

Man-portable Air Defence Systems (MANPADS)

Presentation to the Geneva Process on Small Arms

by

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My presentation today concerns man-portable air defence systems—or MANPADS for short.

The acronym—MANPADS—serves as both the singular and the plural, so if I talk of MANPADS in general or a MANPADS, my English hasn't failed me, it's just the way it is.

Incidentally it's not gender dependent either, so you won't find references to FEMPADS or HERPADS, as some of our reviewers suggested.

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Many of you are probably well aware of what a MANPADS is, but for those of you who don't, I hope this brief presentation will help.

Even for those of you who are already *very* knowledgeable, I hope that another set of perspectives will add some richness to your grasp of the issue.

When most people think of small arms they really think of firearms, such as pistols and rifles.

However, *today*, I want to flag a category of weapons that are often overlooked in the field of small arms research and policy

These are light weapons, included in the 1997 UN definition

They number some of the most destructive portable weapons, and MANPADS are no exception.

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This presentation evolved from a chapter published in the Small Arms Survey 2004, which was largely prompted by a flurry of interest in MANPADS in the last few years.

Much of this interest concerns the possibility of MANPADS being used by terrorists...

...and, as a result, when I speak today of the threat of MANPADS I will be referring expressly to MANPADS in the hands of non-state groups.

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It is *no* surprise that MANPADS have become conceptually linked with terrorism.

In the past three years—*indeed* only days ago—the world’s major powers have been confronted with terrorist incidents that have resulted in large-scale loss of life.

Also within the past three years, both Russia and the United States have been confronted with highly organised combatants armed with MANPADS and have incurred casualties as a result—Russia particularly in its operations in Chechnya.

In concert with these events, there has been a series of MANPADS attacks—or attempted attacks—in Kenya, Iraq and Saudi Arabia, in conjunction with reports of attempted illicit transfers in Russia and the United States.

These events have combined to politicize the issue above and beyond usual levels of interest in small arms and light weapons.

Such a well-fed debate is fortuitous in that it has not, in civilian terms at least, been prompted by large-scale loss of life directly attributable to an attack using MANPADS.

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In this presentation I will explain why I feel such attention is not only justified but needed.

In so doing I will give you a brief overview describing:

- Firstly, what MANPADS are designed to do;
- Secondly, who manufactures and distributes them;
- And third, who currently has them in their possession.

I will then illustrate what I believe to be some of the most salient issues concerning the extent of the problem and aspects of this problem that we need to address most urgently

In particular, I will consider the likely impacts of recent international initiatives to control MANPADS, and illustrate some new aspects I believe future initiatives should take account of.

MANPADS are probably the most technologically advanced person-portable weapons.

The only thing they share in common with most small arms is their size, which enables them to be easily transported by small teams of people on a battlefield.

Importantly—from our perspective—this also means they are easy to smuggle and easy to hide.

As a product designed with a single purpose—to destroy aircraft—they are not intended to discriminate between military and civilian targets.



All MANPADS comprise a missile (ABOVE), which is launched from a missile launcher (BELOW).

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The principle of operation for all MANPADS involves firing a guided missile at an aircraft, but aside from this, they differ considerably.

Simply for the purposes a clear presentation, I will divide MANPADS into three generations.

Generations of MANPADS

1st: Passive IR guidance, have to be fired from behind the target aircraft. Confused by flares.

2nd: Combination of seekers, can be fired from many more angles. Harder to confuse.

3rd: Operator guided, multiple missiles from one firing. Impervious to most countermeasures.

I base these distinctions primarily on the operational characteristics of the weapons and, crucially, on their likely success of hitting an aircraft.

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Among the first generation are weapons such as the SA-7 (used in the Mombassa attack of 2002)

These utilise—in terms of today's technology—a simple infrared (or IR) sensor to guide the missile to its target.

The missiles acquire a target by locking onto the heat from an aircraft's exhaust....

...and by and large, they must be fired from *behind* an aircraft, where the source of heat is greatest

Effects



FIM-92 Stinger:

The seeker is attracted to the heat from the aircraft's exhaust

The warhead explodes with a burst of lethal shrapnel designed to tear the fabric of the aircraft



Second generation weapons include so-called fire-and-forget systems such as the infamous Stinger.

These do not simply track the heat signature for an engine via infrared, but use a combination of energy seekers.

This means they can hit an aircraft from *many* more angles than a 1st generation MANPADS.

Importantly, if fired upon by a 1st or 2nd generation MANPADS, an aircraft can launch flares, which emit energy in an attempt to lure the missile away.

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The third generation of MANPADS are more difficult to defeat.

A number of them rely on the operator aiming a laser at the aircraft, so in theory, as long as the laser stays on target, the missile will hit the aircraft.

Others fire multiple missiles, which independently track an aircraft, so that if one missile misses, then another will hit.

These 3rd generation MANPADS are designed to be resistant to flare-based countermeasures and other types of jamming.


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The progression from 1st to 3rd generation means—in short—that modern MANPADS can now be operated from a greater number of positions, to greater ranges, and with far more chance of success in hitting crucial parts of an aircraft.


I say crucial parts of an aircraft, because modern passenger jets have multiple engines.

Older MANPADS were designed to destroy single-engine fighter aircraft as demonstrated in this picture:

Effects



FIM-92 Stinger:
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The warhead explodes with a burst of lethal shrapnel designed to tear the fabric of the aircraft

There is a good chance that modern passenger aircraft will survive a hit from one of these systems.

Larger aircraft may be safer

DHL freighter,
Baghdad: Against
older MANPADS
at least, larger
aircraft with
multiple engines
are likely to be
safer



Against 3rd
Generation
MANPADS such
a claim doubtful

New generations of MANPADS are more able to target the body of an aircraft and the chances of the aircraft being destroyed are much higher.

This discussion of generations is important, as I will argue later, because given today's lack of adequate controls over proliferation, future improvements in MANPADS technology is likely to make the problem much worse if unchecked.

In terms of production, we estimate that around 15 companies and consortia produce MANPADS today, in more than 15 countries.

These numbers are relatively low for two reasons:

Firstly, simple factors of technology prevent many states from producing MANPADS—many states simply don't have the capacity to produce.

Secondly, there are a limited number of mechanisms to prevent the transfer of technology to potential new producers—an example of this is the Stinger Project Group.

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However, in recent decades, the number of producing countries has increased.

Old and New Producers

- Established producers:
China, France, Japan, Russia (and former satellites),
Sweden, UK, US.
- More recent producers:
Egypt, Germany, Pakistan, Switzerland.
- Latest producers:
N. Korea, Singapore, Vietnam.

The newest producers include North Korea, Singapore and Vietnam.

Vietnam and Singapore in particular have recently acquired the licences to produce Russian SA-16 MANPADS.

Future moves such as these will not only increase the number of potential suppliers of MANPADS to the world market, but also increase the number of people with knowledge of MANPADS production technology.

Stockpile Estimates

105 states have MANPADS

1st generation systems = 73 countries

2nd generation systems = 93 countries

1st and 2nd generation systems are common in regions where conflict is widespread.

To date, technology transfers have involved 1st and 2nd generation MANPADS.

Although a number of 3rd generation MANPADS have recently been manufactured, no production licenses have—as yet—been granted.

My fear—based on past trends—is that they may well be granted in the future.

One matter of great debate has been how many MANPADS are currently in existence.

A number of studies claimed as many as five hundred thousand, but we believe this estimate to be inflated.

A simple count of missiles cannot give you the number of complete and operational systems in existence.

At an estimated deployment of around five missiles per launcher, we conclude there are probably fewer than *one hundred thousand* complete systems in the world.

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The numbers, whilst important, are not the critical factor.

An estimated 105 states stockpile MANPADS, and in these countries, 2nd generation weapons marginally outnumber 1st generation MANPADS.

We know that MANPADS are in the hands of states with very poor records of stockpile security.

We have identified around 20 on the African Continent alone.

Losses from states such as these are very *unlikely* to be reported.

Perhaps more alarmingly, we also know that MANPADS producing states, such as Russia, have lost weapons to theft, possibly involving large criminal organisations.

We can say with surety that the problems of stockpile insecurity have never been as apparent as they are today.

MANPADS have certainly been used in Iraq and are most likely to have come from former government stockpiles

As the picture demonstrates, there were deliberate efforts by certain parties to hide these weapons out of the reach of coalition forces, whether for later use or transfer to other regions.

MANPADS have also been found in Afghanistan and are known to be in the hands of a number of non-state groups.

According to Jane's information group, at least 13 non-state groups possess MANPADS, with a further 14 groups reported to have received them.

These groups include the FARC of Colombia, Hezbollah of Lebanon, and the LTTE of Sri Lanka.

Some of the 27 groups are considered terrorist organisations.

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Given the proliferation of MANPADS to states with poor records of stockpile security, the safest assumption is that more non-state actors possess MANPADS than we yet know of.

In any case, two crucial factors may dictate whether such '*lost*' weapons are likely to be used in the future:

These are:

- 1) Whether actors have the training to use MANPADS, and
- 2) Whether MANPADS will continue functioning after years of storage

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We estimate that both these barriers to use have been reduced in recent years:

Firing a MANPADS requires training—but the sheer number of countries deploying MANPADS today undoubtedly means that there are many people trained in their operation.

Furthermore, the disbanding of national armies, or large parts of national armies, such as was the case in Iraq, only adds to this pool of knowledge.

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Whether MANPADS remain serviceable after years in storage is a matter of some debate.

In defence of proponents of a long shelf life, these weapons are engineered to military specifications.

They are designed to be rugged;

They are deployed in elaborate cases designed to protect them from the elements;

And information is freely available on the Internet giving at least basic handling techniques.

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The 2002 Mombassa case is a very good example of both the limits to use imposed by training and issues of serviceability.

The weapons reportedly missed because of user error—they were fired too close to the aircraft—*but they functioned*.

Importantly, the Mombassa MANPADS were of 1978 vintage.

They were far older than the ‘*Afghan*’ stingers that have been the primary focus in the debate over service life.

The transfer of MANPADS is arguably better documented than for most small arms and light weapons, as you might expect for a product of both high political significance and high value.

Nevertheless, transfers are still not transparent for many countries.

We have no records of transfers out of states such as Vietnam, North Korea or China.

China alone is thought to have transferred systems to Afghanistan, Cambodia, Myanmar and—again—North Korea.

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Illicit, non-state transfers are arguably also of a far different nature than most small arms transfers.

MANPADS simply don’t have much utility for most people—they are ineffective tools for crime, coercion or enhancing personal security.

MANPADS are a specialist weapon and it is likely that those that *are* transferred are destined for particular groups rather than simply transported to a conflict region in the hope of securing sales.

One thing *is* for certain, those groups so far implicated in MANPADS acquisitions have been well organised and well-funded.

And what is worrying about that is that these well-organised groups are probably in the *best* position to recruit or train MANPADS operators and hence are potentially better able to mount a successful attack should they chose to do so.

Given the scale of the problem I will now consider some of the measures that have recently been proposed to deal with it.

The most prominent of these fall into two very different strategies

On the one hand are those designed to defend aircraft against a MANPADS attack.

On the other are supply-side measures designed to better control the transfer of MANPADS.

Taking measures simply to defend aircraft is not a comprehensive or desirable solution at the international level.

This is for several reasons:

- First, it is prohibitively expensive for many nations.
- Second, there is strong opposition to using flare countermeasures by a number of airport authorities.

This is because flares—which are the most commonly considered and cost-effective means of deterring MANPADS—are flammable.

- Third, detecting a MANPADS launch, amid the clutter of a busy airport is likely to be extremely difficult.



The last and most important point is this:

The threat under consideration today is from terrorists who may have 1st and 2nd generation MANPADS.

The latest MANPADS are likely to be impervious to the countermeasures being proposed for civilian aircraft.

Unless we have adequate means to stop the latest generation of MANPADS, say in five or ten years time, becoming as prolific as earlier generations,

Then the costly defences we adopt today will be obsolete tomorrow.

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The greatest hope for alleviating the MANPADS problem lies—not with the largely national efforts to defend against missiles—but in supply-side measures.

From 2003, we have seen initiatives among the Wassenaar states, a G8 Action Plan on MANPADS, an APEC Leaders Declaration, an OSCE Decision on MANPADS, a CIS Agreement on Export,

The precise details of these were released too late to appear in the Small Arms Survey 2004, but we will give a more detailed account of them in 2005.

To greater or lesser degrees, depending on the initiative, the most important points of agreement have been:

- Banning transfers of MANPADS to non-state end users
- Ensuring the secure storage of MANPADS
- Continued reporting of inventories of MANPADS in the recipient country and general information exchange
- Storing MANPADS components separately—especially missiles and launchers
- And, destroying surplus stocks—as has already happened, for example, in Nicaragua.

These initiatives are a very important step, but they largely focus on domestic export controls.

Phrases such as ‘The exporting government will satisfy itself’ are not sufficient.

Moreover, most initiatives give little weight to reporting mechanisms, whereby transfers and inventories in recipient countries are continually monitored.

This is crucial, because it is not in the initial export where the greatest danger lies, but in the re-export or loss from the arsenals of purchasing countries.

From my perspective, two critical points to bear in mind for future initiatives are:

- One, that suppliers must take increasing responsibility in determining whether recipient states have both the *will* and the *capacity* to keep MANPADS in state arsenals.
- And two, that there must be mechanisms which enable suppliers to monitor whether their requirements have been met.

Existing instruments of this type are clearly far more advanced in some states than others, but they are not yet sufficient.

We can take, for example, the case of the United States and Stinger missiles.

Whilst the U.S. has, undoubtedly, been the strongest voice in efforts to control MANPADS proliferation it has fallen well short of its objectives.

As of 1993, Security Assistance Organization offices—part of the DOD—are directed to conduct annual inventory inspections of *one hundred percent* of Stinger missile systems sold overseas.

However, to quote from a US Government Accounting office report:

“No single DOD office has maintained copies of all the Stinger’s shipping records”

For example, the report notes:

“One SAO reported in 2002, that “the total number of Stingers received by a recipient country over the years was *one hundred and fifty six fewer* than the number the army had on record”.

I’m not simply pointing the finger at the U.S. here— U.S. efforts to keep control of MANPADS go far beyond those of most countries.

In fact, the only reason I am able to report this case is because of the relative transparency in U.S. missile exports. Which is commendable.

The most pressing need is to get as many states as possible involved in formulating international agreements

This is particularly true of new producers and the likely recipients of the latest generations of MANPADS.

The addition of MANPADS to the UN conventional register is but one example of a step in this direction.

I also understand that the Australian Government may be taking a welcome initiative in the form of a draft resolution on MANPADS.

All initiatives in the last few years have added to a debate which appears to have generated momentum for change.

I would, however, like to finish with a word of caution.

There is far too much weight given to terrorism a 'source of the threat that MANPADS pose'.

I have contributed to this today simply because it is the concern of the moment.

However, if history is any indication of the future, MANPADS transferred to friends and allies today—if not properly guarded—will be in the hands of terrorists tomorrow.

Measures

'The significant problems we face cannot be solved at the same level of thinking we were at when we created them.'

Albert Einstein

The launch of a new generation of MANPADS is likely to mean that the threat of MANPADS will not only continue to exist, but will be enhanced significantly unless the measures discussed today are fully implemented.