



Department of State Notice of Inquiry:  
Request for Comments Regarding Review of United States Munitions List  
Categories V, X, and XI (RIN 1400-AE46)

Comments of the Small UAV Coalition –  
Request for Revision of U.S. Munitions List Category XI(a)(3)(i)

*Filed via email to [DDTCTPublicComments@state.gov](mailto:DDTCTPublicComments@state.gov), DOS-2017-0017*

The undersigned, on behalf of the Small UAV Coalition ("Coalition")<sup>1</sup> submits these comments in response to the Federal Register notice published on February 12, 2018, 80 Fed. Reg. 5970.

The Coalition supports the Department's objective of establishing a positive U.S. Munitions List ("USML") under the International Traffic in Arms Regulations ("ITAR," 22 C.F.R. Parts 120-130) that "uses technical parameters and descriptions" to reduce jurisdictional confusion, and to "control on the USML only those items that provide at least a significant military or intelligence applicability."<sup>2</sup> The Coalition is providing these comments, consistent with the Department's stated objective, because USML Category XI(a)(3)(i) does not currently include any specific technical parameters regarding airborne radar systems it controls. The Coalition believes the lack of such parameters unnecessarily restricts U.S. development of small Unmanned Aircraft Systems ("UAS") incorporating airborne radar systems that do not provide a significant military or intelligence applicability.

The Coalition proposes that Category XI(a)(3)(i) be amended to exclude airborne radar systems with a range no greater than 8 kilometers, angular resolution no less (better) than 2 degrees, and/or target refresh rate no greater (faster) than 1 Hz. These revisions would not implicate any militarily sensitive capability or undermine U.S. national security, but would enable U.S. civil UAS manufacturers and operators to incorporate short-range collision avoidance radar in their civil UAS, thereby promoting U.S. competitiveness in an emergent technology sector while delivering

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<sup>1</sup> A list of the Small UAV Coalition members is available at <http://www.smalluavcoalition.org/members/>.

<sup>2</sup> Remarks of Assistant Secretary Kevin Wolf at Update 2011 Conference (Jul. 19, 2011), <https://bis.doc.gov/index.php/policy-guidance/encryption/94-about-bis/newsroom/speeches/speeches-2011/383-remarks-of-assistant-secretary-kevin-wolf-at-update-2011-conference>.



important benefits for safety and utility across a range of U.S. industries and activities.

## **I. The Small UAV Coalition**

The Coalition is a partnership of leading American consumer and technology companies with a demonstrated history and interest in applying UAS technological advancements to benefit consumers. We believe a proper regulatory and policy environment can encourage the growth of the UAS industry and benefit the economy by creating jobs and encouraging increased economic activity. As American companies with a global footprint, we believe the United States should lead technological innovation in the industry and set the global benchmark for operational safety. Towards that end, the Coalition strongly encourages development of a regulatory and policy environment that permits the safe operation of small UAS within and beyond the line of sight, and with varying degrees of autonomy, for commercial, consumer, recreational and philanthropic purposes.

## **II. The Coalition's Interest in USML Cat. XI(a)(3)**

Category XI-Military Electronics includes:

- (a) Electronic equipment and systems not included in Category XII of the U.S. Munitions List, as follows:
  - (3) Radar systems and equipment, as follows:
    - (i) Airborne radar that maintains positional state of an object or objects of interest, other than weather phenomena, in a received radar signal through time.

While this control parameter is seemingly intended to cover target tracking radars on missiles and military aircraft, its breadth also captures much less sophisticated airborne radars that are not designed for military use but can be used by small civil UAS for collision avoidance in flight and landing operations.<sup>3</sup>

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<sup>3</sup> The ITAR does not define the phrases “maintains positional state” nor “a received radar signal through time.” This ambiguity has created confusion as to the performance parameters that distinguish an airborne radar system subject to the ITAR from those currently controlled under Export Control Classification Number (“ECCN”) 6A008.e. The lack of objective parameters has also resulted in the Department’s control of airborne radar systems that are designed for commercial uses and are not suited for military-specific applications. Such regulatory confusion is contrary to the



These short-range radars provide no critical military or intelligence advantage. Therefore, under the criteria established in ITAR § 120.3(a), they should not be ITAR-controlled. Because they provide no military-specific functionality, subjecting these non-military UAS radars to ITAR control provides no discernable national security benefit. In fact, it may weaken U.S. national security by stifling innovation in an important technology sector. Unnecessarily limiting UAS manufacturers in the ability to enhance their sense-and-avoid systems with such collision avoidance radar could encourage investment by our strategic competitors and potentially deny or diminish the benefits of autonomous civil UAS to a range of American industries and industry participants. For these reasons, the Coalition firmly supports excluding such radars from USML Cat. XI(a)(3)(i) and controlling them instead under an appropriate category of the Commerce Control List in the Export Administration Regulations ("EAR," 15 C.F.R. Parts 730-774).

### **III. The Evolving UAS Industry and Its Benefits for Safety, Utility and Competition**

The global UAS industry has expanded and evolved dramatically in recent years. The value of the global industry for UAS solutions has been estimated at more than \$127 billion. UAS are already being used by the tens of thousands by hobbyists and commercial operators for an array of tasks, including aerial photography and videography, entertainment, site inspection, industrial operations monitoring, pipeline survey, mapping, fishing and fishery management, disaster recovery, search and rescue, and agricultural tasks such as applying fertilizer or monitoring crops.

Possibilities for civil UAS applications in the next several years go much further, particularly if they can operate autonomously and beyond line-of-sight. Autonomous UAS promise significant improvements to safety, capability and cost in a range of civil applications including humanitarian assistance, firefighting, logistics and package delivery, medical support, weather monitoring, wildlife management and similar applications. In addition, with appropriate regulatory controls, UAS development can be a significant source of technical innovation for the U.S. economy, and provide an important advantage for the United States in related

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spirit of the Export Control Reform Initiative, and unnecessarily burdens U.S. manufacturers who are dependent upon the radar technology for the development of safe civil UAS with broad commercial utility.



emerging technologies, including, for example, telecommunications, mobile robotics and autonomous vehicles.

#### **IV. Continued ITAR Control of Airborne Collision Avoidance Radar Is Limiting Development of the U.S. UAS Industry**

While the expanding industry for autonomous civil UAS promises important benefits, current USML controls over airborne radar put U.S. leadership in this sector at risk. Growth of the U.S. UAS industry depends on the adoption of robust and redundant technologies for safe operation within the National Airspace System. The safe operation of UAS beyond an operator's line-of-sight depends on UAS's ability to autonomously sense and avoid potential collision hazards both in flight and during landing. For small UAS, airborne collision avoidance radar is currently one of the most promising solutions for this potentially critical capability.

Continued ITAR control over airborne collision avoidance radar could effectively deter U.S. manufacturers and operators of civil UAS from incorporating that technology into their products and operations. The ITAR compliance programs, employment controls, export authorizations, end-use provisions and retransfer restrictions necessitated for ITAR-controlled products would make civil use not viable. Rather than incurring the investment, restrictions and risks associated with managing ITAR controls, as a practical matter, many in the U.S. civil UAS industry would exclude collision avoidance radar technologies, thereby losing out on its benefits and potentially undermining U.S. competitiveness in this important sector.

The U.S. commercial satellite industry's history illustrates how crippling ITAR restrictions can be for civil industries. U.S. satellite manufacturers held approximately 75 percent of the global commercial communications satellite industry in 1998 when Congress shifted satellites to the USML. Over the next decade, U.S. manufacturers dropped to 30 percent of the industry, lost an estimated \$21 billion in revenue to their European and Asian competitors, and shed approximately 9,000 jobs. While there were many contributing factors, participants in the U.S. commercial satellite industry have indicated that overly broad ITAR restrictions contributed to this significant opportunity loss for the United States. The continued control of airborne collision avoidance radar, as well as other technologies important to the autonomous civil UAS industry, could have a similar effect on the



U.S. UAS sector, and could surrender leadership in this emerging industry to foreign competitors.

## **V. Airborne Collision Avoidance Radar Is Not Militarily Sensitive**

USML Cat. XI(a)(3)(i) seeks to control military tracking radars used by missiles and military aircraft to track and/or intercept a moving target. Airborne collision avoidance radar systems do not provide these capabilities, any equivalent performance capability, or any other critical military or intelligence advantage. Indeed, within the technical parameters proposed by the Coalition below, airborne collision avoidance radar has few, if any, military applications.

The Coalition proposes three technical parameters to distinguish airborne collision avoidance radars with no applicability to the high-performance military tracking radars that Cat. XI(a)(3)(i) is intended to control:

1. Range – no greater than 8 kilometers;
2. Angular resolution – no less (better) than 2 degrees; or
3. Target refresh rate – no greater (faster) than 1 Hz.

Radar conforming to these technical parameters would fall well below the performance capabilities needed for military-specific applications, but would be sufficient for small UAS use for “sense and avoid” during flight and landing.

### *Range:*

In order for airborne tracking radar to be militarily useful against the range and speed of engagement of modern weapons and weapons platforms, they must be able to detect moving targets from hundreds of kilometers away. In order for airborne tracking radar to be useful in civil applications (*e.g.*, to sense and avoid birds and aircraft at relatively slow speeds and low altitudes, as well as obstacles during the landing process), a detection range as limited as 8 kilometers is more than adequate. While much larger detection ranges should be satisfactory to distinguish between civil and military airborne tracking radar, an 8 kilometer limit range is well below what would be useful in military applications.

### *Angular Resolution:*



Because of the distances, speeds, and stakes involved, military airborne tracking and targeting radar must be able to resolve targets at small angular resolutions. Resolving military targets from 100 kilometers away would generally require angular resolutions much less (better) than 2 degrees. However, an angular resolution of 2 degrees would be perfectly adequate for a small UAS seeking to avoid obstacles in flight or landing. Precise positioning information for the object is not needed if the UAS's protocols direct it to steer well clear of any object presenting a collision risk.

*Tracking Update Rate:*

Military airborne targeting and tracking radar needs to track fast-moving, agile targets with high precision. That can only happen if the radar sweeps the target frequently. By contrast, the typical collision threats for small civil UAS include birds, low-flying aircraft, animals, people and ground-based objects. These threats are relatively slow moving, so a radar refresh rate of 1 Hz, corresponding to one radar interrogation of the environment every second, would provide an acceptable radar map of the UAS's surroundings for the purpose of avoiding collision with such slow moving objects.

Meeting any one of the range, resolution or refresh rate exclusion parameters above renders a radar system unfit for anything specific to a military application. The Coalition therefore suggests that USML Cat. XI(a)(3)(i) be revised to exclude radar that meet any one of the exclusion parameters. For example, a radar would be excluded from ITAR control under USML Cat. XI(a)(3)(i) if it had a range of less than 8 kilometers, even if its angular resolution was less (better) than 2 degrees and its tracking update rate was greater (faster) than 1 Hz.<sup>4</sup>

## **VI. Proposed Change to USML Cat. XI(a)(3)(i)**

Pursuant to its position above, the Coalition respectfully requests that DDTC update USML Category XI(a)(3)(i) to exclude airborne radars meeting the above technical parameters. The proposed revision to Cat. XI(a)(3)(i) would read as follows:

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<sup>4</sup> The Coalition notes that the technical parameters suggested above fall well short of the carve-out provided for automotive sense-and-avoid technologies issued in 2013. Prior to that change, USML Cat. XI(a)(3) encompassed all radar systems with search, acquisition and tracking capabilities, regardless of range, power or sensitivity. In July of 2013, the U.S. Government agreed that automobile collision avoidance systems did not provide a critical military or intelligence advantage, and shifted such systems to the EAR. The fact that collision avoidance radar for the auto industry does not merit ITAR control strongly suggests that similar radar for the civil UAS industry also does not merit ITAR control.



*Airborne radar that maintains positional state of an object or objects of interest, other than weather phenomena, in a received radar signal through time, other than airborne radar meeting any of the following criteria: with a range no greater than 8 kilometers; an angular resolution no less (better) than 2 degrees; or a target refresh rate no greater (faster) than 1 Hz.<sup>5</sup>*

The Coalition believes this proposed regulatory change clearly defines the technical parameters of airborne radar that is excluded from control under the ITAR. However, the Coalition stands ready to support the relevant U.S. Government agencies in refining the technical parameters for this exclusion if that would be helpful.<sup>6</sup>

## **VII. Conclusion**

Small unmanned aircraft systems promise to improve safety and utility across a range of industries and activities, and offer an opportunity for U.S. leadership in an important technology industry. That promise should not be artificially constrained by unnecessary ITAR control over airborne collision avoidance radars with no appreciable military or intelligence capability. The Coalition therefore respectfully requests that USML Cat. XI(a)(3)(i) be modified as proposed above to exclude such radars from ITAR control.

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<sup>5</sup> DDTC could alternatively add a note that states the following: Note to paragraph (a)(3)(i): This paragraph does not control radars not otherwise controlled in this subchapter, designed with a range no greater than 8 kilometers, an angular resolution no less (better) than 2 degrees, or a target refresh rate no greater (faster) than 1 Hz.

<sup>6</sup> The Coalition notes that any airborne radar system excluded from the USML as a result of this change would still be subject to EAR controls, most likely under Category 6 of the Commerce Control List.