

Case study:

Scion field crews' data collection three-to-five times faster with SouthPAN

The Challenge

Accurate maps are needed for modern forestry operations. These maps help define native forest boundaries, working areas and environmental management zones. Geolocated harvesting machines and mapping software are increasingly used on the ground, however current satellite positioning from 'standalone GPS' cannot provide the necessary position accuracy required in these challenging conditions.

The Solution: SouthPAN

The Southern Positioning Augmentation Network (SouthPAN) is the first satellite-based augmentation system (SBAS) in the Southern Hemisphere. Improvements to Global Navigation Satellite System (GNSS) positioning across New Zealand and Australia, including from new SouthPAN ground stations, enables compatible devices to achieve less than a metre accuracy.

Scion field crews are utilising SouthPAN in handheld GNSS kits to accurately collect data, manage forest inventory, and monitor pests and diseases. Handheld GNSS devices have been used in forestry for years, however, the positioning accuracy in these challenging conditions is often limited to 15 metres. By enabling the SouthPAN L1 SBAS satellite signal in the configuration, these GNSS devices are now working at sub-metre positioning accuracy.

Scion has found that enabling SouthPAN on the Arrow Gold GNSS receiver from EoS Positioning Systems, provides a low-cost solution with results that are indistinguishable from more expensive 'high-grade' systems currently in their toolkit. SouthPAN is now another tool in the belt for Scion's geospatial and autonomous systems.



SouthPAN: A more accurate location in less time for Scion and New Zealand forestry.



Scion UAV utilising SouthPAN for high-definition forestry mapping.

In addition to chainsaws and handheld GNSS kits, foresters have a wide range of equipment in their utes, including drones or unmanned aerial vehicles (UAV). Scion is also configuring SouthPAN into their fleet of UAVs, for high-definition forestry mapping. By periodically flying UAVs over forest nurseries, seedlings can be monitored for disease, nutrient stress, growth, and other insights. SouthPAN allows Scion's Geographic Information Systems (GIS) and data science teams to expand this precise monitoring to individual trees in larger forests. The move to capture data more accurately from planting to harvesting falls under Scion's vision of precision forestry, that is driving process and productivity improvements within the industry.

The Impact

In late 2022, SouthPAN launched its Early Open Services, the first open-access GNSS augmentation system for New Zealand and Australia. SouthPAN's L1 SBAS service is an open satellite signal that allows devices to correct errors that affect 'standalone GNSS', impacting receiver accuracy and reliability. Although similar SBAS services have been available in the US, Europe, Japan, and other regions for over 15 years, positioning users who require higher levels of accuracy in New Zealand and Australia had to pay for commercial positioning services or deploy their own GNSS base stations. Through improving precision forestry mapping, Scion can better detect and address anomalies in seedling communities while ensuring the presence of healthy, rich, indigenous biomaterials that further enhance the surrounding ecosystem. Scion can use data collected to optimise and inform their future processes to support sustainable forestry management, preserve biosecurity and ensure material processing meets their rigorous standards. Scion can also use this information to better engage end users and supply them with accurate information supporting diverse ecological fields. Scion was an early adopter of SouthPAN, participating in an SBAS test-bed in 2020, while demonstrating its use to internal and industry partners since mid-2023. Using SouthPAN, Scion has been able to:

- Reduce and avoid equipment costs by using SouthPAN L1 SBAS over more expensive systems.
- Improve productivity using SouthPAN L1 SBAS in challenging conditions over 'standalone GPS'.
- Enhance accuracy and quality of data captured by forestry field crews.
- Optimise processes by standardising 'precise' data capture across applications.
- Reduce time in the field by decreasing point acquisition from three minutes (Arrow Gold without SouthPAN) to 20-30 seconds (Arrow Gold with SouthPAN L1 SBAS).
- SouthPAN SBAS allows Scion field crews to collect data 3-5 times faster, and make the final location of data available for researchers to use within minutes, where previously this took days.

SouthPAN is helping Scion to achieve their vision of precision forestry and to improve the processes and productivity of the forestry wood and biomaterial sectors.

“A quicker, more precise location in less time, requiring little to no post-processing”

Peter Massam, Scion

Scion carries out research, science, and technology development for the benefit of New Zealand's forestry, wood, and other biomaterial sectors. As a leading Crown Research Institute (CRI) in sustainable forest management, biosecurity, wood processing and ecosystem services, Scion collaborates with end-users to develop soil and freshwater management, climate change adaptation, indigenous forestry, industrial biotechnology, and high-value manufacturing.

SouthPAN is a joint initiative of the New Zealand and Australian Governments that provide SBAS services to these regions. Toitū Te Whenua Land Information New Zealand is working in collaboration with Geoscience Australia on the development, deployment, and operation of SouthPAN, the first SBAS in the Southern Hemisphere.



Scion Field Crew using SouthPAN on the Arrow Gold.



Forest site monitored and mapped by UAVs.



For more information visit: <https://www.linz.govt.nz/southpan>

Email the team: southpan@linz.govt.nz

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