



## **Ensuring effectiveness and efficiency in security screening: the contribution of Human Factors**

**ICAO Symposium on Innovation in Aviation  
Security  
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**Andrew McClumpha**

# Content

**Background to requirement for sustainable innovative solutions**

**Human Factors Integration**

**Implementing solutions**



# There is persistent and increasing pressure on security officers to achieve effective and sustainable performance

## Increasing pressure on Security Officers

Increasing regulatory demands and audits

Increasing use of 2<sup>nd</sup> and 3<sup>rd</sup> Gen technologies

New emerging threats

New skills and training required

Need to meet Key Performance Indicators

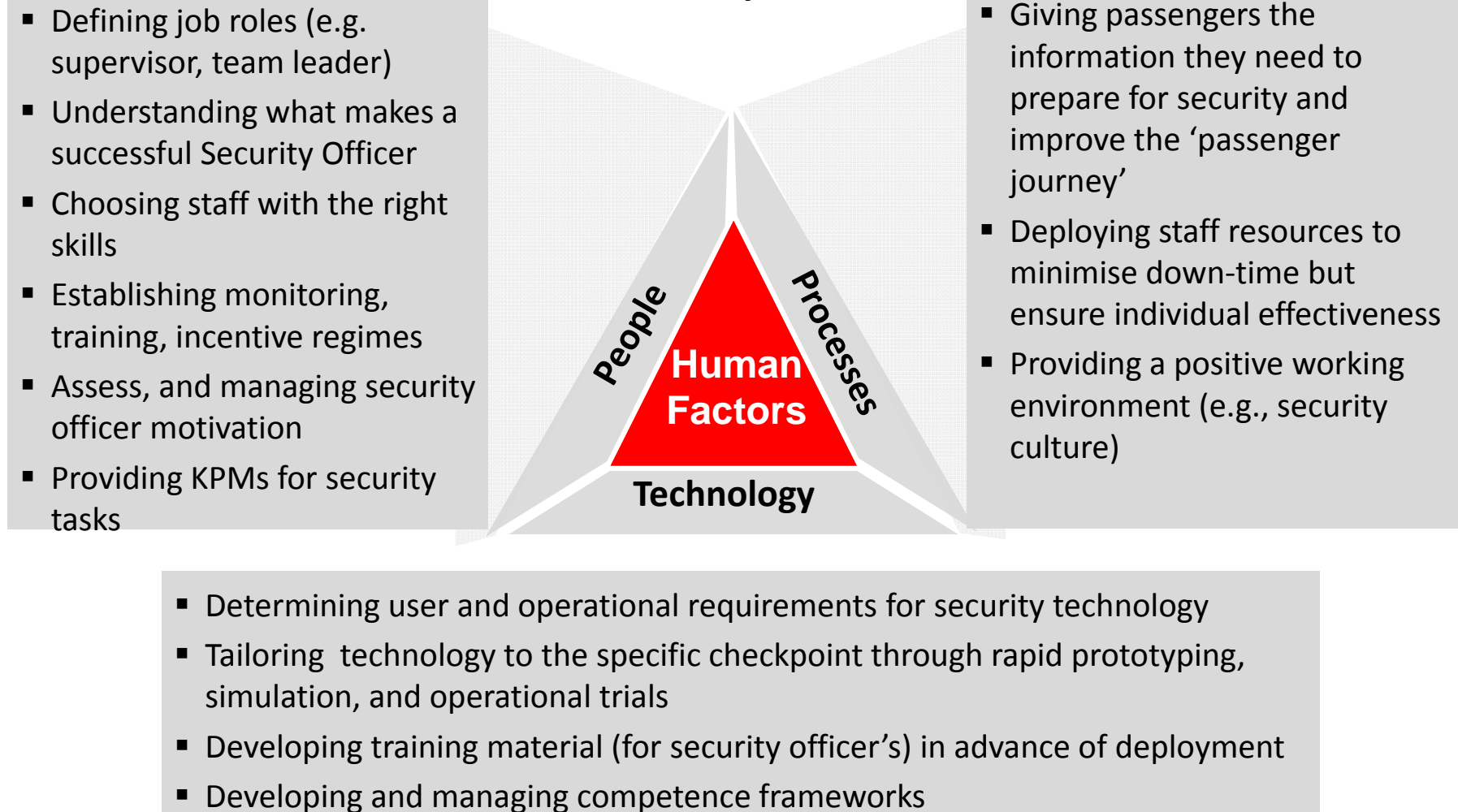
Increasing passenger demands

Increasing airport /airline demands



# A Human Factors programme demonstrates a strong commitment to innovation and is the 'glue' to ensure an effective security system

## Potential areas involved in an airport security Human Factors Program to deliver security and service





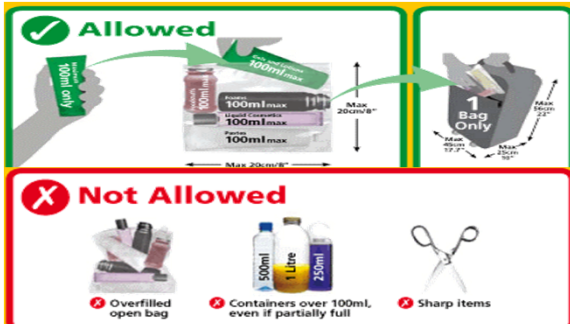
# Human Factors looks at improving and sustaining operational security but essentially addresses the following questions

- Human Factors focuses from the security officer, to their Management, to the Regulator, but essentially through different means asks the following questions
- Can this person...
  - ... with this training...
  - ... do these tasks...
  - ... to these standards...
  - .... with this equipment....
  - ..... within this working environment....
  - ... under these conditions?



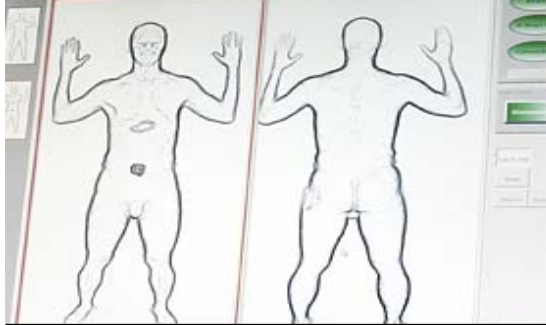
# ....but, security stakeholders have different challenges that can limit the potential to achieve consistent and sustainable security

## Regulators



- Require objective analysis and evaluation of new technologies and processes to decide effectiveness
- Primary focus is on threat detection not cost or operational impact
- Requirement to encourage innovation and remain neutral

## Equipment Manufacturers



- New concepts and ideas are often not in line with industry and regulator requirements resulting in:
  - increased costs
  - inefficient use of R&D resources and budgets
- Various challenges in obtaining requirements from regulators and airports

## Airport Industry



- Want to rapidly implement new technologies and processes but are uncertain of:
  - Impact on operations
  - Cost
  - Performance effectiveness
- Often frustrated by the amount of time taken by regulators to approve technologies

The application of Human Factors Integration in system design can increase operational effectiveness and reduce costs over full life cycle of system

# Content

Background to requirement for sustainable innovative solutions

Human Factors Integration

Implementing solutions

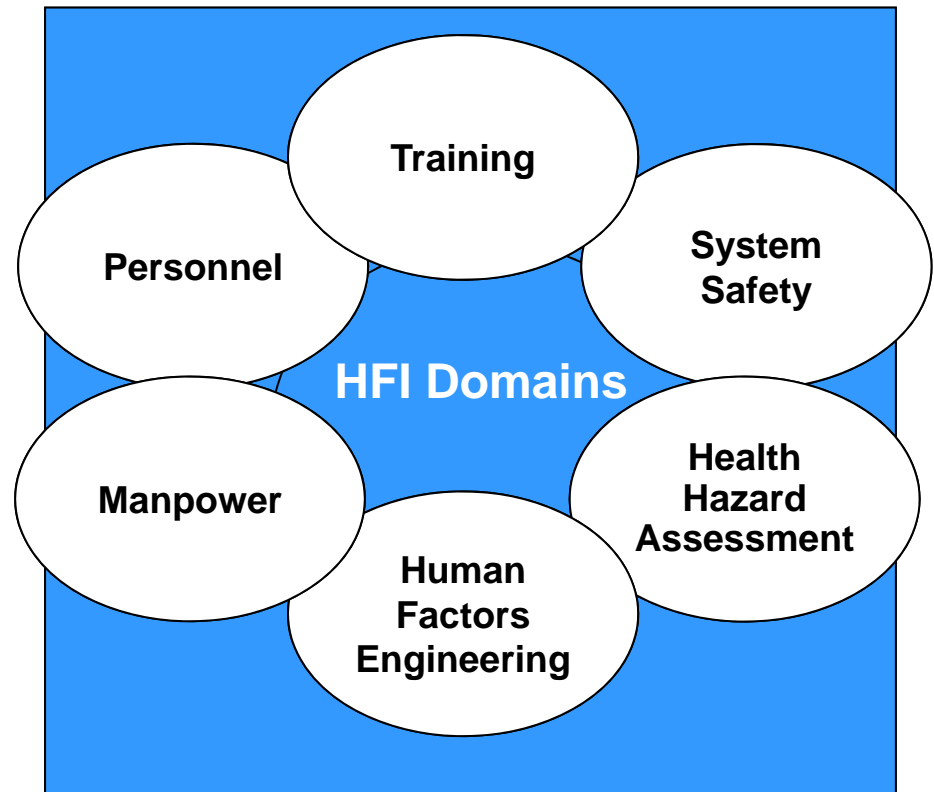


# Human Factors Integration (HFI) in supporting and managing security technology design, development, and implementation

## Purpose of HFI

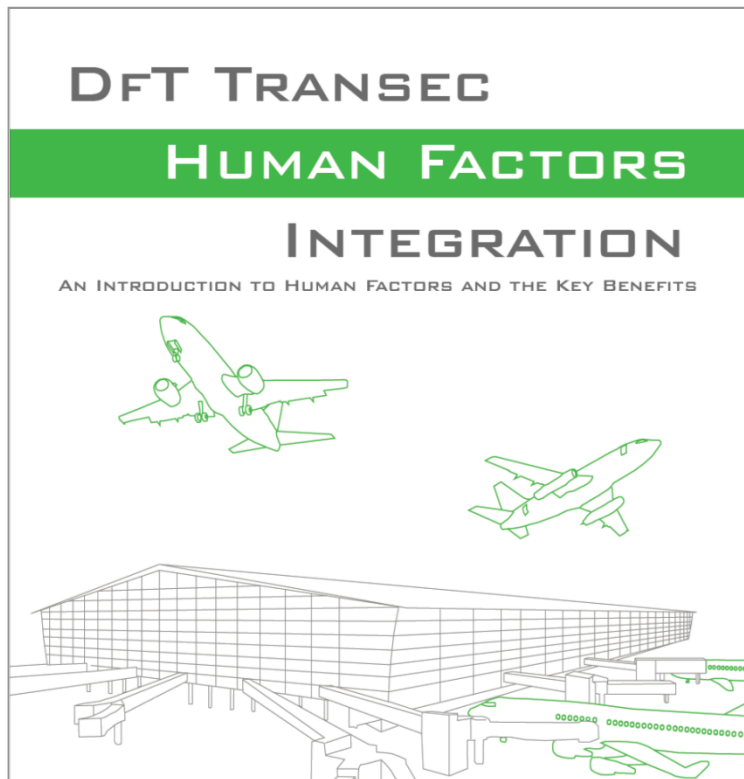
- Ensures application of human factors knowledge about human characteristics throughout the design, development, and evaluation of technology systems
- Provides balanced development of technical, operational, and human aspects
- Provides an audit trail demonstrating human factors issues have been adequately addressed during system design and development
- Provides comprehensive guidance to system developers, system procurers, airport authorities and end users

## HFI typically covers six key areas





# A Human Factors Integration Standard has been developed to leverage the full capability of emerging security technologies



Introduction to key benefits



Detailed implementation guide

# Content

**Background to requirement for sustainable innovative solutions**

**Human Factors Integration**

**Implementing solutions**



# An empirical measure of screening effectiveness has great potential to support continual operational effectiveness

## Aim

- A valid, reliable, and operationally usable operational checklists have the capability to improve performance and achieve a more standardised approach to passenger security screening



## Benefits

- Standard view across Airports and Screening Service Providers that defines “good” performance
- More effective identification of required performance enhancements
- Validated tools for
  - Individual and group performance assessments
  - Training evaluations
  - Procedure evaluations
- More rapid and effective feedback of performance than covert testing procedures are able to provide
- Diagnostic recommendations based on observed and accrued evidence

# The KPM Checklists

The KPM tools, currently in the form of paper-based checklists, have been developed for all checkpoint screening tasks:

## Passenger frisk (male / female)

**Key Performance Measures for Security Screening**

**Passenger Frisk**

Does the Screening Officer search:

- Unremovable headgear (e.g. religious veils)
- Bulky hair
- Shoulder pads
- Behind upper, collar
- Armpits
- Upper arms
- Cuffs
- Inside waistband
- Security sensitive areas
- Medical devices/support (chest brace, dressings, plaster cast) Remove concealment areas (e.g. pockets, inner jacket)

Between shoulder blades

Side of body

Small of back

Chest area - gender applicable (between breasts)

Between breasts

Between thighs

Shins

Ankles

Turn-ups/heels

Footwear (socks)

Australian Government  
Department of Infrastructure and Transport

## Baggage hand search

**Key Performance Measures for Security Screening**

**Baggage Hand Search**

Full search of bag

- Does the Screening Officer maintain control of the search?
- Does the Screening Officer check outside of bag for tampering?
- Does the Screening Officer open all compartments?
- Does the Screening Officer conduct a thorough search of each compartment and items within?
- Does the Screening Officer conduct a visual inspection of electronic items?
- Does the Screening Officer investigate suspect packages, bags, containers etc?
- Does the Screening Officer pay particular attention to footwear?
- Does the Screening Officer pay particular attention to magazines/books etc?

Does the Screening Officer check items for:

- Prohibited items
- Prohibited liquids
- Prohibited solids
- Prohibited powders
- Prohibited gels
- Prohibited pastes
- Prohibited creams
- Prohibited sprays
- Prohibited aerosols
- Prohibited foams
- Prohibited solids
- Prohibited liquids
- Prohibited solids
- Prohibited powders
- Prohibited gels
- Prohibited pastes
- Prohibited creams
- Prohibited sprays
- Prohibited aerosols
- Prohibited foams

For prohibited items

- Does the Screening Officer receive bag and go off to container excluding any prohibited items?
- Does the Screening Officer facilitate removal and disposal of items or make other arrangements (e.g. put in checked baggage)?

Australian Government  
Department of Infrastructure and Transport

## Explosive Trace Detection (ETD)

**Key Performance Measures for Security Screening**

**Explosive Trace Detection (ETD) Search**

Sampling the baggage

- Does the Screening Officer place sample correctly in ETD equipment specific?
- Does the Screening Officer allow adequate time for analysis?
- Does the Screening Officer maintain control of bag and belongings communicate process to passenger?
- Does the Screening Officer confirm results on screen and/or printout?

Using the ETD equipment

- Does the Screening Officer place sample correctly in ETD equipment specific?
- Does the Screening Officer allow adequate time for analysis?
- Does the Screening Officer maintain control of bag and belongings communicate process to passenger?
- Does the Screening Officer confirm results on screen and/or printout?

Alarm resolution

- If negative on test 1 or 2 does the Screening Officer require passenger and belongings?
- Does the Screening Officer sample the same area as before?
- Does the Screening Officer sample additional area?
- If double positive does the Screening Officer follow SOP?

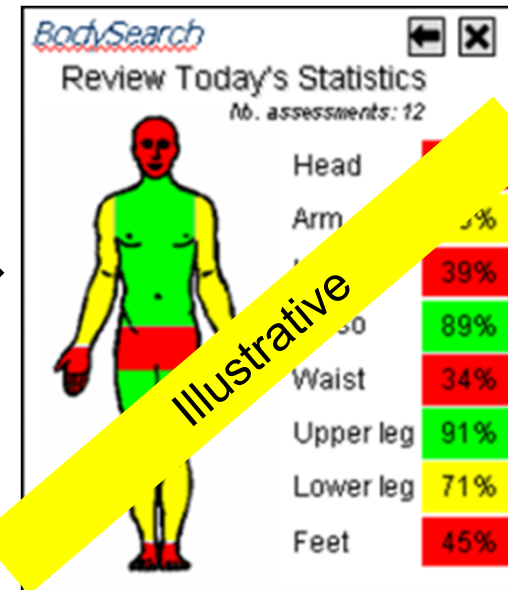
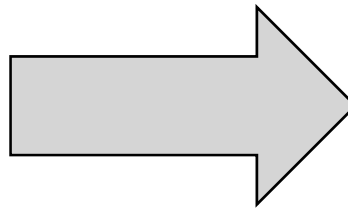
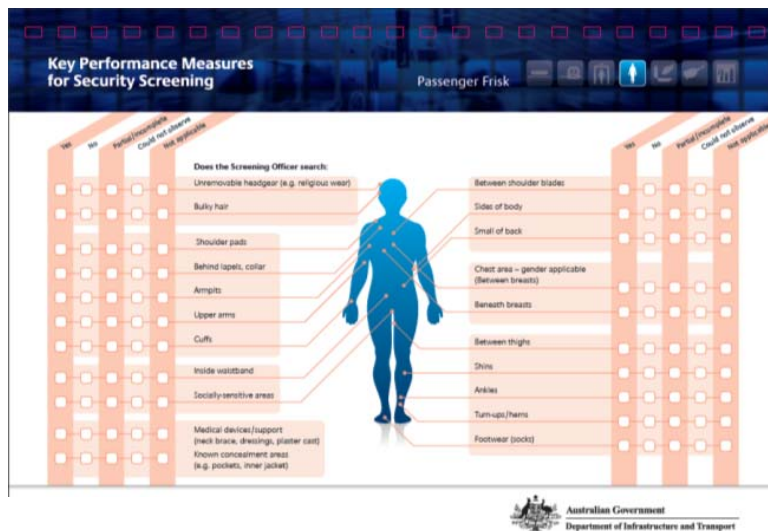
Australian Government  
Department of Infrastructure and Transport





# A valid, reliable, and standardised basis for operational assessment of Security Officers' tasks is now available



- For the very first time standardised operational performance assessment tools have been developed and validated for the range of Security Officers' tasks
- These tools provide a low cost operationally valid, quantitative performance assessment technique



The ACI Guide to Airport Security was formally published in February 2014



# The document provides detailed leading practice information for each component of four high level categories

The ACI Guide to Airport Security Assessment of Human Factors in Checkpoint Security					INTRODUCTION	PEOPLE	ORGANIZATION	TECHNOLOGY	ENVIRONMENT
<b>Contents</b>  This page sets out the categories beneath each of the main headings.  Clicking on a heading name will take you to the high level outcome overview for that category. Similarly, each subcategory can be accessed by clicking the buttons below each heading.  When navigating the tables, the subcategory strip indicates which subcategory table you are viewing. Click along the strip to jump to another subcategory.  To return to this page from anywhere in the document (for ease of navigation), click <a href="#">Contents</a>						<b>PEOPLE</b>	<b>ORGANIZATION</b>	<b>TECHNOLOGY</b>	<b>ENVIRONMENT</b>
						Recruitment	Management strategic focus	Technology awareness & future focus	Working environment
						Assessment & selection	Organizational structure	Procurement	Checkpoint design
						Training	Resource strategy, forecasting & planning	Deployment	Passenger preparation
						Post-training assessment	Resource deployment	Optimization	
						Training evaluation	Communication & engagement		
						Performance management	'Just' culture		
						Motivation & coaching			
						Standards			
									
									Page 000000
					6			<a href="#">Contents</a>	

# The ACI guide to the assessment of Human Factors in Checkpoint Security includes a self diagnostic assessment





# For each area the airport can assess their level of approach

## The ACI Guide to Airport Security

### Assessment of Human Factors in Checkpoint Security Scoring Matrix

INTRODUCTION

PEOPLE

ORGANIZATION

TECHNOLOGY

ENVIRONMENT

PEOPLE High-level outcome	Subcategory	Initial Approach	Intermediate Approach	Leading Practices
Recruitment	Publicity campaign	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Recruitment materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Resource forecasting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Application forms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Application sifting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Competency identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assessment & selection	Tests and measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Test administration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Scoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Monitoring and evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Referencing of candidates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training	Regime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Sequencing and pace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post-training assessment	Regime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Scheduling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Test Content	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Provision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PEOPLE High-level outcome	Subcategory	Initial Approach	Intermediate Approach	Leading Practices
Training evaluation	Training Needs Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Training effectiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performance management	Performance monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	TIP performance monitoring (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Corrective action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Performance review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motivation & coaching	Motivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Competence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coaching & support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Feedback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standards	Clarity of expectations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Communication of change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Enforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# It is important to consider motivation and its organisational and managerial influences in supporting sustainable aviation security

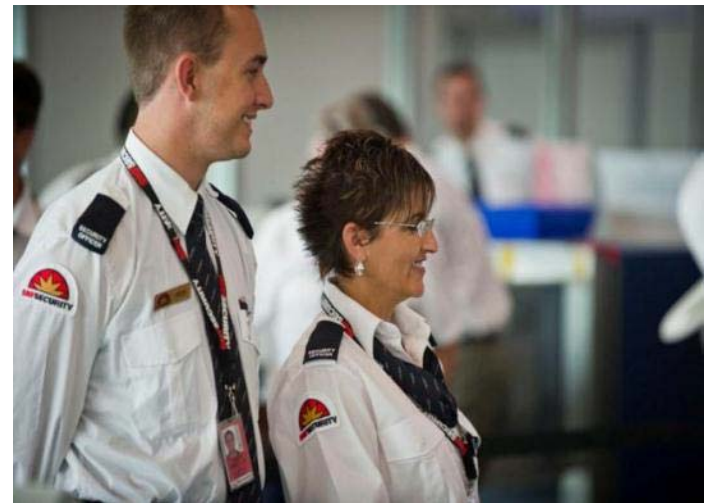
- Many studies have referred to the importance of motivated security officers, but no comprehensive research has specifically looked at:
  - what makes a security officer motivated
  - ...and what makes them demotivated



# Why achieve a motivated workforce?

## Operational benefits of a highly motivated workforce

- Low rates of absenteeism
- Staff turnover is at an acceptable level
- Low number of security breaches
- High standard of KPIs
- Easier to obtain shift cover at short notice with staff willing to support
- Security officers change roles and positions with limited or no complaint and operate effectively
- High pass rate for qualifications and certifications
- Frequent and structured communication between management and security officers
- Positive security culture throughout the organisation

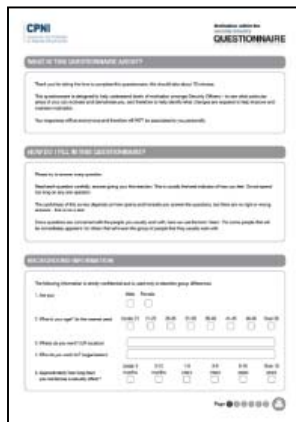


**Sydney airport and SNP, looked at motivation and culture which resulted in voluntary turnover decreasing from 22% to 14%, and absenteeism reducing from 700 days per month to an average of 290 days**

# Three documents enable airports to assess, diagnose, and implement solutions to improve motivation

1

## Security Officer Questionnaire

A screenshot of a questionnaire form titled "CPNI QUESTIONNAIRE". It includes sections for "ABOUT THIS QUESTIONNAIRE", "HOW TO TELL ME YOUR LEGISLATION?", and "HOW TO TELL ME YOUR MOTIVATION?". The form contains various checkboxes and text input fields for data collection.

**Validated  
questionnaire for  
Security Officers**

2

## Analysis Tool



**A simple data analysis  
tool of the  
questionnaire results**

3

## Guidance Document



**Comprehensive  
guidance document to  
providing advice on  
targeted interventions**



# Sustaining effective security and ensuring innovation through continuous improvement can be affordable and implementable

- Human Factors solutions focus from the end-user to management to the regulator, but address how to achieve the most efficient and effective systems ensuring that:
  - **This Security Officer can:**
    - ... **with this training...**
    - ... **do these tasks...**
    - ... **to these standards...**
    - ... **with this equipment....**
    - ... **under these conditions...**
    - ... **sustainably, efficiently and in a motivated and error tolerant manner**
  - And so provide the essential support to effective and efficient aviation security in its role of mitigating the persistent terrorist threat



**Andrew McClumpha**  
**Director**

**McClumpha Associates**

**M: +44 (0) 788 043 9352**

**E: [amcclumpha@mcclumpha-associates.com](mailto:amcclumpha@mcclumpha-associates.com)**