

# Windvane wonder

Electric self-steering tiller systems have their shortcomings, as do windvane set-ups. Join the two together and you have the best of both worlds, says Tom Cunliffe

Everyone enjoys steering on summer afternoons, but most of us would agree that the job deteriorates into a chore after the first few hours. Discounting miracle workers like pioneering solo circumnavigator Joshua Slocum in *Spray*, it was the first singlehanded races in the 1960s that finally cracked the self-steering nut. Sir Francis Chichester's idea of a small sail pulling the helm missed the bull's eye by a mile, but Blondie Hasler's 'pendulum servo' wheeze carried the day with a touch of genius. It still forms the basis of many systems, including my own Windpilot. These set-ups have their limitations but with a little ingenuity they can be modified to cope with almost anything.

## » PENDULUM SERVO GEAR: HOW IT WORKS

The pendulum servo gear uses water flow to beef up raw wind power. A wind vane is adjusted so as to 'feather' when the boat is on course. When she wanders, the vane receives wind on one side or the other. Whether vertically or horizontally mounted, it reacts by pivoting to leeward. This activates the servo paddle which is really a deep blade cutting through the water beneath the windvane. The paddle is hinged fore and aft, so that as it is twisted off the 'feathering' position by the vane, it is kicked up sideways like a pendulum by the water flowing past it. If you doubt the power, try it with an oar when you are buzzing along in the dinghy! This swinging movement to one side is transferred to the helm by lines joining the paddle to the tiller (or to a drum on the wheel). As the paddle is displaced, it drags the helm with it. This steers the boat until she is back at the original angle to the apparent wind. Vane and hence paddle now return to the 'feather' position and the process ceases until repeated again. With decent gear you'll steer a surprisingly straight course in most conditions.

Cruising my boat *Westernman* shorthanded would be a bit of a grunt without self-steering. Before the windvane gear, three of us helmed her across the North Atlantic and by the time we arrived off the Scillies with the fourth gale of the trip blowing itself out, we felt as though we'd been in the gym with the Devil as personal trainer. It isn't that she's badly balanced, it's just that she is a 20-ton gaffer with a very big rig. Her rudder angles aren't excessive, but the 7ft iron tiller needs a relieving tackle in more than Force 4.

If you're thinking my boat is irrelevant to yours, consider this: if *Westernman* can be induced to self-steer, the same arrangement will be a cake-walk for a modern yacht.

The Windpilot copes well in a steady breeze, but it's a non-starter if we are motoring and it isn't great in the ever-shifting wind strengths and directions along our coasts.

We invested in an electronic tiller pilot to take the helm in such situations. These are great bits of kit but can drain your batteries and sometimes

struggle in fresh winds or awkward seas. Initially, I set up the big Raymarine Autohelm ST4000 directly onto the tiller. It simply could not cope with the forces and looked like a mistaken purchase until one day I noticed a small hole engineered in my Windpilot vane gear. It looked as though it would accept the tiny stainless pin supplied by the Autohelm manufacturers to

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set into the tiller to accept the small socket on their pilot. I had a spare and it fitted perfectly. Obviously the hole was there for just this purpose, so I epoxied it in with 'Araldite Rapid'. While the glue was hardening, I offered up the unit, then drilled the hardwood taffrail for the pin on the other end. Raymarine had even supplied a spare bush to set into the hole.

An hour later I unshipped the windvane and set up my new unit. Rather than trying to shove

the mighty tiller across, all the pilot now had to do was tweak the servo paddle. No longer driven by the wind, the paddle of the steering gear was adjusted continually by the Autohelm set to a compass heading. Because the arrangement is equally effective when sailing, I don't use the vane at all unless the wind is solid and unchanging.

The only refinement has been a short length of shock cord to hold the socket of the 'tiller end' of the pilot onto the horizontally mounted pin on the windvane mechanism. Battery drain is negligible because the diminutive motor in the Autohelm hands all the tough stuff straight over to the pendulum servo paddle. This revels in its labour. The faster we go, the harder it pulls, and the boat steers herself without fuss for thousands of miles. It's quiet because the autopilot noise is all well aft, and the same unit has worked since 1999 without any maintenance whatever.

The Autohelm ST4000 suits *Westernman*, but most boats will manage fine with the tiniest tiller pilot. So why not marry your windvane steering and your tiller pilot? They'll make a great couple. ▲



The Windpilot's wooden windvane is easily removed



The pendulum servo gear with the paddle in the water



The tiller pilot fits into a hole drilled into the wooden capping



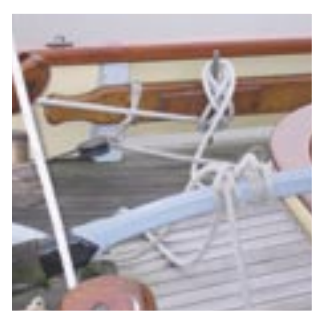
The extendable tiller arm is secured to the Windpilot



As the tiller arm extends or retracts paddle is twisted



Steering lines run from the Windpilot through the transom



The lines pass through blocks to Westernman's 7ft iron tiller



The finished installation combines electronics with water power

## » HOW TO DO-IT-YOURSELF

If your windvane is pre-drilled to accept the tiller attachment pin – as mine is – that part is easy. If not, you'll need a drill and sharp bit. Make the hole a snug fit because the system will worry away at it hour after hour. Attaching the other end of the unit to a wooden capping is easy. Set the tiller mate at its neutral position and offer it up with the outboard end attached to the 'tiller pin' on the vane gear.

Mark where the big pin on the inner end lands on the timberwork, get hold of a bush from the manufacturers of the tiller mate, drill for this and drop it in with a dab of epoxy.

If you've no suitable place

to mount the pilot on the boat, something can usually be contrived by using the pushpit because the loads are almost non-existent.

You may need an extension for the activating arm of the tiller unit. Raymarine supplies one for my own unit. Otherwise you'll have to fabricate something out of wood, plastic or anything else lying around in your shed.

Don't worry if there isn't space to allow the arm to run fore and aft, you've only to rotate the windvane mechanism as though feathering the vane and it'll all line up sweetly.

It's a straightforward job that you can do in an hour or two.

LEFT: Raymarine's ST1000 Autohelm. FAR LEFT: This S1 has superseded the ST4000



## » OTHER SYSTEMS

While my own arrangement favours the Windpilot (www.windpilot.com) and a Raymarine Autohelm (www.raymarine.com), there's no reason why the same method cannot be used with similar windvane systems or pilots.

Hydrovane (www.hydrovane.com) users have had success without the added power of the pendulum servo. This gear favours a balanced auxiliary rudder and I'm told it works a treat powered by Autohelm instead of the vane.