-	2.4	1.1	2.3	1.2	-	1.6	1.7	3.2	0.2
OTTMI	1.8	8.6	3.5	4.9	8.2	1.9	8.6	6.6	-	-	8.1	2.2	7.6	10.0	-
PERZS	0.2	2.6	1.5	2.2	-	9.3	9.3	9.4	9.4	9.6	9.6	-	-	-	4.7
PUCRC	-	-	-	2.1	1.5	6.2	8.9	8.9	8.6	7.4	7.9	-	3.5	2.2	2.1
ROTEC	6.9	-	-	-	-	5.1	-	9.0	9.1	-	-	7.3	8.5	0.5	1.9
SARAN	6.9	8.1	7.6	5.1	8.6	8.8	8.7	9.2	6.9	7.1	9.8	9.8	9.5	9.9	8.4
	9.1	9.0	9.1	9.2	9.2	8.1	8.4	9.0	6.3	6.4	9.2	9.3	9.0	9.8	8.2
	-	9.4	9.4	8.9	9.4	9.6	8.3	8.7	6.1	7.1	9.8	9.5	9.5	9.8	7.5
SCALE	-	0.2	-	3.8	1.2	2.3	9.0	9.3	3.5	8.7	-	-	-	5.9	-
SCHHA	7.1	3.8	8.2	5.1	8.3	8.3	9.0	9.0	7.5	3.4	3.5	3.2	4.9	1.2	9.5
SLAST	-	-	-	-	-	0.5	7.4	6.6	7.0	5.8	8.0	-	-	0.4	-
STOEN	1.2	2.1	-	4.3	3.4	3.3	9.5	9.6	6.7	9.0	7.3	-	-	8.9	7.0
	0.7	3.0	-	7.1	4.5	4.1	9.6	9.6	8.4	8.8	8.7	-	-	4.5	-
	1.2	2.7	-	6.4	4.3	3.8	9.7	9.7	8.7	9.1	6.4	-	-	8.7	7.4
STRJO	3.9	-	8.0	5.1	1.3	7.6	0.5	8.4	8.7	-	4.9	8.7	5.0	2.1	8.6
	5.6	-	8.0	1.9	1.9	7.5	-	8.4	8.7	0.6	4.2	8.9	5.9	2.9	9.0
	3.3	-	8.1	3.1	-	5.9	-	6.9	8.3	-	1.9	8.8	4.3	0.2	8.7
	5.9	-	7.6	3.6	1.9	6.9	-	8.4	8.7	-	4.1	8.1	5.5	1.9	9.1
TEPIS	-	6.7	3.4	5.8	-	9.0	9.1	8.8	9.2	9.2	8.8	-	-	-	8.5
TRIMI	-	5.0	-	-	0.4	2.2	9.4	9.5	9.5	9.6	-	-	-	-	-
YRJIL	-	0.3	7.2	-	6.1	3.3	2.0	5.2	4.4	0.8	4.5	2.2	6.3	-	8.5
Sum	169.1	216.8	229.0	259.8	186.0	403.3	413.2	522.0	473.0	436.5	372.9	244.6	241.8	241.1	347.2

September	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	-	-	-	4.7	-	-	2.7	-	-	-	-	-	6.8	-	-
BERER	2.5	3.8	-	-	2.7	9.9	-	6.4	-	10.0	10.0	-	7.6	-	2.5
	-	3.6	-	-	2.6	9.9	-	6.3	-	10.0	10.1	-	4.3	-	2.1
	-	3.6	-	-	2.3	9.3	-	5.7	-	10.0	10.0	-	3.7	-	2.3
BIRSZ	5.1	5.5	8.9	-	9.9	8.7	3.0	9.0	4.0	10.2	8.2	1.7	2.9	0.3	1.4
BOMMA	6.7	9.0	5.3	0.8	10.4	10.2	2.7	5.0	10.4	9.1	0.2	0.3	-	-	-
BREMA	7.9	3.7	6.1	8.8	9.2	-	10.0	-	1.4	0.8	4.7	4.6	1.2	4.5	4.1
	7.8	3.0	5.4	9.2	7.7	3.1	6.8	-	2.1	1.0	6.5	7.6	2.2	5.6	10.3
BRIBE	8.1	5.1	6.3	9.1	9.1	3.4	7.5	2.1	2.0	-	2.0	3.8	7.1	9.0	10.6
	8.4	5.8	6.9	7.5	7.1	3.9	5.1	1.5	1.7	-	-	0.2	0.5	7.6	10.2
CASFL	1.8	8.5	-	8.9	3.0	4.5	0.4	-	8.3	-	-	-	-	0.3	-
	1.0	7.0	-	8.2	5.1	-	-	-	7.6	-	-	4.7	-	-	-
CRIST	9.1	7.2	-	9.1	9.2	8.9	0.3	1.0	9.5	0.2	2.8	4.6	-	-	-
	9.8	7.3	-	9.0	10.0	9.4	0.5	-	4.4	-	2.9	5.2	-	2.9	-
	9.8	6.9	0.3	9.4	10.0	9.9	0.4	0.8	10.2	0.5	0.2	4.3	-	0.2	-
CSISZ	8.4	6.9	4.6	-	9.4	7.6	5.5	9.3	-	7.5	3.7	-	-	-	-
ELTMA	1.2	10.2	6.0	4.2	7.4	8.2	-	-	-	7.5	-	-	-	0.9	-
GONRU	8.2	-	9.8	9.8	9.0	10.2	3.7	5.8	1.5	-	-	-	-	5.9	10.4
	8.7	-	9.9	9.8	9.0	10.3	3.4	5.5	4.0	-	0.9	-	-	10.3	10.5
	4.9	-	6.7	9.9	9.0	10.2	1.5	5.5	1.7	1.2	-	-	2.1	10.6	10.5
	6.1	-	9.9	9.8	9.1	10.3	-	4.0	2.0	-	-	-	-	10.3	10.4
GOVMI	8.7	9.2	9.2	-	9.8	9.8	6.4	9.9	3.2	9.9	8.2	1.2	1.0	3.3	-
	8.5	9.2	8.2	-	9.8	9.8	6.3	9.9	2.6	10.0	5.3	0.8	-	3.4	-
	8.4	9.2	9.3	-	9.9	9.9	6.8	10.0	4.1	10.0	7.5	1.1	-	-	-
HINWO	9.1	8.9	-	-	9.1	2.3	1.7	8.3	4.7	4.6	-	-	5.0	-	-
IGAAN	7.6	3.9	9.6	1.2	3.6	9.7	7.9	6.5	3.6	10.3	10.2	0.2	6.3	-	0.2
	6.3	0.4	8.1	-	1.4	10.0	1.2	4.9	-	-	5.2	0.2	0.5	-	2.1
	3.5	8.2	8.8	-	4.1	9.7	9.1	6.2	8.7	9.9	10.0	-	-	-	-
	0.2	0.2	0.8	-	1.0	0.5	0.4	0.7	-	1.1	0.9	0.2	-	0.2	-
JONKA	7.0	5.1	8.3	-	9.1	10.1	-	7.1	4.4	10.4	7.6	-	-	-	0.7
KACJA	-	-	-	-	-	9.6	6.2	-	-	-	-	-	-	-	-
	4.3	0.5	0.6	-	3.2	4.3	3.2	0.3	-	1.5	-	0.2	-	-	-
	9.7	7.7	-	-	-	1.3	-	-	3.1	1.0	-	-	-	-	-
	9.9	7.6	-	-	-	1.3	-	-	1.3	1.2	-	-	-	-	-
KERST	9.9	7.1	8.5	7.9	9.5	5.1	3.7	9.6	6.0	1.6	4.8	9.4	9.7	3.9	-
KOSDE	-	7.4	10.2	10.2	10.2	10.2	5.6	1.3	9.4	-	1.0	5.7	-	-	7.0
	-	2.5	3.8	4.1	-	-	6.8	-	3.1	-	2.5	2.3	-	2.4	-
LERAR	3.2	8.0	8.9	7.6	3.3	0.4	0.3	-	-	-	-	1.5	10.4	-	-
MACMA	-	9.8	9.7	-	-	10.3	6.1	10.4	1.8	8.1	7.5	-	-	-	7.6
	-	9.6	9.6	-	1.3	10.1	6.1	10.2	4.1	9.0	10.2	0.5	5.2	0.7	10.5
	-	9.6	9.8	-	-	10.1	6.3	10.5	3.1	9.2	10.1	-	5.6	-	10.4
MARGR	3.2	6.7	9.7	4.8	9.2	-	-	-	-	-	5.6	5.9	2.3	4.2	-
MOLSI	-	-	-	-	-	-	-	-	4.9	8.4	0.7	-	6.0	-	-
	9.8	9.9	-	7.9	10.0	2.7	5.3	10.2	8.2	9.4	2.3	6.9	10.2	-	-
	9.6	9.5	0.6	9.8	9.8	1.0	10.0	1.8	5.6	-	0.9	1.4	9.8	9.0	9.7
MORJO	8.5	-	9.5	-	9.4	9.7	5.8	7.7	4.1	-	-	-	-	-	-
OCAFR	1.3	1.3	4.7	-	1.5	-	-	-	1.3	-	-	-	-	-	-
OCHPA	0.2	2.7	0.2	0.4	0.5	0.7	-	-	0.6	-	-	-	-	-	-
OTTMI	8.5	8.1	8.5	6.9	6.6	3.2	8.2	7.9	9.4	9.0	9.9	9.1	9.8	9.5	7.4
PERZS	9.9	10.0	9.9	-	10.2	10.2	8.4	10.3	2.8	10.4	7.5	0.2	0.3	3.7	-
PUCRC	5.7	8.2	7.0	1.4	9.4	9.4	-	1.6	6.9	7.7	2.4	2.5	0.5	1.4	3.6
ROTEC	8.7	9.7	-	9.0	8.9	-	10.0	0.5	5.3	1.3	-	0.2	10.2	9.5	7.8
SARAN	7.8	-	5.3	10.2	6.6	9.7	0.2	9.8	1.3	-	-	-	-	6.3	8.4
	-	-	-	10.2	6.7	9.6	-	10.0	1.5	-	-	0.4	-	9.3	10.6
	-	-	4.8	10.1	6.6	9.2	-	8.6	1.4	-	-	-	-	9.0	10.4
SCALE	-	8.1	-	3.1	5.3	8.0	-	-	7.6	4.6	-	3.2	-	-	-
SCHHA	8.4	5.3	6.4	6.9	6.2	3.1	5.9	0.7	0.9	-	1.3	6.2	8.1	10.6	10.5
SLAST	-	6.7	-	-	8.2	5.9	6.3	0.7	-	6.1	-	0.5	0.4	-	-
STOEN	-	-	4.9	6.3	6.1	10.3	0.4	-	7.0	5.8	-	4.7	-	0.3	-
	-	1.5	2.8	-	6.0	10.3	0.5	-	7.3	6.4	-	4.5	-	0.6	-
	-	10.1	5.2	5.8	6.1	10.3	0.8	0.2	7.1	6.3	0.2	4.3	-	0.3	-
STRJO	8.9	4.6	8.2	8.9	9.3	3.8	9.4	-	4.4	-	-	-	5.8	8.3	10.0
	9.2	4.8	8.3	9.4	8.6	4.4	8.5	0.2	5.6	0.9	-	1.9	7.9	8.9	10.0
	9.0	3.3	8.1	8.3	7.8	2.9	6.8	-	3.7	-	-	-	3.9	7.1	10.0
	9.1	4.9	8.2	9.3	9.4	4.1	9.4	0.2	4.1	0.6	-	0.8	5.1	7.1	9.2
TEPIS	6.1	6.0	6.2	-	9.8	8.9	2.8	9.5	3.4	10.2	8.7	2.5	2.1	-	-
TRIMI	9.4	9.1	5.4	-	10.1	9.1	7.3	8.5	4.3	4.4	2.1	2.7	-	-	-
YRJIL	1.4	6.3	-	3.5	9.0	2.4	-	-	-	-	-	-	-	-	6.8
Sum	346.5	358.0	333.4	291.4	433.8	431.3	243.6	262.1	242.7	257.3	194.8	118.2	164.5	187.4	238.2

3. Results (Meteors)

September	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	-	-	8	11	-	11	-	14	12	-	-	-	5	-	-
BERER	5	7	-	-	-	96	57	95	98	110	100	-	-	-	14
	2	1	-	-	-	22	33	30	36	31	26	-	-	-	7
	1	-	-	-	-	15	23	18	30	21	21	-	-	-	4
BIRSZ	-	6	7	13	2	35	30	28	40	30	16	-	-	-	20
BOMMA	11	1	-	1	3	43	43	60	29	27	23	-	-	7	42
BREMA	12	-	21	6	2	25	14	29	20	5	3	11	27	21	-
	9	-	15	7	-	32	20	24	28	3	1	12	24	23	28
BRIBE	16	1	26	8	3	39	42	45	39	4	5	38	19	3	30
	17	8	41	1	7	44	33	57	47	2	5	33	12	4	33
CASFL	-	-	-	-	-	-	26	24	13	24	2	-	14	33	12
	-	-	-	11	5	10	23	20	-	20	4	-	11	27	3
CRIST	3	-	7	2	10	46	48	60	50	21	-	56	60	51	48
	14	-	4	1	12	33	19	16	20	3	-	42	43	49	34
	-	-	-	-	-	1	39	53	64	32	-	80	70	82	68
CSISZ	-	7	1	9	-	19	-	20	29	21	13	-	-	-	-
ELTMA	-	-	-	-	18	7	51	54	14	34	8	-	-	42	9
GONRU	34	27	22	36	31	20	29	14	-	44	39	31	61	53	58
	42	38	32	24	28	16	21	21	-	42	39	25	39	35	34
	27	27	31	20	21	9	16	16	18	23	34	23	38	36	36
	27	31	35	36	40	19	19	16	-	27	39	23	47	36	25
GOVMI	-	14	-	4	1	44	47	54	64	54	31	-	-	-	10
	-	8	-	4	-	-	-	31	28	27	19	-	-	-	-
	-	7	2	3	1	27	46	34	33	25	22	-	-	-	3
HINWO	-	-	-	-	-	-	23	48	47	-	-	-	-	28	-
IGAAN	8	19	4	14	-	14	31	27	41	30	23	1	-	-	25
	22	26	9	16	1	24	5	33	48	27	20	27	14	-	2
	-	8	-	16	-	12	29	27	46	22	28	10	-	-	32
	5	4	3	3	-	8	6	5	6	4	3	-	-	-	7
JONKA	6	19	4	14	-	17	27	25	39	30	29	2	-	-	16
KACJA	-	-	-	-	-	7	-	-	61	49	-	-	-	-	-
	-	4	-	-	-	6	22	6	38	22	8	-	-	-	3
	-	-	-	-	-	-	79	98	83	75	25	-	-	-	-
	-	-	-	-	-	-	27	58	67	38	15	-	-	-	-
KERST	49	45	46	45	24	28	24	57	16	50	36	40	31	33	40
KOSDE	-	44	-	95	95	91	78	65	33	60	-	-	-	72	76
	10	12	11	4	7	30	17	17	6	8	20	-	8	21	24
LERAR	-	-	-	-	-	-	-	-	2	4	1	-	5	1	7
MACMA	-	1	4	14	2	24	1	27	17	23	14	16	-	-	17
	1	1	4	34	16	52	4	44	37	40	45	29	-	-	25
	-	4	4	14	5	23	-	21	20	21	18	20	-	-	12
MARGR	16	34	29	28	32	41	15	32	38	26	27	32	35	-	-
MOLSI	-	-	-	-	-	59	-	-	81	1	-	-	134	-	-
	-	-	-	1	2	37	35	38	33	39	-	-	31	16	43
	82	3	58	65	1	28	-	86	106	107	1	86	60	21	-
MORJO	-	23	8	16	-	17	23	25	30	24	26	-	-	-	16
OCAFR	3	1	1	4	3	3	10	2	2	7	13	13	4	6	4
OCHPA	-	2	-	-	-	-	16	6	14	9	-	5	10	19	1
OTTMI	1	24	8	14	31	3	47	20	-	-	20	3	18	32	-
PERZS	1	8	2	5	-	46	76	57	64	56	48	-	-	-	45
PUCRC	-	-	-	6	3	14	50	56	41	31	21	-	18	8	15
ROTEC	13	-	-	-	-	7	-	25	19	-	-	9	12	1	4
SARAN	15	17	6	3	10	7	16	17	14	17	14	15	18	16	12
	15	15	14	14	10	7	12	7	14	7	26	14	20	19	20
	-	6	11	8	15	8	7	10	12	12	13	15	24	16	18
SCALE	-	1	-	14	2	5	19	25	6	25	-	-	-	25	-
SCHHA	32	24	26	24	31	42	47	46	33	9	18	5	23	4	41
SLAST	-	-	-	-	-	2	15	20	28	9	17	-	-	5	-
STOEN	9	9	-	21	13	9	62	68	22	62	17	-	-	87	42
	4	7	-	27	9	7	40	48	17	38	9	-	-	13	-
	8	9	-	37	14	10	61	72	38	61	12	-	-	66	53
STRJO	5	-	12	8	3	11	2	15	22	-	15	12	3	1	11
	8	-	12	3	4	12	-	17	19	1	9	23	13	6	19
	5	-	7	1	-	11	-	10	15	-	3	5	2	1	7
	7	-	16	9	3	17	-	24	45	-	14	38	12	6	19
TEPIS	-	8	5	7	-	35	43	39	48	64	26	-	-	-	47
TRIMI	-	4	-	-	1	3	22	19	21	23	-	-	-	-	-
YRJIL	-	2	38	-	22	12	11	24	13	2	16	8	34	-	45
Sum	545	567	594	781	543	1402	1681	2199	2114	1763	1100	802	999	1025	1266

September	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ARLRA	-	-	-	7	-	-	3	-	-	-	-	-	12	-	-
BERER	13	13	-	-	13	47	-	32	-	117	72	-	53	-	7
	-	3	-	-	2	18	-	7	-	24	23	-	6	-	1
	-	3	-	-	2	11	-	6	-	26	21	-	8	-	2
BIRSZ	9	7	24	-	48	13	7	15	5	26	26	5	5	1	3
BOMMA	29	31	12	3	53	41	6	23	52	37	1	1	-	-	-
BREMA	17	25	20	40	11	-	36	-	1	1	11	21	5	11	2
	20	4	10	20	13	5	13	-	4	1	10	15	4	6	23
BRIBE	20	10	27	34	13	13	19	3	2	-	2	16	14	27	33
	38	14	36	49	18	19	17	6	8	-	-	1	3	35	42
CASFL	5	33	-	39	17	24	2	-	24	-	-	-	-	2	-
	4	26	-	28	18	-	-	-	25	-	-	18	-	-	-
CRIST	50	40	-	39	25	45	1	6	56	1	24	24	-	-	-
	39	29	-	30	26	32	1	-	15	-	11	19	-	13	-
	90	58	2	48	49	63	3	3	67	2	1	15	-	1	-
CSISZ	18	20	6	-	18	10	13	15	-	25	6	-	-	-	-
ELTMA	9	40	7	36	37	33	-	-	-	10	-	-	-	6	-
GONRU	27	-	49	42	42	52	2	31	4	-	-	-	-	24	22
	20	-	30	39	23	45	2	16	6	-	1	-	-	22	32
	11	-	11	29	33	36	1	17	2	7	-	-	4	43	40
	14	-	26	29	28	31	-	8	4	-	-	-	-	22	32
GOVMI	43	32	14	-	52	35	19	40	6	50	21	5	4	8	-
	19	18	8	-	22	21	10	18	8	18	14	6	-	3	-
	21	11	20	-	38	32	21	28	8	34	14	6	-	-	-
HINWO	111	129	-	-	120	6	8	71	57	30	-	-	33	-	-
IGAAN	13	6	21	1	2	20	20	14	4	31	24	1	28	-	1
	17	1	14	-	10	27	3	8	-	-	29	1	2	-	4
	1	17	28	-	19	27	27	10	13	45	25	-	-	-	-
	1	1	5	-	6	3	2	5	-	7	7	1	-	1	-
JONKA	17	3	21	-	27	21	-	12	8	28	16	-	-	-	3
KACJA	-	-	-	-	-	60	34	-	-	-	-	-	-	-	-
	2	2	1	-	4	2	6	2	-	1	-	1	-	-	-
	98	77	-	-	-	4	-	-	58	4	-	-	-	-	-
	50	26	-	-	-	3	-	-	3	1	-	-	-	-	-
KERST	39	30	30	35	24	4	13	35	39	4	8	35	49	6	-
KOSDE	-	67	75	70	72	74	34	11	65	-	5	33	-	-	27
	-	12	7	15	-	-	33	-	7	-	5	12	-	12	-
LERAR	2	5	9	6	5	2	1	-	-	-	-	3	9	-	-
MACMA	-	22	21	-	-	9	24	21	3	12	16	-	-	-	14
	-	47	35	-	2	18	32	42	8	27	29	1	24	1	32
	-	13	7	-	-	16	22	23	2	13	10	-	7	-	7
MARGR	7	35	40	32	31	-	-	-	-	-	22	23	1	2	-
MOLSI	-	-	-	-	-	-	-	-	134	129	3	-	28	-	-
	41	35	-	22	27	3	6	30	34	21	3	31	30	-	-
	86	91	1	115	90	4	109	2	92	-	4	5	73	97	84
MORJO	15	-	25	-	25	14	10	17	10	-	-	-	-	-	-
OCAFR	5	2	9	-	4	-	-	-	3	-	-	-	-	-	-
OCHPA	1	18	1	3	2	4	-	-	3	-	-	-	-	-	-
OTTMI	14	34	37	21	8	12	38	39	29	16	35	31	26	31	16
PERZS	65	50	43	-	62	65	40	65	11	74	37	1	2	15	-
PUCRC	43	43	19	10	44	45	-	4	42	24	10	14	1	3	12
ROTEC	13	15	-	15	18	-	27	1	7	4	-	1	26	17	11
SARAN	9	-	7	24	5	24	2	17	2	-	-	-	-	21	21
	-	-	-	25	12	23	-	23	2	-	-	1	-	17	18
	-	-	3	14	4	15	-	16	7	-	-	-	-	13	24
SCALE	-	25	-	11	13	16	-	-	14	9	-	21	-	-	-
SCHHA	28	20	32	24	13	12	18	4	3	-	4	28	30	48	39
SLAST	-	14	-	-	21	33	8	1	-	4	-	4	1	-	-
STOEN	-	74	13	88	32	61	3	-	51	20	-	60	-	2	-
	-	3	7	-	31	51	1	-	29	18	-	35	-	3	-
	-	77	12	66	34	71	7	1	49	18	1	55	-	3	-
STRJO	14	7	25	17	9	3	15	-	6	-	-	-	8	7	12
	22	4	19	21	15	11	23	1	7	1	-	1	19	23	26
	14	4	14	11	7	6	4	-	2	-	-	-	5	9	9
	30	11	27	40	17	13	23	1	8	1	-	4	16	20	26
TEPIS	44	19	26	-	43	30	13	34	7	63	43	12	6	-	-
TRIMI	17	17	5	-	18	18	11	18	17	5	7	4	-	-	-
YRJIL	8	41	-	18	46	5	-	-	-	-	-	-	-	-	46
Sum	1343	1514	941	1216	1523	1461	793	802	1133	989	601	571	542	575	671