

EXCEL
2009
NEWS

THE WORLD'S NUMBER ONE DEDICATED RIB MAGAZINE

R.I.B.

INTERNATIONAL

Leander's Tenders

The role of the RIB aboard
the Megayacht



BOAT TESTS

Scorpion Sting

Silver Marine Phoenix 610

6m boat package
for under £25k

Anchoring your investment

Do you know how to secure your boat?

Caribbean
RIB Rally
785 Report

Onboard with a Rescue Team

Routines, Rescues and RIB Training, all in a
day's work for the Community Rescue Service



UK £3.95 Issue 87 APRIL/MAY 2009



9 771360 940046

8 7

A new slant on stern power

Canted downwards at 45° and with straight-through transmission, the Axis Drive by Caudwell Marine is rousing interest among hard-boat and RIB builders worldwide. Why? Read on...

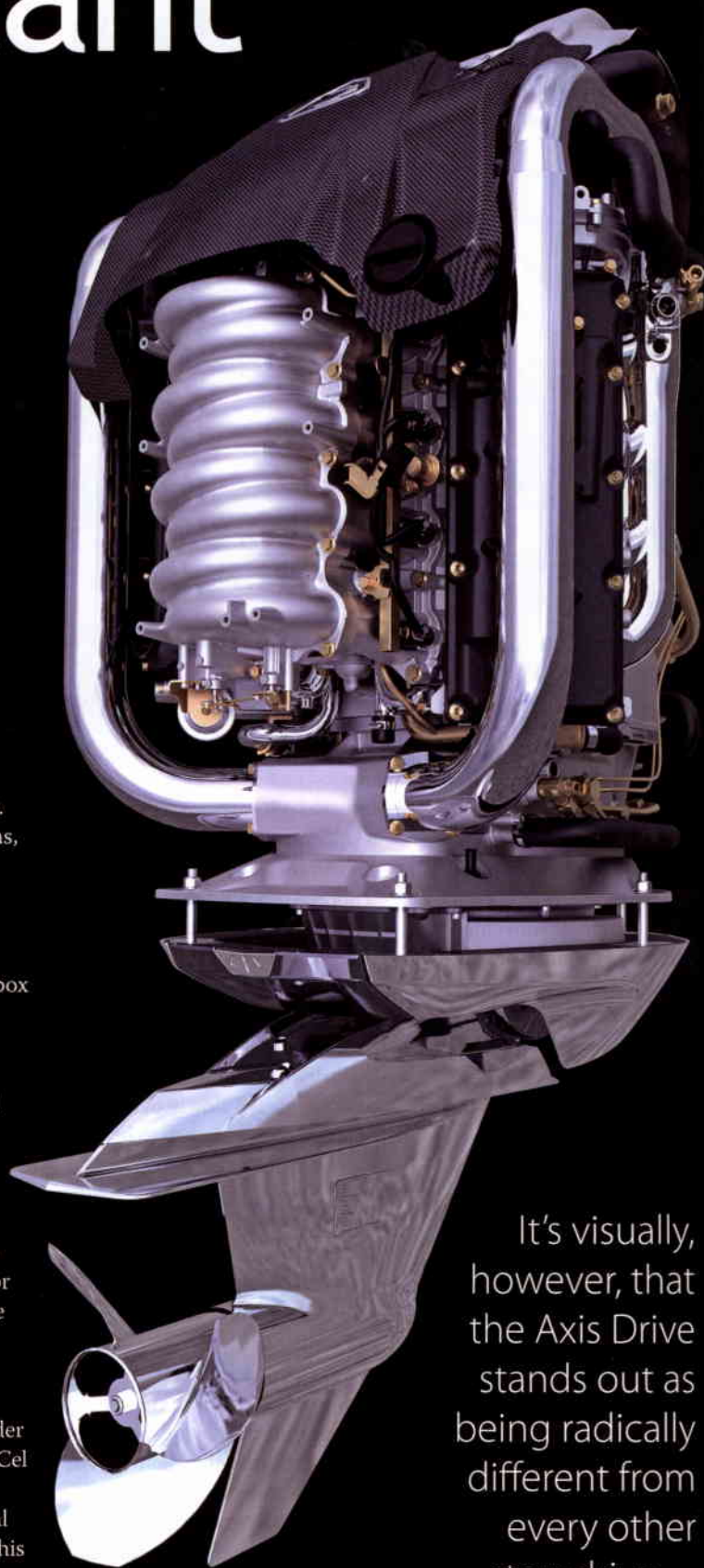
A hundred years ago in the USA, Ole Evinrude launched the world's first outboard motor for small boats. Fifty years ago Volvo Penta launched the world's first inboard-outboard hybrid, the sterndrive, which is claimed to have been invented by Jim Wynne, who had been working on the concept with Mercury but left when the US outboard maker decided there wasn't a future in it.

At the end of last year a third propeller-using competitor for the transoms of small-to-midsize planing dayboats and powercruisers was unveiled at major boat and marine trade shows in the US and Europe by a company whose name will not yet be overly familiar to devotees of RIBs, but may soon become so. Since September last year Caudwell Marine,

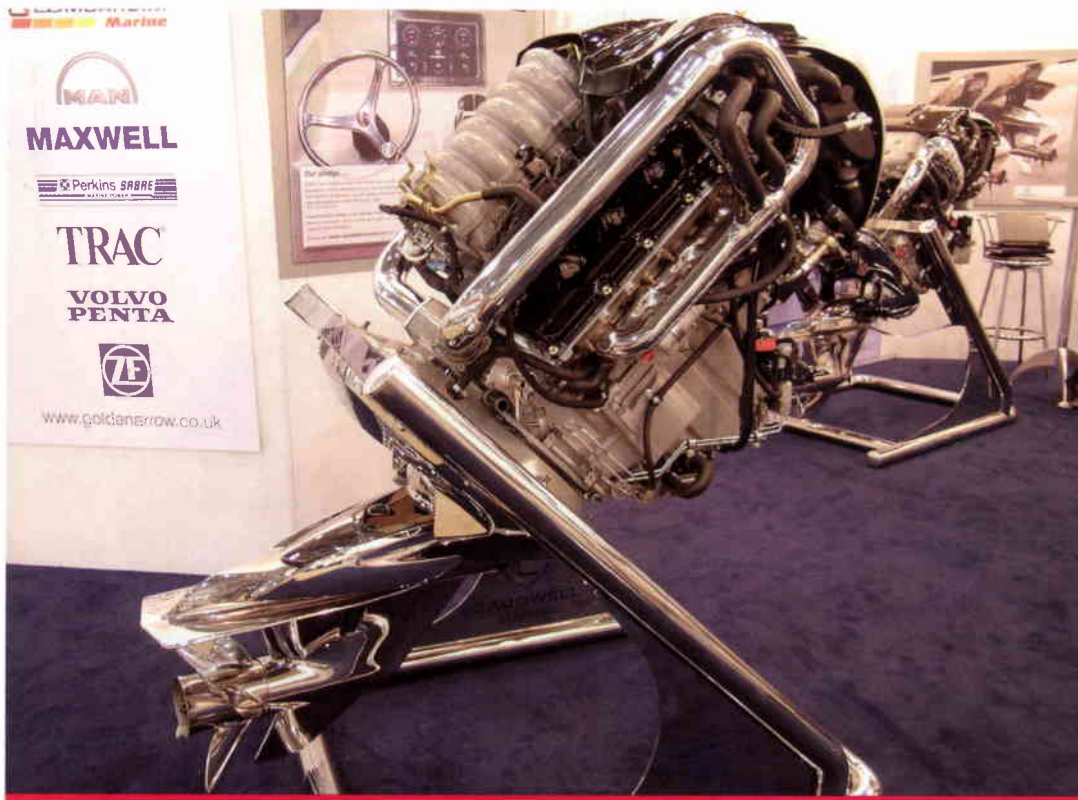
propulsion into new territory.

According to Lloyd Williams, Caudwell's international marketing manager, the new drive takes up 20 per cent less engine bay space than a standard sterndrive; the gearbox offers up to 7 per cent power loss – with enough torque to swing a 16-inch propeller; it's smoother and quieter and quicker, and it's easier for boatbuilders to install.

It's visually, however, that the Axis Drive stands out as being radically different from every other sterndrive, and for two reasons. The first of these is the expanse of the mirror-finished stainless steel of its leg, lower-body housing and exhaust manifolds which, under spotlights (as it was at the ExCel London International Boat Show where RIB International caught up with it in January this year) is bedazzling.



It's visually, however, that the Axis Drive stands out as being radically different from every other sterndrive



Axis Drive at the 2009 London boat show. The Nissan petrol powerhead has a closed cooling system.

set at a totally unaccustomed angle. Whenever we lift the cowling off the top of an outboard we're used to seeing engines mounted vertically on their flywheel ends on top of the drive train. We also expect to see horizontal, longitudinally-mounted engines close-coupled to transmission legs when we lift the engine covers off. What we're not used to is an engine that slopes upwards.

This engine has an integrated mid-section gear configuration that's bolted through a boat transom that must be inclined outwards at the unusual angle of 45°. The leg is set at a similar level to the waterline as sterndrives. It is trimmed and steered by means of articulating around a pivot and steering axis respectively, with trim and tilt movement managed through integrated cylinders, and power-assisted steering managed through a dual-acting twin-cylinder rack and pinion unit. The drive is straight through, via a series of drop gears with ratios of 2.68–1.88, unlike sterndrives, where the power is transmitted via a combination of horizontal and vertical shafts, universal

joints and final-drive gears.

Power is provided by a choice of Japanese-built Nissan Infiniti block V6 and V8 petrol engines. The 3.5-litre V6s are rated at 250hp at 5500–6000rpm, and at 300hp tuned to run at 6000–7000rpm. With supercharging, the 4.5-litre V8 delivers 450hp, revving from 6200–6900rpm. A diesel option is under development, we're told, using a 3.6-litre block which should deliver 285–290hp.

So far, the drive is offered only with a single-prop option, although a dual-propeller arrangement is not ruled out sometime in the future. Meanwhile, Lloyd Williams points out that even with a single prop 'the tracking and trim are remarkable, with the propeller always staying on the centre line of thrust.'

All engines have closed-circuit water cooling to avoid the risk of saltwater corrosion. The same reasoning applies to the choice of 316 marine-grade stainless steel for the drive leg and lower gear casing, as opposed to aluminium which is generally used for sterndrive housings and which, without

adequate protection with sacrificial anodes, can suffer serious galvanic corrosion. Moreover, the trim and steering mechanisms are entirely encased so that there are no vulnerable external hydraulics, pipes or linkages.

Better oxidization resistance and fewer exposed components might well allow Caudwell Marine to claim that it has produced a better propulsion system, but that's hardly

The engine and upper gear case are set at a totally unaccustomed angle

radical. Rather, it's the whole engineering concept behind the Axis Drive that enables the company to claim that it has taken marine propulsion for small-to-midsize craft in a wholly new direction.

The man responsible for doing that is South African industrial designer, aerospace engineer and entrepreneur Mike Beachy Head, the man who incidentally is said to own the world's largest private collection of serviceable military jets. About seven years ago, having been frustrated by universal joint failures on sterndrives and outboards that he owned, and aspiring to do away with the weaknesses and improve the benefits of both technologies, he decided that he could do a better job than existing manufacturers and design a more efficient system. He had an idea for an engineering solution that avoided the dreaded



Lloyd Williams, international marketing manager with Caudwell Marine (left) and Seb Freeman, group sales manager for Axis Drive at Golden Arrow Marine. Golden Arrow handles marketing and sales for the drive in European markets.

UJs and, in time-honoured inventor legend fashion, he sketched it out on the back of a cigarette packet. He kicked it around with members of a consulting group linked to the engineering department of the Western Cape's Stellenbosch University, and also drew on his business contacts in the motor manufacturing industry – most notably the UK's Cosworth engineering group which at that time was heavily involved in Formula One motor racing – to turn his concept into a working prototype.

In 2007 funding was supplemented by UK mobile phone billionaire John Caudwell, the former owner of

within 48 hours, free of charge.

For boatbuilders, one of the major attractions of Axis Drive is that it has been designed to be easy to fit. Says Seb Freeman, group sales manager of Golden Arrow Marine, the company that handles European distribution from its premises at Southampton's Saxon Wharf: 'Boatbuilders tell us that the moulding into an existing hull design of a 45° transom is not an issue. Most likely, it will only require the addition of an insert into the hull mould.' He adds: 'The installation of the drive is likely to take no more than 30 minutes as there are far fewer connections to make than with a sterndrive.'

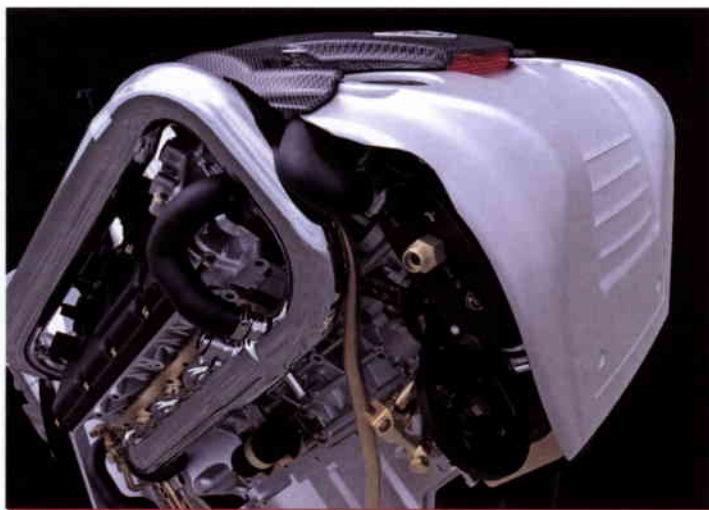
In time-honoured inventor legend fashion, he sketched it out on the back of a cigarette packet.

Phones 4u, who in exchange for a substantial investment to commercialise the product, took a 51 per cent stake in the fledgling Axis Drive business. Today, that business employs about 40 people, including former Cosworth engineers who have used their F1 expertise to help develop the drive's unique UJ-free gearing system. Having invested about US\$40 million so far to take Axis Drive to market, Caudwell Marine claims to have developed a powerful yet quiet drive with advanced mechanical engineering and fly-by-wire electronic controls that are claimed to be among the smoothest in the boating market.

Any fears that the height of the engine rising from the transmission might make it seem ungainly are also allayed. 'The engine block is all aluminium, and the new centre of gravity, closer to the transom, provides for excellent stability,' Williams says. And should any of the units suffer a breakdown not of the operator's doing, and not repairable within 24 hours, the entire unit will be replaced

Since Caudwell Marine introduced Axis Drive, first at the IBEX boatbuilders show at Miami Beach in October last year, and then subsequently at the METS trade show in Amsterdam in November and January's London boat show, it claims to have aroused considerable trade and, latterly, consumer interest. 'We've been blown away by the response so far,' says Lloyd Williams. 'We're in advanced discussions with a number of boatbuilders in the US.' European boatbuilders have also shown interest. According to Seb Freeman 'more than half a dozen have indicated that they would like to explore the Axis Drive concept further.' Among these, he says, are a couple of leading UK RIB makers.

Caudwell Marine expects to reach full production 'in the third quarter of 2009,' says Freeman. The company has no ambition of knocking the likes of CMD, Volvo Penta and Yamaha off their perches as far as market share is concerned, Lloyd Williams says, with production numbers to be



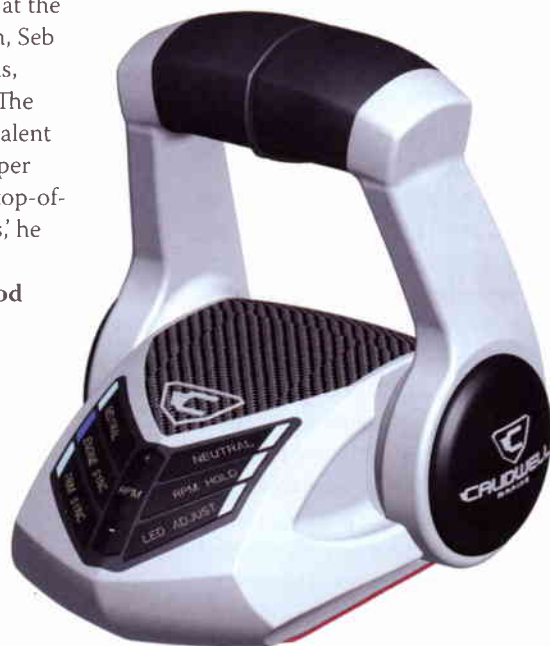
Axis uses Nissan all aluminium engines as its power source. The lightweight V6 and V8 engines deliver up to 350hp. A diesel option is promised.



Engine detail shows swirling air/petrol induction chamber and electric engine management unit.

around 300–500 units a year. As one might expect with a premium product, prices are likely to come out at the high end, although, Seb Freeman maintains, still competitive. 'The price will be equivalent in terms of dollar per horsepower with top-of-the-line outboards,' he promises.

Robert Greenwood



Electronic fly-by-wire controls are part of the Axis Drive package.