Results of the IMO Video Meteor Network – December 2018

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At the end of 2018, 81 video cameras were in operation, which recorded over 55,000 meteors in almost 10,000 hours of effective observing time. The weather was mediocre and the observing statistics look like a Swiss cheese. However, if we compare December with previous years, it's not that bad after all. We never recorded more than 65,000 meteors in any December, and the average of 5.6 meteors per hour is at the upper end of the usual range. Every second camera managed to observe in twenty or more observing nights – we have experienced months with a much poorer result.

Highlight of the month were the Geminids - as in every year – whose maximum were predicted for mid-day (UT) of December 14. So, both the night before and after the peak promised high rates. As shown in Figure 1, activity was highest in the night of December 13/14. There were strong fluctuations, but overall, the flux density profile fits well to the long-term average since 2012. In the following night, rates were still at the same high level in the first interval, but rapidly declined thereafter. Even though as distant from the peak as the previous night, the flux density became much smaller, because the ascent of the activity to the maximum is shallower than the descent thereafter.

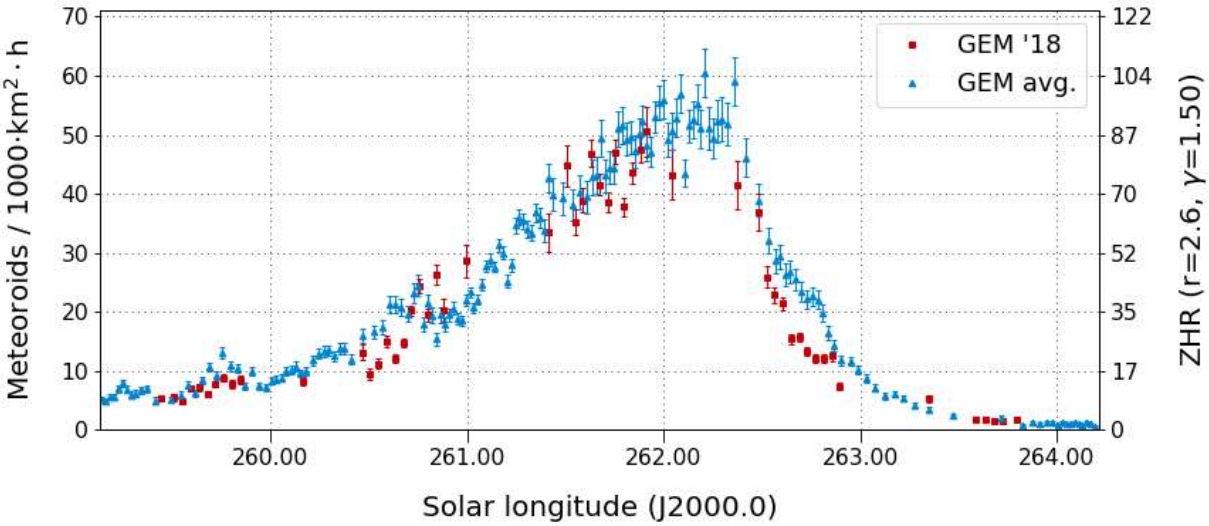

Figure 1: *Flux density profile of the Geminids 2018 (red), compared with the long-term profile of the years 2012-2017 (without 2015, blue), derived from video data of the IMO Network.*

We have checked if the fluctuations in the activity profile of the pre-maximum night can be found in visual IMO data as well (figure 2). It turns out that visual observations show even stronger scatter, but there is little overlap with the video data. Both "minima" at 261.72° and 261.78° solar longitude are not confirmed by visual observations.

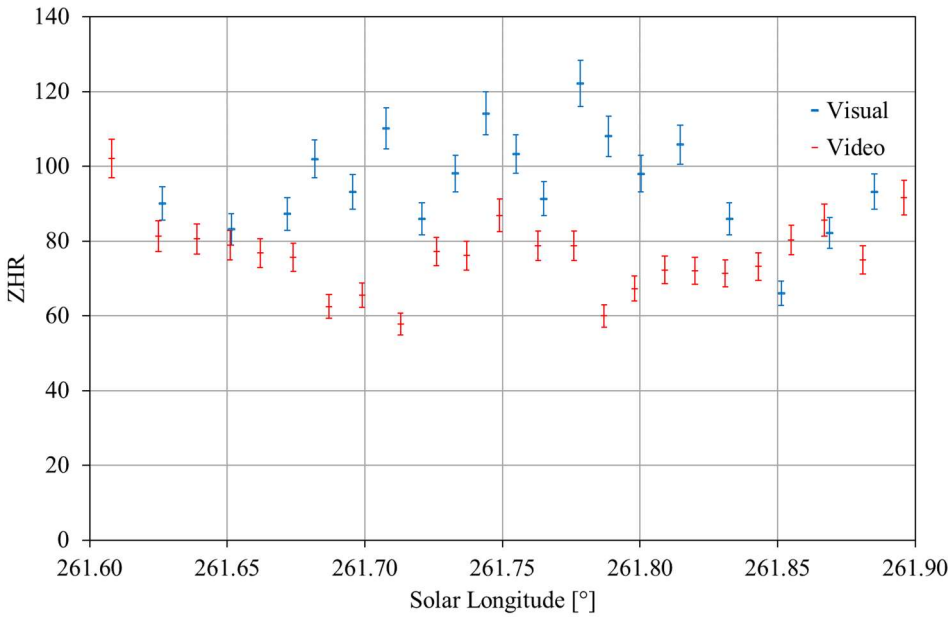

Figure 2: *Comparison of the activity profile of the Geminids on December 13/14, 2018, from visual (blue) and video observation (red) of IMO.*

The population index of the Geminids varies at the time of peak between 1.8 and 2.4, but the sporadic values are about the same. Only at the end of the activity period near 263° solar longitude, the r-value of the Geminids is clearly smaller than the sporadic r-value (figure 3).

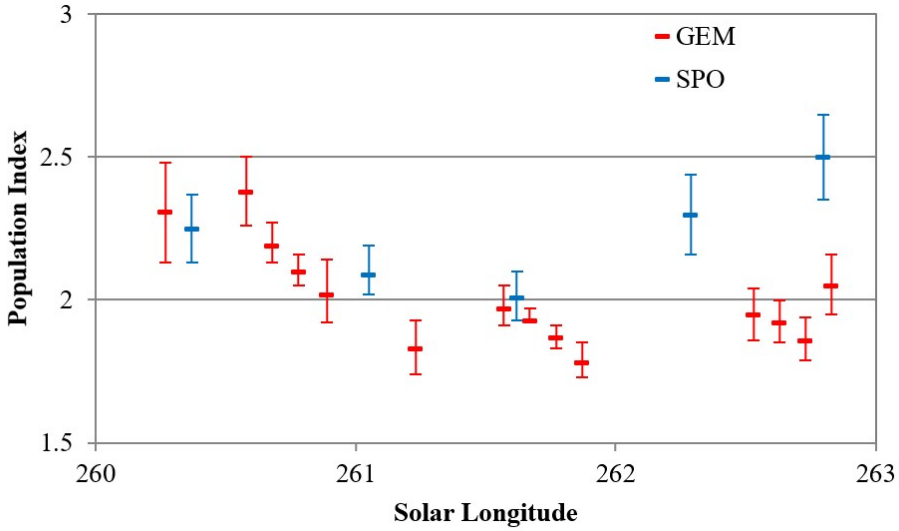

Figure 3: *Population index of the Geminids (red) and sporadic meteors (blue) during the Geminid maximum 2018.*

To check if this effect is because of the comparably small data set of a single year, we calculated the average population index profile of the years 2011 till 2017. We can see, that the r-value of the Geminids 2018 fits nicely to the long-term profile (figure 4, left), whereas the sporadic population index is slightly smaller (figure 4, right). Still, we see also in the long-term sporadic profile a dip at the time of the Geminid peak, which hints on a pollution by shower meteors.

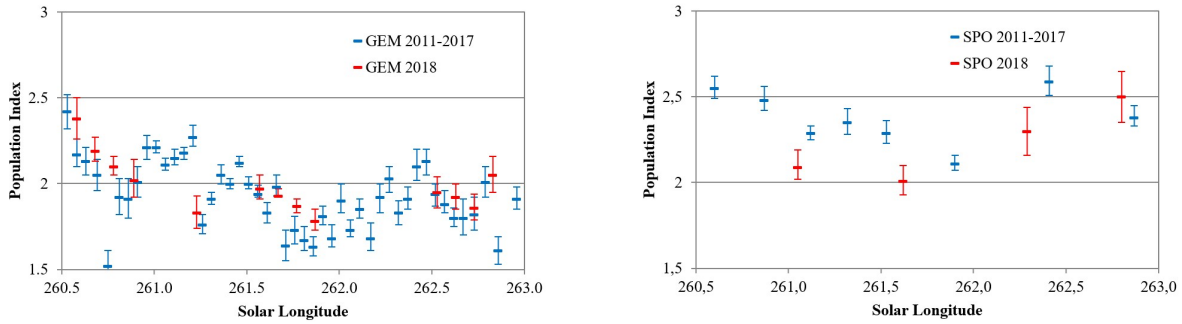

Figure 4: *Comparison of the population index profile of the Geminids (left) and sporadic meteors (right). We show the values of the years 2011-2017 (blue) and 2018 (red).*

Finally, we present in figure 5 the population index profile of the Geminids and sporadic meteors over all years from 2011 to 2018. In the interval between 261.8 and 262.2° solar longitude, i.e. right at the Geminid maximum, the population index reaches a low of about r=1.8. Thereafter it raises to values of 2.1, only to reach a secondary minimum with a similar low population index at 262.7° solar longitude. It would be interesting to know if visual data show the same effect.

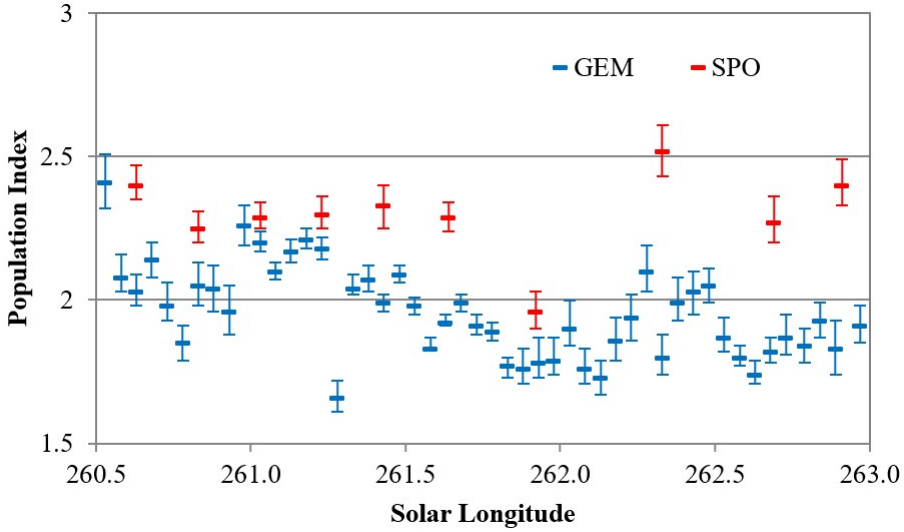

Figure 5: *Population index of the Geminids (red) and sporadic meteors (blue) in the average of the years 2011 till 2018.*

The maximum of the last shower of 2018, the Ursids, is expected at 270.0° solar longitude according to the IMO Meteor Shower Calendar. In practice, we observed highest rates in 2011 at 270.4°, and a rather short peak at 270.8° solar longitude in 2014. In all the other years since 2011, we could not observe an unambiguous peak.
In 2018, the time of maximum fell perfectly into the European night-time hours, and indeed we could record a strong peak with a flux density of up to 25 meteoroids per 1,000 km^2 and hour on December 22/23 right after midnight (UT). Figure 6 shows the activity profile of the years 2016 and 2018, which complement each other perfectly: Whereas in 2016 we could record the intervals before and after the peak, but the peak itself was missing, the conditions were opposite in 2018. Just as in 2014, the peak occurred at a solar longitude of 270.8°. The full width at half maximum (FWHM) was only 0.4° in solar longitude or less than ten hours, which is comparable to the FWHM of the Quadrantids. This explains why we don't see a lot from the Ursids in years when the peak falls into the daytime hours.

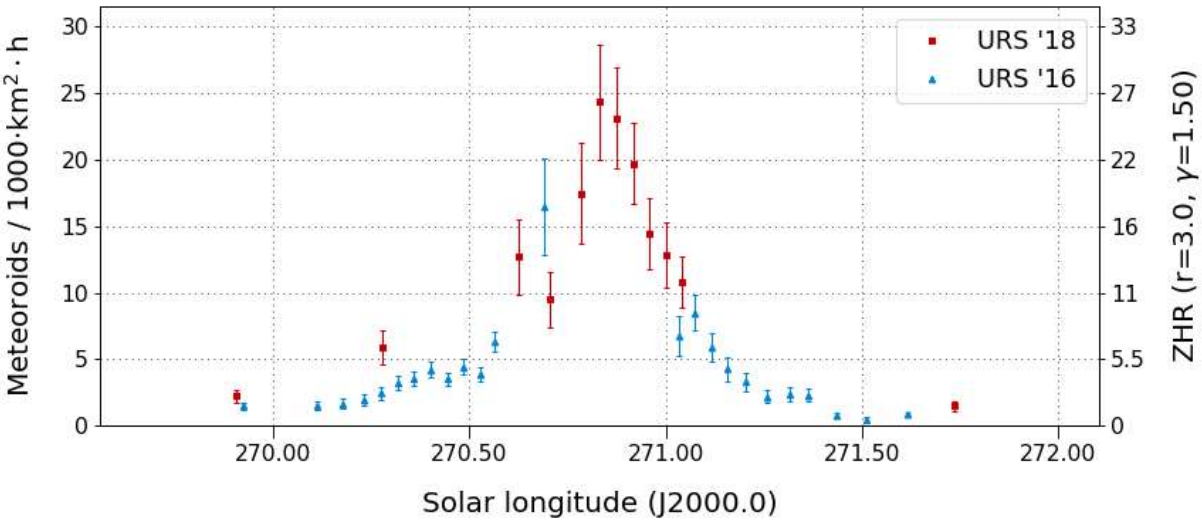

Figure 6: *Flux density profile of the Ursids 2018 (red) and 2016 (blue), obtained from observations of the IMO Video Meteor Network.*

At the end of the December report, we want to review as usual the complete year. Whereas until 2015 we reported a continuous grow in the number of IMO network observations, the activity level has been stagnating since then at a constantly high level. In the 20th year of the IMO network, 43 observers (2017: 41) from 11 countries (2017: 11) contributed with overall 88 meteor cameras (2017: 83). Front runner was once more Germany with 21 video cameras, followed by Italy (15). 13 cameras were operated in Portugal, and 12 in Hungary and Slovenia. Less than ten cameras were operated in Poland, Spain, the USA, in the Netherlands, Finland and Russia.

In 365 observing nights (2017: 365) and 113,760 observing hours (2017: 118,269) we recorded a total of 444,033 meteors (2017: 433,047). The average rate was 3.9 meteors per hour, which is identical to the average of the last four years.

Table 1 shows the monthly distributions of video observations. On average, we recorded 9,500 hours per month. With over 13,000 hours, most observing time was collected in the months August to October, which makes the 1st, 4th and 5th rank in the long-term IMO network statistics. We have been continuously recording more than 10,000 meteors each month since June 2010, but this series almost terminated in March 2018.

Table 1: *Monthly distribution of video observations in the IMO Network 2018.*

Month	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour
January	31	8,172.2	20,672	2.5
February	28	8,310.9	16,565	2.0
March	31	6,172.2	10,438	1.7
April	30	9,013.7	18,789	2.1
May	31	7,545.6	14,965	2.0
June	30	5,795.3	14,236	2.5
July	31	8,348.7	34,264	4.1
August	31	13,140.5	88,080	6.7
September	30	14,421.8	54,899	3.8
October	31	13,725.6	74,787	5.4

November	30	9,282.5	41,307	4.4
December	31	9,831.4	55,031	5.6
Total	***365***	***113,760.4***	***444,033***	***3.9***

Seven observers from Germany, Portugal and Italy managed to collect more than 300 observing nights in 2018, two less than in the previous year. The three front runners did not change compared to last year, only their order. In this year, Sirko Molau was on top with 345 nights, followed by Rui Goncalves (334) and Rui Marques (327). Also, with regards to the effective observing time, the first three places did not change compared to 2017, whereby Rui Goncalves and Sirko Molau managed to collect over 10,000 hours of effective observing time alone. Looking at the plain meteor counts, Sirko Molau was dominating with almost 63,000 detections, which is the second-best annual outcome in the IMO network history. Unbeaten in this respect remains Detlef Koschny, who recorded 75,000 meteors back in 2016. Second to fourth rank are taken by Stefano Crivello, Enrico Stomeo and Rui Goncalves with over 30,000 meteors each. There are nine more observers who managed to contribute more than 10,000 records to the meteor database.
Table 2 shows presents the details for all active IMO network observers 2018. The number of cameras and stations refers to the major part of the year.

Table 2: *Distribution of video observation over the observers in 2018.*

Observer	Country	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour	Cameras (Stations)
Sirko Molau	Germany	345	10,616.2	62,822	5.9	7 (2)
Rui Goncalves	Portugal	334	10,930.5	30,362	2.8	6 (1)
Rui Marques	Portugal	327	3,429.6	10,790	3.1	2 (2)
Carlos Saraiva	Portugal	320	8,526.8	16,938	2.0	5 (1)
Enrico Stomeo	Italy	307	4,398.9	30,805	7.0	4 (1)
Stefano Crivello	Italy	306	6,522.4	33,935	5.2	4 (1)
Mario Bombardini	Italy	305	1,874.5	9,169	4.9	1 (1)
Jörg Strunk	Germany	298	7,433.8	26,046	3.5	5 (1)
Bernd Klemt	Germany	292	2,798.0	10,144	3.6	2 (2)
Francesca Cineglosso	Italy	292	1,472.9	7,581	5.1	1 (1)
Rainer Arlt	Germany	288	1,486.1	8,084	5.4	1 (1)
Carl Hergenrother	USA	288	2,415.7	5,642	2.3	1 (1)
Henrietta Nagy	Hungary	285	2,668.2	11,293	4.2	3 (3)
Hans Schremmer	Germany	284	1,521.3	4,646	3.1	1 (1)
Mitja Govedic	Slovenia	273	3,352.9	7,727	2.3	3 (1)
Maurizio Carli	Italy	272	1,849.2	13,067	7.1	1 (1)
Istvan Tepliczky	Hungary	267	2,729.9	8,420	3.1	2 (1)
Maciej Maciejewski	Poland	263	4,800.3	18,589	3.9	4 (1)
Wolfgang Hinz	Germany	263	1,543.2	5,789	3.8	1 (1)
Fabio Moschini	Italy	255	1,518.9	4,056	2.7	1 (1)
Flavio Castellani	Italy	252	1,856.1	5,907	3.2	1 (1)
Thomas Bianchi	Italy	248	1,030.3	4,183	4.1	1 (1)
József Morvai	Hungary	244	1,434.3	2,437	1.7	1 (1)
Leo Scarpa	Italy	244	1,301.3	2,400	1.8	1 (1)
Karoly Jonas	Hungary	242	2,565.0	5,022	2.0	1 (1)
Jure Zakrajsek	Slovenia	241	2,100.1	7,408	3.5	2 (1)
Wala Wegrzyk	Poland	238	1,153.3	3,195	2.8	1 (1)
Javor Kac	Slovenia	233	4,155.5	19,207	4.6	4 (4)
Maurizio Eltri	Italy	224	1,317.6	5,908	4.5	1 (1)
Eckehard Rothenberg	Germany	221	1,320.6	2,672	2.0	1 (1)
Martin Breukers	Netherlands	215	1,228.4	2,849	2.3	1 (1)
Zsolt Perkó	Hungary	214	1,258.5	3,718	3.0	1 (1)

Mike Otte	USA	211	1,068.8	2,162	2.0	1 (1)
Stane Slavec	Slovenia	209	2,001.4	4,079	2.0	2 (1)
Kevin Förster	Germany	199	1,166.4	5,437	4.7	1 (1)
Antal Igaz	Hungary	188	1,075.5	1,460	1.4	1 (1)
Detlef Koschny	Netherlands	178	2,210.4	22,237	10.1	2 (2)
Ilkka Yrjölä	Finland	155	854.0	2,502	2.9	1 (1)
Paolo Ochner	Italy	144	747.4	1,566	2.1	1 (1)
Erno Berkó	Hungary	105	819.2	5,229	6.4	1 (1)
Tomasz Lojek	Poland	83	555.0	2,408	4.3	1 (1)
Stefano Missiaggia	Italy	66	490.8	4,218	8.6	1 (1)
Mikhail Maslov	Russia	28	154.5	1,197	7.7	1 (1)
other	Germany	2	6.7	727	108.5	1 (1)

When there have been 15 individual cameras that collected meteors in over 300 nights in 2017, it was just a single camera in 2018. That one would not even have made it into the Top-10 of the previous year! Thanks to the weather conditions, most observing nights were collected by cameras in Italy and Portugal.
The following cameras, which recorded more than 10,000 meteors each, are missing in the Top-10: BMH2 (13,067), AVIS2 (12,268), SCO38 (10,764), STG38 (10,448) and ICC9 (10,361).

Table 3: *The ten most successful video systems in 2018.*

Camera	Location	Observer	# Observing Nights	Eff. Observing Time [h]	# Meteors	Meteors / Hour
MARIO	Faenza (IT)	Mario Bombardini	305	1,874.5	9,169	4.9
TEMPLAR1	Tomar (PT)	Rui Goncalves	299	2,167.1	8,107	3.7
TEMPLAR2	Tomar (PT)	Rui Goncalves	294	2,158.1	6,578	3.0
JENNI	Faenza (IT)	Francesca Cineglosso	292	1,472.9	7,581	5.1
TEMPLAR5	Tomar (PT)	Rui Goncalves	291	1,851.6	5,653	3.1
TEMPLAR4	Tomar (PT)	Rui Goncalves	289	2,054.2	6,619	3.2
SALSA3	Tucson (US)	Carl Hergenrother	288	2,415.7	5.642	2.3
LUDWIG2	Ludwigsfelde (DE)	Rainer Arlt	288	1,486.1	8,084	5.4
MIN38	Scorce (IT)	Enrico Stomeo	287	1,534.2	11,153	7.3
REMO4	Ketzür (DE)	Sirko Molau	285	1,708.0	11,633	6.8

The complete dataset from 1993 till 2018 is available for download at the IMO network homepage http://www.imonet.org. Our database meanwhile comprises 3,971,618 meteors from 981,838 hours of effective observing time in 6,834 nights. Just at the 20th anniversary of the IMO Video Meteor Network in March 2019 we may have collected one million hours of observing time and four million meteors. If we really managed to do so, you will read in the next report.

We would like to thank as always the avid observers which contribute to the camera network. We are particularly grateful to Stefano Crivello, Enrico Stomeo, Rui Goncalves, Carlos Saraiva and Jörg Strunk, who double-check the observations in every month together with Sirko Molau and ensured the high quality level of the database.

Last but not least we have to state, that the level of workload caused another significant delay in the completion of this report. We assume that this will be the last monthly report in this format. Starting from the next, we will probably switch to quarterly reports.

1. Observers

Code	Name	Place	Camera	FOV [^{o2}]	St.LM [mag]	Eff.CA [km^2]	Nights	Time [h]	Meteors
ARLRA	Arlt	Ludwigsfelde/DE	LUDWIG2 (0.8/8)	1483	6.2	3812	16	64.3	365
BERER	Berkó	Ludanyhalaszi/HU	HULUD1 (0.8/3.8)	5524	4.8	3829	12	105.5	603
BIATO	Bianchi	Mt. San Lorenzo/IT	OMSL1 (1.2/4)	6422	4.0	1699	20	35.7	262
BOMMA	Bombardini	Faenza/IT	MARIO (1.2/4.0)	5779	3.3	644	22	181.8	1327
BREMA	Breukers	Hengelo/NL	MBB3 (0.75/6)	2399	4.2	641	9	46.9	182
BRIBE	Klemt	Herne/DE	HERMINE (0.8/6)	2369	4.2	674	17	89.7	407
		Berg. Gladbach/DE	KLEMOI (0.8/6)	2374	4.6	1123	17	61.6	312
CARMA	Carli	Monte Baldo/IT	BMH2 (1.5/4.5)*	4243	3.0	371	27	334.1	3271
CASFL	Castellani	Monte Baldo/IT	BMH1 (0.8/6)	2402	5.0	1633	27	321.4	1429
CINFR	Cineglosso	Faenza/IT	JENNI (1.2/4)	5995	3.9	1240	19	158.1	1065
CRIST	Crivello	Valbrevenna/IT	ARCI (0.8/3.8)	5566	4.6	2571	18	139.1	1375
			BILBO (0.8/3.8)	5441	4.2	1764	18	138.3	1630
			C3P8 (0.8/3.8)	5489	4.2	1603	18	157.8	1140
			STG38 (0.8/3.8)	5574	4.4	1905	20	131.3	1870
ELTMA	Eltri	Venezia/IT	MET38 (0.8/3.8)	5607	4.3	2381	13	114.5	1089
FORKE	Förster	Carlsfeld/DE	AKM3 (0.75/6)	2387	5.1	2145	4	19.3	61
GONRU	Goncalves	Foz do Arelho/PT	FARELHO1 (0.75/4.5)	2260	3.0	206	3	2.4	11
		Tomar/PT	TEMPLAR1 (0.8/6)	2212	5.3	1873	25	211.0	851
			TEMPLAR2 (0.8/6)	2341	5.0	1718	26	214.8	790
			TEMPLAR3 (0.8/8)	1438	4.3	542	20	165.0	342
			TEMPLAR4 (0.8/3.8)	5180	3.0	497	25	199.5	837
			TEMPLAR5 (0.75/6)	2309	5.0	2248	25	180.0	772
GOVMI	Govedic	Sredisce ob Dr./SI	ORION2 (0.8/8)	1471	5.5	2170	26	163.2	462
			ORION3 (0.95/5)	3152	4.9	2130	22	149.6	214
			ORION4 (0.95/5)	3818	4.3	1634	24	109.9	186
HERCA	Hergenrother	Tucson/US	SALSA3 (0.8/3.8)	2336	4.1	538	29	221.1	887
HINWO	Hinz	Schwarzenberg/DE	HINWO1 (0.75/6)	2375	5.1	1889	11	42.6	188
IGAAN	Igaz	Hodmezovasar./HU	HUHOD (0.8/3.8)	5502	3.4	764	15	80.3	306
		Budapest/HU	HUPOL (1.2/4)	2414	3.6	409	1	1.5	10
JONKA	Jonas	Budapest/HU	HUSOR2 (0.95/3.5)	2468	3.9	716	19	128.4	270
KACJA	Kac	Kamnik/SI	CVETKA (0.8/3.8)	5334	4.3	2028	21	110.5	479
		Kamnik/SI	REZIKA (0.8/6)	2269	4.4	863	20	151.3	901
		Ljubljana/SI	SRAKA (0.8/6)*	2348	4.8	1595	16	117.8	446
		Kamnik/SI	STEFKA (0.8/3.8)	5458	3.6	911	18	122.7	390
KOSDE	Koschny	La Palma / ES	ICC9 (0.85/25)*	660	6.7	2835	29	242.4	1378
			LIC2 (3.2/50)*	1933	6.5	6554	25	166.9	3115
MACMA	Maciejewski	Chelm/PL	PAV35 (0.8/3.8)	5329	4.0	1530	6	13.5	34
			PAV36 (0.8/3.8)*	5484	4.0	1501	7	18.0	49
			PAV43 (0.75/4.5)*	2251	4.7	1484	5	13.7	59
			PAV60 (0.75/4.5)	2302	5.1	1803	7	21.4	75
MARRU	Marques	Lisbon/PT	CAB1 (0.75/6)	2362	4.8	1517	28	261.7	840
			RAN1 (1.4/4.5)	4395	4.0	1330	25	218.7	938
MISST	Missiaggia	Nove/IT	TOALDO (1.2/4.5)	4329	4.6	2049	20	192.5	2239
MOLSI	Molau	Seysdorf/DE	AVIS2 (1.4/50)*	1204	6.9	5982	24	82.4	420
			DIMCAM1 (0.8/8)	1553	6.8	10447	23	49.6	412
			ESCIMO2 (0.85/25)	154	8.1	3828	20	76.0	117
		Ketzür/DE	REMO1 (0.8/8)	1467	6.5	5459	21	77.1	398
			REMO2 (0.8/8)	1479	6.4	5037	19	86.2	582
			REMO3 (0.8/8)	1422	6.4	4207	20	98.7	424
			REMO4 (0.8/8)	1478	6.5	5355	18	94.9	567
MORJO	Morvai	Fülöpszallas/HU	HUFUL (1.4/5)	3666	3.8	805	20	137.5	320
MOSFA	Moschini	Rovereto/IT	ROVER (1.4/4.5)	3868	4.2	1240	26	230.1	1317
NAGHE	Nagy	Budapest/HU	HUKON (0.8/3.8)	5475	4.0	1583	22	126.7	568
		Piszkestetö/HU	HUPIS (0.8/3.8)	5622	4.0	1539	18	86.3	670
		Zamardi/HU	HUZAM (0.8/6)	2359	4.7	1340	20	131.0	257
OTTMI	Otte	Pearl City/US	ORIE1 (1.4/5.7)	2317	3.8	373	6	7.5	24
PERZS	Perkó	Becsehely/HU	HUBEC (0.8/3.8)*	5557	2.9	470	23	159.7	695
ROTEC	Rothenberg	Berlin/DE	ARMEFA (0.8/6)	2359	4.5	907	9	46.8	61
SARAN	Saraiva	Carnaxide/PT	RO1 (0.75/6)	2354	4.0	536	29	154.0	529
			RO2 (0.75/6)	2365	4.1	635	23	162.9	556
			RO3 (0.8/12)	720	5.7	1126	23	149.1	513
			RO4 (1.0/8)	1568	4.2	546	19	152.5	265
			SOFIA (0.8/12)	726	4.8	516	27	200.3	565
SCALE	Scarpa	Alberoni/IT	LEO (1.2/4.5)*	4170	4.5	2044	15	117.8	463
SCHHA	Schremmer	Niederkrüchten/DE	DORAEMON (0.8/3.8)	5522	4.7	3184	20	90.9	339
SLAST	Slavec	Ljubljana/SI	KAYAK1 (1.8/28)	1074	5.7	2642	15	105.9	166
			KAYAK2 (0.8/12)	742	5.7	1052	19	133.1	156
STOEN	Stomeo	Scorze/IT	MIN38 (0.8/3.8)	5587	4.5	2362	23	186.7	2239
			NOA38 (0.8/3.8)	5612	4.2	1889	22	199.7	2268
			SCO38 (0.8/3.8)	5583	4.8	3304	21	195.6	2295
STRJO	Strunk	Herford/DE	MINCAM2 (0.8/6)	2355	5.6	3423	14	60.1	699
			MINCAM3 (0.8/6)	2302	4.5	1150	15	64.8	344
			MINCAM4 (0.8/6)	2274	4.7	1001	13	45.1	121
			MINCAM5 (0.8/6)	1481	6.0	3200	14	62.0	310
			MINCAM6 (0.8/6)	2396	5.3	2748	15	58.5	421
TEPIS	Tepliczky	Agostyan/HU	HUAGO (0.75/4.5)	2428	4.6	1247	20	97.1	351
			HUMOB (0.8/6)	2388	4.6	1225	10	64.1	191
WEGWA	Wegrzyk	Nieznaszyn/PL	PAV78 (0.8/6)	2376	4.4	1264	12	47.4	155
YRJIL	Yrjölä	Kuusankoski/FI	FINEXCAM (0.8/6)	2315	5.5	2769	6	10.3	26
ZAKJU	Zakrajšek	Petkovec/SI	PETKA (0.8/8)	1431	5.6	1956	23	186.7	1362
			TACKA (0.8/12)	715	5.3	784	20	176.5	408
Sum							31	9831.4	55031

* active field of view smaller than video frame

2. Observing Times (h)

December	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	7.1	0.7	5.5	11.7	4.2	-	3.1	4.2	2.0	1.5	2.1	1.2	5.0	-	-
BERER	-	-	-	7.7	13.5	-	-	9.1	9.2	11.4	1.3	2.7	-	2.5	-
BIATO	-	1.2	0.3	8.2	1.0	-	0.1	0.3	2.3	5.4	4.8	0.7	-	3.8	-
BOMMA	-	1.8	5.6	13.2	0.3	1.8	0.3	13.4	12.9	13.4	13.5	1.7	-	12.9	13.0
BREMA	-	-	-	-	-	-	-	-	9.8	8.8	4.0	10.9	2.8	-	-
BRIBE	-	-	1.9	10.2	-	-	4.4	0.5	9.4	7.0	4.7	4.7	6.2	-	6.2
	-	-	0.2	5.8	-	-	1.6	-	0.9	1.4	2.2	6.3	2.1	-	1.8
CARMA	12.4	7.6	10.9	13.6	-	11.2	3.3	13.6	13.2	13.7	13.7	13.7	13.7	13.7	13.2
CASFL	12.2	5.5	10.3	13.5	-	11.4	2.7	13.5	13.2	13.6	13.6	13.6	13.5	13.6	12.6
CINFR	-	1.6	5.3	13.3	-	2.8	1.7	13.3	13.2	13.5	13.4	2.2	-	13.0	13.0
CRIST	3.4	-	7.5	13.1	1.8	9.8	1.6	12.9	12.9	13.2	7.3	-	13.2	13.0	5.6
	10.7	0.3	9.8	13.1	1.6	10.6	2.0	13.1	13.2	13.2	7.2	-	12.8	13.2	5.6
	10.6	-	6.9	13.0	0.3	12.0	4.9	12.9	13.1	13.2	5.9	-	10.0	13.2	4.9
	11.9	0.4	7.6	13.1	1.8	12.0	1.9	13.1	13.2	13.2	7.3	-	12.5	13.2	5.7
ELTMA	-	-	5.3	-	-	4.6	-	11.9	11.4	13.2	13.4	9.6	3.9	13.0	-
FORKE	1.2	-	-	7.5	1.8	-	-	-	-	-	-	-	-	-	-
GONRU	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-
	5.5	1.8	7.5	9.9	12.7	4.0	7.7	12.6	10.4	12.8	-	-	9.9	6.1	-
	5.1	1.8	7.6	9.4	12.9	3.5	7.2	12.9	9.3	12.6	-	-	9.8	6.5	-
	-	-	-	12.7	-	-	5.8	12.6	7.1	11.4	-	1.6	9.5	5.1	-
	3.7	1.6	6.9	9.6	12.9	3.5	7.2	12.8	9.8	12.5	-	-	10.0	6.4	-
	3.1	-	-	12.3	10.2	3.3	6.0	12.2	7.5	11.2	-	1.2	9.6	5.2	-
GOVMI	9.6	3.9	7.3	11.2	5.0	4.5	4.3	11.0	5.1	10.7	0.7	10.6	0.2	-	0.3
	9.9	3.5	7.3	11.5	-	6.3	-	11.1	7.9	10.5	2.5	10.0	-	-	0.4
	9.1	2.2	4.4	10.2	4.2	-	4.0	9.0	4.6	8.9	0.5	0.4	0.2	-	0.3
HERCA	4.1	2.0	11.8	10.5	9.2	1.0	-	-	12.1	12.0	6.4	7.3	11.5	11.4	5.6
HINWO	2.5	0.2	-	10.4	4.0	-	-	1.9	0.9	-	-	4.7	0.2	-	0.6
IGAAN	1.2	2.0	-	-	-	-	3.5	7.5	3.1	13.3	-	-	12.8	-	-
	-	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-
JONKA	-	-	-	12.3	13.1	-	-	10.7	3.8	13.3	-	3.8	0.2	-	0.4
KACJA	1.8	-	-	7.6	-	2.4	2.0	1.6	2.6	0.3	6.1	10.8	-	-	0.7
	2.1	-	-	8.3	-	3.5	2.0	4.7	8.9	7.3	10.2	11.5	-	-	-
	3.5	-	-	7.2	-	-	1.2	3.9	-	-	11.1	8.3	-	-	2.6
	2.3	-	-	8.1	-	2.9	-	2.0	3.0	-	7.0	10.8	-	-	1.7
KOSDE	0.8	10.5	11.6	-	9.0	8.8	11.6	11.6	4.8	10.7	11.6	11.6	10.1	11.6	10.6
	-	-	0.8	-	-	0.3	1.5	5.2	4.4	8.8	10.1	9.9	9.4	10.1	9.7
MACMA	5.6	4.6	0.2	1.6	-	-	-	-	-	-	1.3	-	-	-	-
	6.4	4.3	0.3	4.6	-	-	-	-	-	-	1.5	-	-	-	-
	3.5	3.9	-	4.6	-	-	-	-	-	-	1.3	-	-	-	-
	7.4	4.3	-	5.2	-	0.3	-	-	-	-	2.1	-	-	0.2	-
MARRU	9.1	6.4	10.1	12.4	9.0	6.1	9.0	10.2	12.7	10.3	-	0.9	9.7	9.1	-
	4.1	3.4	10.6	12.2	12.6	11.1	4.2	12.5	11.9	8.6	6.2	-	6.4	6.0	-
MISST	7.6	2.0	5.4	13.1	-	10.1	-	4.3	11.7	13.1	13.1	13.1	12.6	13.1	12.0
MOLSI	5.8	0.5	3.4	7.5	2.0	1.2	6.5	3.3	1.0	2.0	1.9	2.5	-	-	7.7
	2.6	0.3	3.2	2.4	0.9	0.4	3.7	3.2	0.8	1.8	1.1	2.3	-	-	6.3
	6.9	-	3.3	4.8	-	0.6	5.5	3.6	0.8	1.9	1.6	2.5	-	-	6.3
	8.0	2.6	4.3	11.2	3.3	-	3.7	3.4	6.7	2.8	4.6	1.6	-	-	1.5
	9.1	2.2	5.5	13.1	4.2	-	4.8	4.2	9.1	3.2	6.1	2.0	-	-	1.1
	9.8	3.3	5.8	14.0	4.3	-	5.4	4.9	9.5	3.6	6.6	1.9	-	-	1.9
	10.0	2.7	6.0	14.0	4.3	-	5.0	4.2	9.2	3.9	6.5	2.5	-	-	1.8
MORJO	-	1.6	-	13.5	13.3	1.4	5.8	10.0	4.9	13.4	1.8	7.9	3.6	-	-
MOSFA	8.5	2.3	5.8	13.1	0.6	7.8	-	13.4	10.8	13.3	13.5	13.5	12.9	13.6	7.3
NAGHE	-	0.3	-	9.6	13.1	-	0.2	6.2	2.8	7.6	-	3.7	7.1	-	-
	-	-	-	6.3	8.7	-	0.2	7.7	2.3	9.1	-	5.3	8.3	0.2	-
	-	2.7	2.9	10.7	13.3	0.3	3.7	11.4	3.9	11.9	1.3	-	-	-	-
OTTMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2
PERZS	11.7	4.5	10.2	12.1	9.5	3.4	4.6	11.8	3.1	9.7	-	11.2	0.8	-	2.5
ROTEC	5.8	1.5	-	13.8	4.3	-	1.9	3.0	-	-	1.3	-	-	-	-
SARAN	6.2	1.9	5.0	4.5	6.6	2.5	1.6	5.9	11.3	6.5	9.5	1.0	5.4	3.5	-
	7.4	5.0	10.6	12.8	-	-	-	3.9	-	1.2	6.5	1.5	7.9	4.7	-
	7.5	4.6	11.5	12.1	-	-	-	3.8	-	1.0	7.1	0.9	8.8	5.1	0.2
	6.5	4.4	10.8	12.1	-	-	-	-	-	1.0	6.7	0.7	8.0	4.8	-
	5.8	1.6	10.3	12.5	12.5	9.7	5.0	12.8	11.8	8.8	8.9	0.9	8.6	5.0	-
SCALE	-	-	-	9.8	-	3.5	-	10.9	10.5	9.8	9.7	7.1	3.1	13.0	10.8
SCHHA	-	0.3	1.5	4.4	-	-	6.1	0.5	5.7	6.0	5.1	8.4	2.9	-	3.8
SLAST	-	-	-	8.1	-	-	-	4.1	-	2.0	10.9	10.0	-	4.3	3.0
	5.7	-	-	7.7	0.3	-	-	4.7	4.4	1.8	12.0	10.3	-	1.5	3.7
STOEN	1.7	0.2	6.3	13.4	-	6.2	-	10.6	12.1	13.6	13.6	13.2	8.7	13.3	11.6
	1.8	-	6.8	13.6	-	6.4	0.2	10.4	12.9	13.8	13.7	13.7	10.6	10.1	11.8
	2.1	-	6.1	13.3	-	6.1	-	9.7	11.7	13.5	13.3	13.6	9.6	13.0	12.1
STRJO	-	0.3	1.7	10.3	-	-	2.9	1.2	7.1	7.3	0.7	8.0	7.4	-	6.9
	-	-	2.8	10.3	-	-	2.9	0.9	6.8	6.2	-	6.3	6.1	-	7.7
	-	-	-	8.0	0.2	-	1.5	0.7	4.2	4.2	-	2.1	2.7	-	6.5
	-	-	1.7	10.2	-	-	1.9	1.1	7.1	6.0	0.9	7.4	6.4	-	7.2
	-	-	1.6	9.8	-	-	2.5	1.0	5.3	7.1	0.8	7.0	6.4	-	6.5
TEPIS	-	-	2.9	12.8	13.3	-	-	5.0	3.8	7.6	-	3.9	2.0	0.5	1.1
	-	-	1.7	13.1	13.3	-	-	4.7	-	7.1	-	2.7	-	-	-
WEGWA	3.5	-	0.5	12.5	12.2	-	0.2	5.3	-	0.4	-	-	-	-	-
YRJIL	-	-	-	-	5.5	1.3	-	-	-	-	-	0.2	-	-	-
ZAKJU	2.1	-	1.8	7.1	0.2	1.2	-	12.0	11.0	12.0	13.3	11.4	-	5.0	13.2
	2.3	-	1.9	4.2	-	-	-	11.0	8.4	11.2	12.5	11.6	-	3.7	13.2
Sum	308.3	120.3	304.8	732.1	287.0	199.8	180.6	513.5	490.5	576.3	397.6	382.6	355.1	317.2	283.4

December	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	0.1	-	10.5	-	-	-	0.4	-	-	-	-	-	-	-	5.0	-
BERER	-	-	-	-	-	-	-	-	8.7	-	12.8	-	13.7	-	-	12.9
BIATO	-	-	-	-	-	-	1.0	0.7	-	0.3	0.4	1.0	1.3	0.3	1.2	1.4
BOMMA	-	13.4	11.8	-	1.3	-	5.3	-	-	-	-	3.8	13.3	6.6	9.1	13.4
BREMA	-	1.3	-	-	-	-	-	-	-	-	2.5	6.6	-	0.2	-	-
BRIBE	1.5	6.5	1.5	1.8	-	-	-	-	-	7.7	6.0	9.5	-	-	-	-
	1.7	6.4	2.8	0.3	-	-	-	-	3.0	11.2	6.7	7.2	-	-	-	-
CARMA	-	-	13.0	-	13.7	8.7	13.8	13.3	13.7	13.8	13.7	13.7	13.7	11.6	13.7	10.2
CASFL	-	-	12.3	-	13.6	7.3	11.8	11.5	12.5	13.7	13.7	13.7	13.7	11.2	13.6	10.0
CINFR	-	-	-	-	1.7	-	4.5	-	-	-	-	4.0	13.1	7.9	7.2	13.4
CRIST	-	11.3	-	0.2	-	0.6	0.9	-	10.8	-	-	-	-	-	-	-
	-	8.9	-	0.4	-	0.5	2.1	-	-	-	-	-	-	-	-	-
	-	13.2	-	4.7	2.5	-	3.8	-	12.7	-	-	-	-	-	-	-
	-	0.9	-	-	0.2	0.2	0.9	0.3	1.9	-	-	-	-	-	-	-
ELTMA	-	11.6	11.8	-	-	-	-	-	-	-	-	-	-	0.6	-	4.2
FORKE	-	-	8.8	-	-	-	-	-	-	-	-	-	-	-	-	-
GONRU	0.9	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-
	8.1	6.6	-	-	3.3	3.1	7.5	5.9	2.3	11.1	11.0	-	12.8	12.8	12.8	12.8
	6.9	6.2	2.2	-	3.6	3.3	10.1	9.2	2.2	10.7	9.8	-	13.0	13.0	13.0	13.0
	12.8	3.8	-	-	-	7.6	-	3.7	0.2	7.9	8.5	3.5	12.8	12.8	12.8	12.8
	7.0	4.6	2.6	-	4.2	-	8.6	3.4	1.2	9.5	9.6	-	13.0	13.0	13.0	12.9
	12.2	3.3	-	-	0.9	8.4	4.9	2.9	0.2	5.7	7.6	2.8	12.3	12.4	12.4	12.2
GOVMI	3.7	1.8	-	-	0.9	-	3.6	-	8.1	5.7	10.1	10.3	12.7	7.8	3.9	10.2
	3.5	2.1	-	-	-	0.2	5.9	-	6.9	5.7	-	9.5	12.8	8.5	3.7	9.9
	-	1.2	-	0.4	0.4	-	3.8	-	4.5	5.3	0.7	7.7	11.6	6.7	-	9.6
HERCA	6.6	2.6	4.2	11.7	11.5	9.9	5.1	5.6	8.7	6.4	1.9	6.5	0.2	11.9	11.8	11.6
HINWO	-	-	13.0	-	-	-	-	-	-	-	-	4.2	-	-	-	-
IGAAN	-	-	-	-	-	0.3	2.4	-	3.9	9.5	9.2	2.7	2.6	-	-	6.3
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	4.4	10.0	2.8	-	-	-	3.3	-	8.7	1.4	11.5	2.9	12.7	1.9	-	11.2
KACJA	-	11.5	1.6	-	1.0	-	2.6	-	4.7	8.9	12.7	9.5	8.7	4.8	8.6	-
	-	12.8	4.0	-	7.3	-	7.6	-	8.6	8.3	13.3	10.7	11.6	7.5	1.1	-
	-	9.3	-	-	-	-	2.8	-	9.3	7.8	13.2	11.8	10.7	5.5	9.6	-
	-	9.6	2.0	-	-	-	6.5	-	7.2	9.5	13.7	11.0	11.5	6.9	7.0	-
KOSDE	10.1	9.1	8.1	7.1	6.6	6.1	5.1	-	6.1	6.1	6.2	6.5	5.3	6.0	9.0	10.1
	8.2	7.7	6.7	6.0	5.3	5.0	4.9	-	4.8	7.6	7.7	-	8.7	8.4	8.0	7.7
MACMA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	0.6
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9
MARRU	12.1	8.9	10.1	4.3	9.7	11.9	8.8	6.8	1.4	11.3	11.2	-	11.8	12.8	12.8	12.8
	12.4	-	9.7	1.5	5.2	10.1	8.7	5.7	-	4.5	-	-	12.8	12.8	12.8	12.7
MISST	-	10.9	12.2	-	-	-	5.5	-	-	-	-	-	6.6	7.8	12.4	5.9
MOLSI	1.6	2.5	0.3	-	3.1	0.8	-	-	1.8	8.9	1.5	8.3	7.3	1.0	-	-
	0.5	1.8	-	-	1.1	0.2	-	-	0.2	5.1	0.4	3.3	7.4	0.6	-	-
	1.9	3.1	-	-	3.9	1.8	-	-	2.3	8.7	1.6	7.4	7.5	-	-	-
	0.6	0.4	10.7	-	1.0	2.2	0.5	0.2	-	-	0.8	-	-	-	7.0	-
	-	0.2	10.4	0.2	-	2.1	-	0.2	-	-	0.5	-	-	-	8.0	-
	-	-	13.3	0.5	1.4	2.4	0.4	-	-	0.2	1.0	-	-	-	8.5	-
	-	-	13.2	-	1.0	1.4	-	0.2	-	-	0.6	-	-	-	8.4	-
MORJO	2.9	-	2.5	-	-	-	0.4	-	12.9	8.9	7.6	9.1	10.5	-	-	5.5
MOSFA	0.2	9.5	6.7	-	-	1.4	8.1	-	12.9	6.6	12.3	6.5	11.5	5.0	13.0	-
NAGHE	10.2	13.5	4.4	-	0.2	1.0	3.2	-	7.0	-	10.2	1.5	10.5	2.0	0.4	12.0
	0.2	1.6	13.5	-	0.7	1.3	-	-	-	-	-	-	9.9	0.6	2.3	8.1
	8.7	11.0	2.0	-	-	-	3.0	-	4.0	3.3	-	9.3	9.9	-	5.1	12.6
OTTMI	2.4	0.3	-	-	-	-	-	-	2.3	-	-	-	1.1	0.2	-	-
PERZS	3.6	2.1	-	-	-	-	1.6	-	6.3	5.1	5.6	7.6	13.5	6.2	-	13.0
ROTEC	-	-	10.7	-	-	-	-	-	-	-	-	-	-	-	4.5	-
SARAN	8.6	0.3	2.8	0.5	2.4	4.9	5.6	0.7	1.7	2.0	2.3	-	12.7	12.8	12.8	12.5
	12.7	0.9	4.5	-	-	11.6	6.5	3.7	3.0	6.1	2.1	-	12.6	12.5	12.7	12.5
	12.0	-	7.6	0.2	-	7.1	7.7	-	1.2	1.8	4.1	-	12.1	8.9	12.0	11.8
	10.9	-	6.2	-	-	9.2	11.3	7.1	-	6.0	-	-	12.6	11.7	11.4	11.1
	11.8	-	7.6	0.7	3.3	9.2	4.5	2.5	-	0.8	2.8	-	12.7	5.0	12.7	12.5
SCALE	-	8.1	10.1	-	-	-	2.3	-	-	-	-	-	-	1.5	7.6	-
SCHHA	1.2	9.8	-	2.9	-	0.2	1.2	-	4.3	13.3	6.8	6.5	-	-	-	-
SLAST	-	12.5	1.5	-	-	-	2.7	-	-	8.8	-	11.4	11.1	5.7	9.8	-
	0.8	12.5	1.4	-	-	-	8.0	-	-	9.4	13.5	12.5	11.7	-	11.2	-
STOEN	-	10.4	11.6	-	3.7	-	0.7	0.2	8.8	-	-	-	3.2	7.4	12.1	4.1
	-	10.9	11.7	-	5.9	-	6.3	-	8.9	-	-	-	4.8	8.2	13.1	4.1
	-	11.4	11.6	-	5.4	-	4.7	-	8.8	-	-	-	5.1	7.7	12.9	3.9
STRJO	-	-	-	3.3	-	-	-	-	0.2	-	2.8	-	-	-	-	-
	-	0.2	6.4	3.9	-	-	0.2	-	0.2	-	3.9	-	-	-	-	-
	-	-	7.8	4.7	-	-	-	-	-	-	2.3	0.2	-	-	-	-
	-	-	5.1	3.6	-	-	-	-	-	-	3.0	0.4	-	-	-	-
	-	-	2.7	3.5	-	-	-	-	0.2	-	3.9	0.2	-	-	-	-
TEPIS	7.1	8.4	2.6	-	2.1	0.7	-	-	-	0.2	7.0	1.8	1.1	-	-	13.2
	1.3	7.1	-	-	-	-	-	-	-	-	-	-	0.4	-	-	12.7
WEGWA	0.9	-	9.4	-	-	1.6	-	-	-	-	-	-	-	0.2	-	0.7
YRJIL	-	-	-	-	-	-	0.5	-	1.4	1.4	-	-	-	-	-	-
ZAKJU	-	13.3	3.9	-	2.5	-	-	-	9.6	9.5	13.2	11.8	12.4	10.2	7.6	2.4
	-	12.5	5.3	-	-	-	7.5	-	10.4	9.7	13.4	12.2	11.4	8.5	5.6	-
Sum	212.3	359.8	359.2	62.4	130.6	142.3	239.1	83.8	261.0	305.4	336.9	269.1	486.6	327.6	413.2	393.0

3. Results (Meteors)

December	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
ARLRA	10	2	16	117	14	-	28	14	9	2	8	1	83	-	-
BERER	-	-	-	66	82	-	-	44	35	112	11	45	-	13	-
BIATO	-	6	2	56	4	-	1	2	15	41	39	7	-	36	-
BOMMA	-	3	35	57	2	9	1	114	111	151	187	18	-	268	70
BREMA	-	-	-	-	-	-	-	-	25	19	11	67	44	-	-
BRIBE	-	-	11	31	-	-	16	1	33	25	25	83	85	-	8
	-	-	1	34	-	-	9	-	11	11	19	105	8	-	4
CARMA	61	32	91	133	-	37	20	148	130	193	239	364	527	315	48
CASFL	36	9	41	42	-	17	10	64	63	76	95	177	265	150	28
CINFR	-	1	23	60	-	6	3	89	84	135	181	23	-	228	57
CRIST	26	-	95	86	3	27	15	79	102	93	35	-	457	259	16
	30	1	107	107	1	43	18	91	109	140	42	-	506	340	15
	21	-	62	60	1	18	30	63	77	90	21	-	344	229	6
	77	3	134	121	3	77	27	139	167	189	51	-	560	283	16
ELTMA	-	-	32	-	-	12	-	76	65	105	161	159	42	350	-
FORKE	5	-	-	36	2	-	-	-	-	-	-	-	-	-	-
GONRU	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-
	7	3	24	21	57	3	49	74	30	44	-	-	141	45	-
	4	3	32	16	57	3	30	78	22	32	-	-	186	46	-
	-	-	-	34	-	-	15	22	6	15	-	11	99	18	-
	2	1	22	17	60	2	49	72	24	38	-	-	222	64	-
	2	-	-	39	53	1	31	64	21	21	-	10	229	34	-
GOVMI	42	6	14	44	8	8	6	40	14	60	1	102	1	-	1
	20	2	15	15	-	2	-	24	7	17	3	43	-	-	2
	24	4	8	18	4	-	3	16	10	24	1	2	1	-	2
HERCA	14	12	33	39	19	4	-	-	49	45	18	25	122	194	15
HINWO	4	1	-	39	9	-	-	6	4	-	-	74	1	-	2
IGAAN	3	2	-	-	-	-	4	26	11	57	-	-	122	-	-
	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-
JONKA	-	-	-	33	28	-	-	25	8	49	-	32	2	-	2
KACJA	9	-	-	36	-	3	5	3	10	1	38	149	-	-	1
	3	-	-	45	-	11	4	21	61	42	75	153	-	-	-
	7	-	-	16	-	-	3	16	-	-	118	127	-	-	5
	5	-	-	15	-	2	-	2	11	-	38	106	-	-	1
KOSDE	2	18	43	-	12	15	34	39	26	67	104	139	195	105	63
	-	-	5	-	-	2	9	43	82	181	253	360	469	257	169
MACMA	5	7	1	12	-	-	-	-	-	-	8	-	-	-	-
	9	7	1	21	-	-	-	-	-	-	7	-	-	-	-
	10	3	-	28	-	-	-	-	-	-	15	-	-	-	-
	17	5	-	28	-	1	-	-	-	-	18	-	-	1	-
MARRU	11	10	24	33	23	4	17	50	47	30	-	6	125	71	-
	8	13	49	46	45	30	28	66	33	38	24	-	158	54	-
MISST	57	5	71	142	-	42	-	18	63	73	249	370	530	357	52
MOLSI	26	1	44	38	3	14	54	12	5	15	6	22	-	-	63
	21	2	47	21	2	3	26	23	4	19	12	16	-	-	115
	8	-	13	6	-	2	7	3	1	2	3	5	-	-	26
	21	13	16	90	14	-	33	11	31	12	50	1	-	-	6
	19	12	15	167	13	-	52	20	48	14	90	5	-	-	1
	26	11	19	93	8	-	40	21	35	10	64	1	-	-	3
	26	11	24	149	20	-	55	22	42	17	90	6	-	-	1
MORJO	-	3	-	25	25	1	7	31	3	35	9	37	64	-	-
MOSFA	27	6	31	30	2	13	-	50	41	66	83	164	361	193	22
NAGHE	-	2	-	62	47	-	1	26	16	78	-	35	37	-	-
	-	-	-	24	21	-	1	51	3	80	-	90	231	1	-
	-	5	3	21	20	1	4	31	5	42	5	-	-	-	-
OTTMI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
PERZS	57	15	34	77	21	9	7	47	18	62	-	151	6	-	10
ROTEC	3	3	-	34	1	-	3	7	-	-	2	-	-	-	-
SARAN	4	9	15	21	22	16	9	30	31	33	26	10	90	32	-
	16	10	37	34	-	-	-	20	-	2	37	8	107	23	-
	14	15	27	33	-	-	-	18	-	2	33	7	104	18	1
	7	8	12	7	-	-	-	-	-	2	19	4	74	27	-
	4	9	26	29	26	24	21	38	21	17	20	9	95	23	-
SCALE	-	-	-	19	-	3	-	15	28	46	60	45	26	160	15
SCHHA	-	2	1	2	-	-	26	2	31	18	53	61	13	-	8
SLAST	-	-	-	10	-	-	-	4	-	13	37	43	-	12	3
	5	-	-	5	1	-	-	1	1	2	29	48	-	9	1
STOEN	8	1	57	136	-	20	-	51	127	187	274	347	290	419	69
	5	-	65	112	-	10	1	35	112	198	257	390	325	452	58
	10	-	70	113	-	19	-	33	127	207	267	351	336	430	61
STRJO	-	1	20	73	-	-	18	4	40	59	1	210	213	-	33
	-	-	14	33	-	-	12	3	19	22	-	102	104	-	14
	-	-	-	18	1	-	4	4	10	9	-	15	23	-	20
	-	-	9	41	-	-	5	4	10	20	2	89	97	-	14
	-	-	9	45	-	-	15	6	15	29	2	111	149	-	17
TEPIS	-	-	7	48	49	-	-	11	28	27	-	29	19	3	4
	-	-	4	37	40	-	-	11	-	27	-	18	-	-	-
WEGWA	11	-	1	42	35	-	1	33	-	2	-	-	-	-	-
YRJIL	-	-	-	-	19	1	-	-	-	-	-	1	-	-	-
ZAKJU	6	-	27	20	1	4	-	99	56	148	192	215	-	65	92
	2	-	5	5	-	-	-	34	21	41	39	81	-	18	20
Sum	857	298	1644	3473	878	519	867	2445	2504	3779	3857	5485	8288	5602	1264

December	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ARLRA	1	-	43	-	-	-	2	-	-	-	-	-	-	-	15	-
BERER	-	-	-	-	-	-	-	-	48	-	52	-	56	-	-	39
BIATO	-	-	-	-	-	-	7	5	-	2	3	6	8	2	8	12
BOMMA	-	65	30	-	1	-	17	-	-	-	-	31	52	16	32	57
BREMA	-	2	-	-	-	-	-	-	-	-	3	10	-	1	-	-
BRIBE	3	17	2	4	-	-	-	-	-	19	16	28	-	-	-	-
	3	30	1	2	-	-	-	-	3	33	9	29	-	-	-	-
CARMA	-	-	49	-	67	54	138	58	86	99	79	57	91	29	90	36
CASFL	-	-	16	-	37	21	47	23	20	31	41	39	30	13	20	18
CINFR	-	-	-	-	2	-	14	-	-	-	-	24	39	13	31	52
CRIST	-	41	-	1	-	4	6	-	30	-	-	-	-	-	-	-
	-	59	-	3	-	2	16	-	-	-	-	-	-	-	-	-
	-	39	-	25	7	-	16	-	31	-	-	-	-	-	-	-
	-	4	-	-	1	1	5	2	10	-	-	-	-	-	-	-
ELTMA	-	52	24	-	-	-	-	-	-	-	-	-	-	3	-	8
FORKE	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-
GONRU	4	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
	23	11	-	-	3	6	18	4	2	24	40	-	47	64	60	51
	14	10	1	-	11	1	30	13	2	21	15	-	37	34	48	44
	16	1	-	-	-	1	-	1	1	5	10	12	19	19	21	16
	13	8	2	-	6	-	29	3	2	9	25	-	37	50	44	36
	37	5	-	-	5	14	22	6	1	7	11	10	35	36	45	33
GOVMI	3	2	-	-	2	-	6	-	10	19	13	16	13	7	3	21
	2	3	-	-	-	1	7	-	7	7	-	7	18	5	1	6
	-	2	-	1	2	-	4	-	12	7	3	8	13	3	-	14
HERCA	17	11	25	34	27	26	10	20	24	12	4	13	1	34	14	26
HINWO	-	-	33	-	-	-	-	-	-	-	-	15	-	-	-	-
IGAAN	-	-	-	-	-	1	7	-	18	16	20	3	4	-	-	12
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JONKA	3	14	2	-	-	-	16	-	9	2	11	5	18	1	-	10
KACJA	-	35	11	-	3	-	15	-	17	12	39	24	24	13	31	-
	-	64	31	-	48	-	97	-	32	33	60	27	69	21	4	-
	-	11	-	-	-	-	7	-	22	15	25	19	21	7	27	-
	-	17	8	-	-	-	23	-	12	21	40	22	26	13	28	-
KOSDE	71	64	51	45	34	23	29	-	20	14	18	25	24	27	27	44
	112	127	105	90	68	66	46	-	47	85	93	-	114	128	105	99
MACMA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	2
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
MARRU	34	15	24	11	14	38	54	15	2	26	15	-	21	37	51	32
	46	-	25	9	15	36	43	22	-	9	-	-	35	40	34	32
MISST	-	86	27	-	-	-	31	-	-	-	-	-	16	17	24	9
MOLSI	4	10	2	-	5	4	-	-	5	27	10	17	31	2	-	-
	1	12	-	-	6	1	-	-	1	26	4	12	37	1	-	-
	1	8	-	-	2	2	-	-	3	12	1	1	11	-	-	-
	3	2	46	-	4	9	3	1	-	-	7	-	-	-	25	-
	-	1	62	1	-	16	-	3	-	-	7	-	-	-	36	-
	-	-	43	1	4	7	1	-	-	1	6	-	-	-	30	-
	-	-	51	-	1	8	-	1	-	-	4	-	-	-	39	-
MORJO	1	-	2	-	-	-	2	-	9	14	14	8	15	-	-	15
MOSFA	1	35	11	-	-	12	26	-	22	23	28	15	23	9	23	-
NAGHE	26	67	15	-	1	10	11	-	16	-	22	1	36	4	3	52
	1	9	58	-	6	9	-	-	-	-	-	-	42	3	13	27
	11	26	5	-	-	-	11	-	3	7	-	16	15	-	4	22
OTTMI	8	3	-	-	-	-	-	-	3	-	-	-	5	1	-	-
PERZS	7	8	-	-	-	-	17	-	5	22	7	15	54	6	-	40
ROTEC	-	-	5	-	-	-	-	-	-	-	-	-	-	-	3	-
SARAN	22	2	8	3	9	12	25	4	1	5	3	-	25	19	22	21
	55	2	17	-	-	18	28	14	6	5	3	-	25	20	35	34
	35	-	23	1	-	11	27	-	2	6	3	-	30	34	35	34
	21	-	4	-	-	5	19	4	-	4	-	-	8	9	18	13
	27	-	13	4	8	19	28	6	-	4	3	-	24	20	20	27
SCALE	-	17	10	-	-	-	6	-	-	-	-	-	-	4	9	-
SCHHA	1	32	-	3	-	1	2	-	3	44	16	20	-	-	-	-
SLAST	-	7	2	-	-	-	2	-	-	3	-	7	9	2	12	-
	3	2	2	-	-	-	10	-	-	3	11	5	13	-	5	-
STOEN	-	100	37	-	1	-	4	1	16	-	-	-	3	33	44	14
	-	86	29	-	8	-	17	-	20	-	-	-	6	36	39	7
	-	81	28	-	8	-	25	-	23	-	-	-	9	35	57	5
STRJO	-	-	-	8	-	-	-	-	1	-	18	-	-	-	-	-
	-	1	3	4	-	-	1	-	1	-	11	-	-	-	-	-
	-	-	6	2	-	-	-	-	-	-	7	2	-	-	-	-
	-	-	4	5	-	-	-	-	-	-	8	2	-	-	-	-
	-	-	2	5	-	-	-	-	1	-	14	1	-	-	-	-
TEPIS	10	30	20	-	11	2	-	-	-	1	21	1	2	-	-	28
	4	22	-	-	-	-	-	-	-	-	-	-	1	-	-	27
WEGWA	2	-	17	-	-	8	-	-	-	-	-	-	-	1	-	2
YRJIL	-	-	-	-	-	-	3	-	1	1	-	-	-	-	-	-
ZAKJU	-	70	12	-	12	-	-	-	38	41	75	43	72	35	36	3
	-	14	8	-	-	-	13	-	8	12	30	15	26	11	5	-
Sum	646	1442	1073	262	439	449	1043	206	658	789	978	611	1392	918	1276	1089