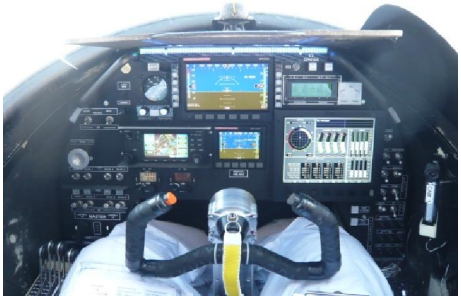
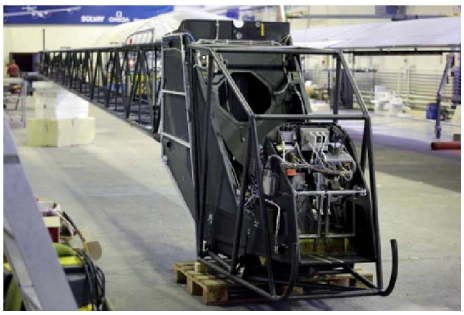
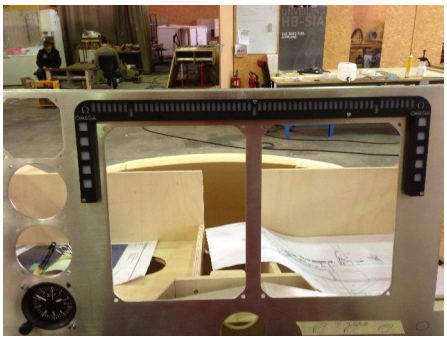
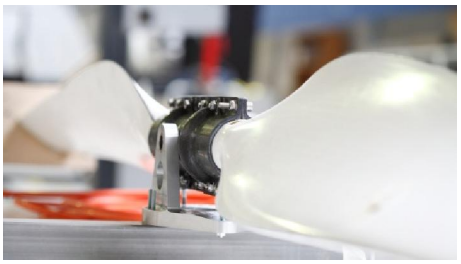
DATASHEET 6

ONBOARD ELECTRONICS


Cockpit form above


Cockpit from the front


Omega instrument


Propeller

Central computer's functions

To be able to fly for long periods, by day and by night, HB-SIA carries a host of electronic systems. These systems relate, on the one hand, to the propulsion chain which includes the solar generator and, on the other, to all the flight control instruments including the central computer. Their three main functions are to convey the power supplied by the solar generator to the engines and the batteries, to communicate to the pilot the necessary information for controlling the airplane, and to provide real-time information to the Mission team which is following the aircraft's flight path and behavior from the ground.

Omega instrument

With the help of astronaut Claude Nicollier, who heads the Solar Impulse test flight team, and in collaboration with Omega, a revolutionary new instrument was designed for HB-SIA. Called the Omega Instrument, its primary function is to inform the pilot within an accuracy of one degree, the bank angle of the aircraft (turn or change of direction in which it banks or inclines) must be kept below 5° for controllability reasons. For this reason, the Omega Instrument is connected to gyroscopes (used to provide stability or maintain a fixed orientation).

The other key function of the Omega Instrument is to inform the pilot of his real flight direction. This is particularly important because HB-SIA's huge wingspan, combined with its lightness, makes it very sensitive to air movements, especially crosswinds, which can cause it to drift. Thanks to the light-emitting diodes (LEDs) on the control panel, the pilot knows his flight direction to within one degree. In this way the Omega Instrument proves an essential ally, especially for aligning the aircraft in the axis of the runway for landing.

Particularities of HB-SIA electronics components

Like all other components of HB-SIA, the on-board electronics have been optimized to combine lightness and maximum efficiency. In flight, the electronic systems undergo significant temperature changes between low and high altitudes. These must not prevent them from functioning correctly. Prototype circuits and devices have therefore been destruction-tested, with the test results used directly in manufacturing the final systems.