



Mission Statement

To increase the awareness and use of precision agriculture (PA) technologies in land-based primary production systems, access funding for research and the development of PA technologies, build capability within the sector and promote adoption of PA through industry events, symposiums and field days.

Editorial

Welcome to the fourth edition of the PAAZ Newsletter. I've added our mission statement as a reminder of what PAAZ is all about. A recent Dairy News article puts a bit more flesh on the bones of the mission statement: <http://www.ruralnewsgroup.co.nz/dairy-news/dairy-agribusiness/precision-ag-can-help-face-the-pressure> and has helped to raise the PAAZ profile in one sector at least.

I hope you find this edition of the Newsletter an interesting read in the run up to Christmas. Whether you're planning to spend the Yuletide shifting irrigators, milking cows or at the beach, I hope you'll find time to consider your response to two news items in particular.

Firstly, the announcement of the Civil Aviation Authority's public consultation on rule changes for unmanned aerial vehicles (UAV). This could have significant implications for PA approaches using the UAV platform.

And secondly, the forthcoming 7th Asian Conference on Precision Agriculture in 2017, which is coming to New Zealand for the first time. 2017 may seem a long way off but if you are involved in PA in New Zealand you are going to want to be involved in this important, international conference so put your thinking caps on early!

Regards,
Roger Williams, Editor

From the Chairman

The PAAZ AGM this year was held on 5 November in Hamilton at the Waikato Innovation Park. For the benefit of readers who were not able to attend, I've summarised the key points from my Chairman's report here.

The PAAZ AGM2014 has been a busy year where PAAZ has attended and presented at many conferences and seminars. These events have provided us a great opportunity to engage with many different sectors and groups, showcasing the benefits that can come from the use of Precision Agriculture.

We kicked off in February 2014 at The Annual Fertilizer and Lime Research Centre Conference where Prof. Ian Yule organised and ran a session on Precision Agriculture. The highlight of this event was the opportunity to host Prof. John Fulton from Auburn University, Alabama. Prof Fulton outlined the use of Precision Agriculture and how they are doing field trials which incorporates a section focused on hands on training for students and farmers. This is a very important point because if we do not have the farmers with these tools in their hands we will struggle to adopt technology. I would like to acknowledge both Massey University and Foundation for Arable Research for bringing John to the South Island to run some meetings there also which were well supported by farmers and industry.

Other events where we have contributed by way of speakers and presentations included the LandWISE Annual Conference, Lincoln University Seminar on Weed Management, Mobile Tech Primary Industries Conference, NZARES Annual Conference, NZ Future Farms Conference and the Waikato Farm Environment Conference.

Both Prof. Ian Yule and I, along with several other New Zealand delegates, had the opportunity to present at the International Precision Agriculture Conference in July at Sacramento, California. It is always interesting to attend these events and be able to see what is happening in the rest of the world and how we can benchmark ourselves in these areas. It is also useful for identifying areas where we could work collaboratively with others to improve efficient use of innovative technologies that are coming to the market.

We have had the opportunity to be engaged with a range of school students, university students and also the educators. This is a space we need to further our work in, to better promote sustainability through the use of

Precision Agriculture.

Several of our members have presented to or hosted Government Ministers and officials, indicating a real interest in this space, where Government is looking to Precision Agriculture to be part of the solutions needed to meet growing environmental constraints while increasing production to meet Government's primary export expectations by 2025.

Regards
Craig Mackenzie, Chairman

New Civil Aviation Rules Proposed for Unmanned Aerial Vehicles

PAANZ considers that unmanned aerial vehicles (UAV), more formally referred to as Remotely Piloted Aircraft Systems (RPAS), can make a great contribution to precision agriculture but acknowledges that the increasing use of these devices raises a number of safety issues that need to be addressed. The current public consultation is a welcome opportunity to discuss these.

As the use of UAV has increased in New Zealand, so have the number of incidents involving them according to the Civil Aviation Authority of New Zealand. The CAA regards the current rules, originally drafted for model aircraft, as no longer adequate and is proposing a new, stricter rule system for operators wanting to fly when public safety could be at risk.

CAA's general aviation manager Steve Moore says the rules catch up with the evolving technology, although it doesn't know how far that evolution will go. "For the recreational users they'll pretty much be the same - if anything there'll be a little bit more latitude available to them," says Mr Moore.

The proposed new civil aviation rules to regulate the use of UAV have been released for public consultation. The CAA's Notice of Proposed Rule Making was issued on 4 December 2014. Members of the public and industry can give feedback until 30 January 2015 through the CAA web site: www.caa.govt.nz/UAV.

More information is available from Civil Aviation (www.caa.govt.nz) and via the industry hub, UAVNZ or Airshare (www.airshare.co.nz).

Readers may also be interested in the The Royal Aeronautical Society – New Zealand Division 30th Annual Symposium, Friday 16th January 2015. The symposium will be a forum for the UAV industry to learn about the development of aviation policy and regulations, engage with the wider aviation community, share knowledge about industry best practice, network and collaborate on technology and business development opportunities. Further information can be found at <http://www.nzras.org.nz/sites/default/files/images/2015%20UAV%20Symposium%20Reg%20Form.pdf>.

Agricultural applications for UAV - a practical perspective

Massey University Professor of Precision Agriculture, Ian Yule, and his colleagues have considerable practical experience of using UAV and see enormous potential for agriculture. In this article, Professor Yule reflects on the need for widespread awareness of risks associated with their use.

"In our experience, it is surprising how often piloted aircraft come close to places we have been operating. These full size craft are not necessarily higher than 400 feet, the current assumed ceiling for UAV. We have spotters, as well as pilots, on the job every time we use our UAV, and experience shows that is a necessary measure.

"The problem comes from agricultural aerial operators who would not have appeared to have been considered when developing UAV regulations either here in New Zealand, or around the world. Almost all other aircraft are expected to fly above 500ft, whereas agricultural aviation operators in New Zealand have an exemption that allows them to operate closer to the ground in order to complete their operations.

"There are two basic problems. The first is communication with these operators. It has been our experience that they do not want to communicate around operational matters. We have been told that they do not read NOTAMs (these are notice to airmen, that are used to notify users of activities in designated areas described in the notice). We have tried using UHF radio which we have trained our staff to use, but the agricultural operators do not respond. We have also tried using email to notify local operators of where, when and at what height we are working. Again clearly these notifications are either never read or ignored.

"The point is that in all cases we have been on Massey property and problems have ensued when they are either operating on a neighbouring property, or travelling through Massey's property at below 500ft to get to their next job, which we understand should not be happening. We have had close calls, including having a plane fly between the remote pilots on the ground and their aircraft. Pilots of piloted aircraft are not likely to be able to see a small object in the sky when they are closing at high speed. It's difficult to say what the outcome of a collision would be but birds are capable of bringing down a plane, and agricultural pilots operating a plane close to the ground would have little time to react so there is the potential for a serious accident. Additionally, the UAV operators on the ground are often not likely to hear an aircraft until it is fairly late if they are facing into the wind and the aircraft is approaching from behind.

"Given that the number of people operating these UAV is likely to increase, and so rather than one group operating UAV in an area there may be several, the potential for an accident seems to be great. A farmer minding their own business on their own property flying a UAV would also have the same issue as agricultural pilots do not appear to need permission to fly over anyone's property.

"We need a system that will give pilots information about what is happening in their airspace. If they will not use notification systems maybe something that gives an audible notification in their cockpit that they are approaching an area where UAV are in the air is required.

"The second problem with the current proposed legislation is that the suggested height restriction will limit the UAV work rate making them relatively expensive to operate. For example, a fixed wing UAV operating at 400ft can be used to photograph an area of approximately 80 ha in 40 minutes. Then you need to bring it into land and so your turn around time on surveys might be two hours by the time you have put in ground control points etc. The system takes high resolution images: each pixel on the image is around 2.5cm on the ground. That is 16 million pixels per ha. We don't need that many.

"If we could go higher then we could cover a much larger area at a reduced spatial resolution. This would make systems more cost effective, especially when working in areas where large changes in elevation are present. The motivation for the regulation would appear to be the expectation that other aircraft are above that limit, but clearly that is not the case when agricultural operators are taken into account, so I would argue that flying above the 500ft limit constitutes very little elevation of risk. Clearly there has to be some practical limit based on keeping visual contact with the UAV so maybe 1000 ft is a more realistic limit.

"UAV systems could have a big part to play in our future and could make a significant contribution to precision agriculture, but we need to develop sound regulations that will allow them to operate safely in relation to other air users.

"Some suggestions in the short term would be:

- UAV pilots either undertake basic training provided by the equipment provider or some accredited body so they have a good understanding of the airspace and how to operate within it;
- UAV pilots are trained in the use of UHF radios so that if they need to contact another aircraft they can do that properly;
- UAV pilots are trained to understand and submit NOTAMS;
- Agricultural aviators need to realise they are no longer the only user of the airspace at the sub-500 ft level and react accordingly, by having their radios switched on and by reading notifications that are sent out prior to them going into the air;
- Collectively a better notification system needs to be developed.

"A longer term solution might be that avoidance technology is developed, where a pilot will receive a warning that they are coming close to an area where UAV are in the air. Each UAV might have a small beacon of some description that can be detected by the piloted aircraft."

Paperwork dwindles with Smart Maps

Ravensdown marked the anniversary of Smart Maps by scooping an international Information Technology award, ahead of 100,000 other nominees worldwide earlier this year.

Smart Maps won the 2014 Environment Systems Research Institute Inc (Esri) Special Achievement Award in Geographical Information Systems (GIS). The annual award recognises outstanding work in GIS technology and Ravensdown was the only New Zealand company to be named among the winners.

Smart Maps is an interactive farm management tool allowing farmers to make real-time management decisions based on accurate data. In just one year, more than 3,400 farmers have transformed the way they record and monitor their businesses, doing away with piles of paperwork and out-of-date data.

Ravensdown Chief Information Officer Mark McAtamney says the high uptake of Smart Maps and positive

feedback from users is rewarding.

"This award is recognition for the time our team spent with customers to understand their needs and then using the latest technology to create a solution," Mark says.

"Being the only award winner from New Zealand is a fantastic accolade and a great example of a local company leading the way on an international stage. The use of technology in agriculture is growing and Ravensdown will continue to pay close attention to our customers' needs and enhance our systems accordingly."



Canterbury dairy farmer Scott Lovelock is one of more than 3,400 farmers nationwide using Smart Maps in his day-to-day management.

Sharemilking 1,130 Holstein Friesian cows on a fully-irrigated 302 hectare farm west of Christchurch, Scott says he utilises "every blade of grass as weather permits as well as maximum pasture intakes without taking our eye off residuals hitting 1,500kg/DM/ha all year".

The system allows farmers to view an online aerial map of their farm and draw on paddocks, blocks and management zones, through a personalised online service site: myravensdown.co.nz. The data is integrated with fertiliser application and other on-farm events, while soil test data is graphically presented to help farmers decide actions for individual paddocks.

"It creates a great picture for our records – and they're accurate instead of having piles of paper that may or may not be out of date. This is our second year of building this data so the performance picture of each paddock is getting clearer all the time," Scott says.

Smart Maps also complements existing technology, so farmers can upload data using a range of tools and suppliers.

Scott monitors pastures on farm every 10 days using his C-Dax Pasture Meter, which uploads measurement data back to Smart Maps. He also uses Ravensdown joint venture spreading company, Canterbury Spreading, to order fertiliser and arrange for spreading online. Joint venture spreaders use proof of placement technology, monitoring where the spreading truck has driven, so farmers can check the nutrient status of each individual paddock.

"I go into Smart Maps, pull up what I want under the applications tab, tick a little box for the last application and it shows me a map of what was done last time so there are no double ups," Scott says.

"Growing grass and utilising grass is everything and a profitable bottom line is also right up there. Smart Maps is helping us to make sure we keep improving grass performance to get us where we need to be."

Summary of PAANZ presentations at events during 2014

Members of the PAANZ Committee have been very active during 2014 in raising the profile of PA in New Zealand by speaking at a wide range of events throughout the year, talking about PA in Action.

For example, Ian Yule and Brendan O'Connell presented at the New Zealand Institute of Primary Industry Management in August this year, Brendan also presented at the NZ Future Farms Conference in October and, most recently, Robyn Dynes delivered a PAANZ opening address to the Spatially Enabled Livestock Management Symposium on 18 November 2014. The event was also sponsored by PAANZ.

Looking ahead, if you would like a PAANZ Committee member to present at an event then please get in touch. We can't promise to always be able to field a speaker but we will do our best.

7ACPA coming to NZ

Armin Werner, Lincoln Agritech

The 7th Asian-Australasian Conference on Precision Agriculture (7ACPA) will be held 2017 in New Zealand and PAANZ will be the host and the principal organiser. The 7ACPA and its parallel activities should be a prime event for agricultural science, research and development for New Zealand in 2017 with a focus on information driven primary production.

Traditionally, ACPAs have had a strong focus on plants with a growing proportion of presentations from R&D in Precision Horticulture. To complement this trend, PAANZ intends to set up in parallel the 1st Australasian Conference on Precision Livestock Farming (1ACPLF) which will build on the success of the recent Spatially Enabled Livestock Management Symposium (SELM, see last PAANZ newsletter: SELM 2014 on 18th Nov. 2014 in Hamilton).

Additional events to 7ACPA and 1ACPLF are envisioned to be hosted by Australian and New Zealand partners involved in precision agriculture, including SPAA (Precision Agriculture Australia) and LandWISE (NZ), who intend to have practitioner oriented workshops in parallel to 7ACPA. These events will address different target groups but will also allow with joint plenary sessions to get cross-sector overviews for all participants.

The majority of attendees of the previous ACPAs have been from Asia with some additional visitors from the rest of the world. PAANZ envisions broadening the targeted audience to Australia, New Zealand and overseas (Europe, North and South America). The PAANZ Committee have decided to hold the conferences in Auckland, so as to allow international attendees easy access to the conference venue and to ensure sufficient opportunities for accommodation and additional off-conference offerings.

Pre- and post-conference tours over several days' duration will be offered to the international guests to visit the latest developments in precision agriculture in key regions of New Zealand. This may include excursions focused on pip fruit, horticulture, arable cropping, red meat production and dairying. Special training courses for latest research methods and scientific achievements will be offered to PhD-students before the event.

It is intended that this multi-conference event will take place in the first months of 2017. Ongoing discussions on the exact timing with organisers of other events for NZ-agriculture will help to avoid any serious conflicts and overlaps.

The website of the 7ACPA will be launched in early 2015 (www.7ACPA-2017.org). This website will contain early information for the potential participants. It will also invite interested sponsors and collaborators to contact PAANZ in order to support or join 7ACPA.