

## Winglets vs. a Single Central Fin

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In looking over some photographs and contest descriptions in recent issues of *Silent Flight* and *Flug- und Modelltechnik*, we suddenly came upon some information which may be of use to designers of swept wing tailless sailplanes.

We noticed nearly all swept 'wings in European competition fall into one of two categories. They have either two fins, one at each wing tip, or a single central fin mounted on a boom. In the descriptions of the contest winners, those with two fins were characterized as the better thermal performers, while those with a single fin were said to track better in straight line flight.

There are a couple of logical reasons for this:

- Fin area mounted at the end of the wing acts as a winglet, increasing the effective span and preventing formation of a large vortex from the wing tip. This increases the potential  $C_{Lmax}$  — just what's needed during thermaling.
- A single central fin provides more directional stability because its surface area remains further behind the CG during yaw, thus providing greater leverage in a more consistent manner. It has no way of affecting the air flow over the wing tips, however.

If you are designing a thermal duration or F3J 'ship, place the vertical fin area at the wing tips. If you are designing a 'ship which will be flying at higher speeds and in straight lines, a single central fin is probably best.

As two of three F3B tasks involve primarily straight line flight and only one task involves thermal duration, it seems a single central fin may be best for that event. But what about F3F? In this event, high speed flight and good tracking are very important, so a single central fin looks like a good choice. High g turns with maximum ballast, however, require sustained  $C_{Lmax}$ , and this task is better suited to winglet equipped 'wings.



Penumbra.3 at 60 Acres. Photo courtesy of Bruce Abell.