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## **RADAR VIDEO SIGNAL ENHANCER (RVSE)**

**Enabling safe wind farm development in aviation zones**

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By 2020, over 30% of the UK's electricity is forecast to come from wind farms<sup>1</sup>

It's official – the UK is the windiest place in Europe<sup>2</sup>! That means we can expect both onshore and offshore wind farms to cover even greater surface areas on land and in coastal regions. It's great news for the renewables sector, but a real headache for air traffic controllers. And that's official too – according to the Civil Aviation Authority's Policy and Guidelines on Wind Turbines<sup>3</sup>, '...providing a suitable environment that allows the co-existence of wind turbines and aviation is extremely complicated'.

Both large-scale and small-scale arrays of wind turbines can cause significant degradation in radar performance, with its implications for the safe provision of air traffic services.

Renewable energy wind farm developments are often hampered by the proximity of aviation facilities, such as airports and ground radars. This is because wind farms cause 'clutter' on civilian and military air traffic control (ATC) radar displays, preventing air traffic controllers from 'seeing' the air space above and around the developments.

A technical solution that both removes the clutter and assures continuous surveillance of the airspace around wind farms is required. The ideal solution is one that is reliable and accurate, requires no changes to existing radar and displays, and is easy to integrate and use. Such a solution would enable renewable energy development using wind farms and aviation activities to coexist.

The Cyrrus solution, called **Radar Video Signal Enhancer (RVSE)**, meets all of these requirements.

The RVSE can be cost effectively retrofitted to existing radar control instrumentation and can also be installed into new air traffic control facilities. The benefit of the RVSE is that air traffic controllers can 'see' the air space above and around wind farms whereas previously the radar coverage would have been filled with clutter from the wind turbines.

Current industry focus is mainly on solutions for modern digital radars and display systems. Until 'wind farm compliant' radars are available, the solutions on offer are either too severe and provide reduced target coverage, or involve complex computer models to manipulate radar data.

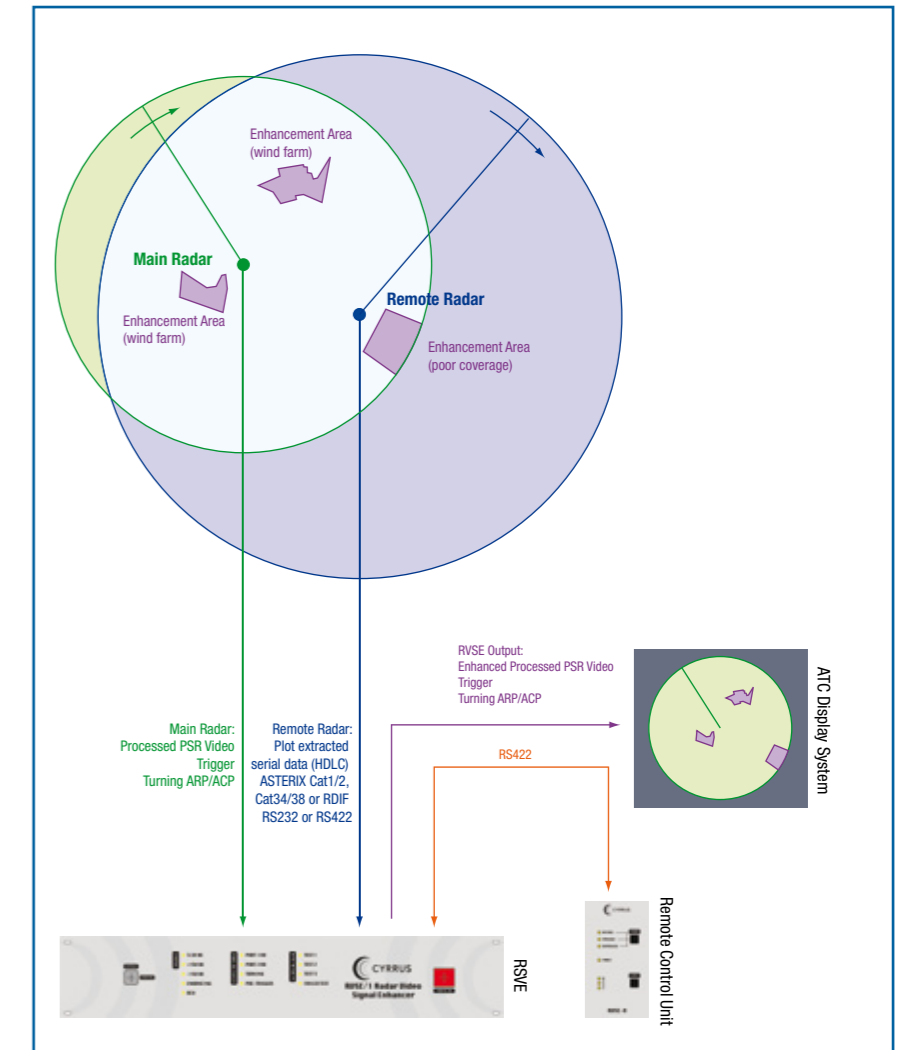
The Cyrrus Products **Radar Video Signal Enhancer** can be integrated seamlessly into traditional airport approach radars used with air traffic control video display systems. Additionally, it addresses both the technical and human factors that have not been resolved by other solutions.

# Cyrrus has created an outstanding solution, enabling the wind energy and aviation sectors to coexist in harmony

The **Cyrrus Radar Video Signal Enhancer** is uniquely for the traditional airport approach radars used with video display systems. Additionally it addresses both the technical and human factors aspects that have not been resolved by other solutions.

## HOW DOES THE RVSE WORK?

- The RVSE is inserted into the processed video feed from the local approach radar to the display system
- The RVSE receives a serial data input from a remote radar, with coverage of the airspace above the wind farms that is not compromised by the turbines
- The synthetic video is presented seamlessly, as if it were coming from the existing local approach radar
- The RVSE is configured with 'enhancement areas' around wind farms or where existing radar coverage is poor
- The processed video from the local radar is attenuated inside the enhancement areas to pre-configured levels
- The RVSE generates synthetic video targets from the plot-extracted targets in the serial data message from the inflill radar. Synthetic targets are inserted into the video input of the existing display system within the enhancement areas
- The ATC operator has a simple control panel which enables:
  - The enhancement process to be activated
  - The level of the local radar video in the enhancement areas to be selected
- The enhancement areas are displayed with a video outline to indicate the enhancement process is active within the boundary.



The RVSE neither hides what is happening nor does it use sophisticated algorithms. It simply attenuates the radar returns in the vicinity of the wind farms and overlays them with a synthetic video output generated from the target reports received from another radar that is not affected by the turbines. It does this in a way that provides the ATC Operator with a seamless and accurate presentation of aircraft tracks as if everything is coming from the local radar.

The continued safe provision of Air Traffic Services and the development of the potential for renewable energy from the wind are both vitally important to the economic development and prosperity. Reconciling these requirements has created intractable problems. But now Cyrrus has created an outstanding solution, enabling the wind energy and aviation sectors to coexist in harmony.

The **Radar Video Signal Enhancer** is a unique innovation in aviation radar product design developed by Cyrrus. It provides air traffic controllers with a clear 'radar video' presentation of aircraft tracks in the airspace over wind farms, leaving the display free of the clutter generated by the wind turbines. They can view this synthetic video directly on their displays and consequently continue to use SSR overlay presentations. This approach minimises additional ATC training requirements and changes to operational procedures.

<sup>1</sup> Building a Low Carbon Economy (Committee on Climate Change December 2008)  
<sup>2</sup> British Wind Energy Association (www.bwea.com)  
<sup>3</sup> CAO 764 CAA Policy and Guidelines on Wind Turbines (Directorate of Airspace Policy: CAA February 2009)

# The RVSE is just one of the many great ideas for the aviation and renewable energy sector to come out of Cyrrus

If your aviation and renewable energy challenges demand innovative product solutions, engineering expertise and project management excellence, Cyrrus can meet them. We can provide expert advice on single issues or a complete end-to-end project-managed solution. Our skilled and experienced team includes air traffic control officers (ATCOs), engineers and designers, supported by hard-to-source skills via our trusted partner network.

## Our services include:

- Advice on the effects of wind energy development on CNS/ATM
- Air Traffic Management (ATM)
- Air Traffic Control Communication, Navigation & Surveillance (ATC CNS)
- System Engineering and Design
- ATM Project Management
- Technical Safeguarding and Simulation
- ICAO PANS-OPS Instrument Flight Procedure Design
- Regulatory and Technical advice on CNS/ATM
- Due diligence and audit of airport CNS and ATM
- ATM Safety Management Systems
- Airport Certification and Regulation of Airports and ATM facilities
- Airspace Design and Development

*“With Cyrrus’ wealth of air traffic management experience, they were the natural choice to turn to when we required aviation advice to progress our projects”.*

**Chris Thomas, Project Manager**  
**West Coast Energy Ltd.**

To find out more about Cyrrus solutions visit us online at: [www.cyrrus.co.uk](http://www.cyrrus.co.uk)

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