Availability and Completeness of IGS/IGLOS Tracking Data

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Motivation

Timely availability of GNSS tracking data is a basic condition for generation of best possible analysis products. Data availability problems are highlighted, with the main focus on the data flow of hourly observation files.

CODE provides high-quality analysis products with regard to all transmitting GNSS satellites. This includes all satellites marked unusable, or unhealthy, brand new satellites, and, since recently, GPS satellites being repositioned. In all mentioned cases, GNSS tracking data without interruption is desired.

IGS/IGLOS Hourly Data Flow

For NRT processing, the hourly file latency is a crucial factor. There is actually no reason why not all, or at least a significant fraction of the IGS/IGLOS hourly files should become available within few minutes after the end of each hour, the more so because exclusively stations are involved that are fully automatically operated.

A corresponding monthly statistics is attached in the bottom part of this poster. The listing includes all (168) IGS stations that delivered hourly data during September 2003. IGLOS stations (providing GPS and GLONASS data) are indicated with a plus sign (+). Note that the "min(imum)" delay specified may be considered as "nominal" delay of the station's hourly file submission.

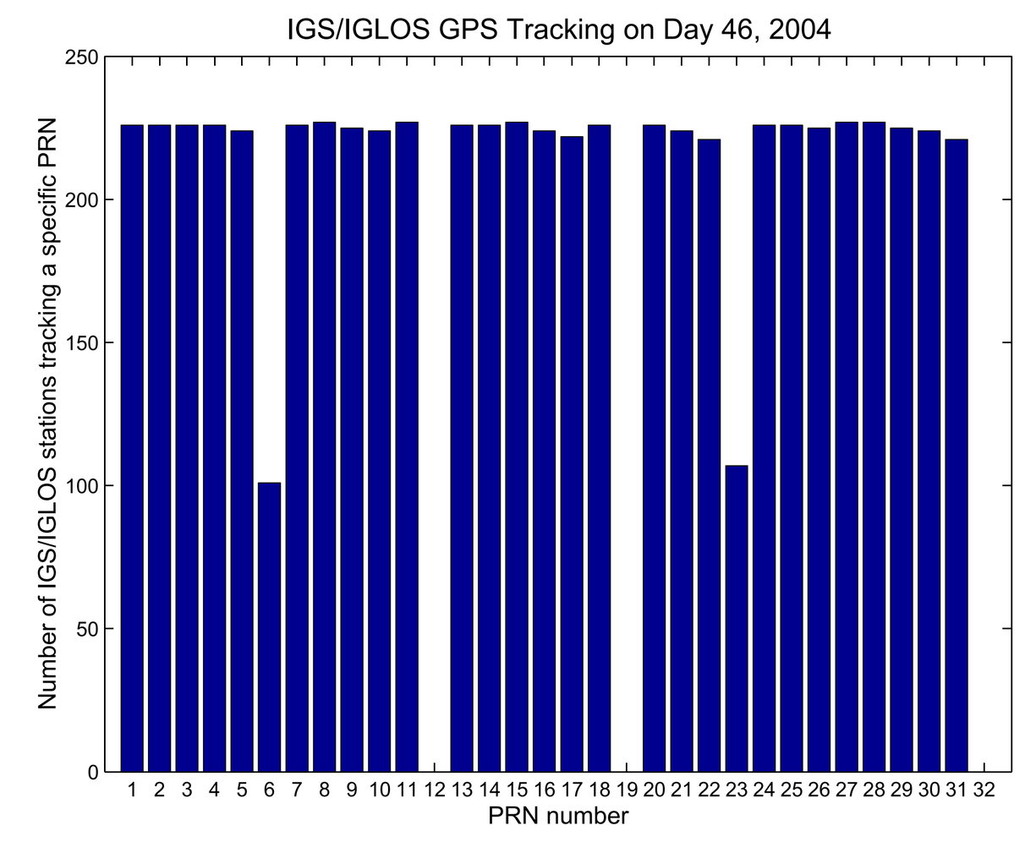
The following table, an excerpt from this statistics, shows the situation concerning IGLOS hourly files made available by the BKG data center. Except for CAGZ, a file latency of generally 3-4 minutes is already achieved here.

Site	Delay in minutes Min	Mean	SDev	Availability	Data center
BOGI+	3	3.2	1.0	86.7%	BKG_IGEX
CAGZ+	36	36.0	0.5	85.4%	BKG_IGEX
CONZ+	3	4.7	4.2	88.8%	BKG_IGEX
DREJ+	3	3.2	1.0	96.4%	BKG_IGEX
FFMJ+	3	3.2	1.0	96.1%	BKG_IGEX
GOPE+	3	4.2	0.9	91.4%	BKG_IGEX
HELJ+	3	3.2	1.0	82.9%	BKG_IGEX
HERT+	3	4.2	0.9	99.2%	BKG_IGEX
HUEG+	3	3.2	1.0	91.4%	BKG_IGEX
JOZ2+	4	4.4	1.0	97.6%	BKG_IGEX
LEIJ+	3	3.2	1.0	95.0%	BKG_IGEX
MAT1+	4	4.8	3.1	89.9%	BKG_IGEX
OHI3+	3	5.2	4.0	74.6%	BKG_IGEX
REYZ+	3	5.3	4.3	91.1%	BKG_IGEX
SPT0+	3	4.1	3.3	93.5%	BKG_IGEX
TITZ+	3	3.2	1.0	92.4%	BKG_IGEX
WROC+	3	4.2	1.5	92.2%	BKG_IGEX
WTZJ+	3	3.2	1.0	95.8%	BKG_IGEX
WTZZ+	3	5.4	4.1	96.4%	BKG_IGEX
ZIMJ+	3	3.3	1.3	99.3%	BKG_IGEX

For a surprisingly big number of IGS stations, the statistics attached shows serious data flow problems. A dramatic example is, e.g., ZIMJ. The many percentage values far from 100% are something unpleasant.

Complete GNSS Tracking

The IGS has been generating orbit and clock products commonly for all transmitting GPS satellites, independent of whether they are declared unusable or not (by the GPS MCC). It is not unusual that one or more GPS (or GLONASS) satellites are marked unusable over a longer period of time. This was recently the case with respect to PRN06 and PRN23. The GPS tracking situation on day 46 of 2004 is illustrated in the histogram plot. More than 50% of the IGS ground receivers did not sample the two satellites.



For the same reason, POD of GPS satellites being repositioned is difficult due to the lack of tracking data. This is illustrated for three recent GPS repositionings (PRN02, PRN14, PRN27), where the number of simultaneous observations per epoch may temporarily drop well below the level of >9 observations (indicated by *).

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DATE : 2004   1   6
   2 |************************986367*************************************

DATE : 2004   1  16
  14 |**********7479*************************************************

DATE : 2004   2   3
  27 |**************************************************964456****************
-----+----------------+----------------+----------------+----------------+
     0                                12                                24
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bogi0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
conz0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
crar0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
darr0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
dlft0310.04o: G01 G02 G03             G07 G08         G11     G14 G15 G16     G18 G20         G23 G24 G25 [illegible]
drej0310.04o: G01 G02 G03 G04         G07 G08 G09 G10     G13     G15 G16 G17 G18     G21         G24     G26 [illegible]
dwh10310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
ffmj0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
godz0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
gope0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
helj0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 [illegible]
hert0310.04o: G01         G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 [illegible]
[illegible]
str20310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 G27 G28 G29 G30 G31 R03 R04 R05     R17 R18 R21 R22 R23 R24  TPS LEGACY     2.2
thu20310.04o: G01         G04 G05 G06 G07     G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 G27 G28 G29 G30 G31 R03     R05     R17 R18 R21 R22 R23 R24  ASHTECH Z18    0065
titz0310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 G27 G28 G29 G30 G31 R03 R04 R05     R17 R18 R21 R22 R23 R24  JPS LEGACY     E_GGD_2/2.3P3
unb10310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 G27 G28 G29 G30 G31 R03 R04 R05 R06 R17 R18 R21 R22 R23 R24  TPS LEGACY     2.3 OCT,17,2003 P3
vis00310.04o: G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G13 G14 G15 G16 G17 G18 G20 G21 G22 G23 G24 G25 G26 G27 G28 G29 G30 G31 R03 R04 R05     R17 R18 R21 R22 R23 R24  JPS E_GGD      2.2 APR,05,2002 P2
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Incompleteness of data is, to an increased extent, a problem concerning GPS/GLONASS-combined tracking. The differences between well performing and poorly behaving GNSS receivers is remarkable in terms of data completeness (not data quality!). For example, missing G02, G03, G08 observations seem to be symptomatic for some Ashtech Z18 receiver models.

Conclusions

(1) It should be possible to drastically reduce the mean hourly file latency. Desirable would be a maximum delay of 5 minutes, namely for all IGS/IGLOS stations that do not have explicit restrictions in communication. Reviewing the procedures at the IGS/ IGLOS data centers would make sense.

(2) Generally all stations should submit their observation files to at least two IGS data centers (for backup). In case of ftp connection problems, "old," not yet submitted files of the previous (24) hours should be uploaded by the stations as soon as ftp connection is reestablished.

(3) At CODE, we started to create daily observation files on the basis of hourly files for all stations where daily files are not available for rapid analysis. The fact that complete sets of 24 hourly files, but no daily files are available 3-5 hours after the end of the day for a number of IGS/IGLOS stations reveals also potential for improvement in terms of daily files.

(4) We consider complete GNSS tracking important for a continuous receiver network, like the IGS/IGLOS network. Javad GNSS receiver models, for example, are able to operate in "all-in-view" tracking mode. This is, however, only the case concerning IGLOS receivers that have been specifically reconfigured by the station managers (successfully convinced by CODE). An official statement from IGS side addressing this issue would be appreciated. Finally, the wish for complete GNSS tracking had to be manifested when interacting with receiver manufacturers.

IGS/IGLOS Hourly Data Latency Statistics, for September 2003

Site	Delay in minutes Min	Mean	SDev	Availability	DC
ALBH	15	35.4	18.4	36.5%	CDDIS
ALBH	16	42.0	6.7	54.6%	IGN
ALBH	30	30.3	1.2	52.9%	JPL
ALBH	16	20.1	2.7	54.4%	SOPAC
ALGO	11	16.5	13.1	92.5%	CDDIS
ALGO	12	18.0	7.6	75.6%	IGN
ALGO	10	13.7	6.8	91.5%	JPL
ALGO	7	10.3	4.7	89.2%	SOPAC
ALIC	19	31.1	2.7	58.6%	CDDIS
ALIC	30	30.5	1.5	72.1%	JPL
ALIC	20	24.5	5.6	72.2%	SOPAC
AMC2	7	13.1	8.3	86.2%	CDDIS
AMC2	6	6.8	0.9	99.4%	JPL
AMC2	6	9.4	2.2	95.6%	SOPAC
AOA1	11	15.8	8.5	86.0%	CDDIS
AOA1	14	18.4	7.8	94.6%	IGN
AOA1	10	10.4	1.2	99.2%	JPL
AOA1	11	12.7	2.7	95.3%	SOPAC
AREQ	8	16.4	9.9	60.1%	CDDIS
AREQ	14	22.5	12.3	54.6%	IGN
AREQ	7	8.7	3.9	73.5%	JPL
AREQ	8	10.9	4.3	72.8%	SOPAC
ARTU	18	24.8	6.6	85.0%	CDDIS
ARTU	15	17.9	3.6	98.2%	JPL
ARTU	19	21.2	4.2	94.2%	SOPAC
ASPA	13	15.7	6.8	88.8%	CDDIS
ASPA	15	18.0	7.0	87.9%	JPL
ASPA	17	22.4	7.8	80.6%	SOPAC
AUCK	31	37.4	6.8	69.7%	CDDIS
AUCK	33	43.9	1.9	52.5%	IGN
AUCK	30	31.8	4.9	90.1%	JPL
AUCK	23	26.1	5.5	85.7%	SOPAC
BAKE	15	44.0	10.3	91.0%	CDDIS
BAKE	30	30.2	0.9	85.3%	JPL
BAKE	12	20.0	3.2	88.8%	SOPAC
BAN2	6	15.3	6.6	95.8%	BKG
BAN2	11	36.5	11.7	91.1%	CDDIS
BAN2	10	27.2	6.8	87.5%	JPL
BAN2	8	18.3	7.2	91.2%	SOPAC
BOGI+	3	3.2	1.0	86.7%	BKG_IGEX
BOGI+	24	24.7	2.0	71.2%	CDDIS
BOGI+	35	35.0	0.3	70.8%	JPL
BOGI+	31	33.2	3.3	63.5%	SOPAC
BOGT	7	9.3	6.5	86.4%	CDDIS
BOGT	5	5.1	1.2	99.7%	JPL
BOGT	6	6.7	2.6	95.8%	SOPAC
BOR1	2	2.6	3.1	85.3%	BKG
BOR1	6	7.5	6.7	81.0%	CDDIS
BOR1	7	14.9	6.1	81.0%	IGN
BOR1	10	11.1	3.2	84.2%	JPL
BOR1	3	4.8	4.3	81.1%	SOPAC
BREW	7	14.4	8.5	86.1%	CDDIS
BREW	6	7.0	0.9	99.3%	JPL
BREW	8	9.6	2.1	95.4%	SOPAC
BRMU	6	6.9	4.3	79.7%	CDDIS
BRMU	15	15.7	3.4	79.0%	JPL
BRMU	12	17.3	5.3	71.5%	SOPAC
BRST	39	42.1	0.6	43.9%	IGN
BRST	45	45.2	0.7	36.8%	SOPAC
BRUS	2	2.0	0.0	98.1%	BKG
BRUS	6	7.0	5.1	93.9%	CDDIS
BRUS	7	14.7	5.4	92.9%	IGN
BRUS	10	10.8	2.8	97.5%	JPL
BRUS	3	3.5	2.2	93.9%	SOPAC
BUCU	5	14.6	6.1	90.8%	IGN
BUCU	12	15.7	4.4	86.7%	SOPAC
BZRG	8	14.7	6.6	80.0%	IGN
BZRG	10	29.8	1.9	76.1%	JPL
BZRG	6	15.6	3.7	77.1%	SOPAC
CAGL	4	4.2	1.7	88.1%	BKG
CAGL	6	7.7	7.5	83.8%	CDDIS
CAGL	6	14.5	6.3	84.3%	IGN
CAGL	10	11.5	4.1	88.3%	JPL
CAGL	5	6.7	3.4	84.9%	SOPAC
CAGZ+	36	36.2	0.6	65.3%	BKG
CAGZ+	36	36.0	0.5	85.4%	BKG_IGEX
CAGZ+	35	44.6	2.3	77.6%	SOPAC
CAS1	11	12.8	3.6	60.8%	CDDIS
CAS1	3	4.7	5.0	59.0%	SOPAC
CHUR	11	16.7	13.3	91.9%	CDDIS
CHUR	12	17.9	7.2	74.3%	IGN
CHUR	10	13.7	6.9	90.4%	JPL
CHUR	7	10.4	4.9	88.6%	SOPAC
CIC1	4	8.0	4.1	84.7%	CDDIS
CIC1	9	18.7	6.2	93.3%	IGN
CIC1	2	3.5	1.6	98.1%	JPL
CIC1	3	5.1	2.8	94.2%	SOPAC
CLAR	7	12.2	5.4	60.1%	SOPAC
COCO	11	12.9	4.0	74.6%	CDDIS
COCO	13	21.2	11.3	71.1%	IGN
COCO	10	11.7	5.0	88.1%	JPL
COCO	3	4.9	5.4	85.4%	SOPAC
CONZ+	3	4.7	4.2	88.8%	BKG_IGEX
CORD	4	8.6	5.4	86.2%	CDDIS
CORD	8	19.5	7.9	79.4%	IGN
CORD	2	4.0	1.6	99.6%	JPL
CORD	3	5.6	2.8	95.8%	SOPAC

Site	Delay in minutes Min	Mean	SDev	Availability	DC
CRO1	4	7.5	3.7	85.0%	CDDIS
CRO1	9	18.7	6.0	93.3%	IGN
CRO1	1	2.1	2.2	98.5%	JPL
CRO1	2	3.7	3.3	94.7%	SOPAC
DAKA	2	2.3	1.2	70.1%	BKG
DAKA	4	5.3	3.7	66.4%	CDDIS
DAKA	3	4.3	2.8	66.5%	SOPAC
DARW	17	31.5	3.2	50.4%	CDDIS
DARW	30	30.7	1.7	50.7%	JPL
DARW	20	24.0	6.3	50.7%	SOPAC
DAV1	11	12.8	4.0	72.8%	CDDIS
DAV1	13	17.8	7.0	82.9%	IGN
DAV1	10	11.7	5.0	86.2%	JPL
DAV1	3	5.9	5.5	83.8%	SOPAC
DRAO	13	13.3	0.8	95.6%	CDDIS
DRAO	9	16.5	6.4	95.1%	IGN
DRAO	10	11.4	4.2	99.6%	JPL
DRAO	6	7.5	2.7	95.8%	SOPAC
DREJ+	3	3.2	1.0	96.4%	BKG_IGEX
DREJ+	24	24.8	2.8	80.4%	CDDIS
DREJ+	35	35.0	0.3	79.6%	JPL
DREJ+	31	33.2	3.3	73.1%	SOPAC
DUBR	5	14.6	6.0	90.0%	IGN
DUBR	10	15.3	4.1	85.8%	SOPAC
DWH1+	3	3.1	1.1	95.4%	CDDIS
DWH1+	0	1.0	4.9	95.4%	SOPAC
EISL	15	32.6	14.8	55.3%	CDDIS
EISL	16	42.3	6.2	41.7%	IGN
EISL	30	33.3	2.5	26.0%	JPL
EISL	18	37.0	9.6	40.4%	SOPAC
EPRT	11	15.6	6.7	94.3%	CDDIS
EPRT	13	20.4	11.4	88.9%	IGN
EPRT	15	17.9	6.9	93.6%	JPL
EPRT	14	20.6	8.3	86.0%	SOPAC
FAIR	7	14.8	8.8	86.2%	CDDIS
FAIR	13	17.8	6.6	94.6%	IGN
FAIR	6	7.2	1.9	99.4%	JPL
FAIR	7	9.6	2.7	95.6%	SOPAC
FFMJ+	3	3.2	1.0	96.1%	BKG_IGEX
GENO	30	30.0	0.0	78.6%	JPL
GENO	13	19.9	3.7	80.0%	SOPAC
GLPS	8	15.8	9.1	83.1%	CDDIS
GLPS	7	8.7	4.0	96.5%	JPL
GLPS	9	10.7	5.0	92.6%	SOPAC
GODE	4	8.9	6.3	84.3%	CDDIS
GODE	14	18.5	6.1	91.4%	IGN
GODE	2	3.8	1.4	96.7%	JPL
GODE	3	6.1	2.6	92.8%	SOPAC
GOL2	4	8.4	5.7	86.0%	CDDIS
GOL2	14	18.9	6.8	94.4%	IGN
GOL2	3	3.4	2.2	99.3%	JPL
GOL2	3	5.9	3.1	95.4%	SOPAC
GOLD	4	8.4	5.8	86.1%	CDDIS
GOLD	14	18.7	6.5	94.7%	IGN
GOLD	3	3.2	1.6	99.6%	JPL
GOLD	3	5.6	2.7	95.7%	SOPAC
GOPE+	2	3.0	0.5	91.4%	BKG
GOPE+	3	4.2	0.9	91.4%	BKG_IGEX
GOPE+	6	7.2	5.7	87.1%	CDDIS
GOPE+	7	14.4	5.1	86.8%	IGN
GOPE+	10	11.0	3.2	90.8%	JPL
GOPE+	3	5.8	2.4	87.2%	SOPAC
GRAS	17	23.5	6.1	86.7%	IGN
GRAS	30	30.0	0.0	64.0%	JPL
GRAS	23	28.3	5.9	77.9%	SOPAC
GRAZ	14	15.1	2.3	93.9%	BKG
GRAZ	33	48.4	8.4	87.2%	CDDIS
GRAZ	30	30.2	0.9	88.2%	JPL
GRAZ	15	18.5	3.5	89.9%	SOPAC
GUAM	9	16.6	9.5	76.0%	CDDIS
GUAM	14	19.0	8.5	84.7%	IGN
GUAM	7	9.7	5.7	90.1%	JPL
GUAM	9	11.8	6.4	86.2%	SOPAC
GUAT	11	15.7	6.7	93.3%	CDDIS
GUAT	13	20.7	11.8	88.2%	IGN
GUAT	15	18.0	7.0	92.5%	JPL
GUAT	14	20.8	8.5	84.9%	SOPAC
HARB	17	23.3	5.9	83.6%	IGN
HARB	30	30.0	0.0	61.8%	JPL
HARB	23	28.2	5.9	74.7%	SOPAC
HELJ+	3	3.2	1.0	82.9%	BKG_IGEX
HELJ+	24	25.1	3.6	68.5%	CDDIS
HELJ+	35	35.1	0.4	67.4%	JPL
HELJ+	31	33.4	3.4	60.4%	SOPAC
HERS	5	6.1	0.4	98.1%	BKG
HERS	7	47.8	10.0	91.4%	CDDIS
HERS	9	14.0	5.8	93.5%	IGN
HERS	10	13.8	8.0	92.5%	JPL
HERS	6	8.9	2.3	94.0%	SOPAC
HERT+	3	4.3	1.0	99.2%	BKG
HERT+	3	4.2	0.9	99.2%	BKG_IGEX
HERT+	4	6.3	2.1	94.9%	SOPAC
HOB2	12	28.6	5.8	75.0%	CDDIS
HOB2	14	30.6	12.9	86.8%	IGN
HOB2	15	29.6	3.8	90.0%	JPL
HOB2	12	18.5	5.8	89.7%	SOPAC
HOFN	8	14.5	6.4	91.2%	IGN
HOFN	10	30.0	0.8	85.7%	JPL
HOFN	9	15.7	3.9	86.9%	SOPAC

Site	Delay in minutes Min	Mean	SDev	Availability	DC
HOLB	13	13.3	0.7	92.5%	CDDIS
HOLB	10	11.3	4.0	96.5%	JPL
HOLB	6	7.1	3.0	92.8%	SOPAC
HOLP	8	14.8	8.6	16.4%	SOPAC
HRAO	7	14.7	8.6	86.1%	CDDIS
HRAO	14	17.8	7.1	94.7%	IGN
HRAO	6	7.1	1.5	99.4%	JPL
HRAO	8	9.6	2.3	95.4%	SOPAC
HUEG+	3	3.2	1.0	91.4%	BKG_IGEX
IISC	7	15.2	9.0	84.0%	CDDIS
IISC	6	7.4	2.6	97.4%	JPL
IISC	7	10.0	3.3	93.5%	SOPAC
ISTA	8	14.7	6.7	87.1%	IGN
ISTA	9	15.4	4.0	83.2%	SOPAC
JAB1	11	24.2	10.9	10.0%	CDDIS
JAB1	15	28.5	6.3	21.9%	JPL
JAB1	12	23.8	12.1	30.6%	SOPAC
JOZ2+	4	5.2	0.9	77.8%	BKG
JOZ2+	4	4.4	1.0	97.6%	BKG_IGEX
JOZ2+	10	17.1	5.4	69.6%	SOPAC
JOZE	2	2.0	0.3	97.9%	BKG
JOZE	6	7.3	6.3	93.6%	CDDIS
JOZE	10	10.9	2.9	97.4%	JPL
JOZE	3	3.9	2.8	95.1%	SOPAC
JPLM	4	7.8	4.6	85.1%	CDDIS
JPLM	9	18.6	6.4	93.5%	IGN
JPLM	2	2.4	2.0	98.8%	JPL
JPLM	3	4.2	3.2	95.0%	SOPAC
KARR	29	31.2	2.4	57.6%	CDDIS
KARR	32	43.7	2.0	53.5%	IGN
KARR	30	31.0	2.1	59.4%	JPL
KARR	12	28.7	4.9	72.6%	SOPAC
KELY	8	15.7	9.3	70.3%	CDDIS
KELY	7	7.7	2.0	81.7%	JPL
KELY	8	9.8	2.2	81.5%	SOPAC
KERG	16	23.2	5.9	85.8%	IGN
KERG	30	30.0	0.0	65.1%	JPL
KERG	23	28.0	5.6	76.7%	SOPAC
KIR0+	12	17.8	5.3	85.0%	SOPAC
KIRU	12	48.7	12.6	84.2%	CDDIS
KIRU	15	31.2	13.0	75.0%	IGN
KIRU	15	29.9	2.2	63.9%	JPL
KIRU	12	22.1	10.3	83.5%	SOPAC
KIT3	7	9.0	3.6	55.6%	BKG
KIT3	11	38.5	11.9	53.3%	CDDIS
KIT3	10	18.0	9.6	51.9%	JPL
KIT3	8	11.3	4.8	53.2%	SOPAC
KOKB	8	14.6	8.2	85.3%	CDDIS
KOKB	14	17.6	6.8	93.9%	IGN
KOKB	6	7.2	2.0	98.8%	JPL
KOKB	7	9.8	2.9	94.9%	SOPAC
KOUR	12	47.3	15.1	84.6%	CDDIS
KOUR	14	27.7	12.9	76.5%	IGN
KOUR	15	28.6	4.7	67.5%	JPL
KOUR	12	19.6	11.3	84.6%	SOPAC
KSTU	10	20.0	7.2	72.8%	BKG
KSTU	13	38.1	9.9	71.5%	CDDIS
KSTU	15	29.8	3.5	60.8%	JPL
KSTU	12	23.4	7.2	70.4%	SOPAC
LEIJ+	3	3.2	1.0	95.0%	BKG_IGEX
LEIJ+	24	25.0	3.6	79.0%	CDDIS
LEIJ+	35	35.1	0.5	77.8%	JPL
LEIJ+	31	33.2	3.3	70.8%	SOPAC
LPGS	9	18.8	7.3	92.9%	BKG
LPGS	13	37.4	10.4	88.1%	CDDIS
LPGS	15	29.7	3.7	80.0%	JPL
LPGS	12	22.1	7.6	88.3%	SOPAC
MAC1	11	12.8	4.1	70.4%	CDDIS
MAC1	9	17.9	7.4	81.4%	IGN
MAC1	10	11.9	5.2	85.7%	JPL
MAC1	3	6.2	5.2	82.9%	SOPAC
MAD2	4	9.1	6.4	75.3%	CDDIS
MAD2	13	19.3	7.6	82.9%	IGN
MAD2	3	3.5	2.2	87.4%	JPL
MAD2	4	6.1	3.2	83.6%	SOPAC
MADR	4	9.3	6.8	78.3%	CDDIS
MADR	11	19.1	7.4	86.2%	IGN
MADR	3	3.6	3.7	91.1%	JPL
MADR	4	6.3	4.5	87.4%	SOPAC
MALI	25	50.5	10.8	13.8%	CDDIS
MALI	43	44.4	1.4	1.5%	IGN
MALI	30	30.0	0.0	9.0%	JPL
MALI	15	23.0	10.7	13.6%	SOPAC
MANA	8	15.7	6.8	86.9%	CDDIS
MANA	13	20.4	11.5	82.8%	IGN
MANA	15	18.0	7.0	86.2%	JPL
MANA	14	20.6	8.4	79.4%	SOPAC
MAR6+	12	17.7	5.5	86.2%	SOPAC
MARS	19	41.5	3.2	90.7%	IGN
MARS	30	44.7	3.4	80.7%	SOPAC
MAS1	12	47.2	14.6	83.6%	CDDIS
MAS1	14	28.5	12.9	74.0%	IGN
MAS1	15	29.0	4.2	65.7%	JPL
MAS1	12	20.7	11.0	82.6%	SOPAC
MAT1+	4	4.8	3.1	89.9%	BKG_IGEX
MAT1+	24	25.3	4.4	75.3%	CDDIS
MAT1+	10	30.4	2.3	88.8%	JPL
MAT1+	6	17.1	5.5	82.1%	SOPAC

Site	Delay in minutes Min	Mean	SDev	Availability	DC
MATE	4	4.3	2.1	88.3%	BKG
MATE	6	8.4	9.1	83.8%	CDDIS
MATE	6	14.5	6.3	84.9%	IGN
MATE	10	11.6	4.3	88.9%	JPL
MATE	5	6.7	3.1	85.3%	SOPAC
MAUI	10	10.8	4.0	84.0%	JPL
MAUI	1	3.3	1.3	88.5%	SOPAC
MAW1	11	12.7	3.9	66.8%	CDDIS
MAW1	10	11.8	5.2	82.1%	JPL
MAW1	3	6.6	5.5	79.6%	SOPAC
MCM4	4	9.0	5.8	85.3%	CDDIS
MCM4	10	18.3	6.2	94.0%	IGN
MCM4	2	4.5	1.3	98.6%	JPL
MCM4	3	6.2	2.5	94.9%	SOPAC
MDO1	7	10.3	7.9	85.6%	CDDIS
MDO1	10	18.4	6.4	93.8%	IGN
MDO1	5	5.5	1.5	98.8%	JPL
MDO1	6	7.9	2.6	95.0%	SOPAC
MEDI	4	4.3	1.7	88.3%	BKG
MEDI	6	9.0	10.0	83.8%	CDDIS
MEDI	6	14.4	6.2	84.4%	IGN
MEDI	10	11.9	4.9	88.5%	JPL
MEDI	5	7.1	3.1	85.0%	SOPAC
MIZU	5	14.3	7.4	76.1%	BKG
MIZU	5	34.4	13.3	71.8%	CDDIS
MIZU	5	25.1	8.2	68.6%	JPL
MIZU	6	17.4	7.9	71.9%	SOPAC
MKEA	8	14.8	8.2	84.4%	CDDIS
MKEA	12	17.5	6.7	93.8%	IGN
MKEA	6	7.2	1.7	97.9%	JPL
MKEA	8	9.6	2.6	94.0%	SOPAC
MORP	10	10.9	4.1	77.6%	JPL
MORP	1	3.4	1.4	82.2%	SOPAC
MSKU	8	15.4	8.5	86.0%	CDDIS
MSKU	12	17.8	7.4	93.2%	IGN
MSKU	7	7.9	1.5	97.6%	JPL
MSKU	8	10.2	2.8	93.8%	SOPAC
NANO	58	58.0	0.0	38.3%	CDDIS
NANO	35	35.8	2.3	87.6%	SOPAC
NKLG	14	23.0	5.8	84.6%	IGN
NKLG	30	30.0	0.0	66.0%	JPL
NKLG	17	28.0	5.8	77.8%	SOPAC
NLIB	4	10.0	6.9	75.7%	CDDIS
NLIB	13	20.7	9.5	83.6%	IGN
NLIB	3	4.4	4.4	88.6%	JPL
NLIB	3	7.2	5.4	85.4%	SOPAC
NNOR	12	45.0	16.7	70.6%	CDDIS
NNOR	15	27.9	5.4	58.9%	JPL
NNOR	12	18.7	11.4	70.8%	SOPAC
NOT1	4	4.8	3.2	79.2%	BKG
NOT1	9	14.4	6.2	74.4%	IGN
NOT1	10	12.7	6.9	70.7%	JPL
NOT1	5	7.6	4.0	76.0%	SOPAC
NRC1	11	15.9	12.7	44.9%	CDDIS
NRC1	12	17.1	6.0	36.5%	IGN
NRC1	10	13.3	6.4	44.0%	JPL
NRC1	7	10.2	3.9	44.6%	SOPAC
NSSP	15	37.2	13.0	48.1%	CDDIS
NSSP	30	33.2	2.7	15.3%	JPL
NSSP	17	39.6	9.1	33.8%	SOPAC
OBE2	5	35.7	12.7	89.0%	CDDIS
OBE2	5	27.7	6.3	81.2%	JPL
OBE2	9	21.9	7.8	84.9%	SOPAC
OHI3+	3	5.2	4.0	74.6%	BKG_IGEX
ONSA+	2	2.5	2.9	94.6%	BKG
ONSA+	6	8.4	9.1	90.0%	CDDIS
ONSA+	7	15.0	6.2	90.4%	IGN
ONSA+	10	11.3	4.1	93.5%	JPL
ONSA+	3	4.3	4.1	91.2%	SOPAC
OSJE	5	14.7	6.4	81.9%	IGN
OSJE	12	15.8	4.6	78.2%	SOPAC
OUS2	6	17.2	6.8	93.1%	BKG
OUS2	11	36.9	11.2	88.8%	CDDIS
OUS2	10	28.7	5.2	83.2%	JPL
OUS2	8	20.4	7.3	89.2%	SOPAC
PADO	2	2.0	0.1	93.3%	BKG
PADO	3	4.0	2.9	89.3%	SOPAC
PENC	3	3.0	0.1	92.5%	BKG
PENC	6	7.8	7.7	88.2%	CDDIS
PENC	7	14.4	5.2	88.5%	IGN
PENC	10	11.1	3.3	92.1%	JPL
PENC	4	5.8	2.3	88.3%	SOPAC
PERT	10	44.5	17.0	71.0%	CDDIS
PERT	14	26.1	12.6	63.3%	IGN
PERT	15	27.7	5.6	59.0%	JPL
PERT	11	18.5	11.5	71.1%	SOPAC
PIE1	4	7.8	4.6	86.1%	CDDIS
PIE1	8	18.3	6.2	94.6%	IGN
PIE1	2	2.4	1.0	99.6%	JPL
PIE1	3	4.2	2.6	95.8%	SOPAC
PIMO	7	16.6	9.0	65.1%	CDDIS
PIMO	14	17.6	6.8	63.5%	IGN
PIMO	10	11.4	3.4	65.8%	JPL
PIMO	0	13.0	3.6	65.6%	SOPAC
POL2	9	24.4	11.7	28.7%	CDDIS
POL2	7	21.5	14.3	38.2%	JPL
POL2	9	24.2	14.3	36.9%	SOPAC

Site	Delay in minutes Min	Mean	SDev	Availability	DC
POTS	2	2.3	2.0	96.1%	BKG
POTS	4	6.0	6.5	92.4%	CDDIS
POTS	2	8.4	5.5	95.7%	IGN
POTS	5	9.1	5.3	96.1%	JPL
POTS	3	4.1	3.3	92.6%	SOPAC
PTBB	10	17.4	5.5	86.0%	SOPAC
QAQ1	3	5.3	4.4	77.6%	BKG
QAQ1	7	11.4	14.1	65.1%	CDDIS
QAQ1	10	12.5	5.8	75.4%	JPL
QAQ1	5	8.2	5.3	73.9%	SOPAC
QUIN	8	15.3	8.5	86.0%	CDDIS
QUIN	13	17.7	7.2	94.7%	IGN
QUIN	7	7.7	1.8	99.4%	JPL
QUIN	8	9.7	2.5	95.7%	SOPAC
RBAY	7	23.6	6.3	69.0%	CDDIS
RBAY	5	20.5	4.5	81.2%	JPL
RBAY	6	25.0	5.3	77.8%	SOPAC
REYK	2	4.4	3.9	94.7%	BKG
REYK	6	12.6	15.4	90.3%	CDDIS
REYK	7	14.6	6.2	90.1%	IGN
REYK	10	12.0	5.2	92.9%	JPL
REYK	3	7.0	4.6	90.6%	SOPAC
REYZ+	3	5.3	4.3	91.1%	BKG_IGEX
RIOG	4	11.0	7.7	49.7%	BKG
RIOG	5	34.8	14.7	47.9%	CDDIS
RIOG	7	16.8	10.6	50.3%	IGN
RIOG	5	19.0	9.6	45.6%	JPL
RIOG	6	13.8	8.3	48.9%	SOPAC
SANT	4	8.9	5.9	85.7%	CDDIS
SANT	13	18.4	6.5	95.0%	IGN
SANT	2	3.3	2.2	99.3%	JPL
SANT	4	5.9	3.0	95.4%	SOPAC
SCH2	11	17.0	13.5	91.2%	CDDIS
SCH2	12	17.9	7.5	73.5%	IGN
SCH2	10	13.9	6.9	90.1%	JPL
SCH2	7	10.5	4.9	88.1%	SOPAC
SCUB	2	13.5	3.7	66.1%	BKG
SCUB	5	36.1	12.6	63.6%	CDDIS
SCUB	5	27.8	5.7	63.1%	JPL
SCUB	5	16.9	4.4	63.6%	SOPAC
SFER	2	2.0	0.0	91.0%	BKG
SFER	6	8.4	9.1	86.5%	CDDIS
SFER	10	10.8	3.0	90.4%	JPL
SFER	3	3.4	2.3	86.9%	SOPAC
SIMO	7	12.9	9.3	21.4%	CDDIS
SIMO	5	9.5	9.6	21.8%	JPL
SIMO	6	11.0	9.3	18.5%	SOPAC
SIO3	16	32.9	6.8	81.7%	CDDIS
SIO3	10	16.9	9.5	85.7%	JPL
SIO3	7	9.9	2.8	90.1%	SOPAC
SOFI	5	14.5	6.3	64.7%	IGN
SOFI	9	16.0	5.1	64.0%	SOPAC
SPT0+	2	2.9	2.9	93.5%	BKG
SPT0+	3	4.1	3.3	93.5%	BKG_IGEX
SPT0+	24	25.6	5.4	78.2%	CDDIS
SPT0+	10	13.3	8.1	91.7%	JPL
SPT0+	3	5.6	4.6	90.6%	SOPAC
SSIA	13	22.0	4.6	16.1%	CDDIS
SSIA	14	41.5	9.6	14.0%	IGN
SSIA	15	31.9	7.4	16.1%	JPL
SSIA	16	31.5	7.6	14.3%	SOPAC
STJO	11	15.2	11.1	45.3%	CDDIS
STJO	12	18.9	8.8	37.2%	IGN
STJO	10	13.8	6.6	44.6%	JPL
STJO	7	10.6	5.3	41.9%	SOPAC
SULP	12	19.2	8.2	87.8%	SOPAC
SUTH	7	14.8	8.5	86.2%	CDDIS
SUTH	13	20.3	10.8	78.6%	IGN
SUTH	6	7.1	1.7	99.6%	JPL
SUTH	7	9.7	2.5	95.6%	SOPAC
SUTM	7	18.0	6.9	95.8%	BKG
SUTM	11	37.3	10.7	90.7%	CDDIS
SUTM	10	29.4	4.0	84.4%	JPL
SUTM	9	21.1	7.4	91.5%	SOPAC
THTI	16	23.1	6.0	86.7%	IGN
THTI	30	30.0	0.0	65.6%	JPL
THTI	22	28.2	6.0	77.5%	SOPAC
THU3	4	7.5	7.1	87.9%	BKG
THU3	7	13.4	16.7	73.8%	CDDIS
THU3	10	12.3	5.4	82.6%	JPL
THU3	5	9.9	7.8	83.8%	SOPAC
TID2	4	9.2	6.5	83.9%	CDDIS
TID2	13	18.4	6.7	92.4%	IGN
TID2	3	3.3	1.8	97.2%	JPL
TID2	4	6.0	2.7	93.5%	SOPAC
TIDB	4	9.1	6.2	83.9%	CDDIS
TIDB	13	18.3	6.5	92.6%	IGN
TIDB	3	3.2	1.6	97.4%	JPL
TIDB	4	5.9	2.7	93.5%	SOPAC
TITZ+	3	3.2	1.0	92.4%	BKG_IGEX
TITZ+	24	25.3	4.5	77.1%	CDDIS
TITZ+	35	35.1	0.7	75.1%	JPL
TITZ+	31	33.3	3.4	68.2%	SOPAC
TLSE	17	22.7	5.4	77.2%	IGN
TLSE	22	27.9	5.6	68.8%	SOPAC
TOW2	11	13.0	4.4	74.7%	CDDIS
TOW2	13	21.0	11.2	71.8%	IGN
TOW2	10	12.6	5.5	88.5%	JPL
TOW2	3	8.9	5.9	86.5%	SOPAC

Site	Delay in minutes Min	Mean	SDev	Availability	DC
TRAB	12	17.6	5.7	79.2%	SOPAC
UCLU	13	34.2	21.0	73.2%	CDDIS
UCLU	15	26.6	6.5	94.3%	JPL
UCLU	13	16.5	2.9	94.4%	SOPAC
ULAB	13	21.4	6.5	8.1%	BKG
ULAB	24	42.3	5.2	7.9%	CDDIS
ULAB	30	30.4	1.4	5.1%	JPL
ULAB	16	25.9	7.4	7.8%	SOPAC
UNB1+	7	12.6	5.0	92.9%	CDDIS
UNB1+	15	25.1	9.0	92.9%	JPL
UNB1+	12	24.2	7.8	84.7%	SOPAC
UNSA	4	8.2	6.1	92.5%	BKG
UNSA	4	21.7	17.9	88.8%	CDDIS
UNSA	5	14.3	9.3	86.4%	JPL
UNSA	5	10.8	7.0	88.5%	SOPAC
USN1	7	14.4	8.3	86.1%	CDDIS
USN1	6	7.0	1.7	99.4%	JPL
USN1	6	9.5	2.6	95.6%	SOPAC
USNO	6	6.1	1.0	94.9%	CDDIS
USNO	15	15.4	1.9	94.3%	JPL
USNO	12	16.8	3.7	86.0%	SOPAC
USUD	4	7.6	4.2	85.8%	CDDIS
USUD	8	18.5	6.5	94.6%	IGN
USUD	1	1.7	2.4	99.4%	JPL
USUD	1	3.7	3.3	95.7%	SOPAC
VENE	8	14.6	6.5	81.9%	IGN
VENE	10	29.9	1.5	77.9%	JPL
VENE	7	15.6	3.7	78.8%	SOPAC
VILL	12	47.9	13.3	75.4%	CDDIS
VILL	15	30.6	12.9	67.1%	IGN
VILL	15	29.8	2.6	58.8%	JPL
VILL	12	21.7	10.3	75.1%	SOPAC
VIS0+	3	17.8	5.6	86.2%	SOPAC
WHIT	11	34.9	16.8	91.8%	CDDIS
WHIT	14	29.9	14.2	37.8%	IGN
WHIT	15	26.2	6.7	86.0%	JPL
WHIT	12	16.9	5.0	87.1%	SOPAC
WILL	13	19.2	14.7	90.1%	CDDIS
WILL	15	19.7	7.0	97.2%	JPL
WILL	13	16.5	2.7	95.7%	SOPAC
WROC+	3	4.2	1.5	92.2%	BKG_IGEX
WROC+	24	25.5	5.0	76.4%	CDDIS
WROC+	30	30.5	1.6	95.1%	JPL
WROC+	10	16.9	5.0	88.8%	SOPAC
WTZJ+	3	3.2	1.0	95.8%	BKG_IGEX
WTZJ+	24	25.6	5.3	79.4%	CDDIS
WTZJ+	35	35.1	0.7	76.7%	JPL
WTZJ+	31	33.2	3.3	69.6%	SOPAC
WTZR	2	4.5	3.7	96.2%	BKG
WTZR	6	13.8	16.5	91.8%	CDDIS
WTZR	7	14.5	6.0	91.5%	IGN
WTZR	10	12.4	5.7	94.6%	JPL
WTZR	3	7.1	4.5	92.1%	SOPAC
WTZT	5	14.7	6.5	90.8%	IGN
WTZT	12	15.7	4.2	86.7%	SOPAC
WTZZ+	3	5.4	4.1	96.4%	BKG_IGEX
WTZZ+	24	25.7	5.7	79.6%	CDDIS
WTZZ+	35	35.1	0.7	76.4%	JPL
WTZZ+	31	33.3	3.5	69.3%	SOPAC
YAR2	29	31.4	2.7	63.9%	CDDIS
YAR2	16	43.2	3.9	74.9%	IGN
YAR2	10	31.2	2.7	66.1%	JPL
YAR2	9	28.3	5.1	78.2%	SOPAC
YEBE	2	3.8	1.0	78.9%	BKG
YEBE	6	9.1	10.4	74.7%	CDDIS
YEBE	6	14.0	5.0	76.0%	IGN
YEBE	10	11.3	3.9	78.2%	JPL
YEBE	3	6.2	2.8	74.9%	SOPAC
YELL	11	26.1	17.0	92.1%	CDDIS
YELL	12	25.0	13.1	57.5%	IGN
YELL	10	21.5	8.9	88.8%	JPL
YELL	8	14.1	5.5	88.3%	SOPAC
ZAMB	7	10.8	8.0	53.5%	CDDIS
ZAMB	3	4.4	3.9	64.0%	JPL
ZAMB	4	7.1	5.0	60.3%	SOPAC
ZIMJ+	3	3.3	1.3	99.3%	BKG_IGEX
ZIMJ+	24	25.8	5.8	82.5%	CDDIS
ZIMJ+	35	35.2	0.8	79.0%	JPL
ZIMJ+	31	33.2	3.3	71.9%	SOPAC
ZIMM	3	5.4	1.1	97.8%	BKG
ZIMM	6	17.9	19.0	92.9%	CDDIS
ZIMM	9	14.1	5.8	92.9%	IGN
ZIMM	10	12.6	5.8	96.7%	JPL
ZIMM	5	8.3	2.9	93.8%	SOPAC

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