AFRICAN MINI-ACE

By H. C. Van Rensburg

I WAS ONE OF those millions of chaps in the world who had a latent desire to fly, but never got around to doing something about it until I read the article on the M.I. Mini Ace in Mechanix Illustrated magazine in December 1965. (We get M. I. a month late in South Africa.)

This article started me thinking. It seemed to be so childishly simple to build and fly your own airplane and the Mini Ace was my dream airplane. I decided, as an absolute layman, that I could build a reasonably stable plane that would be suitable for fairly long cross country flights. I did not want a plane just for flying around the patch on Sunday afternoon in perfect weather. I was not a pilot at the time but had about an hour of flips over a period of some years.

I showed the article to my brother David while visiting him in Johannesburg over the Christmas holiday in 1965. David was a pilot with some 50 hours. He learned to fly at the Grand Central Flying Club near Johannesburg but his license had lapsed some years ago because he found flying too expensive.

David was skeptical about the idea of building an airplane and I did not press the matter. About the middle of January, however, I had a letter from him. He was hooked!

We decided to build the CA-61 Mini Ace as a joint project and he wrote to Cvjetkovic for a set of plans. The plans arrived and then the snags started cropping up. David was living in a bachelors flat in Johannesburg which was 250 miles from where I was living in a small rural town.

Another problem was that the wing of the CA-61 is 27½ feet long and my garage was only twenty feet. Due to the building boom at the time I was unable to get a contractor to enlarge the garage, so I decided to try it myself. It did not take me very long to get the hang of bricklaying, and a couple of weeks later my building project was completed. I now had a 30 foot garage.

By this time I had announced to my wife that I was going to build my own airplane. She thought I had gone off my rocker, and would not talk about it for days. She thought this crazy notion would pass and nothing would ever come of it. She announced to all and sundry that I had gone nuts.

Meanwhile, I went ahead seeking information on how to go about building an airplane and where to get the materials. I could get spruce from a timber firm but it was not "certified" stuff. I knew nothing about spruce at the time. I heard about a plywood factory in Johannesburg and went up to see them about aircraft plywood. They make some beautiful plywood at this factory, but nothing for aircraft.

I was hunting for a Continental 65 engine and eventually could get a new one from an aircraft company for 1800 rand (about $3,000.00). This was too expensive and I decided to use a 1600 VW engine.

I wrote many letters to many parts of the world for information on aircraft building and my brother and I were just about beaten when we discovered EAA and our troubles were over. We now had a source of information and contacts for materials.

I wrote to a firm advertising in *SPORT AVIATION* and had a quote for spruce and plywood within a fortnight. At this stage David decided to drop out of the project and to build a Taylor Titch.

I applied to the Department of Commerce for an Import Permit for the material and after a month's delay it was finally issued. I sent the order and the bank draft off in July 1966.

In the meantime, I was gathering all the information available on spruce and was getting to be quite an expert on the subject. I even made a testing machine for testing spruce samples.

My supplier did not seem to be in a hurry to ship the wood. I ordered the material and waited for 8 months. The spruce and plywood finally reached me on the 4th of May. Now I could really get started on the project.

We have no tool rental store around here and I needed a large number of C-clamps. Buying new clamps would not be economical, so the only solution to this problem was to design and make my own. I spent a week of my spare time making 60 clamps of various sizes.

On examining the "certified and stamped" spruce, I found that part of the shipment was not suitable for aircraft. Some of the planks had a grain of 1 in 2. I bought some rough spruce in Durban and was able to select some very good boards from this.

Construction was slow because it was winter. I was using Aerodux 500 glue and had to heat the garage to have the temperature within the specified limits.

The project started as a hobby but now it was getting to be an obsession. Every free moment I could spare was going into the plane. No more time for visiting or loafing.

With the coming of summer, the work progressed faster and the plane was beginning to take shape. My wife was still skeptical about the thin wooden parts going into the plane. "Surely you are not going to fly in a plane as fragile as all that," she remarked. She was, however, resigned to the idea and was even helping me with the chores.

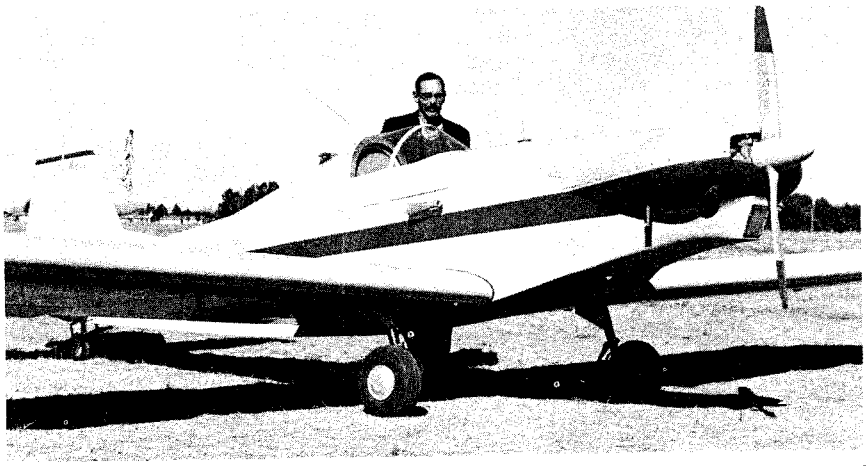
Now I was ready to start learning to fly. I had an airplane taking shape and was determined to be qualified to undertake the test flight. I started taking flying lessons at a flying club in the neighboring town on the 6th of April, 1968. After only 6 hours in the air, the club went into bankruptcy.

There was a steady stream of visitors coming to my garage. Some chaps coming to admire my handiwork with real interest and some just wasting my time with silly questions. A keen interest in flying was developing in our community and quite a number of friends, admitting that they did not have the time or patience (just plain laziness), were asking me how to go about starting a flying club. The result was that some fifteen of us started a flying club and I was elected to organize operations.

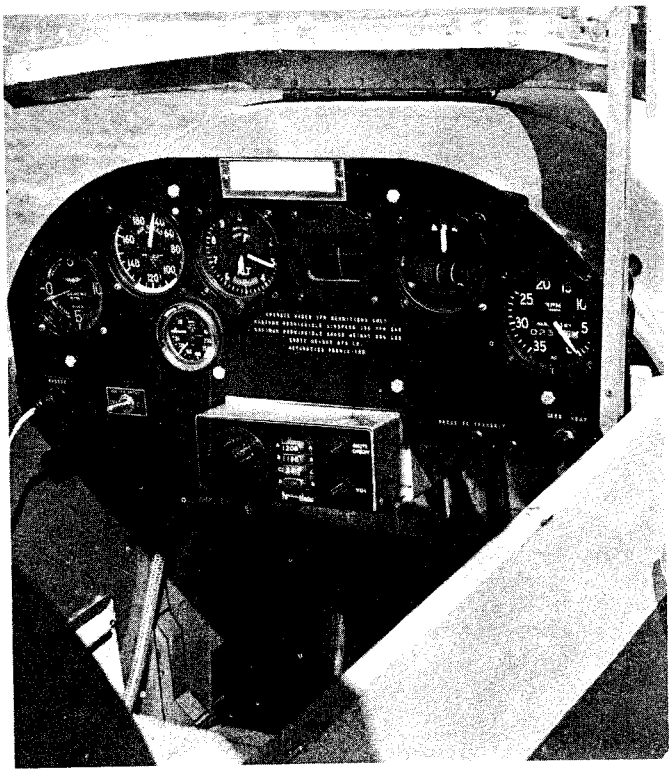
I managed to engage a flying instructor with a Cessna 150, and we

(Continued on Next Page)

South African "Mini-Ace" built by H. C. van Rensburg. CA-61 has a 1600 VW engine which required lengthening the nose to compensate for the reduced weight when the VW was substituted for a Continental 65. The aircraft is beautifully finished in yellow with red trim.



H. C. van Rensburg and his CA-61. Note the Hegy prop — they are found everywhere! Aircraft is operated from an airport 5,300 ft. above sea level! Nice fiberglas work.



Very neat cockpit of van Rensburg's CA-61. Notice time on recording tach and the "different" radio.

started having flight instructions on June 22, 1968. Twenty-three pilots qualified for a license within a year and we bought a Cessna 172 which we are still flying.

Through my flying with the club, I had logged some 100 hours by the time I was ready for test flying my plane. I had some difficulty locating a tail wheel aircraft to get some experience in this type. There do not seem to be many taildraggers around any more. Luckily, I located an Aeronca 7AC and had some instruction.

Our department of Civil Aviation was very helpful and my CA-61 was inspected by a licensed ground engineer with no trouble.

I was then ready for covering by November 1968 and I decided I would be ready to fly in February if I took three weeks holiday and spent the time working all out on the plane. I started covering in December, but with all the small things cropping up and taking a lot of time, I was finally all set to fly in November 1969!

The plane was built strictly according to the plans. The only modification made was moving the firewall bulkhead forward five inches. The 1600 VW engine was 20 lbs. lighter than the Continental 65 and I calculated that I would then be able to hang the VW engine on a nine inch engine mounting. After weighing the completed plane and calculating the CG, I found that I had to make a mounting 22 inches long to have the CG within limits for all possible loading conditions. The final total empty weight was 574.25 lbs.

An enclosed fiberglas cowling was made which could be a chapter in itself! At least I learned something about working fiberglas. The cockpit is completely enclosed, the perspex framed in aluminum and hinged in front. I did not like the cabinet latches specified and so I devised two simple foolproof catches that work very well.

A VW engine was built up from new spare parts. A Solex 32 PHN-1 carburetor was fitted below the engine; a carb heat control box was made. Hot air taken from a heat muff on the exhaust and controlled with a choke cable from the cockpit was installed. Cold air goes through a Cessna 150 air cleaner element. A standard throttle control is used. The carburetor is fitted with an altitude corrector which claims to work up to 10,000 feet, but it seems to work well up to 13,000 feet. I am afraid to go higher without oxygen.

A flat VW oil cooler is used with a shroud exhausting the hot air behind the engine air baffle. An oil temperature of 180 to 190 degrees Farenheit is maintained even in a long climb. A Hegy prop is used and a pair of Rosenhan wheels with hydraulic brakes are fitted. The landing gear legs are faired into the wing with .015 aluminum fairings.

A 24 channel Nipper VHF radio is fitted running off a nickel cadmium battery. Instrumentation consists of a vertical speed indicator, airspeed indicator, oil temperature, and oil pressure guage, compass, sensitive altimeter, turn and bank indicators and a cable driven tachometer.

At long last the Yellow Bird was completed and the final inspection passed with flying colors. I flew the 172 up to Pretoria to see to it that the Proving Flight Authorization was issued by the DCA without delay. I could not wait for the post at this stage! The Proving Flight Authorization was issued and I returned home jubilantly, needless to say.

I tried a fast taxi run and my tail wheel tire exploded. This was a solid rubber tire from a lawn mower and looked good enough for a tail wheel tire. Luckily there was no damage to the plane. This meant I had another delay in getting a 6 x 2 solid aircraft tire and I had to make the hub for it.

Eventually on a bright and clear morning, November 23, I was on the airfield with a couple of friends who had come to witness the first flight.

After two or three taxi runs to feel her out, I lined up on the runway. There was no excuse to delay any longer. This was it! Years of hard work and dreams culminating in this moment. A quick check of the controls and instruments — everything was O. K. I feed in the throttle and the little plane goes forward. The tail comes up and speed builds up quickly. I let the air speed needle come up to 60 mph and ease back on the stick, the wings bite into the air and the rumbling of the landing gear on the grass runway ceases. She is airborne and climbs smoothly. I let the speed build up to 80 mph and climb to 1000 feet. Level flight and 3600 rpm and she indicates 105 mph. I fly a gentle circuit and come in for a perfect three point landing. What does that first flight feel like? There is only one way to find out — build your own airplane and find out. It's wonderful!

I made a thorough check to make sure everything is O. K. It needed a small adjustment to the elevator and rudder trim tabs and I am off again to feel her out in the air: She handles beautifully and flies hands off.

The DCA required me to fly it for 65 hours, restricted to a 25 mile radius and no flight over populated areas. Various tests were to be made including pulling 3.8 G for non aerobatic category. Our airfield is at 5300 feet and climbing tests were made from 5500 feet. She climbs from this altitude at 300 fpm and decreases to 150 fpm at 11,000 feet, timed with a stopwatch. It has a climbing speed of 80 mph.

I did not have the facilities for testing level flight speed accurately, but flying to and from a point 50 miles distant in calm weather, the speed clocked at 100 mph. The power off stall is tame at 40, the nose drops through and recovery is instantly effected.

Hours were built up and the required tests done and the Authority to Fly was issued by the DCA on January 29, 1970.

South Africa is an ideal flying country the year round. We have very little really bad weather conditions. Winds can blow up to 40 knots in August and September. Thermal conditions over the Free State and Northern Cape Province are ideal for gliding and some world record gliding flights have been made here. Summer thunderstorms are usually scattered. I. M. C. conditions are rare except in Natal where it can clamp up without warning.

At the time of this writing, I have flown some 250 hours in the CA-61 in all weather conditions. The plane has a range of 550 miles, using 2 Imperial gallons of gas per hour. I have done some long cross country flights. I have been over the Kalahari Desert and have crossed the Drakensber mountains several times. I once crossed the mountains, coming up from Port Elizabeth, in a 40 knot wind. It gets bumpy in these conditions but I was never in any real trouble. I lined the bottom rear edge of the fuel tank with sponge rubber to keep from barking my shins when hitting negative G.

My CA-61 won the "Best Homebuilt of the Year" trophy at the annual fly-in convention of the Aircraft Builders Association of South Africa at Pietermaritzburg recently.

In summing up, I can say that this plane fully came up to my expectations. It flies cheaply and is fun flying around the patch on Sunday afternoons, but it is also stable and comfortable enough for an occasional long cross country flight. It is more fun to fly than any store bought modern airplane can ever be.

Building my own plane has been great fun and I have met a great number of interesting people from all over the country who share in a common interest.

A friend asked me the other day what I was going to do now that I have my plane finished and flying. Well, besides enjoying my plane, I am now about to start on a CA-65A.