

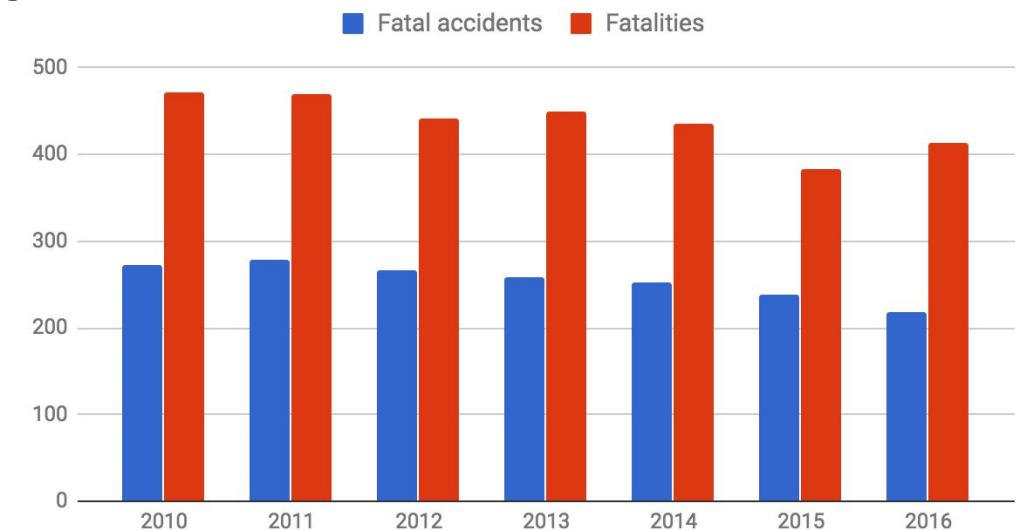
1200.aero: Aircraft Monitoring for General Aviation

Ivan Vasquez – Calido.co



General Aviation Facts (2017)

- Every year: 200+ fatal accidents, 400+ lives
- Many more serious accidents and injuries
- Most due to pilot error
- Uncontrolled airspace: See and avoid
- Aging fleet, slow tech advancement
- Declining pilot population
- “6x more hazardous than driving a car”



Source: FAA Fact Sheet – General Aviation Safety, July 2017

FAA Fact Sheet – General Aviation Safety

https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=21274



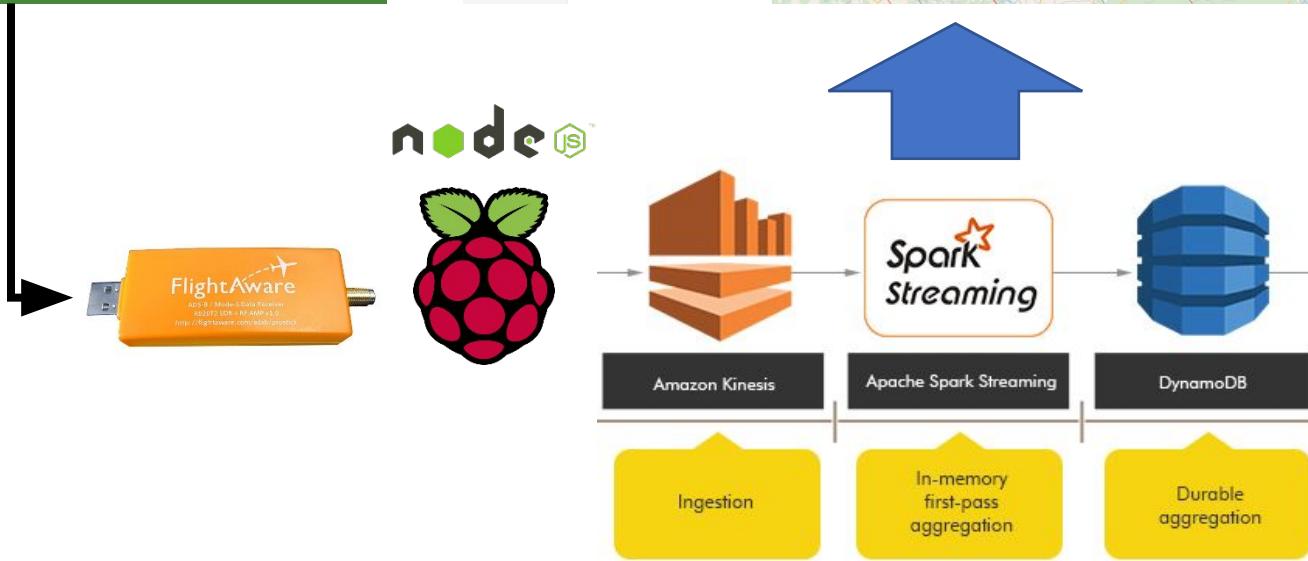
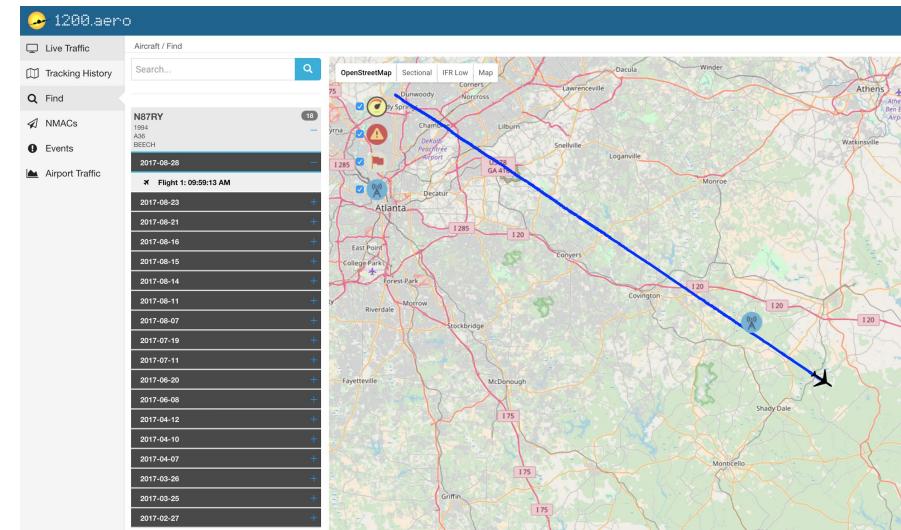
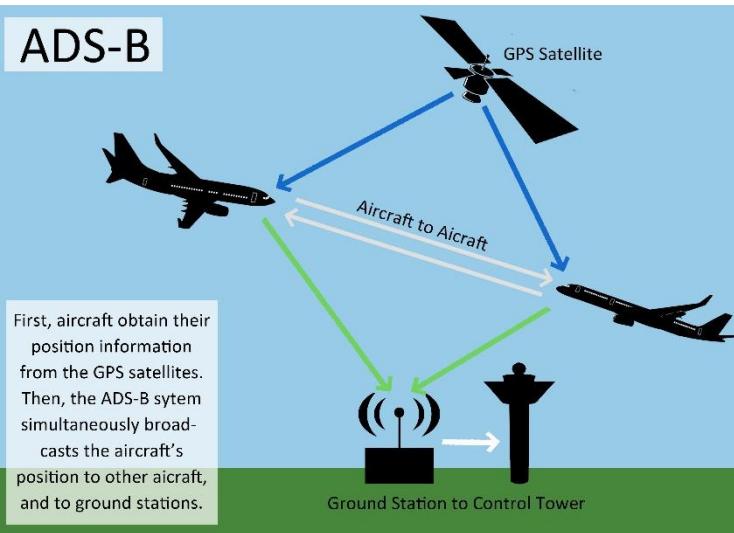
Motivation

- Most GA flights originate from distant, non-towered airports
- Search and rescue operations take hours or days to locate site
- By Jan 1 2020, most aircraft must broadcast vital flight data (ADS-B)
- Adoption is underway, providing unprecedented raw data
- Existing solutions (FlightAware, FlightRadar24)
 - focus on commercial aviation,
 - lack coverage for low-flying aircraft,
 - proprietary,
 - expensive

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- Purpose:
 - Learning tool for general aviation (flight debriefs, ground sessions)
 - Facilitate search and rescue operations
- Capabilities:
 - Aircraft tracking
 - Near mid-air collision detection
 - Hazardous events
 - Airport traffic patterns
 - Proactive notifications*

1200.aero: Solution Design



Live Traffic



Student Pilot

Tracking History



CFI

Near-miss Detection

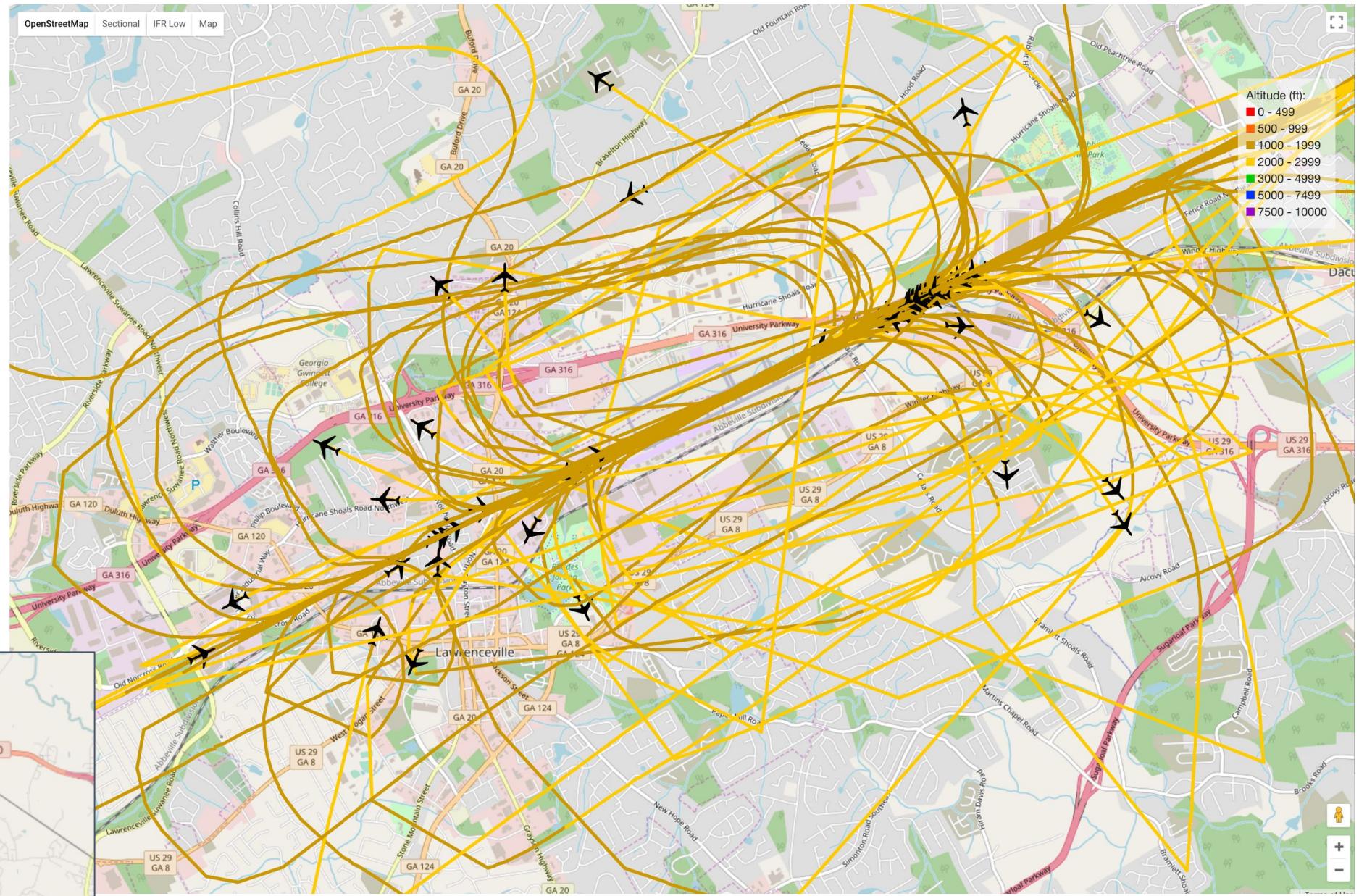
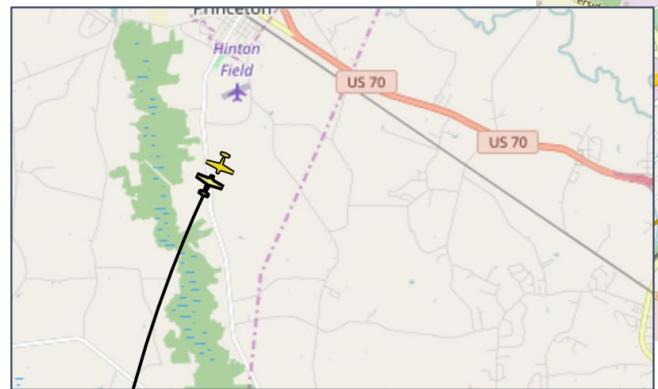
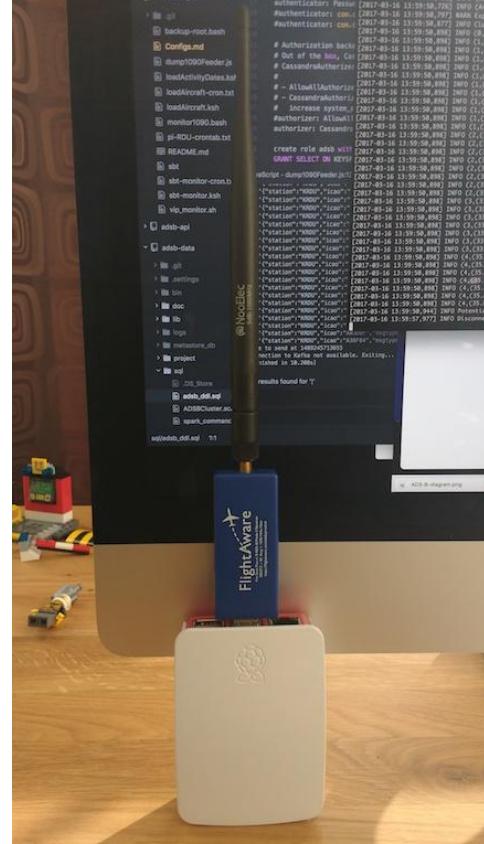


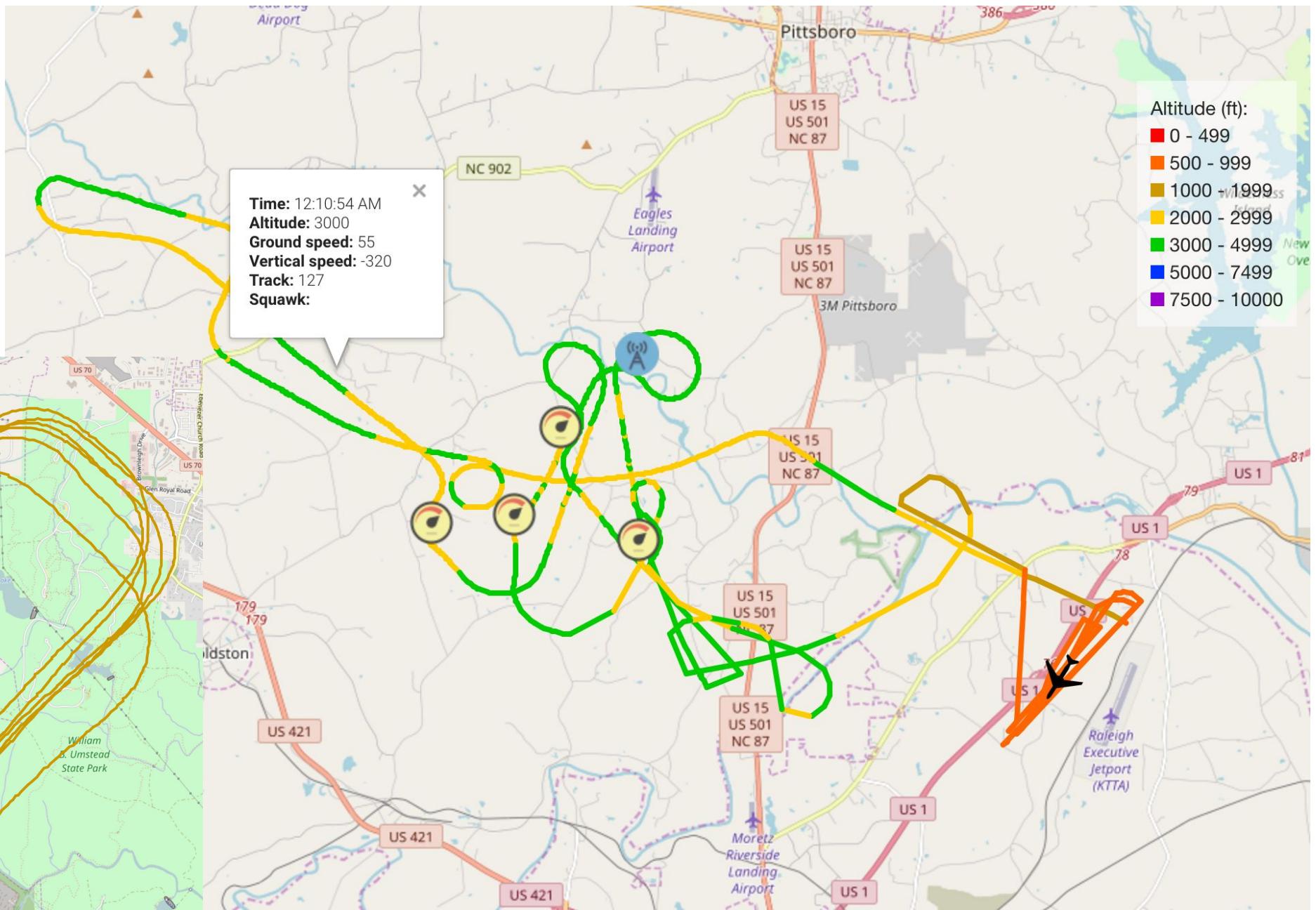
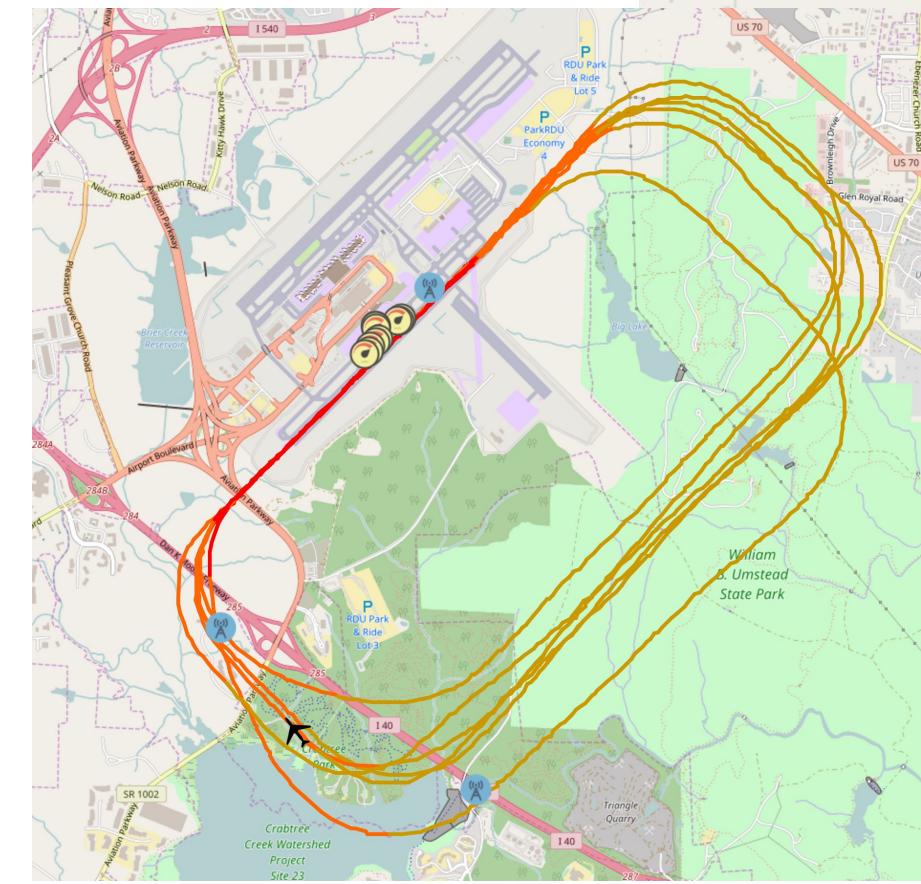
Admin

Hazardous Events

Airport Traffic

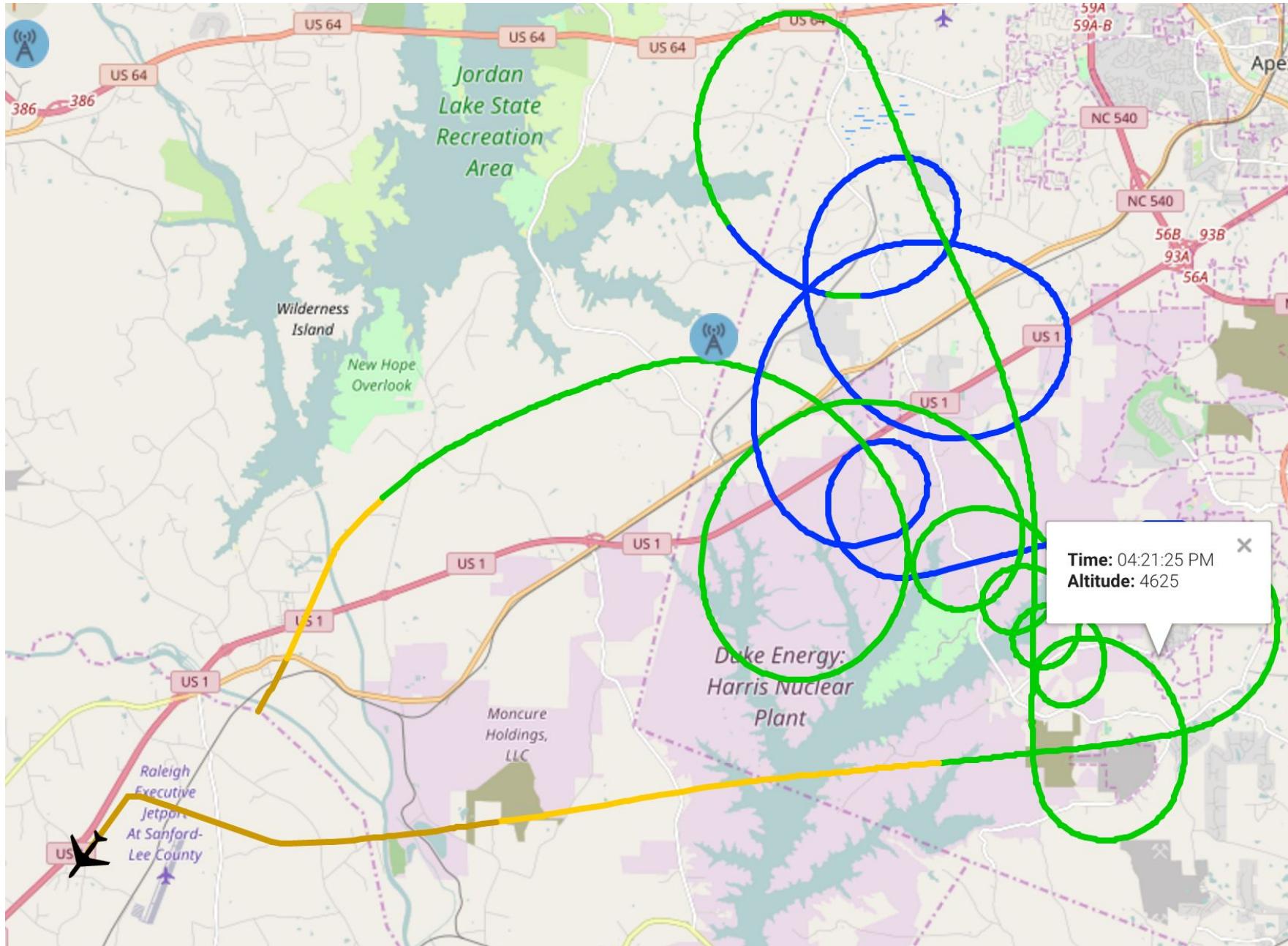
Proactive Notifications



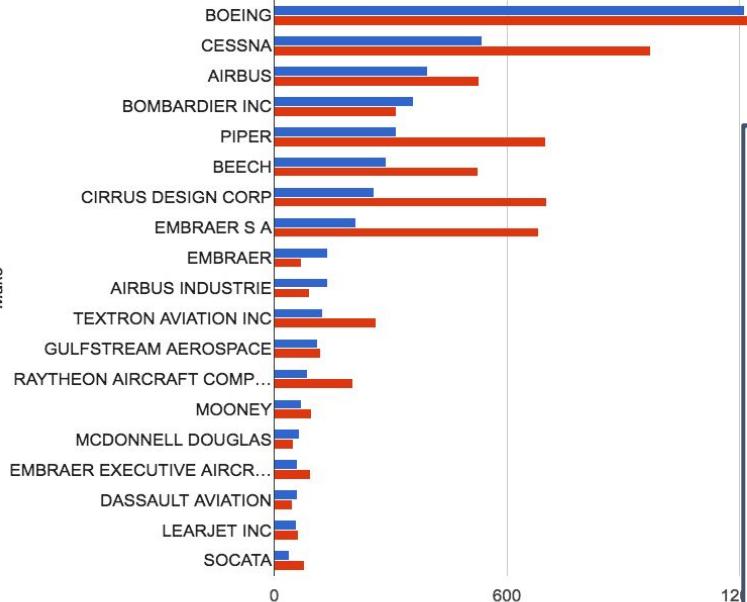


Altitude (ft):

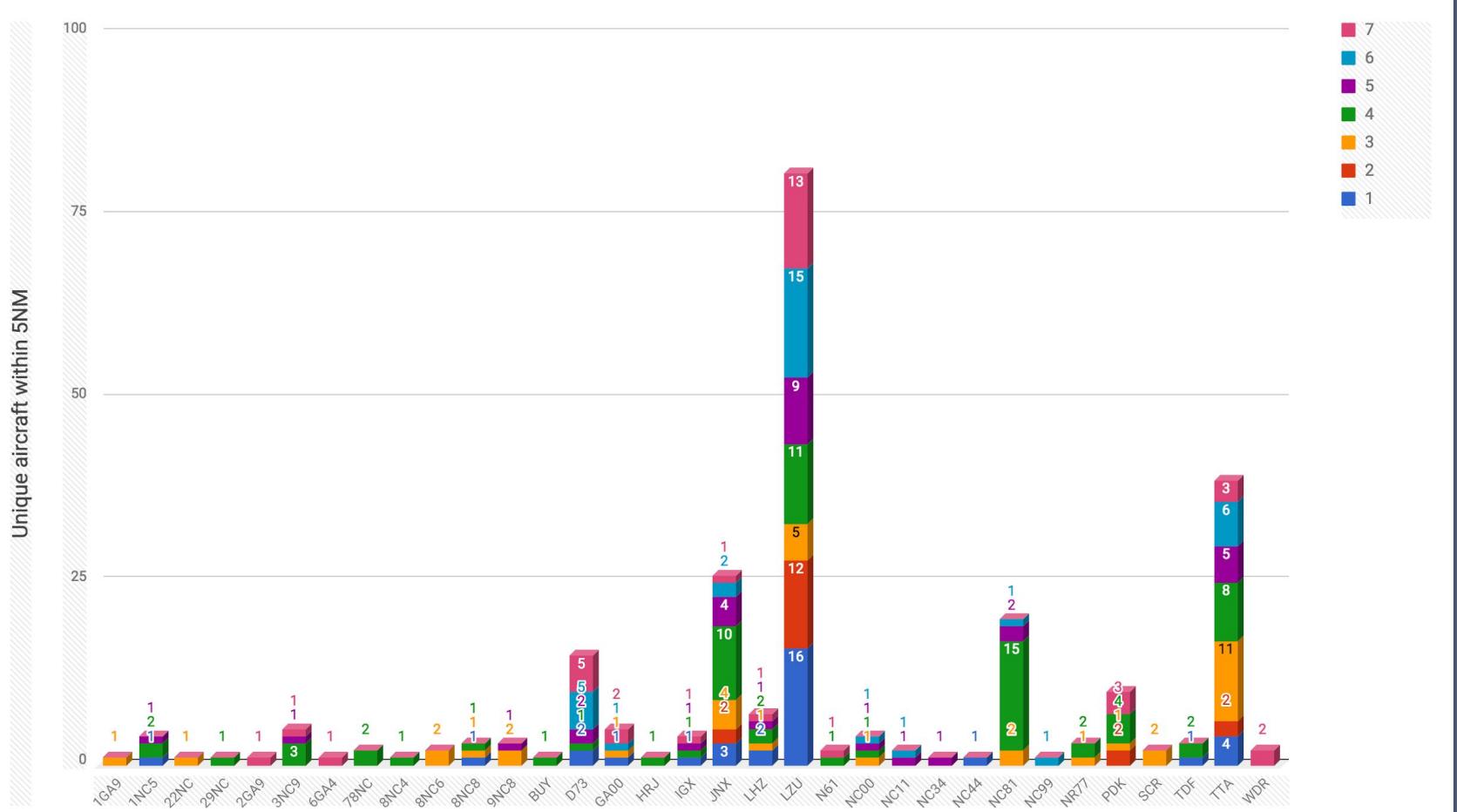
- 0 - 499
- 500 - 999
- 1000 - 1999
- 2000 - 2999
- 3000 - 4999
- 5000 - 7499
- 7500 - 10000



ADS-B Out Stats - April 2017



Weekly Traffic



Available Data

- **Messages:** All data below 10,000ft, every 1 sec
- **Near misses:** 2+ aircraft < 500ft, 20 sec intervals
- **Airport traffic:** Aircraft within 5NM of some airport
- **Events:** Interesting flight events
 - Low altitude
 - Descent rate
 - Emergency
 - Combination of the above
- **Weather data:** Historical weather reports, updated every hour
- FAA public databases:
 - Aircraft
 - Airports

Near-Misses (NMACs) table:

day	eventtime	icao	gentime	alert	alt	callsign	emerg	gndspd	ident	isgnd	lat	lon	sqwk	station	trk	vspd
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:56:59+0000	null	3600	null	null	157	null	null	35.6758995056	-79.4046020508	null	KRDU	353	-64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:00+0000	null	3600	N6026Y	null	157	null	null	35.676700592	-79.4047393799	null	KRDU	353	-64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:01+0000	null	3600	null	null	157	null	null	35.6775894165	-79.4049072266	null	KRDU	353	-64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:02+0000	null	3600	null	null	157	null	null	35.6782417297	-79.4049987793	null	KRDU	353	null
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:03+0000	null	3600	null	null	157	null	null	35.6786499023	-79.4051208496	null	KRDU	353	128
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:05+0000	null	3600	N6026Y	null	157	null	null	35.6806106567	-79.4054412842	null	KRDU	353	128
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:07+0000	null	3600	null	null	156	null	null	35.6818084717	-79.405632019	null	KRDU	353	192
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:08+0000	null	3600	null	null	156	null	null	35.6825408936	-79.4057998657	null	KRDU	353	64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:09+0000	null	3600	null	null	156	null	null	35.6833114624	-79.4059066772	null	KRDU	353	64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:10+0000	null	3600	null	null	156	null	null	35.684009552	-79.4060287476	null	KRDU	353	null
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:11+0000	null	3600	null	null	156	null	null	35.6843414307	-79.4060821533	null	KRDU	null	null
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:12+0000	null	3600	null	null	157	null	null	35.6850090027	-79.4061965942	null	KRDU	353	-64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:13+0000	null	3600	null	null	157	null	null	35.6862487793	-79.4064331055	null	KRDU	353	-64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:14+0000	null	3600	null	null	157	null	null	35.6865310669	-79.4064865112	null	KRDU	353	null
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:15+0000	null	3600	null	null	157	null	null	35.6874389648	-79.4066619873	null	KRDU	353	64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:16+0000	null	3600	null	null	157	null	null	35.6878318787	-79.4067306519	null	KRDU	353	64
2017-07-23	2017-07-23 19:57:20+0000	A7D1EE	2017-07-23 19:57:18+0000	null	3600	null	null	158	null	null	35.6896400452	-79.4070587158	null	KRDU	353	null
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2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:00+0000	null	4200	N613DR	null	169	null	null	35.6838302612	-79.4118118286	null	KRDU	116	-64
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:01+0000	null	4200	null	null	169	null	null	35.6835899353	-79.411277771	null	KRDU	116	-64
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:03+0000	null	4200	null	null	169	null	null	35.682800293	-79.4091796875	null	KRDU	116	-128
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:04+0000	null	4200	null	null	169	null	null	35.6826286316	-79.408782959	null	KRDU	116	-128
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:06+0000	null	4200	null	null	170	null	null	35.6817817688	-79.4066085815	null	KRDU	116	-128
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:07+0000	null	4200	null	null	170	null	null	35.681640625	-79.4062576294	null	KRDU	116	-256
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:08+0000	null	4200	null	null	170	null	null	35.681011169	-79.405456543	null	KRDU	null	null
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:09+0000	null	4200	null	null	170	null	null	35.6809806824	-79.4046020508	null	KRDU	116	-192
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:10+0000	null	4200	null	null	171	null	null	35.680602478	-79.4038009644	null	KRDU	116	-128
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:13+0000	null	4100	null	null	172	null	null	35.6793785095	-79.4005432129	null	KRDU	null	null
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2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:15+0000	null	4100	N613DR	null	172	null	null	35.6787490845	-79.3988418579	null	KRDU	114	null
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:16+0000	null	4100	null	null	172	null	null	35.6784286499	-79.3979034424	null	KRDU	114	64
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:17+0000	null	4100	null	null	172	null	null	35.6781005859	-79.3969268799	null	KRDU	114	128
2017-07-23	2017-07-23 19:57:20+0000	A7FA3E	2017-07-23 19:57:18+0000	null	4100	null	null	172	null	null	35.6779098511	-79.3964996338	null	KRDU	113	128

Event timestamp
Airplane 1

Airplane 2