



The Power of We™

"Let's Fly" Series Montreal to Frankfurt

Data Science Technology

Python Program

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(Continued from Part 3)

```
FlightPath: end of turn orientation= 123.96 degrees
FlightPath: difference= 0.23 degrees
FlightPath: anticipated turn start from end point= 11298076.60 meters

===== great circle =====
FlightPath: distance to last fix= 609.874902756 nautics
FlightPath: still to fly= 623.036333997 nautics
GreatCircleRoute: initial way-point= turn-pt-3-123.96-degrees - latitude= 54.51 degrees -
longitude= -5.85 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= RINGA - latitude= 54.39 degrees - longitude= -5.54
degrees -altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 1129361.92 meters - still to fly= 609.81 nautics
FlightPath: passing waypoint: RINGA - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2611.69 nautics - real time = 20131.00 seconds - 5.00 hours 35.00 minutes 31.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 124.75 degrees to 124.75 degrees - turn step is= 3.00 degrees
FlightPath: distance to last fix= 597.966222541 nautics
FlightPath: still to fly= 609.806651804 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 13123.18 meters - radius of turn= 7.09 nautics
TurnLeg: initial heading= 124.75 degrees
TurnLeg: final heading= 125.82 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 304.65 degrees
FlightPath: difference= 0.39 degrees
FlightPath: anticipated turn start from end point= 6761714.91 meters
```



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Python Program

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```
===== great circle =====
FlightPath: distance to last fix= 597.833948767 nautics
FlightPath: still to fly= 608.617921033 nautics
GreatCircleRoute: initial way-point= turn-pt-1-125.82-degrees - latitude= 54.40 degrees -
longitude= -5.57 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= SLYDA - latitude= 54.20 degrees - longitude= -5.07
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 1087958.20 meters - still to fly= 587.45 nautics
FlightPath: passing waypoint: SLYDA - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2634.04 nautics - real time = 20292.00 seconds - 5.00 hours 38.00 minutes 12.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 125.12 degrees to 125.13 degrees - turn step is= 3.00 degrees
FlightPath: distance to last fix= 577.271566451 nautics
FlightPath: still to fly= 587.450429524 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 13123.18 meters - radius of turn= 7.09 nautics
TurnLeg: initial heading= 125.12 degrees
TurnLeg: final heading= 126.19 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 304.85 degrees
FlightPath: difference= -0.75 degrees
FlightPath: anticipated turn start from end point= 3486219.34 meters

===== great circle =====
FlightPath: distance to last fix= 577.139292454 nautics
FlightPath: still to fly= 586.977588394 nautics
GreatCircleRoute: initial way-point= turn-pt-1-126.19-degrees - latitude= 54.20 degrees -
longitude= -5.08 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= ISLEOFMAN - latitude= 54.06 degrees - longitude= -4.75
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====
```



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Python Program

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```
FlightPath: still to fly= 1060130.99 meters - still to fly= 572.42 nautics
FlightPath: passing waypoint: ISLEOFMAN - alt= 11880.74 meters - alt= 38978.34 feet
-distance=2649.07 nautics - real time = 20403.00 seconds - 5.00 hours 40.00 minutes 3.00
seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 125.37 degrees to 124.38 degrees - turn step is= -3.00 degrees
FlightPath: distance to last fix= 563.29578664 nautics
FlightPath: still to fly= 572.424937982 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 13123.18 meters - radius of turn= 7.09 nautics
TurnLeg: initial heading= 125.37 degrees
TurnLeg: final heading= 124.31 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 305.65 degrees
FlightPath: difference= 0.29 degrees
FlightPath: anticipated turn start from end point= 9079879.52 meters

===== great circle =====
FlightPath: distance to last fix= 563.163489918 nautics
FlightPath: still to fly= 571.848061255 nautics
GreatCircleRoute: initial way-point= turn-pt-1-124.31-degrees - latitude= 54.07 degrees
-longitude= -4.76 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= KELLY - latitude= 53.90 degrees - longitude= -4.36
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 1027210.83 meters - still to fly= 554.65 nautics
FlightPath: passing waypoint: KELLY - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2666.84 nautics - real time = 20534.00 seconds - 5.00 hours 42.00 minutes 14.00 seconds
```



The Power of We™

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Data Science Technology

Python Program

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```
===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 124.68 degrees to 124.67 degrees - turn step is= -3.00 degrees
FlightPath: distance to last fix= 546.164030134 nautics
FlightPath: still to fly= 554.649474404 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 22838.07 meters - radius of turn= 12.33 nautics
TurnLeg: initial heading= 124.68 degrees
TurnLeg: final heading= 124.06 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 305.96 degrees
FlightPath: difference= -18.00 degrees
FlightPath: anticipated turn start from end point= 144216.14 meters

===== great circle =====
FlightPath: distance to last fix= 546.031740683 nautics
FlightPath: still to fly= 554.582619898 nautics
GreatCircleRoute: initial way-point= turn-pt-1-124.06-degrees - latitude= 53.90 degrees -
longitude= -4.36 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= PENIL - latitude= 53.61 degrees - longitude= -3.66
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 970733.86 meters - still to fly= 524.15 nautics
FlightPath: passing waypoint: PENIL - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2697.34 nautics - real time = 20765.00 seconds - 5.00 hours 46.00 minutes 5.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 125.21 degrees to 106.67 degrees - turn step is= -3.00 degrees
FlightPath: distance to last fix= 515.794042491 nautics
FlightPath: still to fly= 524.154350854 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 22838.07 meters - radius of turn= 12.33 nautics
TurnLeg: initial heading= 125.21 degrees
TurnLeg: final heading= 104.93 degrees
===== end of turn leg =====
```



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"Let's Fly" Series Montreal to Frankfurt

Data Science Technology

Python Program

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```
FlightPath: end of turn orientation= 104.93 degrees
FlightPath: difference= 1.99 degrees
FlightPath: anticipated turn start from end point= 1318053.75 meters

===== great circle =====
FlightPath: distance to last fix= 511.501675719 nautics
FlightPath: still to fly= 519.862551912 nautics
GreatCircleRoute: initial way-point= turn-pt-33-104.93-degrees - latitude= 53.59 degrees -
longitude= -3.55 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= ASNIP - latitude= 53.47 degrees - longitude= -2.88
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 916232.84 meters - still to fly= 494.73 nautics
FlightPath: passing waypoint: ASNIP - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2726.77 nautics - real time = 20988.00 seconds - 5.00 hours 49.00 minutes 48.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 105.83 degrees to 107.29 degrees - turn step is= 3.00 degrees
FlightPath: distance to last fix= 487.549678177 nautics
FlightPath: still to fly= 494.726155745 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 13123.18 meters - radius of turn= 7.09 nautics
TurnLeg: initial heading= 105.83 degrees
TurnLeg: final heading= 107.96 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 107.96 degrees
FlightPath: difference= -7.68 degrees
FlightPath: anticipated turn start from end point= 340252.26 meters
```



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"Let's Fly" Series Montreal to Frankfurt

Data Science Technology

Python Program

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```
===== great circle =====
FlightPath: distance to last fix= 487.28509673 nautics
FlightPath: still to fly= 493.541731315 nautics
GreatCircleRoute: initial way-point= turn-pt-2-107.96-degrees - latitude= 53.48 degrees -
longitude= -2.90 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= MANCHESTER - latitude= 53.35 degrees - longitude=
-2.23 degrees -altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 867486.68 meters - still to fly= 468.41 nautics
FlightPath: passing waypoint: MANCHESTER - alt= 11880.74 meters - alt= 38978.34 feet -
distance= 2753.09 nautics - real time = 21180.00 seconds - 5.00 hours 53.00 minutes 0.00
seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 107.81 degrees to 99.62 degrees - turn step is= -3.00 degrees
FlightPath: distance to last fix= 463.318170758 nautics
FlightPath: still to fly= 468.405335148 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 13123.18 meters - radius of turn= 7.09 nautics
TurnLeg: initial heading= 107.81 degrees
TurnLeg: final heading= 99.25 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 99.25 degrees
FlightPath: difference= 0.67 degrees
FlightPath: anticipated turn start from end point= 3915263.21 meters

===== great circle =====
FlightPath: distance to last fix= 462.262680946 nautics
FlightPath: still to fly= 466.442057872 nautics
GreatCircleRoute: initial way-point= turn-pt-8-99.25-degrees - latitude= 53.35 degrees -
longitude= -2.23 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= DISAL - latitude= 53.29 degrees - longitude= -1.62
degrees -altitudeMSL= 11880.74 meters
===== end of great circle =====
```



The Power of We™

"Let's Fly" Series Montreal to Frankfurt

Data Science Technology

Python Program

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```
FlightPath: still to fly= 822198.36 meters - still to fly= 443.95 nautics
FlightPath: passing waypoint: DISAL - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2777.54 nautics - real time = 21358.00 seconds - 5.00 hours 55.00 minutes 58.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 99.95 degrees to 100.15 degrees - turn step is= 3.00 degrees
FlightPath: distance to last fix= 440.307316196 nautics
FlightPath: still to fly= 443.951598144 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 22838.07 meters - radius of turn= 12.33 nautics
TurnLeg: initial heading= 99.95 degrees
TurnLeg: final heading= 100.56 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 279.78 degrees
FlightPath: difference= 0.62 degrees
FlightPath: anticipated turn start from end point= 4224223.58 meters

===== great circle =====
FlightPath: distance to last fix= 440.175022816 nautics
FlightPath: still to fly= 443.548790436 nautics
GreatCircleRoute: initial way-point= turn-pt-1-100.56-degrees - latitude= 53.29 degrees -
longitude= -1.63 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= NAPEX - latitude= 53.20 degrees - longitude= -0.83
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 767549.34 meters - still to fly= 414.44 nautics
FlightPath: passing waypoint: NAPEX - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2807.05 nautics - real time = 21579.00 seconds - 5.00 hours 59.00 minutes 39.00 seconds
```



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"Let's Fly" Series Montreal to Frankfurt

Data Science Technology

Python Program

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```
===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 100.76 degrees to 100.77 degrees - turn step is= 3.00 degrees
FlightPath: distance to last fix= 412.156996793 nautics
FlightPath: still to fly= 414.443489612 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 22838.07 meters - radius of turn= 12.33 nautics
TurnLeg: initial heading= 100.76 degrees
TurnLeg: final heading= 101.37 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 280.70 degrees
FlightPath: difference= -0.03 degrees
FlightPath: anticipated turn start from end point= 84316862.40 meters

===== great circle =====
FlightPath: distance to last fix= 412.024707332 nautics
FlightPath: still to fly= 413.48850311 nautics
GreatCircleRoute: initial way-point= turn-pt-1-101.37-degrees - latitude= 53.21 degrees -
longitude= -0.86 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= DOLAS - latitude= 52.98 degrees - longitude= 1.01
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 638373.58 meters - still to fly= 344.69 nautics
FlightPath: passing waypoint: DOLAS - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2876.80 nautics - real time = 22100.00 seconds - 6.00 hours 8.00 minutes 20.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 102.24 degrees to 100.74 degrees - turn step is= -3.00 degrees
FlightPath: distance to last fix= 343.569716246 nautics
FlightPath: still to fly= 344.694155706 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 22838.07 meters - radius of turn= 12.33 nautics
TurnLeg: initial heading= 102.24 degrees
TurnLeg: final heading= 100.39 degrees
===== end of turn leg =====
```




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"Let's Fly" Series Montreal to Frankfurt

Data Science Technology

Python Program

🔄 Apps Intellect ➡

```
FlightPath: end of turn orientation= 100.39 degrees
FlightPath: difference= 1.18 degrees
FlightPath: anticipated turn start from end point= 2208444.20 meters

===== great circle =====
FlightPath: distance to last fix= 343.17284538 nautics
FlightPath: still to fly= 344.222489214 nautics
GreatCircleRoute: initial way-point= turn-pt-3-100.39-degrees - latitude= 52.98 degrees -
longitude= 1.01 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= ENITO - latitude= 52.80 degrees - longitude= 2.48
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 537044.43 meters - still to fly= 289.98 nautics
FlightPath: passing waypoint: ENITO - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2931.51 nautics - real time = 22513.00 seconds - 6.00 hours 15.00 minutes 13.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 101.89 degrees to 101.93 degrees - turn step is= 3.00 degrees
FlightPath: distance to last fix= 289.324694773 nautics
FlightPath: still to fly= 289.980792223 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 13123.18 meters - radius of turn= 7.09 nautics
TurnLeg: initial heading= 101.89 degrees
TurnLeg: final heading= 102.96 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 281.38 degrees
FlightPath: difference= 6.20 degrees
FlightPath: anticipated turn start from end point= 421633.64 meters
```



The Power of We™

"Let's Fly" Series Montreal to Frankfurt

Data Science Technology

Python Program

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```
===== great circle =====
FlightPath: distance to last fix= 289.192419381 nautics
FlightPath: still to fly= 289.719509219 nautics
GreatCircleRoute: initial way-point= turn-pt-1-102.96-degrees - latitude= 52.80 degrees -
longitude= 2.47 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= BUKUT - latitude= 52.75 degrees - longitude= 2.83
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====

FlightPath: still to fly= 512059.16 meters - still to fly= 276.49 nautics
FlightPath: passing waypoint: BUKUT - alt= 11880.74 meters - alt= 38978.34 feet - distance=
2945.00 nautics - real time = 22614.00 seconds - 6.00 hours 16.00 minutes 54.00 seconds

===== one Turn Leg for each fix in the list =====
TurnLeg: turn from= 102.18 degrees to 108.12 degrees - turn step is= 3.00 degrees
FlightPath: distance to last fix= 276.942048883 nautics
FlightPath: still to fly= 276.489827027 nautics
TurnLeg: tas= 476.27 knots - radius of turn= 13123.18 meters - radius of turn= 7.09 nautics
TurnLeg: initial heading= 102.18 degrees
TurnLeg: final heading= 108.60 degrees
===== end of turn leg =====

FlightPath: end of turn orientation= 108.60 degrees
FlightPath: difference= 3.17 degrees
FlightPath: anticipated turn start from end point= 824869.54 meters

===== great circle =====
FlightPath: distance to last fix= 276.149280443 nautics
FlightPath: still to fly= 274.981301757 nautics
GreatCircleRoute: initial way-point= turn-pt-6-108.60-degrees - latitude= 52.75 degrees -
longitude= 2.82 degrees - altitudeMSL= 11880.74 meters
GreatCircleRoute: final way-point= EVELI - latitude= 52.64 degrees - longitude= 3.41
degrees - altitudeMSL= 11880.74 meters
===== end of great circle =====
```