



Open-source solar tracker specification

1. Presentation

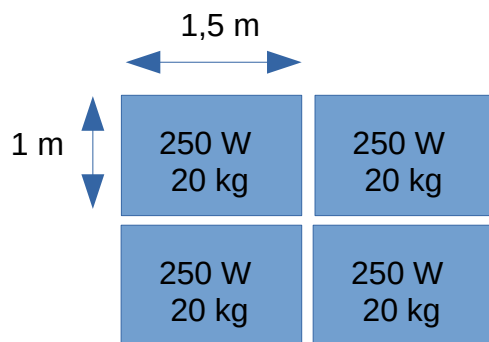
Mobile solar modules can produce up to 40% more power than static ones because they track to always face the sun. The key idea is to design a system as a kit so that people can easily set it up themselves. The tracking system is conceived of as totally Open-source in both its software and hardware. The importance of Open-source is that it allows you the user to be able to improve the system, to adapt it to your needs and/or just to repair it.

2. Description of the system

2.1. Mecanical part

2.1.1 Support

The idea is to design a structure to support four solar panels. Here is an example to produce at least 1KWc.

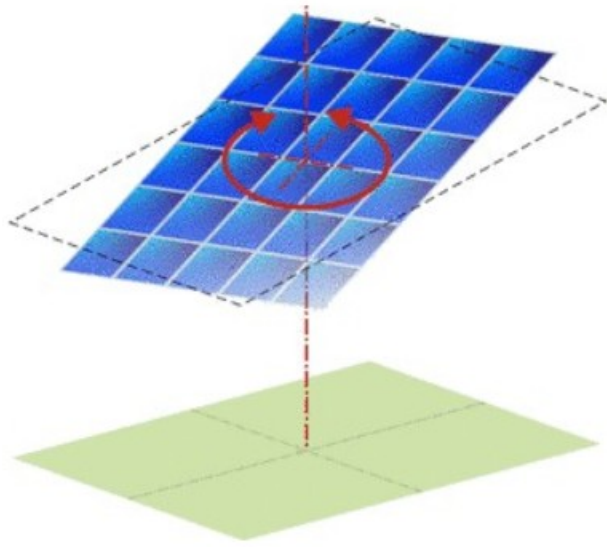


2.1.2 Number of axis

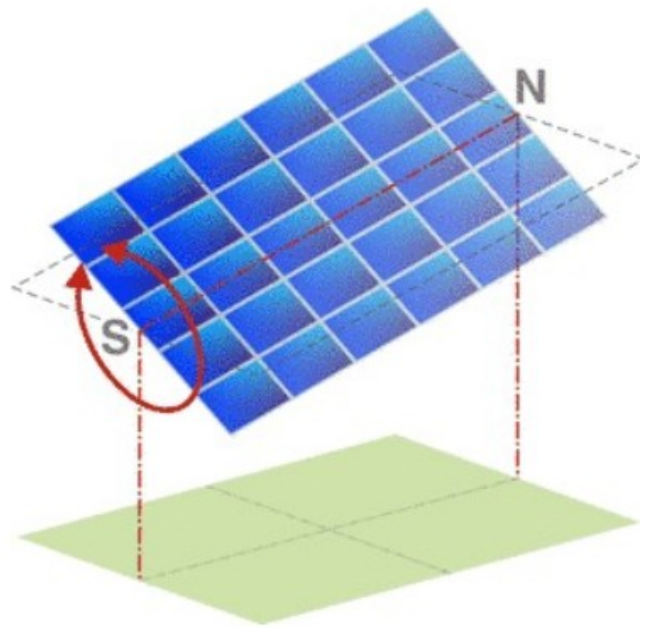
There are two options to move this structure so that it follows the sun :

- Single axis in which the tracker will follow the sun from east to west with a fixed slope for the inclination (which will change depending on the latitude / longitude where the solar tracker is installed).
- Double axis in which one will move in the vertical plane, the other one in the horizontal plane.

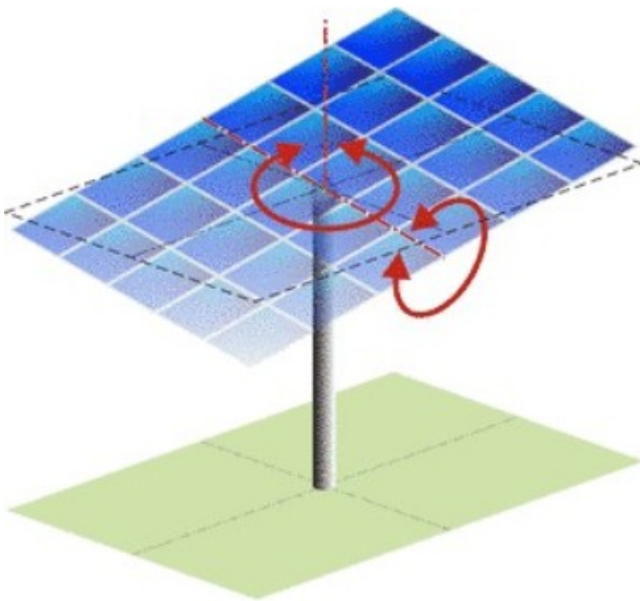
A double-axis tracker is 5-10% more efficient than the single-axis tracker but it is more complex and more expensive so we have to decide between the benefits the lower costs and less complex single-axis system to the increased efficiency of a double-axis system.



Single axis : vertical rotation



Single axis : longitudinal rotation



Double axis : horizontal and vertical rotation

2.2. Electrical components

- 1 or 2 motors (depending if the system has one or two axis) with enough power to move the structure described above.
- Encoders to record the panel position.
- End of course system to prevent the system to moving beyond fixed limits.

2.3. Electronics

- Arduino open-source board.
- An additional board to drive the motors.
- Wind sensor to stabilise the structure in case of high wind.
- Emergency button : to stop the system working.
- Wind safe button.
- Buttons to move the structure manually.
- LCD to display information (position, system running...).

2.4. Software part

There are two options :

1. Use a internal clock and GPS coordinates to calculate the optimal position for the solar tracker to face the sun.
2. Use light sensors to locate the sun.