



FAA

Memorandum

Date: September 13, 2018

To: James Silliman, Senior Investigator, NTSB

From: Richard D. Anderson Jr., Supervisory Inspector, EMI FSDO GL-23

Subject: Inspector Statement Regarding Download of Stratus Data

FAA IIC Douglas Peterson brought the Stratus 2S recovered from the accident site (near KHPN) of Cessna 340A, C-GLKX, to the East Michigan FSDO to recover any flight data stored in the unit. The track log data was downloaded to my ForeFlight account using the instructions in the Pilot's Guide to ForeFlight Mobile, 60th Edition, that Covers ForeFlight Mobile v10.2 on iPad.

Stratus 2S Unit:

SSID – S0110006

Part Number 153510-000008

Stratus 2S had black scrape marks to upper cover of case and tape residue on bottom of case from Velcro tape. The Stratus unit was connected to a charger but did the battery light did not illuminate indicating it was taking a charge.

My personal iPad was used to download the track log data from the Stratus to ForeFlight.

Ipad:

Model – ME280LL/A

Serial Number – F4KLW682FCM9

Software Version – iOS 11.4.1

Prior to powering on the Stratus 2S the date time on the iPad was manually set to 9/6/2018 at 0015 EDT, approximately 30 minutes after accident. This was done because the Stratus stores the last 20 hours of track log data, connecting it to an iPad with a current date/time may cause the track logs to dump if it has been more than 20 hours from power down to connection to the iPad. This information was received from ForeFlight Technical Support.

The Stratus 2S was powered on and the battery indicator was in the yellow range and the unit automatically connected to nine GPS satellites. The 2S was connected to the iPad via Wifi connection and using the instructions in the ForeFlight Pilot's Guide, 17 track logs were stored in the Stratus 2S. Nine of the 17 track logs were flights, the other logs were from the Stratus being powered on then off on the ground.

Track logs stored:

CYQS KPHN

Sep 05, 2018 22:04 CDT (Accident Flight)

CYRP CYQS

Sep 05, 2018 18:29 CDT

2h33m / 337nm / 132Kts

CYRP CYRP

Sep 05, 2018 16:58 CDT

1m38s

CYRP CYRP

Sep 05, 2018 19:23 CDT

0m15s

CYHM CYRP

Sep 04, 2018 17:48 CDT

1h34m / 228nm / 145kts

CYTZ CYHM

Sep 04, 2018 14:23 CDT

0h33m / 49nm / 86kts

CYTZ CYTZ

Sep 04, 2018 08:33 CDT

0m54s

CYRP CYTZ

Sep 04, 2018 07:05 CDT

1h27m / 191nm / 131kts

CYRP CYRP

Sep 02, 2018 20:22 CDT

0m32s

CYTS CYRP

Sep 02, 2018 18:31 CDT

1h51m / 293nm / 159kts

CYRP CYTS

Sep 02, 2108 16:02 CDT

2h15m / 293nm / 130kts

CYRP CYRP

Sep 02, 2018 15:47 CDT

1m30s

CYRP CYRP

Aug 30, 2018 20:13 CDT

3m53s

CYSB CYRP

Aug 30, 2018 14:29 CDT

1h30m / 214nm / 143kts

CYRP CYSB

Aug 29, 2108 1114 CDT

1h57m / 214nm / 110kts

CYRP CYRP

Aug 29, 2018 07:58 CDT

0m30s

CYRP CYRP

Aug 28, 2018 20:08 CDT

4m27s

When download was complete Stratus 2S battery light was in the red and battery status showing in ForeFlight was at 10% charge. Stratus 2S was then powered off.

Track logs were downloaded from ForeFlight cloud to my ForeFlight account for viewing (attached). Track logs without a distance and speed were not flights, they were created when Stratus 2S was powered up on the ground.

Accident flight was overlaid in Google Earth (attached).

Flight path for RNAV 22 approach at KPHN with fixes identified was overlaid in Google Earth (attached).

Flight path across KPHN was overlaid in Google Earth (attached).

The track log (Excel file attached) was downloaded to a .csv format in Excel and the ForeFlight Timestamp (EPOCH time) was converted to a date/Time format using the formula available on the ForeFlight Support site.

» Start Date End Date
MM/DD/YY MM/DD/YY

< 1 2 >

CYQS - KPHN
Sep 6, 2018 03:04 UTC
Total Duration: 00h 43m
Total Distance: 71.95nm

CYRP - CYQS
Sep 5, 2018 23:29 UTC
Total Duration: 02h 33m
Total Distance: 336.83nm

CYRP - CYRP
Sep 5, 2018 21:58 UTC
Total Duration: 00h 01m
Total Distance: 0.08nm

CYRP - CYRP
Sep 5, 2018 00:23 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYHM - CYRP
Sep 4, 2018 22:48 UTC
Total Duration: 01h 34m
Total Distance: 228.42nm

CYTZ - CYHM
Sep 4, 2018 19:23 UTC
Total Duration: 00h 33m
Total Distance: 48.83nm

CYTZ - CYTZ
Sep 4, 2018 13:33 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYRP - CYTZ
Sep 4, 2018 12:05 UTC
Total Duration: 01h 27m
Total Distance: 190.73nm

CYRP - CYRP
Sep 3, 2018 01:22 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYTS - CYRP
Sep 2, 2018 23:31 UTC
Total Duration: 01h 50m
Total Distance: 309.10nm

CYRP - CYTS
Sep 2, 2018 21:02 UTC
Total Duration: 02h 15m
Total Distance: 308.24nm

CYRP - CYRP
Sep 2, 2018 20:47 UTC
Total Duration: 00h 01m
Total Distance: 0.05nm



SUMMARY

Track Log Name	CYRP - CYQS
Date	Sep 5, 2018 23:29 UTC
Start	CYRP
Pilot Name	N/A
GPS Source	Stratus
Tail Number	N/A
End	CYQS
Recorded On	iPad
Imported From	Stratus
UUID	658A4ACE-FBCA-49FC-90FE-CF3C393D8E8D

METRICS

Total Distance	337 nm
Total Time	2h33m
Average Speed	132 kts

ACCURACY

Maximum Vertical Error	1m
Minimum Vertical Error	0m
Average Vertical Error	1m
Maximum Horizontal Error	1m
Minimum Horizontal Error	0m
Average Horizontal Error	0m

» Start Date End Date
MM/DD/YY MM/DD/YY

< 1 2 >

CYQS - KPHN
Sep 6, 2018 03:04 UTC
Total Duration: 00h 43m
Total Distance: 71.95nm

CYRP - CYQS
Sep 5, 2018 23:29 UTC
Total Duration: 02h 33m
Total Distance: 336.83nm

CYRP - CYRP
Sep 5, 2018 21:58 UTC
Total Duration: 00h 01m
Total Distance: 0.08nm

CYRP - CYRP
Sep 5, 2018 00:23 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYHM - CYRP
Sep 4, 2018 22:48 UTC
Total Duration: 01h 34m
Total Distance: 228.42nm

CYTZ - CYHM
Sep 4, 2018 19:23 UTC
Total Duration: 00h 33m
Total Distance: 48.83nm

CYTZ - CYTZ
Sep 4, 2018 13:33 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYRP - CYTZ
Sep 4, 2018 12:05 UTC
Total Duration: 01h 27m
Total Distance: 190.73nm

CYRP - CYRP
Sep 3, 2018 01:22 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYTS - CYRP
Sep 2, 2018 23:31 UTC
Total Duration: 01h 50m
Total Distance: 309.10nm

CYRP - CYTS
Sep 2, 2018 21:02 UTC
Total Duration: 02h 15m
Total Distance: 308.24nm

CYRP - CYRP
Sep 2, 2018 20:47 UTC
Total Duration: 00h 01m
Total Distance: 0.05nm



SUMMARY

Track Log Name	CYQS - KPHN
Date	Sep 6, 2018 03:04 UTC
Start	CYQS
Pilot Name	N/A
GPS Source	Stratus
Tail Number	N/A
End	KPHN
Recorded On	iPad
Imported From	Stratus
UUID	4D42EA2A-560E-48D3-A622-60F788E90AE3

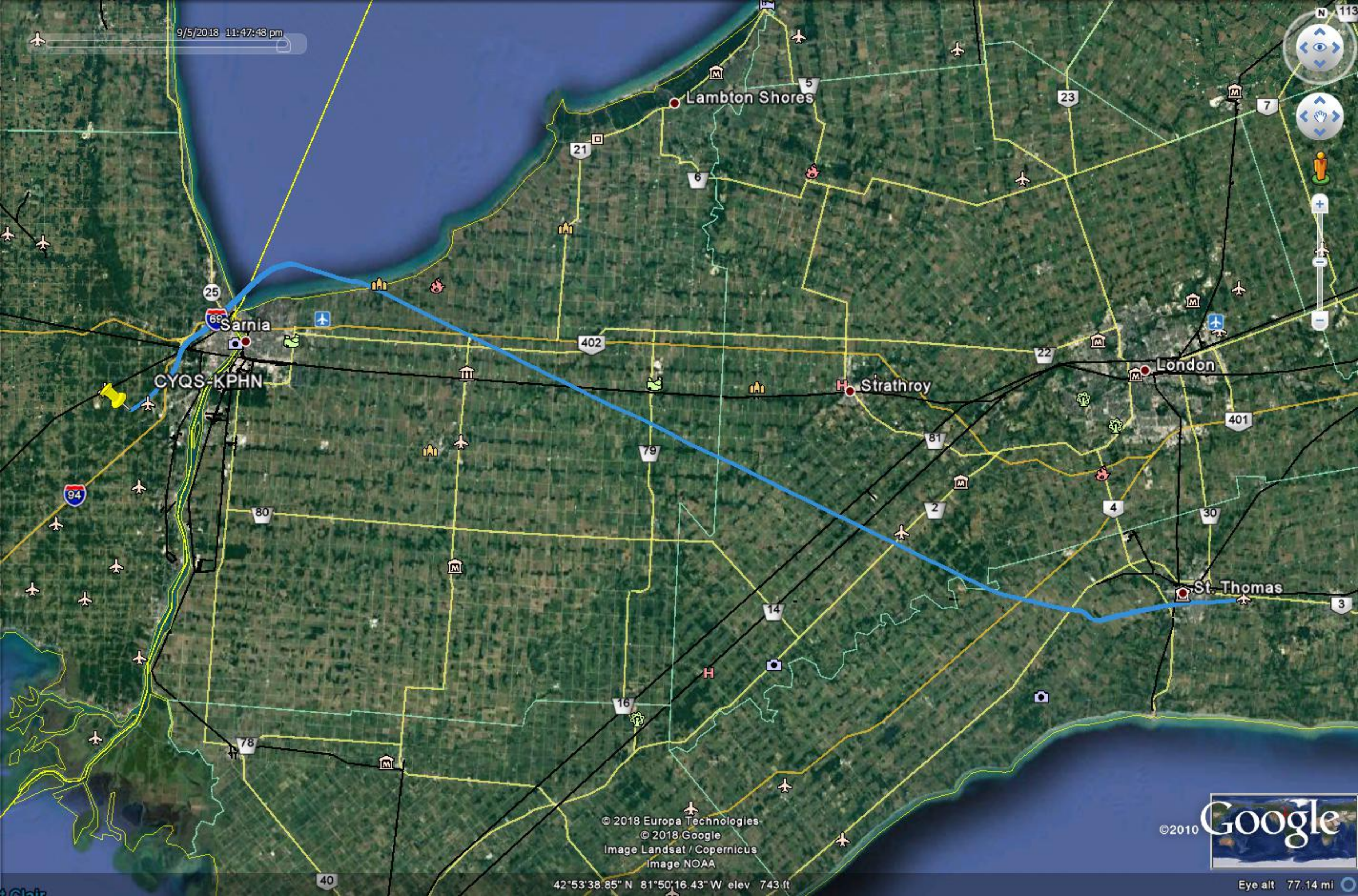
METRICS

Total Distance	72 nm
Total Time	0h43m
Average Speed	99 kts

ACCURACY

Maximum Vertical Error	3m
Minimum Vertical Error	1m
Average Vertical Error	1m
Maximum Horizontal Error	3m
Minimum Horizontal Error	1m
Average Horizontal Error	1m

9/5/2018 11:47:48 pm



Sarnia
CYQS-KPHN

Lambton Shores

Strathroy

London

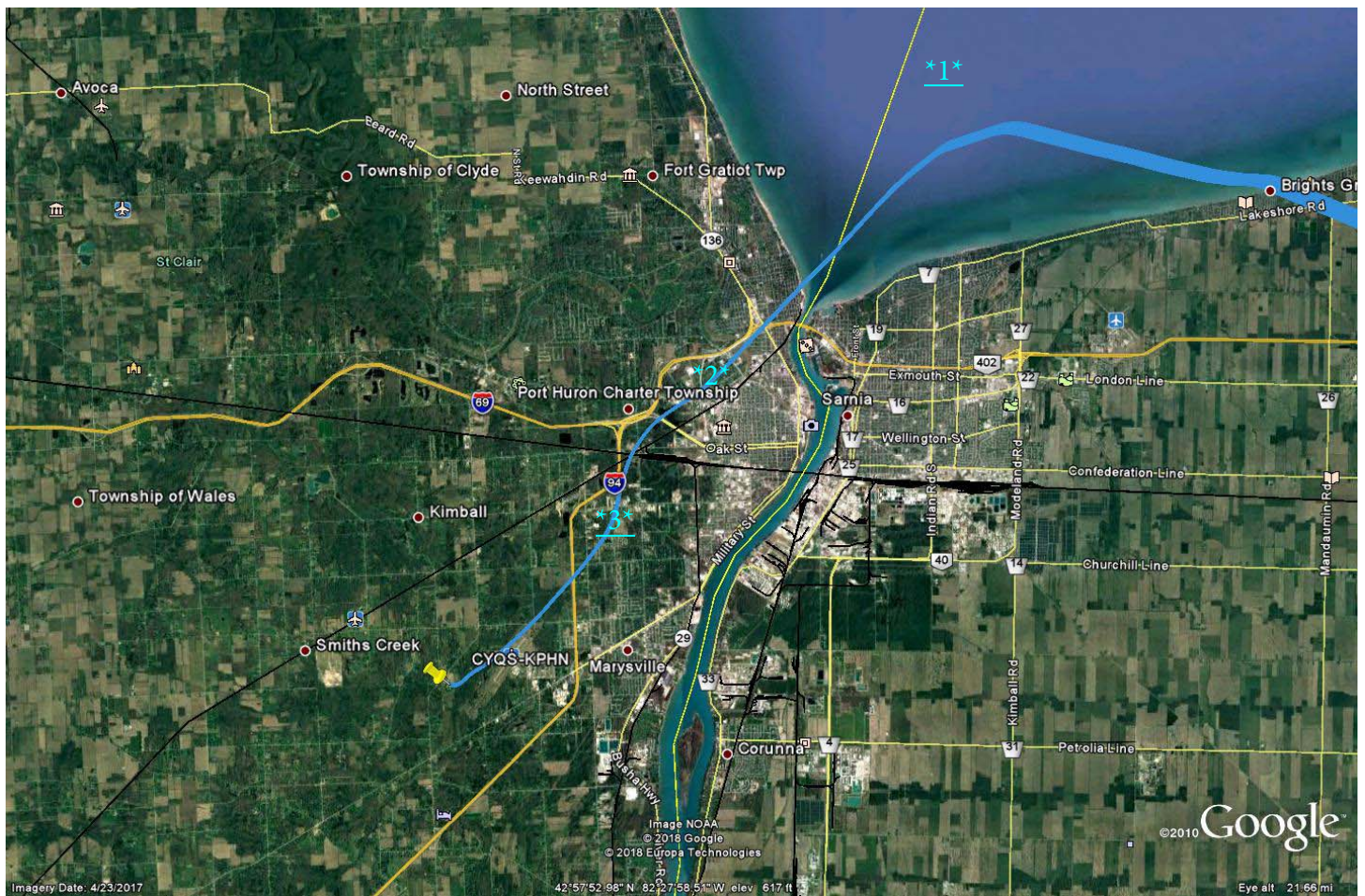
St. Thomas

© 2018 Europa Technologies
© 2018 Google
Image Landsat / Copernicus
Image NOAA

42°53'38.85" N 81°50'16.43" W elev 743 ft



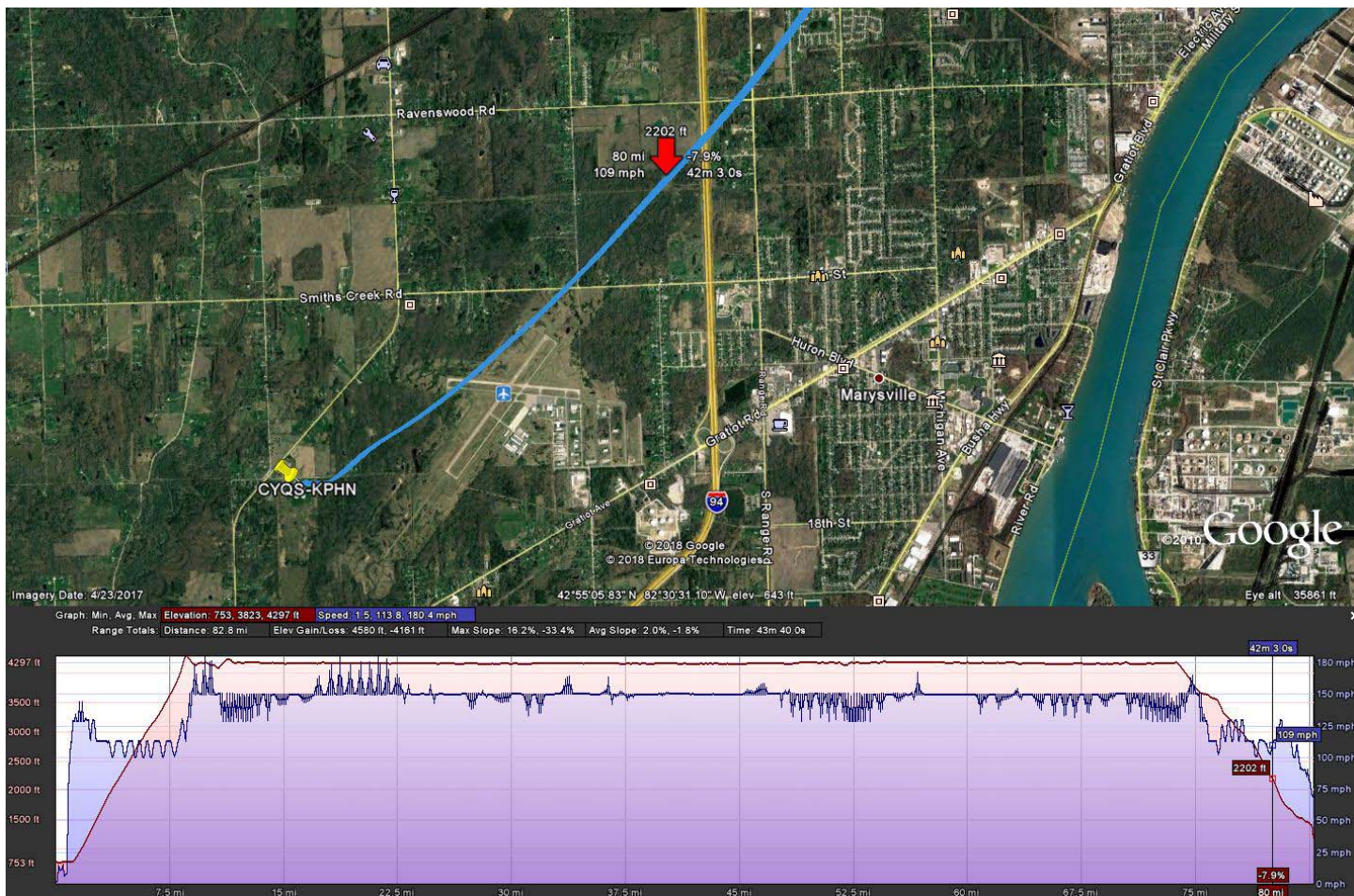
Eye alt 77.14 mi

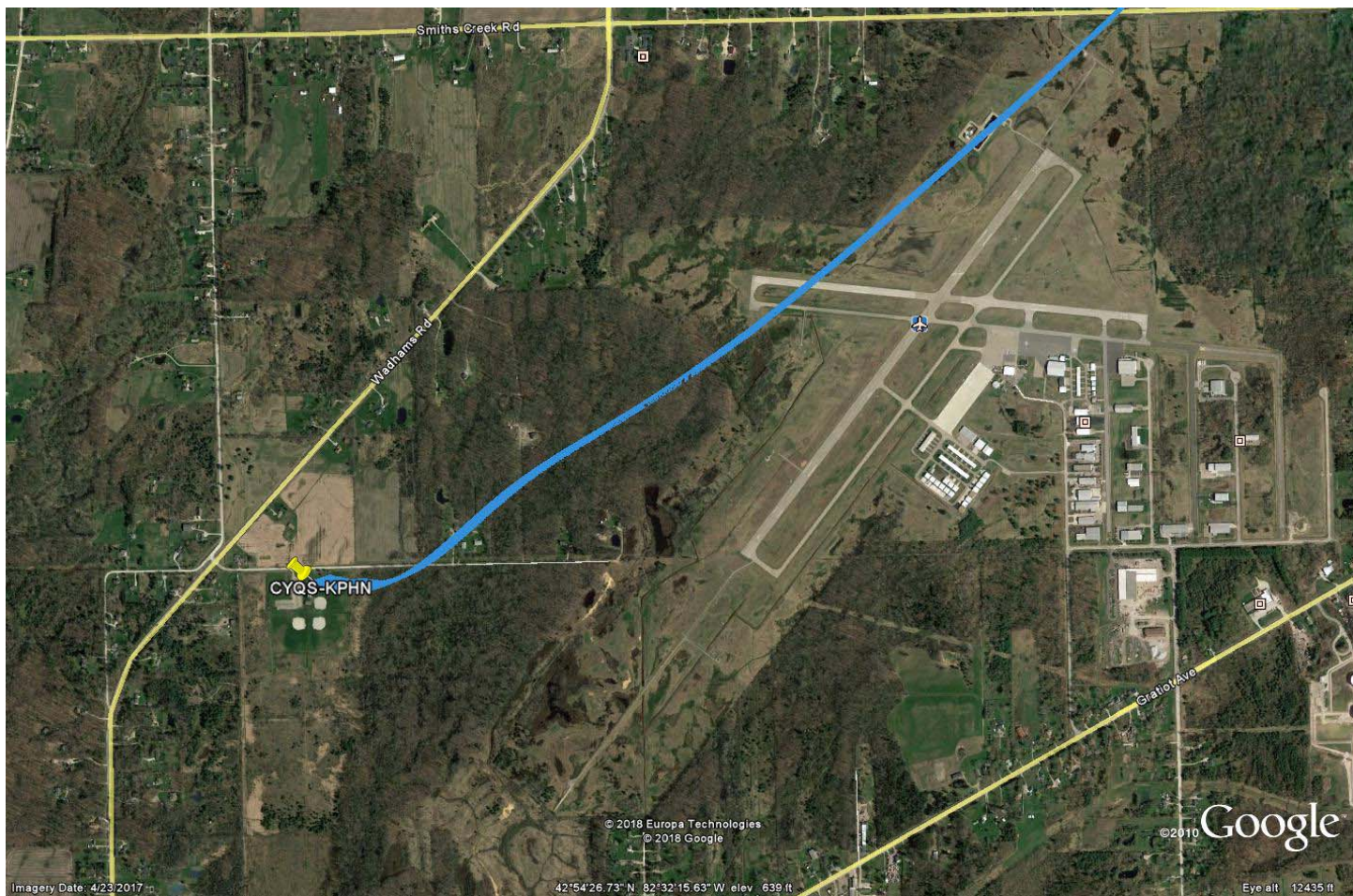


1 - WIGUK (IAF)

2 - ZORIX (FAF)

3 - JULAD





Start Date

End Date

MM/DD/YY

MM/DD/YY

< 1 2 >

CYTZ - CYHM

Sep 4, 2018 19:23 UTC
 Total Duration: 00h 33m
 Total Distance: 48.83nm

CYTZ - CYTZ

Sep 4, 2018 13:33 UTC
 Total Duration: 00h 00m
 Total Distance: 0.00nm

CYRP - CYTZ

Sep 4, 2018 12:05 UTC
 Total Duration: 01h 27m
 Total Distance: 190.73nm

CYRP - CYRP

Sep 3, 2018 01:22 UTC
 Total Duration: 00h 00m
 Total Distance: 0.00nm

CYTS - CYRP

Sep 2, 2018 23:31 UTC
 Total Duration: 01h 50m
 Total Distance: 309.10nm

CYRP - CYTS

Sep 2, 2018 21:02 UTC
 Total Duration: 02h 15m
 Total Distance: 308.24nm

CYRP - CYRP

Sep 2, 2018 20:47 UTC
 Total Duration: 00h 01m
 Total Distance: 0.05nm

CYRP - CYRP

Aug 31, 2018 01:13 UTC
 Total Duration: 00h 03m
 Total Distance: 0.01nm

CYSB - CYRP

Aug 30, 2018 19:29 UTC
 Total Duration: 01h 30m
 Total Distance: 220.59nm

CYRP - CYSB

Aug 29, 2018 16:14 UTC
 Total Duration: 01h 56m
 Total Distance: 230.20nm

CYRP - CYRP

Aug 29, 2018 12:58 UTC
 Total Duration: 00h 00m
 Total Distance: 0.06nm

KOSC - 45G

Aug 12, 2018 15:24 UTC
 Total Duration: 01h 24m
 Total Distance: 126.80nm



SUMMARY

Track Log Name	CYRP - CYTZ
Date	Sep 4, 2018 12:05 UTC
Start	CYRP
Pilot Name	N/A
GPS Source	Stratus
Tail Number	N/A
End	CYTZ
Recorded On	iPad
Imported From	Stratus
UUID	6EAB4EA2-7230-4022-97B5-2B9797969655

METRICS

Total Distance	191 nm
Total Time	1h27m
Average Speed	131 kts

ACCURACY

Maximum Vertical Error	10m
Minimum Vertical Error	0m
Average Vertical Error	1m
Maximum Horizontal Error	6m
Minimum Horizontal Error	0m
Average Horizontal Error	0m

» Start Date End Date
MM/DD/YY MM/DD/YY

< 1 2 >

CYQS - KPHN
Sep 6, 2018 03:04 UTC
Total Duration: 00h 43m
Total Distance: 71.95nm

CYRP - CYQS
Sep 5, 2018 23:29 UTC
Total Duration: 02h 33m
Total Distance: 336.83nm

CYRP - CYRP
Sep 5, 2018 21:58 UTC
Total Duration: 00h 01m
Total Distance: 0.08nm

CYRP - CYRP
Sep 5, 2018 00:23 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYHM - CYRP
Sep 4, 2018 22:48 UTC
Total Duration: 01h 34m
Total Distance: 228.42nm

CYTZ - CYHM
Sep 4, 2018 19:23 UTC
Total Duration: 00h 33m
Total Distance: 48.83nm

CYTZ - CYTZ
Sep 4, 2018 13:33 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYRP - CYTZ
Sep 4, 2018 12:05 UTC
Total Duration: 01h 27m
Total Distance: 190.73nm

CYRP - CYRP
Sep 3, 2018 01:22 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYTS - CYRP
Sep 2, 2018 23:31 UTC
Total Duration: 01h 50m
Total Distance: 309.10nm

CYRP - CYTS
Sep 2, 2018 21:02 UTC
Total Duration: 02h 15m
Total Distance: 308.24nm

CYRP - CYRP
Sep 2, 2018 20:47 UTC
Total Duration: 00h 01m
Total Distance: 0.05nm



SUMMARY

Track Log Name	CYTZ - CYHM
Date	Sep 4, 2018 19:23 UTC
Start	CYTZ
Pilot Name	N/A
GPS Source	Stratus
Tail Number	N/A
End	CYHM
Recorded On	iPad
Imported From	Stratus
UUID	0C820168-45A3-4B8E-B78C-0413F88F2C63

METRICS

Total Distance	49 nm
Total Time	0h33m
Average Speed	86 kts

ACCURACY

Maximum Vertical Error	3m
Minimum Vertical Error	0m
Average Vertical Error	1m
Maximum Horizontal Error	2m
Minimum Horizontal Error	0m
Average Horizontal Error	1m

>> Start Date End Date
MM/DD/YY MM/DD/YY

< 1 2 >

CYQS - KPHN
Sep 6, 2018 03:04 UTC
Total Duration: 00h 43m
Total Distance: 71.95nm

CYRP - CYQS
Sep 5, 2018 23:29 UTC
Total Duration: 02h 33m
Total Distance: 336.83nm

CYRP - CYRP
Sep 5, 2018 21:58 UTC
Total Duration: 00h 01m
Total Distance: 0.08nm

CYRP - CYRP
Sep 5, 2018 00:23 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYHM - CYRP
Sep 4, 2018 22:48 UTC
Total Duration: 01h 34m
Total Distance: 228.42nm

CYTZ - CYHM
Sep 4, 2018 19:23 UTC
Total Duration: 00h 33m
Total Distance: 48.83nm

CYTZ - CYTZ
Sep 4, 2018 13:33 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYRP - CYTZ
Sep 4, 2018 12:05 UTC
Total Duration: 01h 27m
Total Distance: 190.73nm

CYRP - CYRP
Sep 3, 2018 01:22 UTC
Total Duration: 00h 00m
Total Distance: 0.00nm

CYTS - CYRP
Sep 2, 2018 23:31 UTC
Total Duration: 01h 50m
Total Distance: 309.10nm

CYRP - CYTS
Sep 2, 2018 21:02 UTC
Total Duration: 02h 15m
Total Distance: 308.24nm

CYRP - CYRP
Sep 2, 2018 20:47 UTC
Total Duration: 00h 01m
Total Distance: 0.05nm



SUMMARY

Track Log Name	CYHM - CYRP
Date	Sep 4, 2018 22:48 UTC
Start	CYHM
Pilot Name	N/A
GPS Source	Stratus
Tail Number	N/A
End	CYRP
Recorded On	iPad
Imported From	Stratus
UUID	12951839-EC46-48C5-AF14-2441BBDFB4BA

METRICS

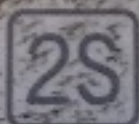
Total Distance	228 nm
Total Time	1h34m
Average Speed	145 kts

ACCURACY

Maximum Vertical Error	9m
Minimum Vertical Error	0m
Average Vertical Error	1m
Maximum Horizontal Error	8m
Minimum Horizontal Error	0m
Average Horizontal Error	0m



STRATUS



STRATUS

2S

APPAREO



ForeFlight

sporty's



Direction of Flight

SSID:

Stratus2S011006



PN: 153510-000008

Contains FCC ID: YOPGS2100MIP

Made in the USA

ATTENTION: Stratus contains a lithium-ion battery.
Do not expose to high temperatures. Do not store in your aircraft or vehicle.

MITRE

POWERUP APPLIED

This system incorporates elements of the UAS technology developed by MITRE Corporation on behalf of the U.S. Government.

FC



Back

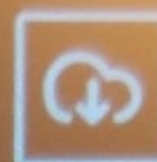
Stratus Track Logs

Clear

LAST 7 DAYS

CYQS

Sep 05, 2018 22:04 CDT



CYRP CYQS

Sep 05, 2018 18:29 CDT

2h34m | 267nm | 105kts



CYRP CYRP

Sep 05, 2018 16:58 CDT

1m38s



CYRP CYRP

Sep 04, 2018 19:23 CDT

0m15s



CYHM CYRP

Sep 04, 2018 17:48 CDT

1h35m | 212nm | 135kts



CYTZ CYHM

Sep 04, 2018 14:23 CDT

0h34m | 37nm | 65kts



CYTZ CYTZ

Sep 04, 2018 08:33 CDT

0m54s



00:38 CDT

Stratus, No 1

Back

Stratus Track Logs

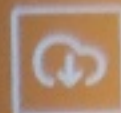
Clear

LAST 7 DAYS

CYTS CYRP

Sep 02, 2018 18:31 CDT

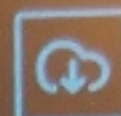
1h51m | 293nm | 159kts



CYRP CYTS

Sep 02, 2018 16:02 CDT

2h15m | 293nm | 130kts



CYRP CYRP

Sep 02, 2018 15:47 CDT

1m30s



CYRP CYRP

Aug 30, 2018 20:13 CDT

3m53s



CYSB CYRP

Aug 30, 2018 14:29 CDT

1h30m | 214nm | 143kts



OLDER

CYRP CYSB

Aug 29, 2018 11:14 CDT

1h57m | 214nm | 110kts



CYRP CYRP

Aug 29, 2018 07:58 CDT

0m30s



CYRP CYRP

Aug 28, 2018 20:08 CDT

4m27s

