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Channel manpower hopefuls weigh up the problems
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HE weather problems of flying over
the Channel at 10 m.p.h. and less
than 100ft; the rules of the new
£100,000 Kremer competition for a
man-powered flight from England to France; the future of man-powered flight; and more revelations from Paul MacCready on how he won the £50,000 Kremer prize for a figure-of-eight flight—these were the main topics in the Royal Aeronautical Society's sym-posium in London on February 6. The Channel competition rules call for a flight in one direction only— England to France—during which the aircraft must not be more than 50m above the sea for longer than three minutes. One reason for the height restriction is simple: the aircraft will not have far to fall if something goes amiss, and escorting boats will have a good chance of rescuing the pilot from a watery grave. Take-off must be from a point no higher than 30m above sea level, to avoid the hazards of a diving launch from Dover's famous white cliffs, and three ground crew can help to stabilise the take-off. A crossing will be reckoned to have been completed when the aircraft lands on any piece of the French mainland uncovered by the sea. Favourite landing spot after the 21-mile crossing will thus be the large areas of sand exposed at low tide at Cap Gris Nez. For take-off there are a number of possible sites just west of Dover.

R. M. Morris, principal met officer
at the London Weather Centre, looked at the weather factors which will affect the flight. Maximum wind strength must be lOkt, obviously from a north-westerly direction. Such a con-dition, together with reasonable visi-bility, occurs about 10 per cent of the time on some six days a month from May to August. Channel sea tem-peratures peak at 16-17°C in July and August, suggesting that the flight will have to take place in summer. Ideal weather pattern will be an anti-cyclone centred over Dover or southern Ireland and giving a light north-westerly flow. Sea breezes could easily be a problem, causing reversal of the prevailing wind. Such winds can reach 15-20kt in spring and early summer, and while they can usually be forecast, their structure and extent may be unknown quantities.
Ann Welch looked at some of the practical problems posed by Channel weather. The English Channel con-ducts the shallow North Sea into the deep Atlantic, and tidal flow may affect the manpowered flight. A wind of only 5kt against a tidal flow of, say, 3kt will ruffle the water, pro-ducing a "surface roughness." This in turn could lead to a minute but significant turbulence capable of

troubling a man-powered machine perhaps flying just a few feet high. Sea swell created by an "old" wind can be active for a surprisingly long time, so that the preceding few days' weather may be important in fore-casting likely conditions.
From the pilot's point of view, lack of depth perception is a traditional problem in low-level flight over water. This could well be exacerbated by haze arising from the subsidence characteristic of the anticyclonic con-ditions in whichtan attempt is most likely to be made. Weather aside, by far the biggest "environmental" prob-lem is seen as Channel shipping. About 150 ships, many of them large vessels like oil tankers, ply the Chan-nel routes in each direction every day. A ship like an oil tanker is expected to generate wake turbulence persisting for an unknown distance. An attempt would attract a lot of attention, and turbulence from light aircraft and helicopters could be disastrous. Some sort of "purple air-way" arrangement would therefore be needed to keep aircraft at a distance. Attempts are also likely to be made at the height of the Channel holiday season, which means that there will be lots of small boats and crowded beaches. A dawn or dusk start for the two-hour flight will probably help in this respect.
Hot favourite for the £100,000 prize is Paul MacCready's Gossamer Albatross, described with a cutaway drawing in Flight last week. Mac-Cready talked mainly about stability and control in his prize-winning Gossamer Condor, to which the Albatross is broadly similar but with a smaller and more smoothly con-toured wing. "Stability in the conven-tional sense is not important," said MacCready, "because at 10 m.p.h. everything happens so slowly and you can manage with neutral stability, pro-vided you have controllability." This is illustrated by the fact that a dozen people—some with no previous flying experience at all—have flown Gos-samer Condor.

MacCready's biggest problem in developing the Condor lay in making controlled turns possible. He tried many experiments, from spoilers to wingtip-mounted rudders like those fitted to some rigid-wing hang gliders. Most were unsuccessful and created a lot of extra drag. Eventually he developed the present successful tech-inque, in which the wing is twisted, aided by tilting the canard foreplane. According to MacCready, this tech-nique is similar to that used by soar-ing birds. Typical of his practical approach was an experiment illus-trated by a slide which showed him leaning into a swimming pool and gently moving an underwater model said to have been glued together in five minutes. He gave few secrets away about the Gossamer Albatross, but radiated quiet optimism.
The future of man-powered flight as
a whole was considered by J. C. Wimpenny of British Aerospace. The RAeS's Man-Powered Aircraft Group was founded in 1959, and since then projects have been developed in some 20 countries, although very few have achieved the kind of flights of which MacCready's aircraft are clearly capable. But a sizeable amount of experience and knowledge has now been acquired, and Wimpenny thinks that it is time to look ahead and con-sider future aims.

Should progress be stimulated only by competitions, and is it possible now to develop man-powered flight as a sport? Wimpenny discussed three designs. The "racer," with a 50ft span and demanding 0-5 h.p., could be flown at 25-30 m.p.h. by a person of athletic fitness. The 65ft-span "general purpose" design could be flown by an average person at 18-20 m.p.h. on 0 • 35 h.p. The "long distance" aircraft, with a 124ft span and need-ing 0-25 h.p., would be capable of 10 m.p.h. over cross-Channel distances. By comparison, Gossamer Condor spanned 96ft and the Japanese Stork, which was nearly a close runner-up for the £50,000 Kremer prize, 69ft. Rear Admiral Nick Goodhart's two-man Newbury Manflier is nearing completion and has made some taxi-ing runs. This 157ft-span design is in many ways the most radical yet, with the two pilots housed in separate nacelles 50ft apart. Turning is to be achieved mainly by having one pilot pedal harder than the other (see the description in Flight, February 8, 1978). The Manflier will probably attempt the other Kremer prizes. These include awards for a 3min flight by a British entrant.
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