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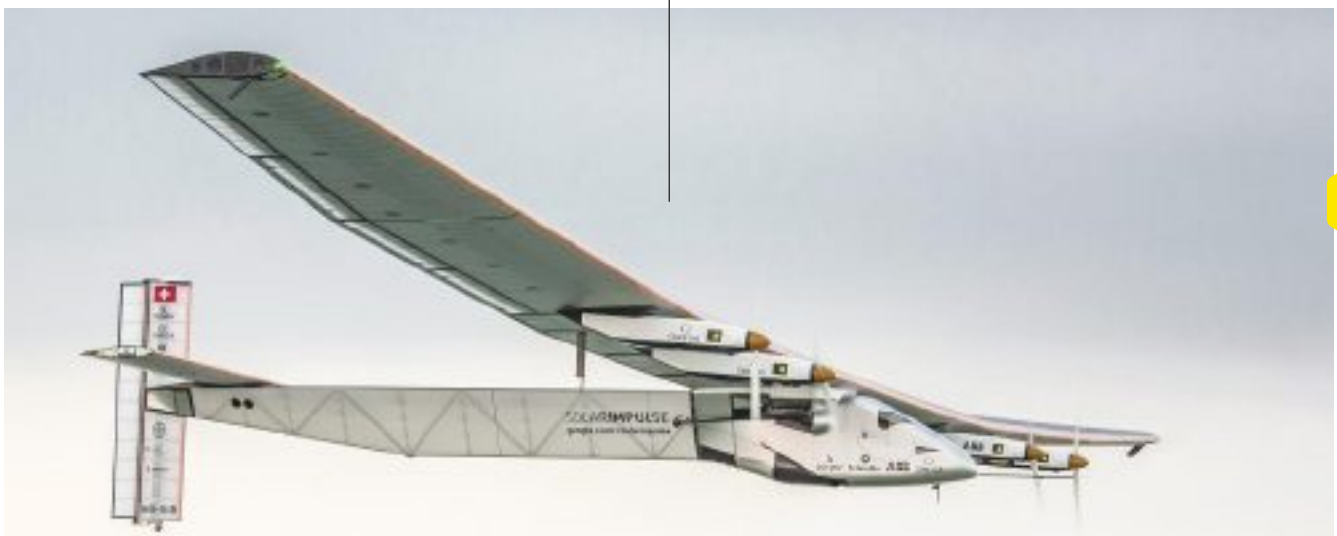

2 MINS

EVERYTHING NEW UNDER THE SUN

Could *Solar Impulse 2*'s mission point to a solar-powered future? By **Paul Sillers**

The eerie dimness of March's solar eclipse in northern Europe was a cursory reminder of our reliance upon the Yellow Dwarf that powers our Solar System. The sun's blaze, despite its 150 million km distance from us, transmits sufficient radiation to illuminate five 60-watt light bulbs for every square metre of Earth's surface. Could that energy be harnessed for use in air transportation?

The key to prolonged solar-powered flight with a meaningful payload is to absorb and store enough sunlight energy during the day to sustain flight throughout the night – until sunrise, when the cycle repeats itself.

The thing is that photovoltaics, the science created in 1839 by French physicist Edmond Becquerel, which converts sunlight into storable electricity, has become a bit of a Cinderella technology. It hasn't garnered the same investment that's enabled other transport energy initiatives to thrive. Over the past four decades, with the exception of renowned aeronautical designer Paul MacCready's *Solar Challenger,* which, in 1981, flew from Paris to RAF Manston in Kent, only a handful of attempts have been made to advance the science of manned solar flight.

So, what would it take to reboot photovoltaics, combine it with cutting edge electronic propulsion and lightweight carbon airframe construction and reinvigorate solar aviation science?

Cue *Solar Impulse 2*, the world's first attempt at manned, solar-powered, aerial circumnavigation of the Earth. The programme's 12 legs, the first of which started on 9 March – ironically the same month as the eclipse – is the culmination of 12 years' planning, the joint vision of André Borschberg, fighter pilot and engineer, and Bertrand Piccard, a psychiatrist and pilot who hails from a dynasty of explorers. The two pilots alternate on each leg of the 35,000km route.

> Circling the globe without fuel is an unprecedented undertaking in the history of flight

But circling the globe without fuel, an unprecedented undertaking in the history of clean-tech flight, is just part of *SI2*'s mission. It's also about galvanising the multidisciplinary team of 80 specialists, 90 partners (including Solvay, Schindler, Omega and ABB) and 100 advisors, so that the science of solar flight will have a credible roadmap for the future.

As Borschberg explains, "Dreams fuel innovation, and I also know that human commitment in new technologies can really change the world."

Solar Impulse 2's specs include a wingspan wider than that of a Boeing 747, whilst weighing a meagre 2,300kg; the 17,248 solar cells form the skin of the wings, which enables a 28,000ft cruising altitude. Specific photovoltaic aspects include covering the solar cells with Halar film with a 17-20 micron thickness, saving 35 per cent in weight while making the wing waterproof.

For Picard, *SI2* is about changing mindsets. "Conventional aviation cannot switch straight to zero fuel. Intermediate steps are needed," he says. It's about revolutionising "the way in which people think about energy and clean technologies. If *Solar Impulse* technologies were used on a massive scale, the world would be able to save up to 50 per cent of the current consumption of fossil energy."

Solar Impulse 2 is scheduled to complete its round-the-world adventure in early August. ■

Paul Sillers is a design consultant and writer specialising in aviation branding and technology

SOLARIMPULSE