Controlled-traffic farming in Oxfordshire:

Farming on the straight and narrow

Over the past decade, Oxfordshire farmer Nick August has progressed his precision farming operations. He started out with yield mapping, moved on to developing zones for variable treatments, and now works his whole area under a controlled-traffic farming regime. Mick Roberts charts the August story

Back in 1999 Nick August started out on the precision farming path by making yield maps on his 500ha of arable crops at Burford in Oxfordshire. Ten years later he is now one of the few farmers in the UK that's running a full, commercial-scale controlled-traffic farming system (CTF).

Yet despite his obvious enthusiasm for employing the most modern techniques and all things electronic, he says this latest move was not a foregone conclusion. When Tim Chamen of CTF Europe, a well-known protagonist of the CTF system, first approached him about adopting CTF on his farm, Mr August admits that he was 'fairly sceptical' about the advantages that the regime could provide.

"I felt that the benefits of reducing traffic on my land, which is fairly shallow Cotswold Brash, were quite limited. After all, normal cultivations take out a large percentage of any damage caused as part of the conventional min-till system. But after discussing this and other concerns with Tim, I decided to become more involved in the concept," he explains.

"Having thought about it a great deal, the only answer seemed to be to set up some field scale trials to find out what the potential advantages might be. Until then the only information I was getting was from small-scale projects. I believed then, and still do, that the system needs properly costed, full-sized trials to prove its worth."

After the past two seasons, which were spent putting his system in place, Mr August is already beginning to discover some CTF advantages that were not so evident before. The most obvious ones, such as soil structure improvements, have also provided the environmental bonus of far less run-off, which is possibly also helped by a move to direct drilling. It's still early days, but, even after only one full year of the trials, he says he has already noticed some significant fuel savings.

"From an economical point of view, the savings so far have come from the more

Auto-Guide drilling to RTK precision initiated Nick August's controlled-traffic farming trials. The green stripes show the location of the previous tramlines put in with normal markers.

Farm Facts

August Farms

Location: Signet Hill, Burford, Oxfordshire
Area: 500ha
Soil: Cotswold Brash with some clay caps
Rotation: Wheat, oilseed rape, peas
Staff: Nick August plus one full-time
Combine: Massey Ferguson MF 7274 Cerea with Datavision II+
Tractors: 190hp Fendt 820 Vario, 155hp John Deere 7710
Fertiliser spreader: Kuhn MDS 1141 with LH Agro 5000 controller
Sprayer: Clayton C410S with 22m wide booms and 2,500-litre capacity tank; LH Agro 5000 controller
Drill: 8m wide Väderstad Seed Hawk

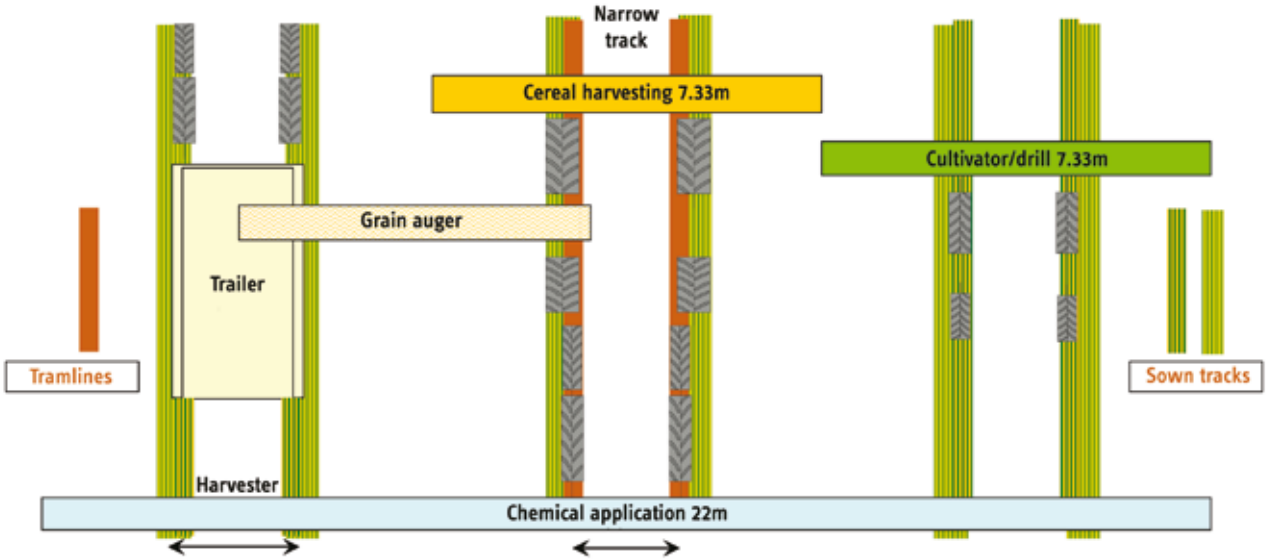
Nick August based his Out Track controlled-traffic system around his MF 7274 Cerea's 7.5m header. He couldn't justify changing his combine just to fit in with CTF.

The LH 5000 controller is used on the sprayer and spreader. Massey's Datavision II+ screen plays a part in both mapping and controlling variable rates.

free draining soils, which are now easier to work, and from carrying out fewer operations. My main concern before moving over to CTF was that I needed to consider if these relatively small advantages would ever justify the cost of implementing the system and then producing a higher margin. It also took about six months of head scratching to work out exactly how I was going to implement the CTF system."

Mr August felt his circumstances were best suited to the 'Out Track' controlled-traffic farming system, which is where the combine or harvester's wheels straddle the conventional tractor 'tramlines' (see diagram, p72). Put simply, the combine header is never going to be wide enough to span across the entire tramline width – so the system is devised so the combine sits astride one tramline on the first bout, runs in its own marks between tramlines and then straddles the next tramline.
The other alternative is to extend all the machines' wheel tracks out to the same width. "This is not only a more expensive option, but you also need to negotiate with all the manufacturers to ensure they are happy with you doing that. I know some Fendt tractors are operating with 'cotton reel' wheel extensions on their axles, and others are using dual wheels with the inner tyres deflated, but I thought that the Out Track route was probably the most practical option for me."

The farm's Fendt 820 tractor was ordered with a 2m track width to fit the Out Track controlled-traffic farming system. Here the tractor's wheels are in the combine's marks, in between the farm's 22m tramlines.



Calculation of tracked area			Input your own figures in the yellow boxes				
Harvester drive tyre section width (mm)	Harvester track gauge (m)	Widest tyre section width of narrower gauge (mm)	Narrower track gauge (m)	Common implement width (m)	Tracked width/impl. width (m)	% tracked area	
800	**2.9**	**650**	**2**	**7.33**	**2.35**	**32.06**	**August system – wide track, narrow tyres**
800	2.9	650	1.8	7.33	2.55	34.79	system without wide track, narrow tyres
800	2.9	710	2	7.33	2.41	32.88	system with wide track, wide tyres
800	2.9	710	2	8	2.41	30.13	8m implements, wide track, wide tyres

This means the combine becomes the key machine, with its header's dimensions determining the width of all the other equipment – much in the same way as the sprayer or fertiliser spreader does in normal tramlining operation. For example, all the machine widths must be able to multiply up to fit exactly within the tramline.

"It was the only practical and economical answer. The combine is the most expensive machine I own, and I can't afford to replace this simply to fit into the CTF system. I'm sure I could never justify the cost of a new combine on the back of any savings from using CTF," he adds.

The combine's wheels are set 3m apart and the main tractor, a Fendt 820, was ordered to come with a wider 2m track. The combine header is 7.5m wide which, accounting for a little leeway, means that 7.33m wide bouts make 22m his most practical CTF tramline width. This is 2m wider than his previous 20m system, which also made it easier to adapt existing equipment to fit the new regime.

"Three header widths add up to 22.5m, which means the header cuts 7.33m, leaving a 17cm overlap to gather up oilseed rape or other crops that flop over."

Nick August tried out this 6m wide Väderstad Seed Hawk for a season before opting to invest in an 8m wide version for his CTF work. He has also switched to direct drilling across his entire 500ha arable area.

A benefit of using the relatively narrow, 7.5m wide header is that Nick August can ensure a good spread of chopped straw and chaff across its entire width. This helps when direct drilling.

"The length of the combine's unloading auger is another important dimension when instigating the CTF system. It needs to be able to line up with the centre of an adjacent tramline to enable unloading on the move. This can be quite a problem for people with wider headers who are setting up controlled-traffic work.

"My MF 7274 Cerea's auger matches up well with its narrower header. When we got to harvest I was a bit apprehensive about how it would work, because of the huge time penalty that would come from being forced to empty on the headland. But during the past harvest I think there has been only one occasion where I have been in the wrong place and had to do that – instead of unloading on the move," he says.

The last important combining consideration, he adds, has to be an efficient straw and chaff spreader. This is vital for direct drilling to work.

So, having placed the combine at the heart of the CTF system, Mr August then turned attention to his other equipment, starting with the drill. In his first season he used a 6m wide Väderstad Seed Hawk, but to accommodate the new 22m wide tramlines he shut off the end coulters to reduce its effective working width down to 5.5m.

The original 20m booms on the Clayton C410S were extended with the addition of 1m long sections at each end. The machine now fits into the 22m wide system.

Before the CTF system was even on the horizon Mr August admits he was looking closely at a move to full direct drilling on his Cotswold Brash land. He runs a wheat, OSR, wheat, peas rotation, concentrating on Group 1 milling wheats – currently Hereward and Solstice – with peas for seed and an OSR break. He aims for quality above quantity, because the soil type and rainfall are the main limits on yield.

Over the past ten years he has employed precision farming techniques extensively – variable seed rates, targeted fertiliser – to control input costs for the best returns. At the same time he has also focused on fuel use. This logically led to direct drilling as a way to cut the number of passes and slash establishment costs.

"I was investigating a move to direct drilling before the CTF project and eventually ordered a tine-based direct drill – an 8m wide Väderstad Seed Hawk. I had this on demo in 2007 and felt it was a drill I could work with," he explains.

While he did not buy the direct drill specifically for the CTF system, he says that the technique does make implementing CTF much easier. "The drill was up for replacement and direct drilling does mean I don't have to adapt further cultivators to fit, or run through the field so often."

But the Seed Hawk's width – 8m – is an important dimension and one that does not fit into the 22m tramline system. His simple solution is to block off the outside coulters for an effective working width of 7.5m.

The farm's remaining kit was much more straightforward to convert. The booms on the existing 2,500-litre Clayton self-propelled sprayer were fitted with 1m wide extensions at each side, increasing overall boom width from 20m to 22m. As for the Kuhn MDS 1141 fertiliser spreader, which is also carried by the Clayton, this needed no big mechanical changes apart from resetting its twin discs to boost their application width. "It works fine without any problems accommodating the extra 2m," adds Mr August.

No alterations were required to the Kuhn MDS 1141 fertiliser spreader. Adjusting the disc speed now allows it to spread accurately to the new width.

With the new direct drilling regime in place, few other machines required modification. But with CTF this kit all needs to be operated in dead straight lines after first establishing the tramlines precisely 22m apart. For this task Mr August turned to AGCO, a firm

The Seed Hawk's coulters are set at 25cm between the rows. It's just possible to make out a wheel mark, which extends from the lower left side of this picture.

PDI checks on the farm's new drill didn't pick up that the seed shut-offs were on the wrong spouts – hence the missed row in the middle of the tramline.

This 'special' Valtra is designed for a system in which all the tractors and vehicles run in the same tracks. Out Track avoids this specialist machine mod cost.

that he has worked with closely in the past. As well as the RTK base station and looking after the signal, AGCO has also fitted a TopDock antenna, which is integrated into the Auto-Guide system on the main tractor – a Fendt 820. Having used this set-up to establish the 22m tramlines, Mr August continues to the steer the combine and Clayton manually, though these machines are also due to be upgraded to auto-steer in the future.

"Harvesting without auto-steer in the CTF system is not so difficult. I open up a bout on a tramline and then cut down the next tramline. As the header is 7.5m wide, I always have a little overlap on the third bout, cutting what remains in the middle, between the two tramline cuts.

"It's actually made harvesting far easier, because I can cut out the lands and know they will always match up. Also, from the grain handling point of view, I try to unload on to a tramline so the tractor driver knows where to wait, which cuts down a lot on unnecessary running around," he explains.

Although Mr August set out to conduct only 'field scale' trials on his farm to find out for himself the benefits and any drawbacks, he has now established the system across his entire 500ha of cropped area, except for in one field, which acts as the control for the CTF experiment. The trials themselves are still restricted to just four fields: two flat and two with slopes.

"It would be totally impractical to include all of the fields in the trial. As it is, I'm having enough difficulty extracting the data from the tractor for just these four fields. AGCO is working on a telemetry system, which I hope will make it easier to transfer and interpret the information I need," he comments.

On the sloping fields he is working one up and down the slope and the other across. "Two years ago the CTF 'perceived wisdom' was that you can't do it across the slope, because of the machines' tendency to crab. But equipment has moved on and, although it is more expensive, you can now steer the implement's position as well as the tractor. I now want to quantify the drawbacks that come from equipment 'crabbing' in work.

"I really don't want to work fields up and down. I stopped doing this a while ago because I was concerned that it did not comply with Good Agricultural and Environmental Practice – after all, we all know that run-off is exacerbated by working up and down.

"Also, experience shows that fertiliser/chemical application rates do vary when you go up a slope compared with coming back down again. Maintaining a consistent speed plays a big part in improving precision, particularly with spraying when you aim to keep the pressure steady to produce the optimum droplet size to enhance product efficacy. All of these small points add up," he explains.

Moreover, he knows that working across slopes means he is able to maintain higher outputs. No matter how fast you go downhill, he notes, it never makes up for the time lost going back up more slowly. Fuel use is also reduced by not working up and down.

"When drilling across the slope the tractor used 3.1 litres/ha compared with 3.4 litres/ha going up and down – that's a 9% saving."

Summary: It's still early days in the CTF trials on August Farms, but Nick August is already encouraged by the signs he is seeing. The land has become more free draining and, without compaction, easier to work. There are also savings from working in straight lines without excessive overlaps.

Nick August has kindly allowed profi to follow his moves into CTF and to report on the results from his unique field scale trials. On our next visit we'll delve more deeply into each element of the system and how it performed during last year's harvest/establishment seasons. We will also be reporting on agronomic issues and on how other advanced precision farming techniques are being employed across the farm.

Nick August's CTF experience so far

- Implementing CTF is easier than initially expected
- The main costs predominantly involve installing an RTK signal and investing in the most accurate steering systems
- You don't have to switch to direct drilling crop establishment to move to CTF, but it keeps life simple
- While min till is more difficult to practise under a CTF regime, it does provide an opportunity to create stale seedbeds for better weed control in problem fields
- Ploughing doesn't lend itself to the CTF system
- You don't have to adopt a full CTF system to gain some of the benefits: keeping grain trailers to tramlines; avoiding unnecessary travelling
- Lower fuel and operating costs. Working in straight lines without unnecessary or excessive overlaps cuts costs
- Land becomes more free draining and easier to work, which also cuts power requirement and saves fuel.