

[EXTERNAL] OPUS solution : R120097KlutinaJune30sec.21o OP1636233135612

opus <opus@ngs.noaa.gov>

Sat 11/6/2021 1:14 PM

To: Cusick, Joel J <Joel_Cusick@nps.gov>

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FILE: R120097KlutinaJune30sec.21o OP1636233135612

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information: https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=04%7C01%7Cjuel_cusick%40nps.gov%7C74809bb2f6b54f80ad6808d9a16a60d8%7C0693b5ba4b184d7b9341f32f400a5494%7C0%7C0%7C637718300561035940%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAiLCJQljojV2luMzliLCJBTil6lk1haWwiLCJXVCi6Mn0%3D%7C1000&sdata=icnSiNCdpyG1t5LKjaKGC9vLjYE5EUvYqutu3auVUAI%3D&reserved=0

[url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=04%7C01%7Cjuel_cusick%40nps.gov%7C74809bb2f6b54f80ad6808d9a16a60d8%7C0693b5ba4b184d7b9341f32f400a5494%7C0%7C0%7C637718300561035940%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAiLCJQljojV2luMzliLCJBTil6lk1haWwiLCJXVCi6Mn0%3D%7C1000&sdata=icnSiNCdpyG1t5LKjaKGC9vLjYE5EUvYqutu3auVUAI%3D&reserved=0](https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=04%7C01%7Cjuel_cusick%40nps.gov%7C74809bb2f6b54f80ad6808d9a16a60d8%7C0693b5ba4b184d7b9341f32f400a5494%7C0%7C0%7C637718300561035940%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAiLCJQljojV2luMzliLCJBTil6lk1haWwiLCJXVCi6Mn0%3D%7C1000&sdata=icnSiNCdpyG1t5LKjaKGC9vLjYE5EUvYqutu3auVUAI%3D&reserved=0)

USER: joel_cusick@nps.gov

DATE: November 06, 2021

RINEX FILE: r120178s.21o

TIME: 21:13:38 UTC

SOFTWARE: page5 2008.25 master294.pl 16032 START: 2021/06/27 18:52:00

EPHEMERIS: igs21640.eph [precise] STOP: 2021/06/28 02:04:00

NAV FILE: brdc1780.21n OBS USED: 20088 / 21415 : 94%

ANT NAME: TPMT500 NONE # FIXED AMB: 117 / 126 : 93%

ARP HEIGHT: 2.05 OVERALL RMS: 0.017(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)

ITRF2014 (EPOCH:2021.4875)

X: -2472665.970(m) 0.007(m) -2472667.055(m) 0.007(m)

Y: -1711875.116(m) 0.011(m) -1711873.961(m) 0.011(m)

Z: 5606148.888(m) 0.035(m) 5606149.152(m) 0.035(m)

LAT: 61 56 55.10530 0.012(m) 61 56 55.10260 0.012(m)

E LON: 214 41 44.21310 0.013(m) 214 41 44.10560 0.013(m)

W LON: 145 18 15.78690 0.013(m) 145 18 15.89440 0.013(m)

EL HGT: 366.081(m) 0.034(m) 366.424(m) 0.034(m)

ORTHO HGT: 352.107(m) 0.107(m) [NAVD88 (Computed using GEOID12B)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 06) SPC (5003 AK 3)

Northing (Y) [meters]	6869620.405	885398.157
Easting (X) [meters]	588953.926	536506.184
Convergence [degrees]	1.49652222	0.61390556
Point Scale	0.99969693	0.99991632
Combined Factor	0.99963966	0.99985904

US NATIONAL GRID DESIGNATOR: 6VWP8895369620(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DP5994	BCRK BEAVER CREEK CORS ARP	N622451.408	W1405137.425	237172.4
DM7463	AC76 LOGCABIN_AK2008 CORS ARP	N630223.992	W1431531.638	160987.4
DP3835	AC62 DENLIHWY32AK2004 CORS ARP	N630500.983	W1461845.611	136758.4

NEAREST NGS PUBLISHED CONTROL POINT

TT1523	KLUTINA	N615655.111	W1451815.825	0.6
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BASE STATION INFORMATION

STATION NAME: bcrk a 2 (Beaver Creek; Beaver Creek, Yukon Canada)

MONUMENT: NO DOMES NUMBER

XYZ	-2297115.5740	-1869451.3456	5630681.4186	MON @ 2010.0000 (M)
XYZ	-0.0154	-0.0047	-0.0079	VEL (M/YR)
NEU	-0.0000	0.0000	0.0083	MON TO ARP (M)
NEU	0.0007	0.0002	0.0865	ARP TO L1 PHASE CENTER (M)
NEU	0.0001	-0.0001	0.1159	ARP TO L2 PHASE CENTER (M)
XYZ	-0.1769	-0.0540	-0.0908	VEL TIMES 11.4881 YRS
XYZ	-0.0030	-0.0024	0.0074	MON TO ARP
XYZ	-0.0305	-0.0251	0.0770	ARP TO L1 PHASE CENTER
XYZ	-2297115.7844	-1869451.4271	5630681.4122	L1 PHS CEN @ 2021.4875
XYZ	0.0001	-0.0000	0.0000	+ XYZ ADJUSTMENTS
XYZ	-2297115.7843	-1869451.4271	5630681.4123	NEW L1 PHS CEN @ 2021.4875
XYZ	-2297115.7538	-1869451.4020	5630681.3352	NEW ARP @ 2021.4875
XYZ	-2297115.7508	-1869451.3996	5630681.3279	NEW MON @ 2021.4875
LLH	62 24 51.40577	219 8 22.47227	719.5876	NEW L1 PHS CEN @ 2021.4875
LLH	62 24 51.40575	219 8 22.47225	719.5011	NEW ARP @ 2021.4875
LLH	62 24 51.40575	219 8 22.47225	719.4928	NEW MON @ 2021.4875

STATION NAME: ac76 a 4 (LogCabin_AK2008; Tok, AK USA)

MONUMENT: NO DOMES NUMBER

XYZ	-2323970.8107	-1734834.3965	5663413.7360	MON @ 2010.0000 (M)
XYZ	-0.0163	-0.0058	-0.0042	VEL (M/YR)
NEU	-0.0000	0.0000	0.0083	MON TO ARP (M)

NEU	0.0012	0.0008	0.0860	ARP TO L1 PHASE CENTER (M)
NEU	0.0006	-0.0006	0.1183	ARP TO L2 PHASE CENTER (M)
XYZ	-0.1872	-0.0661	-0.0477	VEL TIMES 11.4881 YRS
XYZ	-0.0030	-0.0023	0.0074	MON TO ARP
XYZ	-0.0300	-0.0233	0.0772	ARP TO L1 PHASE CENTER
XYZ	-2323971.0309	-1734834.4881	5663413.7729	L1 PHS CEN @ 2021.4875
XYZ	0.0000	-0.0000	0.0000	+ XYZ ADJUSTMENTS
XYZ	-2323971.0309	-1734834.4881	5663413.7729	NEW L1 PHS CEN @ 2021.4875
XYZ	-2323971.0010	-1734834.4648	5663413.6957	NEW ARP @ 2021.4875
XYZ	-2323970.9980	-1734834.4626	5663413.6883	NEW MON @ 2021.4875
LLH	63 2 23.98726	216 44 28.25814	1585.4039	NEW L1 PHS CEN @ 2021.4875
LLH	63 2 23.98722	216 44 28.25809	1585.3179	NEW ARP @ 2021.4875
LLH	63 2 23.98722	216 44 28.25809	1585.3096	NEW MON @ 2021.4875

STATION NAME: ac62 a 6 (DenliHwy32AK2004; Paxson, Alaska United States)
 MONUMENT: NO DOMES NUMBER

XYZ	-2409397.6475	-1606097.1716	5665403.9194	MON @ 2010.0000 (M)
XYZ	-0.0242	0.0088	0.0044	VEL (M/YR)
NEU	-0.0000	0.0000	0.0083	MON TO ARP (M)
NEU	0.0012	0.0008	0.0860	ARP TO L1 PHASE CENTER (M)
NEU	0.0006	-0.0006	0.1183	ARP TO L2 PHASE CENTER (M)
XYZ	-0.2784	0.1011	0.0508	VEL TIMES 11.4881 YRS
XYZ	-0.0031	-0.0021	0.0074	MON TO ARP
XYZ	-0.0311	-0.0216	0.0772	ARP TO L1 PHASE CENTER
XYZ	-2409397.9602	-1606097.0943	5665404.0548	L1 PHS CEN @ 2021.4875
XYZ	0.0000	-0.0000	-0.0000	+ XYZ ADJUSTMENTS
XYZ	-2409397.9602	-1606097.0943	5665404.0548	NEW L1 PHS CEN @ 2021.4875
XYZ	-2409397.9291	-1606097.0726	5665403.9776	NEW ARP @ 2021.4875
XYZ	-2409397.9259	-1606097.0705	5665403.9702	NEW MON @ 2021.4875
LLH	63 5 0.97795	213 41 14.27326	1347.2958	NEW L1 PHS CEN @ 2021.4875
LLH	63 5 0.97791	213 41 14.27320	1347.2098	NEW ARP @ 2021.4875
LLH	63 5 0.97791	213 41 14.27320	1347.2015	NEW MON @ 2021.4875

REMOTE STATION INFORMATION

STATION NAME: r120 1

MONUMENT: NO DOMES NUMBER

XYZ	-2472667.7766	-1711873.5718	5606149.2116	MON @ 2021.4871 (M)
NEU	-0.0014	0.0009	2.0500	MON TO ARP (M)
NEU	0.0014	-0.0009	0.0742	ARP TO L1 PHASE CENTER (M)
NEU	0.0005	0.0001	0.0592	ARP TO L2 PHASE CENTER (M)
XYZ	-0.7931	-0.5502	1.8085	MON TO ARP
XYZ	-0.0282	-0.0184	0.0662	ARP TO L1 PHASE CENTER
XYZ	-2472668.5979	-1711874.1404	5606151.0863	L1 PHS CEN @ 2021.4875

BASELINE NAME: bcrk r120

XYZ	0.7245	-0.3862	-0.0782	+ XYZ ADJUSTMENTS
XYZ	-2472667.8735	-1711874.5266	5606151.0081	NEW L1 PHS CEN @ 2021.4875
XYZ	-2472667.8452	-1711874.5082	5606150.9419	NEW ARP @ 2021.4875

XYZ -2472667.0521 -1711873.9580 5606149.1334 NEW MON @ 2021.4875
 LLH 61 56 55.10245 214 41 44.10554 368.5299 NEW L1 PHS CEN @ 2021.4875
 LLH 61 56 55.10240 214 41 44.10561 368.4556 NEW ARP @ 2021.4875
 LLH 61 56 55.10245 214 41 44.10554 366.4057 NEW MON @ 2021.4875

BASELINE NAME: ac76 r120

XYZ 0.7234 -0.3955 -0.0577 + XYZ ADJUSTMENTS
 XYZ -2472667.8745 -1711874.5359 5606151.0286 NEW L1 PHS CEN @ 2021.4875
 XYZ -2472667.8462 -1711874.5175 5606150.9624 NEW ARP @ 2021.4875
 XYZ -2472667.0532 -1711873.9673 5606149.1539 NEW MON @ 2021.4875
 LLH 61 56 55.10258 214 41 44.10603 368.5508 NEW L1 PHS CEN @ 2021.4875
 LLH 61 56 55.10254 214 41 44.10609 368.4766 NEW ARP @ 2021.4875
 LLH 61 56 55.10258 214 41 44.10603 366.4266 NEW MON @ 2021.4875

BASELINE NAME: ac62 r120

XYZ 0.7171 -0.3845 -0.0428 + XYZ ADJUSTMENTS
 XYZ -2472667.8808 -1711874.5249 5606151.0434 NEW L1 PHS CEN @ 2021.4875
 XYZ -2472667.8525 -1711874.5065 5606150.9773 NEW ARP @ 2021.4875
 XYZ -2472667.0595 -1711873.9563 5606149.1688 NEW MON @ 2021.4875
 LLH 61 56 55.10284 214 41 44.10517 368.5635 NEW L1 PHS CEN @ 2021.4875
 LLH 61 56 55.10279 214 41 44.10523 368.4892 NEW ARP @ 2021.4875
 LLH 61 56 55.10284 214 41 44.10517 366.4393 NEW MON @ 2021.4875

G-FILES

Axx2021 627 21 628

B2021 6271851 21 628 2 3 1 page5 v2008.25IGS 132 1 2 27NGS 202111 6IFDDPX
 IITRF2014_2178 IGS 20211003
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 D 1 2 5981949 1 3 -7375190 2 3 -8288475

Axx2021 627 21 628

B2021 6271851 21 628 2 3 1 page5 v2008.25IGS 132 1 2 27NGS 202111 6IFDDPX
 IITRF2014_2178 IGS 20211003
 C00090003 1486960552 7 -229604953 6 572645344 17 X1781AR120X1781AAC76
 D 1 2 7157859 1 3 -6434204 2 3 -8405944

Axx2021 627 21 628

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 IITRF2014_2178 IGS 20211003
 C00090002 632691335 9 1057768858 7 592548014 23 X1781AR120X1781AAC62
 D 1 2 8019847 1 3 -8226017 2 3 -5985132

POST-FIT RMS BY SATELLITE VS. BASELINE

OVERALL	01	02	04	05	06	07	08	09
bcrk-r120	0.017	0.018	0.011	0.016	0.016	0.018	0.025	0.016
	0.020							
	10	12	13	14	15	16	18	20
	21							
bcrk-r120	0.014	0.013	0.018	0.023	0.017	0.017	0.015	0.018
	0.020							

	22	23	24	25	26	27	28	29	30
bcrk-r120	...	0.016	0.025	0.013	0.020	0.016	...	0.022	0.025
	31	32							
bcrk-r120	0.018	0.025							

	OVERALL	01	02	04	05	06	07	08	09
ac76-r120	0.016	0.016	0.015	0.023	0.014	0.021	0.021	0.016	0.019
	10	12	13	14	15	16	18	20	21
ac76-r120	0.015	0.015	0.020	0.022	0.016	0.014	0.012	0.014	0.015
	22	23	24	25	26	27	29	30	31
ac76-r120	...	0.014	0.019	0.014	0.016	0.040	0.029	0.018	0.014
	32								
ac76-r120	0.017								

	OVERALL	01	02	04	05	06	07	08	09
ac62-r120	0.018	0.022	0.016	0.014	0.016	0.020	0.022	0.017	0.021
	10	12	13	14	15	16	18	20	21
ac62-r120	0.014	0.014	0.017	0.022	0.020	0.016	0.013	0.016	0.034
	22	23	24	25	26	27	29	30	31
ac62-r120	...	0.016	0.031	0.014	0.016	0.048	0.021	0.019	0.012
	32								
ac62-r120	0.017								

OBS BY SATELLITE VS. BASELINE

	OVERALL	01	02	04	05	06	07	08	09
bcrk-r120	6398	43	237	103	476	88	86	344	120
	10	12	13	14	15	16	18	20	21
bcrk-r120	420	130	291	65	356	450	635	443	184
	22	23	24	25	26	27	28	29	30
bcrk-r120	...	535	77	249	510	43	...	64	72
	31	32							
bcrk-r120	240	137							
	OVERALL	01	02	04	05	06	07	08	09
ac76-r120	6976	81	237	167	477	88	192	378	148
	10	12	13	14	15	16	18	20	21
ac76-r120	426	140	299	120	356	486	634	454	198
	22	23	24	25	26	27	29	30	31
ac76-r120	...	521	79	262	507	86	70	130	278
	32								
ac76-r120	162								
	OVERALL	01	02	04	05	06	07	08	09
ac62-r120	6714	73	236	167	442	88	193	378	148
	10	12	13	14	15	16	18	20	21
ac62-r120	427	142	251	104	323	496	550	431	201
	22	23	24	25	26	27	29	30	31
ac62-r120	...	535	61	271	525	68	39	119	286
	32								
ac62-r120	160								

ITRF position of r120 as determined by individual baselines

	X	Y	Z
bcrk	-2472667.052	-1711873.958	5606149.133
ac76	-2472667.053	-1711873.967	5606149.154
ac62	-2472667.059	-1711873.956	5606149.169

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
bcrk	0.003	0.003	-0.019	-0.000	-0.005	-0.018
ac76	0.002	-0.007	0.002	0.007	-0.001	0.003
ac62	-0.005	0.004	0.017	-0.006	0.007	0.015

Covariance Matrix for the xyz OPUS Position (meters^2).

0.0000004689	0.0000000302	-0.0000000852
0.0000000302	0.0000003311	-0.0000000728
-0.0000000852	-0.0000000728	0.0000028933

Covariance Matrix for the enu OPUS Position (meters^2).

0.0000003475	0.0000000528	-0.0000000154
0.0000000528	0.0000009051	0.0000009551
-0.0000000154	0.0000009551	0.0000024408

Horizontal network accuracy = 0.00200 meters.

Vertical network accuracy = 0.00306 meters.

Derivation of NAD 83 vector components

Position of reference station ARP in NAD_83(2011)(EPOCH:2010.0000).

	Xa(m)	Ya(m)	Za(m)
BCRK	-2297114.66015	-1869452.40506	5630681.13391
AC76	-2323969.88982	-1734835.45016	5663413.43383
AC62	-2409396.72001	-1606098.22035	5665403.60119

Position of reference station monument in NAD_83(2011)(EPOCH:2010.0000).

	Xr(m)	Yr(m)	Zr(m)
BCRK	-2297114.65715	-1869452.40266	5630681.12651
AC76	-2323969.88682	-1734835.44786	5663413.42643
AC62	-2409396.71691	-1606098.21825	5665403.59379

Velocity of reference station monument in NAD_83(2011)(EPOCH:2010.0000).

	Vx (m/yr)	Vy (m/yr)	Vz (m/yr)
BCRK	0.00670	-0.00392	-0.00071
AC76	0.00589	-0.00502	0.00305
AC62	-0.00203	0.00955	0.01192

Vectors from unknown station monument to reference station monument
in NAD_83(2011)(EPOCH:2010.0000).

	Xr-X= DX(m)	Yr-Y= DY(m)	Zr-Z= DZ(m)	
BCRK	175551.31285	-157577.28666	24532.23851	2010.00
AC76	148696.08318	-22960.33186	57264.53843	2010.00
AC62	63269.25309	105776.89775	59254.70579	2010.00

***** New Reference Frame Preview *****

We are replacing the nation's NAD 83 and NAVD 88 datums, to improve access and accuracy of the National Spatial Reference System. More at https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fdatums%2Fnewdatums%2F&data=04%7C01%7Cjoel_cusick%40nps.gov%7C74809bb2f6b54f80ad6808d9a16a60d8%7C0693b5ba4b184d7b9341f32f400a5494%7C0%7C0%7C637718300561045896%7CUnknown%7CTWFpbGZsb3d8eyJWljiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTil6lk1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=PiLumAMRBBguPHTVX8ZcNv8klQAmh9B8YbXgU6326LI%3D&reserved=0

Below are approximate coordinates for this solution in the new frames:

APPROX ORTHO HGT: 350.338 (m) [PROTOTYPE (Computed using xGeoid19B,GRS80,ITRF2014)]

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

8002 Was this collected on a published mark? Please help update

8002 NGS records by sharing https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Fsharing%2F&data=04%7C01%7Cjoel_cusick%40nps.gov%7C74809bb2f6b54f80ad6808d9a16a60d8%7C0693b5ba4b184d7b9341f32f400a5494%7C0%7C0%7C637718300561045896%7CUnknown%7CTWFpbGZsb3d8eyJWljiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTil6lk1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=ewAQgTDNvMMPNRcIDjUUdE7Mm3r%2BCsui3RHV%2F9j3Dpw%3D&reserved=0 or

8002 updating descriptions https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fmarks%2Frecover%2F&data=04%7C01%7Cjoel_cusick%40nps.gov%7C74809bb2f6b54f80ad6808d9a16a60d8%7C0693b5ba4b184d7b9341f32f400a5494%7C0%7C0%7C637718300561045896%7CUnknown%7CTWFpbGZsb3d8eyJWljiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTil6lk1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=75shl%2BnsOyMfTUR%2BPirgsVpCJNEuCtJiiNBt1rbZ36o%3D&reserved=0