

TAILLESS AND F3B

Carl R. Illinik, of So. California, asked in a recent letter, "If flying wings are so good, how come they're not blowin' 'em away in F3B?" An excellent question, as there is no technical reason for a tailless sailplane to do any less well than a conventional design. From a practical standpoint, however, there are a few good reasons.

First, 'wings fly faster than conventional sailplanes of equal wing loading. If a sailplane has a glide ratio of 25 to 1 and travels forward at 25 feet per second, it will drop at 1 foot per second. If it is traveling at 50 feet per second it will drop at 2 feet per second with that same glide ratio of 25 to 1. Translated, this means if our 'wing and a conventional sailplane have the same glide ratio and are launched to the same height in "dead" air, our 'wing will be on the ground first. But it will have covered the same distance as the tailed airplane. This is not a problem in the speed or distance tasks, but it is a problem in the duration task. The new flying wings we've been seeing tend to have better glide ratios than tailed 'craft, however, so this first disadvantage is at least partially offset. The new 'wings also have camber changing capability, and as a result their scores are going up. So "practical" seems to be getting closer to "technical."

Second, although tailless performance is now very good, there is also little doubt that we still have some problems with the planform itself. We need some hard data on airfoils (particularly those with low C_{m} and high lift), sweep vs. cross span flow, and camber changing devices which are more effective. Control systems need improvement. And because of their higher speeds and lower drag, 'wings will always need landing aids in the form of flaps and/or spoilers. So there is much yet to do in the way of advancement.

Third, we Americans tend to see F3B as only that which happens at the World Championships. Allow us to explain that statement through a single example...

The F3B pilots in Germany are rated according to a class system, and the German pilots going to the World Championships are the country's top flyers. The Germans do not fly thermal duration very much at all, they fly the F3B schedule almost exclusively, and this gives them a lot of practice in competition. The German team at the WCs, therefore, consists of the top three pilots of the last two years, and they are well practiced. Tailless F3B machines have simply not yet "come up through the ranks" of the German system. They're actually doing quite well at the local level.

Fourth, and getting more directly to the question, the top European pilots tend to be conservative when it comes to sailplane design, and are thus flying conventional tailed aircraft. The 'wings entered in competition are being flown by good pilots, but certainly not Europe's best. There was a flying wing at the '87 WCs, not entered in competition. It impressed the likes of Ralf Decker and did a 26.4 second speed run during a demonstration. Now 26.4 seconds sounds pretty good, especially when compared with the speed runs we witnessed at the NATS in Richland this summer. But, the top European pilots are consistently flying the speed run in under 21 seconds, sometimes under 18, and the record is 14.6 seconds, or some such thing, flown at a German meet.

It is our impression that current 'wings are capable of the performance required to win, but piloting skills need improvement.

The bottom line is this: Until an excellent F3B pilot can wring astounding performance from a tailless sailplane, we will continue to see tailed aircraft dominate F3B. Of course there's also the possibility that tailless sailplanes, once they dominate F3B, will be outlawed from competing in the event. Should you doubt this, look at the history of RC pylon racing!

On a slightly different but related note, Dr. Helmut Quabeck was recently asked what he thought the F3B machines of the future would look like. He drew a 100" span V-tailed canard(!), so maybe there is some movement away from conventional aircraft after all.