pilot report

THE ACROSTAR

By Dr. Urs Meyer

The comparison of the Eagle, the Pitts and the Acrostar that was published in a recent issue of *Sport Aerobatics* has led me to give some more information on the Acrostar, which may be of interest to the reader who in most cases may never have seen this airplane.

Nine Acrostars have been built during the years 1969 to 1973 — mine carries Nr. 4009 and is the last ever produced. The Company Wolf Hirth Gmbh, Nabern/Teck, Germany, still has all tools and a complete set of materials for at least one more airplane, but there is no chance that it will ever be completed due to the high price this latecomer would cost, probably about $90,000. Of the nine planes, two were exported to Switzerland and are still in frequent use. These two have been modified and reportedly behave very well — although being a Swiss myself, I have never seen one of them because they are operating in the French speaking part of this country. Two planes are still in Germany, one of them is mine. One is still operating in Spain, where a second one has been wrecked on the ground while taxiing. One plane was exported to the United States, but its present location is unknown to me. Two planes have crashed due to mistakes on the side of the pilot.

The Acrostar panel: in the center fuel and oil pressure gauges. On the right side manifold pressure and rpm indicator, on the left airspeed and altimeter, climb/descend and G-meter. Most indicators are metric. Throttle and rpm levers are left, mixer and manual fuel pump right.

The unique feature introduced by the Acrostar is certainly the integrated control system. By a very ingenious mechanical linkage, the movements of the elevator, the ailerons and the flaps are interconnected. First of all, let's look at the ailerons and flaps: stick to the left gives a full movement of the left wing aileron to the upside, while the right wing aileron goes completely down. The flaps follow, but with half way travel only. On the other hand, if the stick is moved back from central position, the elevator goes up on the rear end, while both flaps move completely down and the ailerons follow halfway. All movements are completely symmetric, so that the plane has virtually identical behavior in normal and inverted flying attitude. The controls are all totally balanced and connected by pushrods and spherical bearings, so that there is no recognizable play, and the stick is holding in any position on ground.

Due to this interlinked controls, the plane has some unique characteristics that make unconventional handling necessary for take-off and landing. In principle, it is probably easier to control than the Pitts. For take-off, the plane must be held straight by the brakes for the first feet of rolling, while power must be applied very slowly. The slipstream effect is very strong, and may be enhanced by the prop that will go to high pitch with a certain delay when the throttle has been suddenly opened. This effect has displaced me several times about 40 feet to the left side when I started to learn flying this plane — until I recognized the reason by careful analysis of what had happened.

Another special feature on take-off is that the stick is firmly held in a near-fully pulled position. The airplane will accelerate in the tail-to-ground attitude until liftoff, which calls only for a 300 feet ground run. Whenever the stick is given way forward, the plane just tends to jump, because this at the same time lifts the flaps and consequently reduces wing lift.

As to landing, I was told quite controversial things by the experts before trying to fly the plane. One person told me to keep to grass runways of ample width by all means, so that a turn-around would do not much damage. Another just cautioned me against using grass strips, due to a certain weakness in the fixture of the tailwheel, and advised me to land only on smooth concrete runways. Well, after all, I didn't have any choice: the airodrome where my Acrostar found a convenient home has a concrete runway of 2500 feet by 50 feet.

For landing, a long lineup on final is preferred, because the rate of descent is controlled only by stick and by throttle, and the speed has to be watched carefully because the plane has only a marginal speed difference between a warning shake of the stick and the final drop into the spin while stalling. In fact, power-off stall takes place exactly at 55 KIAS, so that the approach speed is about 80 KIAS, reduced to 65 KIAS over the threshold. Just after touchdown, which I prefer to do slightly tailwheel-first, the brakes are applied fully to decelerate until a normal taxiing speed is reached. Actually, I found out that the safest landings are done with both heels fully on the brakes already on touchdown. Maybe this will cost some more use of tires and brake pads, but it gives reliable control of direction regardless of the sidewind component. By the way: the manual says that brakes may be fully applied anytime, because the main wheels are mounted so much in front that there is no danger of overturning.

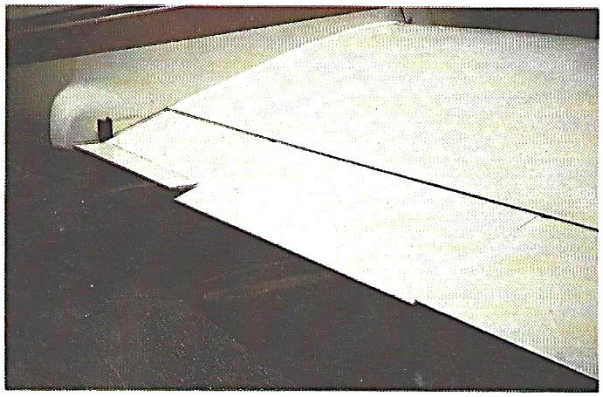
The Acrostar is designed to fulfill all requirements of FAR 23. Therefore, means had to be provided to make control possible even if a failure of the ailerons or the elevator would occur. This might be an academic assumption, but the requirement was met by the arrangement of two trim tabs on the flaps. This will make this plane

The integrated control system of the Acrostar. Upper picture: stick pushed completely, lower picture: fully pulled. Ailerons follow flaps half way. Oil can on tail helps to collect oil from crankcase vent tube, keeps ground clean. Of course, it is removed before take-off!

probably the only one with flap trimming! In fact, while the flaps are directly connected to the elevator, trim tabs on the flaps give a shorter length for the controlling pushrods while serving the same purpose. Because the plane has no dihedral at all, its stability regarding the roll movement is virtually non-existent. In case of the failure of aileron control, it would be possible to control bank by a different setting of the trim tabs on both sides. The overall range of the trim tab effect is quite large: it is possible to trim for landing attitude on the full "tail down" side, over to a full power climb in inverted flight on the full "tail up" side.

Now to some positive properties and some problems of the plane. Of course, you must be aware that I have only about 20 hours of training on it, so my knowledge is quite limited. The Acrostar is easy to maintain, because there is hardly any weak point in the structure, except perhaps the tailwheel mounting. All surfaces are covered by plywood or fiberglass, so there is no fabric

(Continued on Page 24)



The right side flettner trim tab on the flap: upside deflection means downward force on flap and consequently nose up tendency of the airplane. Right and left side trim tabs are independently operated by two levers on the left hand side of the pilot.

PILOT REPORT . . .
(Continued from Page 7)

to take care of. No problem with the undercarriage, that has been borrowed from the Boeklow MONSUN. However, the engine may become a headache for the owner, because the production of the Franklin engines has been shifted to Poland, and there seems to be no way to get parts else than going behind the iron curtain and bribing the persons involved. There is no alternative to this engine, because of its excellent power/weight ratio. One major problem, at least on my plane, is the oil supply. The engine is equipped with two oil pumps, operating both together, one on the standard bottom oil sump and one on the engine top. The changeover from positive to negative G's leads to several seconds of zero oil pressure. The same applies of course in knife flight. So, in order to keep the engine alive as long as possible, I refrain from hesitation rolls and knife flight attitude almost completely.

24 SEPTEMBER 1981

On the other hand, the plane is very easy to handle on inverted spins and flicks. A stable normal spin takes exactly 180° to recover, while the inverted variant takes 90°. Snap rolls are admitted up the manoeuvering speed of 150 KTS, and may be terminated at almost zero speed due to the excellent effectivity of the controls. On the other hand, the roll rate is considerably slower than with the Pitts. The manual states that 3 vertical rolls are possible if started with the maximum speed of almost 200 KTS and with 2800 RPM, which is full power. The speed is probably generally higher than with the Pitts, and the aerobatic manoeuvers are likely to put more and longer G's on the pilot. But if I see the owner of the Pitts in my neighborhood crawling in his seat — I would certainly need some sort of shoehorn — I prefer the ample room in the cockpit I get for my 190 pounds. Moreover, in European weather conditions, the excellent visibility of the single wing airplane is an asset for training aerobatics in reduced VMC.