

## UAV Export Controls

UAV manufacturers save time and money with a better understanding of export controls

By Howard Loewen

### Introduction

If you are involved in Unmanned Aerial Vehicles (UAVs) then it is vital to understand export controls and how they apply to your business. UAVs, UAV production equipment, UAV autopilots, UAV related software, UAV launchers, and many other UAV related items are all subject to export controls. Any time you plan ship or transport any of these items across an international boundary you need to be aware of the particular controls that apply. Even if it is only a temporary export and even if it is for your own use export controls may apply. Ignoring these laws can lead to heavy fines or a jail term.

“A Washington grand jury indicted Harold Hanson, a former Army lieutenant colonel, and his wife, Yaming Nina Qi Hanson, for conspiracy and violating export laws. Authorities allege that the Silver Spring, Md., couple exported miniature controls for unmanned aircraft. The controls involve technology that cannot be shared with China because of national security concerns.”

– Associated Press March 12, 2009

It is important to understand that all UAV related items likely require an export permit before they may be exported to other countries, even for civilian use. Be sure to obtain as much information as possible from the manufacturer and remember that it is your personal responsibility to double check your country’s regulations and controls associated with the UAV items you are exporting.

In order to export UAV related goods you will usually have to obtain an export permit. The process to obtain an export permit will vary from country to country but usually consists of four steps:

1. review the appropriate lists of controlled goods for your country to determine if the goods you are exporting are controlled. If there is any possibility that the goods are controlled you should request an export permit.
2. the organization receiving the UAV related goods must complete an end use statement that explains who they are and how they intend to use the goods;

3. you submit the end use statement along with product information and an application form to your country's export control authority;
4. your country's export control authority will investigate the end user and, provided everything checks out, will issue you an export permit that allows you to ship the goods.

Sometimes a General Export Permit will exist that covers all exports of certain types of goods to certain countries. For example, the UK has a general export permit for UAV autopilots to all members of the EU. In this case you only need to ask the recipient for an end use statement to ensure that they will not re-export the goods outside the EU.

While it is up to individual countries to implement export controls, most countries belong to two international groups that jointly draw up lists of which goods are controlled and which are not.

- Missile Technology Control Regime  
<http://www.mtcr.info/>
- Wassenaar Arrangement  
<http://www.wassenaar.org/index.html>

The **Missile Technology Control Regime** (MTCR) is an informal and voluntary partnership between 34 countries to prevent the proliferation of missile technology. The MTCR was established in April 1987 by Canada, France, Germany, Italy, Japan, Great Britain, and the United States. The MTCR was created in order to curb the spread of unmanned delivery systems for nuclear weapons, specifically delivery systems that could carry a minimum payload of 500 kg a minimum of 300 km. At the annual meeting in Oslo in July 1992 it was agreed to expand the scope of the MTCR to include nonproliferation of unmanned aerial vehicles (UAVs) for all weapons of mass destruction, making the payload/range threshold much less rigid than the original 500kg/300km.

The **Wassenaar Arrangement** (full name: The Wassenaar Arrangement on Export Controls for Conventional Arms and *Dual-Use* Goods and Technologies) is a multilateral export control regime (MECR) with 40 participating states. *Dual-use* is a term that is used to describe items that are primarily for civilian use but may also have a military use. The goal of the Wassenaar Arrangement is to contribute to regional and international security and stability, by promoting transparency and greater responsibility in transfers of conventional arms and *dual-use* goods and technologies, thus preventing destabilizing accumulations of these goods. Since 9/11 the mandate of the Wassenaar Arrangement has been expanded in order to prevent terrorists from obtaining goods that could be used in a terrorist attack. As of March 2009, the 40 participating states are: Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands,

New Zealand, Norway, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom and United States.

Note that even if your country is not a member of either the MTCR or the Waasenaar arrangement it may still have export controls. A good example is Israel which is not a member of either organization but still has its own export control authority.

UAV related goods can be found on the dual use list, the munitions list and on the MTCR Missile Technology list. Goods that are found on the munitions list and the MTCR lists are more sensitive than goods found on the dual use list. Often the recipient of goods on the munitions list or the MTCR list will need to be certified by their government to possess military goods. All countries that are members of the Waasenaar Arrangement and MTCR have their own set of regulations that are derived from these lists. In the U.S. these regulations are implemented through the Department of State and Department of Commerce as well as a set of government regulations called International Traffic in Arms Regulations (ITAR). The U.S. regulations can vary depending on the goods purchased and on their intended use.

- U.S. Department of State (UAV for military use)  
<http://www.state.gov/>
- International Traffic in Arms Regulations (ITAR) (specifically for the U.S. Munitions List)  
[http://en.wikipedia.org/wiki/International\\_Traffic\\_in\\_Arms\\_Regulations](http://en.wikipedia.org/wiki/International_Traffic_in_Arms_Regulations)
- U.S. Department of Commerce (UAV for civilian use)  
<http://www.commerce.gov/>

We strongly recommend that you contact the appropriate department or agency within your government to answer any questions or concerns you have regarding the UAV related goods before you export these goods.

### **Exporting Information**

Not only are physical goods controlled but information, such as documentation and customer support, is also controlled. It is helpful to become familiar with export control terminology since this will enable you to better understand the controls associated with any items you might wish to export. The following is a simple guideline for basic export controls terminology as they apply to information.

## **Technology**

In the context of the export controls lists, the term *technology* is used to refer to information that is controlled. The term *technology* has three variations:

- Development Technology
- Production Technology
- Use Technology

The terms *development*, *production* and *use* are all separately defined by the Wassenaar Arrangement and the MTCR. *Technology* can take the form of technical data (blueprints, plans, engineering designs, manuals etc.) and technical assistance (instruction, skills training, consulting). The *Dual-use* list and the munitions list share a definition of the term *technology* that is defined by the Wassenaar Arrangement. The MTCR Missile Technology list has a separate definition of the term *technology*. However, both definitions are virtually identical.

### **Development Technology**

*Development technology* refers to information used in stages prior to serial production. This might include design specifications, prototypes, design documentation, and development processes.

### **Production Technology**

*Production technology* is information related to producing a product and includes manufacturing documentation, quality assurance procedures, inspection and testing among others. For example, the gerber files necessary to produce printed circuit boards, parts lists, assembly instructions, and checklists would all be considered *production technology*.

### **Use Technology**

*Use technology* refers to information related to operation, installation (including on-site installation), maintenance, repair, overhaul and refurbishing. Schematics and manuals would be included in this category.

### **Public Domain**

There is also a definition for the term *public domain* in both the Wassenaar Arrangement and the MTCR lists. Public Domain refers to software or technology that is made available without restrictions, other than copyright, on its further distribution. There are broad exceptions for technology and software that are in the public domain and as a result, items that are in the public domain are generally not controlled. Note however that the

information must truly be available without restrictions. For example if you publish source code for a UAV autopilot that can only be used on hardware that you sell for profit then it would be hard to argue that this source code is available without restriction.

## UAV Control Lists

For your convenience, we have extracted and summarized most of the entries in the *dual-use* list, the munitions list and the MTCR that apply to UAV related goods. The section numbers are from the original documents published by the Waasenaar arrangement and the MTCR. Your export control authority may have a different numbering system. Note that within the documents references to sections/sub-sections also include any sub-sections/sub-sub sections. For example, a reference to section 1-9 would include all sub-sections within section 1-9. The documents are divided into sections, sub-sections, sub-sub-sections etc. and there are many references within the documents.

### Dual-Use goods

Information in this section applies specifically to UAV related goods. If you would like to see the complete list, go to <http://www.wassenaar.org/controllists/index.html>

**6.A.2** Controls a broad range of optical sensors.

**6.A.2.a.3.f** Controls any infrared camera element.

**6.A.3** Controls a broad range of cameras.

**6.A.3.4.b** Controls any camera system that incorporates an infrared camera element controlled in 6.A.2.a.3.f.

**6.A.3.b.1** Controls stabilized high resolution (4 megapixel) black and white and very high resolution (12 megapixel) colour cameras. Note that NTSC, PAL and HDTV cameras are not controlled as their resolution is too low.

**6.A.4.d** Controls high performance gimbal systems (e.g. an update frequency of greater than 100hz and a pointing accuracy of more than 10 micro radians).

**7.A.3.b** Controls inertial navigation systems embedded with GPS or data base reference navigation (i.e. uses ground elevation to determine location). The system must be able to achieve an accuracy of 10 meters CEP or better after 4 minutes of loss of GPS or other position reference information.

- 7.A.3.a** Controls inertial navigation systems with position error of better than 0.8 nautical miles in an hour and inertial navigation systems that can function at accelerations in excess of 10g.
- 9.A.12.a** Controls UAVs with an autonomous flight control and navigation capability or that can be operated by video link outside of direct visual range of the operator. Model aircraft are specifically excluded.
- 9.A.12.b** Controls UAV autopilots, equipment specially designed for remotely controlling UAVs and equipment specially designed to convert manned aircraft into a UAV. This section applies to all UAV autopilots.
- 9.B.10** Controls equipment specially designed for the production of everything in 9.A.12 (UAVs, autopilots, etc.). For example, this control applies to MicroPilot's automatic calibration equipment.
- 9.D.1** Controls software specifically designed for the development of everything controlled 9.A and 9.B. This includes autopilots and UAVs. For example, this control applies to parts of MicroPilot's Horizon GCS Software (gains adjustment, VRS editor, gain optimizer, configuration wizard etc.). This section would also apply to software developer's kits such as MicroPilot's xtender since this can be used to develop UAV related software.
- 9.D.2** Controls software specially designed for the production of everything controlled in 8.A and 9.B. For example, this section applies to MicroPilot's automated calibration software.
- 9.D.4.e** Controls software designed for the use of UAVs. For example, this section applies to ground control station software such as MicroPilot's Horizon and the various plug-ins that go with it.
- 9.E.1** Controls the technology for the development of equipment/software controlled in 9.A.12 (UAVs and autopilots). For example, this section would also apply to a product such as MicroPilot's extender.
- 9.E.2** Controls the technology for the production of equipment/software controlled in 9.A.12 (UAVs and autopilots). For example, this type of control applies to items like the schematics for autopilots, the gerber files to produce the autopilot's circuit boards, production assembly instructions etc.

Note that the dual use list contains no controls for *use technology* for UAVs and UAV autopilots. There are controls for *use technology* on many other items. In addition, there are no controls for *use*

*technology* for UAV autopilots. *Use technology* for UAV autopilots can also be defined as technical support and documentation from a manufacturer such as MicroPilot.

It is also important to keep in mind that there are no controls for sub components of UAV autopilots. Only the complete UAV autopilot has controls that are applied to it. There are, however, separate controls for gyros and accelerometers that are either very accurate or can operate in high G environments.

### **Munitions List**

Information in this section is from the munitions list. The munitions list is not just for munitions. It is a list of items that are clearly designed for military use. If you would like to download the complete Munitions list, go to <http://www.wassenaar.org/controllists/index.html>

**ML10.c** Controls UAVs, remotely piloted vehicles and lighter than air vehicles specifically designed for military. In addition it controls the launchers and ground equipment used for these vehicles and their command and control systems (i.e. ground control stations and software).

**ML10.d** Controls aero-engines specifically designed or modified for military use and so could control the engine in your UAV.

**ML11.a** Controls all electronic equipment specifically designed or modified for military use. As one might imagine, this is a very broad category. However guidance and navigation systems are mentioned in the note that accompanies this category.

**ML15.b** Controls Cameras specially designed for military use. This category also controls components and accessories of cameras that were specially designed for military use.

**ML15.d** Controls thermal and infrared imaging equipment specially designed for military use. This category also controls components and accessories of thermal and infrared imaging equipment specially designed for military use.

### **Missile Technology Control Regime (MTCR)**

These are controls that apply to UAV autopilot equipment capable of delivering 500kg to a range of 300km. If you would like to download the complete Munitions list, go to <http://www.mtcr.info/english/annex.html>

**1.A.2** Applies to UAVs that are capable of delivering a 500kg payload to a distance of 300km.

- 1.B.** Applies to production facilities specially designed for systems controlled by 1.A (i.e. UAVs).
- 1.D.1** Applies to software that is used in 1.B (i.e. software that is used by UAV production equipment).
- 1.E.1** Applies to development, production and use technology incorporated into in 1.A (UAVs), 1.B (UAV Production equipment) and 1.D (UAV production software).
- 2.A.1.d** Controls guidance sets (a.k.a. UAV autopilots) usable in 1.A that achieve a system accuracy of 10km (1 CEP) or less at a range of 300km. System accuracy is never defined. Autopilots that incorporate a range limit that is less than 300km do not have this type of control applied to them.
- 2.B** Controls production facilities and production equipment for items controlled in 2.A.
- 2.D** Controls software for the use of guidance sets in 2.A.1.d. **Note:** This control applies to software that increases the performance of guidance sets to exceed the performance specified in 2.A.1.d. It is good to keep in mind that some guidance sets do not meet that performance level.
- 2.E** Controls technology for the development, production and use of UAVs, guidance sets and all other types of equipment that fall under these categories.
- 12.A.1** Controls launch systems (1.e. catapults) or UAVs controlled in 1.A.
- 19.A.2** Controls UAVs with a range greater than 300km – note that the 500 kg payload has been dropped. Also note that it does not refer to guidance sets or autopilots so this category does not apply to our autopilots.
- 19.A.3** Controls all UAVs with an aerosol dispensing capability.
- 19.E** Controls development, production and *use technology* for UAVs and guidance sets with a range greater than 300km.

To summarize, if the UAV related goods you want to export were not originally designed for military use and are not useable by UAVs with a range greater than 300km then they will likely be controlled by the dual use list. If the UAV related goods you want to export were originally designed for military use but are not useable by UAVs with a range greater than 300km then they will be likely



controlled by the munitions list. If the UAV related goods you want to export are useable by UAVs with a range greater than 300km then they will be controlled by the MTCR.

Treat this article as an introduction to the topic of export controls. The information provided in this article has been simplified and should not be used as a final reference. In addition the interpretation of these regulations may vary from country to country. Your export control authority has the final say in how these lists apply to your products.

### **About MicroPilot**

With 750 clients in 65 countries, MicroPilot is the world leader in miniature autopilots for UAVs and MAVs. MicroPilot is the first UAV autopilot manufacturer to bring to market a sub 30 gram autopilot, triple redundant autopilot, and full-function general purpose autopilot. MicroPilot offers a family of lightweight UAV autopilots that can fly fixed-wing, transitional, helicopter, and Multi Rotor UAVs. MicroPilot also provides complementary products such as the XTENDER<sup>mp</sup> SDK, trueHWIL, payloads, and catapults.