Horos

120Kg Solar Motor Glider

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The aim of this project is the construction and building of a solar motor glider as amateur project in the 120Kg / FAR103 class.

History:

During the last 20 years several solar aircrafts had been developed. Most of them had been done by research teams at universities or as big project covered by industrial sponsors.

1980:	Pathfinder	1980 / 1996:	Solair I + II
1989 / 2006:	Sunseeker I + II	2004 / 2009:	Solar Impulse I + II

Project description:

Since a few years a class of light sport aircrafts with a maximum empty weight of 120Kg has been defined. Similar to the FAR 103 it allows flying for pilots with low requirements and costs compared to standard ultra light air sailplanes:

- no medical which has to be renewed periodically
- in general slow and easy handing of the aircrafts
- maintenance and repair in own responsibility
- lifetime licence

Sunseeker II © Solar-flight/Eric Raymond

Sunseeker II that has been build more than 10 years ago already fulfils these requirements.
Requirements for new development:

- maximum empty weight 120Kg (incl. battery)
- folding propeller in the back of the glider
- Capable to start independently on grass runways
  ⟹ usable on many ultralight and gliding airfields
- charging of onboard battery using solar cells placed on the wings and aileron
- easy assemble and disassemble of the glider by one person
- enough power from the solar-engine-propeller unit to allow levelflight by sunpower only. So a limitless flight is possible as long as the sun is shining.

Currently defined outsourced items:

Solarcells	Sunpower C60
Brushless motor, continuous power approximately 6 kW	Ingenieurbüro Thomas Senkel
Planetary gearbox: propeller max. ~900 rpm	Not defined
Batterie	Sony 18650 vtc5
Motor Controller	Not defined
Charge controller incl. balancer	Not defined
Propeller	Not defined
Canopy	Not defined
Flight instruments	Not defined

Rough preliminary milestones of development:

Aerodynamic design and simulation using „xflr5“	1st design finished	2016/08
Bench test of power unit	open	2016/10-11
Solarpanel (mechanical design, definition of production)	open	2016/11-12
FEM analysis and definition of wing spars	open	2016/11-12
Construction of details	open	2017/01-03
Build of mould for fuselage	open	2017/04-06
Build of fuselage + beam	open	2017/07-08
Build aileron and rudder	open	2017/09
Build of wing and solar panels	open	2017/10-12
Integration of mechanical control equipment	open	2018/01-03
Integration of electric components	open	2018/04-05
1st flight	Open	2018/06

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