



Perfect vision

John Edgley has reacquired Optica design rights and is looking for a backer. Greg Dolph flies this unique aircraft. Pictures: Tony Walsh and Austin Brown

One Saturday morning found me sitting in a chair floating 2,000 feet above the Hampshire countryside, master of everything I surveyed. I was able to scrutinise every inch of the earth as it passed serenely beneath my feet. That's what it feels like flying in the Edgley EA-7 Optica observation aircraft, an unusual and fascinating machine that I had the privilege to sample. Designed in the late 1970s by John Edgley and produced in limited numbers in the eighties, the Optica was aimed at a gap in the aviation market that still exists today for a lower-cost fixed-wing observation aircraft to replace helicopters in tasks like pipeline patrol, aerial photography, search and rescue and policing where there is no need for hover and land capability.

At first glance the Optica looks like the product of a one-night stand between a helicopter and a P-38 Lightning. At second glance, when you see the ducted fan you think that there was a hovercraft on one side of the family. This is definitely an unusual beast. Edgley's goal was to put a helicopter-style cockpit on the front of the aircraft, and the rest all stems from that. The duct structure is a logical way to join the helicopter cockpit to the rest of the aircraft while acting as the fuselage



and main spar. Although a pusher propeller could have been mounted high above a more conventional structure, the duct design has several advantages: it allows the engine thrust to be closer to the aerodynamic thrust line giving better stability with power changes, it protects the propeller from ground strikes, it's quieter than a conventional prop, and the duct gives better performance at slow speeds. Plus, "ducts were in fashion at the time" Edgley said in an interview.

The 260HP fuel-injected Lycoming engine and five-blade ducted fan are in a pod mounted to the back of the fuselage. By removing four bolts the whole assembly can be removed from the aircraft in less than an hour and rolled out for maintenance and replacement, a useful feature for a working aircraft. The elevator is mounted high between twin booms for this very reason. Fuel is stored in wing tanks, which are mounted across the exact centre of gravity so the balance of the aircraft does not change as the flight goes on, and the aircraft has a loiter capability of over five hours, which is far superior to the majority of helicopters. Edgley says: "The main problem with helicopters is that vibration fatigues both the aircraft and the pilots. The Optica is very

extremely well. There are built-in inspection doors instead of removable covers. The seat belts are four-pointers with inertia reels. The whole thing has a solid, well-built feel. Pre-flight checks are pretty standard except that you have to crawl under the fuselage to get to the engine fuel drain, which on a wet day starts you off with a very damp back. Definitely a good thing to do in the hangar! Fortunately it's a dry day and Clive Davidson, the Optica's pilot, stays comfortable. Because the aircraft's design has much of the weight close to the centre of gravity the aircraft has two 7.5 kg counterweights that must be positioned according to passenger load. With one-up the weights are up front, with three up the weights are locked into compartments in the two fins, and with two up the weights aren't needed, so for this flight they stay in the hangar. Obviously counterweight positioning is vital to safe flight, which is why there's an annunciator panel for them on the cockpit ceiling.

Access to this airplane is the simplest I've ever experienced. The Optica is low-slung, the doors huge and the bubble cockpit is very roomy, so getting in takes no acrobatics whatsoever. Sit and swing or step up, it's your



Above: Greg Dolph in the helicopter-like cockpit of the Edgley Optica

Above left: Optica's helicopter-like instrument binnacle increases visibility for the pilots

Left: instruments look a little dated and 'cry out for some glass'

Bottom left: the entire engine and prop pod can be removed easily for maintenance

comfortable; someone could fly it for an eight hour day."

Although the design is unconventional the flight characteristics are ordinary and instrumentation is all off the shelf. The flight controls are standard stick and rudder, and handling is no different from any other aircraft. The main thing to get used to is the panoramic view as the lack of a cowling up front can take some getting used to. Also, the slow cruise speed can trick pilots inexperienced with the aircraft into thinking that they are flying too slowly, similar to new pilots on a Piper Cub.

Up close the first things that stand out to me are the excellent build quality and the attention to small details. The doors and seals fit

choice. The seats are three across with the left two having sticks and pedals, with the engine and flap controls between them. The right door has a large panel that can be opened to allow for a camera lens. The instruments are set in a helicopter-style console between the left and middle seats and are in a standard six-pack configuration, with engine instruments below. There are some circuit breakers on the left side, which I can imagine isn't optimal as during flight the pilot has to lean forward to see them. More circuit breakers are located on the housing of the engine instruments and are much more accessible. While sufficient to do the job, the instruments on this particular aircraft are a bit sparse and this panel just cries out for some glass.

Startup is standard fuel-injected engine stuff. Master on, prime until you get fuel flow, boost off, hit the starter and it rumbles to life. I mean rumbles as well: the engine is well behind the cockpit with structure between so the whole thing sounds very different from having the mill in the front. It's reasonably quiet as well: at idle you can easily have a conversation without headphones. The usual checks done, we start to taxi.

Clive had warned me that taxiing takes a bit of future planning as the nosewheel is direct-drive and is offset to the left to allow for a camera pod. I see what he means right away – the turning radius is adequate but without differential brakes – the brake lever is situated on the centre console – and when turning right, you definitely have to think ahead. The ride is firm but not uncomfortable, and with the wide undercarriage very stable. I find it impossible to manipulate the throttle and brake at the same time from the middle seat without completely redesigning the human hand, but they are close enough together that moving my hand between them takes a fraction of a second so it's not a problem. After a couple of turns it becomes second nature.

The bottom of the ducted propeller only has about a foot of ground clearance and at high power can suck up gravel which is bad for the propeller, so we pull back to idle when crossing any loose stone. A screen can be fitted to the lower half of the duct when operating at rough fields.

While backtracking Clive has me throttle up to put on some speed and I can see why: the nosewheel steering is very responsive at speed and only small inputs are necessary. Run-up is completely ordinary and soon we're lining up on Thruxton's runway 25 for takeoff with 10 degrees of flap. The acceleration doesn't exactly force my eyeballs back in their sockets but I don't nod off either and sooner than you'd think Clive eases the nose off the ground at 55kt and the aircraft unsticks at about 65kt. Ideal climb rate is 70kt.



Above: the prototype Optica, 'a cross between a P38 Lightning, a helicopter and a hovercraft'

If the London Eye could lift you at 1,000 fpm I'd say the experience would be pretty similar, as the sensation is not as much flying as levitating. In this respect it's very similar to a helicopter – the ground really does sort of fall away. The visibility is nothing short of fantastic. The only opaque material in the cockpit is the floor and the superstructure to keep the Perspex in place. The doors are clear, the roof is clear, and the front is clear right down to the floor. There's remarkably little distortion from all the curved plastic. It doesn't feel like a helicopter because there's no bone-shaking vibration and audible assault to contend with. It's no more noisy than a standard light aircraft, and maybe a bit quieter – certainly fine with a basic no-ANR headset. Because noise levels are low the airflow

around the canopy sounds deeper than I'm used to and is more noticeable.

We level out at circuit height with a cruise speed about 100knots. Loiter speed at 80 knots gives a whopping eight-hour endurance, which will see pilots being recruited on the basis of bladder capacity rather than superior flying skill.

Others have experienced disorientation when first flying this aircraft as the bubble canopy has no level surface to provide a reference to the horizon. When flying any new aircraft there's always a bit of bobbing up and down until you get the hang of it and this time is no different, but in my case it was more due to getting a feel for the controls and not to lack of a reference point. I found this an easy aircraft to fly visually and didn't experience any disorientation at all.

The ailerons have heavy breakout forces but are crisp and effective, and the roll rate is fine but not sprightly. The elevator is also heavy,

The case for the Optica



The company John Edgley started began production in 1983 but failed following the fatal crash of the first production aircraft, which had been sold to Hampshire Police, and the withdrawal of financial backing in the mid 1980s. Later a serious fire due to an unsolved arson destroyed eight completed aircraft, which effectively sealed the

company's fate, and this innovative design was nearly consigned to the back of history's hangar forever.

Now Edgley has re-acquired his design and is attempting to bring it back into production. Is this the time to try to start an aircraft company? In the case of the Optica, yes. It is designed to offer a cheaper alternative to



Left: John Edgley and Optica at Old Sarum for the Neville Duke Memorial Day last summer; among his many achievements, Neville Duke was test pilot of the Optica

Above: first production Optica went to Hampshire Police, but it crashed

Right: the Optica hangar at Old Sarum before it was destroyed by fire

helicopters, and with recession lightening the pockets of industries and governments across the globe many will be looking for a way to replace costly helicopters with less expensive alternatives. This is one of those few cases where starting production of an aircraft in a recession actually makes sense.

Plus, as Edgley says, "when you start up an aircraft company from scratch there's so much to do: you have to develop the aircraft, build the tools, and start up a manufacturing line all at the same time. With the Optica all you'd have to do is start the manufacturing line as much of the hard work has been done. The airplane is ready to go. We have all the original press tools, forms, and jigs. It's EASA and FAA certified and can fly anywhere in the world."

With the government looking for ways to stimulate the economy, supporting Optica production would be a comparatively inexpensive way to jump-start a high-tech manufacturing industry in Britain and create

Chris Stanbury

but the trim lever is nicely geared and quick to balance out the stick forces. The twin rudders are fairly light compared to the other controls and take a bit of getting used to. Because of the unusual shape and the fact that most of the weight is in the middle of the aircraft the Optica is very sensitive to rudder changes, so footwork is important. Turns need to be led to get the nose around, but with the powerful rudders it doesn't take much pressure and it doesn't take long to get used to. All in all it's a pretty easy aircraft to fly, and a stable observation platform.

The stall characteristics are benign. The mild buffet comes well before a nose drop and high sink rate, and with the stick pulled back all the way (two hands are better than one with that heavy elevator) wing drop is easily held up using rudder. Stalling in a turn sees the wings roll level on their own. While the stall characteristics weren't exciting, looking straight down at the ground through the clear door at a steep bank and high angle of attack while feeling airframe buffet was exciting – so exciting I asked Clive to do the next one to the left instead.

On final approach, once throttled back and trimmed there's not much to do except keep an eye out for other aircraft, which needless to say is very easy to do. The light wind was pretty much straight down the runway so I didn't get to sample the aircraft's crosswind characteristics, but with the good rudder I don't see there being much drama in that regard. The aircraft's demonstrated crosswind limit is 25kt. Flaps down to 50 sees some trim



'Hershey-bar' wing confers good loitering capability on the Optica



skilled jobs. Edgley says: "If you look at the nations that are consistently doing well in the world they are the ones who have high-tech manufacturing, and it's as simple as that. It is important for the UK to have an economy that is not solely based on finance and service industries."

Edgley is adamant that the aircraft if at all possible should be built in Britain in order to inspire young engineers and entrepreneurs. "Where's Concorde?" he asks. "Where's the Space Shuttle? Somebody's just spent three million pounds to re-create a 50-year-old steam engine. Where are the new challenges that will interest young people in the UK?"

"When we originally started production at Old Sarum we had a policy of hiring new graduates, and almost all of them stayed in the industry because of the experience."

Edgley is cautiously optimistic that government funds will start to shake out to support new businesses, and the EA-7 is a classic case for support. "This aircraft is ready to go, it only needs someone to take it on and make it happen," he says. In this economic climate there is a need for an aircraft such as the Optica, and a need to create new industry. It would be a waste if this inspired design was not put back into production. ■

changes, and after a short float we plunk down and roll out. The brake lever does a good job in slowing us down and I'm sure short fields would be a piece of cake in this aircraft although very rough fields would be a challenge due to ground clearance limitations and firm suspension.

The Optica is an inventive, well designed, and robust aircraft that accomplishes its goals, and I hope it finds a backer. I know that if I was stranded somewhere, someone flying an Optica would have a better chance of spotting me than in an Islander, and because of fuel limitations the Optica could spend far longer looking for me than a helicopter. Anyone in the market for an aircraft that can loiter for hours watching for brushfires need look no further.

I really enjoyed my flight in the Optica not because of the aircraft's handling characteristics but the sheer sense of freedom and of openness that you get flying this aircraft. Sure, it's not something you'd throw around, but it's not meant to be. It's comfortable, stable, you can see straight down, and it can stay up long enough to give you kidney failure. At the end of this memorable flight I definitely had what Clive calls "the Optica smile." ■

Can the Optica now take off?

