MANPADS

Scale & Nature of the Threat

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Man-Portable Air Defense Systems

- **Carried & operated by one person.**
  - **30-40 pounds, 5-6 feet in length**
  - **Fits in trunk of a car**
- **Easy to store & maintain.**
  - **Simple, rugged design**
  - **Long shelf-life (sealed canister)**
- **Easy to aim & fire.**
  - **Quick setup & reload**
  - **Visually sighted (like rifle)**
  - **Once sensor locks on, fire & forget**
- **Countermeasures difficult**
  - **Seconds to target**
  - **Small size & passive sensor minimize signature**
  - **Increasingly sophisticated sensors**
- **Relatively low-cost & widely proliferated.**

How Great Is The Danger?

- **500,000-700,000 MANPADS produced worldwide since 1960s.**
- **Thousands have found their way to non-state actors & black market.**
  - **“Tens of thousands” stolen in Russia in 1990s**
  - **Only a third of 5,000+ Iraqi MANPADS accounted for**
- **11/02 attack on Israeli 757 in Kenya a wake-up call.**

MANPADS Attacks on Civil Aircraft			
Organization	**Period Covered**	**Number of Attacks**	**Number of Deaths**
TSA	**1979-present**	**35**	**640**
CIA	**1977-1996**	**27**	**400**
FBI	**1970s-present**	**29**	**550**
RAND	**1975-1992**	**40**	**760**
Janes	**1996-2000**	**16**	**186**

Widely Proliferated Systems

Name	Origin	Weight	Max Range	Max Altitude	Guidance
Stinger	U.S.	35 lbs.	5 miles	2 miles	Passive IR/UV
SA-7B (Strela-2)	Russia, China, Egypt	33 lbs.	2.6 miles	1.4 miles	Passive IR
SA-14 (Strela-3)	Russia	~30 lbs.	3.7 miles	>2 miles	Passive IR
SA-16 (Igla-1)	Russia	~30 lbs.	3.1 miles	2.2 miles	Passive IR/UV
SA-18 (Igla)	Russia	~30 lbs.	3.2 miles	2.2 miles	Passive IR/UV
QW-1	China, Pakistan	36 lbs.	3.1 miles	2.5 miles	Passive IR

- All missiles have high-explosive warheads w/ contact fuzing.

Terrorist Possession of MANPADS

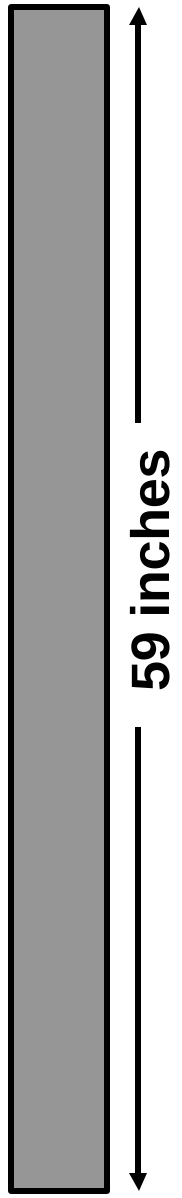
- **Over two dozen terrorist groups are believed to possess man-portable, heat-seeking missiles.**

Groups with SA-7	Groups with Stinger
- Al Qaeda (Afghanistan) - Taliban (Afghanistan) - Hezbollah (Lebanon) - Kurdistan Workers Party (Turkey) - Tamil Tigers (Sri Lanka) - Harkat al-Ansar (Kashmir) - Irish Republican Army (Ireland) - Revolutionary Armed Forces of Columbia (Columbia)	- Al Qaeda (Afghanistan) - Hezbollah (Lebanon) - Kurdistan Workers Party (Turkey) - Tamil Tigers (Sri Lanka) - Hizbul Majahideen (Kashmir) - Armed Islamic Group (Algeria) - National Liberation Front (Columbia)

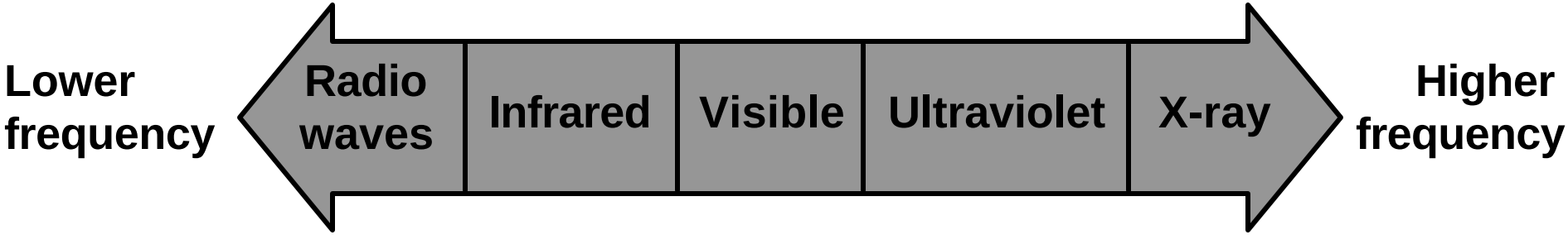
- **Other groups with MANPADS: Khmer Rouge, Popular Front for Liberation of Palestine, Somali National Congress, Kosovo Liberation Army.**

SA-7B: Most Common Threat System

- **Russian SA-7B (Strela-2M) is system most frequently employed by terrorists.**
  - **Introduced in 1970s**
  - **At least 50,000 produced**
- **Licensed/exported to over a dozen countries.**
  - **Chinese version is “Hong Nu”**
  - **Egyptian, Pakistani & Yugoslav variants**
- **Can hit aircraft above 7,000 feet at ranges of up to 14,000 feet.**
  - **Missile speed exceeds 1800 feet per second**
  - **5-10 seconds to sensor lock on target**
  - **6-10 seconds to reload**
- **System consists of canister, missile & battery.**
  - **Heat-seeking sensor (medium IR)**
  - **Filters to reject flares & decoys**
  - **High-explosive warhead w/contact fuzing**



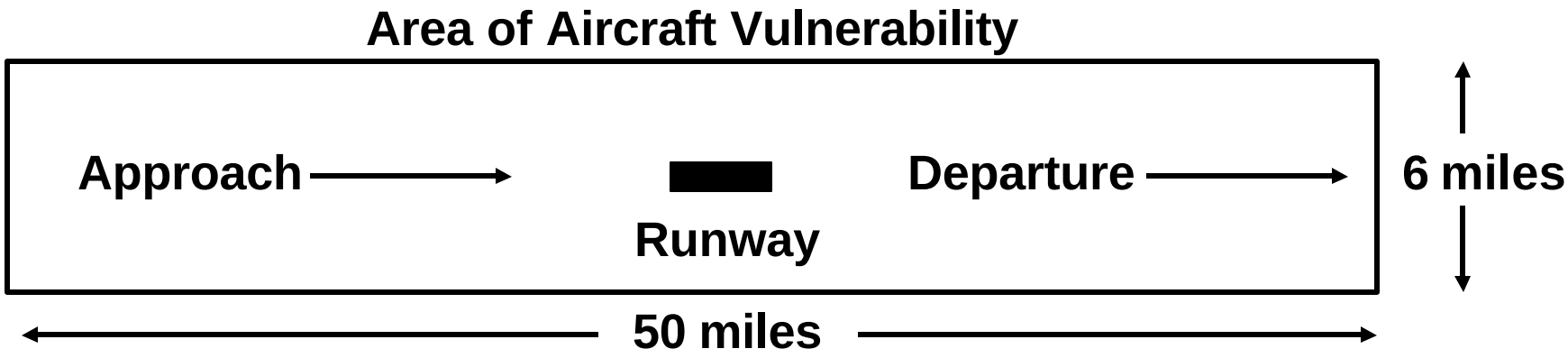
How Heat-Seeking Missiles Work



- Aircraft emit energy in the infrared (IR), visible & ultraviolet (UV) parts of the electromagnetic spectrum.
- Missile sensors operate like the retina of an eye, but are sensitive to infrared rather than visible light.
- Operator visually aims the missile, and once sensor locks onto the heat source he fires the missile.
- Missile guidance system deflects thrust to spin the missile so the heat source stays centered on the sensor.
  - Won't work if stronger IR source appears (flares)
  - Won't work if IR source disappears in the clutter (chaff)
  - Won't work if field of view is blinded (laser)
- Newer missiles have two-color sensors (IR & UV) to distinguish aircraft from flares or chaff.

Ground Security Nearly Impossible

- **MANPADS can hit aircraft at altitudes of up to 12,000 feet from distances of 3-5 miles away.**
- **Protection of approach & departure paths for a single runway could require policing an area of 300 square miles.**



- **A similar zone might need to be established for every active runway at every major airport.**
- **Protecting New York area airports alone could require policing >1000 square miles containing 10,000,000 people.**

Mitigating Factors

- **No confirmed reports of MANPADS successfully smuggled into the U.S.**
  - **Threat concentrated overseas**
  - **War zones & unsecured airports (Athens, Manila)**
- **Terrorists have limited experience using MANPADS.**
  - **Minimal use outside Afghanistan**
  - **Mombasa case suggests poor training**
- **Equipment quality is uneven.**
  - **Most MANPADS on black market are older models**
  - **Shelf-life of some components limited**
- **Commercial transport vulnerability unclear.**
  - **High-bypass engines produce less heat**
  - **Aircraft can fly on one engine**

The Bottom Line

- **Terrorist groups like Al Qaeda target large concentrations of civilians and seem fixated on airliners.**
- **As tighter security discourages hijacking, shootdowns may become a favored option.**
- **Many terrorists already possess portable surface-to-air missiles, and thousands more are available on the black market.**
- **MANPADS are easy to conceal & operate, and can hit aircraft from miles away.**
- **Numerous attacks by non-state actors against civilian planes have occurred since 1970s.**
- **Greatest area of danger is on international routes.**