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Daher TBM 930



Safety taken to a new level?
Jacques Callies flies Daher's latest
TBM, a \$4.1m turbine single,

a much-enhanced
version of the TBM
900 – with a little help
from an electronic
co-pilot, developed by Daher
hand-in-hand with Garmin

The TBM is an aeroplane whose name fascinates. I have followed its development with both attention and pleasure since the 1990 launch, when it redefined the concept of a business aeroplane. At that time, it called for a lot of nerve to come up with a new vision of a small, pressurised business aircraft powered by a single Pratt & Whitney turboprop, cruising at nearly 300kt at FL300, and piloted by the man who pays the bills, namely its owner.

At the time, the concept was revolutionary, but was rapidly accepted; personally, I was immediately persuaded that a private pilot with an instrument rating – properly trained and sticking to the correct procedures – would be perfectly okay at the controls of this aeroplane... which is why I never turn down the chance to fly the aircraft, irrespective

of my timetable. It's quite simple: the TBM seems to enhance your talent and imagination, building the desire to fly more and more. This aeroplane is not just a rapid form of transport, but a flying carpet inspiring the desire to travel. Is this the reason why so many businessmen use the TBM to fly their families around the world?

Almost exactly two years ago I wrote a story having flown the then new Daher TBM 900, it had required three years of development work carried out under the greatest secrecy by a team of 125 engineers and technicians. Working heavily with 'Conception Assistée par Ordinateur' (CAD) computers; they lightened the fuselage before optimising the aerodynamic details, then used composite materials to create complex and precise forms where needed: propeller blades, the nose to firewall profile, air inlets and cooling outlets,

the inertial separator, air vents, main landing-gear doors, winglets, fin leading-edge... all received attention

The result of all this work was to make the aircraft more efficient, to enhance performance and reduce both its noise and carbon footprint. But that's not all, the engineers also worked on the aircraft systems and achieved a number of significant improvements such as: the pressurisation; simplified turbine fire-up with an automatic starting system; torque limiter to prevent overspeeding; a dual 300A electrical power supply in lieu of the 200A system and backed up by a 100A standby alternator that can continue to supply enough power for all the systems – even the de-icing system – should one of the main supplies fail. Further, the cockpit was redesigned with particular attention to the needs of larger

pilots (many of the TBM's sales take place in the US), the pilot's flight controls, engine controls and all the push-buttons; the circuit-breakers were rethought and modernised. In my opinion it was the ultimate TBM.

So is this still the case after the arrival of the TBM 930? Which is why Daher now talks of a range of aeroplanes – customers can order either the 900 or the 930, a significant change for the Tarbes based company, and almost certainly the signal for the start of a growing range of TBM offerings. That's encouraging and reminiscent of the golden era of the 1980s where the company manufactured the TB-9 Tampico, the TB-10

Tobago, the TB-20 and TB-21 TC Trinidad, the TB-30 Epsilon trainer for the French Air Force and the famous TBM 700.

So the TBM 930 adds an aircraft to the range rather than replacing the incumbent – the TBM 900 received automatic flight control and software-based safety enhancements, and it remains available as a model for buyers who want the G1000 system rather than the latest G3000.

Six-screen view

To produce a new class of aeroplane calls for a major effort combining organisation and investment, as was described to us by Didier

Kayat, Daher's new CEO whom we met at Tarbes in company with the company chairman Patrick Daher, and several Government movers and shakers including Alain Vidalies, Secretary of State for Transport, and Patrick Gandil, the Director General of the French CAA (DGAC). On March 25, Tarbes was plainly the place to be to witness the action.

But let's get back to the subject in hand, because we're not interested in social events, are we?

I like surprises and that morning I'd flown towards the Pyrenees from Toussus with no idea of what awaited me. If you are offered the first



You can see more photos from this feature on the iPad and Android edition of FLYER and on the Editorial Extras section of the FLYER forum at forums.flyer.co.uk

Garmin's G3000 has the capacity to provide amazing situational awareness, but to get the very best from it you'll need know the system inside out



bite at a story from a company like Daher there's no point in hesitating. I had heard vague talk of an 'e-co-pilot', an electronic co-pilot, but the concept seemed to be pretty hazy – after all, for some time our iPads have done duty as co-pilot, equipped as they are with navigation software, flight logs, the weather and various data providing answers in response to a couple of finger taps. I walked into a hangar where stood the TBM 930 protected from curious views by a simple red DO NOT CROSS barrier! Sales and service manager François Blumé was waiting for me and he started by drawing my attention to the various details: the new leather seat design, the cabin lining, the build quality.

It's easy for a pilot like me (who sadly isn't about to spend over \$4m on a new aircraft) to gloss over this kind of thing, but it is obviously important for someone about to invest a significant sum in an aircraft... I once met a guy who insisted that no less than 80 incredibly minor cosmetic details were sorted on his Learjet before he agreed to take delivery... but having flown a number of Dassault, Embraer and Cessna bizjets, Daher certainly didn't need to worry about the quality of its interior finish, but nevertheless it has taken the new interior to a higher level.

The real difference with the 930 is better seen from the two front seats where you'll find a

significant number of changes, the most obvious of which is the redesigned panel of a G3000 that's been tailored to Daher's requirements in collaboration with Garmin. The G3000 instrument panel now has three, wide-format, WXGA displays that can operate in the split-screen mode, enabling maps and flight plans to remain on the screen side-by-side with primary, traffic and weather information, the three twelve-inch GDU1200W screens sit above two GTC580s touchscreen control panels. The associated autopilot is a Garmin GFC700 whose control unit is located under the central screen, where it is perfectly accessible from either the left or right seats. My



Material and detail changes bring even more luxury to four club seats in the rear

It's tough to beat the combination of 300kt and the ability to land on the short runways that aren't available to jets

first impression was that this was heavy stuff; the new glass cockpit has a strong resemblance to that in the Phenom 300, other than the arrangement of the touchscreen control panels.

By providing the ability to split each of the screens, thereby providing six different panes or windows, the pilot really does have an abundance of choice in how the cockpit and its information is configured.

Acoustic warnings

While the screens are undoubtedly impressive, it's the systems behind them that bring the real world benefits during critical phases of flight. Daher

has joined other manufacturers in implementing Garmin's ESP (Electronic Stability and Protection) which works to prevent the aircraft stalling, overspeeding, or achieving an excessive angle-of-climb or descent; it also ensures automatic descent in the case of a depressurisation event that is not detected by the pilot or crew. During any conversion to type, the future TBM pilot will have to revise his technical vocabulary and understanding to include Angle-of-Attack (AOA), Electronic Stability and Protection (ESP), Underspeed Protection (USP), Pitch Limit Indicator (PLI), Emergency Descent Mode (EDM) plus a few other words in common parlance – this will

be particularly important for non-native speakers as the new system (installed as a standard option in both the TBM 900 and 930) gives acoustic warnings in plain language for maximum efficacy, so you can expect to hear things like "Use oxygen mask... Stall stall... Overspeed overspeed... Landing gear landing gear..."

For my flight, I am pleased to find myself once more alongside chief test pilot Stéphane Jacques, a remarkable pilot whose simple demeanour conceals a wealth of talent and experience acquired on the Mirage F1C fighter, followed by the French EPNER test pilot school at the CEV flight test centre. He is a happy man and when I

ask how he is, he says, "Couldn't be better! I did two test flights this morning and now I am off with you for a third." He is a generous man, because when I ask him to keep a close eye on me since I have not flown for some long time, he says, "Really? Didn't I see you arrive today at the controls of a Mooney?" My kind of pilot. I am accompanied by our photographer, Jean-Michel, and Frédéric – a friend from a local flying club who I plan to introduce to the fun of gentle gyrations in the Mooney, followed by a quiet flight in the TBM – and by Tony Thoma, VP Marketing and Communications at Daher. This means we will be five on board with full tanks, bringing us close to

"the pilot really does have an abundance of choice in how the cockpit and its information is configured"

the max weight as displayed by the FMS. The plan, with the help of the local radar unit, is to climb right up to max altitude of FL300 (30,000ft).

Getting things going is a simple case of hitting

start, introducing fuel when Ng reaches 13% and making sure that the ITT doesn't exceed 870° (that would be an expensive mistake), the pressurisation system is set simply by entering the altitude of the destination airfield (in this case we're coming back top Tarbes, so 1,260ft) in the Garmin's FMS.

There's 850hp immediately available for take-off and with an active torque-limiter (for all flight regimes), there's no need to worry about over-torquing the engine. I advance the power lever and on reaching 85 Kt indicated ease back on the yoke and we're in the air. With the gear up it is time to focus on Vy – exactly 124KIAS, that level of



Buyers have a choice, identical airframes and engines but the 900 with G1000 or the 930 with G3000 avionics, the latter commanding a \$200,000 premium

accuracy seems like a job for the autopilot, so the GFC700 is engaged in Flight Level Change (FCL) mode and set to climb through the cloud at exactly 124KIAS. With nothing to see outside, and nothing to do inside, we talk while adjusting the torque whenever we think about it. There was no plan to scream for height as fast as possible but 17 minutes after take-off we level off at FL300.

Impossible to override

Still in cloud and with nothing to see. Stéphane turns to the passengers and asks them to put on their oxygen masks. This surprises them somewhat, but after a moment's hesitation, they are all correctly masked. He tells me to depressurise the cabin using the dump valve. This seems to me to be a bit risky, but I do as I'm told and at once the alarm is heard: "Use Oxygen Masks" and the TBM automatically switches into Emergency Descent Mode, turning left 90° to leave the airway that we have been following while maintaining descent at 265KIAS and then

levelling in the cruise at 15,000ft amsl.

We then climb back quietly towards FL200 with our masks on and the temperature and pressure change rises to acceptable levels. Back in the cruise, Stéphane tells me to disconnect the autopilot and do a steep turn; given that we're at a fairly high altitude and in IMC, this suggestion comes as something of a surprise. I proceed with caution, but backed by vigorous encouragement I reach 45° bank, but then there is no more I can do; in spite of my efforts the controls countermand the action and the wings return level, with the ESP system switched on (its default setting) it is impossible to initiate and continue an accidental turn.

As we are still in hand flying mode, Stéphane tells me to start a full power descent at up to the Vmo, the maximum speed in normal use of 266KIAS, and to go through it. Once again, I feel uncomfortable because this is an unusual manoeuvre that can become very expensive indeed. So I progressively push the horn forward

and watch the ASI advance, but on reaching the red line there is a sudden audible warning "Overspeed". Instructed by Stéphane, I continue to push but, the yoke moves back and the TBM's speed quietly bleeds off. Phew.

Meanwhile Stéphane's fertile brain has come up with another wild idea: "Just imagine that you were a thoroughly distracted pilot trying to claw for height with the power lever set to idle." So there I am with the power lever right back, still in IMC and pulling on the yoke. I'd entered the manoeuvre with an excess of speed thanks to the Vmo demo but the speed was decaying quickly, now clear of cloud I look out of the window to see that both the angle-of-attack and angle-of-incidence are becoming excessive. Above the flight director now appear symbols that look a bit like moustaches in the shape of a rake, these indicate the limits of the flight envelope. I have pulled hard as possible on the yoke at the risk of stalling. But with the warning "Airspeed" the yoke moves forward and reduces pitch, reminding me



There's no problem with manual flying, but generally the TBM 930 is an aeroplane that's operated through the touchscreen controls and GFC700 autopilot

of the sensation of a twin bizjet with a stick-pusher to prevent a stall.

I am absolutely flabbergasted by the profound impression of all-round safety. Even with Stéphane at my side, certainly the most gifted of instructors, I dared to do pretty much anything in IMC conditions in a three-ton aeroplane full of passengers. I tried my hardest to fly like a novice pilot with no aeronautical empathy! My conclusion is simple: despite trying, the TBM 930 gave me no chance to asphyxiate my passengers, or to enter a spin, even less to lose a piece of aeroplane. The feeling of safety is absolute. The others, Tony, Frédéric and Jean-Michel have all been instructed to remain strapped in. They were not scared for a single moment, maybe due to the fact that we were wrapped in a blanket of cloud concealing the reality and ignorant of our extreme attitudes. We head back to Tarbes, which is child's play with the G3000. I set up for the ILS Z to R20, Stéphane suggests I try the Go Around/Missed Approach function. On approaching decision height, I press

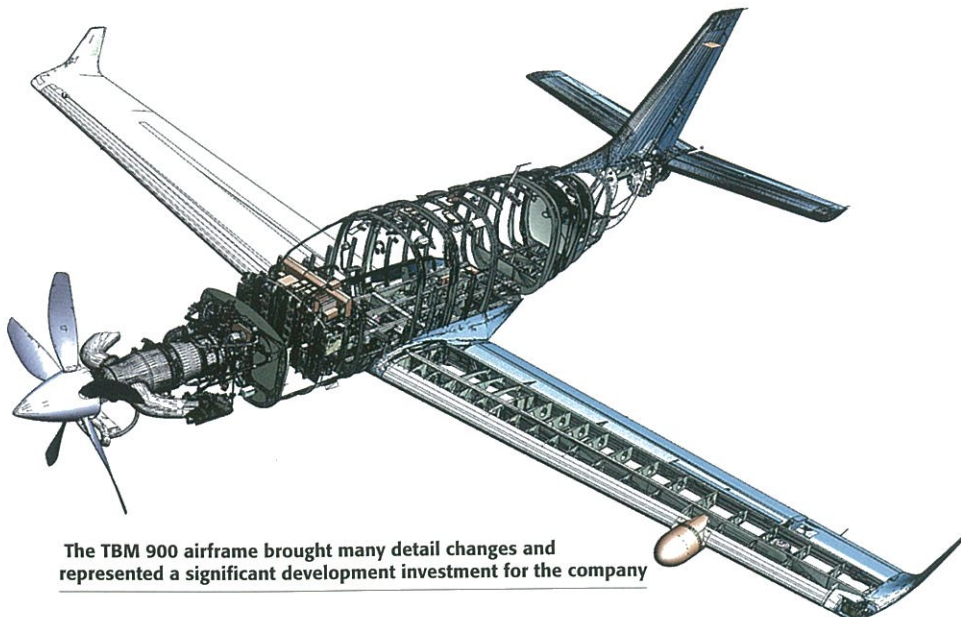
on the GA button located on the power lever while advancing to full power and the aircraft switches to the missed approach trajectory.

Unfortunately, all good things come to an end, I resume hand flying and put myself in position for a visual approach. The aircraft remains easy to fly right down to the moment when the wheels kiss the runway.

Before leaving, I met Daher's head of aviation Nicolas Chabbert, who expressed his great satisfaction at the way his team had worked so well with Garmin, and had developed and certified the 930 with EASA and the FAA in only 18 months. "Not only can customers try the TBM 930, they can also buy it." Daher has already received a number of orders and the day after our visit one TBM 930 was heading to the United States flown by Stéphane Jacques. Happy man...

The idea of developing another line to the 900 was a good one, because it enables the customer to choose between two glass cockpits. Personally I think that the private owner/pilot will stick with

the G1000 while corporates or those operating the aircraft routinely with two crew will go for the G3000. Ian Seager, publisher of **FLYER**, doesn't share that view and believes that the vast majority of aeroplanes will be leaving the factory with the G3000 avionics. Whoever is right, perhaps what's more important is that Daher Socata is no longer a one-aeroplane company, the TBM 930 is an addition to the range and I'd be surprised if it was the last. ■



The TBM 900 airframe brought many detail changes and represented a significant development investment for the company

TECH SPEC

TBM 930



■ DIMENSIONS

Wingspan.....42ft 1in (12.83m)
Length.....35ft 2in (10.74m)
Height.....14ft 3in (4.36m)

■ WEIGHTS & LOADING

mtow.....7,394lb (3354kg)
Empty weight.....4,623lb (2097kg)

■ PERFORMANCE

Max cruise speed (28,000ft).....330kt (mph)
Climb to 31,000ft (at mauw).....18min 45sec
Max range (45min reserve).....1,730nm

■ ENGINE

Pratt & Whitney PT6A-66D 850shp

■ SEATING

6

■ PRICE

\$4.1m

■ CONTACT DETAILS

www.tbm.aero