



Asia-Pacific  
Economic Cooperation

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Aviation Security Panel 2

## **Effective Countermeasures Against MANPADS**

Submitted by: Incheon International Airport (ICN)



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# EFFECTIVE COUNTERMEASURES Against MANPADS



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## **I. OVERVIEW**

### **Basic Information**

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#### **What is MANPADS?**

- Man Portable Air Defense System

#### **※ Other names**

- Shoulder Launched Air Missile

- SAM(Surface to Air Missile)

#### **Feature**

- Protect ground troops from helicopters or air attacks

- Heat-seeking missile

## **MANPADS Threats**

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**Threat increased after 9-11 incident**

**Threat emerged after TWA Crashed in 1996**

**Recent high threats after the Mombasa Incident(2002) and the DHL Incident (2003)**

**Newly emerging threat exceeds Aircraft Hijackings**

## **History and Current Status**

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**First developed in the late 1950s(Redeye)**

**Lots of MANPADS produced since 1970s**

**Distributed to the Mujahedin in 1980**

**More than 100,000 MANPADS dispersed World Wide as of 2004**

**27 Terrorist Groups own MANPADS**

**※ Mainly Al-Quaeda affiliated groups**

**Slide 5**

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**C.D.S.1** Christine, 2/25/2004

## Main Specification

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Class	Details
Length	1.5 m ~ 1.9 m
Weight	15 kg ~ 18 kg
Maximum Altitude	4 km (13,000 feet ~ 15,000 feet)
Speed	2,400 km / hour
Price	US\$ 25,000 ~ US\$ 250,000

## Attack Points & Threat Area

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### Attack Points : Take-off / Landing

※ Especially Take-off because the aircraft is full of fuel . This causes severe damage to surrounding populated area.

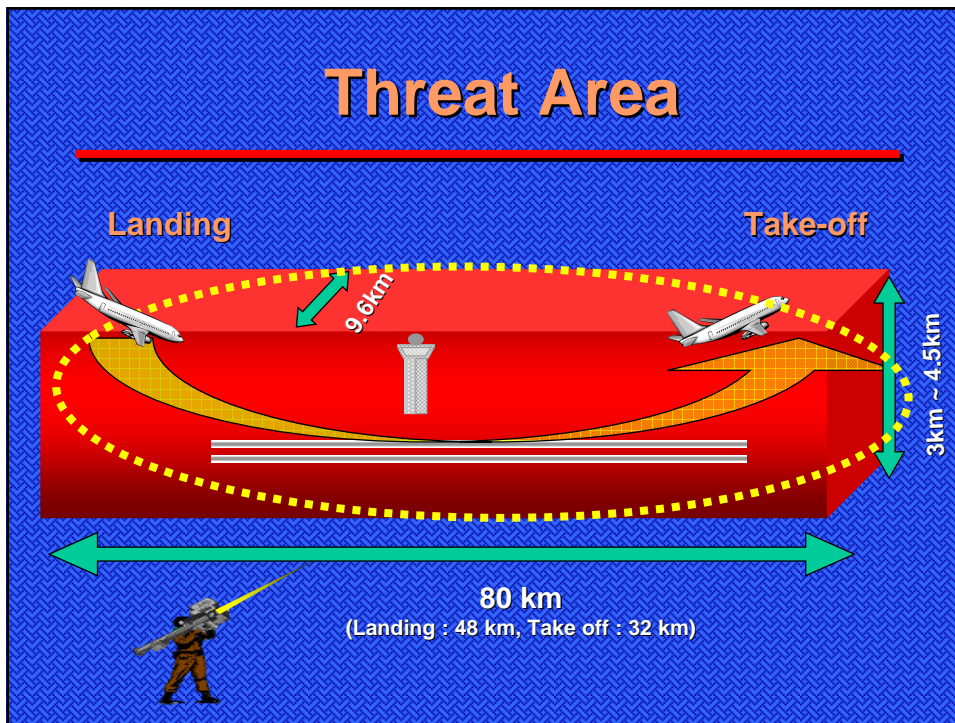
### Threat Distance : Total of 80 km

- Take-off : 32 km
- Landing : 48 km

### Threat Width : 9.6 km

### Threat Height : 3 km ~ 4.5 km

## Threat Area



## MANPADS - Advantage

### Maximizing result

(No single proper countermeasures so far)

### Easy to Carry and Conceal

### Easy to Aim and Fire

### Free Firing Position

(launched from vehicles, boats, or populated areas.)

### Easy to Store and Maintain

### Inexpensive

## **MANPADS - Disadvantage**

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**Difficult to Operate**

ex) Mombasa incident

**Unreliable Qualities**

**Cannot Incur Fatal Damage**

(Aircrafts can operate with only one engine)

**Target only Engine-heating aircraft**

**Only be launched from behind the aircraft**

## **II. TYPES**



## Types of Manpads

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### 1<sup>st</sup> Generation (Primitive Heat Seeker)

- RED EYE (Produced in 1950)

### 2<sup>nd</sup> Generation (Old Heat Seeker)

- SA-7, SA-14, Blow pipe, Stinger

### 3<sup>rd</sup> Generation (Advanced MAMPADS)

- SA-16, SA-18, Mistral, FIM-92 ,  
Stinger FIM-92, Javelin

## 1<sup>st</sup> Generation

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### RED EYE (U.S 1950~1967)

- First MANPADS Model
- Details
  - Primitive Heat-Seeking
  - Max Altitude range : 2.7km(8,900 ft)
- Quality not much reliable

## 2<sup>nd</sup> Generation

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### SA-7b (Strela2, Russia, 1972)

- Deployed since 1970's, 1980 widely
- Details :
  - Old Infrared Seeker
  - Max Altitude Range: 4.2km(14,000 ft)
- MANPADS most commonly used by Terrorist groups
  - ※ Al Quaeda, Hezbollah, etc. (Total of 9 Groups)
- Not correctly hit the target when Countermeasures applied

## 3<sup>rd</sup> Generation

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### Stinger FIM-92(U.S.1990)

- Most advanced and accurate MANPADS
- Details
  - Max. Altitude Range : 4.7km(15,400ft)
- Not widely dispersed to Terrorist
- Need some training to operate

### **III. COUNTERMEASURES**

## **Countermeasure**

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### **Aircraft Measures – System Installing**

- IRCM
- Flare

### **Ground Measures**

### **Air Measures**

### **Cooperation**

## Aircraft Measure – IRCM

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### IRCM (Infrared Countermeasure)

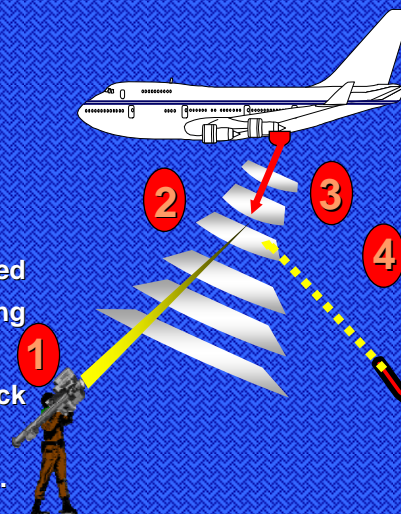
- Military Jets Applied
- Principle  
: change the missile's direction by giving off IR
- Application  
: US & other country under development
- Estimated Cost: \$US 1 ~ 3 million

## Aircraft Measure – IRCM

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### How it Works

- Stage 1 Launch a missile.
- Stage 2 Sensors detect a missile launch.
- Stage 3 The system fires an infrared beam at the missile, blinding its heat-seeking sensor.
- Stage 4 The missile is unable to track the plane, the rocket is diverted away from its target.



## **Aircraft Measure – Flare**

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### **Decoy Flares**

- **Military Jet Applied**
- **Principle :**  
Ejecting flares when missile is approaching
- **Application :**  
Israeli Commercial Aircrafts

## **Aircraft Measure – Flare**

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### **How it Works**

- **Detects the Launched Missile**
- **Projects Flare around Aircraft**
- **Missile is misdirected**

## **Air Countermeasures**

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**Aircrafts Escorted by Military Fighters**

**Aircraft Frame Hardened**

**Special Paints on Aircrafts**

**Pilot Training**

**Aircraft Power Minimized**

**Flight Procedures Changed**

## **Ground Countermeasures**

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**Heighten Airport Perimeter Patrol  
(Airport Authority Portion)**

**Anti Missile System Positioned**

**Military Helicopter Patrol**

**Flare Dispensing around Airport**

## **Countermeasure- Cooperation**

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**Intelligence Gathering System among  
countries.**

**MANPADS Counter Proliferation  
among countries.**

## **Airport's Position**

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**No single solution is available.**

**International Standards should be  
established .**

**Responsibilities among Organizations  
must be defined especially in Ground  
Countermeasures.**

**More thorough Discussion needed  
to prevent MANPADS attacks.**

## **CONCLUSION**

## **Conclusion**

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**Cooperation between states  
Urgently needed.**

**Exchange the Threat Information.**

**Share the Technology and Tactics.**

**Develop World Wide Standards against  
MANPADS.**





**THANK YOU FOR  
YOUR ATTENTION!!**

Incheon  
International  
Airport

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