Modern Techniques for Enhancing the Safety and Security in Airports

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***Abstract*: - A comprehensive study is conducted to explore the safety and security systems implemented in airports and their advancements in terms of technology. In addition to these observations, a critical approach is followed to recognize the extent of success reached and how much more efficiency and functional perfection achieved in today's world. An insight is given into the existing precaution measures followed in the airports to avoid hazard any time. Many budding technologies are capable of preventing illegal activities, which can forecast natural hazards that can help reducing pollutions caused by airport premises.**

I. INTRODUCTION

Increase in air travel drives the need for well-organized safety and security systems.Terrorism and crimes have encouraged worldwide governments to make airport security stricter and keep it as a higher priority. Airport safety and security is important because air transport full of passengers attracts the bombers and hijackers and also high chances of accidents.Terrorism is a major problem in air transportation. Hijacking and bombings became the method of choice for subversive by the militant organizations around the world. The security at airports must be firm and strong. These airport safety and security systems comprise infrastructure, regulations, software and technology for better monitoring, detection and risk prevention.

II. AIRPORT SAFETY

The worst year on record of air accidents is 1929 killing 69 people. The safest year for commercial aviation is 2017for bothnumber of fatal accidents and fatalities.

The common reasons for fatal accidents are:

- Uncontrolled Flight into Terrain
- Improper Ground Safety
- Loss of Control in-Flight
- Lack of capacity in handling flight operations
- Lack of Runway Safety

Crucial safety measures

Fire

There are multiple types of fire extinguishers based on the type of flame that starts and spreads. The different class of fires are:

- Ordinary combustibles such as wood and paper.
- Flammable and combustible liquids and gases.
- Energized electrical equipment.
- Combustible metals.
- Cooking Oils and Fats.

The different types of fire extinguishing agents used are

- Primary aircraft fire extinguishing agents like liquid foam.
- Supplementary aircraft fire extinguishing agents that mostly containfluoroprotein foam.
- Other aircraft fire extinguishing agentslike wetting agents.

These portable fire extinguishers require periodic inspection and proper maintenance and staff also have to be trained and educated on fire extinguishers. Airports also have "Fire brigades". The Fire brigade is a group of employees who are very well trained in firefighting operations. In addition to these measures, there arenumber of restrictions imposed on passengers and airport staff in smoking, bringing flammable objects, switching off computers after use etc.

Airside safety

The role of Airside Safety and Operations Department is to carry out regular inspections of the movement area. Athree-level inspection system is effective to ensure high standards of safety.

LEVEL 1: Inspections coveringthe movement zones adjacent to the airport premises

LEVEL 2: Thorough inspections are carried out in different airside departments

LEVEL 3: This level consists of performing audit so that the ascending inspection levels are of required standard.

Landside safety

Passenger Evacuation:

Evacuation of passengers from aircraft and airport terminals may occur at anytime. The Evacuation plan should exist where the routes to the designated safe area should be kept clear without any interruptions like vehicles, equipmentetc. These procedures for the evacuation should be done quickly by the Airport Emergency Procedure team with full control.

Wildlife Hazards:

Wildlife surrounding the airport causes hazards in the airport area. Proper fencing should be there around the airport area. There should not be tall tree in and around the airport so that there is no habitation of wildlife. Movement detectors are been installed near runway areas to avoid accidents. The feeding of birds and animal should be strictly avoided.

III. AIRPORT SECURITY

Airport security measures are:

Type 1: standardized screening for all passengers

Type 2: elevated-risk screening for only selected passengers.

Confirming the identity of travelers:

The valid and relevant ID proofs of the passengers are checked apart from their tickets for domestic travel within the country. Passport and Visa (for the traveling country) are the only valid ID proofs for passengers traveling abroad.

Metal detectors using electromagnetism:

Metal detectors are very basic security check. An AC generator and a coil are present in the detector. Due to a variation in the magnetic field, an AC current is produced. Eddy currents are produced by the metal objects near the detector. Due to this, there is a net change in the magnetic field. A magnetometer detects the change that starts an alarm, thus detecting the metal object successfully.

Scanners using the properties of X-rays:

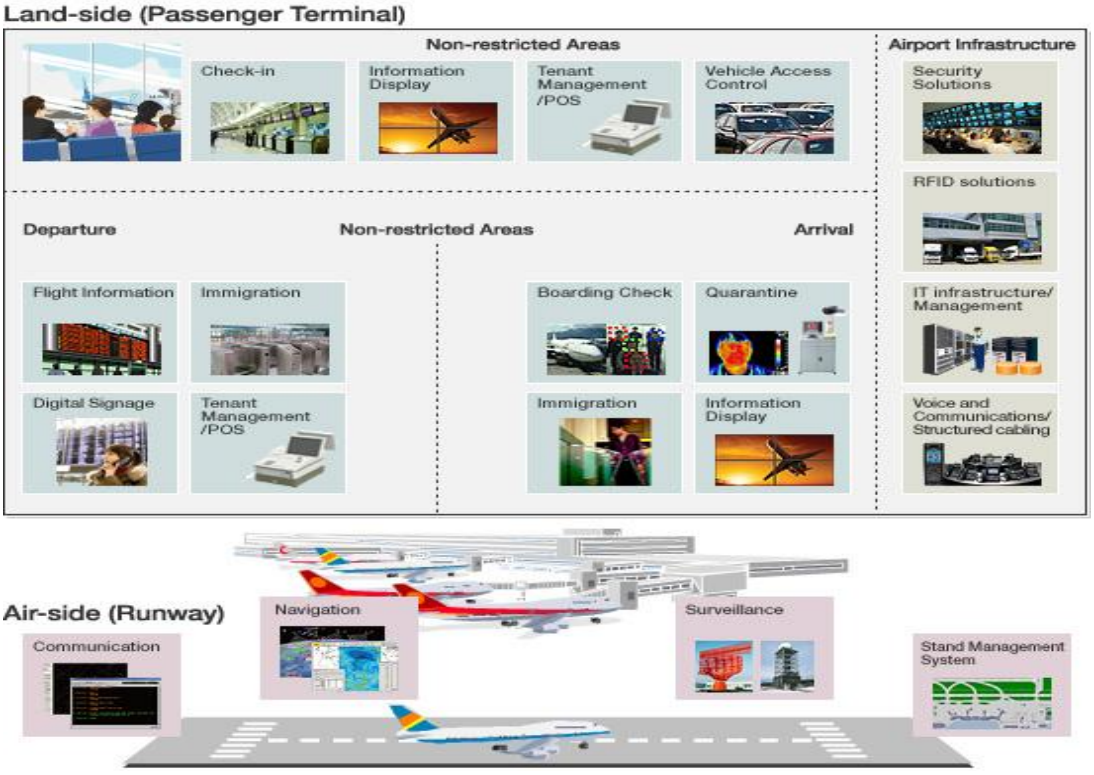
Baggages are sent inside the scanner andpasses through the X-rays.A digital image is formed that describes the shapes and the material of objects by different color representations. Denser materials are represented by darker colors and lighter material are represented by lighter colors.The transmitted ray's intensity is measured normal X-ray scanning. The other kinds of X-ray scanning technologies are:

- Backscatter X-ray technology
- Millimeter wave technology

The scatteredray's intensity is measured forthe above-mentioned scanning technologies.

Explosives and illegal drugs detectors:

Ion Mobility Spectrometry is used to detect explosives and illegal drugs. The particles are ionized to measure the "ion mobility".A database containing all acceptable colors alerts the authorities if the output does not match.Trained dogs are also used to detect certain drugs and explosives.



IV. NEW TECHNOLOGIES TO IMPROVE SAFETY AND SECURITY IN AIRPORT

Smith's Detection a company specializing in manufacturing of threat detection devicesand screening technologies announced that the Airports Authority of India (AAI) has placed an order for multiple **CTX 9800 Ds systems** at a combined value of over USD50 million.Powered by computed tomography (CT) technology, which can be tailored to meet the specific needs of any legacy or new baggage-handling system. This new scanning system can reduce the time passengers spend in lines to clear security checks and airports can earn good credit from passengers.

Implementation of Biometric Based passport System to Make Airports Safer

Biometric passports or e-Passports combines paper documentation and state of the art biometric identification to create a hassle-freetraveler identification system that is reliable, full proof and easy to use. After the International Civil Aviation Organization laid down guidelines for biometric passports, many countries including India, started to revamp their archaic paper-based passport system to make their airports secure. Experts believe that once this new system is established the biometric fingerprint reader will become the norm in the aviation industry. The passenger can enter the airport, check-in, pass through security and board the aircraft using their stored biometric information like fingerprints. There will be no need for paper tickets or boarding passes nor the need for a physical identification document. This will apply to domestic travel. For international travel,a passport is still required.

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Blockchain technology

The Blockchain technology is most efficient technology that reduces blocks in the transaction data. The power of blockchain is due to decentralization. The blockchaintechnology disappears the intermediary's needs. The airports and airlines are showing their interest towards this technology due to its robustness and secured nature.

Augmented Reality

Augmented Reality (AR) is a high-tech that likely to be implemented in airline and airport space. The image below shows how Augmented Reality works. This technology can be implemented in the airport ramps to enhance better ground operations

AI chatbots

The airlines and airports have started implementing Bot apps for smarter passenger services. With this technology, the passengers can acquire information according to their personal willing through their personal gadgets.

New Distribution Capability

The New Distribution Capability is a new method of business in the travel industry that enables the air products transformation ways for ret ailment. NDC enhances communication capabilities between the travel agencies and airlines. The NDC addresses the industry's current distribution limitations to enhance access to full and rich air content and transparent shopping experience.

Beacons technology

Beacon, a wireless broadcaster ofthe short-range Bluetooth signal can be operated by an app. It plays a major differentiator for many airports and airlines as it directly engages with customers. It provides a customer a range of information about their flights and parking. It helps airports to improve their own performances and monitor them.

V. CONCLUSION

By incorporating these technologies into Indian airport security and safety systems, the AAI together with NITI Aayog, the think tank of Indian government can open up the space and opportunity for new start-ups. Theairline solutions are currently working on these technologies. Bringing in these firms not only will increase the safety and security of airports and passengers, but will also open the gates for employees, engineering graduates and scholars.

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