

# VELOVISION

*The credible cycling magazine*

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## **REVIEWS:**

**AZUB TI-FLY  
PERFORMER SAKI  
TERN VERGE TOUR**

## **SHOWS:**

**CYCLE SHOW  
EUROBIKE**

## **PLUS:**

**Radical Design trailer for Brompton  
Low-power 1.5W dynamo lights  
Lezyne, Zéfal and SKS pumps**



## ***Velo Vision PDF***

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If you have any comments, problems or suggestions about the magazine in general, or this PDF in particular, please email me at [howard@velovision.com](mailto:howard@velovision.com)

I hope you enjoy the read!



Howard Yeomans

Editor and publisher, *Velo Vision* magazine

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**COVER:** Kathi, our visitor from Austria, used the Tern Verge Tour to explore the back lanes of Lincolnshire. Read the review on page 34.

**OPPOSITE:** Paolo Ganio Megeo riding his e-quad, with new solar roof. He rode the Iseran pass in France in July, a 150 km day-ride. [gngbike.com](http://gngbike.com)

## Carpe diem

Here in England, the season has definitely rolled over to Autumn setting. The leaves that once seemed so full of vigour they could never drop have now given their all, and inevitably fallen.

Quite why this event would cause surprise to anyone is, itself, I think, a reflection of the nature of the cyclist – an optimist in denial. Someone who too easily forgets the rigours of a bracing British winter and is consistently dressed for the outdoor conditions one month ago.

Being an optimist, I get caught out. It could be called

complacency, expecting the weather to cooperate with my rides schedule. I also postpone those kind of events that we should all prioritise – rides with new people, challenging rides to new places, and nostalgic journeys down memory lane searching for that magic we all love.

This issue is for my dad. We missed that ride, because we were waiting for those metaphorical 'lemon-soaked paper napkins'. Why make excuses? – they tell me; there's no such thing as bad weather, just poor clothing.

Howard Yeomans



## CLEARED FOR TAKE OFF!

**AZUB has now joined the full-suspension trike party. And what an entry – dispensing with the cruciform frame, AZUB replaces it with titanium leaf springs! They say it's not difficult learning to fly...**

Something of a dark horse, AZUB is a young Czech company, ploughing its own furrow, clearly not afraid of doing new things in new ways. Most will accept that suspension is a good idea on a trike if the rider has to encounter rough terrain, whether it be urban, or extra-urban. The move towards suspension has not been sprung on the manufacturers overnight – rear suspension is easiest to add first, mostly for comfort, then later, the front wheel system. It is this progression that AZUB followed.

**BACKGROUND**

Since we reviewed the 20" TRIcon in Issue 48, things have moved on apace. The main developments in the AZUB trikes have been the introduction of a new extra-strong main frame hinge, a sliding seat adjustment, and a more versatile rear fork, allowing a variety of back wheels, including through-axle 20" or 26" wheels. All of the AZUB machines, from folding bikes to tandems, are built to order from a detailed list of component specifications.

Our Ti-FLY has been equipped with mid-range components: mechanical disc brakes (standard), the larger 26" back wheel, strong looking double-wall rims, dependable 27-speed gearing, mesh seat, and coil-spring rear shock. We didn't receive the

mudguards, but we did get the compact rear rack, giving us a way to carry what's needed for a long day out.

**FIRST IMPRESSIONS**

The wing-like titanium leaf springs are compellingly the first things to hand – slightly rough in their bare-metal state but no less impressive. Although there is some visual similarity with a wishbone design, the members themselves provide the spring function, rather than a coil-spring in a parallelogram. Between the lower spring and the main frame, a pair of telescopic dampers triangulate the geometry but provide no further support.

A subtle transfer on the upper spring says "Aerospace titanium grade 5", hinting at its genuine

association with aviation engineering in design and development. Together with the anodised aluminium parts hewn from billet, the overall effect is stunning.

Brilliant white paint has an ability to disguise, not only contours, but blemishes, too, so believe me when I say, there are none to hide. The welding on the aluminium tube is well executed and designed for maximum overlap between parts, avoiding stress concentrations.

Throughout the frame and components, red detailing contrasts strongly with the black and white elsewhere. All main parts and racks can be finished in a palette of colours to set off the machine nicely, but the bold look isn't for everyone, so the components can be co-

ordinated as the buyer wishes.

Our trike arrived folded with its highly impressive frame hinge clamp that wouldn't look out of place on an aircraft cabin door. The hinge is optional but, without it, the fold is slightly limited, except for the fairly easy wheel removal, swing arm tuck-under, and seat removal – all by quick releases.

The rest of the finishing on the trike looks first class, too. Parts that particularly caught our eye were the braided cables, running internally where possible; hefty stainless fasteners everywhere, some with Torx heads; and the stylish decals.

**THE RIDE**

The deceptively simple front suspension belies the effort required to develop this unique chassis



over a period of more than a year. Expectations are, therefore, high and astute riders will be looking beyond the cosmetic appeal to make ride comparisons with the full-suspension offerings from ICE, Hase, HP Velotechnik, and Steintrike.

With only a little care, I unceremoniously plonked my behind on the mesh seat to feel the effect of springs moving by a small percentage of the 40 mm total travel. Curious, I bounced on the top of the springs directly, confirming everything was actually moving. It was, and in all the right directions. Perhaps I also expected some sounds, but the system was silent, without even a hiss from the twin dampers.

The adjustments necessary to find a comfortable starting point

**CLOCKWISE FROM TOP: Seat adjustment is a breeze, with sliding lower clamp.**

**Avid mechanical disc brakes.**

**Non-adjustable front damping between the leaf springs; both springs are about 5 mm thick.**

**Barrel adjusters on threaded nylon seat stays.**

**Trigger shifters with Jagwire braided cables and locking brake levers.**



on the Ti-FLY are few and simple. The seat itself slides fore/aft on a rail that clamps easily with a unique seat-angle adjustment using finger-tight nuts on stays. I chose to put my weight in a rearward bias with a fairly reclined seat. There was no headrest on our seat and, although I didn't feel the need for one, some riders may add one for €89/\$113.

The seat mesh is tensioned over an aluminium frame with about a dozen belts that can be individually adjusted while seated. Using a strong mesh (perhaps as used on trampolines), the material has minimal 'give' and, after a while, I found myself with minor pressure points. Upon adjusting the straps to give more slack, my back pressed on the frame beneath. Perhaps they soften with use but, with our short time on the trike, this remains unknown. Unlike other trikes out there, a hard-shell seat is not available from AZUB. Matching quick-release levers on every folding part and adjustment, except for the boom, made the rest of setup quick and easy.

On the first ride, I kept a keen lookout for suspension movement: the wheels and kingpins move together as an assembly linked by plain bearings to the titanium springs. On a regular road, the movement is hard to observe, as there's no fixed frame of reference. It's definitely subtle, but the effect of



the mere 40 mm of designed travel is noticeable. Perhaps the figure sounds small, but the system is very quick to respond to the road. Looking at the design, I reasoned, the unsprung mass can't be any lower than that of competitors' designs, so a complete lack of stiction may be the key.

Along the extreme test – a strip of old railway ballast – the overall effect of suspension plus medium pressure tyres (about 70 psi/5 bar) resulted in a slightly jarring ride. Nothing to worry about and, with the seat itself providing a small amount of springiness, I only needed to let down the tyres slightly to reduce the feedback and actually increase efficiency. It would be fair to say the trike is happier on gravel and grit, rather than rocks and mud and, although the treatment caused no harm to wheels or chassis, anyone doing this regularly would be wise to fit fatter tyres than the 40 mm ones we were riding.

On loose surfaces, where traction was limited, we enjoyed the way the front end of the trike would 'dig hard' when cornering on its outside wheel. It would steadfastly refuse to go into a spin at any speed – something to be avoided at all costs – ultimately tending towards understeer when provoked. With a fairly typical 755 mm track width and seat height of 260 mm – 290 mm (depending on position and sag), the stability is partly down to the good distance between the rider's centre of mass and the rear wheel contact patch. We expect the 20" rear wheel version to have an even more immediate and involving ride as the wheelbase would be 68 mm (2.6") shorter.

Part of the leaf-spring design is an inherent self-stabilising effect due to the way the spring bends around the chassis mountings. The claim shows how, when one side of the spring lifts up, as it would during hard cornering, the mid section curves also, resulting in a slight 'up-bend' on the opposite side of the trike. It seems logical – although I'm not sure if the effect is more theoretical than real. Anti-roll (or lack of it) is most noticeable during a sustained hard corner and, given

the short travel and stiffness of our system, the amount of outward roll to counteract isn't all that huge.

The lower leaf-spring is available in two stiffnesses – we tested the soft one; at the other end of the machine, a 'DNM' coil spring unit is the only adjustable part of the suspension. With my 64 kg (145 lb) weight onboard, I set the sag accordingly and, together with the already fairly

stiff front-end, the rear shock was a good match. Being provocative in steering and hard pedalling, none of the system could be persuaded to 'bob' or do anything in any way to soak up the rider's energy. Gas shocks are also available for the rear, while the non-adjustable front system is actually built with the same dampers as the DNM unit.

AZUB doesn't set a weight limit for

the trike with either spring, instead expressing the typical handling characteristic of each one. For example, a rider around 100 kg can expect maximum comfort if they choose the soft spring and anyone under 85 kg, like me, will experience responsive and taut suspension. The hard spring is only suited for anyone over 85 kg and those heavier than 100 kg will enjoy the softest ride. Whether different adjustable dampers could be used to give some adjustability, we can only speculate; AZUB does not offer any alternatives.

As the trail got stickier, the 26" rear wheel and 1.5" tyre provided adequate traction with a bottom gear of 19" – small enough to easily take the Ti-FLY up most gradients. An entry-level Octalink crankset has removable steel rings in the 4-bolt pattern. Its 26/36/48T rings give 27 well-spaced ratios running up to a speed-oriented 110" for fast work on tarmac.

Super-precise gear shifting, thanks to the Deore components and gently curved Jagwire braided cables, was reliable throughout the test. Shimano loses a point for their derailleur, the M592 Shadow design's tensioner mechanism would clang on the 'B-screw' when the lower chain bounced – perhaps partly down to the weight of the recumbent's chain. I easily padded the gap with a slip of rubber.

The rear swing-arm as used on the TRIcon and Ti-FLY is commendably stiff and turns on reassuringly large bearings. The wide rear fork dropout has bolt-on alloy ends to accommodate, in our case, a large-diameter through-hub axle.



**TOP:** Mini-rack works with full-size 25L panniers.

**MIDDLE:** Axle is removed using the hex key which stows in the axle itself. A rear disc brake is an option – fitments are provided. It is recommended for parking only, although both front brake levers have parking brake buttons already.

**LEFT:** Machined and surface-coated main hinge.

The wider ends cope better with the twisting forces placed on trike rear wheels in corners. The 157 mm width and 12 mm hollow axle make it the stiffest option possible. Most of the small deflection we noticed at the rear will have been down to the flex in the 36-spoke wheel itself. Other fork-ends can be fitted for a hub gear, for example.

## THE FOLD

Depending on needs, the Ti-FLY will easily pack down into a compact package. With the optional mainframe hinge, as tested here, and in the absence of the large rack and mudguards, the fold is most straightforward. The quick method is to remove the seat, loosen the handlebars and fold them flat, open the main hinge and fold over the back wheel with the now-widely-used diagonally-aligned hinge, then secure the handlebars. A rubber-stop keeps the frame from damaging itself in transit and the 56 x 83 x 133 cm (h, w, l) lump can still be wheeled about. Dimensions for the 20" rear

wheel version are a little smaller.

A further stage for reducing the length somewhat involves the removal of the front wheels, a simple case of using QR levers and dropping the axle through a slot, then removing the back wheel, too, by unscrewing and withdrawing the axle. The swingarm then folds under the main tube. We found it preferable to keep the front wheels on so the unit stays mobile preventing scratches on the frame. Thus folded (with front wheels still on), the Ti-FLY has a length of 89 cm, although, at 19.0 kg, some would consider it liftable. With front wheels on, the space under the trike accommodates the seat and wheels. The weight of the whole trike, as tested, is 23.6 kg (52.1 lb).

Both folds are reasonably 'clean', as the obedient chain stays within its tubes and on the chainrings. In fact, rear wheel removal with the through-axle hub was easier than with a regular QR with fewer parts at the axle-end to get in the way. Wheel removal and replacement can be done without touching the chain.

## CONCLUSION

The suspension is the unique selling point of the 'FLY and, perhaps understandably, AZUB has delivered the concept with a conservative design margin. It is, therefore, best suited to fast road riding, a theme complemented by the overall low machine weight and narrow racy wheelset. Think 'Lotus Cars' for acute handling and feedback, rather than the oblivious comfort of a 'Rolls Royce'.

For my physique, I would like the front suspension to be a little more flexible and would also benefit from a rear shock to match. Heavier riders, and those carrying luggage, will, I expect, be entirely suited.

AZUB has delivered again. The Ti-FLY's bold and distinctive chassis guarantees an engaging ride with precise handling characteristics – a real rider's trike. The concept is good and, with a bit more adjustability, it could be even better tailored to each and every rider. Take a test flight and see for yourself.

## OPTIONS AND AVAILABILITY

Azub trikes have a five-year warranty on frame, steering, and seat components, with the normal exceptions for wear and tear, misuse, etc. Like the TRIcon, the Ti-FLY is available with either 20" or 26" back-end. The 20" version is more compact and possibly more responsive in turns, while the big-option will roll more efficiently and perhaps offer more grip. We tested the Syntace through-axle hub; conventional width hubs, e.g. for hub gears, are all options from the factory. Up front, Sturmey Archer's 70 mm drum brake hubs are standard.

The mudguard shown in the photos is of our own making. Further *Velo Vision* modifications include the light mount on the front boom, a necessity as the derailleur post has only a single M5 bolt hole, and the clipless pedals. Standard tyres are 40 mm wide Schwalbe Marathon Racer for the rear and Trykers for the front. Fatter options would be my preference. The customisations from AZUB are extensive – consult a dealer or the catalogue for more information.

The base-model (20") retails at €4160 (\$4992). These are some examples of the options available, some as tested on our trike: 26" back-end, €150 (\$180); folding hinge and bars, €280 (\$336); Avid BB7 brakes, €326 (\$391); SON dynamo hub, €250 (\$300); BionX electric assist, €1699 (\$2039); hub gear, e.g. Alfine, approx. €525 (\$630) – depends on rear wheel size; low rack, €59 (\$75); SKS mudguards, €149 (\$189), coloured detailing on wheels attracts an up-charge. Euro prices include purchase tax and shipping within the EU, US\$ prices include import duty and shipping to the USA.

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