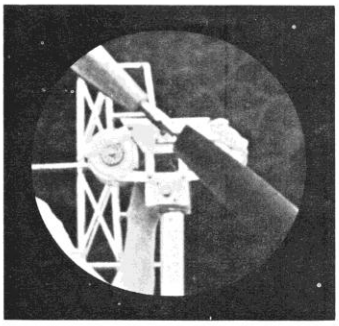
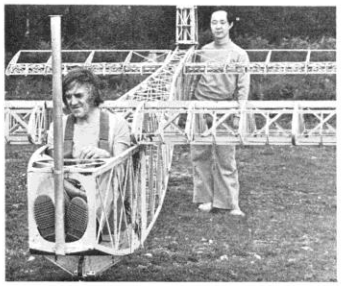


Above: A close-up of the twin one horse-power motors used on Solar One.
Below: David is too big for the cockpit and the first flight will use a professional test pilot.



Solar One could be the domestic aircraft of the future if solar cells ever become cheap enough to power it.

David Williams and Fred To are doing something about making it all possible.

David Williams and Fred To have almost finished building what might turn out to be the world's first totally solar powered winged aircraft. The 68 foot long wings are covered, end to end, with silicon solar cells to convert the radiant energy of the sun into enough electricity to power the two metre two blade propeller.

Solar 1 is nearly 23 feet long, spans 68 feet, weighs in at only 130lbs (without the pilot) and carries 200 square feet of silicon cells. The propeller is powered by two miniature one horsepower motors.

David Williams, 47 years old and who used to work for Vickers building 'planes, said to a reporter 'Once it is built, the running costs are virtually nil, there is enough energy even on a dull day for the solar cells to store energy in the battery stored behind the single pilot seat'.

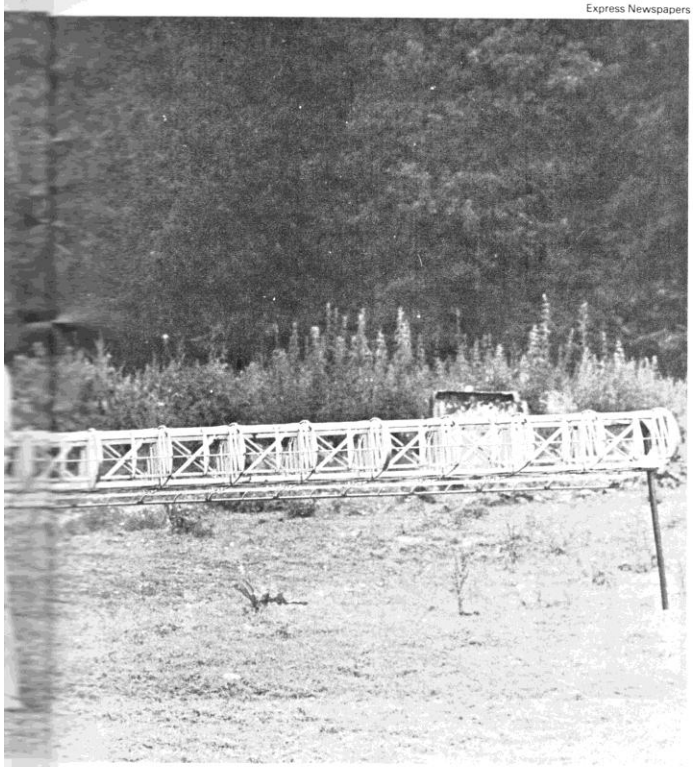
Fred To, born in Hong Kong, was an architect working with solar panels for space heating and it was he who realised the possibilities: 'I knew David as a talented aviation engineer and knew that both the Japanese and the Americans were working on the same idea. Although I first suggested the idea nearly a year ago, we didn't actually start building until last Christmas. Now we think we are ahead of all the competition.'

Neither of the designer/constructors will be flying Solar 1 on her maiden voyage; that privilege has been accorded to a professional test pilot. To is making a film of the entire project and we only hope that the world will get a chance to see this record of what could prove to be a British first.

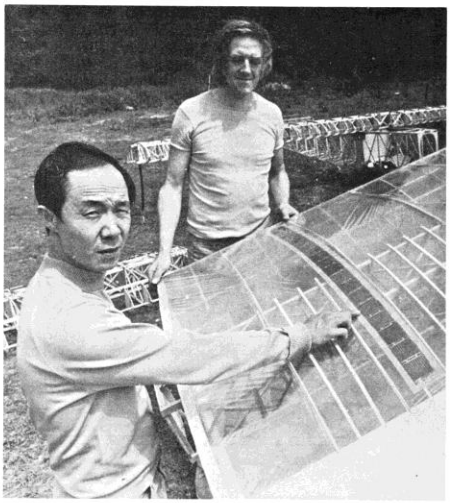
The solar powered plane has a number of advantages in terms of pollution free and cost free flying, but at present these are a little outweighed by the very high cost of silicon cells. At current prices it will cost about £15-20,000 to cover the area required for the William-To design. However, silicon cell research is being developed to a high degree in most industrialised countries and, as their efficiency rises, their cost is expected to drop sharply.

Both Williams and To, should you ever meet them, are sick to death of jokes about flying into cloud and then nose-diving through lack of solar power. This is a 'funny once' joke and they have heard it a lot more than once!

Express Newspapers



Below: Fred To shows one of the strips of solar cells which will eventually power Solar One. She will carry some 200 square feet when ready.

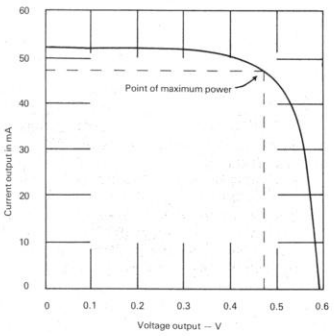


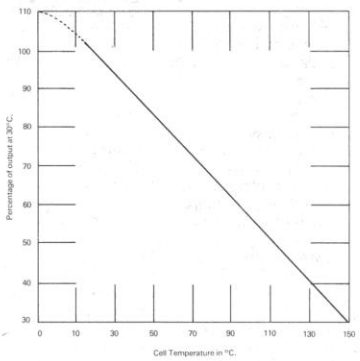
Our Science correspondent writes:

Electrically powered aircraft are far from new. In 1884 Renard and Krebs built an airship, *La France,* which travelled at some 20 kph for nearly 20 kilometres. An earlier French attempt, the *Tissandier* only managed a bare 5 kph.

Solar cells are the biggest present problem with such craft. The U.S. department of energy claim that with intensive research, such as is being conducted for satellite use, cost should come down from the present $400 per peak Watt to about 50 cents per peak Watt in the mid-1980's. At about this time the efficiency of these cells should reach about 20%, a significant improvement on today's models. These efficiencies cannot now, or ever, be achieved using silicon cells which, at present, can manage a top output of some 12% when artificially cooled (efficiency drops far below 12% in a stationary cell due to the effect of heating, but this should be recoverable in a moving panel since the airflow over the wings would help to keep the temperature down).

Voltage/current characteristics of a 12% efficient silicon solar cell with an area of 1.8 cm² at 31°C when irradiated by sunlight at 100 mW/cm²





Output of a typical silicon solar cell as a function of cell temperature

No solar cell known today is capable of lasting indefinitely, and a rough estimate of cell replacement costs on the Williams-To design would amount to about £300 per year at current prices.

Future directions in solar cells include the use of gallium arsenide devices with their much higher conversion efficiencies. However, there is a weight penalty to be paid since, for them to reach their maximum theoretical output, they need to incorporate both filters and reflectors. Manufacturing costs under today's conditions would make them a bit of a dream.

As a rough guide to power availability from silicon cells (not the best, but still the cheapest for experimental use), a 1.5 square metre array could give up to 100 Watts or 0.134 horsepower under conditions of intense illumination. Given that a good site, free of atmospheric pollution and in a hot country within about 40° of the equator will receive about one kilowatt per square metre from the sun, and assuming a total efficiency of cells, motors, propeller and everything else, of about 5% (generous), a solar powered plane is going to need about 15 square metres to power a one horsepower motor.