

spidertracks



An Introduction to Flight Tracking

Overview

The ability to be mobile and to have full visibility of your business is not a luxury, it is an affordable reality in 2017.

Full visibility doesn't just mean visibility of where aircraft are now, but a historical record of where they were this time yesterday or two months ago.

Did the maintenance team get ZKF finished up and in the air? Imagine a world where you could have this visibility in your hip pocket at all times... a world where if one of your aircraft did go down, you could be automatically alerted within minutes of the incident and have a 4 dimensional vector to lead you within a small range of the crash site? This is real time situational awareness, this is live flight tracking.

Key Points:

- Real-time situational awareness is the cornerstone of live tracking.
- When you can see your business you can manage your business!

What information do I get and how?

All tracking providers will give you at least a 2 dimensional position and usually a timestamp also. Most aviation tracking providers will provide you with higher resolution, for example:

- Latitude and longitude
- Altitude
- Speed
- Heading
- Point type (normal, distress, other event)
- Local time
- UTC time

This information is generally presented on top of some type of mapping software and displayed on a website and/or mobile devices to deliver real-time situational awareness



What are the triple bottom line benefits?

People:

Live flight tracking delivers significant benefits for People. It provides peace of mind for those who are flying that if something were to go wrong, someone on the ground is aware of that and help will be coming. Every additional hour before help arrives reduces the chances of survival significantly, so it's important that no time is wasted in finding an aircraft's location. Flight tracking also provides greater convenience and work environment quality through reduced workload in the cockpit and on the ground. For example, flight tracking removes the need to make regular radio calls, negates the need to answer a sat phone from the ground crew while you are on final approach, and more.

Profit:

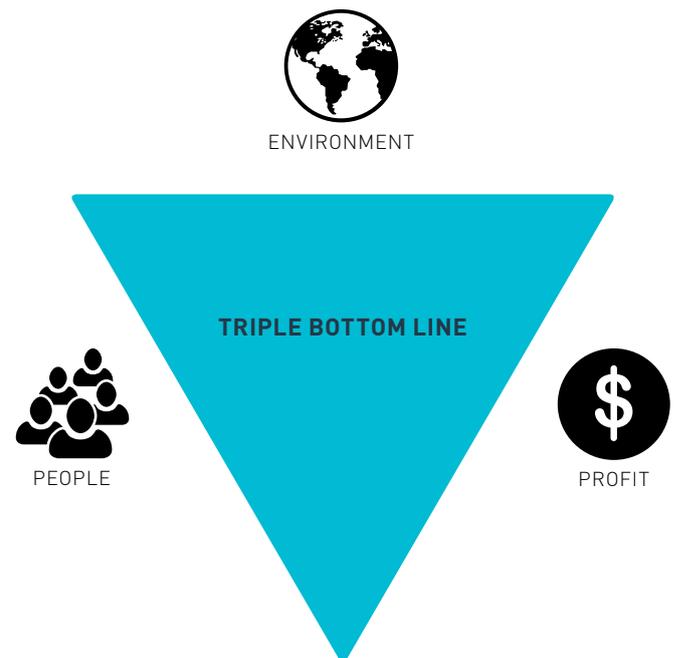
There are many outcomes that drive Profitability. These include advanced safety and risk management capabilities and the ability to re-dispatch on the fly (literally) in conjunction with the pilot. This creates behavioural changes that generally result in better resource utilisation, decreased fuel burn and maintenance costs, not to mention a competitive advantage that comes from being qualified for many lucrative contracts.

Planet:

Flight tracking also has a positive effect on the Planet, through more efficient resource utilisation on a daily basis and more efficient search and rescue efforts in a distress situation.

Key Points:

- The value of live flight tracking stretches well beyond distress situations.
- On a daily basis, live flight tracking delivers triple bottom line benefits to the aviation operator and broader community.
- In 2017, if benefits aren't triple bottom line then they aren't sustainable.



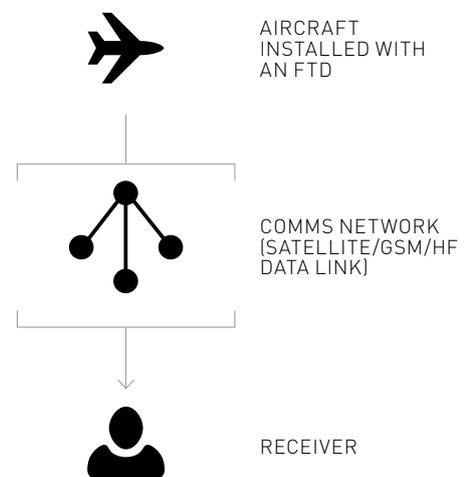
How does flight tracking work?

Real-time flight tracking involves transmitting positional information from the aircraft through some type of data channel to a recipient on the ground.

The positional information generally involves some type of GPS receiver. The flight tracking device (FTD) may be a single integrated product, or a number of components that link together to form a system. The data channel can be satellite, GSM (cellular), HF data link, or a combination.

Key Points:

- Most aircraft will know their position via some type of GPS equipment onboard, real-time tracking is the act of getting that data from the aircraft to someone on the ground.
- This is usually done via satellite or GSM (cellular)
- Satellite generally provides coverage anywhere, where GSM requires to be in range of a cell tower.



Network Comparison:

While cellular based tracking is a lower cost option, it is non-robust for use in aviation as it is designed to provide ground coverage, and signal wains with altitude.

Signal is generally limited to within 35km of a cell tower and towers are usually only located in densely populated areas. Cellular networks operate very close to capacity on a regular day and are susceptible to overload (unavailability) or total loss in civil emergency situations. This was evident during Hurricane Katrina, and the earthquakes in Nepal, and Santiago. Some products utilise dual mode switching, however these have proven to be problematic, particularly when cellular signal is low. Cellular based tracking is ideal for low altitude and non-remote applications, for example a ground based work crew.

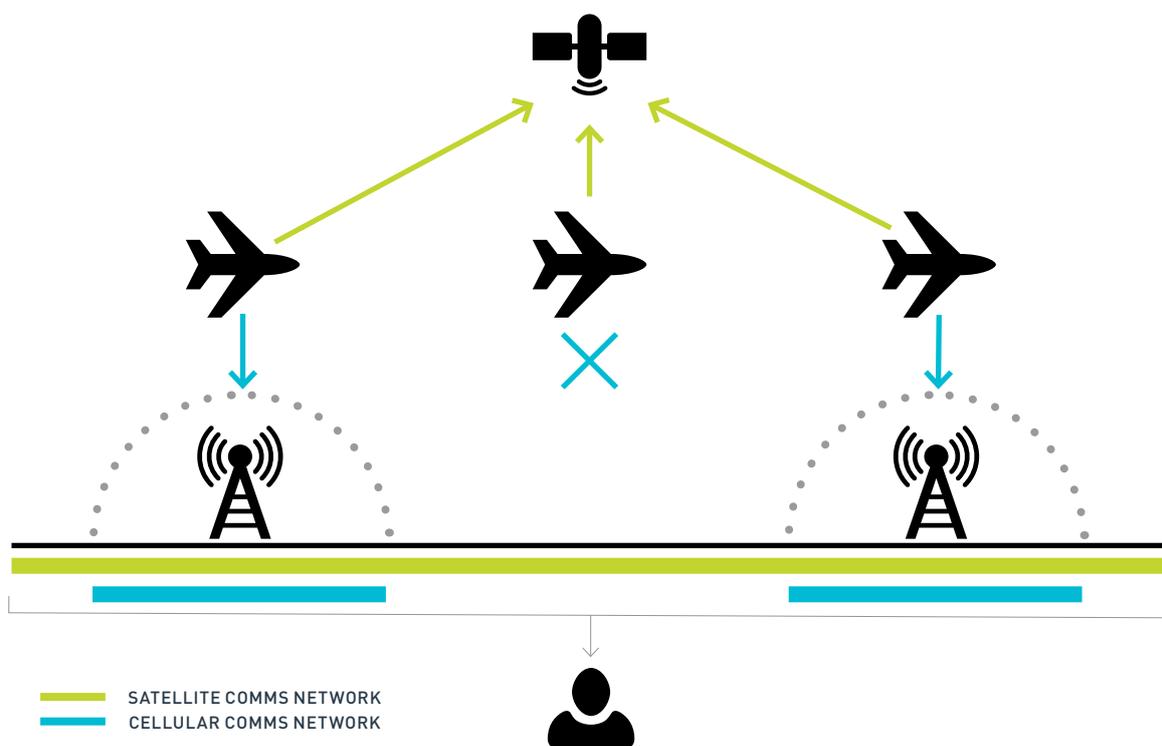
Satellite offers reliable coverage in remote regions; Inmarsat and Iridium are the two main providers for aviation products. Iridium is a low earth orbiting (LEO) constellation comprised of 66 satellites operating approximately 700km above the earth's surface (11 each in 6 planes, 30 degrees apart). This provides pole to pole coverage. Further, the Iridium satellites are cross-linked, which means they hand off data to each other to find the fastest route back to an earth station. This provides a network with very low latency; the average time from a position point being sent from that aircraft until then time that this is processed and displayed is between 10 to 25 seconds in most cases.

Inmarsat is a geo-synchronous constellation, operating approximately 35,000km about the earth's surface; coverage does not include polar regions. Products that connect with Inmarsat will generally consume more power in order to transmit and as such the hardware/kit is generally more substantial, often high capacity data links found on commercial airliners.

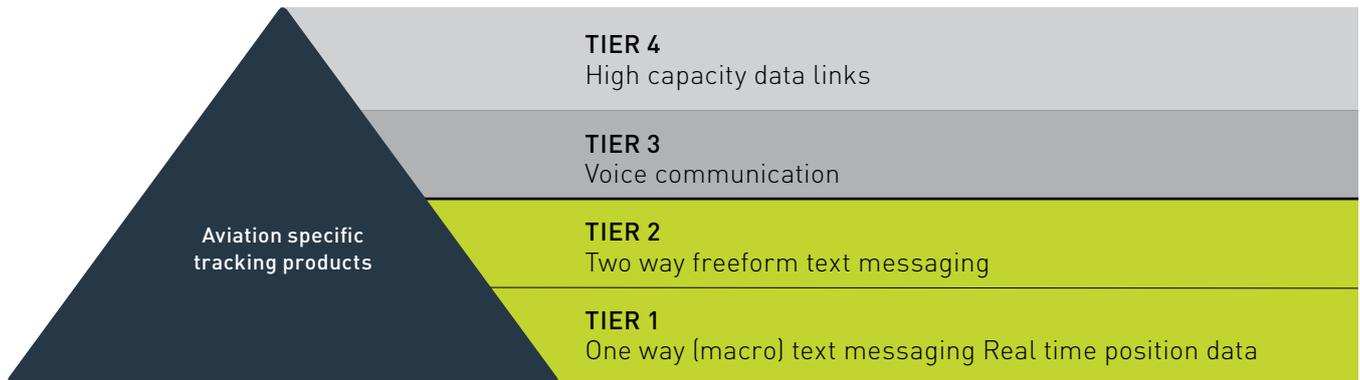
Because a satellite network does not usually have any ground based infrastructure in the region of coverage, it is decoupled from any localised factors that may interrupt service, such as earthquakes, tsunamis and other disasters or unforeseen events. Iridium's short burst data (SBD) protocol enables small packages of data to be transmitted at low cost. These characteristics collectively make satellite, and particularly Iridium, ideal for low cost tracking of aviation assets.

Key Points:

- Cellular based tracking products may cost less to operate but can have reliability issues when used in aviation.
- Satellite offers global coverage and a fast and efficient means of transmitting data.
- Iridium is able to provide reliable low cost service ideal for tracking aviation assets.
- Some products utilise dual mode switching however these can be problematic and can result in periods of non-coverage.



Category Comparison:



There are so many tracking products that span the spectrum in terms of cost, functionality and their applicability. We've attempted to categorise these firstly as general purpose (non aviation) tracking devices and then into four tiers of aviation specific products. Within the aviation specific products these have been classified according to the service level of communication that they offer. Spidertracks operates in the tier 1 and 2 space.

General purpose products are usually hand held devices, where functionality can be limited. These products typically only offer 2 dimensional positioning, inflexible reporting intervals, and may or may not have an SOS feature. General purpose products are intended for use in general recreation, although they may have some value in basic ground based tracking at a commercial level, i.e. a work crew or vehicle.

Tier 1 Aviation products are usually classified as portable equipment, although they will mount somehow in the aircraft, generally under the windshield. Their portability comes from being a fully integrated product, i.e. internal antennas and receivers. Most of these products will deliver one-way macro messages, have an SOS feature, and may or may not be USFS AFF compliant (US Forest Service protocol for Automated Flight Following). This tier of products generally satisfy the requirements of the recreational pilot and are entry level for commercial GA.

Tier 2 Aviation products come in two types, some that are portable and some that require formal installation, i.e., an STC. This usually relates to the level of connectivity between the product and the aircraft. For example, some products in this category connect to engine management systems, the data bus, or an external antenna. Most in this category have bluetooth capabilities, which enable free form text messages to be sent to and from the cockpit using a smart device. Typical applications for these products are commercial GA, business jets and some of the lower end Air Transport operators.

Tier 3 Products are almost always installed (STC'ed) and the cost of acquisition, installation, and service all steps up significantly. These products will enable two-way voice communication and advanced flight data monitoring (FDM).

Tier 4 Products are full data link systems. While these often provide positional information, they're not typically considered to be Flight Tracking Devices (FTD). These systems cost tens and hundreds of thousands of dollars and their general application is in commercial airliners.

Key Point:

- **Horses for courses!** It is important to understand the compatibility between hardware, aircraft, and business requirements and implement the most appropriate solution for your operation.

If you're interested in learning more about the benefits of flight tracking, or would like to know more about what we offer and how it can benefit your operation, drop us a line on:

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