



# Solar Power System for Waverider

Datawell - Oceanographic Instruments

## Solar panel combined with Boostcaps and primary cells!

The Datawell (Directional) Waveriders are designed for use with primary cells, but can be equipped with solar cells as well. This solar power system combines solar cells with Boostcap capacitors and primary batteries. This innovative approach to energy storage and solar panel design relies on primary batteries, unsurpassed in reliability and robustness, with recently available Boostcaps, completely maintenance-free and a specially designed solar panel focusing on mechanical and electrical robustness.



Already 100 % increase of battery life in Dutch climate.

Total solar power in sunny climates.

Maintenance free and robust design.

Less service needed.

Matrix connected solar cells taking care of overshadow.

Resistant to normal high pressure cleaning (150 bar).

Available to all current buoys, except for the Waverider SG and DWR-G4.

### The Solar Power System in a nutshell

The solar panel is supplying energy to the buoy. It has a peak power equal to 15 times the energy consumption of the standard Directional Waverider with HF transmission. The surplus of the solar energy is stored in the Boostcap capacitors. The capacity equals the energy used by a Directional Waverider with HF transmission during 12 hours of operation. This surplus energy is supplied when needed. If the capacitors run empty the buoy automatically switches to the primary batteries. So, on a sunny day the solar panel powers the buoy during the day-time and the Boostcap capacitor will take over during the night-time. Ergo, no battery power used.

### The results

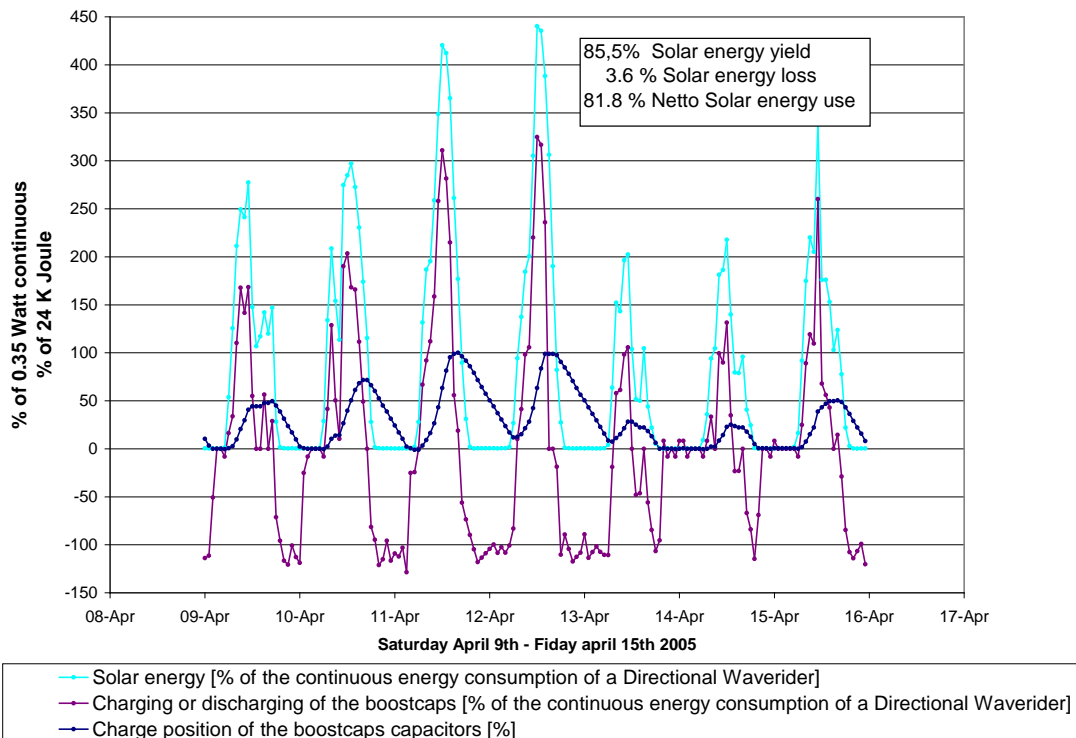
The purpose of the solar system is to reduce primary battery drainage. A typical result of this strategy can be seen in the figure overpage. This data is from a solar powered Waverider in the Dutch waters (52oN latitude) during a nice sunny week in April.





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The solar panel produced up to 4.5 times the required power in this spring week (maximally 15 times). The surplus energy was stored in the Boostcap capacitors and used during the night. Sometimes the Boostcaps were empty before the sun rose again, sometimes on fruitful days the Boostcaps were full, and surplus energy was dispersed. All in all the Directional Waverider operated during the week for 82% of the time on solar energy and 4% of the generated energy was dispersed as surplus to needs.

Doubling of the lifetime of the primary cells can be expected in regions with a pronounced difference between summer and winter. In regions with a more constant supply of sunshine (between the tropics) the lifetime of the primary cells is expected to increase with a larger factor, potentially up to no battery use at all.

## Conclusion

In conclusion, the solar power system developed by Datawell for the Directional Waverider, combines the reliability of primary cells with the use of solar energy. The technology makes no compromise to the buoy design, either with respect to vulnerability, or with respect to functionality of the hatch, hatchcover and antennae. The design is suited for use in all climates and is always ready for use. By at least doubling the life time of the primary batteries, power source can be ignored as a factor when calculating the service intervals.