



How Tobagos and Tampicos are made

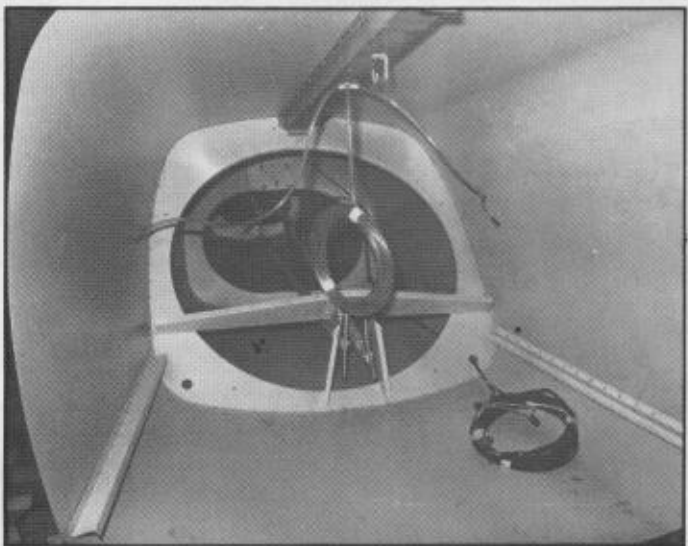
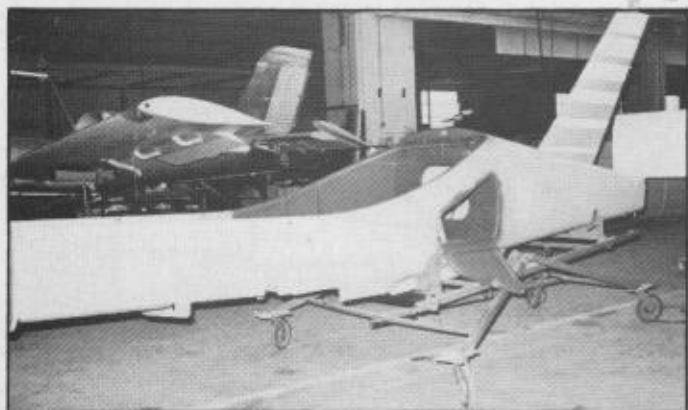
In a way the Americans would say was impossible, discovers Alan Bramson on a visit to the SOCATA factory at Tarbes.

When **Aerospatiale** brought out their Tobago/Tampico lightplanes they claimed these aircraft were built to the same engineering standards as their large military and civil ironmongery — even Concorde! It sounded to me as though our French mates were gilding the lily. UK distributors for Rallye aircraft (and that includes the Tobago and the lower-powered Tampico) are Air Touring Services at Biggin Hill; and it was while visiting that emporium that I told MD Bob Cleary: "You have got to be joking about lightplanes being built to the standard of the Airbus". As a result I was invited to visit their factory at Tarbes (near Lourdes in the foot of the Pyrenees).

Aerospatiale is (like British Aerospace) a nationalised giant formed by amalgamating a number of once-famous names. While BAe swallowed de Havilland, Blackburn, Avro and Vickers, Aerospatiale devoured Morane Saulnier, Dewoitine and many others. The group makes some of the finest choppers in the world, an outstanding bizjet (the Corvette) that should have done better,

guided missiles — and also has a big stake in Airbus Industry.

Light aircraft manufacture is handled by their SOCATA division. One cold day we departed from Biggin Hill in a chartered Cessna 310. Like French mustard (which I believe is something they invented for the British), all that twaddle about our vile English weather is another manifestation of the Gallic sense of humour. Time and again I have flown out of the blue skies of Kent to the clag and cumins of *la belle France*; and this trip was a typical example. Nearing Tarbes the air traffic controller cleared us down to "Flight Level two zero". "There is no such animal" answered our pilot. "Affirmative. Flight Level two zero" insisted the man at Tarbes. "I say again — there is no Flight Level two zero" replied our equally-insistent pilot. There followed a long pause before: "Correction, three zero". From such incompetence accidents are born. I am not impressed with the standard of air traffic control at Tarbes: an inexperienced pilot in this particular case might well have attempted a descent through cloud to 2,000 feet — and hit the mountains as a



Facing page: the main lightplane assembly hall at Tarbes.

This page: fuselage construction, looking aft. The structure is astonishingly simple: the Tobago/Tampico has only 800 parts — less than half the number in the average single.

result. The weather was not good that day, yet we had to wait almost ten minutes before Tarbes Approach was able to give us the airfield weather. And when we left two deer ran across the runway, one of them missing us by a few metres; there'd been no mention of deer by the Tower.

If I do not think much of Tarbes ATC that cannot reflect on SOCAT. The white-painted factory (which originally belonged to Dewoitine, the famous fighter manufacturers) was built in 1929. I had always imagined that the plant at Tarbes was confined to building lightplanes, but not a bit of it. Here are some of their activities:

- manufacture of fuel tanks for Mirage fighters; Alouette helicopters and Rallye aircraft;
- manufacture of Dassault Falcon 10, 20 and 50 airframe sections;
- manufacture of various major airframe sections for several Mirage fighters;
- making airframe sections for the Alouette range of helicopters;
- fabrication of Airbus parts;
- overhaul and re-building of Morane Paris light jet aircraft;
- design, manufacture and development of the new Paris Epsilon military trainer.

Having seen all these widely-differing activities in progress alongside lightplane manufacture, I have been forced to abandon certain long-nurtured strongly-held beliefs about aircraft manufacturing practice on both sides of the Atlantic. The Americans claim that it is uneconomical to build light singles under the same roof as twins: multi-engine technology sends up the overheads and it becomes impossible to make cheap singles in such an environment. Our cousins across the pond are not alone in this belief: whenever I visit Hatfield they make ready to counter my usual bleat: "You built your company turning out Moths like sausages. When are you going to make lightplanes again?" Always I get the same answer: "My dear chap! Think of our overheads!" So there you have two diametrically-opposed beliefs.

I learned that no machine at the Tarbes factory is more than seven years old. Some of it — like the massive stretch formers and the computer-controlled milling-machines which cut intricate shapes out of solid metal, is beyond the reach of even the leading light aircraft manufacturers. These machines (installed at the factory to produce components for expensive airlines, jet fighters, helicopters and big jets) cannot be thus utilised for every second of every minute of every hour of the working day. So sure it makes sense to use them on other projects rather than have plant standing idle but still costing money in depreciation, insurance and factory space.

At Tarbes parts for the Rallye range (both the familiar be-slatted tin parachutes and the new Tobago/Tampico) are made on the same machines as the big expensive aircraft. They are cut, pressed and finished to the same standard, go through the same anti-corrosive plant, and are treated with the same care and attention as everything else coming through the shops. A prime example of this is the Tobago/Tampico main spar. Usually spars for even larger general aviation aircraft are fabricated from light alloy sheet to which are riveted extruded top and bottom booms and a series of vertical stiffening members to prevent the spar web from buckling under load. My first indoctrination at Tarbes was when I was shown the main spar of a Tobago: it is machined from solid metal on a computer-controlled milling machine just like the spars for the Airbus or modern jet fighters. There are no joints, no rivet holes (which must surely weaken the metal), and the standard of finish is of the highest order.

As I was shown around the factory it was at first difficult to understand what was going on. On one side were Mirage fuselages, —



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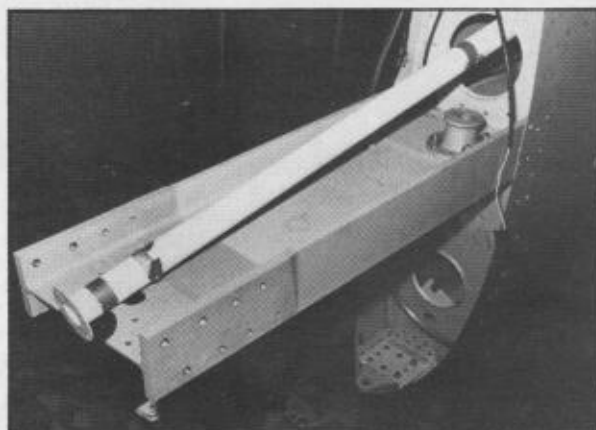
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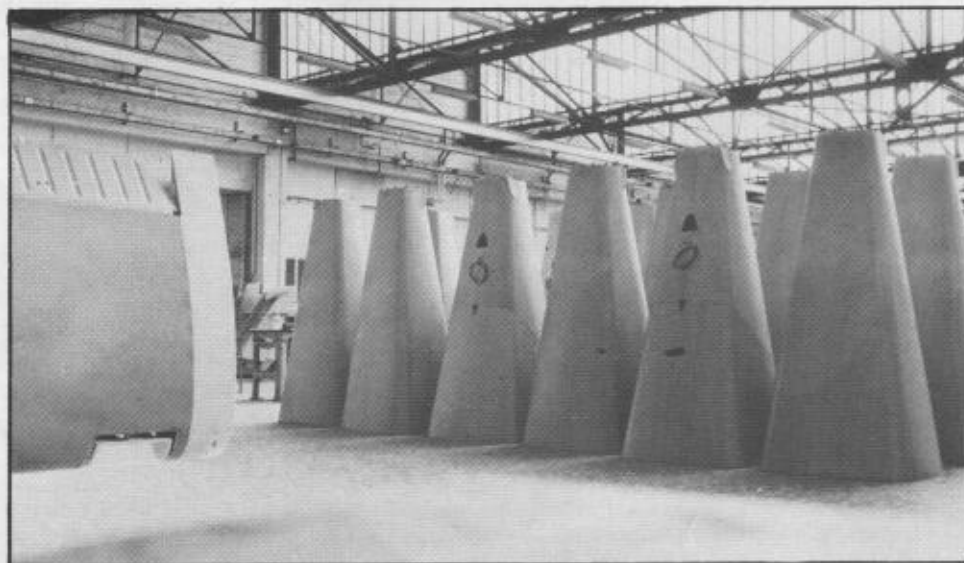
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Continued



Top: a stack of Tobago spars — these are machined from solid by a computer-controlled milling machine. Left: main spar root and an aileron push rod. Below: stack of rear fuselages awaiting installation — the aeroplane's construction is based on five modules which are built and stored pending orders.



while on the other were helicopter assemblies. Then it became clear that the factory floor was laid out in lines, and the various jigs, benches etc. were colour-coded according to the product. At intervals large pots of shrubs and flowers were growing, and at one point was a rock garden complete with miniature waterfall. The factory walls were covered in large colour pictures of mountain scenes, forests, rivers, etc. The Tarbes factory may be an old building, but the management has gone to some lengths to introduce attractive decor into the operation.

The plating and anodising shop is ultra-modern, and a comprehensive extractor system totally removes the usual pungent smells one associates with this kind of plant. From the anodising bath light alloy parts go to the yellow chromate spray shop for further anti-corrosive protection. Such treatment is standard in Rallye aircraft, and (equally important) chromate is applied before the parts are joined together — not after riveting when aluminium oxide may form between metal faces that have been unprotected through spraying after assembly.

I was told that eighty percent of the factory is devoted to non-general aviation manufacturing, and the remaining twenty percent involves making bits for the lightplanes and assembling them in a single bay of the works set aside for the purpose. A limited range of the old Rallye aircraft continues in production; by now over 3,500 have been built.

One cannot but be impressed with the simplicity of the jigs used for fabrication and assembly of the Tobago and Tampico. The various parts — wing spars, ribs, fuselage formers etc. — arrive from the main factory where bits for the big aircraft are manufactured and corrosion-proofed. In a shop running down the main hall is an area where the wings are manufactured around the beautifully-machined spar. The Tobago is a remarkably simple airframe using only 800 parts — as opposed to the usual more-than-2,000 for similar light singles. From the start of the project SOCATA aimed to use car equipment whenever possible, but the company has been disappointed with the general level of reliability experienced. Other than problems with leaking door seals (which were replaced free of charge in the field by Aerospatiale engineers),

and the change from plastic to metal prop spinners, the only other problem in service has been the original engine instruments — a set of vertical read-outs made by a Japanese firm for the car industry. These have now been replaced by better-quality equipment.

Tobago/Tampico manufacture is based on five modules which are built and stored pending orders. Equipment is installed during assembly at a time when (for example) the front cabin area is particularly accessible and unencumbered with roof structures, seats and the like. Ten to fifteen days are required according to the scale of equipment specified. From May 1979 to date more than 200 of these very attractive tourers have been built, and production is currently running at around ten per month. SOCATA claim to have captured 25 percent of the European market for this class of aircraft, and 30 percent of them are sold in France.

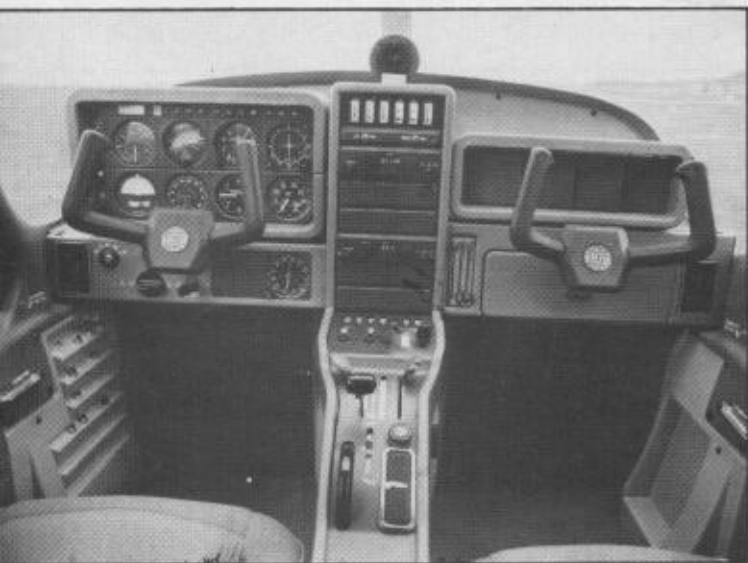
The Tobago and the Tampico are such good value that knockers are inclined to mutter darkly of French government subsidies. However SOCATA has been profitable for the last five years. And from doing its utmost to encourage light and general aviation the French Government is now going to the other extreme and threatening to charge an annual £100 tax on low-powered aircraft. Far from them benefitting from government subsidies, we may now witness the discouragement of French light aircraft manufacture at the very time it is about to take off — something British governments cannot do, because successive ones have already killed off our once-splendid lightplane industry.

At present there are about 6,000 light aircraft in France, where the attitude of sporting pilots is slightly different to ours in the UK. It is not uncommon in France to find light aircraft flying without a full instrument panel and the minimum of radio. Now there is a move towards better equipped tourers.

When I tested the Tobago and the Tampico (*Pilot*, August 1979 and June 1980) I thought the elevator trimmer a rather spongy imprecise affair; and I was pleased to learn that this is now being modified. Also I complained that the triangular door to the baggage compartment was too small: this too is being looked at with a view to possible enlargement. Certainly there are no structural reasons



Ten to fifteen days only are required to complete the aircraft according to the scale of equipment specified. Some 200 have been built, taking 35% of the market in that class, with 70% exported. Production is presently ten a month.



why it should not be made bigger.

While at the factory I suggested that SOCATA should try a fixed-pitch version of the 180 hp Tobago. Unless there is a serious decline in performance (and I suspect there may not be) the reduction in purchase and maintenance costs would be worthwhile. I was told they are working on improving the take-off performance of the 160 hp Tampico; but the most interesting news is the construction of a 235 hp retractable version. It is based on a standard Tobago airframe, and the introduction of disappearing legs has presented few problems because the aircraft was designed from the start with stretch capabilities in mind. It is as yet undecided whether production versions of this model will have a 235 or 200 hp engine, but estimated figures for the higher-powered version are a 75 percent cruise speed of 157 knots, a rate of climb of 1,100 feet a minute and a with-reserves range of more than 800 nm. No doubt some will feel that these capabilities reflect little if any improvement over the Piper Comanche 250 of almost thirty years ago; but it should be remembered that the Tobago has a very much larger cabin — bigger in fact than some family cars.

Recently a Tobago was on a tour of Canada, and it will be interesting to see how it is received in the most air-minded country in the world — per million population Canada has more pilots than

How Tobagos and Tampicos are made

Continued

any other nation. There are also plans to enter the American market, but (wisely in my view) SOCATA has decided to get all the bugs out of the aircraft in Europe where their own engineers can deal with the problem. However there have only been the few minor snags already mentioned, so the future looks bright for these tourers.

During my tour of the factory I was shown the Epsilon, the new military trainer designed and built by Aerospatiale to the requirement of the French Air Force. Jean Quiquempoix, Design and Technical Director of SOCATA, was frank enough to admit there

were problems with the aircraft which had not been experienced with any other design. He described the trouble as "a Dutch roll — without the roll": a tendency towards an unstable condition in yaw and pitch. A re-design of the rear fuselage was in progress when I saw the two prototypes. No spinning has yet been attempted but the test programme will soon be resumed.

When I suggested that because of its wing planform the Epsilon must handle like a World War II fighter rather than a swept-wing jet, I was told it had the characteristics requested by the French Air Force, and that these include a high wing-loading to reproduce military aircraft landing behaviour.

So there we have two stories of a conflicting nature. The British and the Americans say it is not possible to build inexpensive light singles in a high-technology factory turning out multis and jets. Aerospatiale say you can. Certainly their Tobago and Tampico offer remarkable value and the highest standards of engineering. I think we are wrong and the French right.



Tampico (left) and Tobago (above) are externally indistinguishable. The Tampico has a 160-hp Lycoming driving a fixed-pitch prop; the Tobago 180-hp and constant-speed. Coming soon is the Trinidad (below) with 235-hp and retractable gear.



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