

## Wing-sail looks set for take-off

A SAIL that is easily bent could bring back the age of commercial sailing—for fishing boats, at least. The sail is called a “tunny rig”. It looks like an aircraft wing turned on its end, and is now undergoing trials off the south coast of England.

The idea of a wing-sail is not new. Enthusiasts say the design should avoid several problems that face people trying to build commercial sailing boats: conventional rigs take up a lot of space, are expensive, and need a large crew.

The tunny rig, according to its developers Gifford Technology, is cheap, robust and easy to handle. It could also be as efficient as a yachting rig, thanks to a mechanism that bends the trailing edge of the wing according to which tack the boat is on.

Edwin Gifford, the firm's founder, sees its main use as being for commercial fishing boats in Britain and the Third World.

The designers shaped the profile of the sail to a standard that NASA developed for light aircraft. It has the unusual property that its performance does not deteriorate as the wing's surface gets rougher. That is good news for light aircraft, which at low altitudes rapidly acquire a layer of dead insects. It is also ideal for a cloth-covered wing, such as the tunny's sail. The wing has an asymmetric profile, which can be bent to give the aircraft greater lift, or a boat greater thrust.

The innovation with the tunny rig is the ability to bend the trailing edge in either direction, according to which tack the boat is on. A system of ropes and pulleys within the sail does the job.

The movement is very small, but has a surprisingly large effect. Colin Palmer of Gifford Technology says that warping the wing probably gives the boat an extra 20 to 30 per cent of thrust.



Michael Cross



Gifford (above) at the helm of the tunny rig. The sail is simple to control and reef (right)



Gifford is testing the rig on a catamaran in the Solent. The test sail is made of synthetic cloth, stretched over five wooden battens, which maintain the outline and contain the warping mechanism. The sail can be reefed by sliding it down the mast. A microcomputer on board the boat records the sail's performance in different wind conditions.

The test sail is about 40 square metres in area. This can easily be handled by one person, as Edward Gifford demonstrated in the Solent last week. Gifford expects the tunny rig to give about the same thrust as a yacht's Bermuda rig, but at the same time to be commercially attractive.

The idea and name of the tunny rig came from a couple of buskers, Wayland and Aruna Combewright, who wanted a cheap way of crossing America. They wanted a sail that would be easy to handle, and talked to a number of aerodynamicists, including some who had worked on the Mosquito aircraft of the Second World War. They came up with a double-skinned sail which could be warped to get

maximum thrust. From above, it looks like a fish—hence the name. The couple built a boat with the rig for £2000. So far it has carried them (along with a six-month-old baby) across the Atlantic, and through the Panama Canal.

When Gifford heard about the invention, he realised that the shape of the rig was similar to the turbine blades his civil engineering company is building for a wind generator on the Orkneys.

Gifford thinks the rig could have a large market in the Third World, among fishermen who gave up traditional sails for outboard motors, but who now cannot afford fuel. European fishermen are also interested, because fuel is always a large proportion of fishing costs. But so far the government has shown little interest in this potentially export-winning invention. □