

Categorie Premio

Accessibilità

Sostenibilità

Qualità della vita

Product Name

Solarial

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Description of innovation social values

- product category
- formal and functional features
- problems solved by innovation
 - user
 - field of application

Solarial is an unmanned airship that provides mobile support infrastructure for disaster relief and remote communities, generating renewable energy and supplying communications links where they are needed most. Utilizing a skin coated in thin film photovoltaics, and a reversible drive propeller/wind turbine, it delivers clean energy via tether cable. Housing a suite of telecommunications equipment, *Solarial* also acts as a relay station for radio and cellular telephone signals, aiding the coordination of relief operations.

Transportation infrastructure is often damaged in major disasters (both natural and manmade), making it difficult to resupply fossil-fuelled generators, if fuel is even available. As an airborne, autonomous source of renewable electricity, *Solarial* is able to support relief operations regardless of the geography and logistical situation.

The airship is able to operate at all hours and conditions due to reserve power capability provided by hydrogen fuel cells that consume hydrogen gas, which is replenished by electrolyzing water during peak sunlight hours of the day.

Solarial is also meant to serve as a scalable, transitional element towards a more sustainable aerospace industry based on modern, safe and efficient lighter-than-air craft. In fulfilling a present need at a modest, economical scale, *Solarial* thus helps to promote future developments within a much larger context.

Description of technical features

- operations
- technology

Solarial flies autonomously to its deployment location - as one example of deployment capability, if the airships were stationed at US airbases around the world, they would be able to reach all the natural disaster hotspots in the world within two days.

Once at the site, the airship then lowers the power box (which contains anchoring mechanisms). The energy generated while the airship is aloft is then transmitted to the ground to power field hospitals, water pumping and purification, lighting, communications, and computer equipment necessary to sustain the operation. At average latitudes and atmospheric conditions, *Solarial* should be able to produce about 125 kWh per day between its solar cells and the wind turbine. For reference, a 50 L medical refrigerator for storing vaccines and medicine and producing ice might use 300 wH per day. A 10,000 lpd shallow-water pump (sufficient for 300-500 people) may use 5 kWh.

Dimensions

20 meters L x 10 meters W x 6 meters H
630-700 cubic meter volume, based on inflation (expanding dilation panels can be filled with additional hydrogen gas in order to provide greater buoyancy and buffer fuel for H2 fuel cells)

Materials

Envelope: Synthetic laminate w/ integrated thin film photovoltaics
Semi-rigid structure: Pultruded carbon fiber reinforced plastic keel rods
Power-box/anchoring base: Rotationally-moulded ABS plastic

Certifications

Benefits for environment

The emergency power that *Solarial* generates is derived from wind and solar, making it clean and sustainable. In addition, modern airship technology can form the basis of a new kind of sustainable aerospace, with the ultimate ideal of carbon neutral transportation for passengers and freight. *Solarial* is designed as a stepping stone towards this future.

Benefits for human being

Solarial has the potential to save lives around the world by providing rapid, reliable temporary power and communications infrastructure to disaster relief operations. Disaster relief is an oft-neglected social issue, but one that we will be forced to confront more in the future as climate change is expected to produce more extreme weather conditions.