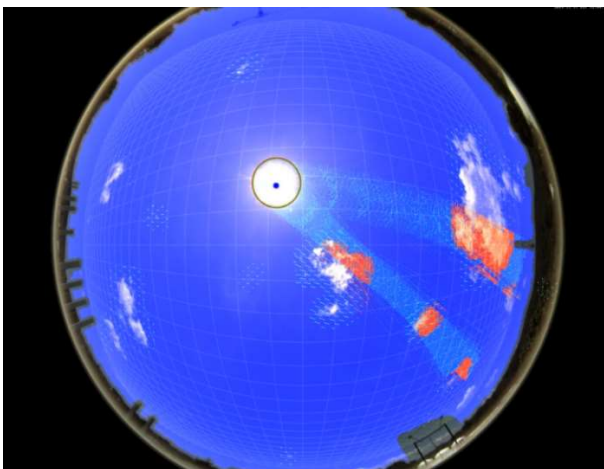


Solar forecasting: assessing and monitoring cloud coverage and how it will effect solar energy output

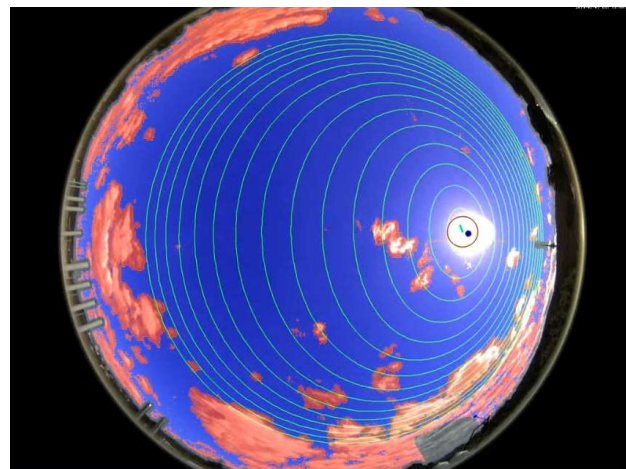
CSIRO, Australia's national science agency, has developed a suite of solar forecasting technologies including Skycam-based solar forecasting (SBSF) which operate using low-cost cameras and incorporates significant machine learning and image processing expertise.

Maximising energy output

Our SBSF prototype technology offers low-cost distributed solar forecasting. It comprises a low-cost security camera and software capable of measuring wind speed and cloud coverage, as well as predicting cloud movement, shade events, cloud formation, irradiance and power levels. This forecast information can be used to inform the operation of other equipment such as generators, loads and storage devices to maximise the use of solar energy. Our technology has been trialled in a number of different environments including at the energy dispatch and coordination level on grid-connected sites and in mini grids and remote area power system sites both in Australia, and internationally.



Cloud presence and proximity detection

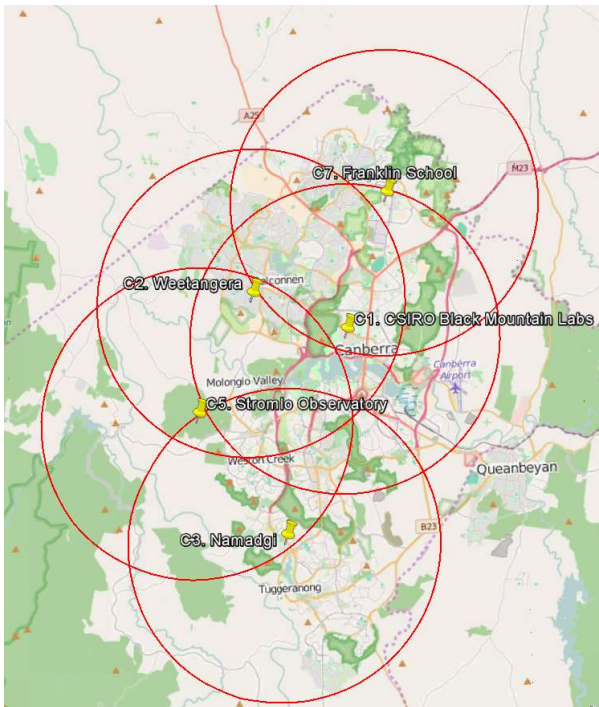


Cloud motion and shade event forecasting

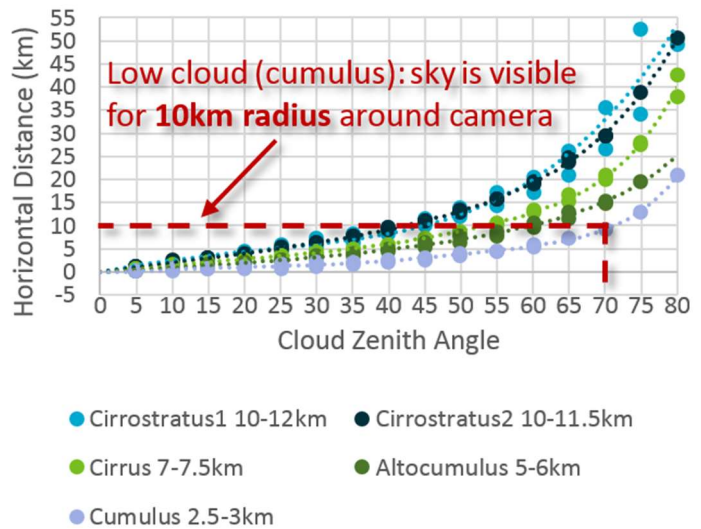
Key specifications

The forecasting algorithms and software system can be combined with inexpensive camera hardware to:

- Provide forecasts up to 30 minutes ahead, per camera
- Update forecasts based on new sky images every 10 seconds
- Detect cloud formation in clear sky areas for advanced warning of shade events
- Combine inputs from a network of cameras to get wide-area irradiance forecasts
- Identify camera locations in a network to allow optimised placement
- Predict PV power and direct and global irradiance based on past measurements and cloud forecast information
- Provide inputs for the control of PV and other generation and equipment using Skycam forecasts
- Provide forecast information to control systems via a variety of standard communications protocols



Viewing Angle vs Horizontal Forecast Range



Left: A network of sky-cameras can provide coverage for large forecast areas and longer forecast horizons. Photo credit: OpenStreetMaps

Right: Clouds can be observed and for areas more than a 10km radius around each camera.

Development and commercialisation opportunities

CSIRO is seeking responses from proponents capable of working with us to develop and commercialise the SBSF technology. We are looking for commercial and research collaborators that have the technical know-how, manufacturing, marketing and financial capacity to further develop, sell and support the technology. This is an opportunity to express interest in developing and commercialising the technology for specific applications, market segments and territories across the world.

This is a two-stage process where an initial expression of interest is sought (Stage 1), followed by a more detailed discussion with interested parties to determine where they see value in deploying the technology and how this could be achieved. We will use the information provided to explore potential development and commercialisation opportunities with selected interested parties.

For more information, please see www.csiro.au/EnergyEol or email EnergyEol@csiro.au

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AT CSIRO, WE DO THE EXTRAORDINARY EVERY DAY

We innovate for tomorrow and help improve today – for our customers, all Australians and the world. We imagine. We collaborate. We innovate.

FOR FURTHER INFORMATION

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