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Application of "Catch-All" Controls to Emerging Technologies

27th Asian Export Control Seminar
Tokyo

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Scope

- UK “Catch-All” (End-Use) Controls
- Nature of Emerging Technologies
- “Catch-All” Controls and Emerging Technologies
- Conclusion

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Introduction to UK Catch-All (End-Use) Controls

The UK Catch-All control was based around European legislation (Council Regulation (EC) 428/2009) which has now been incorporated into UK Legislation is supplemented by national legislation (UK's Export Control Order 2008) and The UK End-Use controls based on exporters being:

- …"aware"…;
- …"having grounds for suspicion"… or
- …"informed"…

That the export of goods, transfers of software or technology (including by electronic means) from the UK **may be intended**, in its entirety or in part for **use in connection with WMD purposes** and otherwise would not be subject to control. Taking into account the **need to balance legitimate trade** with exports that raise **security concerns**.

Extensive use of this control in the UK

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The Reasons for Catch-All Controls

Impracticality of place everything need in a programme of concern on to a control list as much of this items will be basic engineering tools, equipment or commonly used engineering materials.

Nearly all controlled items are made from non-controlled materials, components or are based on basic fundamental knowledge.

Placing specific items on a Multilateral Export Control Regime (MECR) control list takes time and is often a complex process, especially for “emerging technologies”.

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Nature of Emerging Technologies

Emerging technologies are technologies whose development, practical applications, or both are still largely unrealized, such that they are figuratively emerging into prominence from a background of **non-existence** or **obscurity**.

Wikipedia Entry

- "Non-existence" – Being discovered or developed from basic research or concept.
- "Obscurity" – Developed from an old idea or concept that was unfeasible previously for technical or other reason.

"Basic scientific research"
Experimental or theoretical work undertaken principally to acquire new knowledge of the fundamental principles of phenomena or observable facts, not primarily directed towards a specific practical aim or objective.

MTCR Definition

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Emerging Technologies and adding them to Control

Basic Scientific Research ≠ Basic Technical Research

…also called *pure research* or *fundamental research*, has the scientific research aim to improve scientific theories for improved understanding or prediction of natural or other phenomena…

Basically to add to the sum of human knowledge…

… also called *applied research* is the practical application of science. It accesses and uses accumulated theories, knowledge, methods, and techniques, for a specific, state-, business-, or client-driven purpose.

Basically to solve a practical problem…

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Emerging Technologies and adding them to Control

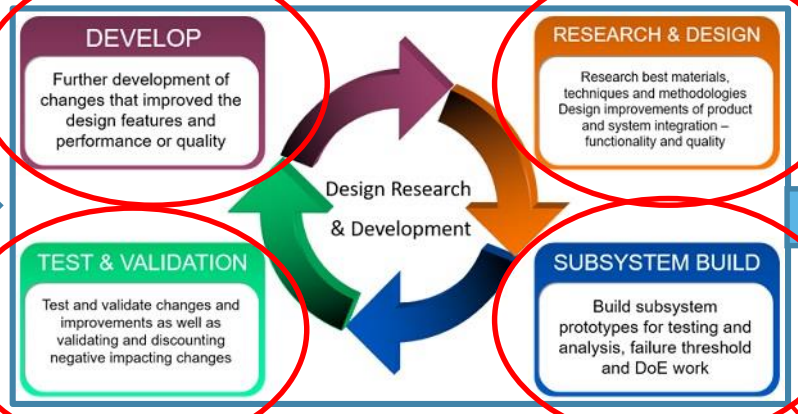
Is it “Scientific” or “Technical”?

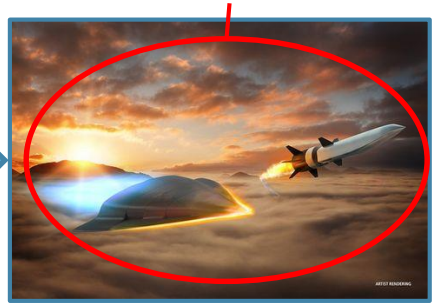
Add to Control List at this point?

Add to Control List here?

Add to Control List when its proven and in operation?

Basic ????? Research





If its “technical” can we add to the Control List?

Add to Control List at this point?

Or here?

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Emerging Technologies and adding them to Control

6.C.1. Resin impregnated fibre prepregs and metal coated fibre preforms, for the goods specified in 6.A.1., made either with organic matrix or metal matrix utilising fibrous or filamentary reinforcements having a specific tensile strength greater than 7.62×10^4 m and a specific modulus greater than 3.18×10^6 m.

Note:

The only resin impregnated fibre prepregs specified in 6.C.1. are those using resins with a glass transition temperature (Tg), after cure, exceeding 145°C as determined by ASTM D4065 or national equivalents.

Technical Notes:

1. In Item 6.C.1. 'specific tensile strength' is the ultimate tensile strength in N/m^2 divided by the specific weight in N/m^3, measured at a temperature of (296 ± 2)K ((23 ± 2)°C) and a relative humidity of (50 ± 5)%.

2. In Item 6.C.1. 'specific modulus' is the Young's modulus in N/m^2 divided by the specific weight in N/m^3, measured at a temperature of (296 ± 2)K ((23 ± 2)°C) and a relative humidity of (50 ± 5)%.

Do we have a suitable description of the goods?

Do we have a suitable technical parameter?

Do we have a suitable values?

Are there relevant technical standards?

Many emerging technologies won't have these and therefore limits the regime's ability to develop and agree suitable control text…

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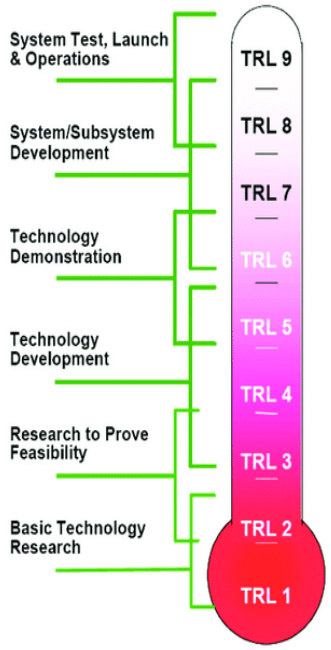
Catch-All and Emerging Technologies

TRL 9-6
Regimes Agree Control Text
(Added to List)

TRL 6-4
Technical Discussion Leading to Agreement
(Proposals)

TRL 1- 4
Regimes Start Technical Discussion
(Non-Papers)



Actual system "flight proven" through successful mission operations

Actual system completed and "flight qualified" through test and demonstration (Ground or Flight)

System prototype demonstration in a space environment

System/subsystem model or prototype demonstration in a relevant environment (Ground or Space)

Component and/or breadboard validation in relevant environment

Component and/or breadboard validation in laboratory environment

Analytical and experimental critical function and/or characteristic proof-of-concept

Technology concept and/or application formulated

Basic principles observed and reported

MECR Control possible through agreement in technical experts

MECR Control difficult as due to lack of agreed technical standards

MECR Control unlikely as possible "basic scientific research"

MECR Process + Technology Readiness Levels (TRL)

The Technology Readiness Level (TRL) scale was developed during the 1970-80's. The NASA introduced the scale as a discipline-independent, program figure of merit (FOM) to allow more effective assessment of the maturity of new technologies.

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Catch-All and Emerging Technologies

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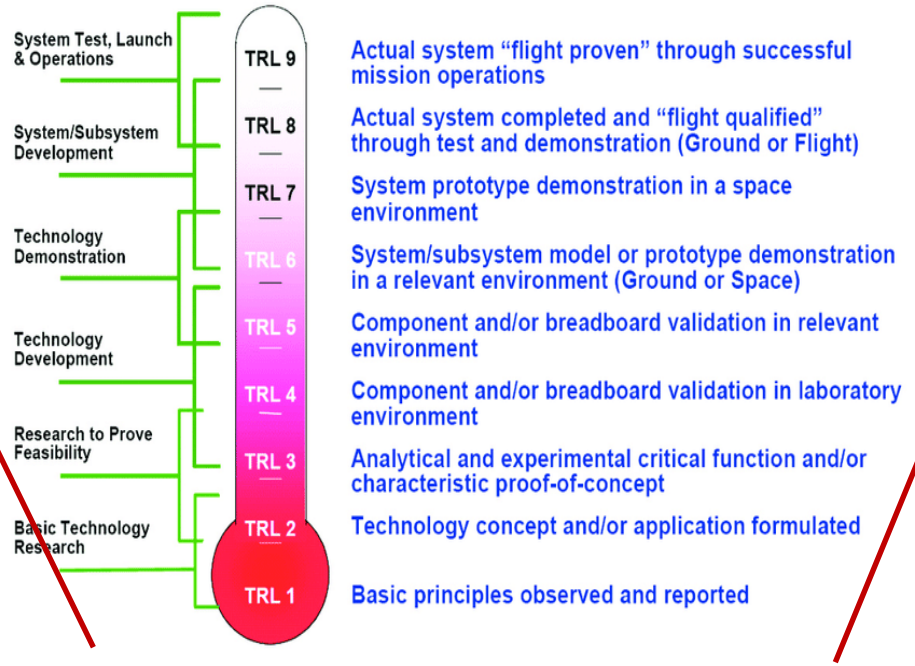

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"Catch-All" Controls could be applied

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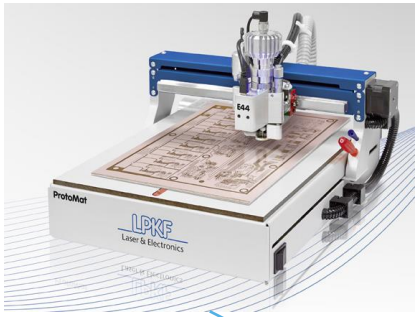
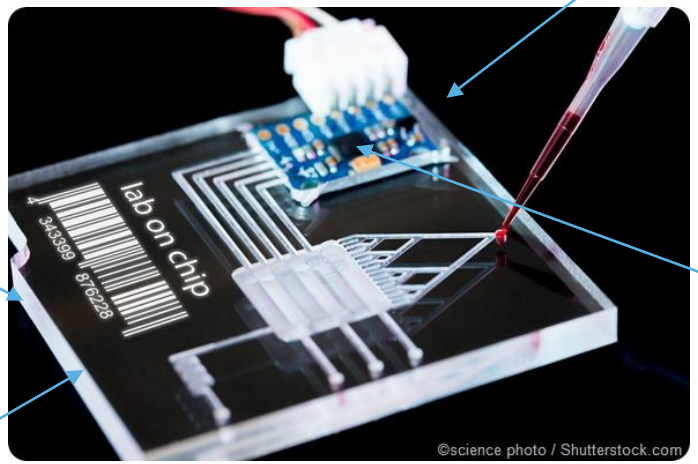
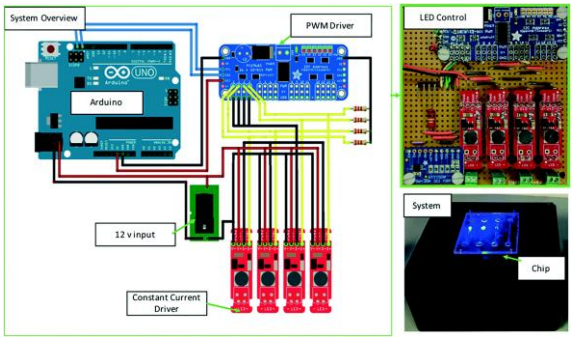
Examples

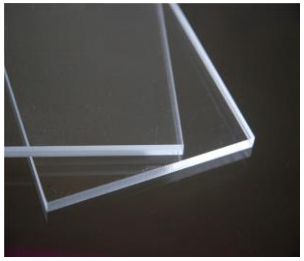


Example - Printed Circuit Board (PCB) CNC Drill & Milling Machine
Application - fabrication in PMMA of mesofluidic channels



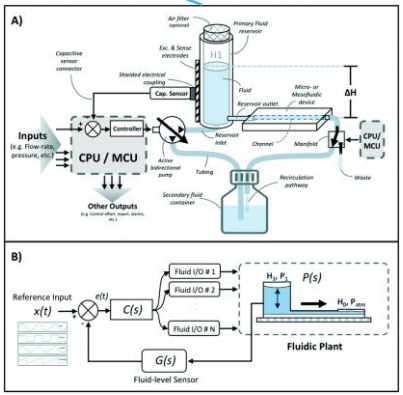


Example - Ardunio Hobbyist/ Prototyping Electronics
Application – control electronics



Example - PMMA plastic sheet
Application – base material for mesofluidic channels.

Example - Commercial process simulation software
Application – develop process control firmware



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Conclusion

“Catch-all” controls are a vital tool for controlling the myriad of non-controlled items and technology that are required in proliferation programmes of concern.

Potentially catch-all controls will be an increasingly useful tool in respect to controlling sensitive emerging technologies that are either not mature enough or lack relevant agreed international technical standards to enable them to be added to the relevant MECR control list in a timely manner.

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