TERMA SCANTER
ENHANCED SMR (ESMR)
INFORMATION ALWAYS ADDS

TERMA INTRODUCES ENHANCED SMR (ESMR)
For the past +20 years, the traditional ground movement radar has been the primary sensor providing surveillance input for Advanced Surface Movement Guidance and Control Systems (A-SMGCS) with reference to e.g. the EUROCAE ED-116.

The flexibility of software-defined radar systems and advances in digital signal processing now allow for processing more information. This improves the situational awareness capability significantly within the same physical envelope.

eSMR is an add-on to the well-known SMR application that supports ILS interception of descending aircraft at parallel runways out to 10,000 m on the final approach.

eSMR enables detection and tracking of descending aircraft as well as non-transponder low-level unidentified flying objects around the airport. It is a 2-in-1 solution not compromising the 60 RPM of an SMR, and with detection and classification of various moving targets, incl. birds & wildlife within and above the aerodrome maneuvering area.

Moreover, eSMR will help the ATC to overcome the surveillance transition challenge for final approach.
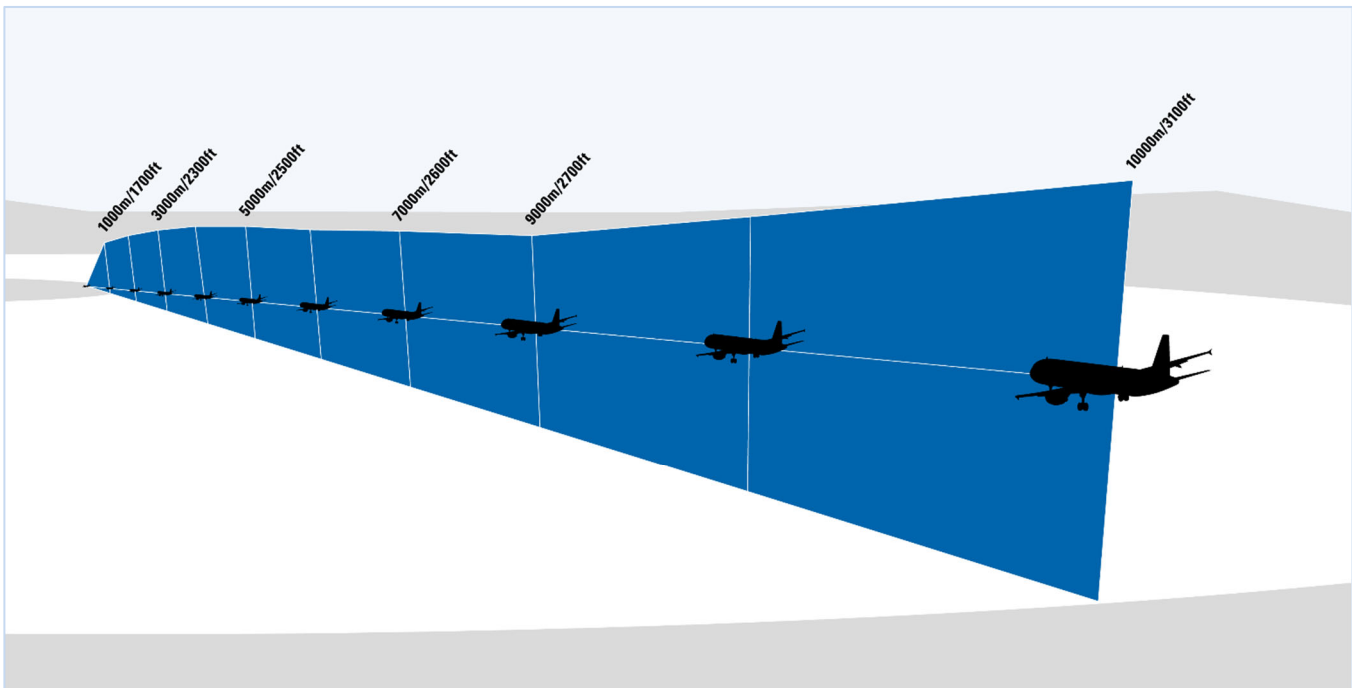
SOLID STATE AND SOFTWARE DEFINED RADAR SENSORS
Previously, solid-state technology was exclusively available for defense applications. During the last decade, full solid-state technology, however, has been introduced for civilian applications and ATC.

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The flexibility of a software-defined modern radar sensor provides the means to enhancing not only the fundamental capability of what is required for the A-SMGCS, but also providing additional data to different users with different primary objective than the tower controller.

UNIQUE CAPABILITIES OF THE ESMR:
- Approach corridor surveillance giving accurate, high precision & high update rate detection allowing ATC a positive confirmation runway alignment for inbound traffic.

- Improved detection and tracking of small hidden objects in high clutter density areas and masked areas such as infield grass areas between asphalt or close to perimeters.

- Possible detection and classification of various moving targets, incl. birds & wildlife within and above the aerodrome maneuvering area.

- Embedded Plot extraction- and tracking fully independent of the A-SMGCS backend system with radar video in standard ASTERIX format.

A well-known challenge of a modern airport is the primary and secondary radars not providing coverage below 2-300 m and the update rate is 4 sec. These radars might also have a limited view to the descending aircraft due to buildings or blind zones. A correlation in the A-SMGCS between the secondary radar and the SMR makes it possible to transfer the label automatically and earlier.
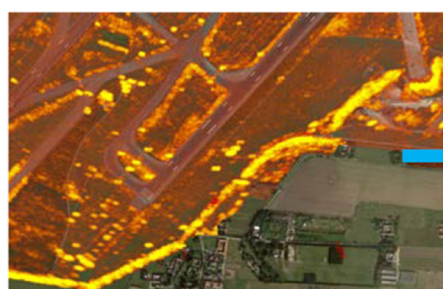
Radar return raw image (yellow color)   Doppler processed image with trajectory history (red color)   Track trajectory highlighted (white triangles)

Along the perimeter, a metallic fence is installed creating a permanent strong echo. And along the fence is a narrow perimeter road. The proximity of the two excludes positive detection of vehicles driving along the road, as these will merge with the background created by the fence. With the eSMR, all stationary objects are eliminated, allowing only moving objects to pass through the filter.

The eSMR will increase the instrumented range from typically 3-4.000 m to 10.000 m and provide primary detection >60 sec prior to touch-down in the 3-degree glide path angle.

ENHANCED GROUND SITUATIONAL AWARENESS
Previously, detection and tracking has not been achievable regarding objects moving close to the edges of runways and taxiways and airside service roads. This is a challenge in an airport. To the air traffic controller, a careful balance between detecting and tracking objects of interest without increasing the false alarm rate is always the main objective. Consequently, track masks are typically defined, leaving a guard zone due to clutter from the boundary between the asphalt and infield grass area. In certain situations, a vehicle driving along and near the runway will not be detected by the normal processing. Consequently, tracking of the vehicle is impossible in such areas.

With the eSMR, it is possible to feed both streams of data simultaneously to the embedded tracking processor, which ultimately provides the final track output suitable for ATC purposes. External radar data processors typically work on 8-bit video. Simultaneously the embedded solution utilizes the full dynamic range of 14-bit in addition to receiving the video feed simultaneously from the two available processing channels.

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