

## Divernet

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# Wacky Races

**You may not need any artificial propulsion more sophisticated than fins unless you're up for some serious diving, yet the idea of underwater scooters always seems to fascinate. We decided to put seven contenders through a series of speed trials at Capernwray. So how would the six scooters match up against Jetboots**



**Memorable movie moments** must surely include that penultimate scene in *Thunderball* in which massed divers are drawn through the water on their underwater propulsion vehicles. DPVs and divers have since become synonymous in the minds of movie directors. A diver simply wouldn't look right without one. Putting aside those DPVs that are not rated to go really deep, few divers in the UK actually use them, though they have remained a staple item for cave-divers.

That hasn't stopped us leisure divers from being interested, however, and one training agency even uses a silhouette of a diver with a DPV as its logo. It's almost as if the use of a DPV singles you out as a truly "technical" diver.

The fact is that if you're loaded up with multiple tanks, your dive will be mainly composed of a descent and an ascent. You aren't going to be doing a lot of swimming, so the only way to get round a deep wreck without too much effort is to be dragged round it by such a device. So as divers go deeper, DPVs are gaining in popularity. Outside cave-diving circles, the different DPVs available do not appear to be widely known. So we decided to do a side-by-side comparison of those that we could easily obtain.

All but one have a lot in common - they basically consist of a propeller driven by an electric motor powered by a big battery and worked by a switch in a handle.

Jetboots are unique in that they comprise a pair of propellers that attach to the legs of the diver and are controlled by a separate switch attached to the waistband.

Putting these Jetboots to one side for the moment, one could easily be confused into thinking that the scooters were very similar. However, they have distinct differences, and not only in price.

The cave-diving fraternity is a small circle of people who seem to be very competitive, and are often critical of the achievements of their peers.

A diver's choice of DPV gets caught up in this rivalry, and when I started on this project I immediately sensed a degree of angst among some manufacturers. Too often, one would be keen to trash the offerings of another. So, in a move unprecedented in a comparison test, we decided to borrow DPVs from private owners where possible. Adam Hanlon lent us his Gavin; Andy Hayhurst provided his Farallon; Dave Crockford supplied a Zeuxo; John Volanthen travelled up from Bristol with his Silent Submersion; and Chris Boardman provided a DiveX X-scooter he had on loan.

Ben Mazin sent over the Jetboots from California; and the Torpedo DPV was supplied by its new importer in the UK. Apart from the Zeuxo, all these DPVs come from the USA.

We travelled to the North-west because most of the bigger DPVs were already up that way, and Capernwray Dive Centre kindly invited us to use the very clear waters of its excellent Jackdaw Quarry for the test. For logistical reasons we tried the Silent Submersion in Wraysbury Dive Centre's lake near London's Heathrow Airport, as we eventually did with the Jetboots.

Manufacturers always seem to claim mask-ripping speeds for their DPVs, though rarely do any of them actually deliver this. However, they all go fast enough, and when you're using a DPV it does seem to be going a lot faster than you are in reality.

We took underwater speedometers to gauge which were the fastest scooters, and Chris Boardman acted as our

"standard" test diver. Craig Nelson also got to try most of the DPVs, and added his comments to what we found. Technique is very important when using these big powerful DPVs, especially the tow-behind Gavin, Silent Submersion, and X-Scooter. The prop-wash from each of these is very broad and powerful. Get it wrong, and you can almost wash your hood off your head.

Prop-wash is less of a problem with the smaller-propped Zeuxo and Torpedo, and is no problem at all with either the Farallon or the Jetboots.

With a tow-behind DPV, it is very important to be above the unit's thrust, so that your body does not obstruct it. Adjusting a lanyard to exactly the right length so that you are above and behind is the secret. This lanyard is clipped to your crotch-strap in such a way that it takes all the load, leaving you merely to reach out to operate the DPV's trigger, steer and control it.

Torque is very important, too. You may not want to travel quickly but you will want to drag yourself and all your equipment through the water without effort. How you use your DPV will affect both its speed and duration.

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The **DIVE-XTRAS X-SCOOTER** is a newcomer in the world of serious DPVs. Evidently the one we had to try had the same back end as the Gavin, but a much sleeker and smaller main body. We assume that it was because of this reduced frontal area that the short-bodied Echo X-Scooter just topped the Gavin on outright speed.

We liked its variable-pitch prop and its brushless motor with both an electronic and mechanical clutch. This provided absolute safety, should anything get dragged into the flow of the propeller.

We did not like the fact that you had to remove the battery for charging, and it proved quite complicated to refit it. However, as it is an expensive ni-mh battery, it deserves to be protected from the effects of a flood.

This DPV is obviously designed for use with crotch-strap and lanyard for one-handed control. In fact there is only one T-handle. The X-Scooter's reduced mass made it very manoeuvrable once we got the hang of how to use it. Trim was adjusted by fitting Velcro trim pockets filled with lead shot within the housing.

We thought it was the most nimble of all the DPVs we tried, and it was easy to steer by rotating the back end by its handle, allowing prop torque to take its effect.

We had a lot of fun dodging around the rainbow trout that mass in the shallows at Capernwray, though we're not sure how much the fish enjoyed it.

The trigger lock is a simple thumbscrew that could be lost if it was unscrewed too much. Otherwise the X-Scooter seems to be well made, with only a single (double O-ring protected) opening into its innards that is closed by four cam-catches. It is certainly small and light enough (15kg) to take on a boat without complaints from the other divers who might be sharing space with it.

The Dive-Xtras X-Scooter is depth-rated to 150m. Top speed we recorded was 0.9m/sec (3.2kmph). Expect to pay around£2200, including batteries and delivery to the UK. ([www.dive-xtras.com](http://www.dive-xtras.com))



Chris Boardman in and out of the water with the Dive-Xtras X-Scooter



**FARALLON** is the name of a DPV well-known to many divers, but few have actually seen or used one. We weren't sure which model we had. It seemed to be a hybrid between the Mk7 and the Mk8, but it was certainly not a Mk7E. Either way, what a brute! When we first saw it, we were all daunted by the prospect of using it. It took two people to cart all 36kg of it down to the water's edge. You certainly wouldn't want to take one of these on a dive boat. It's enormous, almost like those human torpedoes used by Italian frogmen to sink Britain's Mediterranean fleet in Alexandria during WW2.

It uses a 24V, 17A/hr system that takes six hours to charge, and the whole thing is encased in a strong aluminium body.

Once in the water, the DPV changed. For a start, it became only a couple of kilos or less negatively buoyant.

You sit astride the Farallon and let the T-bar seat press against your seat. In this way, all the prop-wash is behind you and there is absolutely no strain on wrists or arms. In fact, once in motion, you end up lying on top of it with your legs trailing behind, reminiscent of a skier on a T-bar lift.

It has two pairs of operating triggers at each side, allowing you to use either hand. Once it's running, you repeatedly press on the second of the right-side triggers to increase the speed, and use those on the other side to slow down.

If you let go of either of the "power-on" triggers, the effect is that of a dead-man's handle, but the unit remembers the chosen speed once you power-on again. It's a very sophisticated electronic method of speed control.

Speed settings are displayed alongside a reassuring battery charge indicator on the "dashboard". Pressing the "power on" switch takes the first-time rider from slight trepidation to exhilaration in a moment. The Farallon proved easy to steer by using your trailing fins. It was total fun, and we zipped around the waters of Capernwray very enjoyably.

I felt that I could be comfortable using it for the duration of its charge (47 minutes at full speed) and it was certainly at least as fast as any of the others. Depth rating is 120m and burntime around 70 minutes.

Then, back in the shallows, we each came up against the downside. Who would help us carry it out of the water? Top speed was 0.8m/sec (2.9kmph).

The Farallon Mk7E costs around £2500 or more.

**[www.farallonusa.com](http://www.farallonusa.com)**



Craig Nelson with the Farallon Mk7E - it's a bit of a brute and you might need help carrying it!



**GAVIN DPVs** were designed by Bill Gavin and George Irvine for the WKPP cave-diving project in Florida. We had the "short" version. It's another heavy item of kit, with all the sleekness of a dustbin with a propeller, but it's just light enough to be manhandled solo when out of the water. And it cannot be denied that it works.

We thought it was number two among the tow-behind DPVs as far as manoeuvrability went, and it is clearly designed for one-handed operation, even though it has two handles. This means you have the other free to clear your ears, inflate your suit and so on. You attach a towing lanyard to your crotch-strap so that it is of the right length to take all the strain, but you can still comfortably reach the trigger. Its large mass means that it trundles in a straight line nicely.

It was spoiled only by its trigger-handle. This felt to be at an awkward angle when used one-handed.

We liked the Gavin's all-plastic (HDPE) construction, which eliminates maintenance problems when used in sea water. We liked the fact that you could vary the pitch of the prop as you went, so matching your speed to that of another diver.

We liked its mechanical clutch, which gave it a degree of safety, and the fact that its buoyancy and trim could be adjusted (before submerging) by sliding weights along a bar arrangement inside it. We liked the fact that it was easily towable should you need that facility (if you ran out of charge, for instance).

There was little or no torque fatigue at the wrist, and you could easily steer using the propeller torque, by rotating the unit's back end almost like a steering wheel.

We did not like the primitive and rather Heath-Robinson split-pin that is used as a safety-stop for the on/off trigger, and felt it likely that we would lose it. Depth rating is claimed to be in the region of 170m. Top speed recorded was 0.8m/sec (2.9kmph).

Expect to pay around£2000 (not including battery or charger) plus import duties. The Gavin uses two 17A/ hr 12V (wheelchair) lead-acid batteries in series. ([www.gavinscooters.com](http://www.gavinscooters.com))



Owners who have had reason to disassemble their Gavins have often expressed disappointment at aspects of the build-quality, and Rodney Nairne, maker of the outwardly similar-looking **SILENT-SUBMERSION DPV**, claims to have answered many such criticisms.

He credits the original designers of the Tekna scooter (circa 1984) for the thruster design, the Oceanic Mako for many of the parts, and admits to being influenced by the design of the Gavin.

As far as reliability goes, Silent-Submersion scooters, at the moment, hold the record for the longest cave penetration.

Like the Gavin, the body is made of high-density industrial polyethylene. Beautifully constructed, you can pull off the outer casing to reveal the entire works, and then pull off the battery pack to reveal that the motor and the electronics are protected behind a Perspex bulkhead.

We liked the variable-pitch prop and mechanical safety clutch that provided absolute safety if anything obstructed the propeller. The model tested had a longer shell than the other tow-behind scooters, which made it slightly less manoeuvrable, but its motorcycle-style throttle control made hanging on and steering it by its single handle a doddle.

The Silent Submersion was easily navigated around the lake at Wraysbury, never stirring up the silt, although visibility must have been at an all-time low. It certainly felt powerful, and, when we compared test results, turned out to be the quickest DPV through the water. Its depth rating is 120m and burntime 60-90min.

Silent-Submersion DPVs come with fully tested lead-acid batteries. Top speed was 1m/sec (3.6kmph). Expect to pay £2500 including duties and taxes for a UV-18, but there are other versions. ([www.silent-submersion.com](http://www.silent-submersion.com)).



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The **TORPEDO 3500** might be thought to be out of its class in this company, but these scooters do cost less than the others described here. As such the Torpedo 3500 was initially far less intimidating to use. It has a very sleek hydrodynamic shape, which is then ruined by being covered in railings! We stripped it down to its bare essentials before using it.

With nothing more than a 12V Mercury Marine trolling motor to power it along, it was never going to be as fast as the others. We reckoned it was only slightly better than two-thirds as fast as the best tested here, but it is still eminently usable.

It is designed with safety very much in mind. The propeller is hidden beneath a deep shroud, and there is no way your hand could wander onto it.

Similarly, the unit is operated by a hidden magnetic switch. The diver attaches a Velcro strap with a built-in magnet to his right hand and, by gripping the unit at the correct point on the right-side guide rail, the electrical current flows and drive is initiated.

Let go and you stop. You need to let go when you adjust buoyancy or clear your ears, which interrupts progress somewhat. Travel speed was more satisfyingly stately than spectacular.

With a main housing of glass-reinforced plastics, the Torpedo looks easy to maintain. You access the wet-acid battery by unlatching two cam-latches that bear the front-end cap down on to a large O-ring. Accessories include a buoyancy-bag. We never really got to test the one supplied, because it had a severe leak. However, one should bear in mind that something of fixed volume is best weighted for neutral buoyancy before you start. Adding air as you go deeper and releasing it on the way up adds a lot of complication to using what is otherwise a very simple item of kit.

This buoyancy bag is really only for use during recovery at the surface. The Torpedo's depth-rating is 52m and as such it is not aimed at truly technical diving. Burntime should be around 45 minutes.

Top speed recorded was 0.6m/sec (2.2kmph), but then, the price is £699. (Starlight Distribution 01803 855225)



The Torpedo, the cheapest DPV tested here and not intended for deep diving



The **ZEUXO ADV14** comes from Italy. It looks very much like a WW2 bomb! Don't leave one on the back seat of your car while visiting a security-sensitive location. It has a very long slim body, which certainly makes it viable for use on a dive boat.

This DPV is made primarily from a technopolymer mix and requires no maintenance after use in salt water.

We liked the way the front end bore down on to a massive O-ring and was held there by a large hand-tightened nut.

This nut unscrewed to allow you access to charge the 14A/hr NiMh battery without the need to remove it. It proved very convenient.

It was less easy to use comfortably in the water than the Gavin or the X-Scooter, because although we used a lanyard for a tow-behind effect we still needed two hands, one to operate the trigger and the other to adjust the electronic speed control.

The electronics allow for a "soft" start, which is useful in confined spaces and presumably extends battery life.

I tended to use it at maximum speed, holding it by the trigger-side handle and the webbing at the front end.

This was because it seemed a bit nose-heavy and otherwise put a lot of strain on the wrists. Presumably it is built to be perfectly neutral in the sea. We didn't see a way to trim it perfectly because we needed to reduce weight at the front rather than add weight at the back.

We were told, for fresh water use, to remove an aluminium plate that sat behind the battery, but this made little difference. That said, its performance did not seem to be compromised.

One worry was that because there were two handles, after adjusting the speed control with the left hand it proved all too easy to let that hand wander and be drawn into the flow of the propeller while fumbling for the left grip. We felt that the front propeller opening should be designed to be safer than it is.

The Zeuxo's depth rating is 100m and it promises to run at full speed for an hour. Top speed recorded was 0.75m/sec (2.7kmph). At £1700 (delivered to the UK) it represents good value among technical-diving DPVs. Other battery-pack combinations are available. (International Training UK, [dave.crockford@techdivesite.com](mailto:dave.crockford@techdivesite.com)).  
Direct link: [www.suex.it](http://www.suex.it)



The bomb-like Zeuxo ADV14 - don't leave it lying around unattended!



**JETBOOTS** are DP without the V! They need to be experienced to be appreciated.

They are beautifully engineered, but at first glance seem to be nothing less than ridiculous. A small carbon-fibre propeller unit within a shroud, complete with brushless motor, is attached to each calf, and their cables threaded up through straps at the thighs to a control unit mounted at the waist.

This is powered by a big 24V 15A/hr ni-mh battery that is strapped to the tank and substitutes for around 4kg on the weightbelt. The cables have large wet-connectors where they fit to the controller. We found it best to fit the controller with its switch downwards, or your stomach tends to alter the position of the large switch as you bend at the waist to steer.

It takes a bit of time to rig it but, because your own body is the structure, the essentials all pack down into a typical photographer's case and are readily transportable. The Jetboots set-up weighs around 10kg.

The power controller is quite sophisticated, sounding a beep when you switch it on, first initialising the motors and then gradually increasing revs to the props, so that acceleration is quite gentle.

You can make fine adjustments to the chosen speed. A system of lights indicates remaining battery charge and cuts off power if the propellers are fouled or the battery charge gets low.

The effect of powering off is rather like standing in a lift. You feel the initial thrust, and then you're off with no effort on your part whatsoever. You simply bend your body at the waist to change direction, or stick out a fin if you suddenly need a tight turn.

Jetboots will send a diver along as fast as the Farallon will, but with his hands free to perform other tasks. You can even fin-kick as well, if you're in a hurry!

You can even forget that you're being propelled mechanically, and there's no prop-wash with which to contend. It's lucky Jetboots are not powerful enough to work when you stand up in the shallows after forgetting to switch off!

It all seems very natural and relaxing once you are under water, although it seems very un-natural while rigging up. Chris protested about his appearance while we dressed him in the Jetboots - as if anyone cared!

He was standing in the shallows at the time and in the ensuing process we managed to drop the lead from the battery-pack into the water.

As it was equipped with a wet-connector this should not have mattered, but we later discovered that there was an earthing-fault in the battery case, so that was that.

I have previously used Jetboots at full speed for more than an hour without any exertion on my part. They were my propulsion-method of choice, but sadly Chris and Craig didn't get a chance to try them this time round. Ben Mazin quickly sorted the problem out back in California, and I was able to take them to Wraysbury Lake later to obtain the speedometer readings we needed.

Those on an IDC there that day might remember seeing what looked like an otter speeding round the lake. That was merely me, with my head breaking the surface, getting my bearings!

I am much larger than Chris, so the speedometer readings are probably not comparable with the others.

The depth rating is 92m and my top speed was 0.75 m/sec (2.7kmph). Expect to pay around£2000 with battery plus duties and import taxes.

There are plans to introduce a lightweight 32A/hr lithium polymer battery as an option for longer duration. ([www.jetboots.com](http://www.jetboots.com))



The control unit is strapped to the waist and the battery-pack to the tank



One of the twin propeller units

clear=all>

## Conclusion

The Silent Submersion was easily the fastest DPV in a side-by-side race, but the X-Scooter was probably the most manoeuvrable.

The Torpedo was far the cheapest, and the Farallon looked the most impressive and gave a notably comfortable ride.

The Jetboots were easily the most transportable, and probably gave the most fun. Duration is always simply down to battery amp/hrs.

People often claim that using a DPV on a wreck equates to seeing everything go by in a blur. This is not true. DPVs are simply not that fast. If they were, they would cause your mask to flood and your regulator to free-flow.

Speed varies very much depending on the resistance of the diver. This includes technique as well as the actual dimensions of rigged diving equipment.

Expect to get around 3mph at best, which is slower than a brisk walking pace. You will probably be more comfortable (and extend burntime) at the more realistic speed of around 2mph.

We used all the DPVs and the Jetboots with twin-tanks and drysuits. A diver in a sleek wetsuit and with

minimal gear will obviously offer less resistance to the water and achieve higher speeds. Each scooter, even the economic Torpedo, equates to a big purchasing decision. They are not items bought capriciously. Whichever one you decide on, someone will always tell you exactly why it was the wrong one! Nickel-metal hydride batteries can be topped-up without any memory effect. Lead-acid batteries may seem primitive by comparison, but they do fade slowly, allowing you the possibility to limp home, rather than cutting you off when the battery-pack runs out of charge. At the end of the day, we decided that each scooter had its plus and minus points, and that their performances were surprisingly similar.

## 5 top scooter tips

- If you use a DPV with a tow-behind lanyard, be sure that you can disconnect it easily.
- A flooded DPV can be extremely negatively buoyant.
- Never use a DPV to ascend or descend.
- Use your computer to control your ascent speed.
- Always be sure to ventilate a battery generously during the charging process.