



**FOREIGN OBJECT DETECTION SYSTEM**  
**DRAFT SCOPE OF SERVICES**

**BACKGROUND**

Miami-Dade County, hereinafter referred to as the County, as represented by the Miami-Dade Aviation Department (MDAD) is soliciting proposals for a turnkey installation and maintenance of an airport (FOD) Detection System, hereinafter referred to as the System, to serve Runway 8 Right/26 Left (8R-26L) at Miami International Airport (MIA). FOD at airports is defined as any object found on the airfield which has the capacity to injure airport or airline personnel and/or aircraft. The presence of FOD on an Aircraft Operations Area (AOA) poses a significant threat to the safety of air travel. FOD has the potential to damage aircraft during critical phases of flight which can lead to catastrophic loss of life and airframe, and at the very least, increased maintenance and operating costs. FOD damage costs airlines, airports, and airport tenants millions of dollars every year. The cost to repair a FOD-damaged engine can easily exceed \$1 million. FOD also causes extensive indirect costs such as flight delays and cancellations resulting in lost revenue and productivity. Current FAA regulations mandate that airport owner/operators inspect runways visually for FOD at a minimum once per day as part of the daily daylight inspection of aircraft operating areas.

The selected Proposer shall be responsible for providing FOD detection equipment/devices, associated software licenses, technology hardware, development, training, testing, installation, and implementation services as well as ongoing support and maintenance for the proposed System. MDAD is not seeking a Software as a Service (SAAS) or cloud based solution, rather the proposed System shall reside on site at MIA. The selected Proposer shall also be responsible for all construction, including all permitting, licenses, and inspections associated with the implementation/installation of the proposed System. The implementation of the proposed System on Runway 8R-26L is being partially funded by Federal Aviation Administration (FAA) under Grant Agreement No. 3-12-0049-066-2012. The intent of this initial implementation is to achieve a proof of concept regarding the efficiencies of automated FOD detection systems. Based on the findings of this initial implementation, the proposed System may be further expanded to additional runways and/or airport areas at the sole discretion of the County.

**CURRENT ENVIRONMENT**

**RUNWAY SPECIFICATIONS**

Runway 8R-26L is 10,506 feet in length and 200 feet in width. 8R-26L is one of two closely-spaced parallel runways that collectively accommodate the largest proportion of air carrier operations at MIA. The two runways have an 800-foot centerline-to-centerline separation with a single intervening parallel Taxiway (Lima) that has a 400-foot runway-to-taxiway centerline separation from each runway respectively. 8R-26L includes runway edges lights every 200 feet on center.

**CURRENT FOD DETECTION PROCESS**

Currently MIA airport and airline operations personnel serve as the primary "sensor" to detect FOD on airport surfaces. Historically, the detection of FOD has been based upon the systematic visual inspection twice a day, one in the morning and one at night, of airfield and apron pavement surfaces by trained airport personnel. A complete inspection

takes approximately 10 minutes. Runways are closed to air traffic during such inspections. Additional inspections may occur during times of inclement weather or when FOD is reported by pilots. The removal of FOD occurs only at time of the inspection. The ability to provide continuous FOD detection of pavements, particularly between each aircraft operation (e.g., take-off or landing) is not provided by traditional pavement inspection practices at MIA.

## **MDAD TECHNOLOGY ENVIRONMENT**

### **Software Infrastructure**

MDAD operates a complex environment that is capable of supporting multiple software platforms. MDAD supports the use numerous operating environments, including Microsoft, Linux and UNIX as well as Oracle, Microsoft SQL and other various database products. MDAD supports a Microsoft client environment utilizing the Windows 7 operating system. MDAD conducts weekly patch management updates on all systems. Software applications installed on the MDAD network are required to run as a user and are not permitted to be run using administrator access rights. MDAD supports McAfee VirusScan Enterprise and AntiSpyware Enterprise version 8.8.0 for its server environment and McAfee AntiVirus Agent version 4.6 for its client environment. All equipment that touches the MDAD network is required to have this antivirus protection software installed.

### **Storage Infrastructure**

MDAD utilizes IBM's Tivoli Storage Manager (TSM) for data backup and recovery. Data is backed up on a daily basis to a centralized server as well as an offsite location for disaster recovery purposes. TSM is capable of backing up numerous platforms, including Microsoft Windows Operating System, Microsoft Windows Server, Linux and UNIX. TSM also allows for the backup of various database software products, including Oracle and Microsoft SQL. In order to operate, TSM requires the installation of a backup client on the hardware/server that houses an application. Backups are completed daily between the hours of 6PM and 6AM.

### **Network Infrastructure**

MDAD operates a Cisco network environment, inclusive of switches and routers with industrial capacity. The network consists of single mode fiber cable with Standard Connectors (SC). MDAD supports either Category 5 Enhanced copper cables or Category 6 cables; however, all components must meet Category 6 transmission parameters.

## **SYSTEM REQUIREMENTS**

The proposed System must fully satisfy minimum performance specifications for systems and equipment that detect foreign objects on airports contained in the FAA Advisory Circular 150/5220-24, *Airport Foreign Object Debris (FOD) Detection Equipment*. The proposed System must also fully comply with the FAA Program Guidance Letter (PGL) 12-06, *Initial Program on FOD Detection Systems* that addresses the FAA's funding eligibility of FOD detection equipment.

The proposed System shall provide MDAD with FOD detection technology in order to expand the accuracy of FOD detection through automation, while also providing the added capability to continuously monitor and detect FOD on runways and other aircraft movement areas. The proposed System is not intended to replace MDAD's current FOD inspection and detection procedures or practices. Rather, the proposed System will serve to enhance and supplement the current MDAD processes as outlined above.

The proposed System shall be a static system comprised of three main components: front end detection equipment/devices that serve to identify FOD, an associated software system that collects information from the detection equipment/devices and provides it to MDAD personnel via a client interface that will run on current MDAD workstations, and a server application and associated technology hardware (i.e. servers) that hosts the FOD software that is required to be backed up on a regular basis in the MDAD storage infrastructure. The server application must be capable of communicating using the MDAD proxy server.

The proposed System must be capable of operating accurately twenty-four (24) hours per day, seven (7) days per week in various environmental conditions.

- TECHNICAL REQUIREMENTS

Req. No.	Requirement Description
1.	Proposed System provides surveillance on Runway 8R-26L.
2.	Proposed System detects and locates single and multiple FOD items on Runway 8R-26L.
3.	Proposed System provides an alert to the user when FOD has been detected. (Please include the method for providing alerts in the Response Description).
4.	Proposed System operates in conjunction with, and does not interfere with, existing and planned future airport and aircraft communication, navigation, and surveillance systems.
5.	Proposed System operates in conjunction with, and without interference from, normal airport and aircraft operations (e.g., aircraft and vehicle movements).
6.	Proposed System provides a data record of detected FOD, allowing for equipment calibration and maintenance, and for analysis of the FOD event.
7.	Proposed System is capable of detecting an unpainted, metal cylinder, measuring 1.2 in (3.1 cm) high and 1.5 in (3.8 cm) in diameter.
8.	Proposed System is capable of detecting a white, grey, or black sphere, measuring 1.7 in (4.3 cm) in diameter (i.e., a standard size golf ball).
9.	<p>Proposed System is capable of detecting 90 percent of the following objects listed in AC 150/5220-24, Section 3.2, (c). (identify which objects in Response Description):</p> <ul style="list-style-type: none"> <li>• A "chunk" of asphalt or concrete</li> <li>• Any portion of a runway light fixture (in-pavement or edge light)</li> <li>• An adjustable crescent wrench (up to 8in. (20 cm) in length)</li> <li>• A deep socket (at least 2 in. (5 cm) in length)</li> <li>• A piece of rubber from an aircraft tire</li> <li>• A distorted metal strip (up to 8in. (20 cm) in length)</li> <li>• A fuel cap (aircraft or automotive)</li> <li>• A lug nut</li> <li>• A hydraulic line (from aircraft or GSE, up to 8in. (20 cm) in length)</li> <li>• PVC pipe, white (2 in. (5 cm) in diameter)</li> </ul>

Req. No.	Requirement Description
10.	<p>Proposed System is capable of detecting any two of the objects list below contained in AC 150/5220-24, Section 3.2, (c), located no more than 10 ft. (3 m) apart from each other, identified as separate objects. (identify which objects in Response Description)</p> <ul style="list-style-type: none"> <li>• A "chunk" of asphalt or concrete</li> <li>• Any portion of a runway light fixture (in-pavement or edge light)</li> <li>• An adjustable crescent wrench (up to 8in. (20 cm) in length)</li> <li>• A deep socket (at least 2 in. (5 cm) in length)</li> <li>• A piece of rubber from an aircraft tire</li> <li>• A distorted metal strip (up to 8in. (20 cm) in length)</li> <li>• A fuel cap (aircraft or automotive)</li> <li>• A lug nut</li> <li>• A hydraulic line (from aircraft or GSE, up to 8in. (20 cm) in length)</li> <li>• PVC pipe, white (2 in. (5 cm) in diameter)</li> </ul>
11.	Proposed System provides location information for a detected object that is within 16 ft. (5.0 m) of the actual FOD object location.
12.	Proposed System provides continuous operation from fixed sensors to allow for the continuous inspection of runway surfaces during flight operations.
13.	Proposed System provides detection and inspection of FOD within 4 minutes of a FOD occurrence.
14.	Proposed System detects objects under rainfall conditions (e.g. having a specific intensity, duration, and frequency) for a two-year category of storms as specified in Climatology of the United States No. 20 (CLIM 20) report included as Attachment 2.
15.	Proposed System is able to perform uninterrupted during clear weather conditions.
16.	Proposed System is able to perform uninterrupted during inclement weather conditions.
17.	Proposed System notifies the user of the amount of time required for the system to recover after a rain storm, that is, to return the performance capabilities of clear weather conditions after adverse weather conditions subside. In this case, the end of adverse weather conditions will be defined as when precipitation of rain ends. (Please provide method for notification in the Response Description.)
18.	Proposed System is capable of alerting the user to the presence of FOD in scanned areas, including visual information and location to allow MDAD staff to assess the severity of the hazard and determine if immediate removal is required. (Please provide method for providing alerts in the Response Description.)
19.	Proposed System does not produce false alarms (an alert causing the airport operator to take action to remove a FOD object that does not exist) that exceed one per day as averaged over any 90 day period, for FOD detection systems with visual detection capabilities.
20.	Proposed System allows users to generate an entry that is associated with a visual FOD inspection not detected by the System.
21.	Proposed System automatically records alert time and date of FOD detection.
22.	Proposed System automatically records location of FOD object, including general location as well as specific location including longitude and latitude within thousandths of a second.
23.	Proposed System automatically records runway designation.
24.	Proposed System is capable of capturing meteorological condition.

Req. No.	Requirement Description
25.	Proposed System is designed to withstand and operate without damage or failure in ambient temperatures ranging from -25 degrees F (-32 degrees C) to +123 degrees F (+52 degrees C).
26.	Proposed System is designed to withstand and operate without damage or failure in relative humidity ranging from 5% to 100%.
27.	Proposed System is designed to withstand and operate without damage or failure in environments that contain dust and airborne hydrocarbons resulting from jet fuel fumes.
28.	Proposed System has the capability to automatically power-up and operate in the condition and settings that were available just prior to the power failure.
29.	Proposed System is capable of capturing a description of FOD detected or retrieved, such as size, name, type, serial number, etc.
30.	Proposed System is capable of capturing the method of detection (System detection, visual inspection, or notification from aircraft or vehicle).
31.	Proposed System is capable of capturing a local control number.
32.	Proposed System is capable of capturing information regarding damage caused by FOD (injury, damage to aircraft/vehicles, etc).
33.	Proposed System is capable of capturing time and date of FOD retrieval.
34.	Proposed System records time and date of disposition of alert.
35.	Proposed System records name of personnel detecting/investigating FOD.
36.	Proposed System is capable of capture the status of FOD (saved, cataloged, discarded, etc.)
37.	Proposed System automatically records an image of FOD retrieved.
38.	Proposed System records chain of custody information.
39.	Proposed System provides digitally recorded data for at least two years after the detection event.
40.	Proposed System includes a high resolution, day/night camera that can capture and display images in sufficient resolution for MDAD personnel to determine the nature and size of FOD. (Please provide the camera resolution provided by the System in Response Description)
41.	Proposed System is capable of pausing and/or ceasing scans during periods when the runway is closed to prevent false detections.
42.	Proposed System includes automated mobile alert capability that can notify MDAD personnel of detected FOD as well as System issues via email, telephone, or text message.
43.	Proposed System has a minimum total life of 10 years.

### **MAINTENANCE SERVICES TO BE PROVIDED**

The selected Proposer shall provide all maintenance services for the proposed System throughout the term of the contract, including any optional renewal periods. At a minimum, maintenance services shall include updates and upgrades to the System to maintain compatibility with future County hardware and software infrastructure. Upgrades should be provided at no additional cost to the County. Maintenance Services on the software component shall include corrections of any substantial defects, fixes of any minor bugs, and fixes due to any conflicts with mandatory operating system security patches as well as upgrades to new version releases. All environments, production and non-production, including testing and staging shall also be covered under Maintenance Services. Maintenance Services may be

provided via Remote Services using virtual private network (VPN) access. No other methods of remote support are permitted. Maintenance Services for the equipment/device component shall include preventative maintenance to combat normal wear and tear from general usage to maintain proper operations. Such preventative maintenance may include cleaning, inspection, and recalibration of the equipment/devices.

**TECHNICAL SUPPORT SERVICES TO BE PROVIDED**

The selected Proposer shall be responsible for provided technical support services to ensure optimal performance of the proposed System, including all components. This should include remote diagnostic tools to detect and correct application errors in the software component. The County's preferred escalation process is outlined below:

<b>Severity</b>	<b>Definition</b>	<b>Response Time</b>	<b>Resolution Time</b>	<b>Status Frequency Update</b>
1=Critical	A major component of the System is in a non-responsive state and severely affects MDAD productivity or operations.  A high impact problem which affects MDAD	One (1) Hour	Four (4) Hours	One (1) Hour
2=Urgent	Any component failure or loss of functionality not covered in Severity 1, which is hindering operations, such as, but not limited to: excessively slow response time; functionality degradation; error messages; backup problems; or issues affecting the use of a module or the data.	Two (2) Hours	Eight (8) Hours	Two (2) Hours
3=Important	Lesser issues, questions, or items that minimally impact the work flow or require a work around.	4 hours	Seventy two (72) Hours	Four (4) Hours
4=Minor	Issues, questions, or items that don't impact the work flow.  Issues that can easily be scheduled such as an upgrade or patch.	24 hours	One (1) Month for an acceptable work around until final resolution	Weekly Status Call

The selected Proposer should make on-site support available twenty-four (24) hours per day, seven (7) days per week to address Critical and Urgent issues. If runway closures are required to complete repairs, such closures must be coordinate with MDAD.

## **IMPLEMENTATION SERVICES TO BE PROVIDED**

The selected Proposer shall be responsible for providing on-site installation, integration and configuration services for all components of the proposed System. This should include planning and operational process redesign. The selected Proposer shall be responsible for testing the proposed System and insuring proper functionality prior to launching in the production environment. No conversion of historical data will be completed as part of this implementation. The selected Proposer must perform all implementation/installation services in accordance with applicable laws, ordinances, rules, and regulations. Runway closures can be conducted during off peak seasons. This will allow closures for multiple consecutive days if required. With prior coordination with MDAD staff, there is no restriction on the time of day during which implementation/installation services can be completed.

## **TRAINING SERVICES TO BE PROVIDED**

The selected Proposer shall provide on-site training on the proposed System for a minimum of 14 users, broken down into user appropriate sessions for the following groups:

Field/Maintenance Users	10
Administrative Users	2
System Administrators/IT Staff	2

The selected Proposer must provide all necessary documentation on the proposed System, customized for MDAD, both in hard copy and in electronic format. This documentation must include an operator's handbook as well as an illustrated parts breakdown and list. Facilities and computers will be provided by the County for the purpose of conducting such training. Additional training shall be made available via on-line videos or other resources on an ongoing basis throughout the term of the contract awarded as a result of this solicitation.

## **SOFTWARE ESCROW**

The selected Proposer shall be required to enter into a software escrow agreement with a licensed third party agent to house the source code associated with the proposed System at the time of Final System Acceptance as well as subsequent updates throughout the life of the contract, including any extensions or renewals thereof. No third party invoicing shall be allowed.

## **INVENTORY REQUIREMENTS**

The selected Proposer shall provide replacement parts for FOD detection equipment/devices to be housed on-site at the County for the completion of immediate repairs.

## Walters, Vivian (RER)

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**From:** Goldsmith, Beth (ISD)  
**Sent:** Thursday, July 11, 2013 1:37 PM  
**To:** Walters, Vivian (RER)  
**Subject:** Project No. RQAV1300038 - Foreign Object Detection System  
**Attachments:** FOD-DraftScope.docx; FOD-SBDINPUT.docx

Good Afternoon Vivian,

I have attached the project worksheet and scope document for the above referenced item. Please be aware that this is a federally funded project from the FAA. Please feel free to contact me if I can provide further assistance.

Thank you!

*Beth Goldsmith, CPPB*

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