



# Emerging Technologies

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# Emerging Technologies (ET) Export Controls

- The Export Control Reform Act (ECRA) of 2018 requires Commerce to establish controls, including interim controls, on the export, reexport, or transfer (in country) of emerging technologies.
- The legislation mandates that emerging technologies essential to national security of the United States are controlled appropriately.
- Commerce does not seek to expand jurisdiction over technologies that are not currently subject to the Export Administration Regulations (EAR), such as “fundamental research” described in Section 734.8 of the EAR.



# Science and Technologies

- Human imagination and creativity: science and technologies are continuously developing.
- Think of our world without fire, engine, transistor, cars and planes, the internet, Wi-Fi,...
- Think of biotechnology, robotics, quantum computing, artificial intelligence, and beyond.
- Not all emerging technologies make it past research and development stage.
- However, when they do, they make a big difference in people's lives.
- Emerging technologies affect every facet of our lives: the way we communicate, learn, think, and live.



# ET in the USA and the World

- Scientists and engineers in the United States and around the world work day and night for more discoveries and more knowledge.
- Legitimate research and collaboration are taking place, thus boosting emerging technologies – for good things and purposes.
- There are challenges :
  - the use of (emerging) technologies for weapons of mass destruction;
  - threat to national security interests of/around the world; and,
  - insure export controls do not inhibit research and development of new technologies.



# US Export Controls Effort to Date

- 2018 ET Advance Notice of Proposed Rulemaking (ANPRM).
- Implementation of multilateral ET controls :
  - 2018 Wassenaar Arrangement controls (May 2019).
  - 2019 Wassenaar Arrangement controls soon to be published.
  - 2020 Australia Group controls (June 2020).
- 2020 Unilateral control on certain geospatial imagery software (January 2020).
- 2020 Foundational Technologies ANPRM.
- ET Technical Advisory Committee (ETTAC).
- Interagency ET teams.



# 2018 Emerging Technologies ANPRM

- November of 2018 Advance Notice of Proposed Rulemaking (ANPRM) sought public comment on criteria for identifying emerging technologies.
- The ANPRM identified 14 general areas warranting review and noted anticipated Export Control Classification Numbers for emerging technologies determined to be essential to national security.



# 2018 Wassenaar Arrangement ET

- Five multilateral controls were agreed to at the December 2018 plenary meeting of Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies:
  - Certain microwave transistors, a major component of wideband semiconductors.
  - Continuity of operation software.
  - Postquantum cryptographic algorithms.
  - Underwater transducers designed to operate as hydrophones.
  - Aircraft specially designed or modified to be air-launch platforms.



# 2019 Wassenaar Arrangement ET

- Additional six emerging technologies controls agreed to at the December 2019 plenary meeting of Wassenaar (soon to be published) :
  - Hybrid additive manufacturing/computer numerically controlled tools.
  - Computational lithography software designed for the fabrication of extreme ultraviolet masks.
  - Technology for finishing wafers for 5nm production.
  - Forensics tools that circumvent authentication or authorization controls on a computer and extract raw data.
  - Software for monitoring and analysis of communications and metadata acquired from a telecommunications service provider via a handover interface.
  - Sub-orbital aircraft.





# 2020 Australia Group ET

- On June 17, 2020, BIS published controls on:
  - 24 chemical weapons precursors; and
  - single-use biological cultivation chambers with rigid walls.



# 2020 Unilateral Control

- On January 6, 2020, BIS published a unilateral control on certain software related to analysis of geospatial imagery :
  - providing a graphical user interface to identify objects;
  - reducing pixel variation by performing scale, color, and rotational normalization;
  - training a Deep Convolutional Neural Network to detect the object of interest; and
  - identifying objects in geospatial imagery using the trained Deep Convolutional Neural Network.



# 2020 Foundational Technologies ANPRM

- On August 27, 2020, Commerce/BIS published an Advance Notice of Proposed Rulemaking (ANPRM) on foundational technologies.
- Foundational technologies essential to the national security are those that may warrant stricter controls if a present or potential application or capability of that technology poses a national security threat. This ANPRM seeks public comment on the definition of, and criteria for, identifying foundational technologies. Comments on this ANPRM will help inform the interagency process to identify and describe such foundational technologies.
- Comments are to be submitted on or before October 26, 2020.



# Emerging Technology Technical Advisory Committee (ETTAC)

- Technical Advisory Committees (TACs) and ETTAC.
- Identify emerging and foundational technologies that warrant review and assess :
  - national security significance;
  - development in foreign countries;
  - the effect export controls may have on the development of such technologies in the United States; and
  - the effectiveness of controls on limiting the proliferation of emerging and foundational technologies to foreign countries.
- Members from academia, industry, federal laboratories, and pertinent U.S. Government departments and agencies engaged in cutting-edge technology.



# Interagency Emerging Technologies Teams (Sprint Groups)

- Identify emerging technologies that warrant review and possible control proposals.
- Organized around technology categories published in the Emerging Technologies ANPRM.
- Members assess and discuss emerging technologies, evolving trends, potential areas for possible control proposals to multilateral regimes or for considering unilateral control proposal.



# ET Export Control: Work in Progress

- Continuous work of identifying
  - emerging and foundational technologies;
  - as well as other technology categories that warrant review for emerging and foundational technologies.
- Continuous collaboration with multilateral regimes on emerging technologies controls proposals.
- Continuous work and collaboration with pertinent US Departments and agencies, advisory committees, academia, industry, and the public.
- Exchanges and sharing in conference's and seminar's platforms like this one is essential in advancing this work in progress.



# Thank You

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