Reinforcement of Automated Logging System in Storage of Infectious Materials

Katsuaki SHINOHARA, National Institute of Infectious Diseases Japan.
Ayato TAKADA, Hokkaido University Research Center for Zoonosis control
Ryoichi KOMATSU, Yamato System Development Co., Ltd.
Kazutoshi KOGURE, Hitachi Appliance Inc.

Tekeshi KURATA, Toyama Institute of Health
Naruhito HAYAKAWA, Genesis Information Technology Inc.
Tadayuki KAJIWARA, UPLOAD Co., Ltd.

Objectives

The Infectious Disease Control Law, as a security standards and/or regulations of pathogen-containing facilities, has been activated on June 2007 in Japan. Although as a matter of fact, the security level basically relies on the individual's sense of morals. Strictly speaking, actually anyone can access to any pathogen in freezers. This new management system aims to automatically control the movement and storage of infectious materials by new tag techniques. It is also expected to reduce the user's workload of pathogen management by this automatic data-collection system.

Methods

In this new system, every sample tube is equipped with IC/Barcode tag and tube racks are also equipped with IC/Barcode tag. As a result, this new system enables the automatic data collection of every operational history and storage locations. This system integrates the following information into the database; classification and risk level of each pathogen, history of storage or delivery of samples out of laboratory freezers, shipping history among different locations, waste control, etc. Especially, the history of sample stock in the freezer was examined in detail. *See figures in right and below.
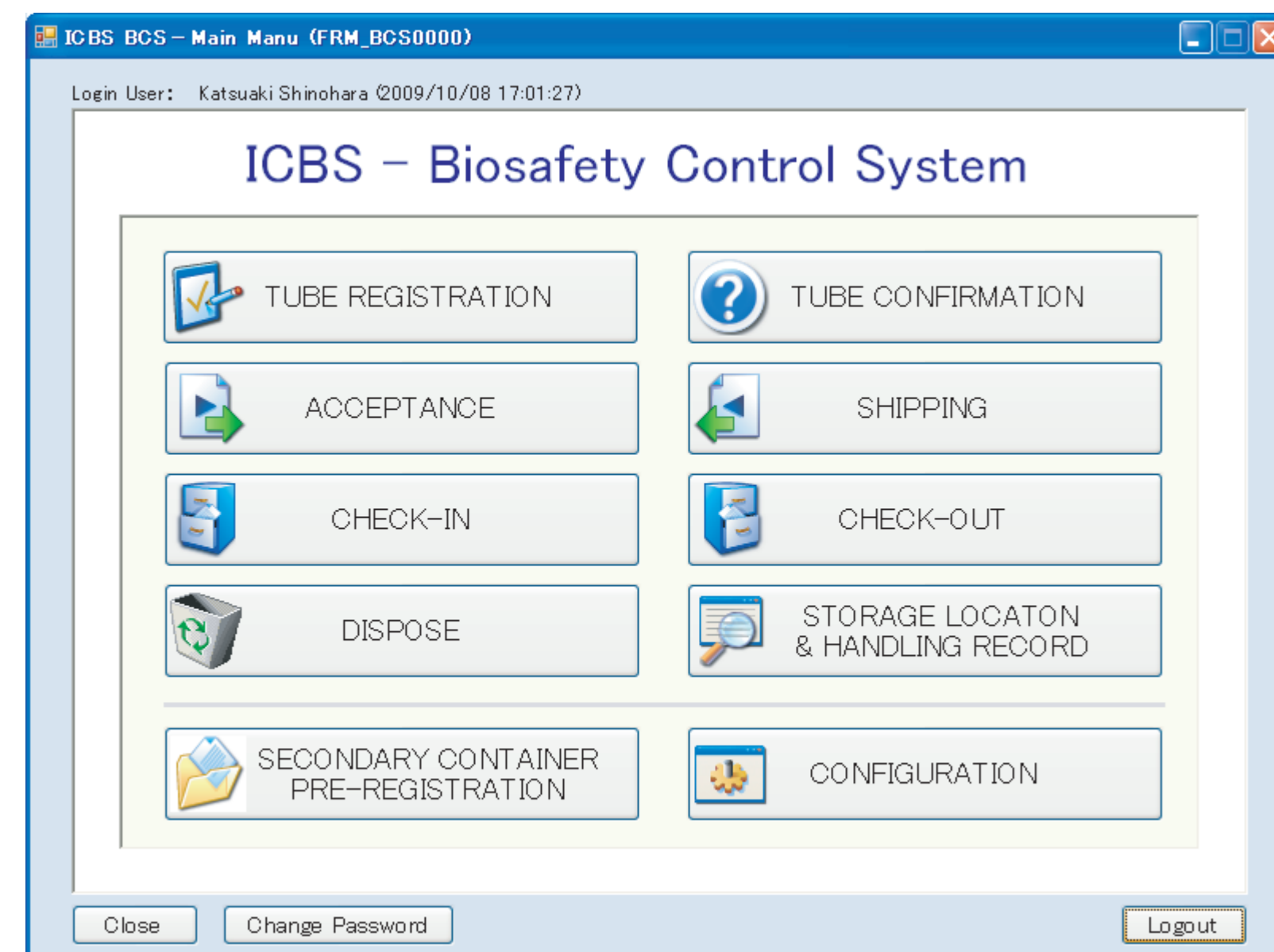
Menu
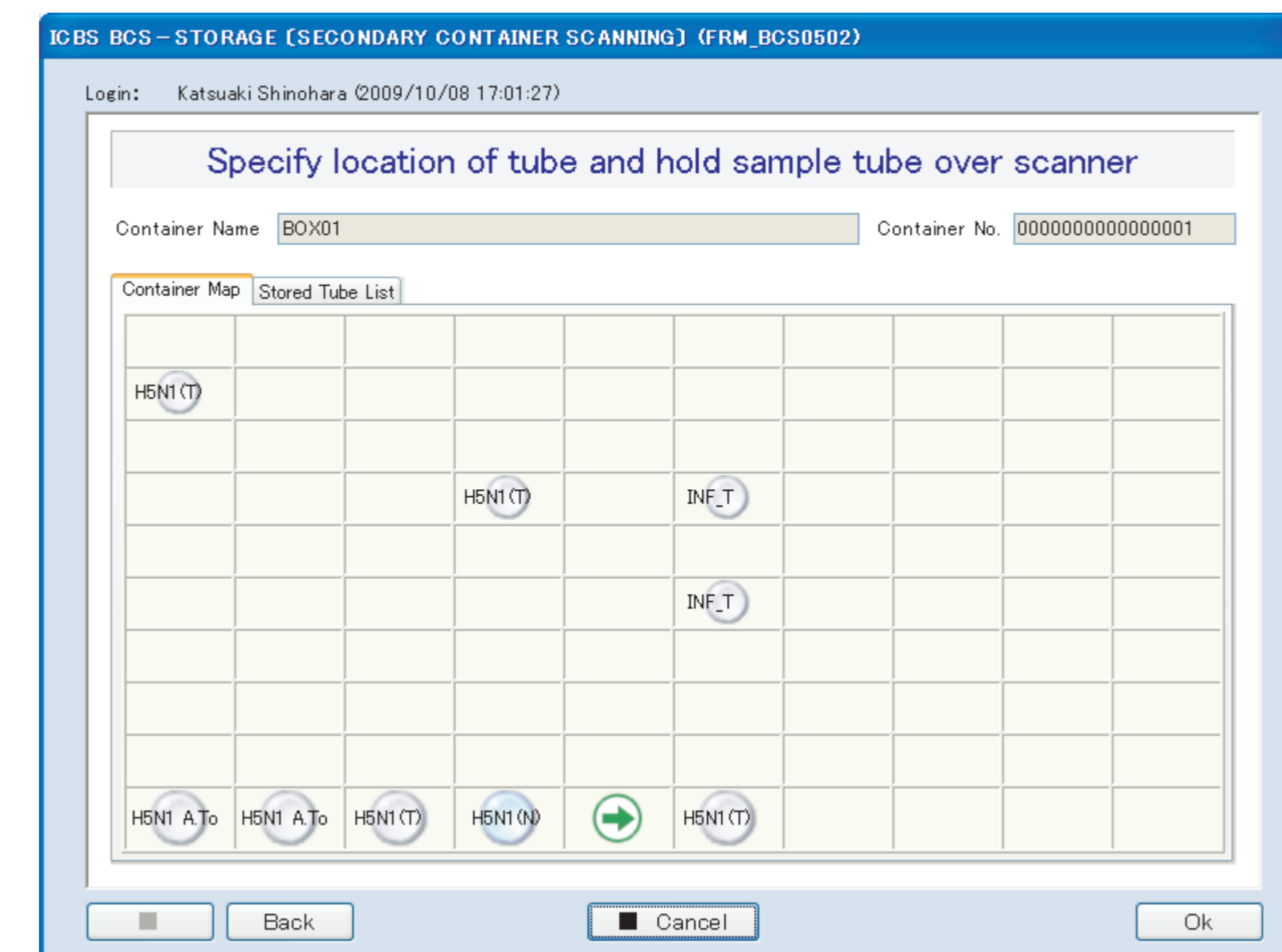
Location management in the secondary container

Results

The handling information was confirmed by the tag at each stage and all results were automatically integrated by this system. Based on the information of individual tag, we were able to record every history successively and automatically in each handling stage of the pathogen. The distribution of each sample in the freezer was able to be observed in detail.

Conclusion

As these results, we expect to simplify the management process in the handling of pathogen by using this system. The load of user in the pathogen management is expected to be reduced by this system. This system is a unique system that achieves the biosafety and biosecurity at the same time. This research was supported by the Health and Labor Science Research Grants Japan.
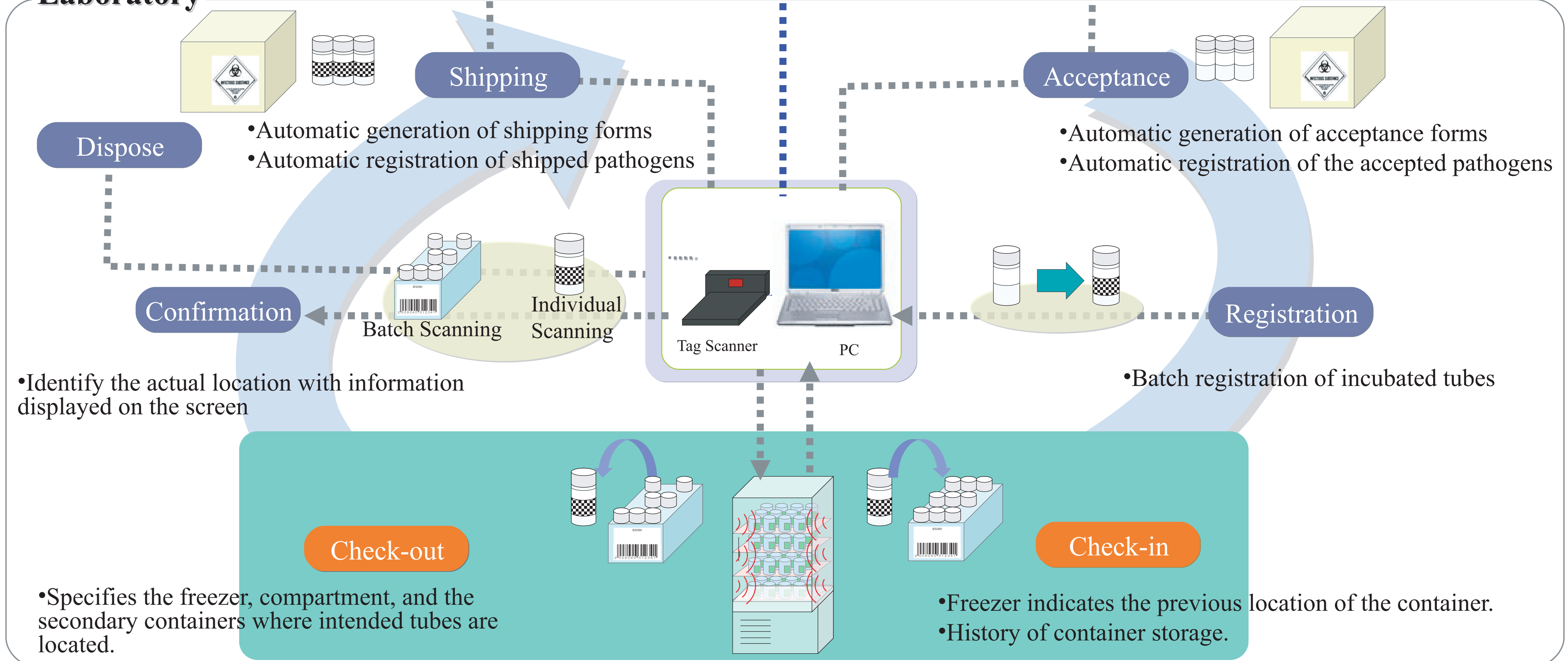
Preparation Room

Management of Individual Pathogens
◆ Retrieval of container location, condition, and quantity by the names of pathogen.
◆ Retrieval of container location, condition, and quantity of one certain pathogen.
◆ Inventory count (whole quantity of each pathogens and locations)

History Log Master Data

Tag Scanner   PC
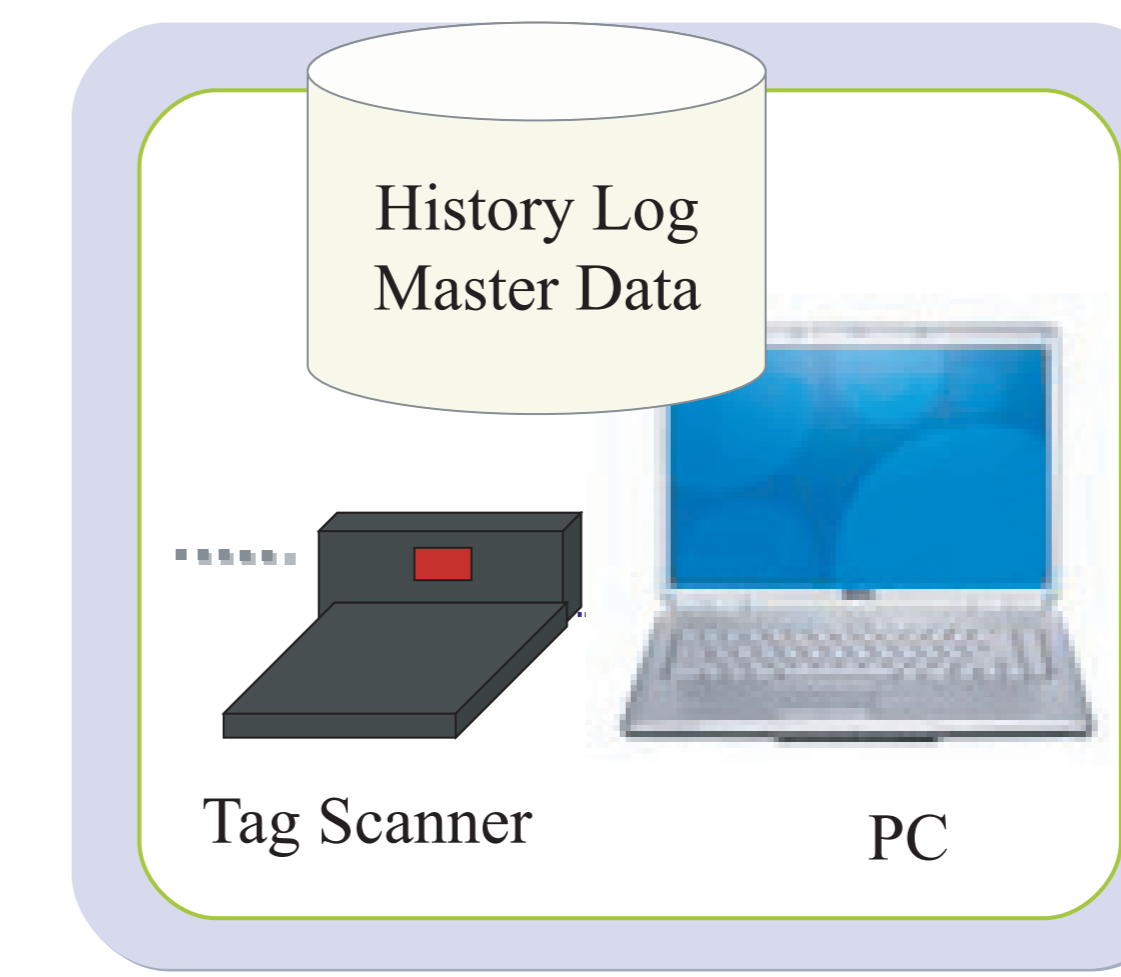
Security Management
◆ Method of authentication
ID/Password or IC card verifier
◆ Authority
Workers' Authority is Limited by the BSL of the person or the kind of pathogens.

Laboratory

Shipping
•Automatic generation of shipping forms
•Automatic registration of shipped pathogens

Dispose

Acceptance
•Automatic generation of acceptance forms
•Automatic registration of the accepted pathogens

Confirmation
Batch Scanning   Individual Scanning

Tag Scanner   PC

Registration
•Batch registration of incubated tubes
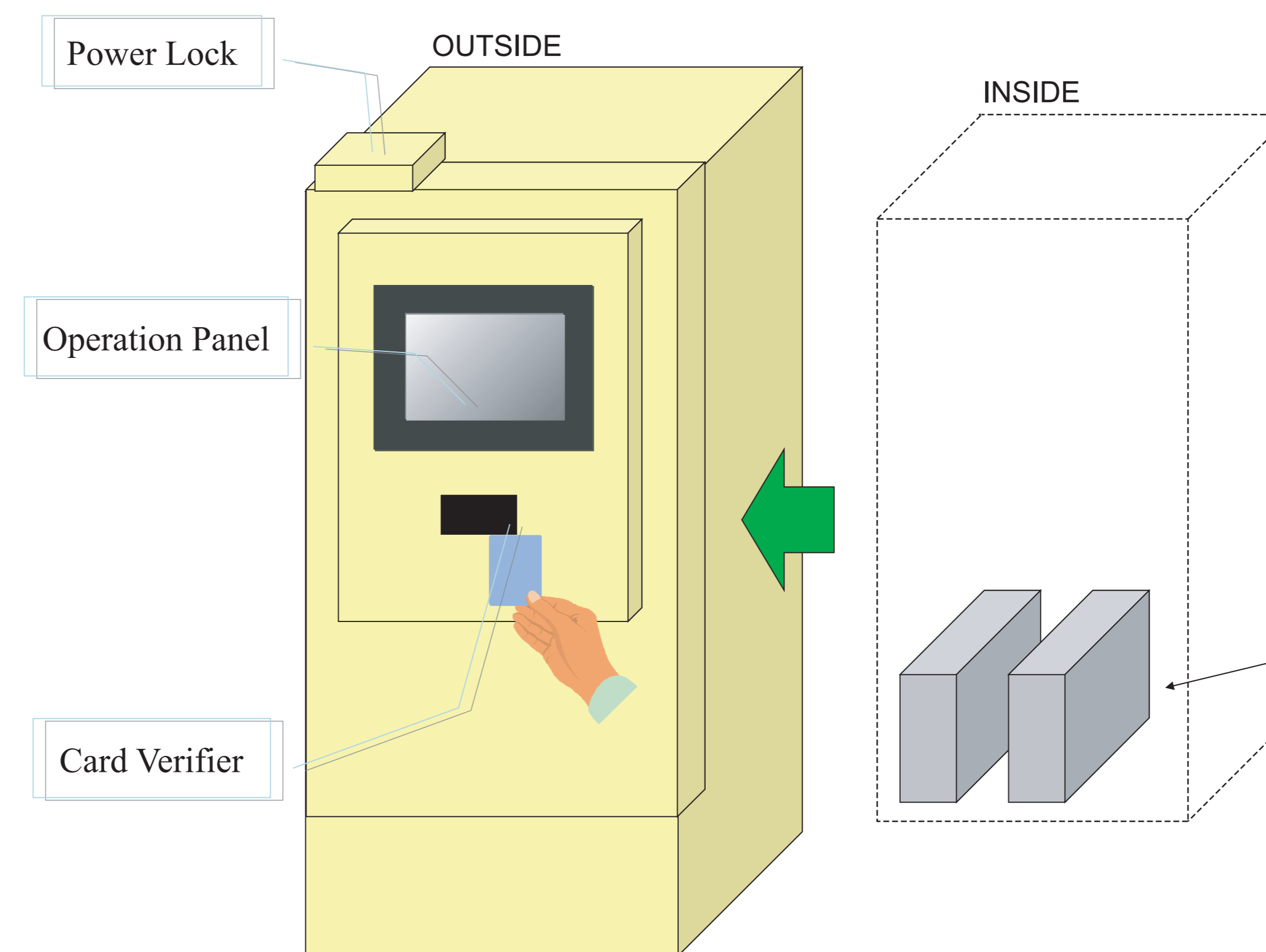
•Identify the actual location with information displayed on the screen

Check-out
Check-in

•Specifies the freezer, compartment, and the secondary containers where intended tubes are located.

•Freezer indicates the previous location of the container.
•History of container storage.

Freezer Functional Overview
*Data Logging
Temperature, Operation, Inventory, Location
*Location Management
Freezer, Compartment, Secondary Container
*Inventory Management
Quantity / freezer, compartment, kind of pathogen
*Access Control
Identification card verification system which keeps unauthorized users away from prohibited materials.

Power Lock   OUTSIDE   INSIDE
Operation Panel
Card Verifier

Storage Box "RS-R12TEXS"
Secondary Container with RFID
Tube with data matrix