13-0205

EUROLAS Data Center (EDC) –Status Report 2011-2013

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Abstract. *This paper provides statistics about the data holding of the EUROLAS Data Center (EDC) as one of the two ILRS data centers in the period from January 2011 until September 2013. In detail statistics about the data holding of normal point data, full-rate data, predictions, SLR products and ILRS mailing lists are provided.*

Introduction

Since 1994 the DGFI operates the EUROLAS Data Center (EDC) within the International Laser Ranging Service (ILRS) (Pearlman M.R., 2002). The EDC (Schwatke C., 2013) by itself works as ILRS Data Center and ILRS Operation Center. All data sets of the data holding at EDC are provided via FTP (ftp://edc.dgfi.badw.de) and Website (http://edc.dgfi.badw.de) (Schwatke C., 2012). On 2012-05-01, the transition to the new Consolidated Laser Ranging Format (CRD) as official ILRS data format was carried out. This paper provides an overview about the data holding of the EDC in the period from Jan. 2011 and Sep. 2013. The data holding contains full-rate data, normal point data, predictions and ILRS-products. Furthermore statistics about SLR products such as positions, earth orientation parameters and orbits are provided.

Full-Rate Data (CRD)

Full-rate data was the first SLR product in the 1970's. At the beginning these data sets were published in the MERIT II format of version 2 and later in the extended MERIT II format of version 3. In April 2008, the first data sets were published in the new Consolidated Laser Ranging Format (CRD). The new format consolidates full-rate and normal point data in one format. In the period Jan. 2011 and Sep. 2013, 32 stations delivered full-rate data. At this time 76 satellites were observed. Table 1 shows the number of observations of full-rate data associated to the corresponding year and satellite.

Satellite	2011	2012	2013	Satellite	2011	2012	2013
Ajisai	20,778,859	25,130,344	24,599,276	Glonass-119	13,242	117,962	191,911
Apollo-11	0	41	46	Glonass-120	275,426	171,161	200,915
Apollo-14	0	8	13	Glonass-121	90,256	148,093	265,816
Apollo-15	219	632	287	Glonass-122	46,252	373,112	350,899
Beacon-C	12,054,682	12,510,732	11,747,780	Glonass-123	44,086	278,918	326,216
Blits	763,011	875,435	57,312	Glonass-124	32,765	294,697	499,854
Compass-G1	0	212,183	377,410	Glonass-125	423,069	48,018	32,575
Compass-I3	0	127,065	402,297	Glonass-126	0	418,213	500,135
Compass-I5	0	421,842	617,147	Glonass-127	0	132,284	641,352
Compass-M1	1,048,571	294,619	0	Glonass-128	40	323,131	520,205

Compass-M3	0	359,708	532,631	Glonass-129	0	463,414	1,163,549
Cryosat-2	3,540,624	4,714,658	4,677,959	Glonass-130	1,945	1,532,275	831,814
Envisat	5,156,559	1,813,043	734,082	Glonass-131	0	0	136,993
ERS-2	3,081,144	0	0	Goce	298,839	555,756	695,754
Etalon-1	1,018,754	959,728	613,605	GPS-35	334	10,907	23,536
Etalon-2	895,214	775,204	405,448	GPS-36	110,641	155,393	63,908
Galileo-101	40,397	760,815	526,613	Grace-A	1,639,676	1,970,292	1,906,343
Galileo-102	40,640	755,954	454,333	Grace-B	1,119,157	1,409,156	1,515,524
Galileo-103	0	46,777	627,621	HY-2A	1,373,144	3,086,977	3,780,331
Galileo-104	0	120,228	887,208	IRNSS-1A	0	0	874
Giove-A	213,979	87,424	40,359	Jason-1	5,665,163	5,080,419	4,839,335
Giove-B	229,482	104,324	0	Jason-2	14,712,284	15,208,162	15,544,481
Glonass-95	18,286	103,182	10,707	Kompsat-5	0	0	145,778
Glonass-100	5,314	0	0	Lageos-1	10,173,803	9,813,575	20,995,224
Glonass-101	35,257	197,711	192,641	Lageos-2	7,592,851	8,258,635	9,107,082
Glonass-102	744,260	457,996	386,790	Lares	0	12,061,056	13,467,060
Glonass-103	22,592	192,314	210,138	Larets	3.582.115	4.512.894	3.650.169
Glonass-105	7,414	120,854	234,835	Proba-2	749,350	0	0
Glonass-106	6,871	143,466	196,651	QZS-1	74,526	60,235	79,559
Glonass-107	41,660	215,851	204,075	Radioastro	10,735	12,360	0
Glonass-109	942,912	792,346	381,484	Saral	0	0	1,929,106
Glonass-110	618,297	525,605	242,707	Starlette	14,051,383	14,221,196	18,111,871
Glonass-111	13,472	115,806	213,001	Stella	6,256,108	6,548,505	8,844,347
Glonass-114	23,707	169,735	135,778	Stpsat-2	0	0	60,362
Glonass-115	1,429,011	1,371,246	0	Stsat2c	0	0	76,264
Glonass-116	19,528	161,618	251,457	Tandem-X	919,117	1,388,289	1,319,300
Glonass-117	8,958	159,552	184,777	TerraSAR-X	884,924	1,459,504	1,463,851
Glonass-118	618,153	523,004	264,399	ZY-3	0	371,152	0
				Yearly	**123,559,049**	**145,816,791**	**163,675,160**
				Ø Monthly	**10,296,049**	**12,151,399**	**18,186,128**

Table 1: Number of observations in full-rate data (CRD) sorted by satellite from Jan. 2011 until Sep. 2013

Normal Point Data (CRD)

Normal point data is the primary product of ILRS stations. It replaced the on-site sampled data and later full-rate data as the primary product. In 2006, the first data sets were published in the new Consolidated Laser Ranging Format (CRD). On May 2nd 2012 the CRD format became official in the ILRS and replaced the CSTG format. In the period Jan. 2011 and Sep. 2013, 45 stations delivered normal point data. At this time 84 satellites were tracked by the stations. Table 2 shows the number of normal points associated to the corresponding year and satellite.

Satellite	2011	2012	2013	Satellite	2011	2012	2013
Ajisai	152,816	174,500	123,680	Glonass-119	888	1,365	1,756
Apollo-11	73	90	61	Glonass-120	3,977	2,259	1,873
Apollo-14	76	85	38	Glonass-121	801	1,818	1,859
Apollo-15	177	396	233	Glonass-122	1,211	3,692	2,555
Beacon-C	97,220	96,076	69,261	Glonass-123	1,430	3,775	2,987
Blits	20,019	21,379	657	Glonass-124	1,160	3,616	2,612
Compass-G1	0	848	898	Glonass-125	3,016	950	178
Compass-I3	0	1,207	880	Glonass-126	286	3,673	2,321
Compass-I4	0	7	0	Glonass-127	0	1,016	1,476
Compass-I5	0	1,606	2,470	Glonass-128	66	4,057	2,781
Compass-M1	8,203	3,254	0	Glonass-129	36	4,580	7,302
Compass-M3	0	1,688	1,895	Glonass-130	13	8,962	6,391
Cryosat-2	58,461	63,897	45,325	Glonass-131	0	0	798
Envisat	75,885	29,786	5,014	Goce	15,783	17,022	9,261
ERS-1	0	0	449	GPS-35	30	892	249
ERS-2	38,822	0	464	GPS-36	2,562	2,654	1,547
Etalon-1	10,411	9,590	6,408	Grace-A	40,245	43,567	28,300
Etalon-2	10,193	9,119	5,636	Grace-B	40,472	42,521	27,340
Galileo-101	521	7,703	4,697	HY-2A	8,270	41,426	24,980
Galileo-102	471	8,650	4,416	IRNSS-1A	0	0	84
Galileo-103	0	533	4,588	Jason-1	159,207	138,625	66,766
Galileo-104	0	549	5,253	Jason-2	200,634	209,978	142,828
Giove-A	3,568	1,718	530	Kompsat-5	0	0	1,537
Giove-B	4,641	1,992	0	Lageos-1	87,966	94,775	60,486
Glonass-95	749	144	6	Lageos-2	78,150	84,748	51,468
Glonass-100	758	0	0	Lares	0	88,484	65,480
Glonass-101	988	2,074	1,603	Larets	31,032	31,002	17,626
Glonass-102	7,438	6,419	3,897	Luna-17	50	23	13
Glonass-103	906	2,248	1,664	Luna-21	29	19	2
Glonass-105	1,172	1,729	1,426	Proba-2	4,589	0	0
Glonass-106	1,230	1,869	1,512	QZS-1	2,241	1,562	933
Glonass-107	1,121	2,016	1,430	Radioastro	193	181	0
Glonass-108	37	0	0	Reflector	188	4	0
Glonass-109	8,019	7,151	5,098	Saral	0	0	26,091
Glonass-110	5,852	6,340	3,437	Starlette	89,824	105,402	69,186
Glonass-111	860	1,344	1,611	Stella	45,876	51,950	35,228
Glonass-113	103	0	0	Stpsat-2	0	0	920
Glonass-114	1,208	2,259	1,110	Stsat2c	0	0	1,081
Glonass-115	8,829	8,797	0	Tandem-X	36,677	49,137	32,653

Glonass-116	989	2,117	1,735	TerraSAR-X	36,973	52,194	34,484
Glonass-117	952	1,497	1,461	Westpac	15	15	0
Glonass-118	6,924	5,848	3,258	ZY-3	0	1380	0
				Yearly	**1,423,582**	**1,583,849**	**1,045,541**
				Ø Monthly	**118,631**	**131,987**	**116,171**

Table 2: Number of observations in normal point data (CRD) sorted by satellite from Jan. 2011 until Sep. 2013

Predictions (CPF)

Since June 30, 2006, the Consolidated Prediction Format (CPF) is the official ILRS format for satellite predictions. The official format for predictions was changed from the Tuned Inter-Range Vectors (TIRV) format to the new CPF. In the period between January 2011 and September 2013, predictions (CPF) of 79 satellites were computed by 21 prediction providers. Table 3 shows the number prediction files associated to the corresponding year and satellite.

Satellite	2011	2012	2013	Satellite	2011	2012	2013
Ajisai	1,082	1,077	810	Glonass-121	6	350	263
Apollo-11	357	359	273	Glonass-122	6	351	265
Apollo-14	357	360	273	Glonass-123	7	348	267
Apollo-15	357	360	273	Glonass-124	7	350	265
Beacon-C	716	704	538	Glonass-125	229	61	49
Blits	560	587	66	Glonass-126	6	351	265
Compass-G1	0	88	77	Glonass-127	0	51	212
Compass-I3	0	85	79	Glonass-128	5	352	265
Compass-I5	0	64	79	Glonass-129	5	420	598
Compass-M1	382	280	0	Glonass-130	6	896	801
Compass-M3	0	114	80	Glonass-131	0	0	88
Cryosat-2	702	718	541	Goce	990	1,005	722
Envisat	1,082	543	67	GPS-35	50	358	127
ERS-2	603	0	0	GPS-36	697	697	538
Etalon-1	711	715	519	Grace-A	804	946	694
Etalon-2	712	709	541	Grace-B	795	883	663
Galileo-101	28	363	336	HY-2A	95	362	268
Galileo-102	30	431	335	IRNSS-1A	0	0	22
Galileo-103	0	55	336	Jason-1	1,032	964	548
Galileo-104	0	49	336	Jason-2	1,068	1,084	810
Giove-A	621	325	258	Kompsat-5	0	0	16
Giove-B	665	339	0	Lageos-1	1,080	1,072	815
Glonass-95	10	66	4	Lageos-2	1,075	1,080	814

Glonass-101	7	350	258	Lares	0	861	754
Glonass-102	687	1043	804	Larets	969	955	711
Glonass-103	6	350	263	Luna-17	357	360	273
Glonass-105	5	349	265	Luna-21	357	360	273
Glonass-106	5	347	265	Luncenter	357	360	273
Glonass-107	8	349	265	Proba-2	36	0	0
Glonass-109	687	1,044	801	QZS-1	341	351	268
Glonass-110	687	1,037	804	Radioastro	28	117	64
Glonass-111	6	350	264	Saral	0	0	210
Glonass-114	20	352	176	Starlette	716	713	540
Glonass-115	687	744	0	Stella	719	702	540
Glonass-116	21	349	262	Stpsat-2	0	0	101
Glonass-117	6	350	267	Stsat2c	0	0	94
Glonass-118	687	1,044	805	Tandem-X	802	1,202	960
Glonass-119	6	351	264	TerraSAR-X	834	1,289	974
Glonass-120	490	422	264	ZY-3	0	50	0
				Yearly	**26,469**	**36,514**	**27,258**
				Ø Monthly	**2,205**	**3,042**	**3,028**

Table 3: Number of predictions (CPF) sorted by satellite from Jan. 2011 until Sep. 2013

ILRS Products

Daily and Weekly POS+EOP products

The most important products provided by the analysis center are the positions and earth orientation parameters. They were computed on a weekly basis until 1st May 2012. From this point of time the standard product is based on a daily basis which is shown on Table 4.

Analysis Center	2011	2012	2013
ASI	49/0	16/245	0/272
BKG	48/0	16/232	0/253
DGFI	15/0	17/243	0/273
ESA	38/0	17/171	0/269
GA	42/0	14/220	0/2
GFZ	49/0	16/240	0/272
GRGS	43/0	17/213	0/269
JCET	53/0	14/242	0/273
NSFG	48/0	17/238	0/266
ILRS-A	53/0	17/243	0/272
ILRS-B	53/0	17/243	0/272
Yearly	**491/0**	**178/2530**	**0/2693**
Ø Monthly	**41/0**	**45/316**	**0/299**

Table 4: Number of weekly/daily delivered position (POS) and earth orientation parameters (EOP) product from Jan. 2011 to Sep. 2013

SP3-Orbits

Next to the daily and weekly position and earth orientation parameters the ILRS provides also SP3-orbits estimated by the different analysis centers to the ILRS community. Table 5 shows the number of submitted SP3-orbit data sets of the corresponding year and analysis center.

Analysis Center	2011	2012	2013
ASI	128	226	160
BKG	241	226	52
DGFI	29	202	156
ESA	0	132	156
GA	186	219	0
GFZ	46	84	78
GRGS	76	78	0
JCET	52	114	156
NSFG	0	0	126
Yearly	**758**	**1281**	**884**
Ø Monthly	**63**	**107**	**98**

Table 5: Number of submitted orbits data sets

ILRS Mailing-Lists

Within the ILRS Community the EDC maintains four mailing lists for information exchange. Table 6 shows the number of sent messages in the corresponding year and web address of the different mailing lists.

Mailing-List	2011	2012	2013	URL
SLR-Mail	96	160	58	http://slrmail.dgfi.badw.de
SLR-Report	1521	1395	872	http://slreport.dgfi.badw.de
SLR-Urgent	66	47	17	http://urgent.dgfi.badw.de
Rapid Service Mail	17	28	8	http://rapidservicemail.dgfi.badw.de
Yearly	**1700**	**1630**	**955**	
Ø Monthly	**142**	**136**	**106**	

Table 6: Overview of messages sent to the ILRS mailing lists in the period from Jan. 2011 to Sep. 2013

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