

## Accessories for Small Arms and Light Weapons

Accessories for small arms and light weapons alter the weapons' effectiveness. This *Research Note* examines accessories designed to enhance a weapon's utility and lethality.<sup>1</sup> For the purposes of this study, accessories are defined as items that can be physically attached to small arms and light weapons and increase their effectiveness or usefulness, but generally are not essential for the basic intended use of the weapon to which they are attached.<sup>2</sup> This definition captures a wide array of items, ranging from extended magazine releases for pistols to fire-control systems for 120 mm mortars. The Small Arms Survey estimates the annual international trade in such items to be worth hundreds of millions of dollars. International and regional reporting requirements for these items are quite limited and national reporting is very imprecise or non-existent, making any study of this trade a difficult undertaking.

Accessories are sold with the weapons with which they are used, as part of upgrade packages, and as stand-alone orders. Many are attached to rails mounted on the weapon, including the widely used Picatinny rail. This *Note* focuses on the following five subsets of accessories:<sup>3</sup>

- weapons sights;
- night vision devices;
- aiming lasers;
- laser rangefinders; and
- fire-control systems.

Below is a brief description of these accessories and the military and civilian markets for them.

### Overview of major accessories

**Iron sights** are the oldest and most widely used type of sight. Iron sights come as standard on most small arms and many light weapons and are the only type of sight used on some weapons. Most iron sights for small arms consist of two main components: a front sight, which is typically positioned at the end of the muzzle barrel, and a rear sight, which is commonly

positioned on or over the receiver. There is a wide variety of iron sights, which range from a simple groove milled into the receiver of some pistols to the elaborate adjustable aperture sights used by competition target shooters.<sup>4</sup>

**Telescopic sights**, which are often referred to as 'scopes', are basically weapon-mounted telescopes with a reticle (crosshair). Telescopic sights aid in targeting and improve accuracy by magnifying—and projecting a reticle onto—the image of the target. They also require less eye coordination than iron sights. Telescopic sights have been widely used for decades by hunters, military snipers, and others engaged in longer-range shooting. Their use has grown in recent years among militaries as they attempt to improve the accuracy and range of standard-issue rifles. Low-magnification sights are now widely issued to soldiers in the militaries of many countries.



A Spanish soldier is equipped with an H&K G36 rifle fitted with accessories, procured as part of the 'Future Soldier' programme.  
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**Reflex sights** display an illuminated reticle that is superimposed on the image of the target in the sight window. Because the reticle often takes the form of a red dot, reflex sights are often referred to as 'red dot' sights. Reflex sights are popular because the shooter's eye can be positioned at more angles to—and at greater distances from—the sight than is the case with telescopic sights. Consequently, target acquisition is much faster with reflex sights than with telescopic and iron sights. The shooter can also look through the sight with both eyes open, allowing for a fuller field of view and therefore better situational awareness than with telescopic sights (White, 2010).

**Holographic sights** feature a hologram of a reticle that is recorded at the time of manufacture and then displayed on the sight window by a laser. The major advantage of holographic sights is that the reticle is fully visible regardless of the angle and distance at which the sight is viewed. The image remains visible even if the sight itself is partially obscured by mud, snow, or rain (Jones and Ness, 2011, p. 617; L3 Communications, 2011).

**Image-intensifying sights** use image-intensifier tubes to gather existing (ambient) light, such as starlight, moonlight, and certain infrared light. The light is then amplified and converted into an image that is displayed in the sight. Since the first military night vision devices were fielded in the late 1930s, three additional generations of image-intensifier tubes have been developed. Generational improvements include brighter and sharper images, improved performance in low-light conditions and light-polluted areas (such as cities), and longer target detection ranges (American Technologies Network Corp., n.d.). Image intensifiers for small arms and light weapons are available as stand-alone sights and clip-on units used with day sights.

**Thermal sights** differ from image-intensifying sights in that they detect infrared radiation emitted by the target rather than light reflected off the target (Electrophysics, n.d.). Since thermal sights do not rely on ambient light, they are more effective than image

intensifiers in the low-light environments encountered in underdeveloped and sparsely populated countries. They can also 'see' through dust, fog, sand, and other obscurants (USMC, 2004, p. 143).<sup>5</sup>

**Laser sights and other aiming lights** project a beam of visible or infrared light at the target. The beam is typically aligned with the barrel of the weapon and therefore laser sights are often used instead of iron sights and telescopic sights when rapid target acquisition is required (White, 2010; Jones and Ness, 2011, p. 622). When the shooter is operating as part of a team, laser sights are also used to identify and hand off targets. Some aiming lights are also used for illumination (Laser Devices, 2010, p. 8).

**Laser rangefinders** measure the time it takes for a laser projected at a target to 'bounce back' to the rangefinder. A microprocessor in the unit calculates the distance to the target by measuring the length of time between when the beam is projected and when it bounces back (Shideler and Sigler, 2008, p. 49).

Laser rangefinders can significantly increase the range and accuracy of the weapons to which they are attached. The use of a laser rangefinder and thermal optic reportedly increases the range of the Shoulder-launched Multipurpose Assault Weapon II rocket by 200–500 m and can increase first-round hit rates to more than 80 per cent (Gething, 2010).

**Fire-control systems** are devices that assist in acquiring and tracking targets, computing targeting data, and controlling the rate and direction of fire.<sup>6</sup> While commonly associated with mortars, fire-control systems are now used with other small arms and light weapons and take various forms.<sup>7</sup> They offer many benefits. For example, advanced fire-control systems for automatic grenade launchers reduce the need to 'walk' rounds onto the target, which wastes ammunition, increases the likelihood of collateral damage, allows the target to take cover, and exposes the gunner to counter-fire. These systems increase the likelihood of a first-round hit, thereby addressing many of these problems.



A German Bundeswehr Army soldier uses the laser pointer on his weapon during a joint patrol with Afghan National Army soldiers north of Kabul, September 2008.

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## International trade in accessories

Data on international transfers of accessories is sparse. None of the multilateral reporting mechanisms on arms transfers requires states to provide detailed, disaggregated data on imports or exports of accessories, and few governments publish such data in their annual reports on arms transfers. Tracking and measuring this trade is therefore nearly impossible, with the partial exception of weapons sights. Based on data from UN Comtrade and other sources, the Small Arms Survey estimates that the annual value of international transfers of weapons sights is worth at least USD 350 million<sup>8</sup> (Grzybowski, Marsh, and Schroeder, 2012, pp. 250–51).

An analysis of transfers of accessories to ten sample countries reveals some of the contours of this trade, including the integral role of Chinese manufacturers and exporters. In detailed customs data obtained by the US company Datamyne, China is identified as the country of origin for nearly

90 per cent of the roughly 133,000 sights imported into Chile, Paraguay, Peru, and Uruguay in recent years,<sup>9</sup> and is identified as the country of export for nearly 65 per cent of the sights transferred to these countries.<sup>10</sup> Whether the civilian market for weapons sights in South America is representative of the global market is unknown, but US import data suggests that the influential role of Chinese producers and exporters may be broadly applicable. According to US customs data, three-quarters of rifle sights imported from 2007 through 2010 were exported from China (USCB, n.d.).<sup>11</sup>

Data on the acquisition of accessories by the militaries of Colombia, India, Portugal, Sweden, the United Kingdom, and the United States reveals key differences between the military and civilian markets for sights. Whereas most of the sights exported to civilian end users in South America came from China, nearly all of the imported sights procured by the six militaries studied were purchased from Canada, Germany, Israel, South Africa, Sweden, or the United States. Common to both markets,

however, is the important presence of US producers and exporters, which are listed as the contractors for nearly all accessories procured by the US Army and a large percentage of the sights imported by the other countries.

The data also sheds light on the military market for other accessories, the procurement of which appears to be small compared to sights. Budget data from the US Army in recent years reveals planned annual procurement of ten times more weapons sights than laser rangefinders and mortar fire-control systems combined (US Army, 2009; 2010; 2011). The number of sights procured by Colombia, Portugal, and the United Kingdom in recent years<sup>12</sup> also far exceeded procurement of other accessories.<sup>13</sup> Interviews with industry representatives also indicate that the procurement by militaries of many accessories is modest compared to sights. For example, the total *potential* global market for fire-control systems for grenade launchers probably numbers in the thousands of units annually, including units procured from domestic sources.<sup>14</sup> The current gap between the procurement of sights and other accessories is likely to narrow as the market for the latter expands, but the comparatively low cost of most weapons sights and their widespread use by militaries, police forces, and civilians ensure that more sights will be procured and exported than other accessories for the foreseeable future.

## Conclusion

The increasing sophistication of accessories and the large civilian and military markets for them has important policy implications. As noted above, many accessories significantly augment the utility and lethality of the weapons to which they are attached. This is particularly true on a networked battlefield where the real-time collection, integration, and dissemination of data—including data collected and received by accessories—provides an increasingly decisive advantage to the best-equipped forces. Many accessories, such as night vision devices, provide comparably important tactical advantages to armed groups and other violent non-state actors. Despite their importance, government reporting on international transfers of accessories is minimal or non-existent, and there is little systematic analysis of the illicit



acquisition and use of accessories by armed groups, criminals, and other unauthorized end users. More and better data on the authorized and illicit proliferation of accessories would help to ensure that national and international policies reflect the growing importance of these items. ■

## Notes

- 1 Technologies also exist to limit the effectiveness of small arms and light weapons by reducing the number of users, for example. Such systems—the subject of ongoing research at the Small Arms Survey—will be covered in a separate publication.
- 2 A small but growing list of exceptions include telescopic sights for long-range sniper rifles and fire-control systems for grenade launchers that fire airburst munitions.
- 3 Accessories not covered in this Note include, for example, silencers (sound suppressors), flash suppressors, and bayonets.
- 4 Since iron sights come as standard on most small arms and are widely viewed as essential for the basic intended use of these weapons, iron sights are considered ‘parts’ for the purposes of this study. Exceptions include emergency sights for use when primary sights are damaged or lost and specialized sights for target shooting.
- 5 For more information on weapons sights and other accessories, see Gobinet (2011, pp. 77–78).
- 6 This definition is based on the US military’s definition of an ‘integrated fire control system’, which is a ‘system that performs the functions of target acquisition, tracking, data computation, and engagement control, primarily using electronic means and assisted by electromechanical devices’ (USDoD, 2009).
- 7 Some fire-control systems are not ‘accessories’, since they are hand held, mounted on vehicles, or essential for one or more intended uses of the weapon with which they are used.
- 8 The estimates reflect sights imported separately from the weapon with which they are to be used. The value of sights imported with weapons is recorded in the same customs category as the weapon itself and generally cannot be disaggregated.
- 9 The data covers imports in 2007–10 for Chile, Uruguay and Paraguay, and in 2008–10 for Peru.
- 10 Data on imports into Peru identifies the ‘country of origin’, but not the ‘country of export’.
- 11 This data reflects imports of rifle sights that are sold separately from small arms.
- 12 The data reflects deliveries in 2005–10 for Colombia, 2008–10 for Portugal, and 2010 for the United Kingdom.
- 13 The one exception is the Swedish military.
- 14 Author correspondence with an industry representative, 7 November 2011.

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- This *Research Note* is based on ‘Piece by Piece: Authorized Transfers of Parts and Accessories’, by Matt Schroeder, Janis Grzybowski, and Nicholas Marsh, in *Small Arms Survey 2012: Moving Targets*.

## About the Small Arms Survey

The Small Arms Survey serves as the principal international source of public information on all aspects of small arms and armed violence, and as a resource centre for governments, policy-makers, researchers, and activists. In addition to Research Notes, the Survey distributes its findings through Occasional Papers, Special Reports, Working Papers, Issue Briefs, a Book series, and its annual flagship publication, the *Small Arms Survey*.

The project has an international staff with expertise in security studies, political science, international public policy, law, economics, development studies, conflict resolution, sociology, and criminology, and works closely with a worldwide network of researchers and partners.

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Publication date: February 2013

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