Unit-2
Introduction to Technological Aids in Security Operations

Introduction

Security has become everyone's concern. It provides a safe environment, wherein people can conduct their daily chores and businesses. In a rapidly changing social and technological environment, understanding of security aspects, actions and use of modern equipment is of great relevance for improving security.

Security technological techniques or devices (also called as aids) such as alarms, CCTV cameras, detectors, and X-rays for access control, identification systems (such as electromagnetic card readers biometrics), etc., are now being widely used for an integrated security system.

The 21st century witnessed a phenomenal growth in technology, for both military and civilian applications. The relevance of technology to security is manifold and it is now seen as an important tool for national security strategies.

The aim of this unit is to provide you with the knowledge and skills to understand and operate different security equipments, such as access control, visitors regulation, scanning and frisking, survelliance camera system, fire detection and public address equipments used in security and safety operations.

The module will also help you to understand and assess threats to security technology systems (equipment and information/ data) and formulate and implement basic protective measures for security.

Session-1
Access Control Equipment

Relevant Knowledge

Access Control System: It is an integrated functioning of a number of networked gadgets, which is used to control and regulate access and movement of people and vehicles in any premises. An access control system can generate data regarding movement of people and vehicles with day, date, time and door-wise or gate-wise details. This data is of immense value for security, administration and investigation purposes.

Main Parts of an Access Control System

Access card: It is a device which acts like a key and allows or denies entry or exit. It contains pre-stored data regarding the authorized user, such as photo, name, employee number, department and access rights.

Card/Bio-metric Reader (Fig.2): A gadget that receives the data from a card after a swipe and transmits it to the system. Similarly, in a biometric system the finger print scanner receives data of a finger and transmits it to the system.

Fig. 1 Biometric Reader

Magnetic Lock: A magnetic lock is a part of the access control system which ensures physical security by keeping the entry point locked. When the access card reader controller confirms authenticity of the card user, a signal is transmitted to the magnetic lock which demagnetizes the lock for a couple of seconds to allow entry or exit.

Controller: It is a device which controls all the functions of the access control system. Based on inputs received from the card reader/

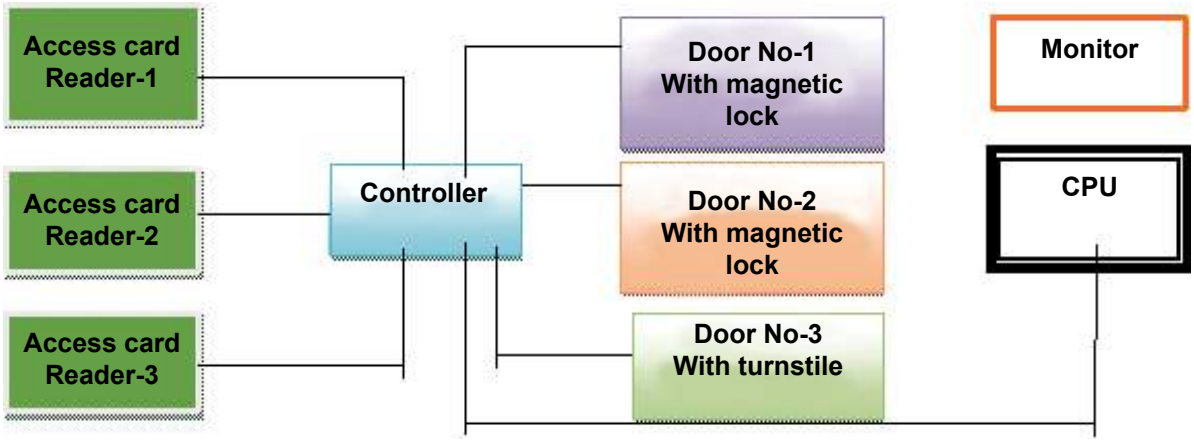
Fig. 2 Controller

biometric device/iris recognition device, the data is analysed and commands are generated for permitting/denial of access at the entry/ exit points. Entry/exit controls are enabled through magnetic doors, turnstiles, flap, boom barrier and bollards.

Fig. 3 CPU Monitor & Key Board

Central Processing Unit (CPU) and Monitor (Fig.3): It is a unit in the network where all the events are logged and stored; for example, the name, day, date and time of those who were given access on a particular day, event logging of all the access points, limited access points and restricted entry points. In case there is break down or malfunction of the access system the CPU will sound an alarm. Whenever an emergency alarm is triggered, the CPU, through the controller, will send out an emergency alarm signal so that the entire access control system is disarmed and emergency evacuation of people can be carried out without any hindrance. Monitor is a device that gives visual images of data of entry/exit points. It also shows all the event logs, alarms, etc.

Block Diagram of An Access Control System



Visitors' Register: This document contains vital information pertaining to visitors and their movement in and out of an establishment. The primary importance of maintaining this register is to enable identification of genuine visitors as well as to detect intruders since it keeps a record of the number of people visiting the unit.

(1)	(2)	(3)	(4)	(5)	(6)
Visitor Pass/ Badge No.	Name of the Visitor	Address	Whom to Meet	Purpose of Visit	Contact Number
(7)	**(8)**	**(9)**	**(10)**	**(11)**	
Time In	Signature of Visitor	Time Out	Signature of the Security	Remarks	

Exercise

Draw a block diagram of an access control system, label its parts and explain about it.

Assessment

Short Answer Questions

Answer the following questions

1. Describe the access control system.

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2. List the types of access control system.

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3. Identify the main parts of access control system.

Checklist For Assessment Activity

Use the following checklist to see if you have met all the requirements for assessment activity:

Part A

Differentiated between

(a) Access Card and Biometric Card

(b) Magnetic Lock and a Turnstile

(c) Controller and Central Processing Unit

Part B

Discussed in class the following:

(a) What is access control system?

(b) What are the different types of access control system?

Part C

Performance Standards

The Performance Standards may include, but not limited to:

Performance Standards	**Yes**	**No**
List the types of access control systems		
Draw a block diagram of an access control system		

Session-2
Scanning and Frisking

Relevant Knowledge

In a situation where a police officer or security personnel is suspicious of an individual, the person can be subjected to scanning using a scanning device, such as a metal detector. Once there is a positive identification, then frisking by hand is carried out. The aim of frisking or scanning is to deter and detect carriage or smuggling of prohibited items in and out of secured premises.

Fig. 4 Frisking

Frisking

Frisking (Fig. 4) is conducted to search a person for weapons, drugs or any prohibited items on person. It is done by passing the hands quickly over the person's clothes or through pockets to detect anything which a person might be carrying with a malafide intention.

Circumstances that Justify Frisking

- Concern for Safety of Security Person and Others.
- Suspicion that the Subject is Armed or Dangerous.
- Suspicion that the Subject is About to Commit a Crime Using a Weapon.
- Suspicion that Subject is Carrying Stolen/Missing Items.

Accepted Methods of Frisking for Men and Women

- Subject is made to stand with hands interlocked behind the head, legs apart and toes pointed out.
- Light patting with hands on the outer garment of the subject on the sides of the body from head to toe.
- Women are frisked only by lady security personnel.

- Women suspects will be frisked in a closed cubicle to maintain privacy. This is done only by an authorized lady security personnel.
- Women suspects will not be frisked in the presence of other male security personnel.

Following are some of the scanning equipment used on people and vehicles:

- Hand Held Metal Detector (HHMD).
- Door Frame Metal Detector (DFMD).
- Under Chassis Inspection Mirror (UCIM).
- Luggage/Cargo/Vehicle X-ray Machine.
- Explosive Vapour Detector (EVD).

Fig. 5 HHMD

Hand Held Metal Detector (Fig.5): An HHMD is a device to sense and detect the presence of metals (ferrous and nonferrous). HHMD is used for detection of weapons like knives, guns, pistols, revolvers, etc. These are extensively used at the airports, malls, hospital, banks and manufacturing units.

Fig. 6 DFMD

Door Frame Metal Detector: DFMD (Fig.6) or walk through detectors is ideal for building entrances, malls, airports and factory entries. It is used where there is constant and heavy flow of visitors.

Under Chassis Inspection Mirror: A UCIM (Fig.7) is a mirror mounted on caster wheels. It has a long handle by which it is slipped under any vehicle to detect the presence of any concealed items such as bombs, explosives, arms and any prohibited items. A torch/light source can also be attached to UCIM for night operations.

Fig. 7 UCIM

X-ray Machine: It is a scanning device based on the use of X-ray (Fig.8). Luggage or other items which are required to be scanned are passed through a scanning box on conveyor belt. In the scanning box X-rays are emitted on the item and its image can be viewed on the monitor. Image reading is a specialized function for which special training is required. Large quantity of items can be scanned in short time. It also enables checking luggage without opening.

Fig. 8 X-ray Machine

Explosive Vapour Detector: EVD (Fig.9) is a simple detection unit which is designed to enable searching of people, luggage and parcels for hidden explosives. On activation of the unit, it draws a continuous stream of air through its nozzle. In case explosive vapours are detected in the sampled air, an alarm rings. In advanced version of EVD, the equipment can also indicate the type of explosive detected.

Fig. 9 EVD

Sniffer Dogs: Sniffer dogs are of special breed which are trained to detect persons, stolen items, explosives, weapons, narcotics, etc. These dogs undergo specialized training through a dedicated dog-handler. Sniffer dogs are helping military, police and investigation agencies at the airport, railway station and sensitive installations.

Exercise

Activity

Make a buddy pair and carry out frisking of fellow student. During frisking, try to recognize normal and abnormal behaviour of the person being frisked

(a) Write a short note of your experience

(b) Discuss in class whether the procedure of frisking was as per the legal requirements and organisational procedures.

Assessment

1. List the scanning equipments.

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2. Explain the purpose of HHMD and DFMD.

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3. Explain the use of Explosive Vapour Detector and sniffer dogs.

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4. Explain the use of Under Chassis Inspection Mirror.

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5. Explain the circumstances that justify frisking.

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6. Describe the standard procedure of frisking men and women.

Checklist For Assessment Activity

Use the following checklist to see if you have met all the requirements for assessment activity.

Part A

Differentiated between

(a) Scanning and frisking

(b) HHMD and a DFMD

(c) UCIM and X-Ray scanning machine

(d) EVD and sniffer dogs

Part B

Discussed in class the following:

(a) Why frisking is done?

(b) What are the various technological aids used in scanning and frisking?

Part C

Performance Standards

The Performance Standards may include, but not limited to:

Performance Standards	Yes	No
Identify the parts of equipment used for scanning and searching		
Demonstrate the knowledge of various components of equipment used in scanning and searching		

Session-3
CCTV System and Equipment

Relevant Knowledge

Closed Circuit Television (CCTV) Camera System

CCTV is used in different situations all over the world. It is also referred to as surveillance cameras. Most sites/units employ a CCTV system to enhance the security. Its three main usages are:

1. To Detect any Criminal or Malicious Activity in the Premises.
2. Real Time Identification of Unauthorized or Suspicious Movements and Vandalism.
3. Investigation, Forensic and Evidence.
4. Collection of Evidences.

A CCTV control system comprise of a camera to capture images and transmit it to a central processing unit (CPU) or a digital video recorder (DVR) which retains the images (footage) for certain period. The images can be retrieved and played back, if required.

Fig. 10 Dome Camera

Fig. 11 Fixed Camera

Types of CCTV cameras

Dome Camera : As the name suggests, it is a dome-shaped high quality video camera (Fig.10). It is ideal for short range indoor application and for areas with some kind of cover or protection. It captures images in a particular arc only.

Fig. 12 PTZ Camera

Fixed Camera: These are fixed in a particular direction and used mainly for short-range surveillance, which is mostly used outdoors (Fig.11).

Pan, Tilt and Zoom (PTZ): A PTZ camera (Fig.12) is a closed-circuit camera with abilities to control functions remotely such as zoom-in on a subject, pan from left to right and back and tilt from top to bottom and back.

Infrared Ray (IRR) Based Camera: Uses infrared ray bands to capture images in low, poor and no light conditions (Fig.13).

Fig. 13 IRR Camera

Digital Video Recorder (DVR): It is a device that captures the images from the camera and stores in its hard disk in a compressed form (Fig.14).

Fig. 14 DVR

Purpose of CCTV

CCTV systems are one of the most popular vigilance gadgets. It enables capturing real time images of activities and incidents and keeping them on record for investigation, forensics and evidences.

CCTV cameras are being used at several places, both for official and personal reasons. Some of the common places where CCTV systems are installed include the following:

- Manufacturing Units
- Business Places
- Offices
- Malls
- Hospitals
- Airport
- Bus Stands
- Railway Stations
- Highways
- Amusement Parks
- Resorts and Hotels

Main Parts of a CCTV System

1. Camera : Captures images of subjects and activities.
2. Monitor : It is used for viewing captured images at a central point, such as the security control room.
3. CPU/DVR : It receives records and stores images in a digital format.
4. Power Supply Unit (PSU) : It supplies power to camera and system.

Exercise

Activity

Visit an establishment, which has got a CCTV system and understand its operations.

Assessment

1. Explain the purpose of a CCTV system.

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2. Describe the three main uses of a CCTV system.

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3. List the types of CCTV camera.

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4. What is the difference between a dome and a fixed camera?

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5. What is the difference between a PTZ and an IRR camera?

Checklist For Assessment Activity

Use the following checklist to see if you have met all the requirements for assessment activity.

Part A

Differentiated between

(a) Dome and Fixed Camera

(b) Pan, Tilt and Zoom (PTZ) and Infrared Ray (IRR) Camera

Part B

Discussed in class the following:

(a) Uses of CCTV system

Part C

Performance Standards

The Performance Standards may include, but not limited to:

Performance Standards	**Yes**	**No**
Identify the various types of cameras used in CCTV system		

Session-4
Public Address System

Relevant Knowledge

A public address (PA) system is a centralized amplifier-based system that is designed to provide voice paging and to broadcast messages during peace and emergencies. The system can transmit alarm tone and routine voice messages from a central location to all or selected areas of the facility in a reliable manner by the use of loudspeakers.

Fig. 15 Speaker

Functions

A PA system is a very powerful tool used for addressing large gatherings. A good PA system meant for security purposes gives a choice to broadcast messages as per zones, for example, floors, location within the site, etc.

Fig. 16 Speaker

Types of PA System

Fixed: The fixed type PA system cannot be moved. Such types of PA systems have a large network of cables and speakers in multiple zones and have one or two microphones located at common places, for example, Control Room.

Main Parts of a Fixed PA System

Microphone: It is a device that converts audio signals into electrical pulse for amplification through an amplifier. It can be either hand-held or mounted.

Amplifier: This amplifies the sound intensity to the required level (decibels). These electronic impulses are then transmitted to the speakers.

Speakers: These convert the received electrical impulses back to sound waves through an audio conversion unit and diaphragms and gives audio outputs (Fig.15 & 16).

Operator Console: The console comprises of various controls, which control the distribution of sound or announcements to the desired zones: floors, parking area, reception area, rest rooms, cafeteria, etc.

Mobile: The mobile type of PA system is compact and small. It can be held in hand and carried around while in use.

Difference between Fixed and Mobile PA System

Fixed PA System

- Larger in Size
- Installed at a Fixed Place
- Larger Audio Range Due to Bigger Speakers
- Costlier

Mobile PA System- Megaphone

- Smaller in Size
- No Fixed Deployment
- Limited Audio Range
- Cheaper

Megaphone is of Two Types

- Hand-Held
- Shoulder Hung

Fig. 17 Hand Held Mobile PA System

Fig. 18 Shoulder Hung Mobile PA System

Main Parts of a Hand-Held Megaphone

Speaker, grip, microphone, battery compartment latch, trigger switch or Press-To-Talk (PTT) button, volume control, siren switch, shoulder strap, 12 volts external power supply point, back cover and cell container are the main parts of a hand held megaphone.

Main Parts of a Shoulder Hung Megaphone

Speaker inside the main body, resting stand, battery compartment latch, spring cord, siren switch, shoulder strap, 12 volts external power supply point, back cover and cell container are the main parts of a shoulder hung megaphone. Microphone assembly consists of volume control, trigger switch or Press-To-Talk (PTT) button.

Operating a Mobile PA System (Megaphone)

Hand-Held Type

- Hold the megaphone by the grip and keep it close to your mouth in such a way that the speaker is facing the front and the microphone end is close to your mouth.
- Press the PTT button and speak when you want to address the crowd or gathering.

Shoulder Hung Type

- Hang the megaphone on your shoulder with the help of the shoulder straps.
- Hold the microphone assembly and keep it close to your mouth, pointing the speaker in the direction of the crowd.
- Press the PTT button and speak when you want to address the crowd or gathering.
- Adjust the volume accordingly.

Exercise

Visit the security laboratory/training organization and study the various types of PA systems. Learn how to use these systems effectively.

Assessment

Short Answer Questions

1. Explain the use of a PA system in security.

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2. List the types of PA system and explain in brief about them.

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4. List the main parts of a fixed PA system.

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5. Describe the function of a microphone and speaker.

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6. Describe the function of an amplifier and operator console.

Checklist For Assessment Activity

Use the following checklist to see if you have met all the requirements for assessment activity.

Part A

Differentiated between

(a) Fixed and Mobile PA System

(b) Microphone and Speaker

Part B

Discussed in class the following:

(a) What are the different types of PA system?

(b) What are the uses of a PA system?

Part C

Performance Standards

The Performance Standards may include, but not limited to:

Performance Standards	**Yes**	**No**
Identify the various parts of a PA system - microphone, speaker, amplifier, operator console, etc.		
Draw a block diagram of PA system		