

# APPENDIX C

## Baseline Totality Run Waypoint Tables for QANTAS/Croydon Eclipse Flight

Glenn Schneider, Steward Observatory, University of Arizona, 26 July 2003

The following tables detail a two parameter (aircraft altitude and *ground* speed) family of possible "Totality Runs", for a mid-eclipse intercept of 22:44:00 U.T. only. The intended use of these tables is for pre-eclipse planning and evaluation by QANTAS flight operations. The tables assume NO variations in family parameters for a given scenario and, thus, are non-optimal for direct implementation flight.

Flight altitudes from 32,000 ft to 38,000 ft above MSL in increments of 1,000 ft, and ground speeds of 420 nM/hr to 520 nM/hr in increments of 10 nM/hr are considered.

The totality run is flown as 4 discrete but contiguous flight segments defined by five waypoints to be loaded into the Boeing 747-400 FMS.

Each possible totality run spans 20 minutes in time, beginning 15 minutes before mid-eclipse (waypoint A), and ending 5 minutes after mid-eclipse (waypoint B). Alternatively, using the same tables, one could begin the totality run 10 minutes before mid-eclipse (waypoint B), though this leave less time and margin for initial on-track course corrections.

The waypoints along the totality run very closely *approximate* a linear track, but in detail deviate from a true geodesic curve by a very small amount. (necessarily to optimize the line-of-site angle to the Sun at mid-eclipse and throughout the totality run)

The waypoints are uniformly spaced in time with a temporal spacing of 5 minutes (300 seconds). Hence, for a fixed ground speed, the distance between successive waypoints is constant (egg., 39.2 nM @ 470 nM/hour).

The five waypoints are defined (and were chosen) as follows:

**A:** Totality Run Track Insertion Point. Mid-eclipse minus 15 minutes (22:29:00 UT). The aircraft should complete any heading alignment maneuvers prior to intercepting this point as close to 22:29:00 UT as possible. Any residual errors from initial approach in both heading and position should be nulled out (or minimized) in segment AB.

**B:** Totality Run Critical Start Point. Mid-eclipse minus 10 minutes (22:34:00 UT). Aircraft flight vector, as defined by waypoints, should be stable at and after crossing this point. Necessary Course and speed corrections due to windage only during segment BC.

**C:** Final Ingress Target Point. Mid-eclipse minus 5 minutes (22:39:00 UT). Last waypoint before lunar shadow overtakes aircraft. Contact II ~ 3m 43s after crossing waypoint C. Differential course and speed corrections due to windage only during segment CD.

**D:** Mid-Eclipse. (22:44:00 UT) Aircraft coincident with the instantaneous position of the center of the lunar shadow. Heading = instantaneous solar azimuth + 90 degrees. Contact III ~ 1m 17s after crossing waypoint D.

**E:** Totality Run Termination. Mid-eclipse plus 5 minutes (22:49:00 UT). Contact III plus 3m 43s.

Following crossing of waypoint E, at the discretion of the pilot in command, the aircraft may continue on a heading of 197° to allow additional viewing of the early phases of egress, the recession of the umbral shadow, and atmospheric color/brightness gradient effects.

This discrete parametric grid of waypoint tables were generated with EFLIGHT 2003 X version 2.0.0\*, and is expected to sufficiently tile the parameter space in flight altitude and ground speed required for the QANTAS/Croydon eclipse flight. Other tables can (and will) be generated as needed in future planning, or in situ during the flight.

\* See Appendix A

**GROUND SPEED = 520 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9456.516E	6755.718S	-900s	130.0nm	+0.3	197.00	108.4	14.6
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9421.836E	6837.027S	-600s	-86.7nm	+0.2	197.53	108.5	14.7
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9344.962E	6918.208S	-300s	-43.3nm	+0.1	198.11	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.62	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9226.395E	7040.293S	+300s	+43.3nm	-0.1	196.92	108.9	15.1

**GROUND SPEED = 520 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9454.964E	6755.540S	-900s	130.0nm	+0.3	197.02	108.4	14.6
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9420.240E	6836.842S	-600s	-86.7nm	+0.2	197.56	108.5	14.7
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9343.321E	6918.018S	-300s	-43.3nm	+0.1	198.13	108.6	14.8
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.64	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9224.658E	7040.090S	+300s	+43.3nm	-0.1	196.94	108.9	15.1

**GROUND SPEED = 520 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9453.411E	6755.360S	-900s	130.0nm	+0.3	197.05	108.5	14.6
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9418.643E	6836.657S	-600s	-86.7nm	+0.2	197.58	108.5	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9341.679E	6917.827S	-300s	-43.3nm	+0.1	198.16	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.67	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9222.920E	7039.887S	+300s	+43.3nm	-0.1	196.97	108.9	15.0

**GROUND SPEED = 520 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9451.857E	6755.180S	-900s	130.0nm	+0.3	197.07	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9417.046E	6836.472S	-600s	-86.7nm	+0.2	197.61	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9340.036E	6917.636S	-300s	-43.3nm	+0.1	198.18	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.69	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9221.182E	7039.683S	+300s	+43.3nm	-0.1	196.99	108.9	15.0

**GROUND SPEED = 520 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9450.302E	6755.000S	-900s	130.0nm	+0.3	197.09	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9415.448E	6836.286S	-600s	-86.7nm	+0.3	197.63	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9338.393E	6917.444S	-300s	-43.3nm	+0.1	198.21	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.72	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9219.442E	7039.479S	+300s	+43.3nm	-0.1	197.01	109.0	15.0

**GROUND SPEED = 520 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9448.747E	6754.820S	-900s	130.0nm	+0.3	197.12	108.5	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9413.849E	6836.100S	-600s	-86.7nm	+0.3	197.66	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9336.748E	6917.252S	-300s	-43.3nm	+0.1	198.24	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.75	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9217.703E	7039.275S	+300s	+43.3nm	-0.1	197.04	109.0	15.0

**GROUND SPEED = 520 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9447.191E	6754.639S	-900s	130.0nm	+0.3	197.14	108.5	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9412.250E	6835.914S	-600s	-86.7nm	+0.3	197.68	108.6	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9335.103E	6917.060S	-300s	-43.3nm	+0.1	198.26	108.7	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.77	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9215.962E	7039.070S	+300s	+43.3nm	-0.1	197.06	109.0	15.0

**GROUND SPEED = 510 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9454.571E	6758.105S	-900s	127.5nm	+0.3	197.03	108.4	14.6
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9420.459E	6838.613S	-600s	-85.0nm	+0.2	197.56	108.5	14.7
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9344.230E	6918.999S	-300s	-42.5nm	+0.1	198.12	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.62	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9227.127E	7039.502S	+300s	+42.5nm	-0.1	196.95	108.9	15.1

**GROUND SPEED = 510 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9453.017E	6757.926S	-900s	127.5nm	+0.3	197.05	108.4	14.6
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9418.862E	6838.428S	-600s	-85.0nm	+0.2	197.58	108.5	14.7
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9342.588E	6918.808S	-300s	-42.5nm	+0.1	198.14	108.6	14.8
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.64	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9225.390E	7039.299S	+300s	+42.5nm	-0.1	196.97	108.9	15.1

**GROUND SPEED = 510 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9451.461E	6757.746S	-900s	127.5nm	+0.3	197.08	108.5	14.6
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9417.263E	6838.243S	-600s	-85.0nm	+0.2	197.61	108.5	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9340.945E	6918.617S	-300s	-42.5nm	+0.1	198.17	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.67	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9223.654E	7039.097S	+300s	+42.5nm	-0.1	197.00	108.9	15.0

**GROUND SPEED = 510 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9449.905E	6757.566S	-900s	127.5nm	+0.3	197.10	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9415.664E	6838.057S	-600s	-85.0nm	+0.2	197.63	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9339.301E	6918.426S	-300s	-42.5nm	+0.1	198.20	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.70	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9221.916E	7038.893S	+300s	+42.5nm	-0.1	197.02	108.9	15.0

**GROUND SPEED = 510 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9448.348E	6757.386S	-900s	127.5nm	+0.3	197.12	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9414.065E	6837.871S	-600s	-85.0nm	+0.2	197.66	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9337.657E	6918.235S	-300s	-42.5nm	+0.1	198.22	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.72	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9220.178E	7038.689S	+300s	+42.5nm	-0.1	197.05	109.0	15.0

**GROUND SPEED = 510 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9446.790E	6757.205S	-900s	127.5nm	+0.3	197.15	108.5	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9412.464E	6837.685S	-600s	-85.0nm	+0.2	197.68	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9336.011E	6918.043S	-300s	-42.5nm	+0.1	198.25	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.75	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9218.439E	7038.485S	+300s	+42.5nm	-0.1	197.07	109.0	15.0

**GROUND SPEED = 510 nM/hr ALTITUDE = 32,000 ft**

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A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9445.232E	6757.023S	-900s	127.5nm	+0.3	197.17	108.6	14.6
B 223900	9429.861E	6704.699S	516.4	109.3	14.1	9334.366E	6917.850S	-300s	-42.5nm	+0.1	198.27	108.7	14.8
C 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.78	108.9	14.9
D 224900	8934.550E	7240.437S	493.6	110.1	15.2	9216.700E	7038.280S	+300s	+42.5nm	-0.1	197.10	109.0	15.0

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A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9452.620E	6800.491S	-900s	125.0nm	+0.3	197.06	108.4	14.6
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9419.079E	6840.199S	-600s	-83.3nm	+0.2	197.58	108.5	14.7
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9343.498E	6919.789S	-300s	-41.7nm	+0.1	198.13	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.62	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9227.859E	7038.712S	+300s	+41.7nm	-0.1	196.98	108.9	15.1

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A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9451.063E	6800.311S	-900s	125.0nm	+0.3	197.08	108.4	14.6
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9417.480E	6840.014S	-600s	-83.3nm	+0.2	197.60	108.5	14.7
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9341.854E	6919.599S	-300s	-41.7nm	+0.1	198.16	108.6	14.8
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.65	108.7	14.9
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B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9415.880E	6839.829S	-600s	-83.3nm	+0.2	197.63	108.5	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9340.211E	6919.408S	-300s	-41.7nm	+0.1	198.18	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.67	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9224.388E	7038.306S	+300s	+41.7nm	-0.1	197.03	108.9	15.0

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A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9447.946E	6759.951S	-900s	125.0nm	+0.3	197.13	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9414.280E	6839.643S	-600s	-83.3nm	+0.2	197.65	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9338.566E	6919.216S	-300s	-41.7nm	+0.1	198.21	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.70	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9222.652E	7038.103S	+300s	+41.7nm	-0.1	197.06	108.9	15.0

**GROUND SPEED = 500 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9446.387E	6759.770S	-900s	125.0nm	+0.3	197.15	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9412.678E	6839.457S	-600s	-83.3nm	+0.2	197.68	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9336.920E	6919.025S	-300s	-41.7nm	+0.1	198.23	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.73	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9220.915E	7037.899S	+300s	+41.7nm	-0.1	197.08	109.0	15.0

**GROUND SPEED = 500 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9444.827E	6759.589S	-900s	125.0nm	+0.3	197.18	108.5	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9411.076E	6839.271S	-600s	-83.3nm	+0.2	197.70	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9335.275E	6918.833S	-300s	-41.7nm	+0.1	198.26	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.75	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9219.177E	7037.695S	+300s	+41.7nm	-0.1	197.11	109.0	15.0

**GROUND SPEED = 500 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9443.265E	6759.408S	-900s	125.0nm	+0.3	197.20	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9409.473E	6839.083S	-600s	-83.3nm	+0.2	197.73	108.6	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9333.628E	6918.640S	-300s	-41.7nm	+0.1	198.28	108.7	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.78	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9217.438E	7037.490S	+300s	+41.7nm	-0.1	197.13	109.0	15.0

**GROUND SPEED = 490 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9450.662E	6802.876S	-900s	122.5nm	+0.3	197.09	108.4	14.6
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9417.697E	6841.785S	-600s	-81.7nm	+0.2	197.60	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9342.764E	6920.580S	-300s	-40.8nm	+0.1	198.14	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.62	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9228.593E	7037.921S	+300s	+40.8nm	-0.1	197.02	108.9	15.1

**GROUND SPEED = 490 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9449.102E	6802.696S	-900s	122.5nm	+0.3	197.11	108.4	14.6
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9416.096E	6841.600S	-600s	-81.7nm	+0.2	197.62	108.5	14.7
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9341.120E	6920.389S	-300s	-40.8nm	+0.1	198.17	108.6	14.8
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.65	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9226.859E	7037.719S	+300s	+40.8nm	-0.1	197.04	108.9	15.1

**GROUND SPEED = 490 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9447.542E	6802.516S	-900s	122.5nm	+0.3	197.14	108.5	14.6
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9414.494E	6841.414S	-600s	-81.7nm	+0.2	197.65	108.5	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9339.475E	6920.198S	-300s	-40.8nm	+0.1	198.19	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.68	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9225.124E	7037.516S	+300s	+40.8nm	-0.1	197.06	108.9	15.0

**GROUND SPEED = 490 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9445.980E	6802.336S	-900s	122.5nm	+0.3	197.16	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9412.892E	6841.228S	-600s	-81.7nm	+0.2	197.67	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9337.829E	6920.006S	-300s	-40.8nm	+0.1	198.22	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.70	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9223.389E	7037.313S	+300s	+40.8nm	-0.1	197.09	108.9	15.0

**GROUND SPEED = 490 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9444.419E	6802.155S	-900s	122.5nm	+0.3	197.19	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9411.288E	6841.042S	-600s	-81.7nm	+0.2	197.70	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9336.183E	6919.815S	-300s	-40.8nm	+0.1	198.24	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.73	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9221.652E	7037.109S	+300s	+40.8nm	-0.1	197.11	109.0	15.0

**GROUND SPEED = 490 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9442.856E	6801.973S	-900s	122.5nm	+0.3	197.21	108.5	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9409.685E	6840.855S	-600s	-81.7nm	+0.2	197.72	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9334.536E	6919.622S	-300s	-40.8nm	+0.1	198.27	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.76	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9219.915E	7036.905S	+300s	+40.8nm	-0.1	197.14	109.0	15.0

**GROUND SPEED = 490 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9441.293E	6801.792S	-900s	122.5nm	+0.3	197.23	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9408.080E	6840.668S	-600s	-81.7nm	+0.2	197.75	108.6	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9332.888E	6919.430S	-300s	-40.8nm	+0.1	198.30	108.7	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.78	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9218.177E	7036.700S	+300s	+40.8nm	-0.1	197.16	109.0	15.0

**GROUND SPEED = 480 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9448.697E	6805.261S	-900s	120.0nm	+0.3	197.12	108.4	14.6
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9416.310E	6843.370S	-600s	-80.0nm	+0.2	197.62	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9342.029E	6921.370S	-300s	-40.0nm	+0.1	198.15	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.63	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9229.327E	7037.131S	+300s	+40.0nm	-0.1	197.05	108.9	15.1

**GROUND SPEED = 480 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9447.135E	6805.081S	-900s	120.0nm	+0.3	197.14	108.4	14.6
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9414.708E	6843.185S	-600s	-80.0nm	+0.2	197.64	108.5	14.7
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9340.384E	6921.179S	-300s	-40.0nm	+0.1	198.18	108.6	14.9
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.65	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9227.595E	7036.928S	+300s	+40.0nm	-0.1	197.07	108.9	15.0

**GROUND SPEED = 480 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9445.572E	6804.901S	-900s	120.0nm	+0.3	197.17	108.5	14.6
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9413.105E	6843.000S	-600s	-80.0nm	+0.2	197.67	108.5	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9338.738E	6920.989S	-300s	-40.0nm	+0.1	198.20	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.68	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9225.861E	7036.725S	+300s	+40.0nm	-0.1	197.10	108.9	15.0

**GROUND SPEED = 480 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9444.008E	6804.720S	-900s	120.0nm	+0.3	197.19	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9411.500E	6842.814S	-600s	-80.0nm	+0.2	197.69	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9337.092E	6920.797S	-300s	-40.0nm	+0.1	198.23	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.71	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9224.126E	7036.523S	+300s	+40.0nm	-0.1	197.12	108.9	15.0

**GROUND SPEED = 480 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9442.444E	6804.538S	-900s	120.0nm	+0.3	197.22	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9409.895E	6842.627S	-600s	-80.0nm	+0.2	197.72	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9335.445E	6920.605S	-300s	-40.0nm	+0.1	198.26	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.73	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9222.390E	7036.319S	+300s	+40.0nm	-0.1	197.15	109.0	15.0

**GROUND SPEED = 480 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9440.879E	6804.357S	-900s	120.0nm	+0.3	197.24	108.5	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9408.290E	6842.440S	-600s	-80.0nm	+0.2	197.75	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9333.797E	6920.413S	-300s	-40.0nm	+0.1	198.28	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.76	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9220.654E	7036.115S	+300s	+40.0nm	-0.1	197.17	109.0	15.0

**GROUND SPEED = 480 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9439.313E	6804.175S	-900s	120.0nm	+0.3	197.26	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9406.683E	6842.253S	-600s	-80.0nm	+0.2	197.77	108.6	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9332.148E	6920.219S	-300s	-40.0nm	+0.1	198.31	108.7	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.78	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9218.917E	7035.911S	+300s	+40.0nm	-0.1	197.20	109.0	15.0

**GROUND SPEED = 470 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9446.726E	6807.646S	-900s	117.5nm	+0.3	197.15	108.4	14.7
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9414.921E	6844.956S	-600s	-78.3nm	+0.2	197.64	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9341.293E	6922.161S	-300s	-39.2nm	+0.1	198.16	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.63	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9230.063E	7036.340S	+300s	+39.2nm	-0.1	197.08	108.9	15.1

**GROUND SPEED = 470 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9445.161E	6807.466S	-900s	117.5nm	+0.3	197.17	108.4	14.6
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9413.317E	6844.771S	-600s	-78.3nm	+0.2	197.67	108.5	14.8
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9339.647E	6921.970S	-300s	-39.2nm	+0.1	198.19	108.6	14.9
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.66	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9228.331E	7036.138S	+300s	+39.2nm	-0.1	197.11	108.9	15.0

**GROUND SPEED = 470 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9443.595E	6807.285S	-900s	117.5nm	+0.3	197.20	108.5	14.6
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9411.712E	6844.585S	-600s	-78.3nm	+0.2	197.69	108.5	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9338.001E	6921.779S	-300s	-39.2nm	+0.1	198.22	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.68	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9226.598E	7035.936S	+300s	+39.2nm	-0.1	197.13	108.9	15.0

**GROUND SPEED = 470 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9442.029E	6807.104S	-900s	117.5nm	+0.3	197.22	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9410.106E	6844.398S	-600s	-78.3nm	+0.2	197.72	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9336.354E	6921.587S	-300s	-39.2nm	+0.1	198.24	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.71	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9224.864E	7035.732S	+300s	+39.2nm	-0.1	197.16	108.9	15.0

**GROUND SPEED = 470 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9440.462E	6806.922S	-900s	117.5nm	+0.3	197.25	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9408.499E	6844.212S	-600s	-78.3nm	+0.2	197.74	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9334.706E	6921.395S	-300s	-39.2nm	+0.1	198.27	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.73	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9223.129E	7035.529S	+300s	+39.2nm	-0.1	197.18	109.0	15.0

**GROUND SPEED = 470 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9438.894E	6806.740S	-900s	117.5nm	+0.3	197.27	108.5	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9406.892E	6844.024S	-600s	-78.3nm	+0.2	197.77	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9333.057E	6921.202S	-300s	-39.2nm	+0.1	198.29	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.76	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9221.394E	7035.325S	+300s	+39.2nm	-0.1	197.21	109.0	15.0

**GROUND SPEED = 470 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9437.326E	6806.558S	-900s	117.5nm	+0.3	197.30	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9405.284E	6843.837S	-600s	-78.3nm	+0.2	197.79	108.6	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9331.407E	6921.010S	-300s	-39.2nm	+0.1	198.32	108.7	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.79	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9219.658E	7035.121S	+300s	+39.2nm	-0.1	197.23	109.0	15.0

**GROUND SPEED = 460 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9444.747E	6810.031S	-900s	115.0nm	+0.3	197.18	108.4	14.7
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9413.528E	6846.541S	-600s	-76.7nm	+0.2	197.66	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9340.557E	6922.951S	-300s	-38.3nm	+0.1	198.18	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.63	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9230.800E	7035.550S	+300s	+38.3nm	-0.1	197.12	108.8	15.1

**GROUND SPEED = 460 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9443.180E	6809.850S	-900s	115.0nm	+0.3	197.20	108.5	14.6
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9411.923E	6846.356S	-600s	-76.7nm	+0.2	197.69	108.5	14.8
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9338.911E	6922.760S	-300s	-38.3nm	+0.1	198.20	108.6	14.9
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.66	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9229.068E	7035.348S	+300s	+38.3nm	-0.1	197.14	108.9	15.0

**GROUND SPEED = 460 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9441.612E	6809.669S	-900s	115.0nm	+0.3	197.23	108.5	14.6
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9410.316E	6846.169S	-600s	-76.7nm	+0.2	197.71	108.5	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9337.263E	6922.569S	-300s	-38.3nm	+0.1	198.23	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.68	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9227.336E	7035.146S	+300s	+38.3nm	-0.1	197.16	108.9	15.0

**GROUND SPEED = 460 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9440.043E	6809.487S	-900s	115.0nm	+0.3	197.25	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9408.708E	6845.983S	-600s	-76.7nm	+0.2	197.74	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9335.615E	6922.377S	-300s	-38.3nm	+0.1	198.25	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.71	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9225.603E	7034.942S	+300s	+38.3nm	-0.1	197.19	108.9	15.0

**GROUND SPEED = 460 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9438.474E	6809.305S	-900s	115.0nm	+0.3	197.28	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9407.100E	6845.796S	-600s	-76.7nm	+0.2	197.76	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9333.965E	6922.184S	-300s	-38.3nm	+0.1	198.28	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.74	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9223.870E	7034.739S	+300s	+38.3nm	-0.1	197.21	109.0	15.0

**GROUND SPEED = 460 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9436.904E	6809.123S	-900s	115.0nm	+0.3	197.30	108.5	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9405.491E	6845.609S	-600s	-76.7nm	+0.2	197.79	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9332.316E	6921.992S	-300s	-38.3nm	+0.1	198.31	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.76	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9222.135E	7034.535S	+300s	+38.3nm	-0.1	197.24	109.0	15.0

**GROUND SPEED = 460 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9435.333E	6808.940S	-900s	115.0nm	+0.3	197.33	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9403.880E	6845.421S	-600s	-76.7nm	+0.2	197.81	108.6	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9330.665E	6921.799S	-300s	-38.3nm	+0.1	198.33	108.7	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.79	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9220.400E	7034.331S	+300s	+38.3nm	-0.1	197.26	109.0	15.0



**GROUND SPEED = 450 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9442.761E	6812.415S	-900s	112.5nm	+0.3	197.21	108.4	14.7
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9412.133E	6848.127S	-600s	-75.0nm	+0.2	197.68	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9339.820E	6923.741S	-300s	-37.5nm	+0.1	198.19	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.63	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9231.537E	7034.760S	+300s	+37.5nm	-0.1	197.15	108.8	15.1

**GROUND SPEED = 450 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9441.192E	6812.234S	-900s	112.5nm	+0.3	197.23	108.5	14.7
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9410.525E	6847.941S	-600s	-75.0nm	+0.2	197.71	108.5	14.8
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9338.172E	6923.551S	-300s	-37.5nm	+0.1	198.21	108.6	14.9
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.66	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9229.807E	7034.558S	+300s	+37.5nm	-0.1	197.17	108.9	15.0

**GROUND SPEED = 450 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9439.622E	6812.052S	-900s	112.5nm	+0.3	197.26	108.5	14.6
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9408.916E	6847.755S	-600s	-75.0nm	+0.2	197.73	108.6	14.7
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9336.524E	6923.359S	-300s	-37.5nm	+0.1	198.24	108.6	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.69	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9228.075E	7034.355S	+300s	+37.5nm	-0.1	197.20	108.9	15.0

**GROUND SPEED = 450 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9438.050E	6811.870S	-900s	112.5nm	+0.3	197.28	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9407.307E	6847.567S	-600s	-75.0nm	+0.2	197.76	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9334.874E	6923.167S	-300s	-37.5nm	+0.1	198.26	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.71	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9226.343E	7034.153S	+300s	+37.5nm	-0.1	197.22	108.9	15.0

**GROUND SPEED = 450 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9436.479E	6811.688S	-900s	112.5nm	+0.3	197.31	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9405.696E	6847.380S	-600s	-75.0nm	+0.2	197.79	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9333.224E	6922.975S	-300s	-37.5nm	+0.1	198.29	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.74	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9224.611E	7033.949S	+300s	+37.5nm	-0.1	197.25	109.0	15.0

**GROUND SPEED = 450 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9434.906E	6811.506S	-900s	112.5nm	+0.3	197.33	108.6	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9404.085E	6847.193S	-600s	-75.0nm	+0.2	197.81	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9331.574E	6922.782S	-300s	-37.5nm	+0.1	198.32	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.77	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9222.877E	7033.746S	+300s	+37.5nm	-0.1	197.27	109.0	15.0

**GROUND SPEED = 450 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9433.332E	6811.323S	-900s	112.5nm	+0.3	197.36	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9402.474E	6847.005S	-600s	-75.0nm	+0.2	197.84	108.7	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9329.923E	6922.589S	-300s	-37.5nm	+0.1	198.34	108.8	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.79	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9221.143E	7033.542S	+300s	+37.5nm	-0.1	197.30	109.0	15.0

**GROUND SPEED = 440 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9440.769E	6814.798S	-900s	110.0nm	+0.3	197.24	108.4	14.7
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9410.733E	6849.712S	-600s	-73.3nm	+0.2	197.71	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9339.082E	6924.532S	-300s	-36.7nm	+0.1	198.20	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.64	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9232.275E	7033.969S	+300s	+36.7nm	-0.1	197.18	108.8	15.1

**GROUND SPEED = 440 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9439.197E	6814.617S	-900s	110.0nm	+0.3	197.26	108.5	14.7
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9409.124E	6849.525S	-600s	-73.3nm	+0.2	197.73	108.5	14.8
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9337.433E	6924.340S	-300s	-36.7nm	+0.1	198.22	108.6	14.9
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.66	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9230.546E	7033.767S	+300s	+36.7nm	-0.1	197.21	108.9	15.0

**GROUND SPEED = 440 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9437.624E	6814.435S	-900s	110.0nm	+0.3	197.29	108.5	14.7
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9407.513E	6849.339S	-600s	-73.3nm	+0.2	197.76	108.6	14.8
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9335.783E	6924.149S	-300s	-36.7nm	+0.1	198.25	108.7	14.8
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.69	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9228.816E	7033.565S	+300s	+36.7nm	-0.1	197.23	108.9	15.0

**GROUND SPEED = 440 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9436.051E	6814.253S	-900s	110.0nm	+0.3	197.31	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9405.902E	6849.152S	-600s	-73.3nm	+0.2	197.78	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9334.133E	6923.957S	-300s	-36.7nm	+0.1	198.28	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.72	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9227.084E	7033.362S	+300s	+36.7nm	-0.1	197.26	108.9	15.0

**GROUND SPEED = 440 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9434.477E	6814.071S	-900s	110.0nm	+0.3	197.34	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9404.290E	6848.964S	-600s	-73.3nm	+0.2	197.81	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9332.483E	6923.764S	-300s	-36.7nm	+0.1	198.30	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.74	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9225.352E	7033.160S	+300s	+36.7nm	-0.1	197.28	109.0	15.0

**GROUND SPEED = 440 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9432.901E	6813.888S	-900s	110.0nm	+0.3	197.36	108.6	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9402.678E	6848.776S	-600s	-73.3nm	+0.2	197.83	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9330.831E	6923.572S	-300s	-36.7nm	+0.1	198.33	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.77	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9223.620E	7032.956S	+300s	+36.7nm	-0.1	197.31	109.0	15.0

**GROUND SPEED = 440 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9431.325E	6813.704S	-900s	110.0nm	+0.3	197.39	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9401.064E	6848.589S	-600s	-73.3nm	+0.2	197.86	108.7	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9329.179E	6923.378S	-300s	-36.7nm	+0.1	198.35	108.8	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.80	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9221.886E	7032.752S	+300s	+36.7nm	-0.1	197.33	109.0	15.0

**GROUND SPEED = 430 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9438.770E	6817.182S	-900s	107.5nm	+0.3	197.27	108.4	14.7
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9409.331E	6851.296S	-600s	-71.7nm	+0.2	197.73	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9338.342E	6925.322S	-300s	-35.8nm	+0.1	198.21	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.64	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9233.014E	7033.179S	+300s	+35.8nm	-0.1	197.22	108.8	15.0

**GROUND SPEED = 430 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9437.196E	6817.000S	-900s	107.5nm	+0.3	197.30	108.5	14.7
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9407.719E	6851.110S	-600s	-71.7nm	+0.2	197.75	108.5	14.8
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9336.693E	6925.130S	-300s	-35.8nm	+0.1	198.24	108.6	14.9
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.67	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9231.286E	7032.977S	+300s	+35.8nm	-0.1	197.24	108.9	15.0

**GROUND SPEED = 430 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9435.620E	6816.818S	-900s	107.5nm	+0.3	197.32	108.5	14.7
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9406.107E	6850.923S	-600s	-71.7nm	+0.2	197.78	108.6	14.8
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9335.042E	6924.939S	-300s	-35.8nm	+0.1	198.26	108.7	14.9
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.69	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9229.557E	7032.775S	+300s	+35.8nm	-0.1	197.27	108.9	15.0

**GROUND SPEED = 430 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9434.044E	6816.636S	-900s	107.5nm	+0.3	197.35	108.5	14.6
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9404.494E	6850.736S	-600s	-71.7nm	+0.2	197.80	108.6	14.7
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9333.392E	6924.746S	-300s	-35.8nm	+0.1	198.29	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.72	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9227.826E	7032.573S	+300s	+35.8nm	-0.1	197.29	108.9	15.0

**GROUND SPEED = 430 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9432.467E	6816.453S	-900s	107.5nm	+0.3	197.37	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9402.881E	6850.548S	-600s	-71.7nm	+0.2	197.83	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9331.740E	6924.554S	-300s	-35.8nm	+0.1	198.31	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.75	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9226.095E	7032.370S	+300s	+35.8nm	-0.1	197.32	109.0	15.0

**GROUND SPEED = 430 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9430.889E	6816.269S	-900s	107.5nm	+0.3	197.39	108.6	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9401.266E	6850.360S	-600s	-71.7nm	+0.2	197.85	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9330.088E	6924.361S	-300s	-35.8nm	+0.1	198.34	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.77	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9224.364E	7032.167S	+300s	+35.8nm	-0.1	197.34	109.0	15.0

**GROUND SPEED = 430 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9429.311E	6816.085S	-900s	107.5nm	+0.3	197.42	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9359.651E	6850.172S	-600s	-71.7nm	+0.2	197.88	108.7	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9328.434E	6924.167S	-300s	-35.8nm	+0.1	198.37	108.8	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.80	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9222.631E	7031.963S	+300s	+35.8nm	-0.1	197.37	109.0	15.0

**GROUND SPEED = 420 nM/hr ALTITUDE = 38,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9326.860E	6032.803S	540.8	113.7	10.2	9436.764E	6819.565S	-900s	105.0nm	+0.3	197.30	108.4	14.7
B 223400	9447.552E	6359.969S	528.5	110.8	12.6	9407.924E	6852.881S	-600s	-70.0nm	+0.2	197.75	108.5	14.8
C 223900	9439.313E	6705.985S	514.4	109.2	14.1	9337.602E	6926.112S	-300s	-35.0nm	+0.1	198.22	108.6	14.9
D 224400	9305.678E	6959.251S	501.8	108.7	15.0	9305.678E	6959.254S	+0s	+0.0nm	-0.0	198.64	108.7	15.0
E 224900	8945.916E	7241.673S	491.8	109.9	15.2	9233.755E	7032.389S	+300s	+35.0nm	-0.1	197.25	108.8	15.0

**GROUND SPEED = 420 nM/hr ALTITUDE = 37,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9325.171E	6032.437S	541.1	113.7	10.2	9435.187E	6819.382S	-900s	105.0nm	+0.3	197.33	108.5	14.7
B 223400	9446.000E	6359.709S	528.9	110.8	12.6	9406.311E	6852.694S	-600s	-70.0nm	+0.2	197.78	108.5	14.8
C 223900	9437.739E	6705.771S	514.7	109.2	14.1	9335.952E	6925.921S	-300s	-35.0nm	+0.1	198.25	108.6	14.9
D 224400	9303.989E	6959.054S	502.1	108.7	14.9	9303.989E	6959.057S	+0s	+0.0nm	-0.0	198.67	108.7	14.9
E 224900	8944.023E	7241.468S	492.1	110.0	15.2	9232.027E	7032.188S	+300s	+35.0nm	-0.1	197.27	108.9	15.0

**GROUND SPEED = 420 nM/hr ALTITUDE = 36,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9323.481E	6032.071S	541.5	113.7	10.2	9433.609E	6819.200S	-900s	105.0nm	+0.3	197.35	108.5	14.7
B 223400	9444.447E	6359.449S	529.2	110.9	12.6	9404.697E	6852.507S	-600s	-70.0nm	+0.2	197.80	108.6	14.8
C 223900	9436.166E	6705.558S	515.1	109.2	14.1	9334.301E	6925.729S	-300s	-35.0nm	+0.1	198.27	108.7	14.9
D 224400	9302.299E	6958.857S	502.4	108.8	14.9	9302.299E	6958.861S	+0s	+0.0nm	-0.0	198.70	108.8	14.9
E 224900	8942.130E	7241.263S	492.4	110.0	15.2	9230.298E	7031.985S	+300s	+35.0nm	-0.1	197.30	108.9	15.0

**GROUND SPEED = 420 nM/hr ALTITUDE = 35,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9321.788E	6031.704S	541.8	113.7	10.2	9432.030E	6819.017S	-900s	105.0nm	+0.3	197.38	108.5	14.7
B 223400	9442.892E	6359.188S	529.6	110.9	12.6	9403.083E	6852.320S	-600s	-70.0nm	+0.2	197.83	108.6	14.8
C 223900	9434.591E	6705.344S	515.4	109.2	14.1	9332.649E	6925.537S	-300s	-35.0nm	+0.1	198.30	108.7	14.8
D 224400	9300.609E	6958.660S	502.7	108.8	14.9	9300.609E	6958.663S	+0s	+0.0nm	-0.0	198.72	108.8	14.9
E 224900	8940.235E	7241.057S	492.7	110.0	15.2	9228.569E	7031.783S	+300s	+35.0nm	-0.1	197.32	108.9	15.0

**GROUND SPEED = 420 nM/hr ALTITUDE = 34,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9320.094E	6031.336S	542.2	113.8	10.1	9430.451E	6818.834S	-900s	105.0nm	+0.3	197.40	108.5	14.6
B 223400	9441.337E	6358.927S	529.9	110.9	12.6	9401.468E	6852.132S	-600s	-70.0nm	+0.2	197.85	108.6	14.7
C 223900	9433.015E	6705.129S	515.7	109.2	14.1	9330.996E	6925.344S	-300s	-35.0nm	+0.1	198.33	108.7	14.8
D 224400	9258.918E	6958.462S	503.1	108.8	14.9	9258.918E	6958.465S	+0s	+0.0nm	-0.0	198.75	108.8	14.9
E 224900	8938.341E	7240.851S	493.0	110.1	15.2	9226.839E	7031.580S	+300s	+35.0nm	-0.1	197.35	108.9	15.0

**GROUND SPEED = 420 nM/hr ALTITUDE = 33,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9318.397E	6030.967S	542.6	113.8	10.1	9428.871E	6818.650S	-900s	105.0nm	+0.3	197.43	108.6	14.6
B 223400	9439.781E	6358.665S	530.3	110.9	12.6	9359.852E	6851.944S	-600s	-70.0nm	+0.2	197.88	108.6	14.7
C 223900	9431.438E	6704.914S	516.1	109.3	14.1	9329.343E	6925.151S	-300s	-35.0nm	+0.1	198.35	108.7	14.8
D 224400	9257.226E	6958.264S	503.4	108.9	14.9	9257.226E	6958.267S	+0s	+0.0nm	-0.0	198.77	108.9	14.9
E 224900	8936.446E	7240.644S	493.3	110.1	15.2	9225.108E	7031.377S	+300s	+35.0nm	-0.1	197.37	109.0	15.0

**GROUND SPEED = 420 nM/hr ALTITUDE = 32,000 ft**

≠ HHMMSS	Umbra Long	Umbra Lat	WidKM	Uaz°	Ual°	AirCr Long	AirCr Lat	MidΔT	MidΔD	LOS	Bearng	ACaz	ACal
A 222900	9316.699E	6030.597S	542.9	113.8	10.1	9427.290E	6818.466S	-900s	105.0nm	+0.3	197.45	108.6	14.6
B 223400	9438.222E	6358.403S	530.6	111.0	12.6	9358.235E	6851.755S	-600s	-70.0nm	+0.2	197.90	108.7	14.7
C 223900	9429.861E	6704.699S	516.4	109.3	14.1	9327.689E	6924.957S	-300s	-35.0nm	+0.1	198.38	108.8	14.8
D 224400	9255.532E	6958.065S	503.7	108.9	14.9	9255.532E	6958.069S	+0s	+0.0nm	-0.0	198.80	108.9	14.9
E 224900	8934.550E	7240.437S	493.6	110.1	15.2	9223.377E	7031.173S	+300s	+35.0nm	-0.1	197.40	109.0	15.0