



inventors corner



A new occasional series looking at ordinary sailors who have developed radical new ideas. Jake Kavanagh looks at the first new mechanical self steering system we have seen in many years.

THE INVENTOR: Rob Chicken, a qualified mechanical engineer who currently specializes in creating uninterruptible power supplies for medium to large companies. He designs yacht equipment as a hobby, and this is his second viable marine invention to date. Rob has been sailing for over 40 years, much of it in his beloved steel 30ft Klipper sloop.

THE IDEA: An entirely new way of using the wind to steer a boat by harnessing the power of the genoa

sheet. The genoa winch pivots on a robust metal platform, balancing out against an opposing adjustable spring, and connecting to the tiller or wheel via a stainless steel arm.

THE INSPIRATION. Rob hankered to do a circumnavigation back in the 80s, but didn't like the thought of cluttering up his transom with a large and heavy wind vane system, which he felt was both vulnerable, and prevented proper use of the transom. He also distrusted electronic

autopilots, which were very basic at the time and needed a lot of power. Feeling the varying forces working through the tiller as he sailed his boat, he realized that the foresail acted as a giant windvane anyway, and the loads on the jib sheet could be turned into a useful turning force, providing it was counter-balanced.

THE DEVELOPMENT: Over five years as time and money permitted, endless hours in Rob's workshop, and two working prototypes fully tested at sea.

THE RESULT: The Steersman consists of a pair of tough stainless steel pivoting platforms that stay permanently attached to a yacht's cockpit, with a detachable elastic counter spring, which is infinitely adjustable.

THE PRICE: £2,550 inc VAT for a complete system of two Steersman units (port and starboard) and a single double-blocked 14mm spring assembly, plus all the various fixtures and fittings.

Close hauled: The spring runs from aft via cheek blocks.



Inventor Rob Chicken with the first production model on his boat *Justine*.



Below: Light springs for light air



Can be locked off for conventional winch use



Above from left: A close up of the unit: Note the wooden back rest. The wide loop on the tiller arm drops easily over the tiller peg, and is secured from jumping off by a rubber collar.

SO HOW DOES IT WORK?

"Anyone who has sailed a yacht will be aware of the varying forces in the sails, and how you have to compensate for them on the helm." explained inventor Rob Chicken when *ST* came calling. "A good helmsman instinctively feels the pressures come and go, either due to gusts, or from a slight change of course, and compensates automatically. About 30 years ago, I realised that if you could harness the varying loads of the genoa directly to the tiller or wheel, you would have a reliable wind-powered steering system."

Many of us have experimented with pieces of bungee attached to the tiller to balance the yacht as it sails close hauled, and enjoyed variable degrees of success. The Steersman, however, radically develops this concept, and efficiently harnesses two opposing forces –

the jib sheet and an elasticised spring - to steer an accurate course.

Fitting the Steersman unit is relatively straightforward, and you'll need one for each side of the cockpit. The yachts existing winches are temporarily removed, and the Steersman assembly is bolted on to the coaming instead. The winches (providing they are self-tailing) are then re-attached the top of the Steersman's 'platform'. The first production models are intended for yachts of between 26-40ft (7.8m – 12m) with tiller steering or wheel steering, but other versions are in development.

The whole unit is robustly made from 316 stainless steel, and has a very strong pivot on the inboard end. This allows the platform to swing through 40-degrees (20 degrees forward and 20 degrees aft) above a thick

(10mm) mounting plate. Through a selection of blocks, a fully adjustable elasticised spring is attached to one side of the platform, and the jib sheet feeds through in the usual way via a deck block.

Many yachts, especially those with long keels, balance well into the wind, but what about off the wind, or even on a dead run? This is where conventional wind powered systems begin to struggle, especially the further downwind you go. "We had problems initially, until we hit on an obvious solution," Rob said. "Reverse the mechanism. This means feeding the jib sheet to a block aft, and moving the spring into a forward position."

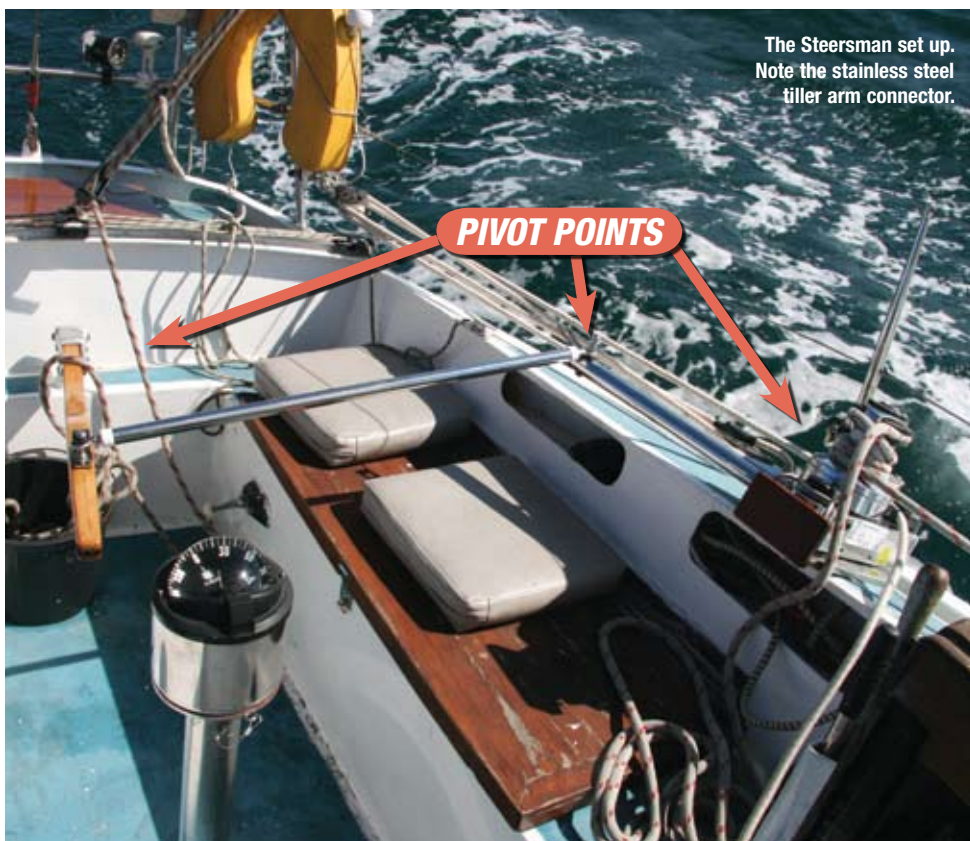
To understand how the Steersman works, we went for a sail on Rob's 30ft Klipper steel sloop, *Jessica*, which was equipped with a pair of the first full production models.

SETTING IT UP

The first thing you notice is that the Steersman is a neat and purposeful looking unit, although it does take up a bit of room on the coaming. "We hit on the idea of covering the pivot with a small backrest to act as a guard," Rob pointed out. "We're exploring making this more comfortable, but it remains a detail. Most of the development has gone into the actual mechanism."

Rob wanted to show the Steersman in the uncluttered waters and clear winds outside the Solent, but he still set the system up as we motor-sailed our way to windward to reach the Needles. With just the genoa hoisted, the steersman took the helm and – after a few adjustments to the bungee, which Rob admitted were 'almost instinctive' - the Steersman held us doggedly on course.

Once clear of the Shingles bank, we hoisted the main, and set the Steersman up on several points of windward sail, on both tacks, upwind of a broad reach. The routine is to first decide on your course, and then set the sails accordingly. The platform has a very strong lock, allowing the winch to be used in the fixed, conventional way. With loads of up to 350lbs on a standard winch (for a 30ft yacht) this lock and the supporting base are



The Steersman set up. Note the stainless steel tiller arm connector.

PIVOT POINTS



ROB'S TIPS FOR INVENTORS

- Keep your idea a secret. That is critical. The fewer people that know about your idea until you're ready to go to the pre-production phase the better. Even a basic concept can be stolen by careless talk, or when seeking non-professional advice.
- Before wasting time and money, check there is nothing comparable out there already. I searched the British and European Intellectual Property databases (www.ipo.gov.uk and www.gb.espace.net) for 'yacht self steering' and at the same time studied the patent applications listed there to see how mine should be presented.
- If you think you have found a niche product, you need to register the idea with the Patent Office and then get the idea into a solid form, either as engineers plans, computer aided drawings (CAD) or as a working prototype. If you don't have the engineering skills or facilities, then there are several specialist manufacturers who offer a prototyping service.
- Try to keep the whole procedure as in-house as possible. An invention is usually made up of several different ideas. If other people – such as professional designers – contribute to your basic idea, the boundaries of ownership can become blurred.
- The patent process is complicated and can be expensive, but if you are convinced you have a winner, then it's worth ensuring your idea is as protected as it can be.
- Having protected your idea, give it a nice name, preferably one that is relevant to what it actually does. The Steersman came to me whilst I was driving. It is the Vikings name for the helmsman, who incidentally stands on the 'Steer-board,' which is located on the right hand side of the ship (hence 'starboard', of course.)
- Don't be put off by early failures. Things may not work at once, but sometimes the solution will suddenly become obvious!

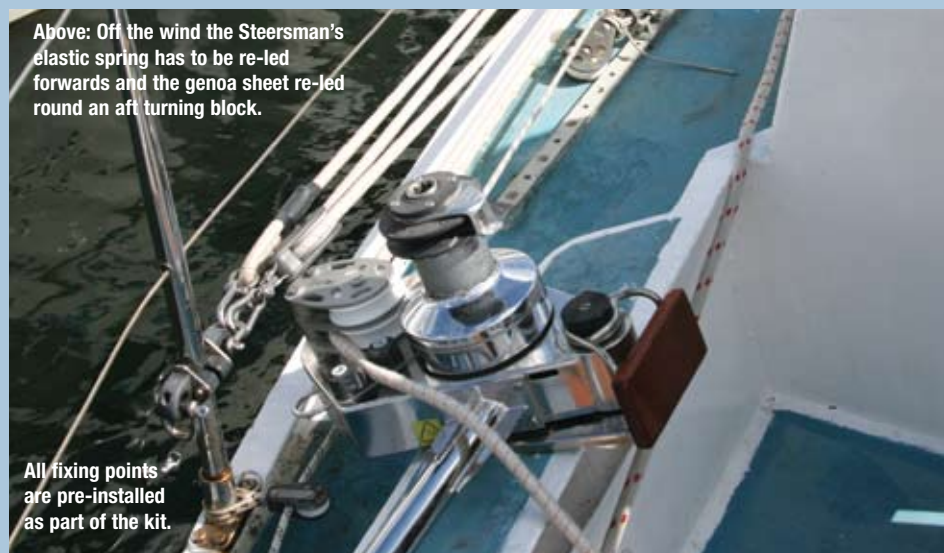
DOWNWIND SET UP



Sailing downwind. Spring and jib sheet are reversed, which takes some minutes to arrange.



Above: Off the wind the Steersman's elastic spring has to be re-led forwards and the genoa sheet re-led round an aft turning block.



All fixing points are pre-installed as part of the kit.

all heavily engineered.

When the yacht is settled and sailing well, connect the forward end of the spring via snap hooks to the platform, tension it up via a clam cleat, disengage the lock and then drop the stainless steel link arm over the tiller and pivot arm pegs. The platform will start to swing, at which point you either tension or ease the spring until the yacht is holding course. The idea is to have a Tug-O-War between the jib sheet and the spring, which neither is winning.

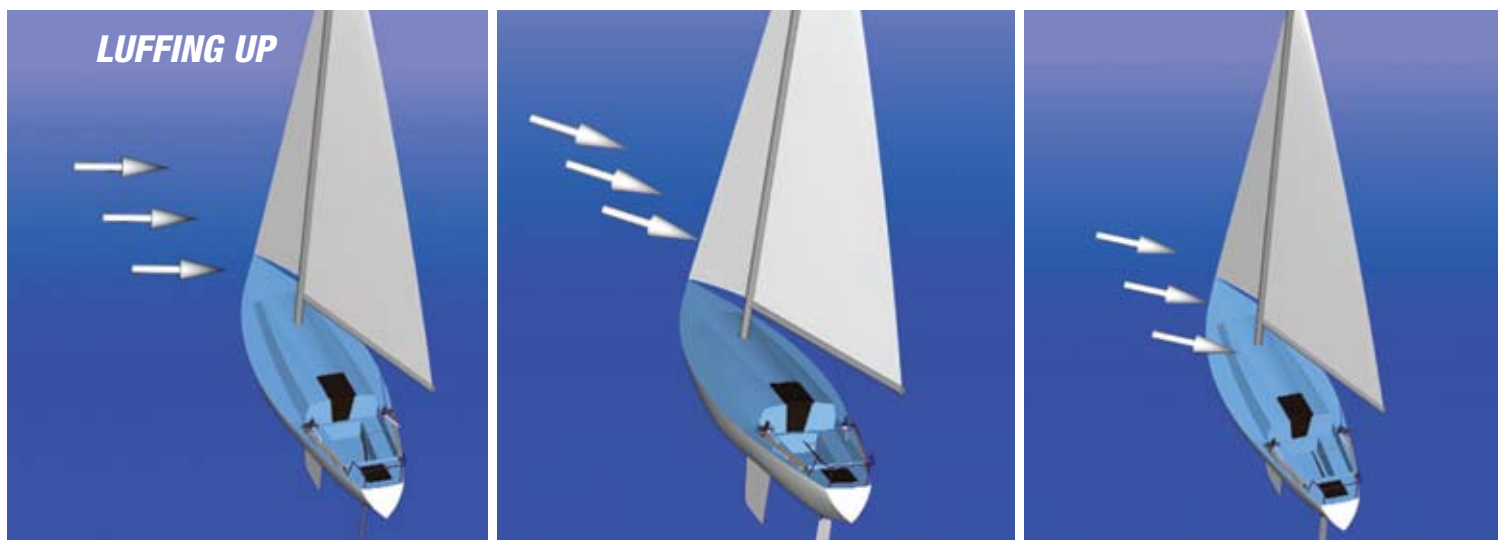
Course changes are straightforward – simply ease or harden the jib sheet, and then ease or harden the spring. In light airs, thinner, less powerful elastic is simply clipped into place on preset connectors. To disengage in a hurry, as we had to when an apparently unmanned yacht bore down on us on autopilot, you simply lift off the steering arm and you have full manual control again.

Where things get a little trickier is off the wind. Taking the 14-knot (F3) south-westerly

breeze on the quarter, *Justine* began to roll as she headed back towards the Isle of Wight. Rob let the jib fly (although furling is an alternative) and with the sheet off the winch, he re-fed it via a block on the pushpit. The spring was also unclipped, and then reconnected forward of the winch. "Off the wind, things happen in reverse," he explained. "The gusts push the yacht further downwind, rather than up into it. This means you have to counter them the opposite way."

It took a few minutes to reset the spring, but once it was in place, and the jib under control again, the Steersman resumed command. After a few of those tweaks that bored yachtsmen on a long passage love to make, we were settled on a new course.

This time, and with less pressure on the sheets, the unit responded more slowly, but steered us competently enough. "In these conditions I would consider putting on a lighter elastic," Rob said. "I think we're just on the cusp of the main spring being too



LUFFING UP

1) The yacht is on course, 2) As the yacht luffs up, there is less pressure on the jib sheet, so the spring takes over, pushing the tiller upwind to bear the yacht away. 3) The yacht has paid off, increasing the pressure in the jib sheet. This overcomes the tension in the spring, so the tiller moves downwind.

powerful.” Just as wind vanes have different sized blades, so the Steersman is infinitely adjustable when it comes to the counter forces.

CONCLUSION

So does it work? Yes, with some limitations. Rob doesn't recommend it for sailing directly downwind, for example. The problem is that once the sail presents at more than 10 degrees off a dead run, the forces reverse again. As yawing beyond that arc is common in big seas, the unit would be caught between the right position for the spring. Tradewind sailors would probably prefer to use the set-up of twin poled-out headsails or a twin-poled spinnaker, with lines fed directly back to tiller. Although the Steersman is at its most efficient to windward, it still works well enough up to about 150 degrees off the wind. Below around 100 degrees, the spring usually has to be reversed. We suspect that some of the gentle meanders along the quartering course were due to a lot of play in *Justine's* rudder, a priority job for the winter.

The units do take up a certain amount

of cockpit space, but look very smart. They are entirely British built, much of it in Rob's own workshop, and the rest via British subcontractors. There are still a few minor refinements to be made, mainly cosmetic, such as a knurled knob for the lock, but the Steersman is ready to go. The unit is also relatively easy to set up and operate, and will provide many hours of tweaking fun as the owner gets to know it. Reversing the position of the spring mechanism can be a bit tricky in a big sea, although on long passages this wouldn't have to be done very often. The main advantage, though, is that it offers an alternative to conventional transom-hung wind vane steering, and on some points of sailing may even be slightly quicker to respond.

AVAILABILITY

The Steersman is suitable for mid-range yachts (26ft to 40ft) depending mainly on the winch size, which must be self-tailing. “Although untried, I think the Steersman will work with a wheel,” Rob says. “The link arm is simply connected to the lower half of the wheel. A smaller unit for boats under 26ft is

also currently in development.”

The basic package consists of two Steersman units, one for each side, a stainless steel tiller bar, and one 14mm spring assembly with all the tiller and rail fittings necessary to install and operate each unit. Additional spring assemblies can be bought as extras or spares. Rob is also able to offer hands-on training and set up for a small additional fee within a certain radius from his workshop in Hungerford.

The Steersman package is available for £2,550 Inc VAT.

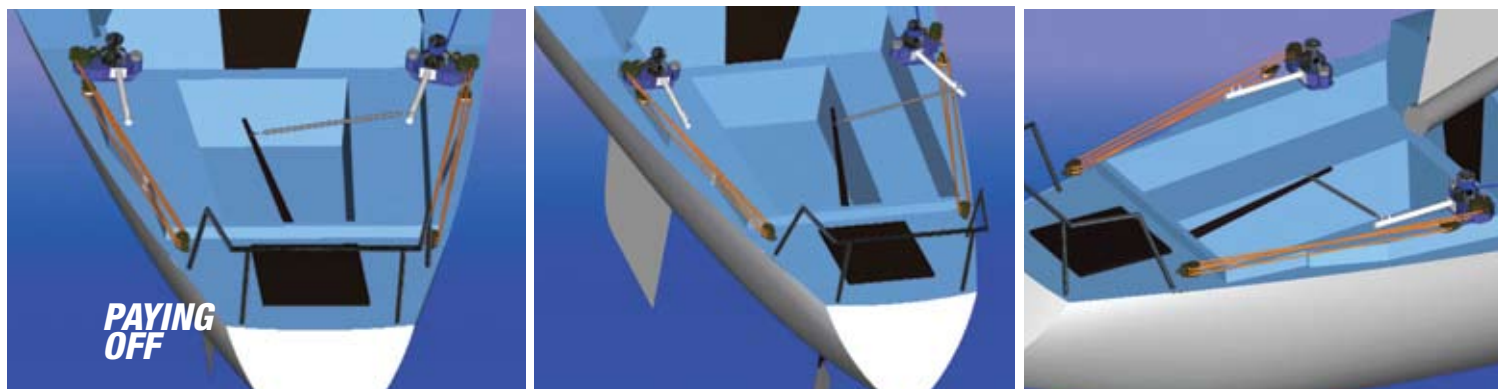
More information can be found at www.steersman.net



Watch our short video of our test sail on Rob's boat at www.sailingtoday.co.uk

HAVE YOU HAD A GREAT IDEA FOR A PRODUCT? *SAILING TODAY* WOULD LOVE TO HEAR HOW YOU HAVE TURNED INSPIRATION INTO REALITY.

Conversely, if the boat veers downwind, then the pressure in the sails increase which also increases the tension in the jib sheet and the winch platform is pulled forward, steering the boat up wind.



PAYING OFF