



Flight Tracking

SPEAKER: Douglas Ferrier

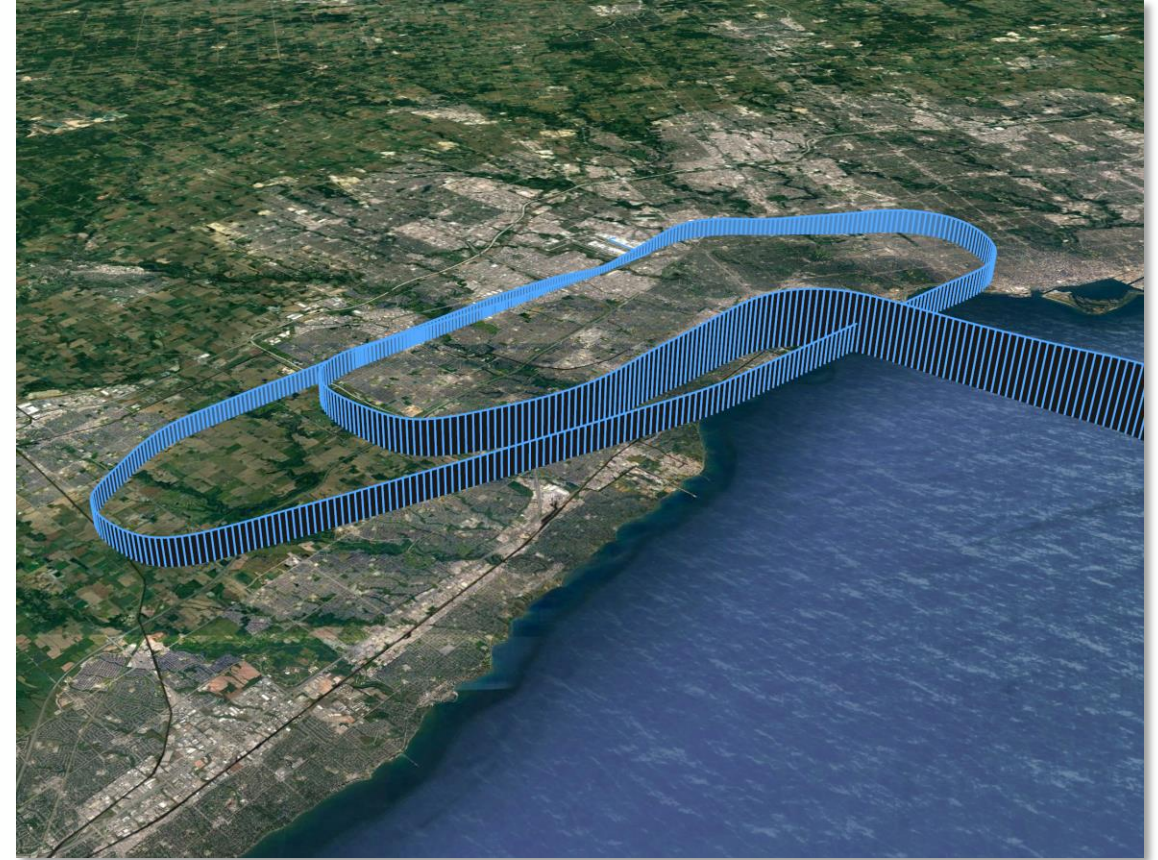


FORUM23

Flightpath to the Future: Reconnect & Collaborate

Flights - what your system is built on

- Flight Tracks are the heart of your Monitoring System
 - Public Presentation and Engagement – Your reputation is at stake
 - Readily understood by the community; as opposed to a SLM 80dBA reading
 - Used as the primary method of determining if a noise event is to be attributed to aircraft or community activity
 - Used for monitoring Operator compliance, abatements, reasons, analytics ...
 - Used for Air Emissions - think clean air act; are you monitoring and reporting your GHG? is your port efficient?
 - Used as the basis of ANEEM - Aircraft Noise Event Extraction Methodology
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- **No Flight Tracks = No System**
 - **But wait, there is more**

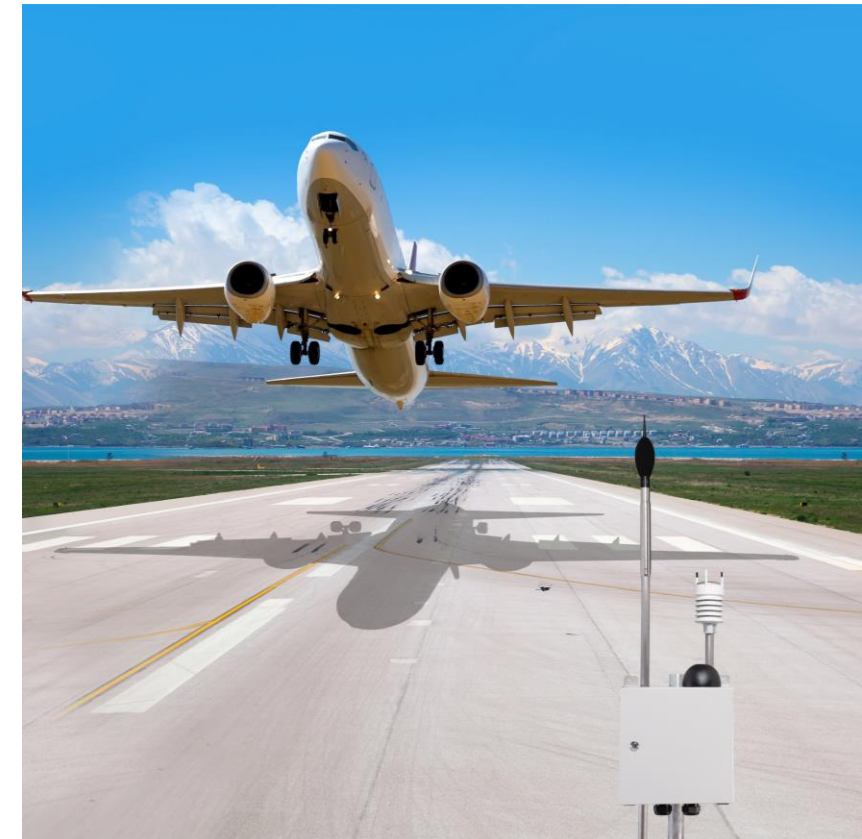
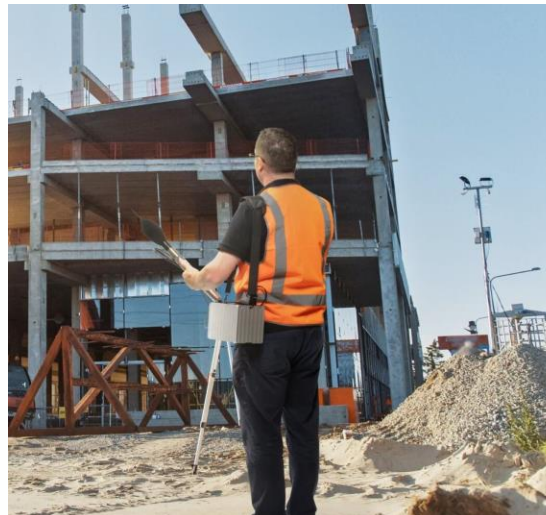


A new EMU is born



It is also great to have measured noise

- AU-2000 SLM
- EMU 3700 Series Systems
- Broadest range of noise, parameters available real time, periodic reports, 48 KHz Audio
- SLM Class 1 Type Approved for use with EMU
- knowing with precision a quantifiable noise level goes a long way to defending sound exposure compliance



EMU 3700

Built for simplicity, Shaped for the future.

Setup as easy as 1, 2, 3

Fully integrated solution combining measurement, remote communication, system monitoring and power supply.

Continuous and uninterrupted

Self-monitoring and auto-restart capabilities for increased uptime and minimal gaps in data.

Compliance-grade data accuracy

Achieve environmental compliance with highly accurate data for stakeholders in line with the global standards.

Simple yet robust build

Permanent and portable monitoring of mining, airports and other industrial activities in harsh weather.



Capture multiple environmental parameters in a single unit.



Noise

Interfaced with Outdoor Smart Microphone to provide real-time 1/2 s or 1s parameters allow EMUs to fulfill IEC 61672 Class 1 standards.



Vibration

When used with a geophone, the EMU measures ground vibration in three axes, providing metrics for a wide range of applications.



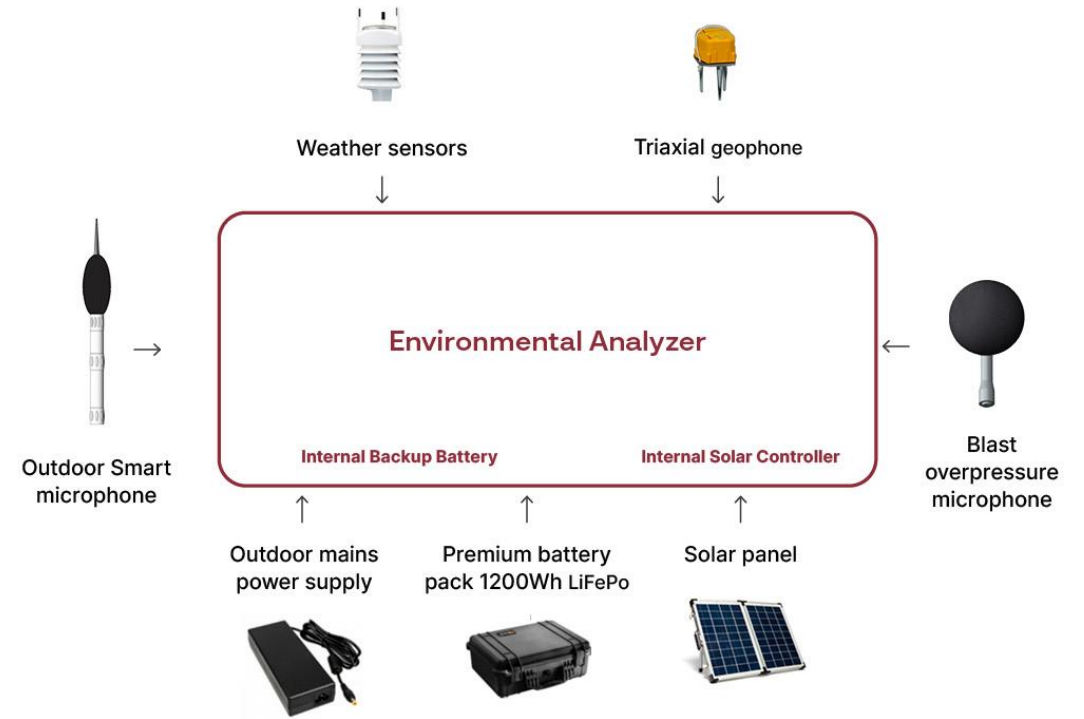
Weather

EMUs can also monitor weather with noise data, ensuring that measurements are not contaminated by meteorological conditions.



Blast Overpressure

Connected with Blast Overpressure microphone, EMUs ensure compliance monitoring of mine blasting while meeting ISEE requirements.



Flight Tracking Data Service

■ SRG – Secure RADAR Gateway

- Redundant Hardware deploy into the closest point to the ATM feed
- 99%+ of feeds are a broadcast – if not listening then data is lost
- Secures data into non-volatile storage
- Stores and forwards – handles wide area network outages and can send later

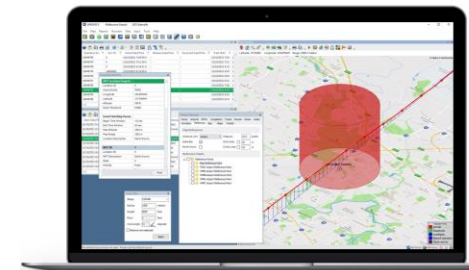
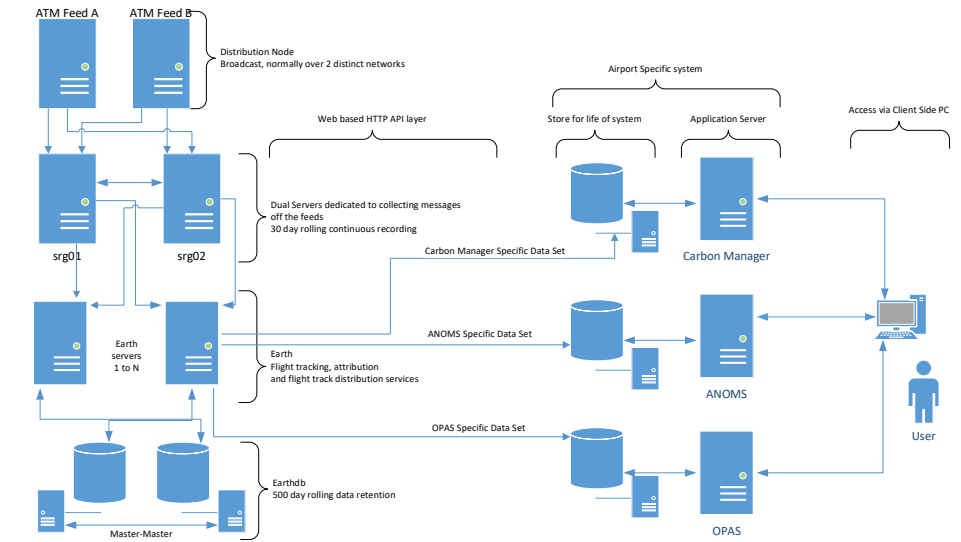


■ Earth

- Where the tracking and attribution and clean-up is done
- Centralised servers and database
- Web based API interface

■ Analysis Display And Reporting

- Delivery out to Analysis, Reporting, Display systems
- ANOMS, OPAS, Carbon Emissions, Noise Desk ... Consultants

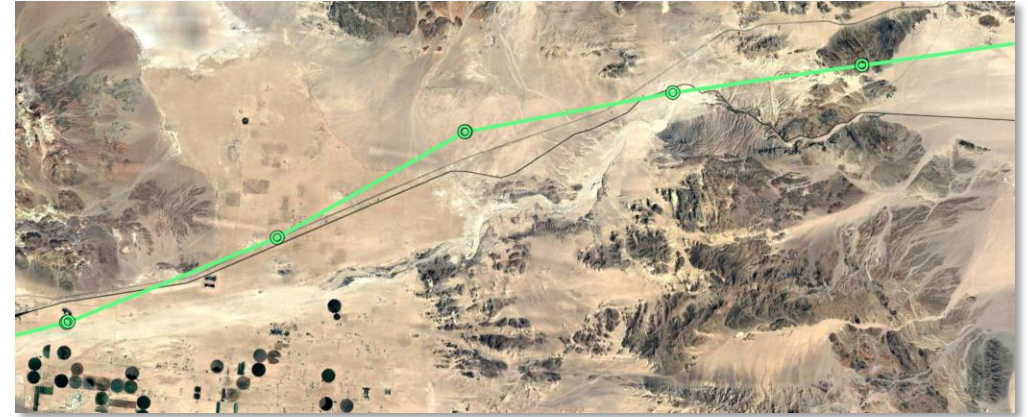


Why not the ATM output as is?

- Not built for presentation, built for safety
- Reliant on trained experts who have communication access to the pilot
- ATM is on a need to “now” expectation

Versus

- Flights are used for Presentation to the public (WebTrak, Reports, Community Meetings, Performance Metrics)
- Non experts expect that flights are known in all places all the time and there is no uncertainty (far from the reality)
- Not needing to explain; there are target points that jiggle around due to RADAR beam spread with distance from the head; makes for easier conversations



Simile

NOW

Flights – Emphasis on the Analogy

- ***“This is so pretty”*** – Good looking data presents well and lightens the spirit, helping people overlook something that they may not like, you need a bit Hollywood to help engage with your community and stakeholders
- ***“Crew cut at the barber”*** versus heading to the EVS Salon for a bit of makeover, We will work on cleaning up and ensuring your data is accurate as well as presentable
- ***“Hair extensions”*** We have flight track extensions to fill in missing surveillance coverage
- ***“The Blended family forced together on a holiday”*** – Envirosuite has been blending, fusing, merging data sets from multiple source and surveillance systems since early 2000’s
- We care that the output is good looking and something you are proud to use for your engagement and analysis work
- We blend and beautify to build and maintain your **Social Licence** to operate

AND

- To **improve accuracy in analysis**; this is a little more mundane, but accuracy is critical in **building trust** and **reducing work loads**

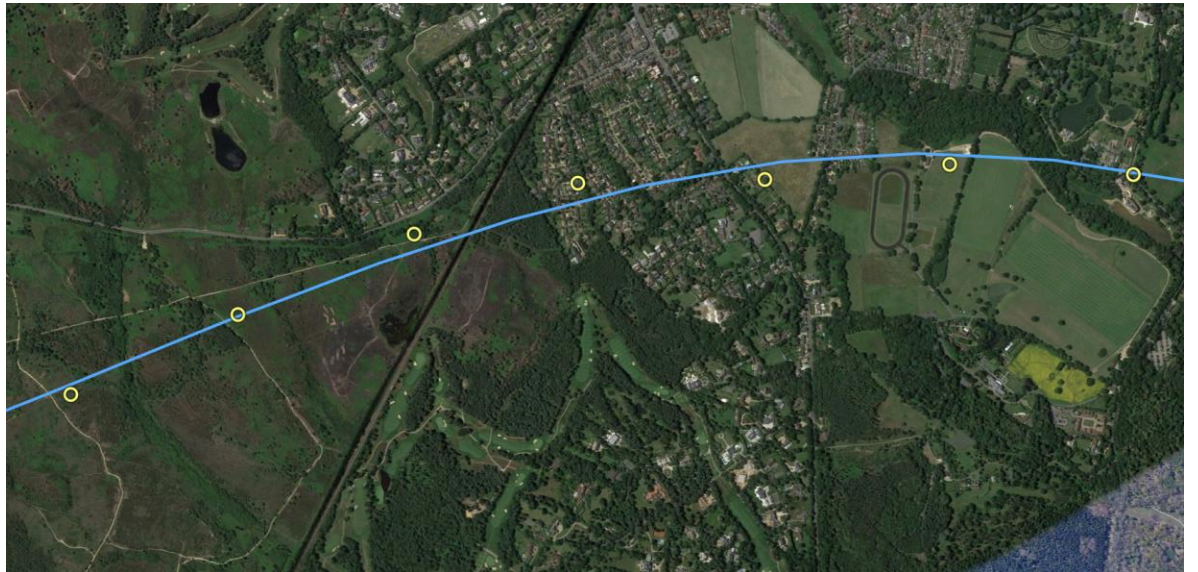
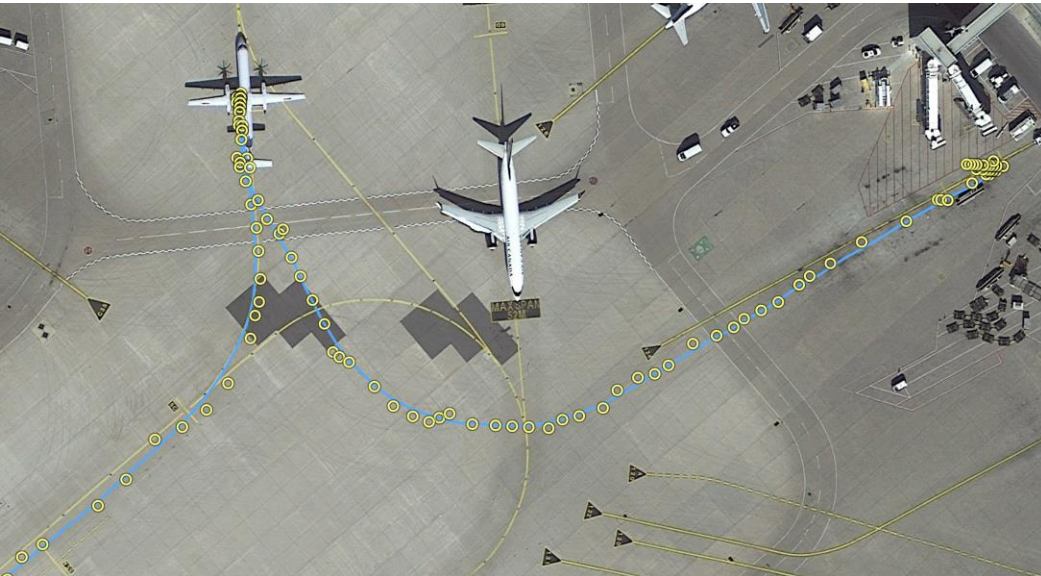
How – based in Technical, Algorithms

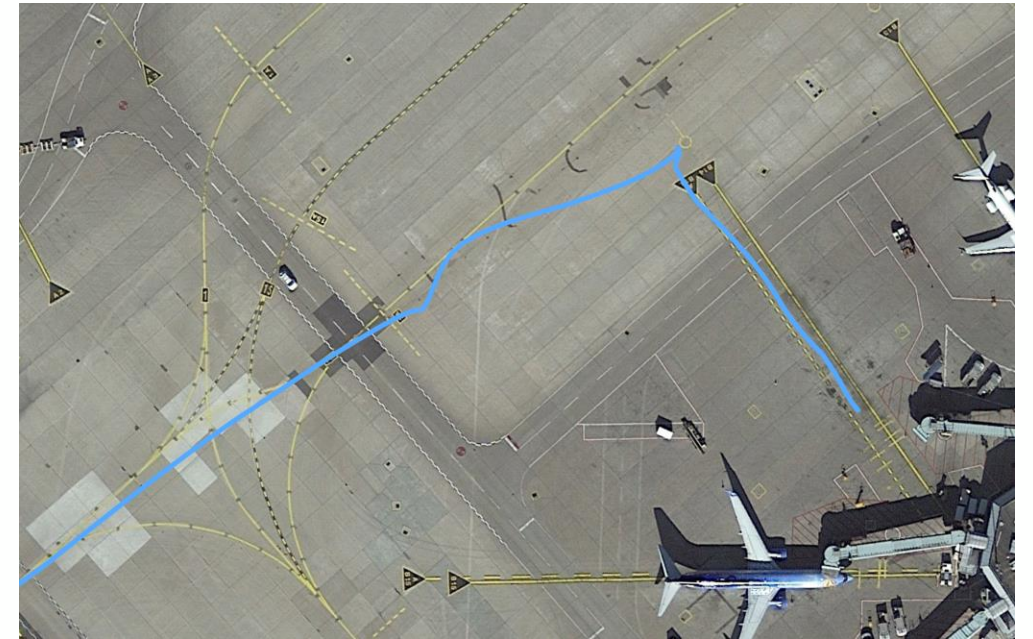
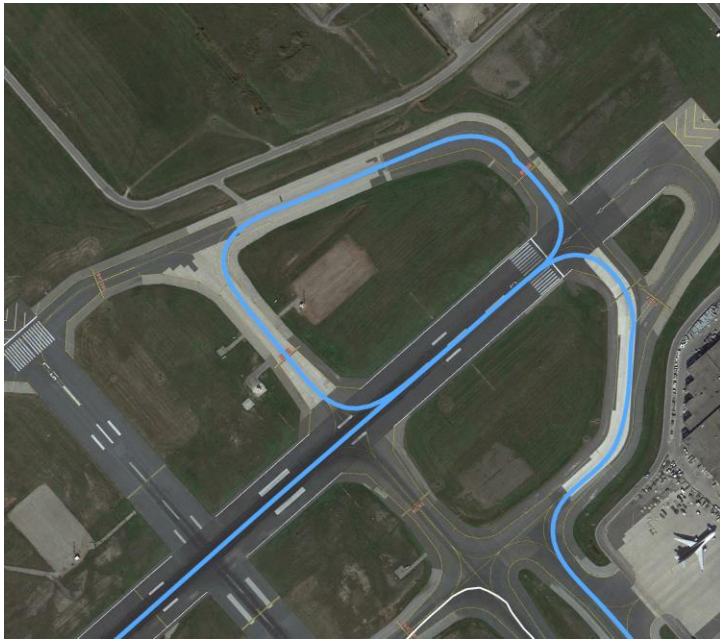
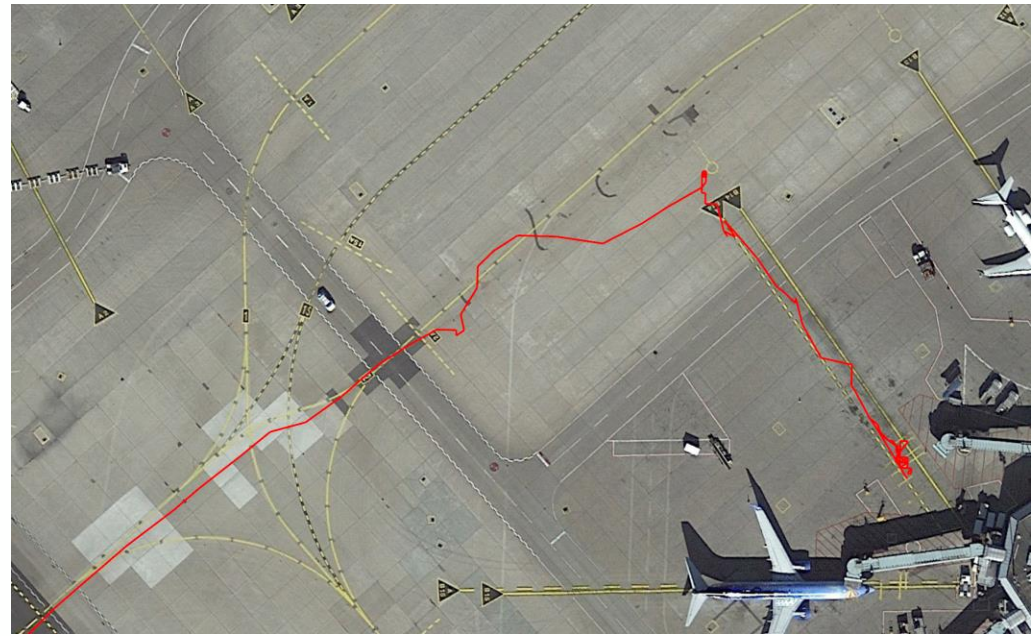
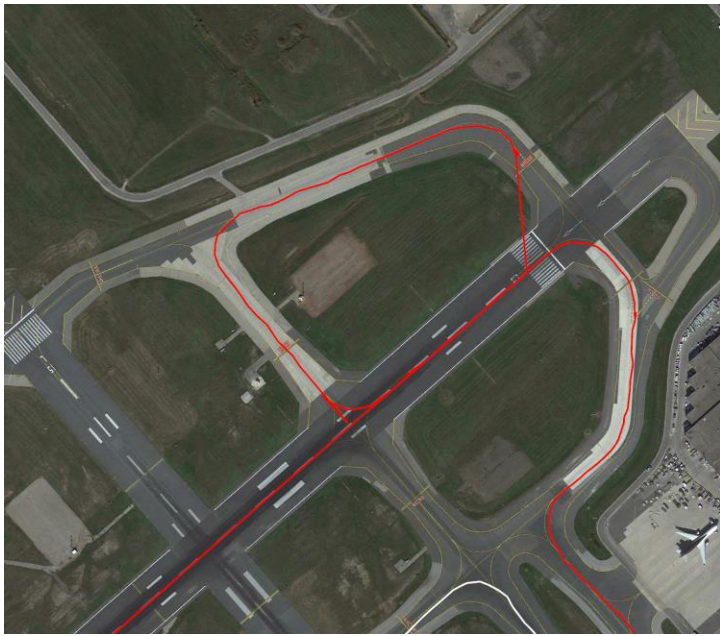
- Calculus

$$1 \dots N \text{ of } a + bx + cx^2 + dx^3 + ex^4$$

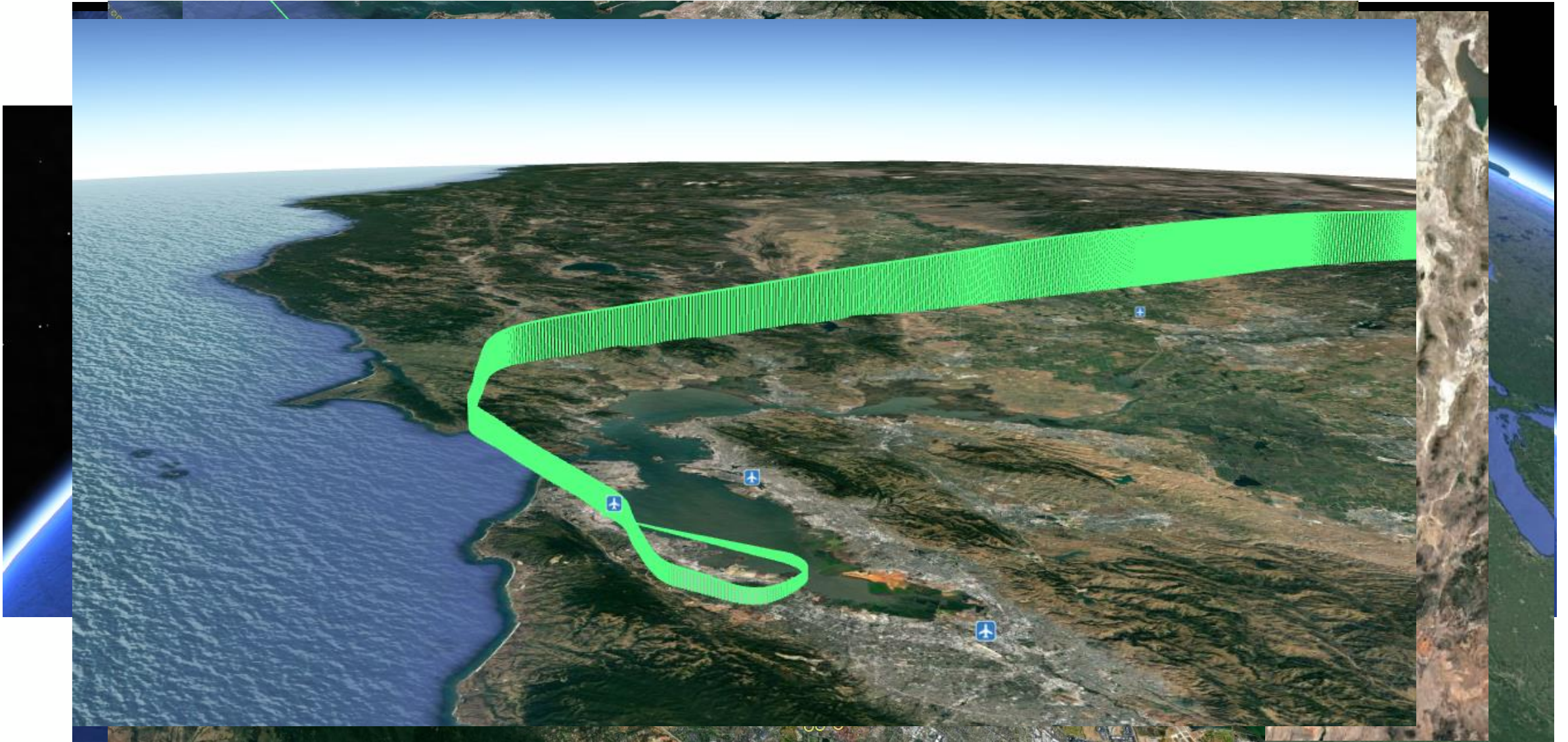
- Discrete Maths

$$[T, X, Y, Z] \text{ where } f(x) = y[i] = \frac{1}{M} \sum_{j=-(M-1)/2}^{j=(M-1)/2} x[i + j]$$





Blending – Many feeds and Surveillance systems



What does it take - some statistics

100's of Thousands
messages
per second

10's of Millions FLOPS
Floating Point Ops
per second

100's of Thousands
Flights Tracks
per day

10's of Thousands
Database Transactions
per second

Propriety Compression
64 Bytes
stored in
2.5 Bytes
Lossless

Volume is too great for
any individual to look at
every flight

The Wrap

- Capabilities available to all clients
- You all benefit from the intelligence and improvements we build into handling data globally
- You can meet with our technical staff to go over concerns you identify in your geography
- We will seek to address concerns that are tractable and aid you in obtaining data and the attribution to meets your needs

We want to hear from you, so your data is usable and presentable

We have the technology, knowledge, experience and expertise.

A problem shared is a problem halved, come to us, we can help.

Q & A