

# **NORTH AFRICA FLYING ADVENTURE**

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# **FIRST LOOK:** BATMAN'S AEROPLANE?

Stuffed with safety features, the curious NEXTH is 'cleverer than it looks'



# Batman's ultralight

Unconventional, edgy, stealthy and *provocative* was what they were calling it at AERO Friedrichshafen. Is there a place in the ultralight market for the strange-looking NEXTH?

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t was back in 2011 when the Italian company Aero & Tech debuted its unusually-named NEXTH concept – an aircraft whose looks certainly would fit well in the next Batman movie – at AERO Friedrichshafen.

When I saw it for the first time, other visitors were calling it 'unconventional', 'edgy', 'stealthy' and even 'provocative'. I thought "this project will never get airborne, and it'll disappear". Well, what do you know: the aeroplane showed up









Luca Morelli points out some of the features of his brainchild, which like the American Mooney series is built around a steel-tube 'safety cage' structure

again at AERO 2018, by which time it was flying, with 1,000 hours in its logbooks. I was so wrong... and on top of all this, just a bit later it received the German approval for the 472.5kg UL (ultralight) class and 600kg was in prospect.

Now, on a late afternoon I'm standing in the centre of the 45-metre-wide, endless runway of Foligno airport and

I'm freezing waiting for the NEXTH (named so, by the way, because Aero & Tech believes

it will be your Next High-speed aeroplane). Here in the middle of Italy at the foot of the Apennines in late autumn, all the mountain peaks are snow covered. Suddenly an aeroplane in dull black paint finish whooshes over my head and disappears again, not giving me a chance to push the camera shutter button.

The next day I finally had the chance

to inspect the aeroplane and visit the Aero & Tech factory. Almost any new aircraft, especially when designed and built by someone new to the field, has an interesting story behind it. The NEXTH is no exception. It began in 2010 when Luca Morelli, an entrepreneur and owner of a metal fabrication plant, decided that it was time to purchase an

# The basic project task was to give the pilot a safety cell

aeroplane. Luca wanted to buy one that would satisfy his expectations regarding structural integrity/strength and – very important – safety. He contacted many ultralight manufacturers in Italy and abroad, and their answers were much the same, something like "we do not have what you are looking for".

So, what did this entrepreneur and owner of a Morelli Group, with over

thirty years of experience in sheet metal processing, do? Correct; he started to design his own ultralight, setting up a new branch he called Aero & Tech. Involved in design and production of parts for automotive and aerospace industry, this company today has a factory equipped with special machinery for laser-cutting carbon fibre and aluminium, CNC bending and forming machines, and has built up valuable expertise in moulding and welding. It has its own specialized milling/turning machines and vast experience with exotic materials like 4130, Titanium, 15CDV6, 17.4 / 10-PH, Avional 2024 T3 and 7075 T6.

Given this, it should come as no surprise that Luca was able to produce an ultralight based on his sophisticated ideas. He wanted it all, not just something sturdy and safe, but aerodynamically clean, simple and... different. The basic project task was to give to a pilot a safety cell and an airframe designed for + 9/– 4.5g ultimate load (but not aerobatics,

which are ruled out in the UL category) and based as far as possible on CS VLA and FAR23 aviation standards.

All a bit too ambitious? Not for Luca. He designed a welded Cr-Mo steel (15CDV6 GR3) space frame structure, filled it with inert gas for early warning of cracks or major damage, as is done with extreme aerobatic aircraft *(and was done for the tubular space frame of the 240mph Porsche 917 Le Mans car - Ed).* The wings are another metal masterpiece, as they are built from





One of Luca's safety features: the steel-tube fuselage frame is filled with pressurised inert gas, any fall in indicated pressure being a warning of developing cracks



NEXTH wing under construction in one of Aero & Tech's jigs – this is a serious manufacturing facility, notably spacious and very well equipped







Marino flew the basic model, which is a 472.5 ultralight 'of the old school' with a carburetted Rotax 912ULS engine and fixed-pitch propeller

How many light aircraft offer this degree of cabin access? Wide door apertures with low sills and built-in steps make it easy



AL2024 T3 – AL6061T6 using proper aviation rivets and spars CNC-machined from billet 7075 T6 aluminium, all material being ultrasonically tested.

Safety is extraordinarily important to Luca. He is using a rupture-proof rubber fuel cell which is located – and well protected – within the fuselage, behind the seats. For ease of construction and repair, the wings are skinned in aluminium and, if the customer specifies, designed to be readily removable (this is an option as it adds weight). Finally, for ready storage and road transport, Luca has designed a dedicated trailer on which the wings can be safely fixed. It is only in the choice of powerplant

that Luca has opted for a traditional solution: the NEXTH has a Rotax engine.

#### TWO MODELS AVAILABLE ...

Currently, the NEXTH is available in two versions, basic and advanced. The basic model has been flying since 2012 and was certified in the 472.5kg UL category in 2018. It is powered by the carburetted Rotax 912ULS engine, and has nondetachable wings, fixed gear and a simple interior. This version is a real ultralight of the old school, with an empty weight just below the 300kg mark. According to the manufacturer, its stall speed is just 35kt. It is available as a kit, in several stages of completeness, or as ready-tofly aircraft. Kit prices start at  $\in$ 50,000, the ready-to-fly aircraft costing  $\in$ 99,000 plus tax (prices as per mid 2022).

The advanced model version will be 600kg-certified, has been flying since 2017 and it will offer all the possible options, including folding wings and a glazed 'sunshine-roof' above the occupants' heads. It is equipped with retractable gear and is powered by a fuel-injected Rotax 912iS engine









It is not just the cabin that is readily accessed – top-hinged cowl panels open up to allow really good inspection of the Rotax engine

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It looks like a giant insect – or the Batmobile from the 1960s TV series – for good reason: bulging the screen halves stiffens them and smooths airflow Never mind the look, feel the quality! All metal components like the undercarriage legs, made in house, are beautifully machined and finished



driving a variable-pitch MT propeller.

In prospect is the HS (standing for High Speed) model, which will be fitted with the turbocharged Rotax 914 turbo engine and a modified, low-drag wing that will also increase the stalling speed.

This is an interesting option for the experimental kit builder. Price on demand, not yet specified.

The beautiful, custommade trailer can be ordered separately for €18.000.

#### FIRST IMPRESSIONS

It's not just at first glance that the aircraft looks very different to what I am used to seeing and flying. In a dim hangar, the impression is of a secret, mysterious, stealth project: darkly toned and almost intimidating. In daylight, and at the marvellous and modern production site



in Fossato di Vico, in the province of Padova, the aircraft becomes way more friendly. Yes, the NEXTH is different, but almost all its unusual details serve a technical purpose and are based on practical and safety-related criteria. They

# Almost all its unusual details... are based on practical and safety-related criteria

are not just there straining for effect.

For example, the gull-wing doors are attached in a way that allows easy opening and rescue of the occupants even in an accident where the aircraft ends up inverted. The fuselage spaceframe is extremely stiff and is covered with lightweight, flat carbon-fibre panels. The engine cowling is made from the same material



in the interest of saving weight.

The mid-wing layout – by far the best aerodynamic solution for almost any aircraft – not only assures optimal performance but also seats the occupants on the wing spar, allowing

> wide door openings and easy access, plus an excellent pilot view. To save weight, the main spar of the 472.5kg UL version

is made in one piece – and for the same reason it has fixed gear.

The engine cowling is another eye-catcher and is dominated by the huge propeller spinner. There are wide inspection hatches – actually they are the biggest I have ever seen in an UL aircraft – and when the cowling is removed another interesting hidden detail appears. The nose gear is not –



as it usually is in ultralights – attached to the engine mount but it is fixed to the fuselage frame – another safety feature demanded by Luca. By the way, the nose gear and the main legs – especially those of the retractable-gear advanced model – are real masterpieces in metal, made in titanium by Aero & Tech itself.

As the aircraft has a single fuel tank, the refuelling point is conveniently placed on the left fuselage wall, above the wing. One of most unusual features is the windscreen, which is made up from two heat-formed acrylic sheets creating a pair of half-bubbles, reminiscent of giant insect eyes. Even this curious detail was included for good technical reasons: to smooth the airflow, stiffen the transparency and prevent drumming.

#### TIME TO GO FLYING

Getting on board the basic UL model

we are sampling today is easy – no bending and straining, no gymnastic exercise, as the doors open wide and the opening extends from the floor to the cabin ceiling. (I measured it, and it's 1.44m across.) Once seated in the cabin you realise that you are really sitting upright and not reclining. The seats are another Italian-style carbon fibre masterpiece, nicely finished, good looking and lightweight.

There is a subjective feeling of enormous space, thanks to an abundance of glazed panels, even if the measuring tape revealed the cabin width is an unremarkable 1.07m. Here I would like to have few more centimetres, especially in the hip/elbow region. (The feeling of spaciousness is stronger in the advanced model when the transparent roof is installed.) The interior trim and instrument panel

#### **NEXTH retractable**

Factory-built: €130.000 plus tax

#### Dimensions

ength	<b>6.94</b> m
ingspan	<b>7.8</b> 3m

#### Weights and loadings

lax AUW	600kg
uel capacity	50 lit
Optional	130 lit)
laggage capacity	30kg

#### Performance

Vne	165kt
Cruise	124kt
Stall	45kt
Takeoff roll	65m
Climb rate	980fpm

#### **Engine & Propeller**

100hp Rotax 912iS driving an MT three-blade variable-pitch propeller

#### Manufacturer

www.aeroandtech.com



While they are certainly stylish and light in weight, the molded carbonfibre seats are one of the few oldfashioned aspects of the NEXTH, being bolt-upright

are stylish and well made, and are consistent with the futuristic look of the aeroplane. The practical theme extends to the carbon-fibre panel, which is divided into sub-sections that allow easy changing of components. Preflight checks completed, we are





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strapped in, the Rotax 912ULS is spinning the fixed-pitch propeller and we are taxying out to the runway. The fixed gear does its job well, even if the damping is limited, due to the springiness of the titanium legs. Even at this stage I am aware of the good field of view: there is almost – and especially in the advanced model – all-round visibility. The forward view is compromised by the lower edge of the windscreen frame, which is a bit too high for my taste but it's generally good, as the top surface of the cowling is angled steeply downward. I also find the two small triangular windows either side of the windscreen really handy, as they allow excellent view to three-quarters forward either side of the instrument panel, which does not extend full-width. The basic panel of the test aircraft was minimalist to the point of being austere. The high-spec advanced model can be had with comprehensive instrumentation, including large dual screens and analogue stand-by instruments

We line up on the runway, full power is applied and we release the brakes. The NEXTH accelerates pretty strongly on the asphalt runway, even though we are at (or possibly over) maximum all-up weight by my guesstimate. Whatever, from brake release – where the engine was spinning at 5,180rpm at 28.3in manifold air pressure – it takes three seconds to reach 58kph indicated, and after nine seconds we're off the ground at 98kph (53kt) and the VSI is showing a climb rate of 400fpm. A few seconds later we have established the climb at 830fpm and the ASI is indicating 106/110kph (sixty knots or so) with the engine running at 5,170 rpm and 28.7in.

We soon level-off, as we can't go over 1,500ft above the airfield, and keep the speed at around 140kph, staying in the circuit for a touch-and-go. Setting the flaps, we fly short final keeping the speed at 120 and, reducing the power to

## Performance update

The aircraft I flew prior to the pandemic was a working prototype, missing wheel spats and gear fairings etc, and the final choice of propeller was yet to be fitted. Since then, according to Luca Morelli the aircraft has been fine-tuned and a Rotax 912iS installed, giving a "real" 100hp. The performance of all models, especially the retractable-gear variant, has been considerably improved, he says.

According to Luca, the definitive UL version (fixed gear, fixed-pitch prop, Rotax 912ULS engine) cruises at 105 knots, has a top speed of 119 and stalls at 35. Performance data for the Advanced model are given in the specification table. If somebody wants more, the 'fast-wing' HS variant is claimed to be capable of 143kt on Rotax 914 power.

idle, allow the speed to taper off to touch down at 100. Applying full power, it is back in the air in a matter of seconds.

We now climb away from the airfield and level off at 3,500ft for some upper-air work. The aircraft has so far performed flawlessly, being easy to fly, feeling just right and responding promptly to control input. Once we're

One further virtue of the advanced model is more extensive glazing, making the aircraft look a little like a Fw190 crossed with a Lamborghini Miura

stabilised straight and level, we apply full power and the aircraft accelerates to top out at 196/200kph (around 108kt) IAS at 5,550 rpm/26.1in.

Even the power-off stall recovery is a no-brainer: wings-level, the aircraft just drops its nose a bit, picks-up speed... and that's it. It behaves the same way with flaps extended and power on, just a bit more rapidly.

#### TO SUM UP

Luca Morelli and Aero & Tech's NEXTH aircraft really is different – many competitors claim this, but very few are able to deliver something as radical. The closer you look at aircraft, the more user-friendly it becomes. Designing it from scratch, Luca has been able to incorporate a large number of safety features, some obvious, many hidden. Yes, the NEXTH does look sinister, but it turns out that this characteristic is confined to its appearance, as it is easy to fly and as docile as a lamb. Almost all its sometimes rather strange features are included for practical and safety related reasons, rather than being there just for the 'optics'.

The aircraft nevertheless is an eyecatcher and the price – especially for the kit version – is appealing too. I really think it will find a place in the market, by virtue of being a safe rugged ultralight that stands from the masses. It might after all be your NEXT aeroplane!



Like a Bat(mobile) out of hell? Not fair – the NEXTH, seen here in advanced, retractable undercarriage form is the product of careful, intelligent design (but it doesn't hurt that it looks such a badass thing, if only to catch the eye)