

U.S. Department of State

DS-4076 Commodity Jurisdiction (CJ) Determination Form

(SEE INSTRUCTIONS PAGE)

* PAPER WORK REDUCTION ACT STATEMENT: Public reporting burden for this collection of information is estimated to average 4 hours per response, including time required for searching existing data sources, gathering the necessary data, providing the information required, and reviewing the final collection. Send comments on the accuracy of this estimate of the burden and recommendations for reducing it to: Department of State (PM/DDTC) Washington, D.C. 20037.

Classified Information must not be included, or referred to, in the form. For issues that may pertain to classified information, contact the DDTC Response Team.

Block 1. Filer Information

Registration Code: Not registered with PM/DDTC

Filer Type:

Manufacturer Exporter U.S. Government Foreign Government Manufacturer's Representative
 Other If other, explain:

Company or Organization: Open Research Institute, Inc."Doing Business As" Name: Address Line 1: P.O. Box 8552Address Line 2: City: Berkeley Country: United StatesState/Province: California Zip/Postal Code: 94707-8552

Point of Contact:

First Name: Michelle Last Name: ThompsonTelephone: 858-350-7579 E-Mail: mountain.michelle@gmail.com

Technical Point of Contact:

Technical POC 1

First Name: Michelle Last Name: ThompsonTelephone: 858-350-7579 E-Mail: mountain.michelle@gmail.com

Technical POC 2

First Name: Michelle Last Name: ThompsonTelephone: 858-350-7579 E-Mail: mountain.michelle@gmail.com

If Filer Type is Exporter, U.S. Government, Foreign Government, Manufacturer's Representative, or Other:

Original Equipment Manufacturer (OEM) Information:

Company or Organization: Open Research Institute, Inc."Doing Business As" Name: Address Line 1: P.O. Box 8552Address Line 2: City: Berkeley Country: United States

State/Province: California

Zip/Postal Code: 94707-8552

Third Party Information:

Company or Organization: Thomsen and Burke LLP

"Doing Business As" Name:

Address Line 1: 2 Hamill Road, Suite 415

Address Line 2:

City: Baltimore, MD

Country: United States

State/Province: Maryland

Zip/Postal Code: 21210

Block 2. CJ Determination Type New Submission Resubmission Related to a U.S. Government Request*If resubmission:*

Prior CJ Case Number:

Select a reason for resubmission: Prior CJ Returned Without Action (RWA) Reconsideration - additional information provided Redesignation of article or service currently covered by the U.S. Munitions List

Summarize reason for resubmission:

If related to a U.S. Government request:

Disclosure/Case #:

USG Agency Requested:

U.S. Government Point of Contact:

First Name:

Last Name:

POC Telephone:

POC E-Mail:

Block 3. Commodity/Service Type End Item Component/Major Component/Minor Part Accessory/Attachment Firmware Software System Service Information Material Other

If other, explain:

Block 4. Commodity/Service Basic Information**Commodity 1***Section a. Commodity/service information released in block 13*

Product Name: Technical Data for a Digital Microwave Braodband Communiations System for Space and Terrestrial Amateur Radio Use

Generic Description: Information related to the design and development of amateur radio hardware for space (Amateur Radio satellites in geosynchronous orbit) and corresponding ground stations. In the United States, the Amateur Radio Service and Amateur Satellite Service are defined by the Federal government in 47 CFR 97 and administered by the Federal Communications Commission.

Model and Version Number: N/A

Part Number: N/A

Section b. Additional commodity/service information not released in block 13

National Stock Number: N/A

Other Identifier:

N/A

Military/Intelligence Specification: None

Patent Information: None. We have no patents currently or any plans to apply for patents. Everything will be open source and public domain.

Cost Per Unit: \$0

Manufacturer's Website: <https://openresearch.institute/>Commodity/Service Website: <https://openresearch.institute/>

Explain if restricted for public release by the U.S. Government:

Not Applicable.

Commodity 2***Section a. Commodity/service information released in block 13***

Product Name: Software for a Digital microwave broadband communications system for space and terrestrial amateur radio use

Generic Description: Software related to the design and development of amateur radio software for space (Amateur Radio satellites in geosynchronous orbit) and corresponding ground stations. In the United States, the Amateur Radio Service and Amateur Satellite Service are defined by the Federal government in 47 CFR 97 and administered by the Federal Communications Commission.

Model and Version Number: N/A

Part Number: N/A

Section b. Additional commodity/service information not released in block 13

National Stock Number: N/A

Other Identifier:

N/A

Military/Intelligence Specification: None.

Patent Information: None. We have no patents currently or any plans to apply for patents. Everything will be open source and public domain.

Cost Per Unit: \$0

Manufacturer's Website: <https://openresearch.institute/>Commodity/Service Website: <https://openresearch.institute/>

Explain if restricted for public release by the U.S. Government:

Not Applicable.

Block 5. Commodity/Service Detailed Description

Provide a detailed description of the item, software, information, or service. At a minimum, describe what it does, how it operates, the components and/or systems that are used in or with it, and identify the end use platform in which the item is to be integrated, incorporated, etc., if it is a minor component.

The ORI Data and Software consists of 2 projects: ORI Space is an open source, broadband, digital regenerative payload with programmable multiplexing. the baseline design is four self-propelled 6U CubeSat stand-alone ham-dedicated satellites and four spares. This design required 3-axis stabilization, propulsion, debris mitigation, and more. The space communications package can also be a rideshare or hosted payload with appropriate integrator partners. four flight payloads and four spares are intended to be deployed 90 degrees apart for global coverage. ORI Ground Station is an open source, digital microwave broadband communications system for space and terrestrial amateur radio use. The ground station implements an open source version of DVB-S2/X for the time-division multiplexed downlink at 10 GHz. The ground station implements an open source frequency-division uplink at 5 GHz. The payload implements an open source polyphase filter bank for receive, uses the open standard Generic Stream encapsulation (GSE) for transport, and multiplexes the downlink with open source Quality of Service (QoS) algorithms. The software associated with these projects will be published as source code and will be available as open source software available at <https://openresearch.institute/public/> and on GitHub. 100% of the software will be available as high-level source code.

If software or firmware, provide the following:

Programming Language: verilog, VHDL, python, C, C++

Operating System: Linux

Percentage of High Level Code and Machine Code: 100%

Intended purpose of the software and possible/likely product use:

The software will be used in the design and development of Amateur Radio satellites in geosynchronous orbit and for the design and development of satellite ground stations.

Firmware involved:

None. We anticipate no firmware to be involved.

Hardware: Provide a detailed description of the associated hardware and equipment necessary to execute the software as well as technical characteristics of any special purpose, developmental, or non-off-the-shelf hardware.

The hardware required to execute the software consists of commercially available field programmable gate arrays, commercially available programmable radio frequency integrated circuits, and general-purpose off-the-shelf computers. No special purpose hardware is required to execute the software for this program.

Software Structure: Describe the software structure in terms of partitioning or modularity. Are the algorithms contained in one distinguishable portion while data is contained in another? If not, can the two be separated?

Yes, the algorithms are contained in software modules that are distinct from the modules that handle the data.

Associated Software: To what extent does the software rely on other systems' software to exchange data? Does this reliance provide a window into the other programs? If so, what programs?

The software does not rely on other systems' software to exchange data. This amateur radio communications system is completely stand-alone, consisting only of personal and non-commercial communications between individual amateur radio licensees. It provides no window into any other program.

Is the software based on or does it contain open-source software or software code?

Yes

Is the software or associated documentation related directly or indirectly to a defense system?

No

Are identical or comparable products available through foreign or domestic, commercial or government sources?

Yes

Does the product or any of its components perform information security functions?

Yes, encryption of the command and control of an Amateur Satellite Service payload. The messages sent via the Amateur Satellite Service are not encrypted. Section 97.113(a)(4) of the Amateur Service rules prohibits the transmission of 'effectively encrypted or encoded messages, including messages that cannot be readily decoded over-the-air for true meaning'. This use of encryption is intended to protect Amateur Satellite Service payloads from unauthorized commands.

Block 6. Special/Unique Characteristics and Capabilities

Ballistic Protection

Explain:

Chemical, Biological Weapon

Explain:

Civil Applications

Explain:

For the design and development of amateur radio software and hardware for space (Amateur Radio satellites in geosynchronous orbit) and corresponding ground stations.

Hard Points

Explain:

Intelligence Applications

Explain:

Low Observable/Counter-Low Observable

Explain:

Military Applications

Explain:

Radiation Hardened

Explain:

Surveillance or Intelligence Gathering Capability

Explain:

Space Applications

Explain:

For the design and development of amateur radio software and hardware for space (Amateur Radio satellites in geosynchronous orbit).

TEMPEST Capability

Explain:

Thermal or Infrared Signature Reduction Capability

Explain:

Other

Explain:

Block 7. Commodity Origin

Was or is this commodity being developed with knowledge for use in or with a particular commodity (e.g., F/A-18 or HMMWV)?

Yes No Explain:

Was or is this commodity being developed with knowledge for use in or with a type of commodity (e.g., aircraft or machine tool)?

Yes No Explain:

Was or is this commodity being developed with knowledge that it would be used in or with defense articles enumerated on the U.S. Munitions List?

Yes No Explain:

Was or is this commodity being developed with knowledge that it would be used in or with commodities not on the U.S. Munitions List?

Yes No Explain:

The information and software will be used for the design and development of Amateur Radio satellites in geosynchronous orbit and corresponding ground stations. In the United States, the Amateur Radio Service and Amateur Satellite Service are defined by the Federal government in 47 CFR 97 and administered by the Federal Communications Commission. We believe the information and software is controlled under ECCNs 9x515 on the Commerce Control List.

Regardless of form or fit, is this commodity a fastener, washer, spacer, insulator, grommet, bushing, spring, wire, or solder?

Yes No Explain:

Does this commodity have the same function and performance capabilities as another commodity used in or with an item that is both (a) currently or formerly in production and (b) not enumerated on the U.S. Munitions List?

Same Function? Yes No Unknown

Same performance capabilities? Yes No Unknown

Same or equivalent form and fit? Yes No Unknown

Provide information on the "like" commodity:

Like Commodity 1

Manufacturer: Department of Commerce

Commodity: GOES-R Ground Segment Documents

Model Number: GOES-R Part Number: None

Status: In Use Manufacturer's Website: <https://www.goes-r.gov/>

Explanation/Description: Documents that contain a complete description of, and provide implementation-related guidance for the algorithms described as they are used in the Geostationary Operational Environmental Satellite-R Series (GOES-R) Program. EAR99 based on a CJ Determination issued on 02/13/2019.

Like Commodity 2

Manufacturer: US Department of Commerce

Commodity: Documents

Model Number: None Part Number: None

Status: In Use Manufacturer's Website: <https://www.goes-r.gov/>

Explanation/Description: Eight technical documents relating to the Geostationary Operational Environmental Satellites - Series R (GOES-R). Classified as EAR99 on a CJ Determination issued on 7/19/2018

Like Commodity 3

Manufacturer: Globecomm Systems, Inc.

Commodity: Satellite based software

Model Number:	1.0 / 1.2M	Part Number:	None
Status:	In Use	Manufacturer's Website:	http://www.globecomm.com/
Explanation/Description:	Satellite-based software used to generate metadata from received radio frequency signals and for performing survey and mapping from space; a single spacecraft consisting of a satellite bus and payload loaded with HE360 software; and a triad of spacecraft comprising three HE360 satellites.		

Like Commodity 4

Manufacturer:	Tampa Microwave		
Commodity:	Man portable Satellite Communication Terminal		
Model Number:	None	Part Number:	None
Status:	In Use	Manufacturer's Website:	https://www.tampamicrowave.com/
Explanation/Description:	Ground based, portable SATCOM terminals in X, Ku and Ka band		

Are identical or comparable products available through foreign means?

Yes No Unknown

Provide information on the "like" commodity:

Foreign Like Commodity 1

Manufacturer:	Libre Space Foundation		
Commodity:	UPSat		
Model Number:	None	Part Number:	None
Status:	In Use	Manufacturer's Website:	https://libre.space/tag/upsat/
Explanation/Description:	UPSat, the first open source hardware and software satellite, was released in orbit by NanoRacks deployer from the International Space Station at 08:24 UTC 2017-05-18.		

Foreign Like Commodity 2

Manufacturer:	FOSSA		
Commodity:	FossaSat-1		
Model Number:	None	Part Number:	None
Status:	In Use	Manufacturer's Website:	https://fossa.systems/fossasat-1/
Explanation/Description:	FOSSASAT-1 is a pocketqube satellite which is being developed using free and open source ethics.		

Foreign Like Commodity 3

Manufacturer:	AmbaSat		
Commodity:	AmbaSat-1		
Model Number:	None	Part Number:	None
Status:	In Use	Manufacturer's Website:	https://www.kickstarter.com/projects/ambasat/ambasat-1-an-educational-space-satellite-kit

Explanation/Description: AmbaSat, an open source satellite project from the United Kingdom, is a comparable foreign research item. AmbaSat-1 is a tiny Space satellite kit that participants assemble and code at home. A wide variety of sensors can be easily integrated into the modular satellite. AmbaSat has a comprehensive curriculum for STEM education that is provided at no cost to teachers, enables citizen science, and has widespread support from amateur radio enthusiasts around the world. Once the satellite kit is assembled and programmed, it will be launched on-board a commercial rocket into Low Earth Orbit, where it will spend up to 3 months in space. AmbaSat-1 will use LoRaWAN and The Things Network to send live data back to Earth. As of 8 January 2020, the first AmbaSat-1 rocket launch is on the Interorbital launch manifest list. All documentation for AmbaSat can be found at <https://github.com/ambasat>.

Foreign Like Commodity 4

Manufacturer: Libre Space Foundation

Commodity: Satellite Network on the Ground (SatNOGS)

Model Number: None Part Number: None

Status: In Use Manufacturer's Website: <https://libre.space/projects/satnogs/>

Explanation/Description: Satellite Network on the Ground (SatNOGS) project. SatNOGS is a global network of open source satellite ground stations. SatNOGS tracks hundreds of satellites around the world and is heavily used and supported by amateur radio operators and enthusiasts.

Block 8. Product Development Stage

What is the current stage of product development for this item?

- Proposal/Concept Blueprint/Design Stage
 Design complete/No sales yet Design complete/Prototype/No sales yet
 Design complete/Sales Other Explain: _____

Block 9. Funding History

- U.S. Government (USG) Agency

Identify which agency funded your item and any USG contract numbers and Points of Contact as applicable.

Identify what percentage of the total funding was by a USG agency.

Provide the date(s) of contracts or funding authorizations.

- Foreign Government Agency

Identify which country and specific foreign government agency, and describe what type of funding was provided.

- U.S. or Foreign Contractor

Provide the name of the contractor and contact number as applicable.

- University Funded

Provide the name of the university and contact number as applicable.

- Self-Funded

Block 10. Sales Information

Have there been any military sales in the past 5 years?

- Yes No

If yes:

Purchaser: _____

Country: _____ Nomenclature/Model #: _____

End Use: _____

End User: _____

Sales Date(s): _____ Units Sold: _____

Additional Information: _____

If no:

If fully developed, please explain why there have not been any sales:

The information and software are for the design and development of Amateur Radio satellites in geosynchronous orbit and for the design and development of satellite ground stations; not for a military end-use. The information and software are publicly available and will not be sold

Have there been any civil/commercial sales in the past 5 years?

Yes No

If yes:

Purchaser: _____

Country: _____ Nomenclature/Model #: _____

End Use: _____

End User: _____

Sales Date(s): _____ Units Sold: _____

Additional Information: _____

If no:

If fully developed, please explain why there have not been any sales:

The information and software are publicly available and will not be sold.

Block 11. Export/Classification Information

Has this commodity been previously exported?

Yes No Unknown

If yes, provide export history:

Provide export history: _____

License #: _____

Was this exported as part of a Foreign

Military Sale (FMS) case?

FMS Case #: _____

Has this commodity been subject to a Department of Commerce Classification Request?

Yes No Unknown

Block 12. Reason for Submitting CJ Request

Explanation:

ORI is seeking a CJ in order to confirm jurisdiction of the information and software related to the design and development of Amateur Radio satellites in geosynchronous orbit and corresponding ground stations.

Suggested U.S. Munitions List (USML) category and/or subcategory: (if applicable)

None. We believe that the Data and Software for a Digital microwave broadband communications system for space and terrestrial amateur radio use is exempt from control under the ITAR based on Sections 120.10(b) and 120.11(a)(i) of the ITAR. However, in the event DDTC does not agree that the data is exempt, we identified several entries with potential relevance under USML Categories XV.. We have completed the DDTC Decision Tree tool (results attached) and determined that the information and software are not ITAR controlled. A review of USML Category XV(a), XV(b) and XV(e) indicates that the ORI Data is not subject to the ITAR. We respectfully suggest that the ORI Data for a Digital microwave broadband communications system for space and terrestrial amateur radio use is not described on the USML. Please see the Cover Letter for a more detailed analysis.

Suggested Export Administration Regulations, Export Control Classification Number (ECCN): (if applicable)

Technology: ECCN 9E515.a, as related to ECCN 9A515.a.5 for the associated hardware Software in Binary form: ECCN 9D515.a
Software in Source Code form: ECCN 9D515.b

Rationale for recommended classifications, to include specially designed analysis: (if applicable)

We completed the EAR Export Classification Decision Tree Tool (results attached). We considered ECCNs 3x611, 5x611, and 5D/5E002. However, we believe ECCNs 9D515 and 9E515 are the correct classifications. Please see the Cover Letter for a more detailed analysis.

Block 13. Publication

The Directorate of Defense Trade Controls reserves the right to post a description of the commodity and final DDTC action on its website to provide the public access to the information in Block 4 and any other descriptive information provided below. If you believe that any information contained in Block 4 is proprietary, please specifically identify the information below and provide a summarized rationale for DDTC to consider withholding the information from public notice.

None.

Block 14. Other

Please provide any other information that should be considered and is not otherwise included in this form.

Dr. Daniel Estevez has provided a letter in support of Commerce Department jurisdiction. Dr. Estevez works as a Global Navigation Satellite Systems (GNSS) engineer in the multinational company GMV in Madrid, Spain. Additionally, he is an independent researcher in the fields of radio communications and space systems. He develops open source software which is used by the European Space Agency, among other research and educational institutions and private companies, and collaborate with the Harbin Institute of Technology (China), ASTRON (The Netherlands), and other research institutions. A copy of his letter is included as an attachment. Libre Space Foundation has also provided a letter in support of Commerce Department jurisdiction. A copy of this letter is included as an attachment.

Block 15. Supporting Documentation*Optional Supporting Documentation*

- Blue Print Cover Letter Drawings Marketing Materials
 Other Schematics Transmittal letter

*Conditionally Required Supporting Documentation***If filer type is Manufacturer's Representative**

- Documentation authorizing you to file on the manufacturer's behalf and to publicly release the information provided in Block 4. Additionally, this documentation must include the manufacturer's name and contact information.

If filer type is Manufacturer, Exporter or Manufacturer's Representative

- Original Equipment Manufacturer Letter

If commodity/service type is software Top-level flowchart of the software architecture**If commodity/service type is software** "Like" commodity identical or comparable products available through foreign means supporting documentation**If funding history is U.S. Government** Attach a copy of the Contract Statement of Work**If yes, this commodity has been subject to a Department of Commerce Classification Request** Copy of the classification request*Describe supporting documentation attached:*

Select Type:	Authorizing Documentation
Explain:	Letter authorizing Thomsen and Burke LLP to file on behalf of the Open Research Institute, Inc. ("ORI")
Select Type:	Cover Letter
Explain:	Cover Letter in Support of Commodity Jurisdiction Request for Open Research Institute, Inc. ("ORI")
Select Type:	Marketing Materials
Explain:	Information on ORI Space and ORI Ground Station - (reference Block 5 of DS-4076). Included are (1) P4XT Digital Multiplexing Transponder Project Program Proposal and (2)Phase 4 Space Funding.
Select Type:	Supporting Documentation
Explain:	Information on Comparable Foreign Research Projects (reference to Block 7 of the DS-4076).
Select Type:	Top Level Flowchart
Explain:	Top Level Flowchart
Select Type:	Supporting Documentation
Explain:	Reference to Block 12 - DDTC Decision Tree Tool Results
Select Type:	Supporting Documentation
Explain:	Reference to Block 12 - BIS EAR Export Control Classification Interactive Tool Results
Select Type:	Supporting Documentation
Explain:	Reference to Block 14 - Letters in Support of Jurisdiction under the EAR
Select Type:	OEM
Explain:	OEM Authorization Letter

Block 16. Applicant/Submitter's Certification

Under Penalty According to Federal Law (See 22 CFR 127, 22 U.S.C. 2778, and 18 U.S.C. 1001).

I am the authorized employee of the company cited in Block 1, or a third party as described in Block 1 authorized to submit on behalf of the company in Block 1, and certify as to the accuracy and completeness of the information provided and have not knowingly omitted information that could have an impact on the final determination issued by the U.S. Department of State. Furthermore, I have specific authority to release for publication the text contained in Block 4.

SIGNATURE

TITLE

DATE

Privacy Act Statement

AUTHORITIES: The information is sought pursuant to Exec. Order No. 13637, 22 U.S.C. 2778, 22 CFR § 120.3, 22 CFR § 120.4, and 22 CFR Part 121.

PURPOSE: The purpose of a commodity jurisdiction determination request is to provide the U.S. Government with information concerning the design, manufacture, export, brokering, and sale of certain defense articles which may or may not be controlled under the United States Munitions List (USML, 22 CFR Part 121) and are therefore subject to the export licensing jurisdiction of the Department of State. This information will be used to determine the correct classification of items under the USML.

ROUTINE USES: The information supplied on this form is made available to appropriate agencies for law enforcement or pursuant to a court order. It may also be used to send required reports to Congress about certain defense transactions. More information on the Routine Uses for the system can be found in the System of Records Notice State-42, Munitions Records.

DISCLOSURE: Providing this information is voluntary and designed to assist individuals and companies to properly determine the classification of certain defense articles. Failure to provide the information requested on this form may result in adverse determinations by the U.S. Government as regards the proper classification of defense articles manufactured, sold, or brokered by the respondent.