



# Joining together to justify RTK outlay

*A group of Cambs farmers has joined forces to set-up their own ultra-accurate GPS network.*

*By Martin Rickatson*

**'One large RTK-equipped farm reckons to have saved £30,000 in its first year on seed, fertiliser and chemicals.'**

**R**TK (i.e. real-time kinematic) GPS guidance is renowned for its accuracy and immunity from satellite 'drift' — providing the precision required to restore tramlines in exactly the same place each season.

However, the investment required for this level of accuracy is enough to put most farmers off, at around £12,000 per base station.

To help spread the cost, a group of five farmers near Cambridge — together with NIAB TAG — have set-up their own RTK network to enable them to achieve what they believe will be significant savings on their machinery operations.

Over the next two years, RTK Farming plans to extend its network coverage to around 160,000ha in the south Cambs

area — allowing farmers who sign-up to operate their machines to within just +/-20mm accuracy.

To achieve this level of precision, RTK-based systems require not just a conventional, tractor-based receiver to 'talk' to communication satellites, but a second, fixed reference point as well.

And while portable, single-frequency receivers are one way of achieving this — set-up on tripods in fields wherever a machine is working — subscribing to a dual-frequency positioning signal is a simpler way of operating.

"Having access to an RTK correction signal is essential for any farmer wanting to get the full benefits from auto-steering, such as minimising overlaps or misses, positioning tramlines in the same place each year, or being able to move towards a Controlled Traffic system," says Edd Banks of Harlton-based Thomas Banks and Partners — one of the founders of RTK Farming.

"Even with the most accurate GPS system, a machine's positioning can

be as much as 10cm off-line because of satellite drift."

He notes that mobile RTK receivers have a number of downsides as well. "They're costly to buy and can take a long time to 'initialise' — plus they're easily damaged, which can be a major issue with the need to constantly reposition them.

## **High installation cost**

"Yet the high cost of installing a fixed RTK base station makes it too expensive for most individual farms to justify," he admits. Moreover, the signal may be too weak to reach outlying fields on widely spread-out farms, he adds.

Edd Banks, who farms 400ha together with his father, Tom, grows cereals, rape, beans and sugar beet. He explains that RTK Farming is now looking to establish a network of fixed RTK base stations — backed by repeaters — to allow subscribers to benefit from the input cost-savings such a system offers, while spreading the set-up costs between founder members and other potential subscribers to their correction signals.

"In short, the idea is to make RTK-level precision more affordable to a wider audience."

The partners adopted the almost universal Trimble VRS Now signal so

users aren't limited by the makes of machines they own. "That means all types of farm will be able to benefit — regardless of their size.

"Farms can equip their existing machines with receivers and steering kits, provided they use a hydrostatic steering system — there's no need to wait until tractors are due to be replaced before upgrading to a full, auto-steering RTK package."

### Recruitment drive

The group has been looking to recruit subscribers since its launch in early July, with the initial instalment of four receivers — each having a 10km radius. "The coverage should enable at least 70 farms, or an area of around 70,000ha, to benefit from the network."

The plan is then to install a further six stations on new recruits' farms in the next year — extending the coverage to 160,000ha.

"We want to offer members a coverage area that's as broad as possible, with full overlaps so that in the event of any problem with one base station, the signal can still be picked up from another."



Each base station is equipped with 12hr back-up batteries, and the 12W systems are fitted with lightning protectors to ensure, as far as possible, that the signal is always available, notes Edd Banks.

With four base stations and four repeaters — and with each base station only having to cover a 15km radius — the signal is as accurate and reliable as possible, he reckons. "Initialisation in the field is also much quicker than for

*RTK Farming has been set-up by six Cambs farmers to make ultra-accurate GPS precision more affordable to a wider local audience.*

mobile-based systems — just 90 seconds or so."

Proposed yearly charges for subscribers to the RTK Farming network are £500 per GPS receiver, with a flat rate of ▶

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*“Setting-up an RTK network in a hillier area would simply require more repeaters,” says Will Mumford.*

► £2,000 for farms running four or more receivers. In addition, there is a one-off joining fee of £200.

The founders include NIAB TAG’s 300ha farm at Cambridge — two-thirds of which is down to field trials, with 65 different crop species grown.

### **RTK rationale**

Farm manager, Mark Leaman, explains that rationale behind the decision to join: “Our involvement stems from three of the group’s farmers being hosts of NIAB field trials. But we were also one of the first farms in the group to adopt RTK technology, having first used a mobile station-based system three years ago.

“Our primary goal was to cut the amount of time spent marking out trials, and to make them more accurate. In addition, we wanted the repeatability that would allow us to keep our tramlines in the same place from one year to the next.

“We originally looked at installing our own base station, but quickly dropped the idea when we found it was going to cost around £50,000. But as prices came down, we costed it out again and calculated it could pay for itself over a four-year period in terms of the savings on time and input costs, as well as the enhanced operating accuracy.

“Having joined with the others to form RTK Farming, the cost will obviously come down further as there will be a potential income-stream from the RTK station.”

Planning to upgrade the farm’s drilling tractor at the same time, although not having any loyalty to any particular

manufacturer, Mark Leaman decided to go with Trimble’s RTK system — one of the key reasons being its compatibility with a wide range of manufacturers’ machines.

“Basically, it will fit any machine with hydrostatic steering,” he points out. “Its development isn’t limited to just one machine make, and the system can be retained when the tractor is sold.”

Moreover, some Trimble guidance boxes can be upgraded to work with RTK, and Trimble after-market ‘finishing kits’ can be supplied for most new machines which are auto-steer-ready.

### **Investment payback**

Having first installed a mast, Mark Leaman then began looking for ways to speed-up the payback on his investment, and discussions with his neighbour, Andrew Crossley of the Trumpington Farming Company, led to the pair agreeing a lease deal for the latter to use the NIAB TAG signal.

From there, the two got talking with other near neighbours, and RTK Farming was formed, together with partners David White of Little Wilbraham, Chris Ascroft of Wilbraham Farms and D&A Sapsed of Croydon near Royston — plus Thomas Banks and Partners of Harston.

Bayer CropScience, which is also based nearby, has joined the network as an ‘associate partner’.

“The return on investment for large-scale farms can be relatively quick,” claims Mark Leaman. “One large, RTK-equipped farm outside of our group reckons to have saved £30,000 in its first year on seed, fertiliser and chemicals — and that’s without having a full system.”

Among the other advantages of having a retrofit receiver and steering set-up is that it can be used on all sizes of machine — including the smaller tractors employed for establishing NIAB TAG trials, he continues. “Our drivers quickly got the hang of the system — enabling them to start drilling at the drop of a hat without even having to mark out the plots.

“Some of them joked that we were taking all the skill out of the job, but the first time they tried it, they didn’t want to go back.” RTK allows them to keep a closer eye on the drill for any problems — even more critical when establishing field trials, he notes.

“We can use the system to accurately

work out how many plots we can fit into a field, and we can then drill at 90° to the tramlines, as well as defining plot ends within established crops.

“In future, we may be able to use it to automatically lift the drill at the plot edge, and use GPS plot references for field recording and harvesting, as well as linking individual plot yields to soil type variations.”

With an accuracy of +/- 20mm, overlaps can be reduced to just 0.33%, compared with around 4% when using no guidance or steering system at all, believes Chris Ascroft of Wilbraham Farms.

“That’s quite a saving in terms of fuel and seed — and HGCA suggests potential savings of £19/ha can be achieved on seed and fertiliser as well from RTK use.

### **Drift problem**

“And while a drift of anywhere between 0.5-1.5m can be a problem with a standard GPS system, that’s eliminated with an RTK correction signal.” The system also offers the potential for variable rate application and for Controlled Traffic Farming — minimising soil compaction, improving soil structure and subsequently reducing tillage costs, he adds.

“With the driver not having to concentrate on steering straight and matching-up with the last bout, he can focus more on what the implement is doing instead.”

Although Chris Ascroft, who oversees 920ha of combinable cropping plus sugar beet, is the only farmer in the group currently not using any form of GPS guidance, he remains unfazed by the switch straight to RTK and auto-steering.

“I’m very excited by its potential. Because of having roots in our rotation, we do a fair bit of ploughing and I’m

### **RTK Farming**

- GPS system with 2-4cm accuracy
- No need for investment in individual masts or mobile base stations
- 70,000ha coverage in south Cambs, rising to 160,000ha in Year Two
- Overlapping areas means back-up cover if one receiver encounters a problem
- Full service back-up from Trimble
- Older tractors can be retro-fitted with autopilot, and system can be removed and changed to another machine easily (e.g. when a tractor is sold)

looking forward to using the system on our MF 7495 as we're ploughing on-land. And while we have very good tractor drivers, this will help to make their jobs a lot easier."

His intention is to discontinue tramlining and to simply drive into his crops in the same place each time. "Some research I heard about recently suggests that sowing sections of crop where the tramlines would normally be aids travel for the sprayer — taking up water which would otherwise make the wheelings soft.

"I'm hoping we won't have to subsoil our wheelings from now on — unless in very wet conditions which would obviously make them too deep.

"And with our sprayer due for renewal soon, we're looking to move from 32m to 36m tramlines which will cut the trafficked area even further — using auto shut-off on the previously sprayed areas."

RTK Farming has a five-year comprehensive maintenance contract with Trimble importer, AS Communications. Technical manager, Will Mumford, gave visitors to the firm's open day a quick refresher on the relative merits of the different

guidance and auto-steer packages available, and the cost versus accuracy arguments for the various signals and systems.

"While the free EGNOS signal was the basis on which GPS first came into farming in the UK, its pass-to-pass accuracy is only 15-30cm, and with the risk of signal drift potentially multiplying that figure ten-fold, relying on it to put tramlines in simply wouldn't work — they could be out by as much as 1-3m.

### **Omnistar signal**

"The Omnistar signal, which is used by a lot of our customers, offers either 7-12cm or 5-10cm accuracy but the cost relative to an RTK service is actually quite high — with a 7-12cm XP system costing £795 for an annual subscription, and £1,200/year for a 5-10cm HP.

"Alternatively, the G2 system — which uses both the American GPS network and the Russian GLONASS satellite system — is £1,200/year for 5-10cm accuracy.

"But for the sort of accuracy required to put tramlines in precisely the same place each year, RTK is essential."

Trimble's VRS Now RTK network uses

the mobile phone/internet network to transmit its signal — hence requiring good mobile signal coverage, continues Will Mumford. "Aside from an £1,195 annual subscription, it's available at no additional cost."

Across the East Anglian area, from Bishop's Stortford to the Wash, AS Communications has set-up its own base station network to enhance RTK acceptance among farmers, and to promote its value as an input cost saver.

Whilst Cambs is a relatively flat region, Will Mumford sees few reasons why setting-up this sort of network shouldn't work in hillier areas.

"All that would be required is a few more repeaters — perhaps four per base station — to ensure signal reception."

As part of its plan to gain regional development agency funding, RTK Farming is looking to identify farms not currently using such a system so comparisons can be made to calculate potential fuel, seed, agchem and fertiliser savings from eliminating tramline width errors.

● Anyone interested in joining can find out more at [www.rtkfarming.co.uk](http://www.rtkfarming.co.uk) ■

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