



# *Runway Safety Solutions*

*Automated and Continuous FOD Detection and  
Runway Monitoring for Airport Operating Areas*

**Varec<sup>®</sup>**  
a Leidos company

## *The Challenge*

Airports across the world are seeing increased demand for air transport, which creates many operational challenges for airport management teams. One of the most critical challenges is finding ways to increase throughput when the runway infrastructure footprint is restricted. When no more runways can be built, then the only option is to increase capacity on the existing infrastructure.

But how can you increase capacity at the operational level without impacting safety? How can you find increased efficiency from an already tight flight schedule? Each day, aircraft face various forms of runway-based safety hazards including birds, wildlife, and a wide range of foreign object debris (FOD). Time must be allocated for safety checks to ensure FOD is not present on runway, apron, and ramp areas. The winter season can be especially challenging, causing additional lost efficiency and increased danger from FOD, mainly due to impaired view of the runway during rain, fog, ice, and snow.





## *The Solution*

Varec's Foreign Object Debris Detection (FODD) system reduces runway downtime while increasing runway safety, allowing you to increase capacity and efficiency. At the center of the solution is a network of sensors, or surface detection units (SDUs), co-located with the runway edge lights. Each SDU utilizes a combination of a millimeter-wave radar and camera optics. Together, these SDUs automatically and continuously scan operational areas and use patented image processing algorithms to monitor runway conditions for FOD, wildlife, and the status of other runway equipment — even during inclement weather conditions. Once detected, your operators are immediately alerted to the potential hazard, so that risk can be averted.

The FODD system can also be enhanced to provide additional value for many operational teams across the airport. With the high volume of arriving and departing flights every day in airports around the world, an effective runway management solution that can provide comprehensive and reliable command of the runway and its surroundings is essential. Better management not only increases efficiency, enhances safety and improves security, but also saves airports and airlines countless hours in time, money, and manpower.



□ *Automated FOD Detection for Critical Areas*

FODspot™ is a scalable system for detection and monitoring of FOD at critical intersections and other airport FOD hotspots.



□ *Ground Level Bird Detection and Recognition*

The BirdWize™ software uses information from the FODD SDUs to automatically separate birds from other FOD types, and then automatically alerts the airport's wildlife team in real time. An image of the bird, its size, and exact location are available to the operator so that action can be taken as needed. An operator-controlled audio system built into the sensors scares the bird away from the runway without harm. BirdWize™ also features a comprehensive reporting system that documents all events, which is useful for investigating behavior patterns or creating Wildlife Hazard Assessments.





### *Automated FOD Detection Sensors*

FODD SDUs scan continuously to provide complete runway surface evaluation every 60 seconds, fast enough to provide coverage between aircraft movements. Each SDU utilizes a combination of a millimeter-wave radar, high-resolution NIR-illuminated optic sensors, operator-initiated laser line generator, and proven advanced image processing. Together, these technologies enable viable sensing, identifying, and locating at a previously unprecedented level of speed and accuracy for objects as small as an aircraft rivet.

## *Remote Snow Depth Measurement*

The addition of an optional infrared laser beam to the FODD SDUs and advanced image processing algorithms used by the SnowWize™ software module combine to provide accurate, remote measurement of snow levels across a runway and calculate snow coverage percentage.

## *Real Time Monitoring*

The ViewWize™ software module uses high resolution NIR-illuminated optic cameras within the FODD SDUs to allow real-time monitoring and management of runway operations, equipment, and the surrounding infrastructure. Your operators can gain an enhanced view of every section of the airfield. For example, they can view close-ups of landings and take-offs, inspect incidents as they unfold, or check operational status of airfield lighting or signage. With ViewWize™, these types of command and control decisions can be made without disrupting runway activity, thus improving operational efficiency.



## *Operational Awareness*

Using the HD camera, your operators can also view the runway up close and then make informed decisions to raise runway availability without sacrificing safety or interrupting current runway operations.





Varec's Foreign Object Debris Detection (FODD) system offers our airport clients yet another powerful solution set that improves runway safety and operational efficiency, and increases runway capacity. The Varec Team brings 85 years of experience with commercial and military aviation markets, a unique FOD detection solution, successful FOD system experience with some of the world's busiest airports, and a culture of corporate responsibility.

FODD is the only solution available in the market that can automatically detect FOD between runway movements, which would have been able to prevent the Concorde crash in 2000, and is the only solution offering a combination of radar and optical image processing for reliable detection of FOD.

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