States, borders, and security: export controls in physical space and cyberspace

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Stanford University

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Export Control Primer

- National security export controls allow the government to decide which militarily significant goods and technologies can leave the country

- Three basic components:
  1. List
  2. Licensing system
  3. Enforcement system

- Have always had an international aspect to them

Export Control Primer

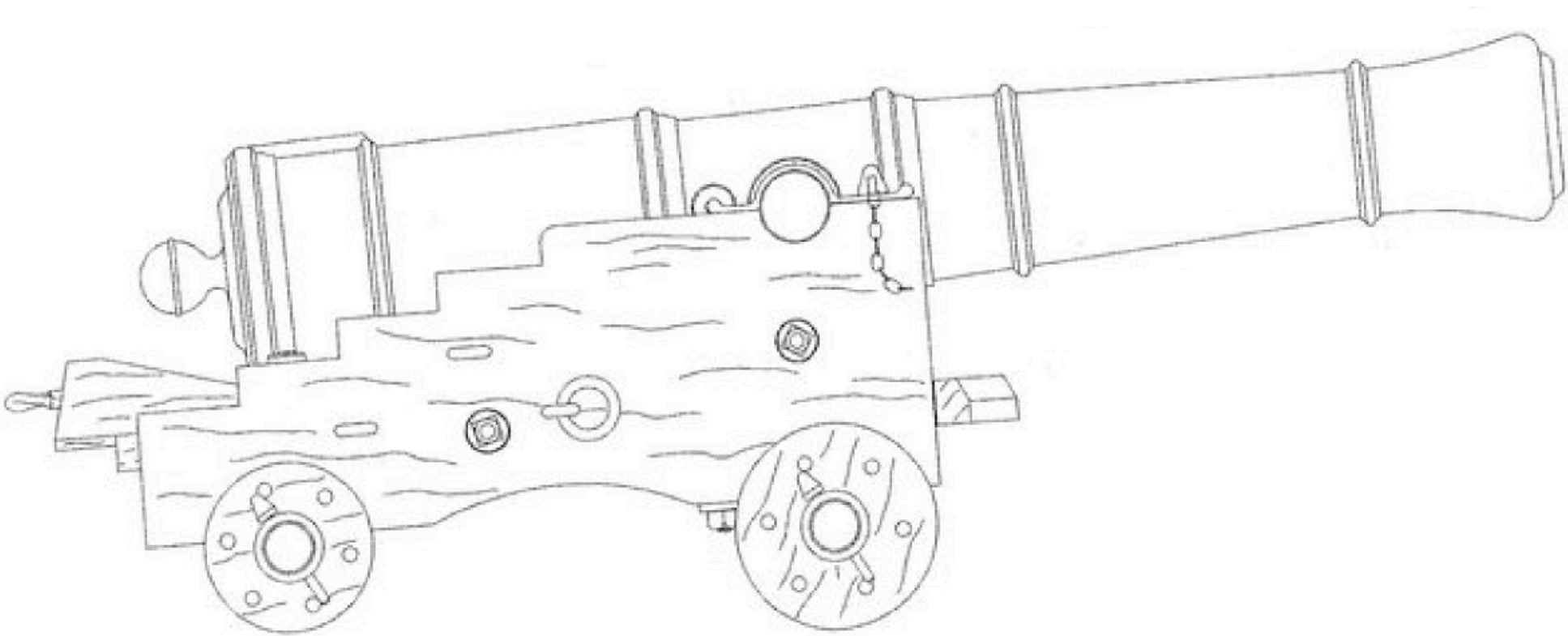
- Modern concept formed during the Industrial Revolution
- Current structure is an outgrowth of World War II system
- Export controls have democratic accountability

Questions for today's talk

- How do export controls define technical and political borders in physical space?
- How do those borders translate (or not) into cyberspace?
- What value is there to the way that export controls draw borders around militarily significant technology, in both physical and cyber space?

How early export controls imagined the state

One border



How early export controls imagined technology

A widget

print courtesy of Jerry Howell

Reasons controls work

- Items originate within political border
- The item is a physical object
- Government can say the item is of military significance and destination is an enemy
- Government can prevent the item from crossing political border

The death of distance?

Or just a new realm for states to assert power?

Wikileaks

A demonstration of the physicality of the internet

Problems with the technical border

- Early controls

"Arms, ammunition, and naval stores"

Problems with the technical border

- 1958 CoCom Lists

Group A	Metalworking Machinery
Group B	Chemical and Metallurgical Plant, Compressors, Furnaces, Pumps, Valves, etc
Group C	Diesel Engines and Electric Generators
Group D	Miscellaneous Goods and Machinery
Group E	Transport
Group F	Electronic Equipment including Communications and Radar
Group G	Scientific Instruments and Apparatus, Servomechanisms and Photographic Equipment
Group H	Metals, Minerals and Metal Manufactures
Group I	Chemicals, Plastics and Synthetic Rubbers
Group J	Petroleum Products, Lubricant and Hydraulic Fluids
Group K	Arms, Munitions, Military Equipment and Machinery etc. Specially designed for their Production

Changing the controls

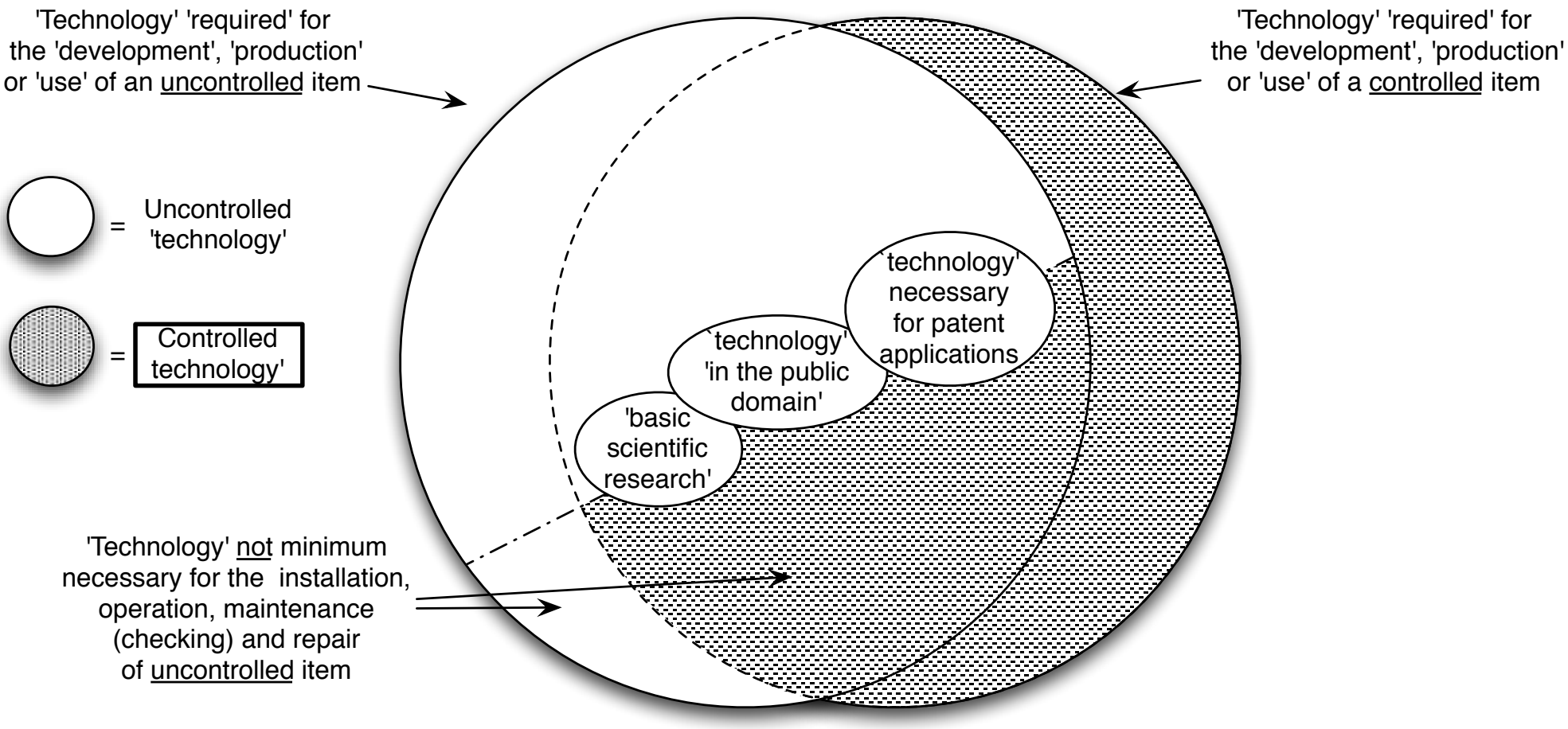
- States shifted to a knowledge economy
- Need to more specifically define controlled versus uncontrolled knowledge
- Changes made, in part, through deliberation with industry, academia, elected officials, and public

Problems with the technical border

- The Wassenaar Arrangement Lists

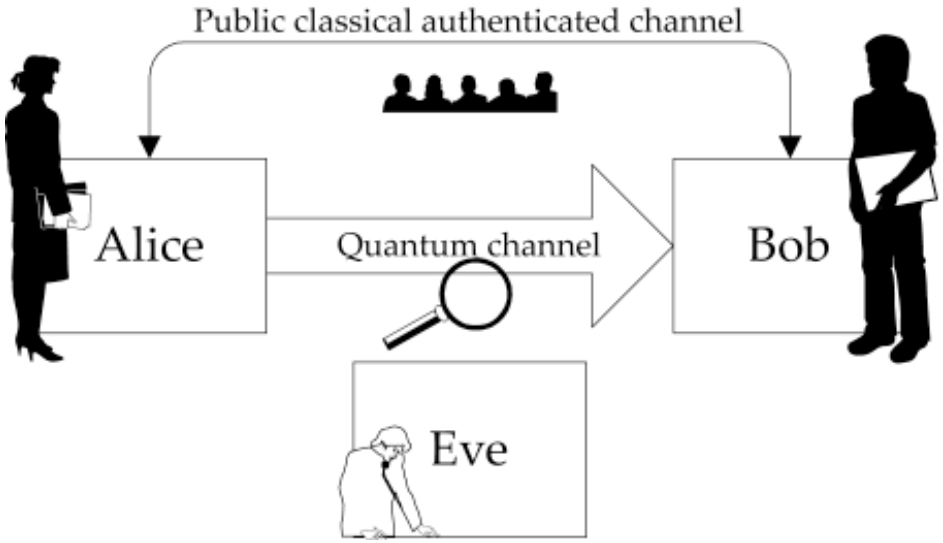
Category 1 – Advanced Materials
Category 2 – Materials Processing
Category 3 – Electronics
Category 4 – Computers
Category 5 – Part 1 – Telecommunications
Category 5 – Part 2 – “Information Security”
Category 6 – Sensors and “Lasers”
Category 7 – Navigation and Avionics
Category 8 – Marine
Category 9 – Aerospace and Propulsion

A – Systems, Equipment, and Components
B – Test, Inspection, and Production Equipment
C – Materials
D – Software
E – Technology



How export controls imagine intangible technology

definition created through collaboration



5. A. 2. a. 9. Designed or modified to use "quantum cryptography".
Technical Note
"Quantum cryptography" is also known as quantum key distribution (QKD).

Wassenaar control text

Quantum cryptography

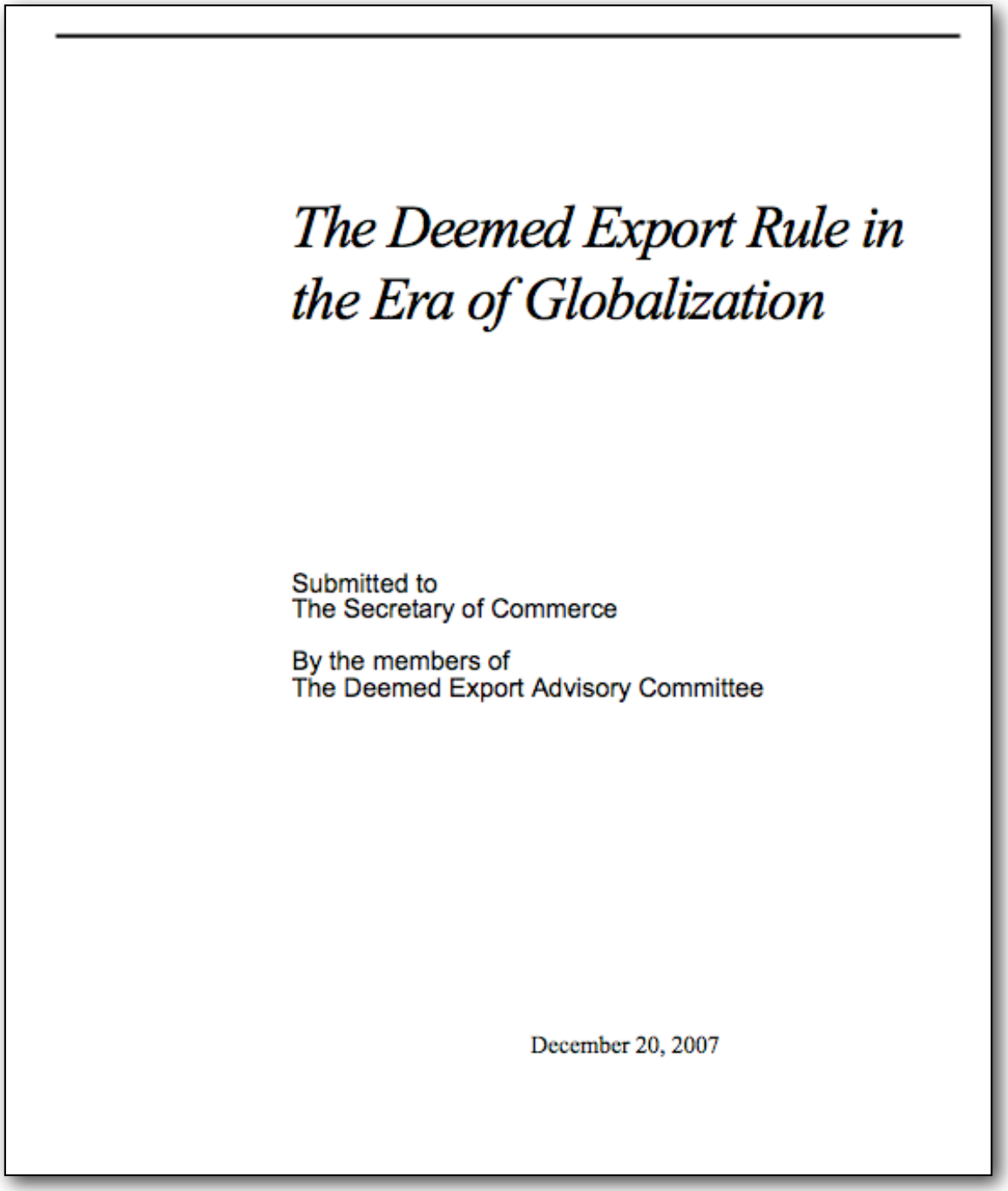
Difficult to define without giving it away

Subjectivity of controls

- Subjectivity is obvious to STS researchers and those involved in the process
- Public rhetoric claims controls are objective
- There are mechanisms to engage the public in shaping export controls

Deemed Exports

- Proposed control change seen to infringe on right to openness for basic scientific research
- DEAC made of industry and academic representatives
- Emerging Technology Research Advisory Committee is successor



The Deemed Export Rule in the Era of Globalization

Submitted to
The Secretary of Commerce

By the members of
The Deemed Export Advisory Committee

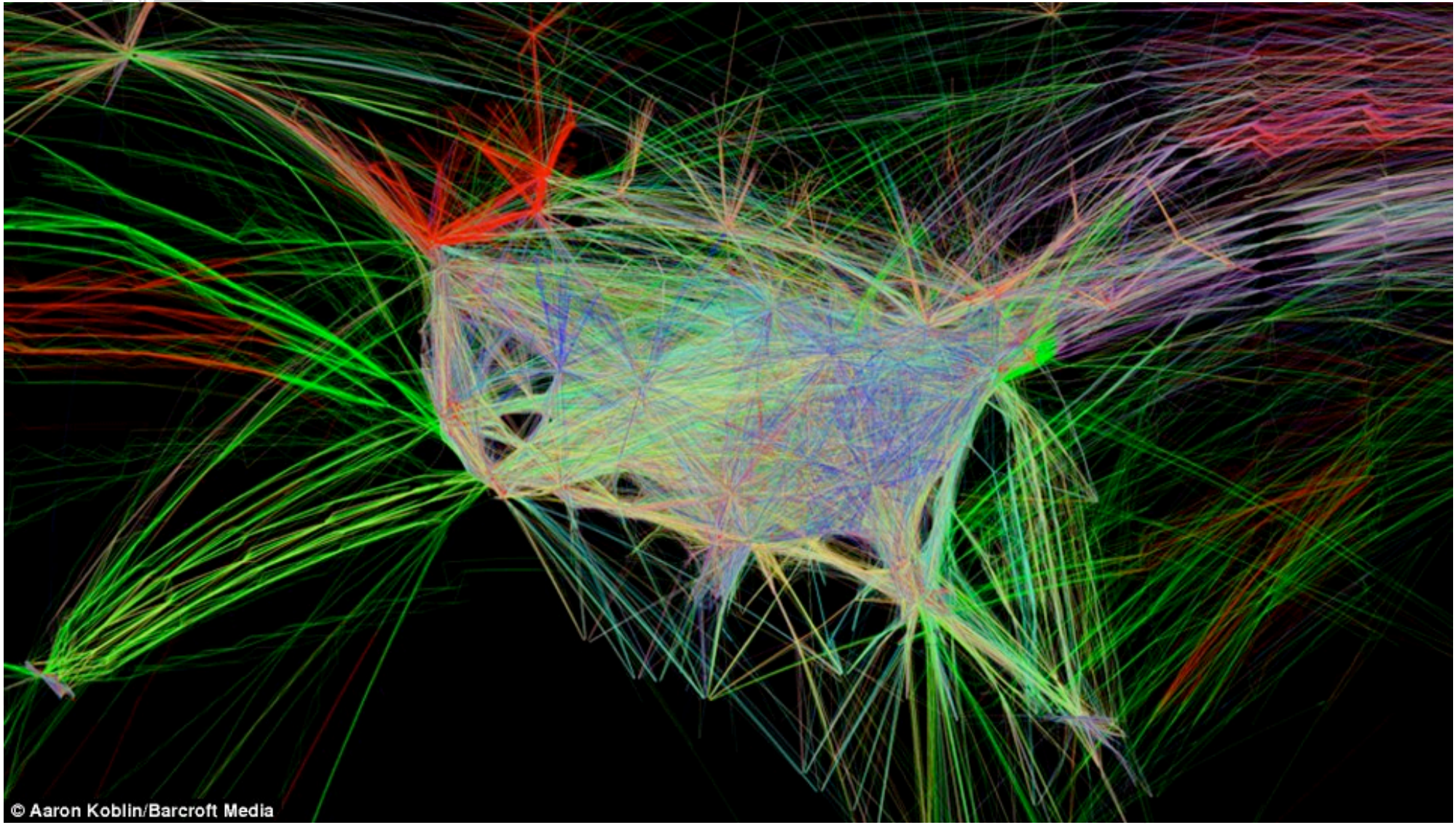
December 20, 2007

Export controls only control intangible technology that is tied to tangible technology

- Except for encryption

Why do export controls not control most militarily significant cyber-technology?

- Much discussion about other controls after encryption debate
- And yet none put in place
- A reason why: The technical border crosses political borders



The shifting political border of export controls

Airports, seaports, computer ports

How export controls imagine the state in cyberspace

An archipelago

The bifurcation of technology across political borders

- Location on political map depends on:
  - geographic location
  - cyber location
  - who is accessing it

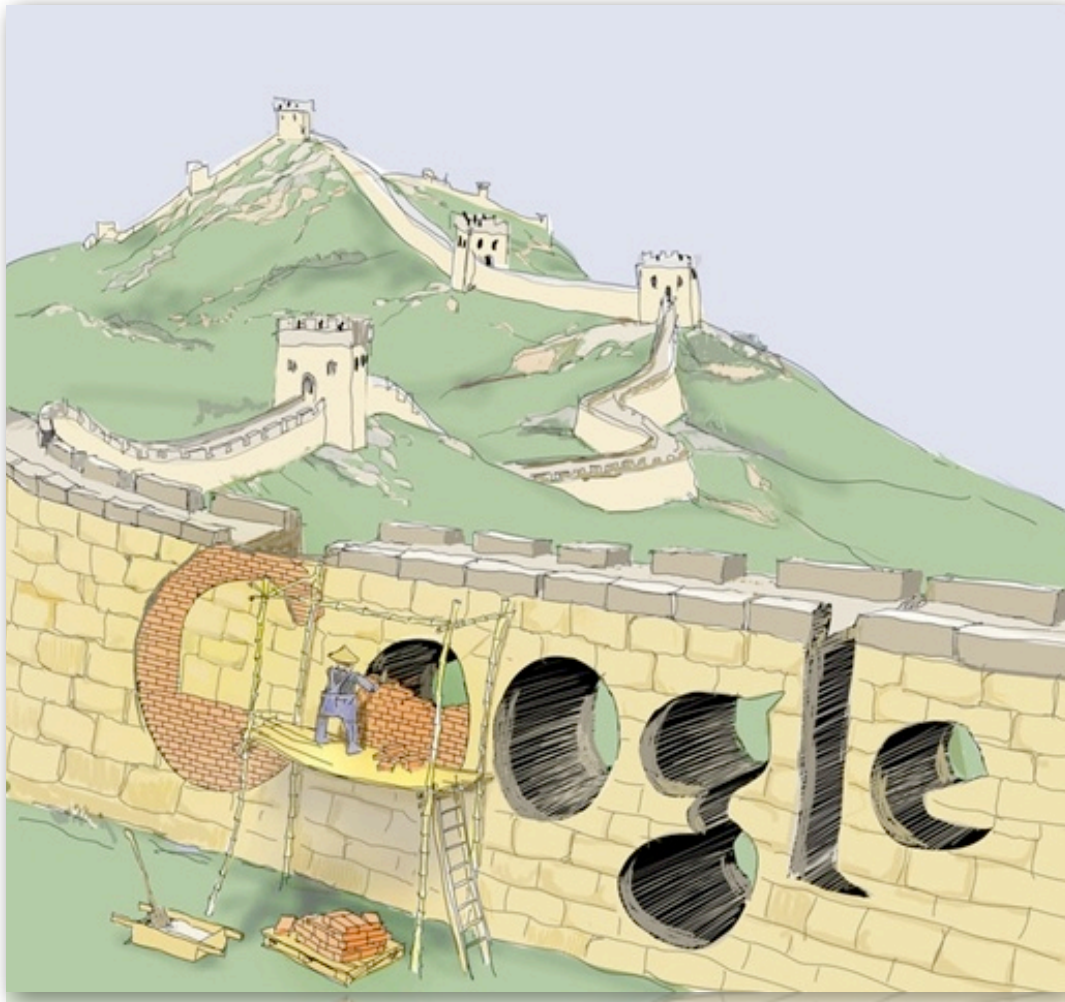
- Technology can be both within and outside a state at the same time

- Law is still nebulous on how to deal with this

- What counts as “objective” controls is what is agreed to by government, industry, academia, and the wider public

Borders are socially constructed and always subjective

- China example
- “Free expression” is defined differently
- Government has much more control over content and distribution



Illustrator: Riber Hansson

How might controls continue to develop in cyberspace?

- Control large government sponsored cyber-munitions
- Must be international
- Will likely have limited, but valuable, applicability
  - Work more closely with law enforcement and intelligence agencies
  - Provide publicly accountable control mechanisms

Export controls are a tool of democratic, rather than objective, governance of militarily significant technology

Questions and discussion

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