Customs Administration & New Technologies

Korea Customs Service


MAKING ROAD

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Technologies & Customs

Full Inspection of All Cargo

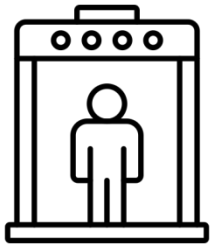
45 Times Increase since 1950

Rapid Increase of Trade

Need to Save Time and Money, Increase Efficiency

Technologies & Customs






3,412

Number of Equipment on Customs Field

61.2billion

Budget on Digitalization

New Technologies in KCS

UNI-PASS

E-Clearance System

- **UNI**fy Various Customs Services into Single Window
  + **PASS** Customs Services via One-Stop Electronic Service

Big FINDER

Customs Risk Management System based on Big Data

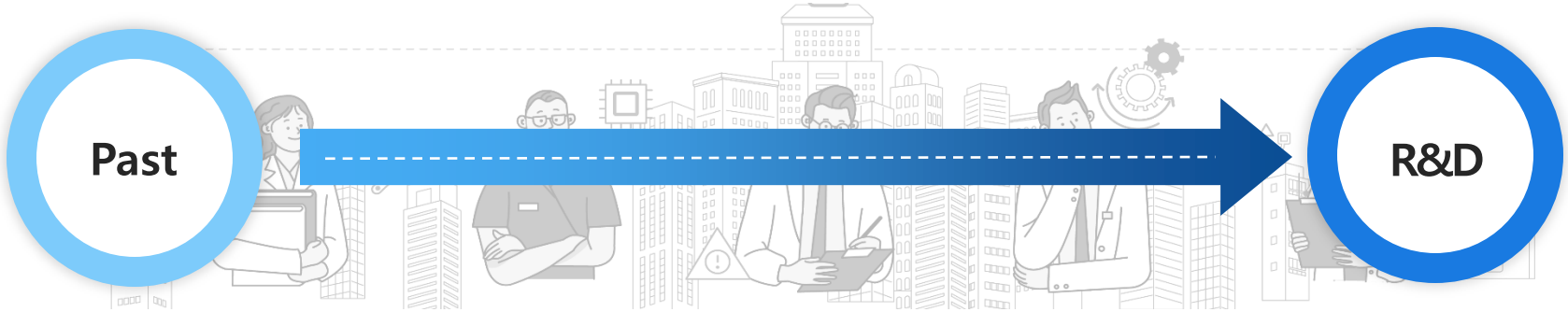
- Passenger, Cargo, Tax-evasion, and Supply Chain Analysis

AI

- **AI X-Ray** - Detect Illegal Goods
- **AI HS Code Recommendation** - Find the Most Appropriate HS Code
- **AI Counterfeit Detection** – Compare Product with Patented Image

R&D?

Set of **Innovative Activities** in **Developing** New Services or Products and **Improving** Existing Ones



Buy New Technologies from the Market

1. Not Specialized to Unique Customs Needs
2. Difficulty in Adapting to Changes in Customs Environment

Develop Field-Customized Technology

1. Develop Customs Worksite-Oriented Technologies
2. Continuous Feedback by Field Staffs

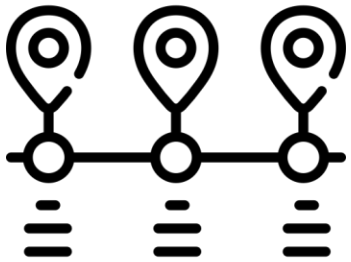
Customs Lab 1.0 : KCS-Own R&D Laboratory

Purpose

Develop Customs **Worksite-Oriented Technologies** Reflecting **Customs Needs**

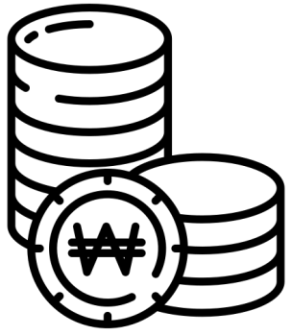
Period

’21 ~ ’24



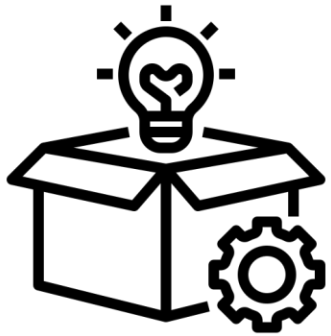
Budget

31 billion Won ($24 million)

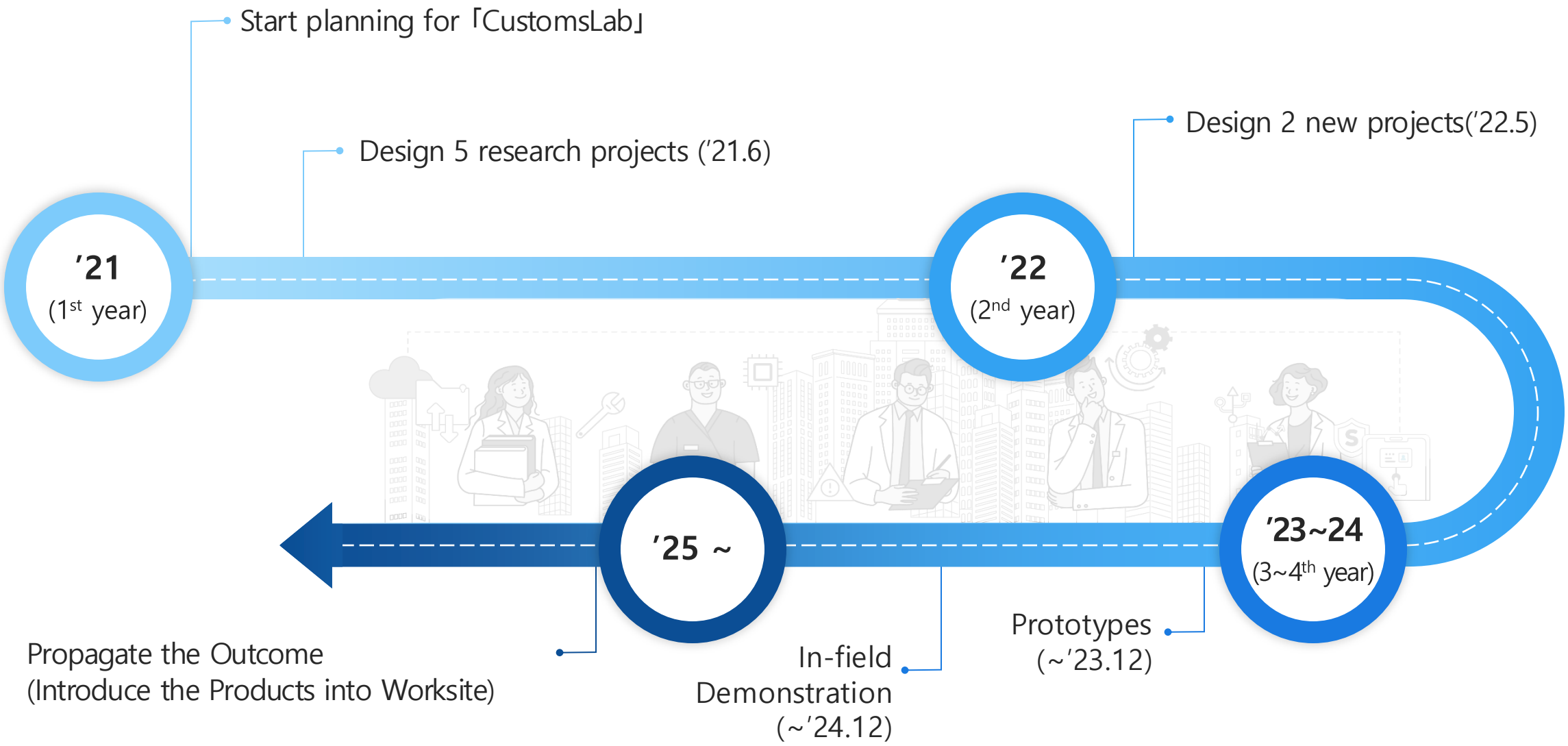


Number of Project

7



Timeline


Start planning for 「CustomsLab」
Design 5 research projects (’21.6)
Design 2 new projects(’22.5)
’21
(1st year)
’22
(2nd year)
’23~24
(3~4th year)
’25 ~
Prototypes
(~’23.12)
In-field
Demonstration
(~’24.12)
Propagate the Outcome
(Introduce the Products into Worksite)

R&D Projects

Fields	Projects	Institute	Type
Cargo	**Complex X-ray Scanner** for Small Cargo Security Inspection	KAERI	**strategic**
	Training System for X-ray Screening	KAIST	general
	3D Multi-Function **Radiation Detection System**	Hanyang Univ.	general
	Detection Robot for Container Inspection	KAIST	general
Human	**AI-based CCTV** for Identifying and Tracking Suspicious Travelers	ETRI	**strategic**
	Concealed Object Detector with **Tera-Hertz** and AI	KERI	general
	Passenger Screening System Based on **Vital Signs and Facial Expression**	KIST	general

▪ **Strategic Projects**

Projects Requiring Urgent R&D
in order to Technologically Improve Customs Service
(Top-Down)

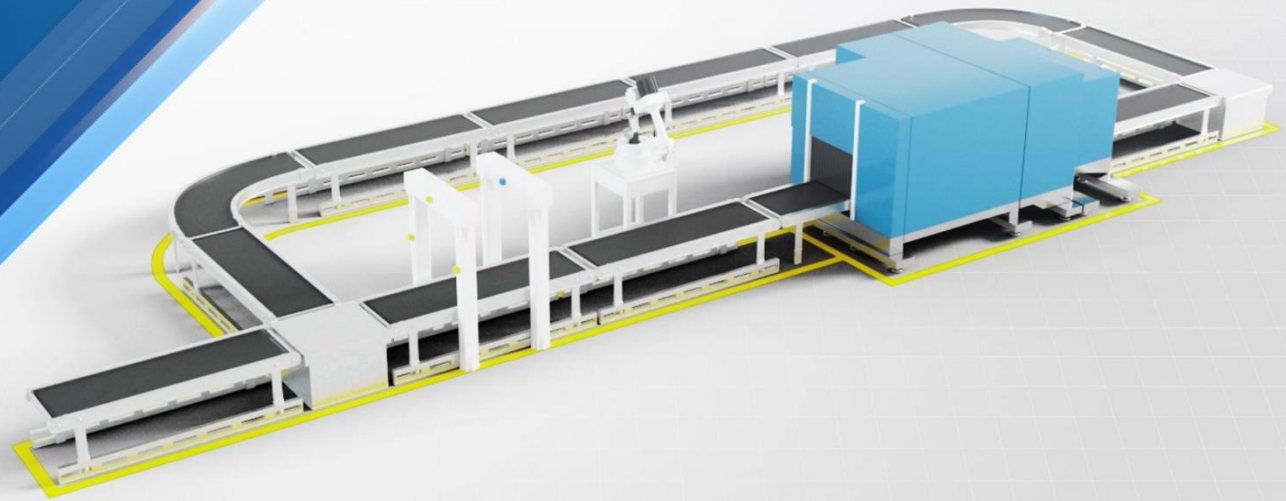
▪ **General Projects**

Research Projects Planned by Surveying Demands for
Technological Advances at Customs Worksite (Bottom-up)

Customs R&D Idea Competition

1

Complex X-ray Scanner for Small Cargo Security Inspection



X-ray.mp4

Project #1

Foreign Made X-Ray Scanners

Raw Data are Out of Reach

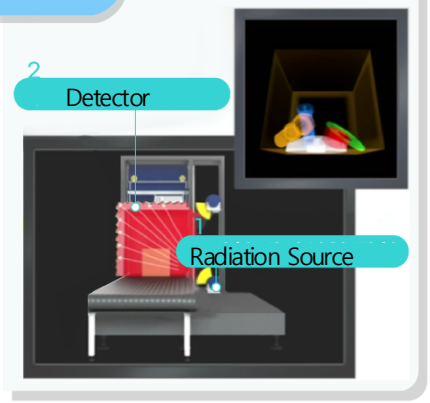
Current Scanners Use
Only Transmission X-rays

Do not Detect
Low-Density Powder

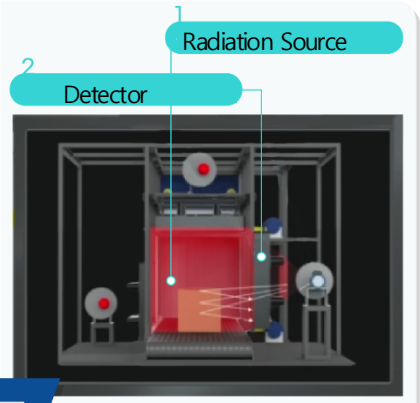
Complex X-ray Scanner

for Small Cargo Security Inspection

2 Transmission X-Ray Scanning Unit
170kV (max. output)
1mm (Image resolution)



4 Automatic Threat Recognition
50 kinds of prohibited objects
1 sec recognition time



1 X-Ray Intensity Control System
Measure size/weight
Control X-ray output

3 Scattering X-Ray Scanning Unit
170kV (max.output)
3-way images
(left, right, up)

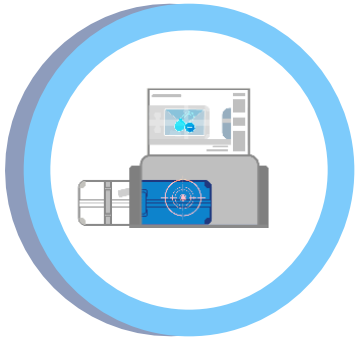
2

Training System for X-ray Screening

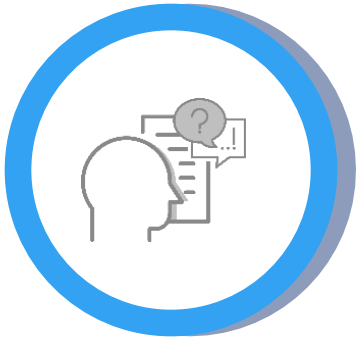
CBT.mp4

Project #2

Lack of
Domestic CBT
Programs

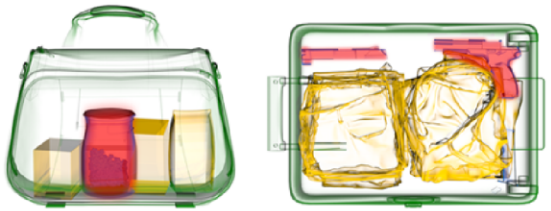


Lack of
X-Ray Image Data of
Hazardous Objects



Need for
Student-Customized
Curriculums

Training System
for X-ray Screening



X-ray Image Generated by AI

Smart Training Program Meeting Different User Level

CBT Program Tailored to Customs Service

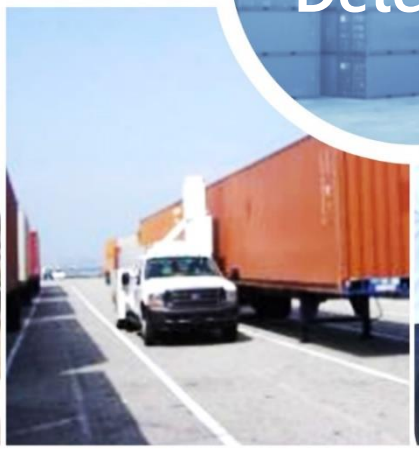
3

3D Multi-Function Radiation Detection System

Radiation.mp4

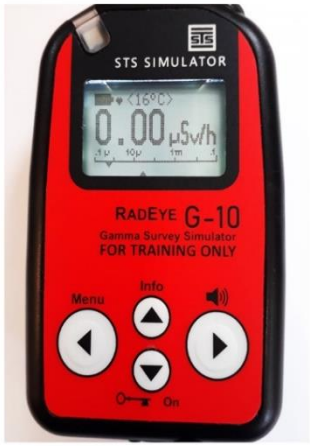
Project #3

Fixed Radiation Detector (1st Scan)



Current Detector

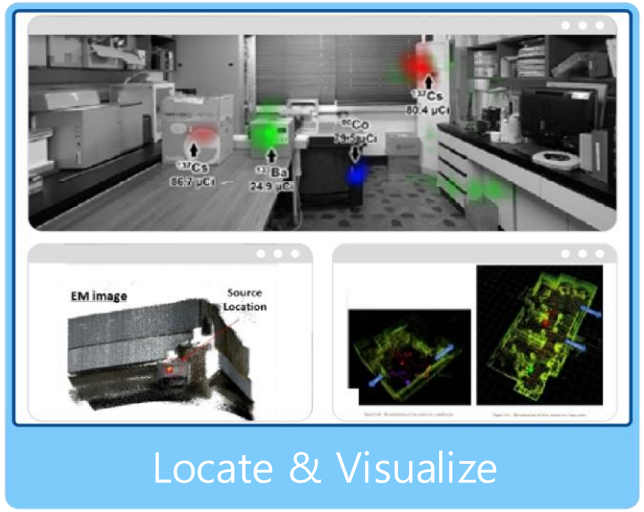
Portable Detector (2nd Scan)



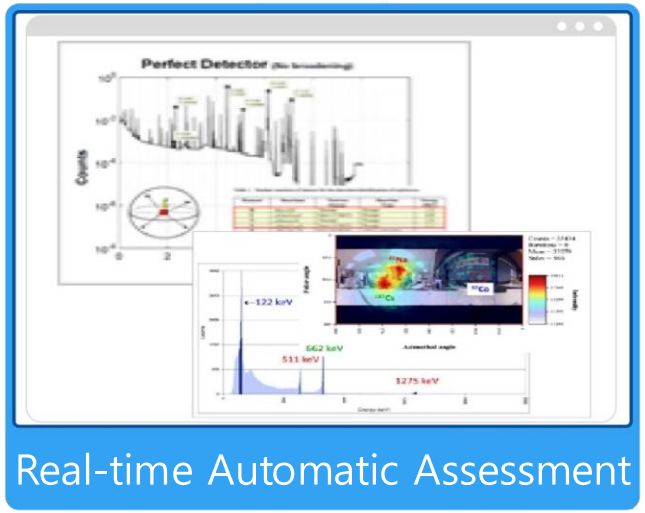
The Exact Location is Unavailable

Officers may be Exposed to Radiation

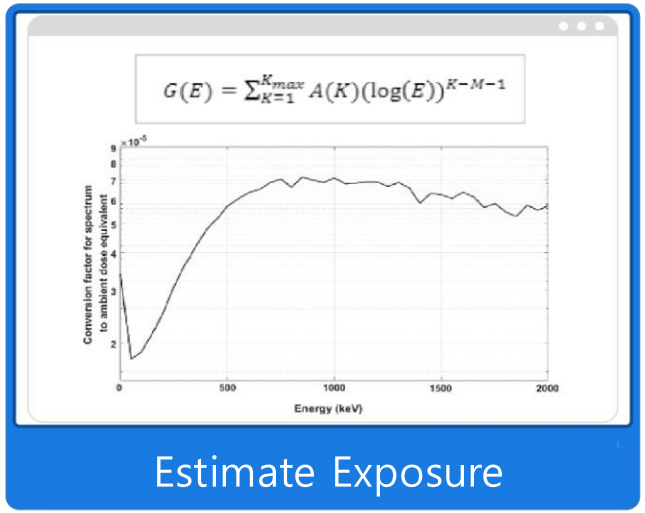
3D Multi-Function
Radiation Detection System



Locate & Visualize



Real-time Automatic Assessment



Estimate Exposure

3 Technologies + Integrated Control + Respond to Risks

4

AI-based CCTV for Identifying and Tracking Suspicious Travelers

CCTV.mp4

Project #4

Monitor High Risk Passengers

Track Passengers **Behaving Abnormally**

Find **Companions** of High Risk Passengers

Find **Switched Luggage** of High Risk Passenger

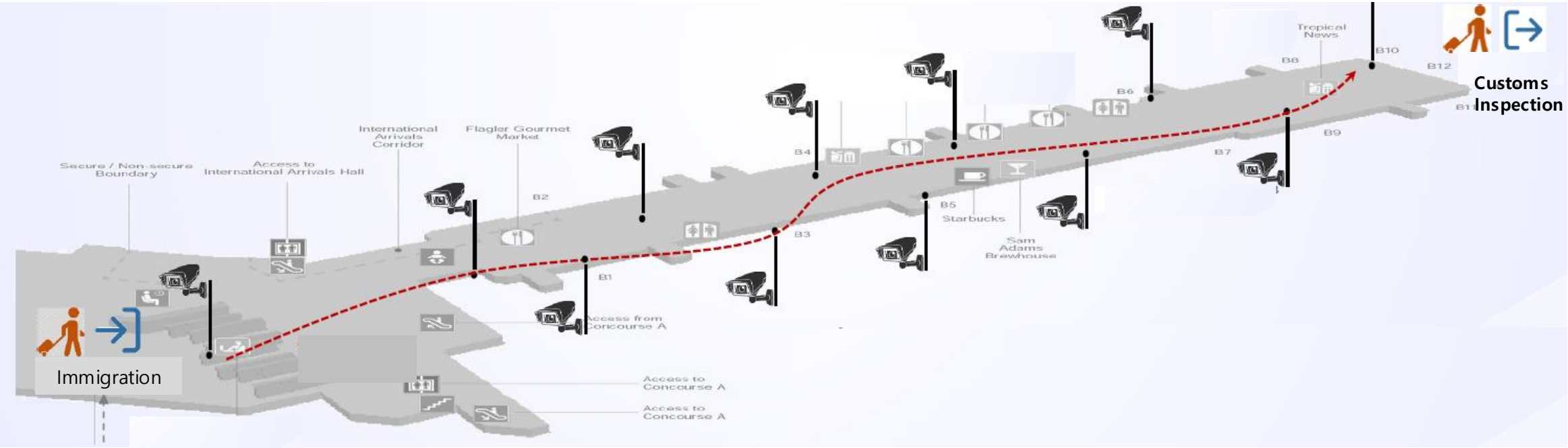
Environment Changes

COVID 19 : Hard to Detect Faces Wearing Masks

Labor-Intensive : Manually Following a Suspect

Increasing High Risk Passengers Immigration

AI-based CCTV
for Identifying and Tracking Suspicious Travelers



Extract Facial Information → **AI Automatically Identify and Track** → **Detect Abnormal Behaviors** → **Inspect**

5

Concealed Object Detector with Tera-Hertz and AI

Body Scanner

Contact/ Metal Scanner

- Uncomfortable
- Only Detects Metal

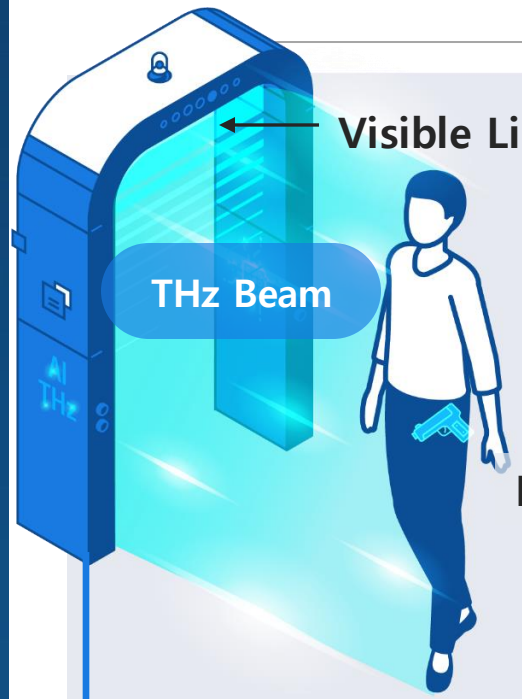
Scatter X-Ray

- Radiation Exposure
- Privacy Violation

mm wave

- Low Resolution
- Does not Detect Hidden Objects Well

Concealed Object Detector with **Tera-Hertz and AI**



Visible Light Image Equipment

Overlap with THz Image

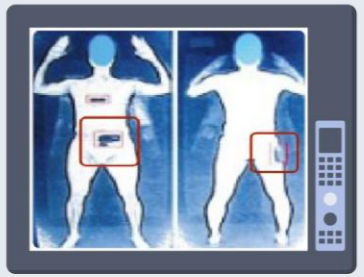
High speed THz scanner system

THz Image

Integrated Image (THz + Visible)

High speed signal processing + visualizing

Real time image processing of THz



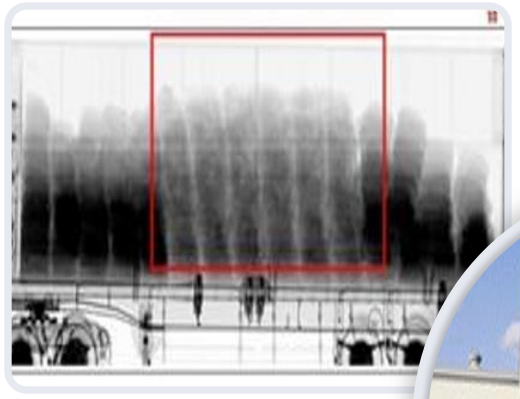
AI-Detection

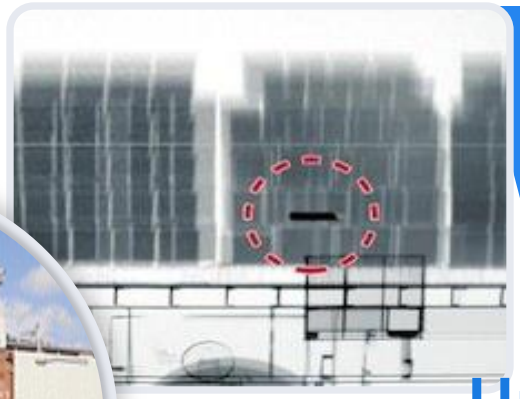
6

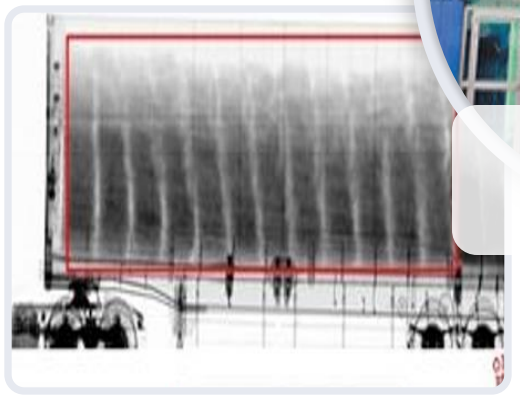
Detection Robot for Container Inspection

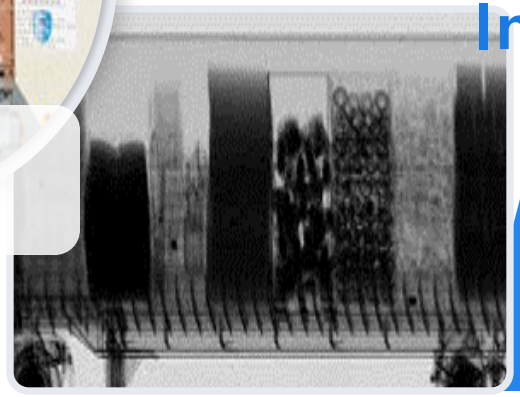
robot.mp4

Project #6







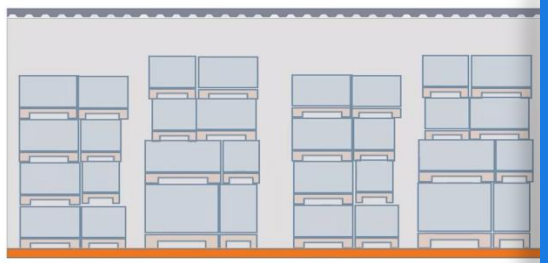


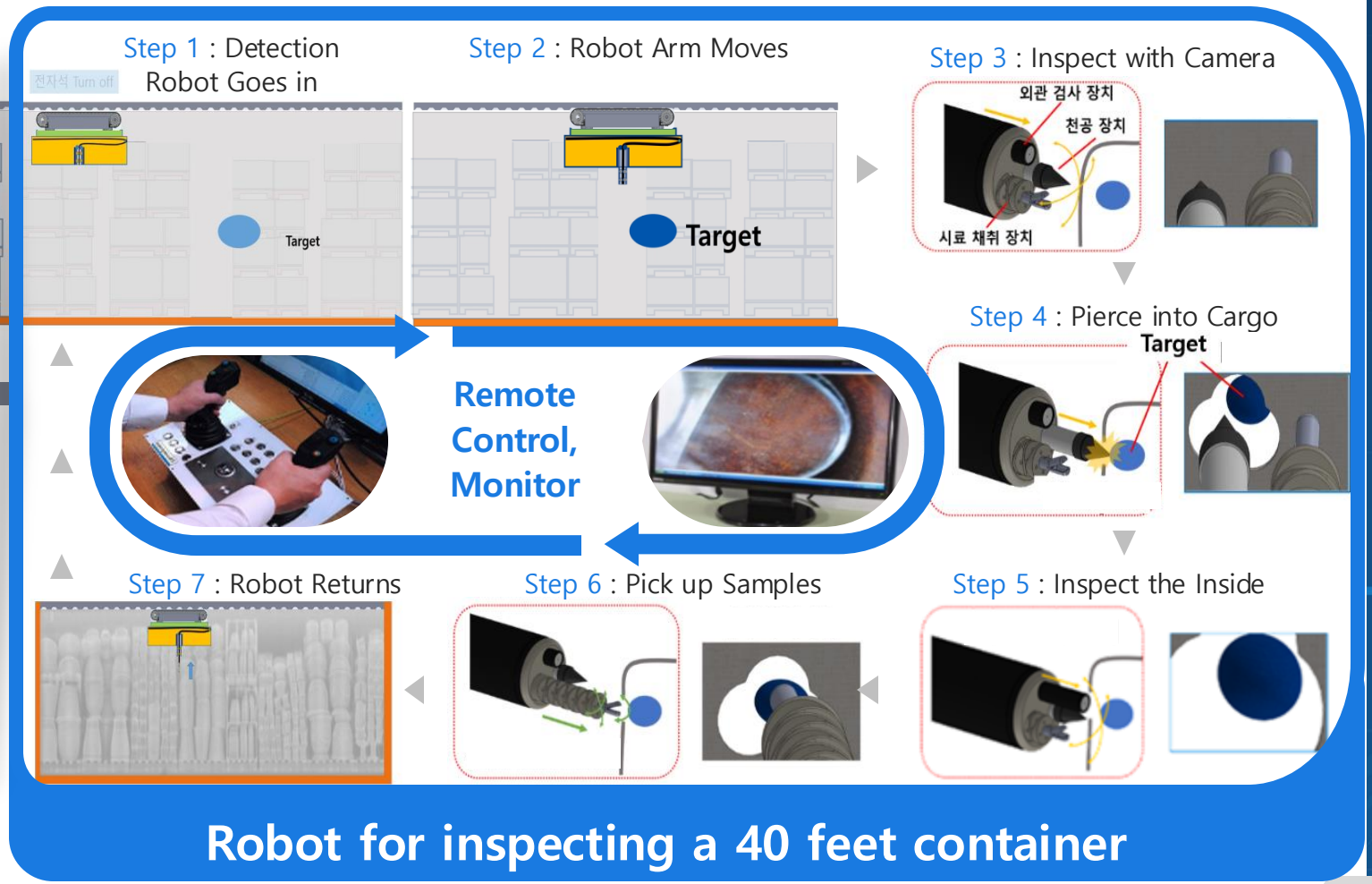
Container scanner

Unload for Inspection

1. Long Inspection Time
2. Possible Danger to Staffs

Detection Robot
for Container Inspection





- **Faster Inspection**
  without Unloading the Cargo
- **Prevent Exposure**
  to Hazardous Cargo

7

Passenger Screening System Based on Vital Signs & Facial Expression

vitalsign.mp4

Project #7

Tracking Multiple Suspects Has Limits

- Depend Heavily on **Personal 'Feeling'**
- Need to Enhance Traveller Convenience
- Data Based **Scientific Selection** is Needed

Human Emotions are Being Studied

- Changes in Facial Expression or Vital Signs can be Used
- Usage for Customs is Unknown Yet

Passenger Screening System
Based on **Vital Signs and Facial Expression**

Recognize Face with Camera

Extract Vital Signs and Facial Expressions

Look for Anomalies

Select Passengers for Customs Inspection

Customs Lab 1.0

1 Complex X-ray Scanner for Small Cargo Security Inspection

2 Training System for X-ray Screening

3 3D Multi-Function Radiation Detection System

4 AI-based CCTV for Identifying and Tracking Suspicious Travelers

5 Concealed Object Detector with THz & AI

6 Detection Robot for Container Inspection

7 Passenger Screening System Based on Vital Signs and Facial Expression

Customs Lab 2.0 ('25~)

Advance
Customs Lab 1.0

Narcotics

Global R&D

TECHNOLOGY holds the KEY to the FUTURE of CUSTOMS

Korea Customs Service