

Case study: Military Airfield

# Robust Perimeter Protection In Military Environment



## Introduction

This military airfield located in South East Asia boasts a runway longer than 3,000 m. The airfield houses maritime patrol aircraft, jet tankers, as well as military personnel. Situated in a key area along Asia's maritime peninsula, the airfield deploys aircraft to protect the waters under the skies, further strengthening seaward defence and sea lines of communication of the region.

Canals and drainage systems were constructed at the airfield to keep the runway and taxiways free of surface water and prevent flooding due to frequent rain in the region. The canals and drainage systems become potential intrusion points. In securing these points, large drain gratings were installed.

In 2016, the military airfield started sourcing for an innovative and reliable Perimeter Intrusion Detection System (PIDS). They sought for solutions that could meet stringent requirements of a military airfield's security standards.

### CLIENT SITE INFORMATION

Perimeter length: 16 km

Type of fence: Welded-mesh

Height of fence: 3 m – 5 m

Type of drains: Storm drains

Max length per drain: 40 m

## Challenges

### ■ Deployment on a Variety of Perimeter Infrastructures

A typical PIDS is only able to accommodate a single type of infrastructure or barrier. This site has various types of perimeter infrastructures along the fence line, including walls, chain-linked and welded-mesh fence as well as drain gratings. The reaction or impact from an intrusion for each structure differs, and the typical PIDS will not be able to adapt appropriately with just one setting.

### ■ High Nuisance Alarm

A typical PIDS with some level of sensitivity and detection capability is susceptible to high nuisance alarm during weather changes, including heavy rain, strong wind or changing velocity of stream and drainage. Nuisance alarms or undesired alarms compromise safety and can hinder the effectiveness of functionality and operations.

### ■ Low Probability of Detection Rate

To counter the nuisance alarms caused by inclement weather and environmental conditions long the fence line or at the drain gratings, some PIDS would decrease the sensitivity level. Most of the time, sensitivity levels are decreased to a point where there is a chance of no detection during a real intrusion, especially during bad weather.

### ■ Situational Changes to The Site

In the event of plans to expand the airfield, the PIDS will require a mixture of permanent and temporary fences to accommodate the expansion. The PIDS in the field needs to be modular, with sections that are independent of each other as not to affect a huge perimeter length of security during the expansion.

## Client's Requirements

### ■ High Probability of Intrusion Detection

To be able to perform with > 95% detection rate for all relevant intrusion / tamper scenarios, even at the drain gratings when above water or submerged.

### ■ Very Low Nuisance Alarm Rate

To achieve an average of  $\leq 3$  per km per day in the actual environment after taking into account the disturbance from jet blasts and changes in the canal's water flow rate.

### ■ Pinpoint Accuracy

To achieve pinpoint accuracy of < 5 m, even at drain gratings.

### ■ System Flexibility & Robustness

One PIDS solution to be deployable on a variety of perimeter infrastructures, including temporary ones. Ability to minimise system downtime when perimeter line is being expanded or constructed.

### ■ Seamless Integration to Existing Systems

Integrate to existing Integrated Security Management System and leverage on existing PTZ cameras.



## AGIL Fence Solution

AGIL Fence PIDS was deployed along 16 km of the military airfield's perimeter fences, along with 40 m of continuous storm drains.

AGIL Fence PIDS uses advanced fibre-based sensors, which are embedded in fibre optics cables, and mounted on existing fences and drain gratings. Intrusions which include climbing, cutting of fence or drain gratings, tampering of cable, unnatural disturbance on the perimeter, etc. will be detected by the system and immediately conveyed to the security personnel.

### ■ Adaptable to be deployed on Various Perimeter Infrastructures

AGIL Fence PIDS can be implemented on a variety of fence types; chain-linked, welded-mesh, palisade, solid wall and drain gratings.

### ■ Easy Deployment

It is a one-step deployment of securing a single pass of AGIL Fence PIDS sensor cables with high-grade PVC cable ties onto perimeter fencing. For drain gratings deployment, the sensor cables can be routed down from the fence line and through a PVC tube secured to the drain gratings. There is no electronics and power supply in the field, so there is no fear for any sort of electromagnetic and radio frequency interference.

### ■ Secure Architecture and Design

An open-loop system, coupled with the flexibility of the sensor cables deployment, segregates the sensor cables into 240 m channels. Each channel acts independently without affecting others. This architecture will address the scenario in the event of any site changes the user may remove or disarm a single channel for fence construction or removal without fully compromising on the airfield's entire perimeter security.

### ■ Outstanding Performance with Lowest Nuisance Alarm Rate

The proprietary signal processing software has the ability to adapt and adjust automatically to inclement weather and different environmental conditions along the fence line and canals, reducing nuisance alarm rates without compromising the integrity of the system's intrusion sensitivity.

### ■ Accurate Pinpointing Capabilities

Fibre sensor spacing is customised to the perimeter length and type of perimeter infrastructure, and the sensor accuracy for pinpointing an intrusion location range is customary  $\pm 2.4$  m. This pinpoint accuracy works seamlessly with pan-tilt-zoom (PTZ) cameras, where the PTZ cameras can be preset and auto-triggered to slew to the point of intrusion. This provides users with the ability to verify the alarm and track the intruder visually.

Paired with the PIDS solution is the **AGIL Fence Integrated Perimeter Alarm Management System (iPAMS)**, capable of interacting with the military's airfield existing CCTV and Integrated Security Management Systems.



## Executive Summary

The implementation of AGIL Fence PIDS was crucial to a critical facility like the military airfield. It can potentially reduce reaction time by the security teams in times of threat and provide peace of mind for militants on site. Confidential assets are also protected more securely.

Validated by various institutes such as the UK Centre for the Protection of National Infrastructure and Safe Skies, AGIL Fence has proven time again its effectiveness when deployed in different scenarios ranging from substations to airfields, and the capability to cater world-class perimeter security to any facility.

## About ST Engineering

ST Engineering is a global technology, defence and engineering group specialising in the aerospace, electronics, land systems and marine sectors. The Group employs about 23,000 people across offices in Asia, Europe, Middle East and the U.S., serving customers in the defence, government and commercial segments in more than 100 countries. With more than 700 smart city projects across 130 cities in its track record, the Group continues to help transform cities through its suite of Smart Mobility, Smart Security and Smart Environment solutions. Headquartered in Singapore, ST Engineering reported revenue of \$7.9b in FY2019 and it ranks among the largest companies listed on the Singapore Exchange. It is a component stock of the FTSE Straits Times Index, MSCI Singapore, iEdge SG ESG Transparency Index and iEdge SG ESG Leaders Index. For more information, please visit [www.stengg.com](http://www.stengg.com).

AGIL Fence by ST Engineering is our solution-driven focus and tactical approach in representing the suite of fibre-optics perimeter security products and solutions. Through our deep sense of intuition and expertise, we know what it takes to deliver unparalleled perimeter security protection. AGIL Fence systems have been tested for use in airports and critical infrastructure including substations, military sites, correctional facilities and other high-security sites across the world. For more information, please visit our website [www.AGILFence.com](http://www.AGILFence.com) or contact us at [AGILFence@stengg.com](mailto:AGILFence@stengg.com).