SKYNET
REACH Aero

Case Study

How the Royal Flying Doctor Service has transformed its flight management technology

SKYNET Aviation

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SKYNET REACH Aero | INTRODUCTION

The operational data revolution at the Royal Flying Doctor Service (Queensland Section) (RFDS) began with acquiring live fusion flight tracking across all 1.73 million km2 of coastal, regional and outback Queensland through SkyNet Aviation®'s wide-area ADS-B and Satellite network.

The revolution is continuing with the aeromedical provider now leveraging a powerful real-time data capture, flight management and operations tracking platform driven by the vast geographical network. SkyNet REACH offers high fidelity flight information to optimize decision support across the complete organisation.

In delivering these cutting-edge solutions, SkyNet Aviation® has taken the aeromedical service through five crucial stages:

1. Complete assessment and network review of operations
2. Implementation of wide-area ground-based SkyNet ADS-B services
3. Delivery of Day of Operations and aircraft tracking systems for decision support
4. Demonstrating the value of analytics data
5. Provide the training to empower an effective flight control, scheduling, dispatch and manifesting solution.

Make no mistake about the scale of what the above has involved. Queensland is huge – over twice the size of Texas – and much of the inland is virtually uninhabited. And yet, it is now covered by more than 60 ADS-B receivers in a network designed, supplied and managed by SkyNet Aviation®.

In total, this region of plains, deserts, mountains, scrubland, jungles, wetlands, mines and colossal cattle stations, presented a major aircraft tracking challenge for the RFDS (Queensland Section). While Australia's aviation sector is world-class in general, the outback is so big and so empty that there's often no aircraft tracking infrastructure at all and reliance on satellite reporting is expensive.

Until SkyNet Aviation®'s solution, the RFDS (Queensland Section), like other outback operators, had relied on a combination of satellite and radio to ascertain aircraft position. These technologies lacked either the precision, responsiveness or cost-effectiveness that the RFDS (Queensland Section) required. So, in late 2019, the senior management decided the time had come to do something about it.

With the Fusion ADS-B and Satellite solution now in full service, RFDS (Queensland Section) moved on to working with SkyNet Aviation® on getting the most from it:

- First, through harnessing the significantly improved data that was now available to improve aircraft tracking intervals from minutes to seconds
- And, more recently, to implement a proactive manifest distribution solution.

Read on to find out how, in less than 12 months, the RFDS (Queensland Section), SkyNet Aviation® and Ergon Energy all teamed up to achieve world-leading aircraft tracking across a vast sweep of the Australian outback. And, following this, how that tracking platform was used to rapidly modernise the systems relied on by Duty Tasking Officers (DTOs) at RFDS (Queensland Section) to ensure the right aircraft and right crews are tasked.

The story is a perfect example of how any operator can rapidly acquire SkyNet REACH technology and gain the ability to manage, operate and monitor all its aircraft and then leverage those insights to get more from its fleet.

KEY POINTS

CLIENT NAME: Royal Flying Doctor Service (Queensland Section)

CLIENT PROBLEM: Need to improve aircraft tracking and manifesting systems.

PROJECT DURATION: January 2020 – September 2021

GOAL: Remote and real-time operational awareness for a fleet of 20 Beechcraft King Air air-ambulances. In turn, this capability will enable improved creation and updating of real-time location information at better than 5 seconds across the entire Queensland state. This data will support faster and more accurate prediction of route destination ETAs, simplified schedules and more effective manifest distribution.

PROGRESS: A smooth and effective ongoing relationship of technical development and implementation.

QUICK FACTS: RFDS (QUEENSLAND SECTION)

CORPORATE STRUCTURE: An operating division of the Royal Flying Doctor Service of Australia. The other sections are: Central Operations (SA and NT), South Eastern Section (NSW), Tasmania Section, Victoria Section and Western Operations (Western Australia).

SERVICES: 24/7 aeromedical retrieval of the critically ill or injured; essential primary and preventative healthcare services; patient transfer.

AREA SERVED: 1.73 million square-kilometres

FLEET: 4 x King Air B350C, 16 x Beechcraft King Air B200

AVERAGE PATIENTS CONSULTED PER YEAR: 98,000

AVERAGE PATIENTS TRANSPORTED PER YEAR: 12,300

BASES: 8 – Cairns, Townsville, Mount Isa, Charleville, Roma, Rockhampton, Bundaberg, Brisbane

STAFF: 75 pilots, 60 doctors, 88 nurses, plus support staff

PROMISE: To deliver the finest care to the furthest corner of the state.

SKYNET REACH Aero | IDENTIFYING THE ISSUES

As an aeromedical service, the main objective for RFDS (Queensland Section) is always the quality of care for the patients. However, to pursue this goal requires careful coordination and management of the 20 aircraft in the fleet, plus a few hundred staff across the flight, medical, technical, operations and support teams.

It's complex work requiring highly accurate live fleet tracking of aircraft movements and responsive management of the people working on board. In seeking to do this work better, the RFDS (Queensland Section) began talks with SkyNet Aviation® to find out what solutions were available.

After a measured program of discovery sessions and probing conversations, SkyNet Aviation® proposed the five stages above. The degree of systems improvement on offer was too promising for RFDS (Queensland Section) not to investigate. As the collaboration developed, the Duty Tasking Officer Team Leader for RFDS (Queensland Section) took a prominent role. On the development side, delivering this capability rested on the shoulders of the CEO of SkyNet Aviation® and their expert software engineering team.

SKYNET REACH Aero | DIAGNOSING THE SITUATION

While the ability of a large organisation in a developed country to track something as sophisticated as a $10-million air-ambulance sounds unremarkable in the age of smartphones and GPS, bear in mind that these technologies rely on ground infrastructure. This kind of infrastructure simply doesn't exist across much of remote Queensland. Indeed, the immensity and emptiness of inland Australia are hard to convey. Consider an area the size of western Europe with fewer than 80,000 residents.

Therefore, the operating situation is one where domestic aviation:

- is well regulated, reliable and established
- serves a low population density
- covers vast distances.

In combination, the economics of supporting aviation with extensive ground infrastructure do not stack up. Other than Australia, this combination of factors is perhaps only found in Canada, Russia, Scandinavia and South Africa.

While contributor sourced ADS-B receivers are common worldwide, they are generally and only placed ad-hoc where the population density warrants it, or to cover aerodromes with high volumes of traffic. In places where few people live and air traffic is sporadic, this ad-hoc ADS-B coverage is rare. The receiver networks must instead be purpose-built. And for that, SkyNet Aviation® is the world leader.

Further, once an ADS-B solution went live, the RFDS (Queensland Section) would need to be able to harness that data to support improvements to operations. Because it's one thing to know where an aircraft is, it's another to integrate that with the forward schedule of the day and then use this to dynamically adapt to patient needs, flying conditions and the availabilities and skills of the various staff involved.

This is the operating context for which SkyNet Aviation® had to develop solutions suitable for many Aeromedical organizations internationally.

SKYNET REACH Aero | PLANNING THE ADS-B AND SCHEDULING SOLUTIONS

For years now, SkyNet Aviation® has been working on how ADS-B Fusion network capacity can be built out and what data insights can be derived from the technology. Currently, SkyNet Aviation® has hundreds of receivers in place in multiple countries, as well as far out to sea. The RFDS project was a perfect example of both the operational capabilities of ADS-B and the power of capturing and capitalising on all the data it generates.

SkyNet Aviation® CEO Jon Davis sums it up simply: "RFDS (Queensland Section) needed to have operational oversight of all its assets in order to get the maximum performance from its fleet and therefore maximise patient care."

Once that ADS-B network was in place, RFDS (Queensland Section) could use SkyNet's solutions to enable advanced data sharing with other vital aviation systems. Crucially, these include integration with Avinet Air Maestro - the leading crewing and rostering specialist solution.

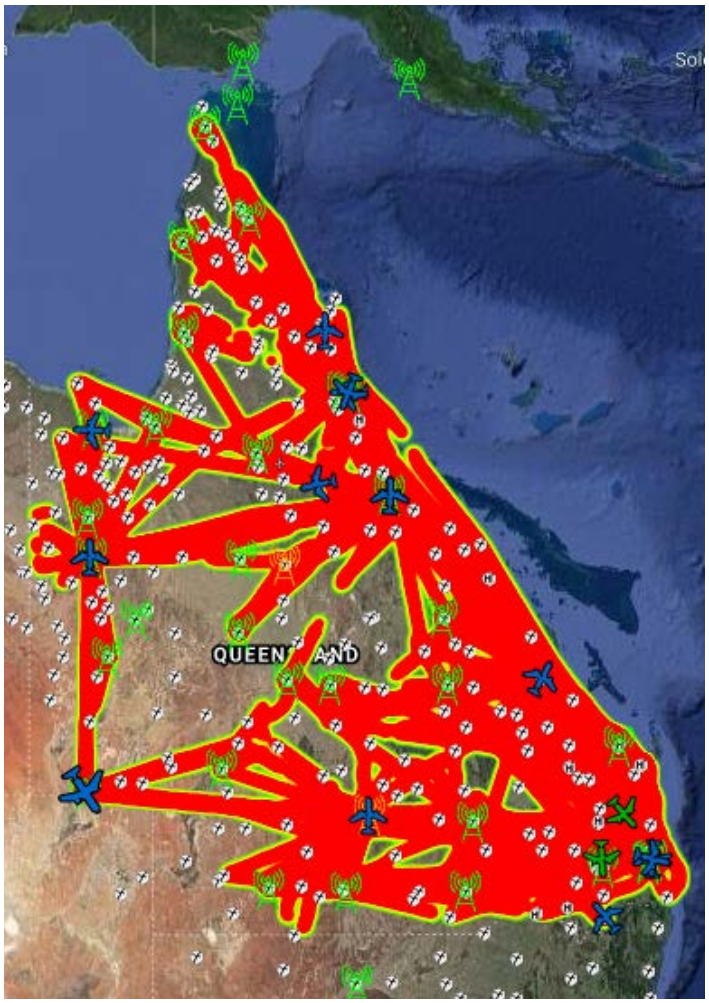
So, if the SkyNet Aviation® solution could use the ADS-B fusion network data to power an Air Maestro integration with live information, then the DTOs would have the ability to coordinate patients, planes and personnel with a level of dynamic decision support not dreamt of before.

"The DTO's job is important and far-reaching," Davis says.

"They're responsible for dispatch compliance with legislation, regulations and RFDS procedures. They are looking for operational efficiencies within the limitations posed by meteorology, NOTAMs on airfields, the weight of aircraft into certain airfields and so on.

"Once they have all that, they can then build schedules and produce and distribute the patient manifests and other paperwork that authorise the day's flights to occur."

But, before the DTOs could get their solution, the new advanced tracking technologies had to be implemented. And that part of the project began much earlier when SkyNet Aviation® began looking closely at the flights that RFDS (Queensland Section) was undertaking: where they were going to and how frequently.



SKYNET REACH Aero | DELIVERING THE SOLUTIONS

SkyNet Aviation®'s first step in building the REACH Ecosystem for RFDS (Queensland Section) was to run a comprehensive flightpath analysis to yield a heatmap of its air operations. This advanced chart then formed the basis for identifying critical coverage needs and where the ADS-B receivers would need to be placed to provide coverage down to ground level (in most places).

The result from the analysis was clear: most traffic paralleled the Queensland coast, while the inland flights had a definite in-and-out pattern from coastal hubs.

From this heatmap, locations for many initial ADS-B receivers were identified. Installing them involved bringing in RFDS corporate ally Ergon Energy, which had agreed to make its considerable on-the-ground electricity infrastructure network available as secure, powered sites for the ADS-B receivers.

Because the SkyNet Aviation® ADS-B units have been designed to be simple to deploy for anyone with a modicum of technical training, the initial set of receivers was up and running surprisingly quickly.

"However, due to the vast geography of Queensland, getting all of SkyNet's receivers into some very remote locations wasn't without its challenges," RFDS (Queensland Section) Executive General Manager Aviation and Logistics Glyn Butchard says.

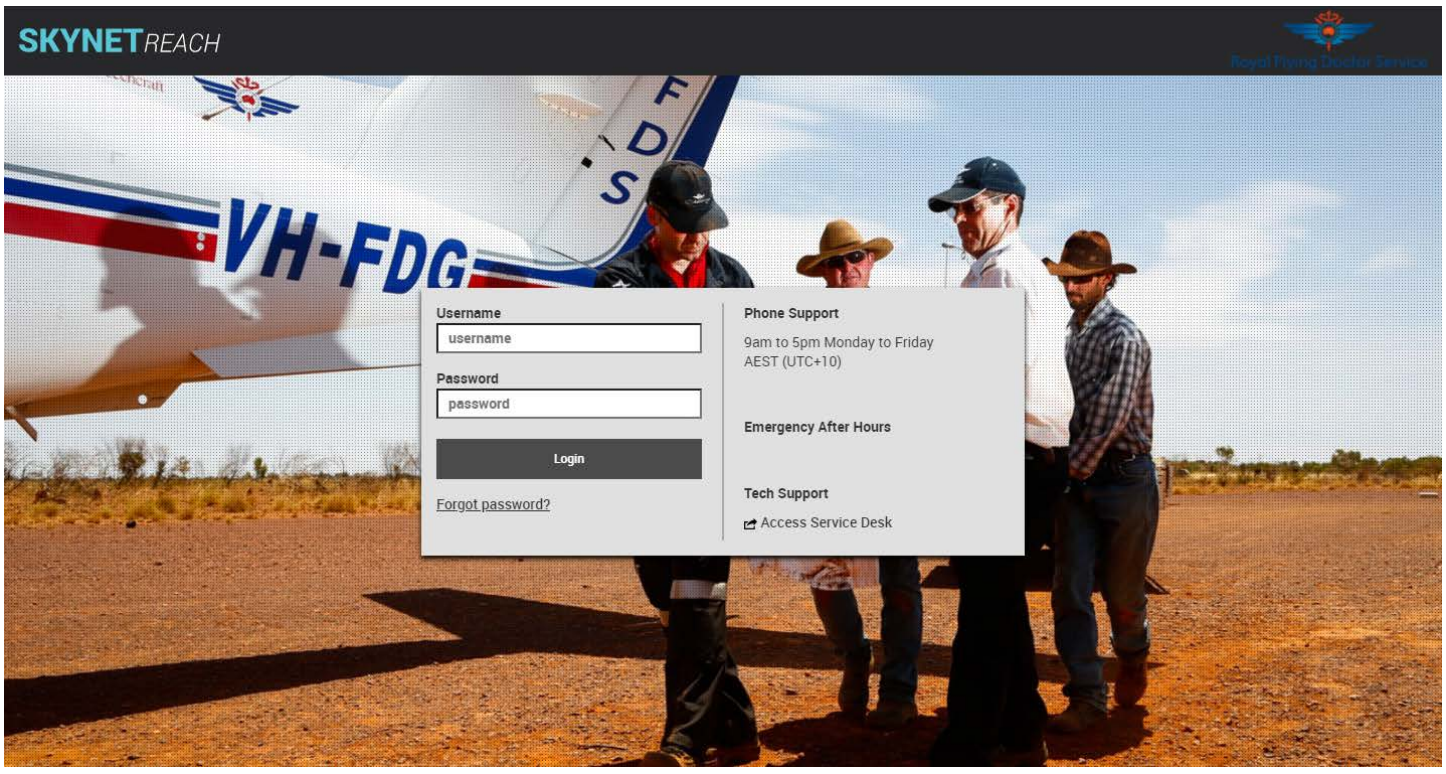
After the system went live in early 2020, the task became one of training. SkyNet Aviation® worked closely with RFDS (Queensland Section) staff to bring them up to speed on the new decision-support capabilities of the cutting-edge network and the accompanying operations control software, REACH Aero Day of Operations.

"With the new SkyNet ADS-B sites, we have saturated all the regional airports of western Queensland with unprecedented new coverage. RFDS (Queensland Section) now has the capability of seeing where all its aircraft are in real time, all the way down to the ground," Davis says.

"There is also a secure app. This means operations managers and executives can check live fleet status instantly on their smartphones and tablets."

In practice, what this means is that those who are responsible for keeping things running have an instant and total operational overview, anytime and anywhere. If it's green across the board, there's nothing to worry about. If there is an issue, they know immediately with the new decision-support tools and can do something about it with more agility.

"And it's not just for managing operational issues, this offers business improvement tools. RFDS (Queensland Section) can analyse movements, manage the fleet and dispatch faster and more efficiently," Davis says.



SKYNET REACH Aero | SKYNET REACH ECOSYSTEM: THE POWER TO DISPATCH, MANIFEST AND SCHEDULE - EFFICIENTLY AND FLEET-WIDE

Not long after the ADS-B network went into service, a push to move forward with Stage 2 arose within RFDS (Queensland Section). They wanted their team of seven Duty Tasking Officers (DTOs) to be more proactively involved in dispatch/scheduling and also move away from their venerable and reliable, but slow and labour-intensive, manual email manifest distribution system.

The need for this capability becomes clear when you understand the role that the DTOs perform. They are the initial contact point for all aeromedical requests from three powerful stakeholders:

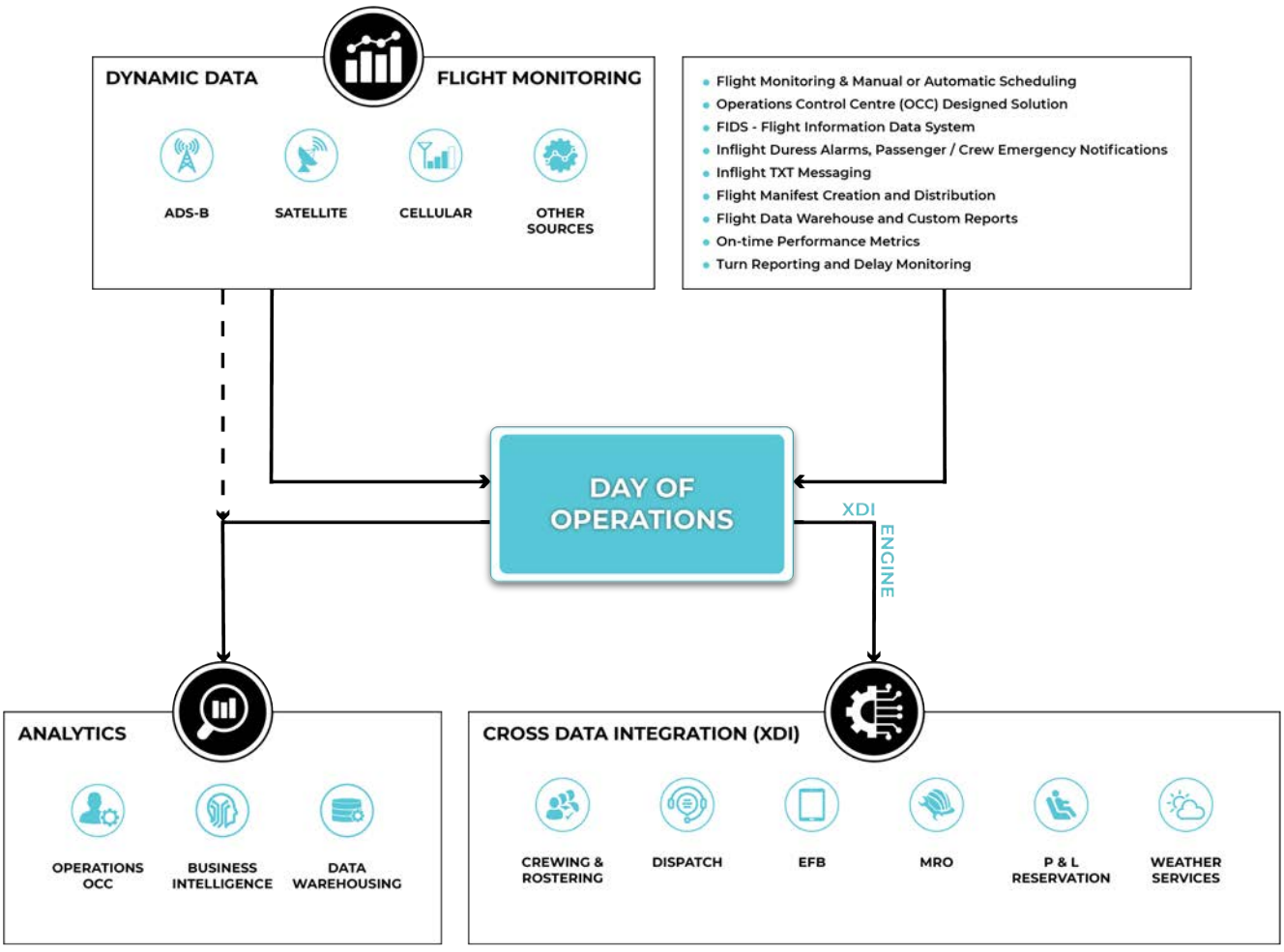
- Queensland Health - the state's public health department (the customer)
- Retrieval Services Queensland - the body that tasks all clinical coordination of aeromedical retrieval and inter-hospital patient transport statewide
- RFDS (Queensland Section) medical officers.

Thus, the DTOs have a pivotal role, from responding to these requests through to planning to have the right crews and aircraft available in the right places to meet developing demand, as well as authorising flights and personnel for take-off.

Needs develop and change through the day, so the task of building schedules and distributing manifests to bases, pilots and clients is a highly responsive one. The DTOs, therefore, must balance ongoing demand against detailed record-keeping, a thorough understanding of operational capacities, RFDS policies and external compliance rules.

As such, it was clear to both RFDS (Queensland Section) and SkyNet Aviation® that the DTO function needed to be equipped to take a bigger role in dispatch/scheduling and have easier access to a live view of what each aircraft was going to be doing throughout a day.

SKYNET Ecosystem



SKYNET REACH Aero | WORKING CLOSELY WITH THE EXPERT END USERS

In planning the scheduling upgrade, SkyNet Aviation® worked closely with the DTOs, gathering input on what they did and did not like about their current scheduling and manifesting systems. RFDS (Queensland Section) management also stipulated that they wanted a real-time view of the fatigue hours and location of staff, as well as aircraft movements.

From all the feedback, the SkyNet Aviation® engineering team developed a prototype. Then, through a series of meetings, they continually refined this into something that would give the DTOs precisely what they needed. A key aspect of that was the integration of leading crewing and rostering specialist solution, Air Maestro.

As it turned out, the biggest challenge for the development team was not wrangling the data and integrations, but rather building the user interface. Because there are so many different data fields in play, it was tricky to make the interface easy to understand and use. A large part of successfully achieving this was to use automation where possible. For example, when inputting scheduled departure times, the system can calculate expected arrival times; or, when adding crew to a flight, the system can then roll them down through the roster. In the end, all challenges were overcome effectively.

From scoping to delivery was estimated to take 8 weeks, and the module was delivered precisely on deadline. Once the system was built, SkyNet commenced the training phase. This was supported by videos, written user guides, phone support and email support. And so, Stage 2 of the system went live in February 2021. By September of that year, it had already been used to successfully schedule and manage just over 10,000 flights.

SKYNET REACH Aero | PROJECT SUCCESS

For an aeromedical provider, everything is focused on improving patient care. As Butchard points out, the boost that SkyNet Aviation® has delivered to operational capability means just that. For his part, DTO Team Leader Greg Bushnell notes that the new system has been very stable, very reliable and very accurate. Any apprehension about adopting the new system is gone.

"It has worked incredibly well. SkyNet Aviation® has worked tirelessly to understand what RFDS wanted. We really got there with a minimum of fuss," Bushnell says.

On the SkyNet Aviation® side, Jon Davis is full of praise for the commitment RFDS (Queensland Section) has to innovative thinking around its mission of providing excellence in, and access to, primary health care and aeromedical services across Queensland.

"RFDS are brilliant and extremely interested in adapting and being leaders in new technologies that can improve patient care and outcomes. We're pleased to be part of helping them improve the health of Queenslanders," Davis says.

He points out that RFDS (Queensland Section) now has world-class 24/7 capabilities to manage their aircraft, answering all these questions continually in real-time:

- Where are the aircraft?
- What are they doing?
- Where are they going?
- Who is on board?
- Are they late or early?
- What is the weather like where they are?
- What is it like where they're going?

"The DTOs, the operational staff and the management team can see the state of the entire fleet across Queensland – all at once and live. To the second," Davis says.

"We provided RFDS (Queensland Section) access to a world-leading ADS-B network and we unlocked their data. This allowed them to come off SkyNet's automated tactical scheduling and to do their own scheduling, integrating Air Maestro crewing and rostering, and then the electronic manifest distribution. The collaboration is now progressing onto other projects and we're currently looking at moving on to deeper analytical fusion analytics reporting."

SKYNET REACH Aero | CONCLUSION

In sum, the prescription has been simple: the more flights the RFDS can coordinate and crew for each aircraft, the better they can serve patients. And now, enabled by a tailored SkyNet REACH Ecosystem and the SkyNet Fusion ADS-B network plus the scheduling solution delivered by SkyNet Aviation®, they are doing that at a level that befits the world's largest aeromedical service.

Butchard says that by increasing the efficiency of handover, it means patients have less waiting time and are able to get to their destination of care much quicker.

"The SkyNet Aviation® system gives our operational staff a whole new set of tools to be able to reduce delays we may have previously experienced in our tasking system," he says.

"The beauty of the new system is not just the ability to track our aircraft more frequently, but the system and set of tools that go with it. The greater amount of clearer information that is now available to our Duty Tasking Officers including start of taxi on the ground at remote locations, more accurate departure and arrival times, expected weather conditions, etc – all the tools that they use to make decisions around access to the right aircraft are available at the right time.

"The RFDS is always looking at ways to build on our level of care, and this is another way we are achieving that goal."

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