Contents

Overview of Tool

This Excel-based tool was developed to demonstrate the implementation of the PARAS 0014 framework as described in Section 5 of the accompanying guidebook. The tool works by automating Step 4 of the framework, which is the quantitative measure-combination selection process. The spreadsheet is customizable and inputs are intended to be replaced by the user to match the airport project under consideration. However, example input has been provided to demonstrate the functionality of the tool.

The tool consists of example non-secure areas including:

- Arrival and Departure Halls
- Terminal Roadway
- Fuel Farms
- Air Traffic Control Tower
- Parking Garage
- Metro Connections
- Airport People Mover
- Car Pick-up Zones

The tool provides example mitigation measures consistent with those proposed within Section 4 of the guidebook; these include:

- Resilient Finishes
- Vehicle Security Barriers
- Structural Hardening
- Facade Enhancement
- Security Patrols
- Explosives Detection Canines
- CCTV

- Passenger Screening
- Crowd and Queue Reduction
- Vehicle Checkpoints and Screening
- Behavioral Detection
- Evacuation and Emergency Procedures
- Security Management Systems

The tool consists of seven example metrics to evaluate the effectiveness of a measure, which include:

- Deter
- Detect
- Disable / Disarm
- Reduce Crowds
- Inform Law Enforcement
- Protect People
- Protect Property

Finally, example costs have been included for all example mitigation measures to show functionality. It is expected that unique cost estimates will be provided for a specific use case.

A map of how the input sheets interact with each other is attached at the end of these instructions.

Sheets entitled Metric 1, Metric 2, Metric 3, Metric 4, Metric 5, Metric 6, Metric 7, Combined Cost, and Combined Metrics and Cost are calculation output sheets. These sheets only store values used as part of the arithmetic of the tool. These sheets can be reviewed if the user would like to delve into this detail. Otherwise, no user input is required.

Step-by-Step Instructions

Step 1

Users can familiarize themselves with the user interface sheet; no inputs are required initially at this stage. The user interface sheet is described below.

User Interface Sheet

The user interface sheet manages the user input that will be included within the framework assessment. It allows the user to select an airport area, include mitigations for evaluation, and assign tiers of performance for mitigations. This page is linked to other worksheets where the user can assign vulnerabilities, mitigation scoring, and costs specifically.

| Airport Area | Mitigation addresses the following | | | Type of Mitigation Measure | Mitigation Measure | Cost ($NPV) | Performance Tiers | Vulnreability Factor | Detect | Deter | Disable | Reduce Crowds | Inform | Protect People | Protect Property | Total Functional Score |
	LS	C	OR						Metric 1	Metric 2	Metric 3	Metric 4	Metric 5	Metric 6	Metric 7	
Metro Connections	✓	✓	✓	Physical	Resilient Fit-out	$ 800,000.00	Platinum	1	0	0	0	0	0	12.5	0	12.5
	✓	✓	✓	Physical	HVM	$ 750,000.00	Platinum	1	0	15	15	0	0	15	30	75
	✓	✓	✓	Physical	Structural Hardening	$ 1,500,000.00	Platinum	0.8	0	4	0	0	0	12	24	40
	✓	✓	✓	Physical	Façade Enhancement	$ 4,500,000.00	Silver	1	0	5	0	0	0	20	5	30
	✓	✓	✓	Operational	Security Patrols	$ 900,000.00	Silver	1	0	3	1	0	20	10	0	34
	✓			Operational	Explosives Detection Canines	$ 500,000.00	Silver	0.3	6	4.5	4.5	0	4.5	0	0	19.5
	✓	✓	✓	Technology	CCTV	$ 3,000,000.00	Gold	1	20	20	0	10	20	0	0	70
	✓			Operational	Screening of Individuals	$ 1,000,000.00	Platinum	0.3	9	12	6	-9	0	0	0	18
	✓	✓		Operational	Crowd and Queue Reducing	$ 632,000.00	Bronze	0.5	0	0	0	2.5	0	0	0	2.5
	✓	✓	✓	Operational	Vehicle Screening	$ 150,000.00	Gold	1	20	25	15	0	0	0	0	60
	✓			Technology	Behavioral Detection	$ 750,000.00	Bronze	0.3	1.5	1.5	0	0	3	0	0	6
	✓			Technology	Changes to Passenger behaviour / habits	$ -	Gold	0.3	0	0	0	1.5	0	0	0	1.5
				Operational	Evacuation and Emergency Procedures	$ -	Platinum	0	0	0	0	0	0	0	0	0
				Operational	Security Management Systems	$ -	Bronze	0	0	0	0	0	0	0	0	0

Non-secure airport area — **Listing of mitigations** — **Cost** — **Level of Service** — **Vulnerability weighting** — **Scoring of mitigations**

The user interface sheet also initiates the framework process by calculating all possible combinations of security mitigation measures selected for evaluation. This analysis is started by clicking the Run button. The results of this calculation are displayed graphically, where each combination is represented by a functional security score and an annual Net Present Value (NPV) cost. This can be seen as an example below:
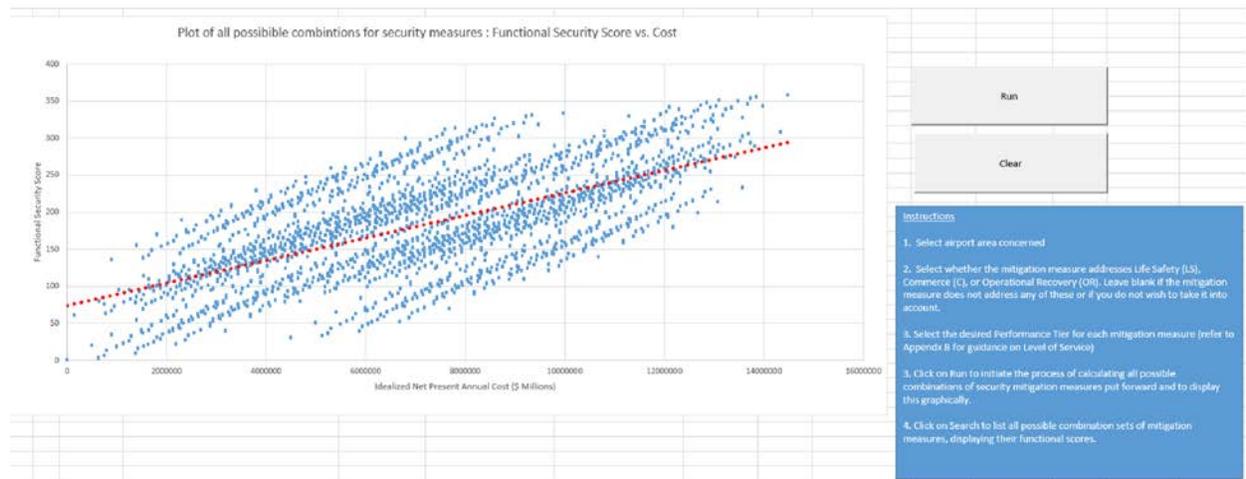
Once the analysis has run, the user can interact with the results by searching for measure combinations that are within range of a specific functional security score and cost. Furthermore, these searched results can be interrogated further by breaking them down into Physical, Operational, and Technological expenditures. This is shown below:
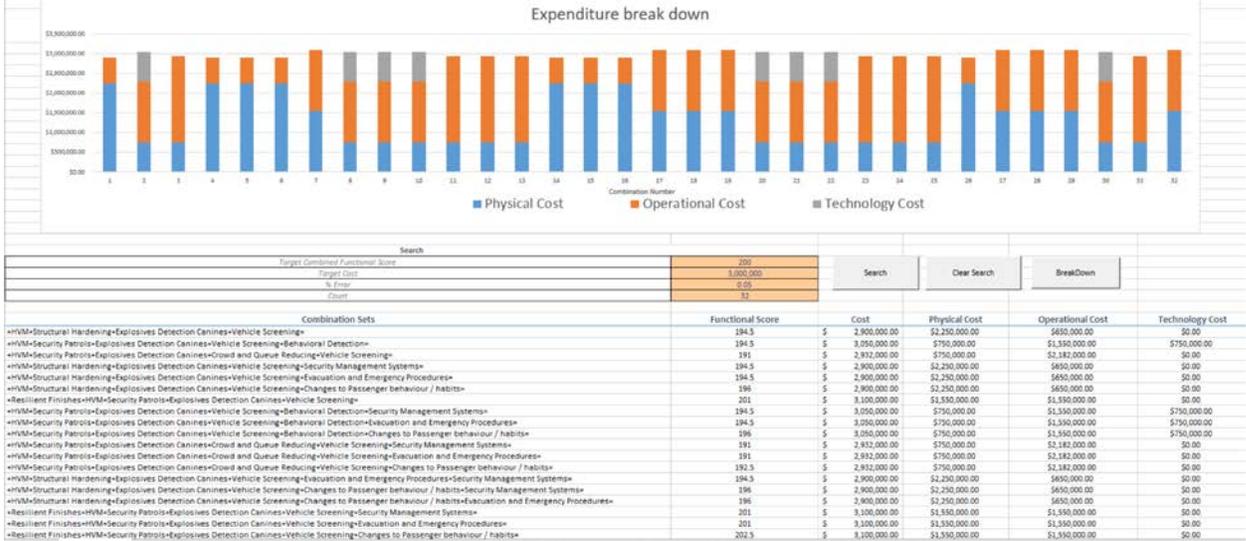
Step 2

Within the vulnerability sheet, the user inputs the airport area or areas that are to be assessed and then assigns vulnerability ratios for life safety, commerce, and operations for each area(s). The vulnerabilities sheet is described below.

Vulnerabilities Sheet

The vulnerabilities sheet allows the user to input their specific vulnerability to life safety, commerce, and operations for each of the specified non-secure airport areas. These vulnerabilities are represented as a ratio, whereby the sum of the vulnerabilities is equal to one. The purpose of a vulnerability variable is to weigh mitigations appropriately against the specific risk. The vulnerability input should be sought from a risk assessment process.

The vulnerability sheet looks as follows:

No.	Airport Area	Life Safety	Commerce	Operations	Total Score
1	Arrival and Departure Halls	0.6	0.1	0.3	1
2	Terminal Roadway	0.4	0.1	0.5	1
3	Fuel Farms	0.1	0.1	0.8	1
4	Air Traffic Control Tower	0.1	0.1	0.8	1
5	Car Parks	0.4	0.4	0.2	1
6	Metro Connections	0.6	0.2	0.2	1
7	Automated People Mover	0.6	0.2	0.2	1
8	Pick Up Zones	0.9	0.05	0.05	1

Note: Vulnerability Factors to be determined from a risk assessment process

Clear Values

Area Selected	Life Safety	Commerce	Operational Recovery
Metro Connections	0.6	0.2	0.2

Metro Connections

▪ Life Safety ▪ Commerce ▪ Operational Recovery

Step 3

Within the mitigation scoring sheet, the user assigns scores to security objectives for each security mitigation. The user has the option to assign scores for different performance tiers (Bronze, Silver, Gold, and Platinum) for a particular mitigation. The mitigation scoring sheet is described below.

Mitigation Scoring Sheet

The mitigation scoring sheet allows the user to input their own individual scores for each measure and each performance tier that is specific to the airport project under consideration. Example scoring has been provided as a default. Scoring is based upon a measure's effectiveness in meeting specific security objectives. The user also has the opportunity to provide a limit to any particular metric. We have defaulted to scores based on 100, whereby limits can represent percentages. For example, it may be concluded that it is not possible to completely detect all explosive devices on the landside due to the high volume of suitcases in peak times, and therefore, the measure's score is capped at a specific value.

The user needs to manage what numbers to use for both scoring and limits. This is an important realization of managing security risk and should be thought out carefully by the user before implementing. It is also pertinent to note that although quantitative values are provided, the absolute numbers do not have meaning; the results are dependent upon the relative scoring. As long as the same scale is followed during the user's assessment, the scoring system can be changed from the default.

The mitigation scoring sheet looks as follows:

Performance Tiers	Security objectives							Mitigation
	Detect	Deter	Disable	Reduce Crowds	Inform	Protect People	Protect Property	
Bronze	15	10	5	-60	0	0	0	Screening of Individuals
Silver	20	35	10	-50	0	0	0	
Gold	25	35	15	-40	0	0	0	
Platinum	30	40	20	-30	0	0	0	
Bronze	0	0	0	5	0	0	0	Crowd and Queue Reducing
Silver	0	0	0	10	0	0	0	
Gold	0	0	0	15	0	0	0	
Platinum	0	0	0	20	0	0	0	
Bronze	10	10	10	0	0	0	0	Vehicle Screening
Silver	15	20	10	0	0	0	0	
Gold	20	25	15	0	0	0	0	
Platinum	25	30	20	0	0	0	0	
Bronze	5	5	0	0	10	0	0	Behavioral Detection
Silver	5	5	0	0	10	0	0	
Gold	10	5	0	0	10	0	0	
Platinum	10	5	0	0	10	0	0	
Bronze	0	0	0	0	0	0	0	Changes to Passenger behaviour / habits
Silver	0	0	0	5	0	0	0	
Gold	0	0	0	5	0	0	0	
Platinum	0	0	0	10	0	0	0	
Bronze	0	0	0	5	0	5	0	Evacuation and Emergency Procedures
Silver	0	0	0	5	0	10	0	
Gold	0	0	0	10	0	15	0	
Platinum	0	0	0	10	0	20	0	
Bronze	5	0	0	0	5	0	0	Security Management Systems
Silver	5	0	0	0	5	0	0	
Gold	10	0	0	0	10	0	0	
Platinum	10		0	0	15	0	0	
LIMIT	80	80	65	75	100	75	75	Combined Mitigations

Step 4

Within the cost sheet, the user assigns costs to implement each mitigation measure and performance tier (if required). The costs sheet is described below.

Costs Sheet

The costs sheet allows the user to input costs for various mitigations and performance tiers. The cost sheet looks as follows:

Level of Service	Cost ($)	Mitigation
Bronze	$ 200,000.00	Resilient Finishes
Silver	$ 300,000.00	
Gold	$ 500,000.00	
Platinum	$ 750,000.00	
Bronze	$ 300,000.00	HVM
Silver	$ 450,000.00	
Gold	$ 800,000.00	
Platinum	$ 1,000,000.00	
Bronze	$ -	Structural Hardening
Silver	$ 1,500,000.00	
Gold	$ 2,000,000.00	
Platinum	$ 3,000,000.00	
Bronze	$ 350,000.00	Façade Enhancement
Silver	$ 700,000.00	
Gold	$ 1,200,000.00	
Platinum	$ 1,500,000.00	
Bronze	$ 1,500,000.00	Security Patrols
Silver	$ 2,500,000.00	
Gold	$ 3,500,000.00	
Platinum	$ 4,000,000.00	
Bronze	$ 400,000.00	Explosives Detection Canines
Silver	$ 800,000.00	
Gold	$ 1,400,000.00	
Platinum	$ 1,800,000.00	

Clear Cost Values

Step 5

Once all input sheets have been filled in, the user interacts with the user interface sheet by selecting an airport area and mitigation measures to be assessed, and then initiates the tool by clicking the Run button.

Step 6

The user is to analyze the results by searching for combinations of measures with particular scores and costs. The user can review the expenditure breakdown in terms of cost for physical, operational, and technological costs to facilitate their decision making.

Step 7

The user can identify favorable measure combinations for implementation.

Step 8

The user then repeats steps using next vulnerable area.