



# Export Control Revisions and CubeSat Programs

Results from an Informal Survey

October 30, 2015



# An informal survey of CubeSat programs

1. Are you familiar with the new export control categorizations for satellite technologies, effective November 10, 2014?
2. Have these new policies affected how you conduct your CubeSat or other activities?
3. How will the growth of the CubeSat sector be affected by the new ITAR/export control regime?
4. What are the important constraints that will limit international collaborations for CubeSats?
5. Do you have any advice for additional changes to ITAR/EAR policies?

# Responses received from representatives of

- Cal Poly San Luis Obispo
- Dartmouth College
- Jet Propulsion Laboratory
- Massachusetts Institute of Technology
- Montana State University
- Morehead State University
- NASA Ames
- National Science Foundation
- Secure World Foundation
- St Louis University
- University of New Mexico
- Utah State University

## Export Control (EC) changes effective Nov 14, 2014

- Less sensitive ITAR Category XV USML items transferred to EAR CCL
- New regulations use performance capabilities and functions as basis for categorization, not military vs. commercial
- New ITAR Category XV uses more detailed descriptions of capabilities than its predecessor and generally controls fewer items
- Most of the items that shift off of ITAR Category XV go to 9x515 ECCNs in the CCL of EAR
- Satellite housekeeping and telemetry data are now EAR99
- License Exception AVS 740.15(e) authorizes university export of spacecraft and components for fundamental research purposes, with conditions

## Summary of Responses

- Nearly all respondents were aware of the EC changes
- The changes are seen as well intentioned and in the right direction, and offer new flexibility for some programs
- However, the fundamental Export Control requirements remain, and rules are still complicated
- Complexity of the law often results in people following career or program paths of lesser resistance
- There is concern that students are missing opportunities to be exposed to the latest technologies
- The compliance burden is seen by some to hinder science, invention, business and innovation

## Summary of Responses

- Universities are left with the burden of deciphering the new rules and how they are applied
  - NASA and NSF sponsors do not advise on EC compliance
  - Rigorous application requires EC experts and money
    - While security plans for FNs are sometimes possible, they generally are not practical or practiced
  - Some default to a conservative approach
    - limits student engagement, opportunities
    - no foreign national students allowed on HW or SW
  - Others claim Fundamental Research Exemption
    - may be a risky approach if misapplied

## Positives

- International collaboration and foreign student involvement should become easier in principle for universities
- ITAR to EAR shift creates a more manageable compliance profile on some campuses, frees resources
- Telemetry and housekeeping data as EAR 99 is a huge help
- US commercial providers of CubeSat hardware are now in a much more competitive position globally
- EAR licensing system is easier to use than the ITAR system, and universities should find compliance easier



## Negatives

- Fundamental controls on certain systems remain, and still impact how university programs can be conducted
- Rules remain somewhat vague in certain areas, and require expert interpretation
- Launch services remain under ITAR control
- Some universities avoid foreign collaboration or limit foreign student participation on hardware and software
- Increasing numbers of foreign national students complicate space-systems research and operations programs
- CubeSat technology growth in the US is being hampered as demand is met by foreign ITAR-free vendors
- No funding for international collaboration



## Recommendations

- Continue review of technologies to further ease restrictions, such as on low rate communications, GPS, small scale ACS, X-ray detectors, electro-optics, focal plane arrays
- Find better ways to return foreign-made parts to the supplier for rework/repair, without an export license
- Consider support for a shared resource that offers universities review assistance for publishing papers, lessons learned, and program advice on EC issues
- Reaffirm the Fundamental Research Exemption and keep it out of Export Control for the benefit of students
- Harmonize a clear and broad definition of Fundamental Research across the engaged agencies (DOD, DOS, DOC)
- Special EC sessions/panel discussions at SmallSat conference

# Backup

**More detailed responses to questions**

## 2) Have the new policies affected your CubeSat program? (1)

### The Good

- "... we are a lot more comfortable integrating international students into the lab and establishing collaboration with international schools. "
- " They have simplified our activity, and enabled a broader range of participation. It has also lowered the 'temperature' of our school's Compliance Officer -- with the advent of EAR, I am no longer among the most compliant-needed programs on campus."
- " We have a number of international collaborators on student-built, research-based small satellite missions that will be positively impacted. Additionally, we have several foreign students in our undergraduate and graduate programs that will be able to work directly on spacecraft that do not meet the restriction conditions."
- Good news that telemetry is no longer ITAR, this is a huge help

## 2) Have the new policies affected your CubeSat program? (2)

### The Good

- US commercial providers can now offer products in the international market with a much more competitive position to deliver and support their products
- “ ... the Commerce license system, SNAP-R, is much easier to work with than the ITAR system DTRADE for license applications. In addition, the transition will also support international collaborations as only an export license is required by Commerce since TAAs only fall under the ITAR. Finally, the “specially designed” definition has also focused the controls on the actual satellite technology instead of the bolts and fasteners, which previously would fall under the ITAR.
- “ All our students are US so no impact.”

## 2) Have the new policies affected your CubeSat program? (3)

### The Not So Good

- “ The changes have not impacted how I can conduct my CubeSat activities ... and have not fundamentally changed what is controlled or how universities can work within the law. ”
- “ ... the rules remain somewhat vague and there is some interpretation of when the technology becomes controlled.”
- “ ...launch services remain ITAR control even with the standardization and international options available in the market. This is still restricting some of our activities.”
- “ ... every abstract and presentation I submit has to be reviewed by ITAR experts, adding greatly to the approval time. I don't think the new regulations will make things better...they are far more complicated. ”

## 2) Have the new policies affected your CubeSat program? (4)

### The Not So Good

- “ ... operations have not been significantly affected by the change. ... work that does not fall under the Fundamental Research Exemption (FRE), and therefore export controlled, still maintains the same limitations in terms of foreign national involvement if the technology falls under 9A515. Either with the ITAR or EAR, both regulations require an export license or use of an exemption/exception in order to have foreign nationals involved in any export controlled project to any country except Canada. ”
- “ ... I have avoided involvement of foreign nationals or collaboration with foreign entities in our satellite projects from the beginning. The new regulations as they currently stand are not likely to change my approach in that regard; despite the fact that my program and our own US citizen students could in some cases benefit from such interactions.”

### 3) How will the growth of the CubeSat sector be affected by the new ITAR/export control regime? (1)

#### The Good

- “ ... transition to the EAR will support collaborations with international entities (universities and businesses) on export controlled work outside of FRE. Under the ITAR, the TAA is a substantial process and requires significant overhead to manage. Having an export license on the technology will only be limited by the provisos provided in the Commerce license. ”
- “ The new ITAR/export control regime will open the door to important international collaborations in CubeSat technology and CubeSat science. Additionally, opportunities for launches of US CubeSats on European and Russian launch vehicles will increase, accelerating the development of new enabling technologies and the pursuit of science research in astrophysics, planetary science, space weather, Earth remote sensing and others”



### 3) How will the growth of the CubeSat sector be affected by the new ITAR/export control regime? (2)

#### The Good

- "... I don't think ITAR/EAR have/will significantly affect overall growth of the CubeSat sector. ... while specific schools may have been limited, the overall growth of the sector was not. Many schools figured out how to play within the rules, and the rest assumed that they were exempt."
- "... with EAR, it means that more schools can be/will be within the rules, which is good for \*sustained\* growth for any school that wants to participate."
- "... We are able to better compete with international providers and we expect a significant increase in international sales from US developers in direct competition with the established European providers. Significant benefits to US industry."

### 3) How will the growth of the CubeSat sector be affected by the new ITAR/export control regime? (3)

#### The Not so Good

- "The growth will be slower in the US with the regulation than without it. I expect that we will/(and have) give significant market share to entities/businesses outside of the US because of the export control laws.
- "The very existence of ITAR throws cold water on the US taking leadership in collaborative activities with a range of partners, including overseas partners, by adding cost and time and fear and too many lawyers and accountants. "

## 4) What are the important constraints that will limit international collaborations for CubeSats? (1)

- “ The constraint on what items can be shipped to what countries without requiring an export control license under the EAR. Right now it is very restrictive. ”
- “ Launch restrictions are still in place and that makes launches outside the US more difficult for US developers than for those from other countries. ”
- “... international collaborations will be naturally limited for US schools, because of the logistical constraints along CubeSat timescales. When a mission can/should be developed in 18 months from concept to final assembly, it's hard to organize and maintain international collaboration. Especially if you have to get a compliance arrangement in place ...”
- “ ... the significant uptick in foreign-born students in US programs ... can \*profoundly\* complicate funded space-systems research”

## 4) What are the important constraints that will limit international collaborations for CubeSats? (2)

- “ ... the biggest constraints now are related to funding of international collaborations for CubeSats. Funding for CubeSat-based research in general is limited. Funding for international collaboration utilizing CubeSat platforms is almost non-existent. ”
- “ ECCNs, such as 9A515, requires the use of an exception or an export license for all countries except for Canada. This means that an export applications still needs to be submitted to Commerce and there is also a 30-60 day timeline for license approvals. This is a constraint in that any international collaboration will require pre-planning and the inclusion of an export control officer to support the collaboration. That said, it is nowhere near as arduous as a TAA. ”

## 5) Do you have any advice for additional changes to ITAR/EAR policies ? (1)

- “ ...continued review of the technology under the 9A515 to determine whether certain CubeSat technology can be moved to a lesser controlled ECCN. This would allow certain technology to be exported to countries, such as category B countries, with No License Required (NLR) and would assist international collaborations. ”
- Suggest special Export Control sessions and panel discussions at the SmallSat conferences and other appropriate venues
- Reduce restrictions on low rate communications, GPS receivers, small scale attitude control systems
- There is a need for a shared resource or service for universities that could offer EC review assistance for publishing papers, access to specialized legal counsel, etc. for CubeSat or nanosat issues

## 5) Do you have any advice for additional changes to ITAR/EAR policies ? (2)

- “Easing the restrictions even more on electro-optics, IR detectors and focal plane array detectors (i.e. X-ray detectors) would enhance our CubeSat programs ...”
- “ Get rid of ITAR all together, or reduce its impact greatly by providing a rapid turn around low cost service which generally results in approvals (knowing without stopping). Allow open collaboration and competition. Sell American technology everywhere ...”
- “ Most CubeSat parts are made by offshore vendors. There should be a simple way to return parts to them that are broken.”
- “ There should be a review of ITAR control for systems based on standardized launch accommodations with existing international competitors.”

## 5) Do you have any advice for additional changes to ITAR/EAR policies ? (3)

- “Create a mechanism where a broad export license for a CubeSat integration/fabrication activity can be granted to a university at the conceptual design stage. This would involve licensing all non-US persons to participate in the activity. It would involve upfront licensing for all necessary spacecraft components purchased from commercial vendors that might be export controlled.
- Reaffirm the Fundamental Research Exemption and keep it out of Export Control
- Harmonize a clear and broad definition of “Fundamental Research” across the regulation agencies (DOD, DOS, DOC)
- Consider exempting the tools used by universities to do fundamental research from EC (when used and applied by universities)