

# Using ADS-B data in accident investigations

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# What is ADS-B?

## AUTOMATIC

Data sent without pilot input or action.

## DEPENDENT

GNSS signal required for position updates.

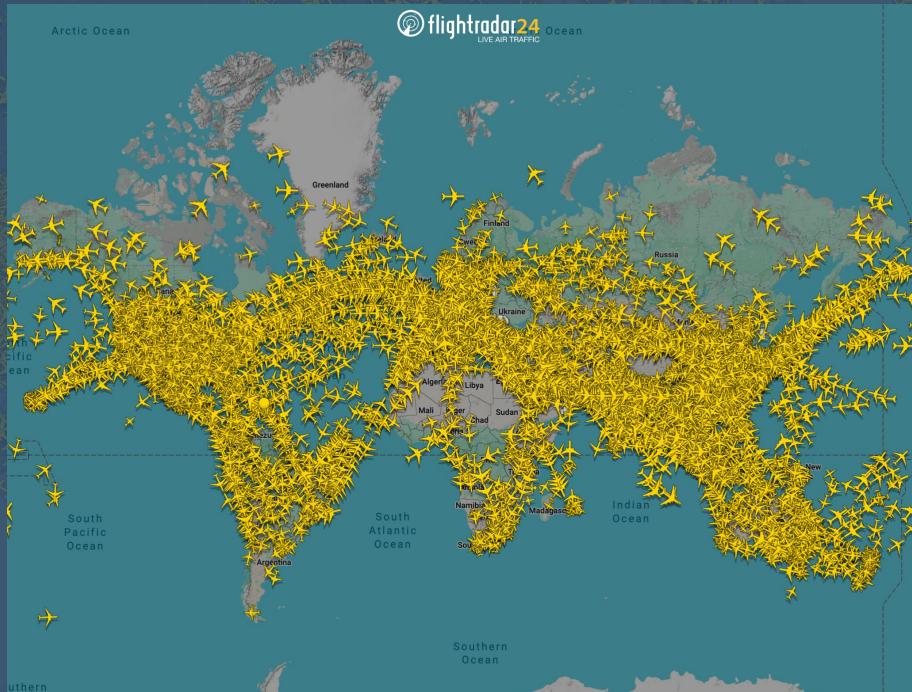
## SURVEILLANCE

Used by ANSPs and others to know the position of the aircraft.

## BROADCAST

Signal constantly sent “in the blind”.

# What is Flightradar24?



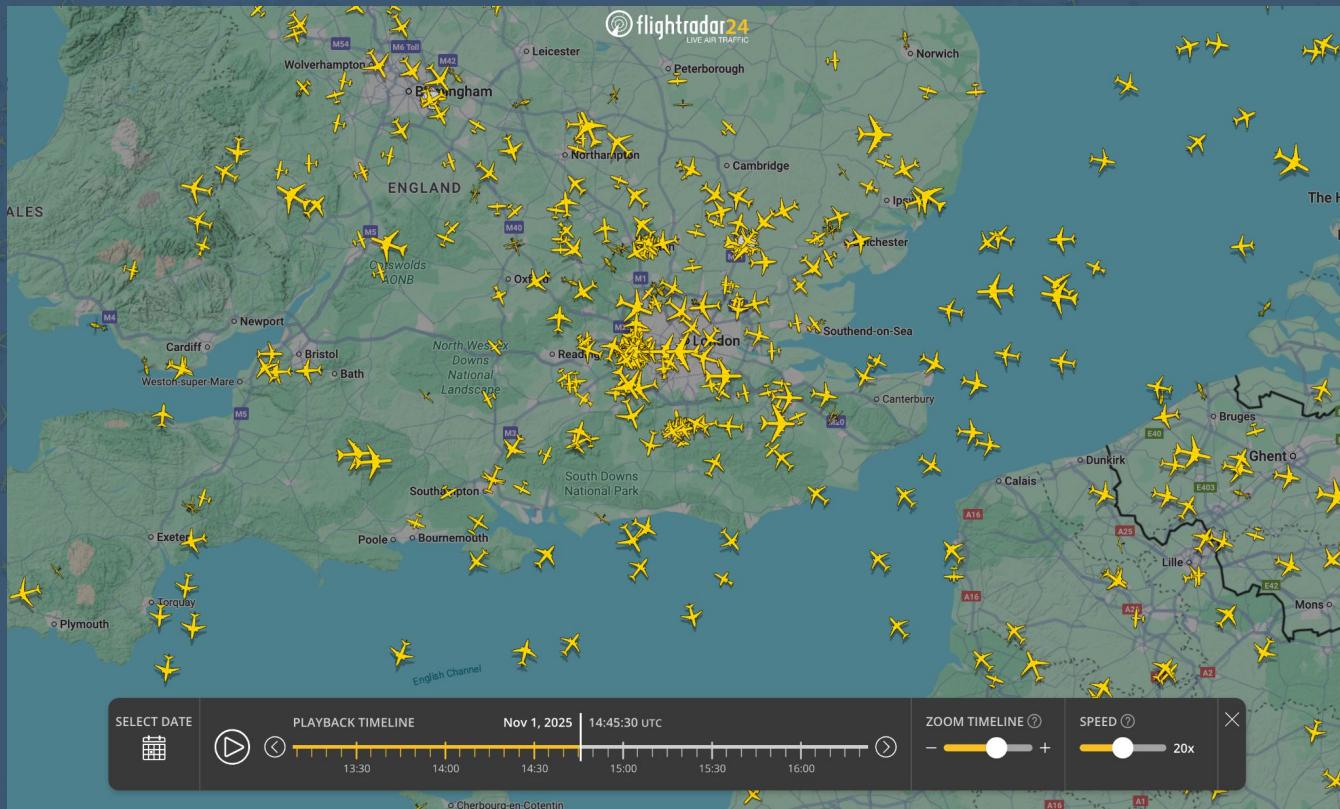
- Global flight tracking
- 55,000 terrestrial receivers
- 200,000+ flights per day

# How does Flightradar24 collect data?

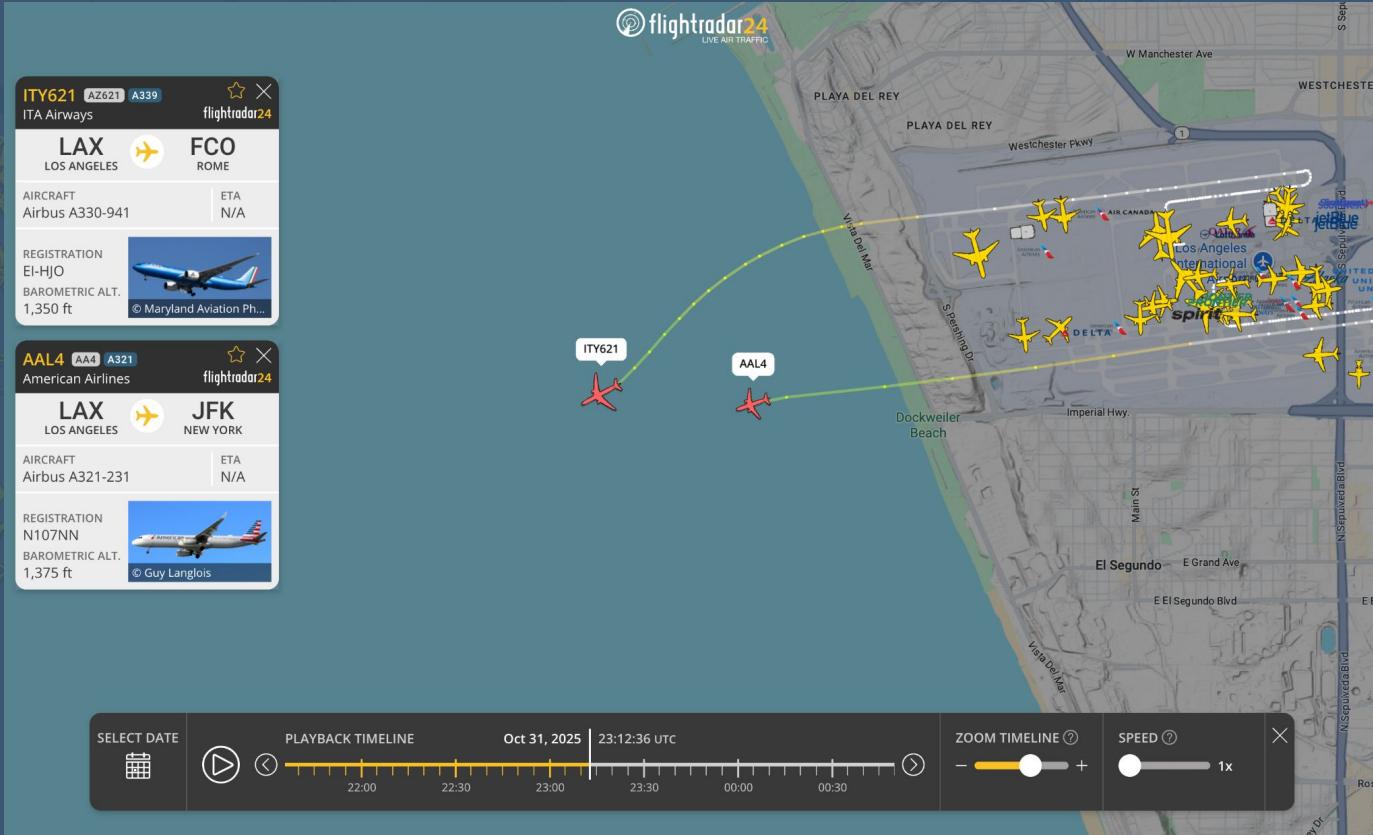


- Flightradar24's own receivers
- Home-built receivers
- Satellite-based sources
- External sources

# Playback-enhanced situational awareness



# Playback-enhanced situational awareness



# Self-service data

Playback of flight EK9788 / UAE9788

GREAT CIRCLE DISTANCE  
5,956 KM

AVERAGE FLIGHT TIME  
6:42

ACTUAL FLIGHT TIME  
6:53

AVERAGE ARRIVAL DELAY  
0:00

FROM Dubai (DWC) ⚡ TO Hong Kong (HKG)

TIME 19:53 UTC BAROMETRIC ALTITUDE 0 FT GROUND SPEED 50 KTS VERTICAL SPEED 0 FPM

GPS ALTITUDE N/A TRUE AIRSPEED N/A INDICATED AIRSPEED N/A

TRACK 25° SQUAWK 0540

AIRCRAFT Boeing 747-481(BDSF)  
REGISTRATION TC-ACF  
SERIAL NUMBER (MSN) 25645

DATE FROM TO FLIGHT FLIGHT TIME STD ATD STA STATUS

19 Oct 2025 Dubai (DWC) Hong Kong (HKG) EK9788 6:53 17:00 16:59 05:20 Landed 03:53

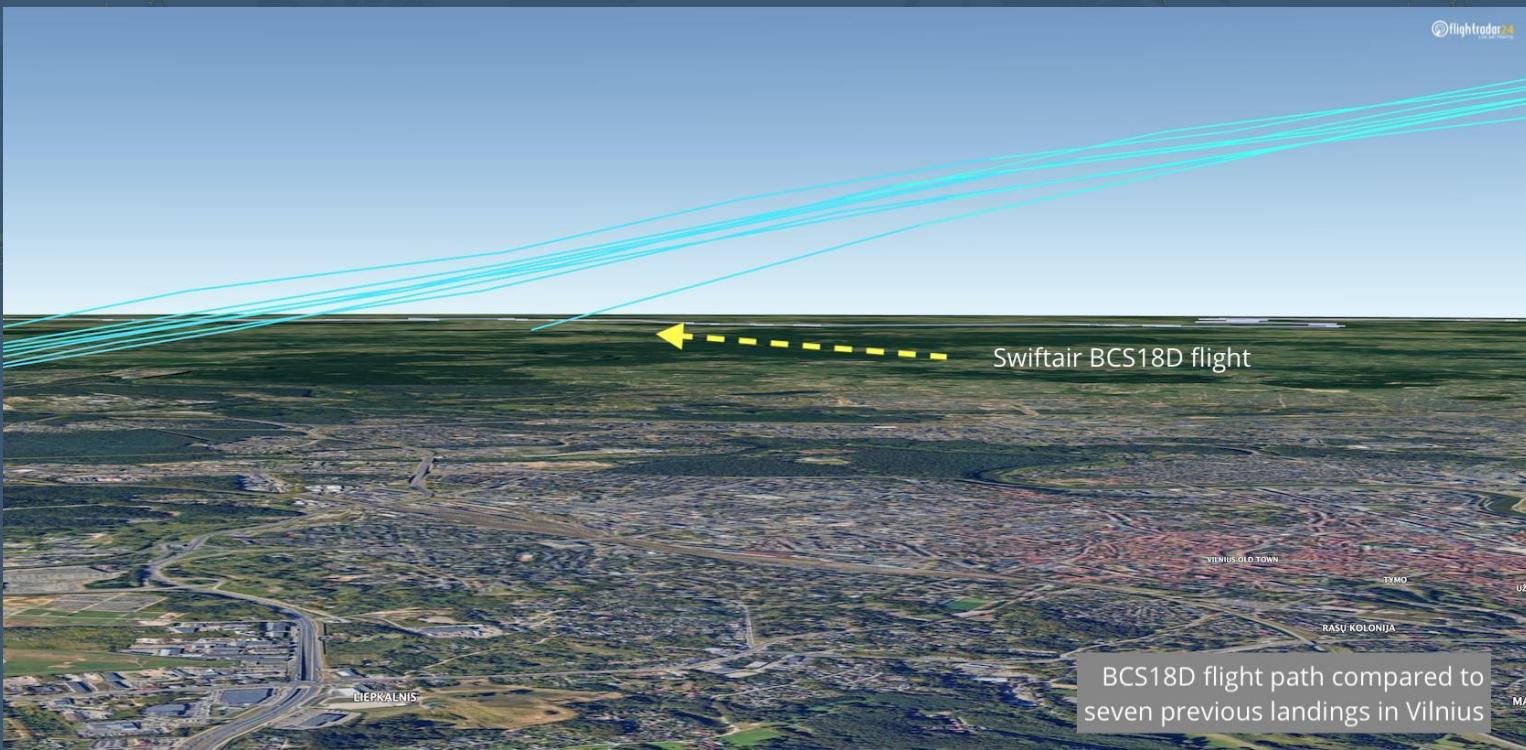
[KML](#) [CSV](#) [Play](#)

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# Standard CSV – full flights at a glance

A	B	C	D	E	F	G
Timestamp	UTC	Callsign	Position	Altitude	Speed	Direction
1760878523	2025-10-19T12:55:23Z	UAE9788	24.886311,55.167934	0	19	120
1760878532	2025-10-19T12:55:32Z	UAE9788	24.885767,55.168896	0	19	120
1760878615	2025-10-19T12:56:55Z	UAE9788	24.882008,55.175705	0	0	120
1760878631	2025-10-19T12:57:11Z	UAE9788	24.88155,55.176609	0	0	112
1760878806	2025-10-19T13:00:06Z	UAE9788	24.896805,55.16098	375	158	302
1760878813	2025-10-19T13:00:13Z	UAE9788	24.899551,55.1563	600	157	302
1760878822	2025-10-19T13:00:22Z	UAE9788	24.90312,55.15007	850	157	301
1760878830	2025-10-19T13:00:30Z	UAE9788	24.906332,55.144318	1125	158	301
1760878838	2025-10-19T13:00:38Z	UAE9788	24.909531,55.138653	1400	158	301
1760878846	2025-10-19T13:00:46Z	UAE9788	24.912756,55.132919	1650	162	301
1760878853	2025-10-19T13:00:53Z	UAE9788	24.91527,55.128513	1825	163	302
1760878861	2025-10-19T13:01:01Z	UAE9788	24.91864,55.122681	2125	163	302
1760878869	2025-10-19T13:01:09Z	UAE9788	24.921833,55.117062	2400	164	301
1760878878	2025-10-19T13:01:18Z	UAE9788	24.925415,55.110676	2650	167	301
1760878884	2025-10-19T13:01:24Z	UAE9788	24.927795,55.106403	2825	170	301

# KML – useful for comparisons



# Bulk historical data

## Events

- List of historical flights meeting selected criteria

## Positions

- Positions for all historical flights meeting selected criteria

Airline | Airport | Route | Aircraft type | Aircraft category |  
Country | FIR | Other

Use case: information needed for pattern analysis

# Granular data

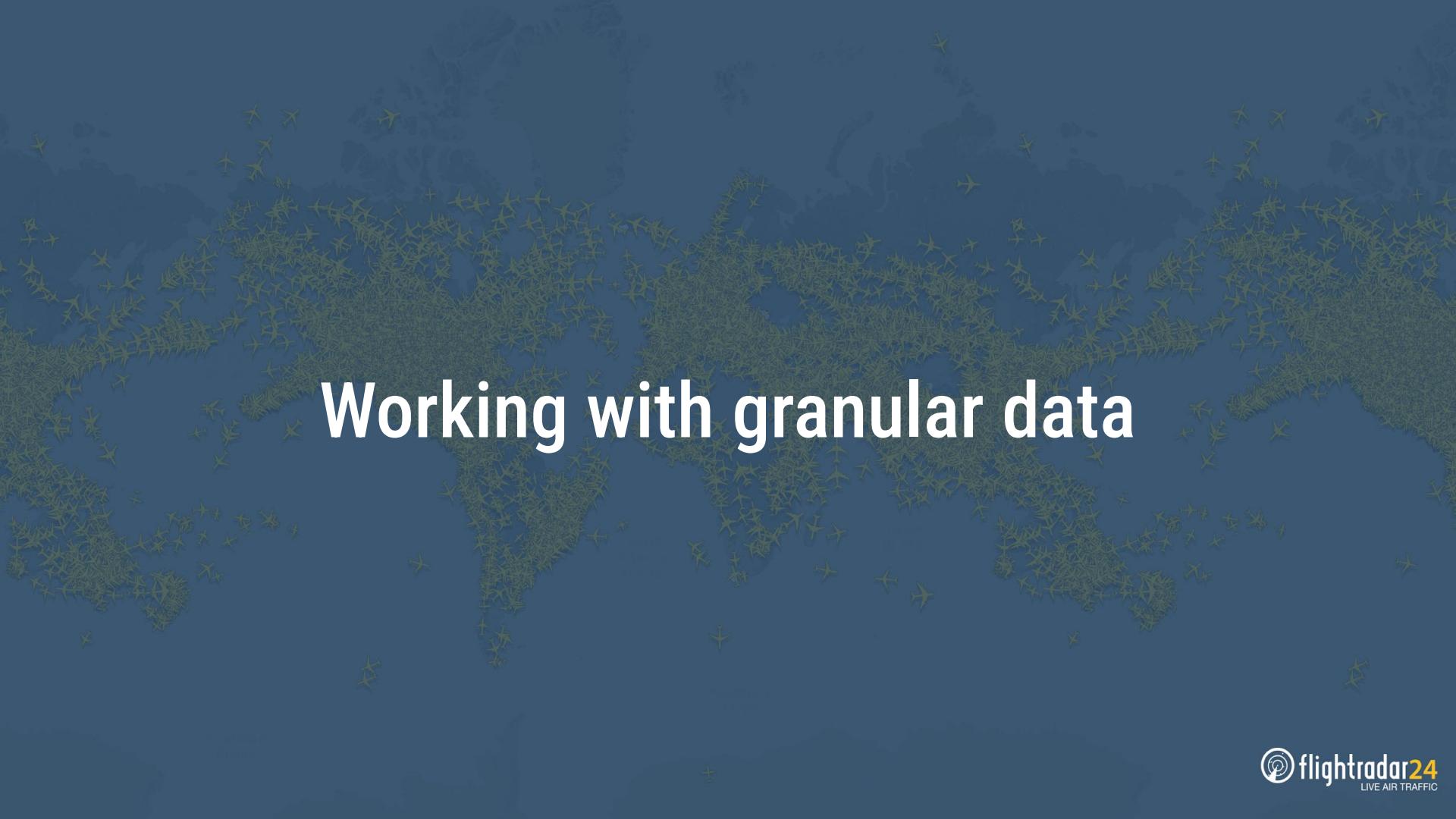
- High-frequency data for one (1) particular flight
  - Raw ADS-D data collected by Flightradar24 receivers
  - Processed high-frequency, multi-source data
    - Flightradar24 ADS-B receivers
    - Software data sharers
    - MLAT
    - Selected other sources

# Always available fields

- Timestamp
- ICAO 24-bit address
- Call sign
- Latitude/Longitude
- Altitude
- Squawk
- Track
- Vertical speed
- Air flag (ground/air)
- NIC
- Position source (ADS-B/MLAT/etc)

# Dependent fields

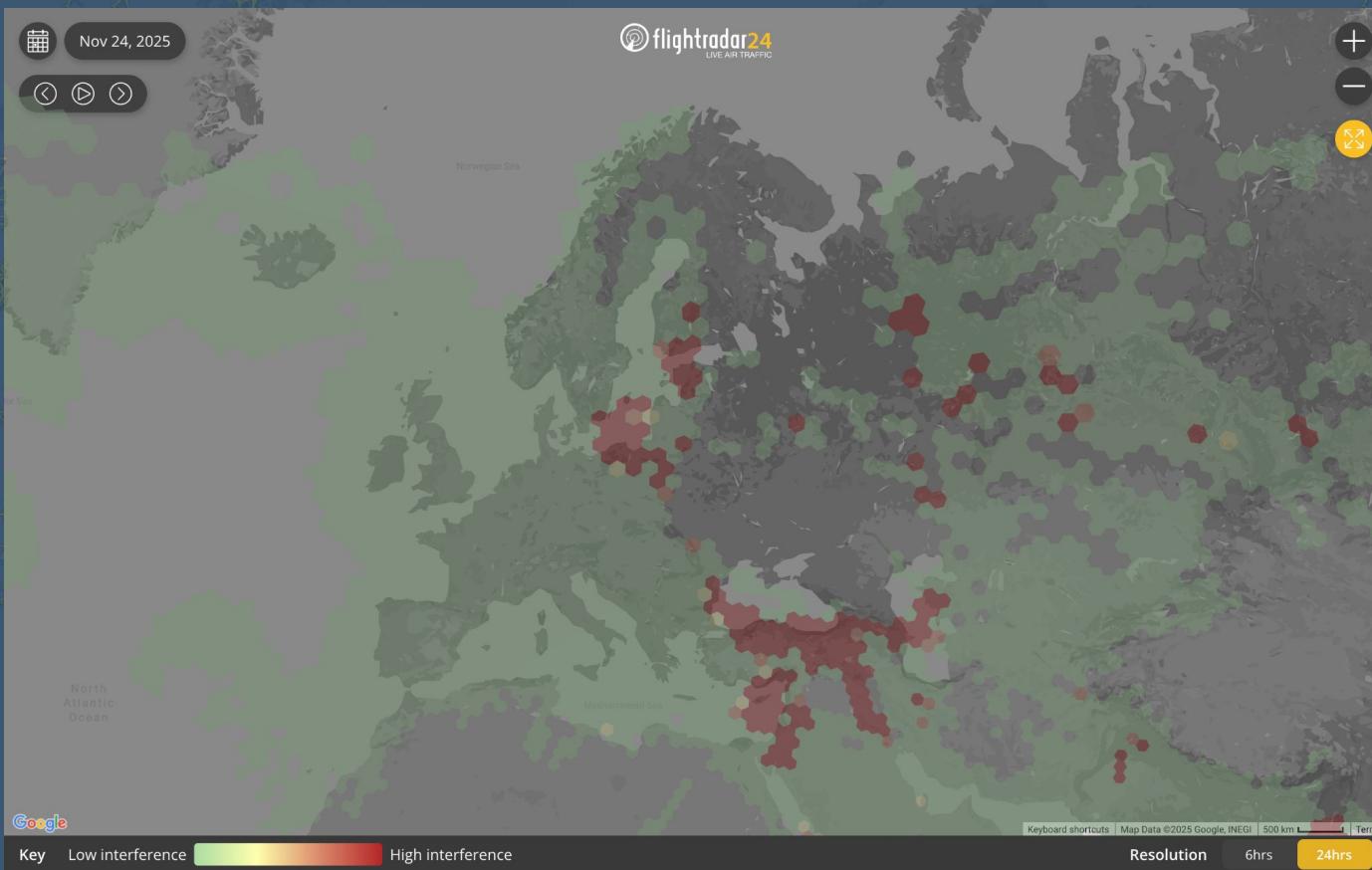
- Emergency status
- MCP altitude
- FMS altitude
- GPS altitude
- TCAS status
- TAS/IAS/MACH
- Heading
- Roll
- AP heading / track
- OAT
- Wind
- QNH



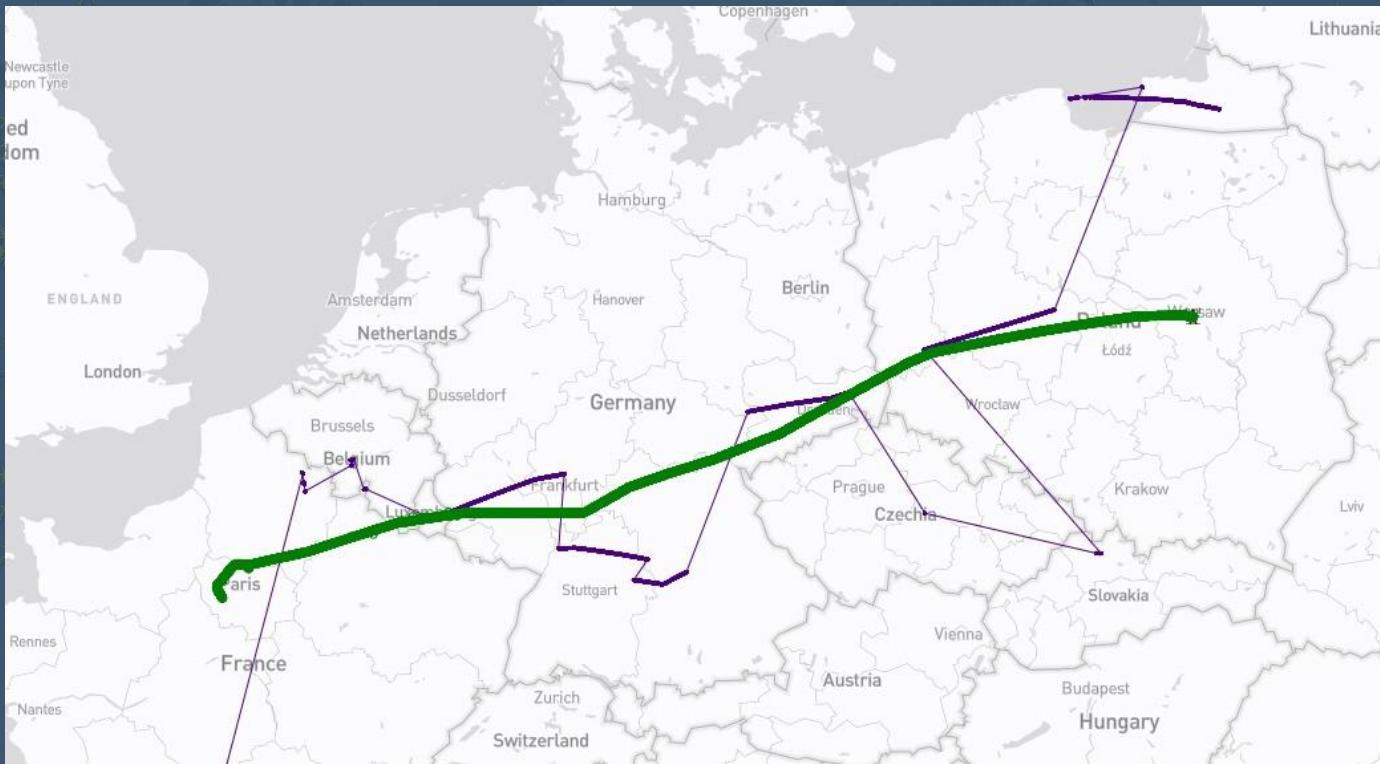
# Working with granular data

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	
1	server_tir	receiver	icao24	callsign	latitude	longitude	pos_flag	altitude	squawk	ground_s	track	vertical_s	air_flag	feed_id	radar_id	proto fla	radar typ	origin	destinatic	icao_type	broadway	broadway
2825	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12448	-84.76045	P	35000	6172	547	32	A	49361	F-AER	0	OTHER						
2826	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12576	-84.75952	P	35000	6172	546	32	0 A	19222	F-BDWY1	4	ADS-B				5 F-KCLW1;F-K		
2827	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12466	-84.76053	P	35000	6172	546	32	0 A	7742	T-MLAT1	4	MLAT				5 F-KCLW1;F-K		
2828	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12448	-84.76045	P	35000	6172	546	32	0 A	57074	T-KAPF10	0	ADS-B				5 F-KMKY3;F-K		
2829	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12448	-84.75799	P	35000	6172	546	32	-128 A	19222	F-BDWY1	4	ADS-B				5 F-KMKY3;F-K		
2830	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.128	-84.75999	P	35000	6172	546	32	-128 A	7742	T-MLAT1	4	MLAT				5 F-KMKY3;F-K		
2831	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12783	-84.75961	P	35000	6172	546	32	-128 A	45929	T-KFMY18	0	ADS-B						
2832	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.128	-84.75799	P	35025	6172	546	32	-128 A	49361	F-AER	0	OTHER						
2833	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.128	-84.75799	P	35000	6172	546	32	-704 A	49361	F-AER	0	OTHER						
2834	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12991	-84.75661	P	34975	6172	547	32	-1472 A	19222	F-BDWY1	4	ADS-B				4 F-KCLW1;F-K		
2835	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.12856	-84.75774	P	34975	6172	547	32	-1472 A	7742	T-MLAT1	4	MLAT				4 F-KCLW1;F-K		
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2838	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13174	-84.75542	P	34950	6172	546	32	-1792 A	7742	T-MLAT1	4	MLAT				4 F-KMKY3;F-K		
2839	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13359	-84.75408	P	34950	6172	547	32	0 A	13388	T-KCLW9	0	ADS-B						
2840	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13466	-84.75334	P	34950	6172	547	32	-1152 A	19222	F-BDWY1	4	ADS-B				4 F-KCLW1;F-K		
2841	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13466	-84.75334	P	34950	6172	547	32	-832 A	49361	F-AER	0	OTHER						
2842	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13647	-84.75206	P	34925	6172	547	32	-704 A	19222	F-BDWY1	4	ADS-B				4 F-KCLW1;F-K		
2843	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.137	-84.75178	P	34925	6172	547	32	-704 A	7742	T-MLAT1	4	MLAT				4 F-KCLW1;F-K		
2844	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13734	-84.75143	P	34925	6172	547	32	-704 A	32943	T-KTPA31	0	ADS-B						
2845	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13817	-84.75087	P	34900	6172	547	32	-704 A	49361	F-AER	0	OTHER						
2846	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13817	-84.75087	P	34900	6172	547	32	-576 A	57074	T-KAPF10	0	ADS-B						
2847	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.1395	-84.74993	P	34900	6172	547	32	-448 A	19222	F-BDWY1	4	ADS-B				4 F-KCLW1;F-K		
2848	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.13738	-84.75162	P	34900	6172	547	32	-448 A	7742	T-MLAT1	4	MLAT				4 F-KCLW1;F-K		
2849	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.1395	-84.74993	P	34900	6172	547	32	-448 A	45929	T-KFMY18	0	ADS-B						
2850	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.1395	-84.74993	P	34900	6172	547	32	-704 A	49361	F-AER	0	OTHER						
2851	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14078	-84.74905	P	34900	6172	546	32	-192 A	19222	F-BDWY1	4	ADS-B				4 F-KCLW1;F-K		
2852	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14021	-84.75171	P	34900	6172	546	32	-192 A	7742	T-MLAT1	4	MLAT				4 F-KCLW1;F-K		
2853	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14078	-84.74905	P	34900	6172	547	32	-192 A	49361	F-AER	0	OTHER						
2854	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14293	-84.74755	P	34900	6172	547	32	-320 A	13388	T-KCLW9	0	ADS-B						
2855	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14406	-84.74764	P	34900	6172	546	32	64 A	19222	F-BDWY1	4	ADS-B				4 F-KCLW1;F-K		
2856	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14425	-84.74789	P	34900	6172	546	32	64 A	7742	T-MLAT1	4	MLAT				4 F-KCLW1;F-K		
2857	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14429	-84.74755	P	34900	6172	546	32	64 A	49361	F-AER	0	OTHER						
2858	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.1462	-84.74526	P	34900	6172	545	32	320 A	19222	F-BDWY1	4	ADS-B				3 F-KCLW1;F-K		
2859	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14408	-84.74886	P	34900	6172	545	32	320 A	7742	T-MLAT1	4	MLAT				3 F-KCLW1;F-K		
2860	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14513	-84.74746	P	34900	6172	546	32	320 A	49361	F-AER	0	OTHER						
2861	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14847	-84.74371	P	34925	6172	545	32	576 A	19222	F-BDWY1	4	ADS-B				5 F-KMKY3;F-K		
2862	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14719	-84.7475	P	34925	6172	545	32	576 A	7742	T-MLAT1	4	MLAT				5 F-KMKY3;F-K		
2863	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14742	-84.74444	P	34900	6172	545	32	448 A	57074	T-KAPF10	0	ADS-B						
2864	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14965	-84.74288	P	34925	6172	545	32	448 A	45929	T-KFMY18	0	ADS-B						
2865	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.15072	-84.74214	P	34925	6172	544	32	640 A	19222	F-BDWY1	4	ADS-B				6 F-KCLW1;F-K		
2866	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14827	-84.74593	P	34925	6172	544	32	640 A	7742	T-MLAT1	4	MLAT				6 F-KCLW1;F-K		
2867	1970-01-21 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.14965	-84.74288	P	34925	6172	545	32	640 A	49361	F-AER	0	OTHER						
2868	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.15295	-84.74055	P	34950	6172	544	32	640 A	19222	F-BDWY1	4	ADS-B				4 F-KCLW1;F-K		
2869	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.15098	-84.74473	P	34950	6172	544	32	640 A	7742	T-MLAT1	4	MLAT				4 F-KCLW1;F-K		
2870	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.15511	-84.73911	P	34950	6172	544	32	576 A	19222	F-BDWY1	4	ADS-B				4 F-KMKY3;F-K		
2871	2025-10-30 00:00:00	2025-10-30 00:00:00	0xa7da9c	JBU1230	26.15524	-84.73748	P	34950	6172	544	32	576 A	7742	T-MLAT1	4	MLAT				4 F-KMKY3;F-K		

# GNSS interference



# MLAT – Defense against GNSS interference



# Limitations

- Data availability depends on coverage
  - Receivers in the area
- External interference can impact utility
- Design of ADS-B parameters limits precision in certain fields
  - E.g., altitude reporting in 25 foot increments

# Requesting data from Flightradar24

- For **urgent inquiries**, use our press and media center
  - <https://www.flightradar24.com/blog/press-and-media-center/>
- Otherwise, email [ian@fr24.com](mailto:ian@fr24.com) directly
- Please include as much detail as possible for all inquiries
  - Date/time in UTC
  - Aircraft registration/ICAO 24-bit address



# Questions?