# 3D Radioactive Material Detection System for Customs Clearance

# Virtual Reality Experience for **Customs Administration**

### Introduction

The 3D radioactive material detection system inspects customs a earance goods to identify the presence of radicactive materials.

Goods are first inspected by a mobile system, which traverses large bonded areas. The mobile system detects adioactive materials and provides the characteristics (e.g. nuclices, location, cose) of the detected radioactive materia from a distance.

In the following step, a handheld system is positioned close to the estimated location of the radioactive material for precise measurements.







Research Objective

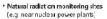
Protect the health of workers in customs and public by preventing inflow of radioactive materials

Final Objective

- Develop real-time visualizing technology detect the presence of radioactive material in clearance goods
- Develop a radiation measurement system for customs sites and enhance independence in the security screening field.



- Customs in the national border facility
- Facilities where radiation monitoring system is mandatory (e.g. scrap metal recycling plants)



## Mobile-type 3D Radiation Measurement System





### Introduction

Virtual Reality Assisted Training Program is a **VR Education** system for strengthening the capacity of customs officials in 185 countries.

Learning the selection criteria for air cargo customs clearance, including e-commerce and experiencing the clearance process.

## VR/PC simulation for technical e-learning content

Experience the entire air customs logistics clearance process by using non-destructive inspection equipment such as checking declaration documents, scanning bar codes, X-rays, and ior scanners.



### Maritime customs logistics

Experience the complete marine logistics customs clearance, covering import doc inspection, safety rule checks, container examination, ZBV utilization, and open container inspection.



### Available Areas:

air/sea traveler baggage air/sea/land import goods, border management, mail and personnel in the customs area.













# X-ray Interpretation Training System

# Fraining system for X-ray screening

Our model uses 4 stages to generate diverse synthetic X-ray mages

- Generating background X-ray images
- 2) Generating X-ray Images of a single object
- Combining background and single object
- Adjusting mages according to difficulty level
- Final goal: Generating the background/single object
   ⇒ Combining two images for generationg a unique image



- Projectiong illegal item onto the background X-ray of baggage
- Combining the object and background at the feature Level · Controlling difficulty with different a values



### Expected Effects

- Learning cata tailored to the employee's level of learning.
- By utilizing  ${\bf A}$  , various types of learning data can be generated at a low cost
- Enhanced X-ray interpretation skills to contribute to customs border protection.

# Al-Based Recognition and Tracking of suspicious travelers using distributed security cameras

(Masked) Facial Recognition

AI CCTV Technolog for Human Identifica & Abnorma Behavio

Specific person / Group / Baggage

→ Abnormal detection

Baggage Detection/ Tracking

Group Identification

Development and demonstration of ALCCTV Technologies for autonomously identifying, tracking and responding to doubtful behaviors of suspicious travelars by analyzing distributed security cameias in the airport arrival hall.







- Decrease in Ilegal behaviors such as smuggling and undeclared goods
- Creating an environment for efficient customs administration service
   Uncover i legal behaviors in restrooms and blind spots of security cameras

# Biosignal and Micro-facial Expression Analysis Technology to Screen Passengers for Customs Inspection

## Techno ogy Introduction

- A customs inspection Al solution is a contactess system designed to cuickly and accurately analyze abnormal states in individuals, such as excessive tension or excitement, based on internal and external biosignals
- · This system extracts and analyzes external biosignals like facial expressions and internal biometric signals, roluding rPPG [remote chotople:hysmography] and respiration using only an RGB camera.
- Unlike traditional systems that require additional equipment attached to the body or fingers to detect factors I ke tension or blood flow, this system eliminates the need for such devices, providing greater convenience.
- Furthermore, unlike conventional technologies that rely on a single algorithm to assess a subject's condition, this system utilizes multiple technologies to extract both internal and external biometric signals, enabling high-precision analysis.
- The component technologies integrated into this system are designed to accurately analyze specific features, such as significant changes in blinking requency observed in unusual situations. Each component technology can also function independently, offering flexibility in application.
- This system is versatile and can be applied across various fields, including financial crime investigation, healthcare, and entertainment.

### Technology Photos



Face/Chest Region Scanning via Single Camera





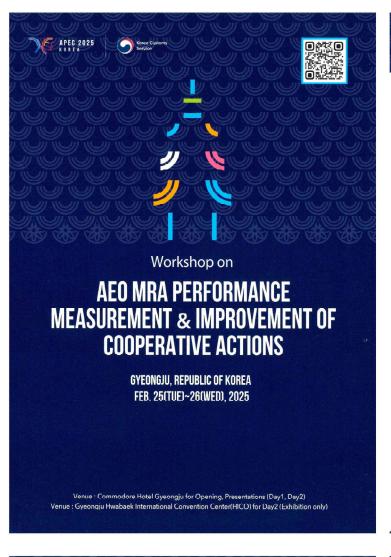
Analysis of Internal/ External Biosignals



Abnormal State Recognition based on Multiple Signals









# DAY 1 (FEB. 25TH)

Venue: Commodore Hotel Gyeongju

TIME	TOF	PIC	PRESENTER
WELCOME	AND	OPENING OF WORKSHOP	
09:30-09:40	Оре	ning remarks and introduction of the program	SCCP Vice Chair
09:40-09:50	Welcoming remarks by the Deputy Commissioner of Korea Customs Service		Korea
09:50-10:05	Introduction of participants and group photo		Workshop Organizers Delegations, Guests
SESSION 1	Glob	oal Trends of the Authorized Economic Operator (A	EO) Program
10:05-10:20	1.1	Project Overview*  * Project background, research model, methodology,	Korea AEO Association
		scheduled activities	Mr. Sunbok KWON
10:20-10:40	1.2	Presentation: AEO as a Key Driver for Economic Growth and Key Revisions to the SAFE Framework of Standards - Cooperation between Customs and Other Government Agencies (OGAs), expanding the AFO program to include e-commerce	WCO Ms. Lazzat DANIYAROVA
MORNING E	BREAM	( (20 MINUTES)	-1 - 1 3/10, 1
11:00-11:20	1.3	Presentation on China Customs AEO Implementation Effectiveness Evaluation - Overview of the effectiveness of China Customs' AEO program, highlighting its achievements and directions for improvement	China Ms. Xiaofan YIN
11:20-11:40	1.4	Presentation of Outline of Research* and Q&A *Cooperation scheme and measurement of economic efficiency of AEO	Korea AEO Association Mr. Sunbok KWON
		<ul> <li>IKS Model (by economy, methodology, progress/ outcomes), AEO Dictionary</li> </ul>	IVII. SUNDOK KWON



SESSION 2	AEC	Program for Smart Customs	
11:40-12:00	2.1	Sharing of best AEO practices in Member economy	Hong Kong, China
		- Current status, Innovation in Implementing and promoting the AEO Programme	Mr. Chi Ming Simon LEE
12:00-12:30	2.2	Efforts Towards Promoting AEO Certification to Small and Medium Enterprises (SMEs)	Korea AEO Association
		- AEO expansion model through Public-Private Partnership, governmental support for AEO SMEs	Ms. Hannah KIM
LUNCH (1 H	OUR	30 MINUTES)	VE ALE TENEVE
	_		

LONCIT(TTI	OUN	30 MINUTES)	
SESSION 3	Expa	ansion of the AEO Program and Innovation in Cus	stoms Administration
14.00-14.20	3.1	Presentation: Stimulate AEO through Mutual Recognition between Government Agencies	KCS Mr. Hyeonwoo SHIN
14:20-14:50	3.2	Case Reports by Asia-Pacific Customs Authorities and Q&A Session - Group (a) of 3 Developing Economies	WCO accredited expert Mr. Dongseok KIM (Moderator)
14:50-15:20	3.3	Case Reports by Asia-Pacific Customs Authorities and Q&A Session - Group (b) of 4 Developing Economies	– (Moderator)

		(Moderator)
3.3	Case Reports by Asia-Pacific Customs Authorities and Q&A Session - Group (b) of 4 Developing Economies	(Moderator)
N BRI	EAK (20 MINUTES)	15 ft 18 5 36 81
Enha	ancing Cooperation to Strengthen Supply Chain Co	onnectivity
4.1	Presentation: WTO TFA Implementation and AEOs	WTO Mr. Jesse NICOL
4.2	<b>Presentation:</b> Benefits of AEO and AEO MRA for the Private Sector (AEO Certified Company)	Samsung Electronics Mr. Kyuwon SHIM
4.3	Presentation: Strategies and Rest Practices for AEO MRA, Q&A	Singapore Ms. Jia Ying Nelly CHAI
Wra	p up of Workshop and Closing Remarks	Vice Chair
Post	e-event Survey	Vice Chair
	4.1 4.2 4.3	and Q&A Session - Group (b) of 4 Developing Economies  IN BREAK (20 MINUTES)  Enhancing Cooperation to Strengthen Supply Chain Co  4.1 Presentation: WTO TFA Implementation and AEOs  4.2 Presentation: Benefits of AEO and AEO MRA for the Private Sector (AEO Certified Company)  4.3 Presentation: Strategies and Best Practices for AEO



# DAY 2 (FEB. 26TH)

12:30-14:00 Lunch

 $Venue: Commodore\ Hotel\ Gyeongju\ for\ Presentations$ 

Venue: Gyeongju Hwabaek International Convention Center(HICO) for Exhibition tour only

DPENING OF N	MEETING	Venue: Commodore Hotel	
09:30-09:40	Opening and Recap of Day 1		
09:40-10:00	Comments from participants		
10:00-10:10	Video on innovative Customs technologies		
10:10-10:20	Introduction of the Customs Technology Exhibition	on	
10.20-10.40	Move to the exhibition half		
SESSION 5: EX	HIBITION TOUR AND DISCUSSION	Venue: HICO(3F)	
10:40-11:40	Exhibition hall tour (Showcases are subject to change)		
	5.1 Sharing KCS's experiences and best practic Customs technologies:	ces in utilization of	
	Showcase 1 : X-ray training program		
	<ul> <li>Showcase 2: Al based tracking system for high risk passengers</li> </ul>		
	<ul> <li>Showcase 3: Passenger verification (facial recognition)</li> </ul>		
	Showcase 4 : 3D multi-function radiation detection system		
	<ul> <li>Showcase 5 : Virtual Reality (VR) Training s</li> </ul>	system	
ESSION 6: GF	ROUP DISCUSSION		
11:40-12:10	6.1 Group discussion and sharing outcome of t		
	<ul> <li>Member economies are invited to share their experiences,</li> </ul>		
	challenges, and best practices using innov facilitate trade in their economies	vative technologies to	









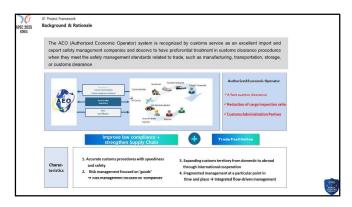


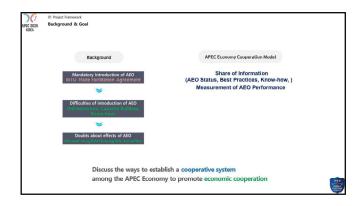


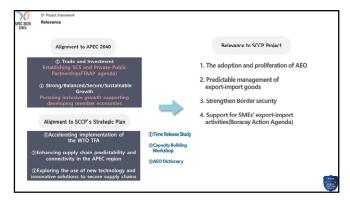


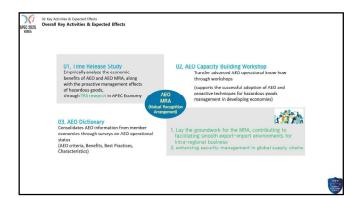


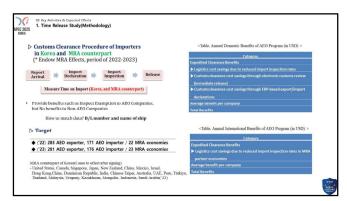


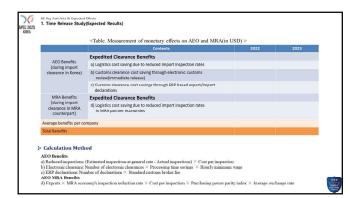




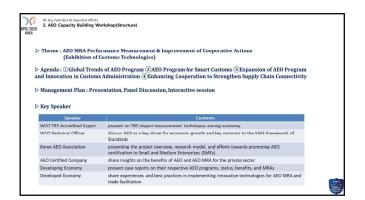


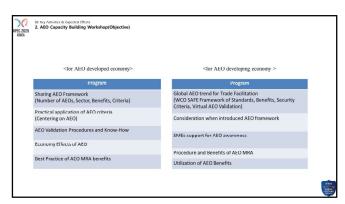


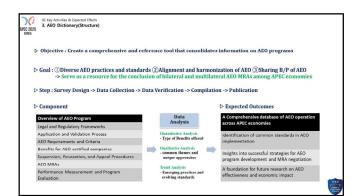


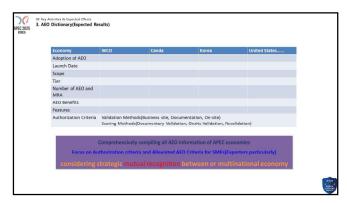










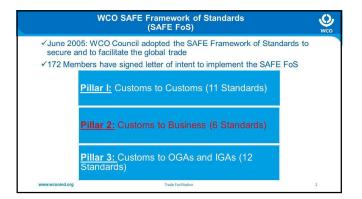


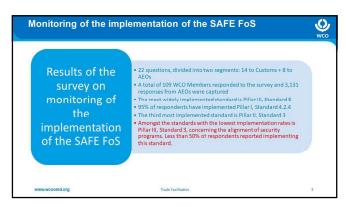






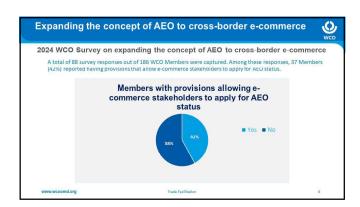


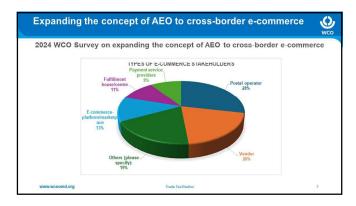


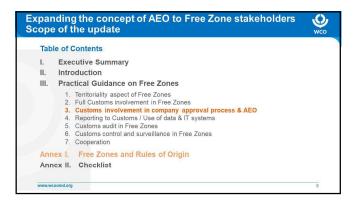


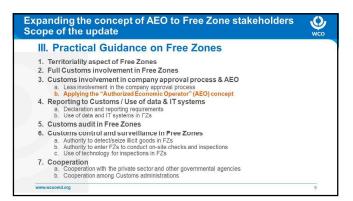


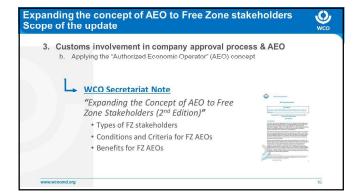


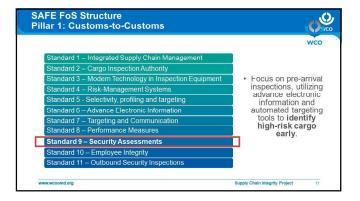




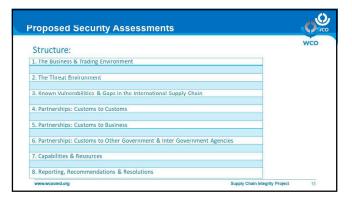






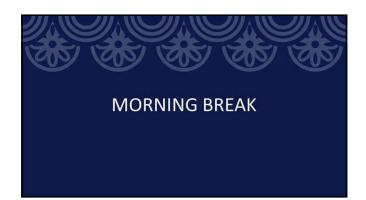


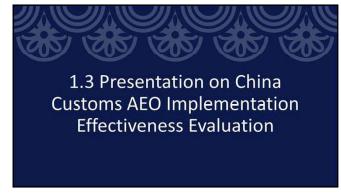








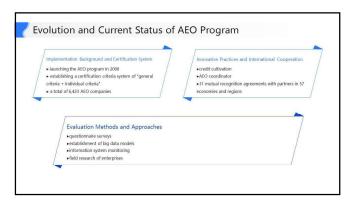








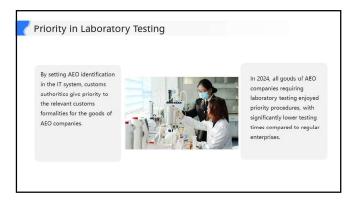


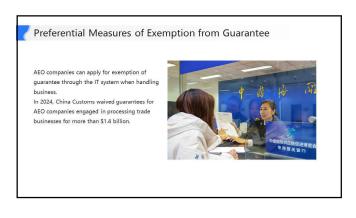














Survey Results on Domestic Implementation Effectiveness

Questionnaire survey in 2024 by Shanghai Customs College

Category of Change Significantly Decreased
Customs Inspection Rate 80%

Import/Export Clearance Time 90%
Frequency of Audits 80%

Survey Results on Global Implementation Effectiveness

Questionnaire survey in 2024 by Shanghai Customs College

Category of Change Significantly Slightly No
Customs Inspection Rate 1/3 1/3 1/3

Import/Export Clearance 1/3 1/3 1/3

Document Review Rate 1/3 1/3 1/3





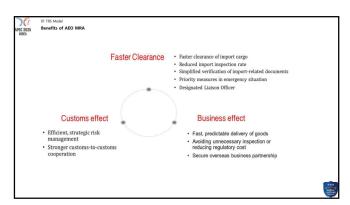


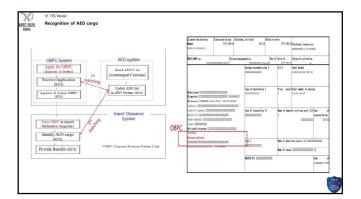




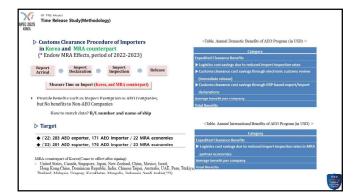


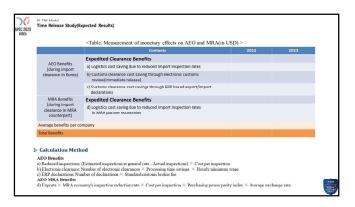


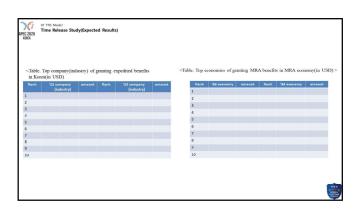


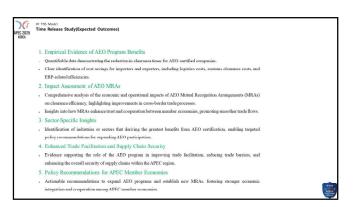


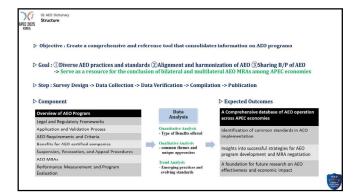


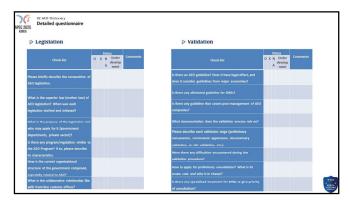


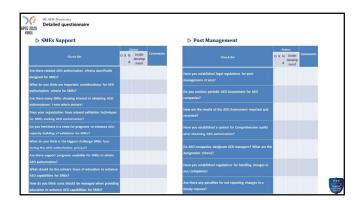


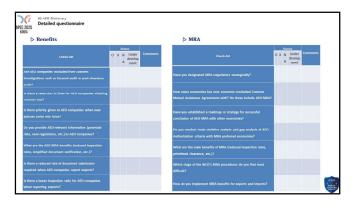


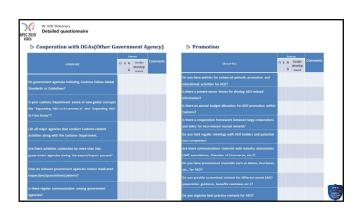




































Advanced PublicityEnhanced Collaboration













# Innovative tool - Enhanced Collaboration



- 3. Pillar 1: Customs-to-Customs network arrangements
- Collaborate with Mainland China and Macao, China Customs
- MoU on Enhancing AEO Co-operation in the Greater Bay Area
   Mutual referral mechanism and prioritized processing on relevant AEO applications
  - ☐ Enhance training and exchange of AEO officials
- Visit the "China Customs AEO Training Base (Shenzhen)"
- Bring more benefits to AEOs



# Innovative tool - Enhanced Collaboration



- 3. Pillar 1: Customs-to-Customs network arrangements
- · Collaborate with other customs administrations
- Collaborate with ASEAN to organized "AEO Expert Mission and Symposium"
   Invited 50 AEO experts from Customs administrations of ASEAN Member States communicate and share the best practice of AEO Programmes

 $\hfill\Box$  Invited 200 AEO experts and relevant stake holders to share insights on subjects related to AEOs

 $\hfill \square$  Connect with business sector and trade associations to foster Customs-to-Business partnership

Explore the feasibility of collaboration events with other customs administrations



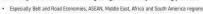
# **Way Forward**



Increasing Publicity Coverage



Extending MRA network with Hong Kong, China's major trading partners





Enhancing Cooperation with other customs administrations

With reference to MoU on Enhancing AEO Co-operation in the Greater Bay Area, explore
the feasibility to liaise arrangements with other customs administrations











