Department for Transport

UK Space Industry Bill

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UK Department for Transport

ICAO/UNOOSA Aerospace Symposium – Aug 2017

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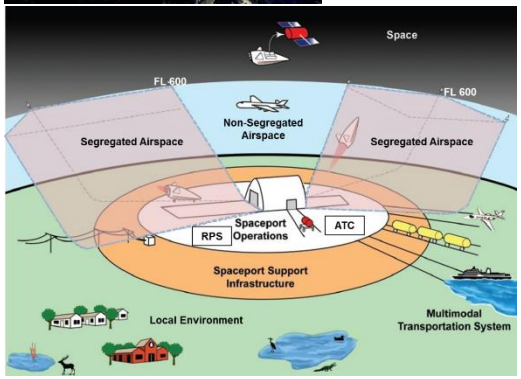
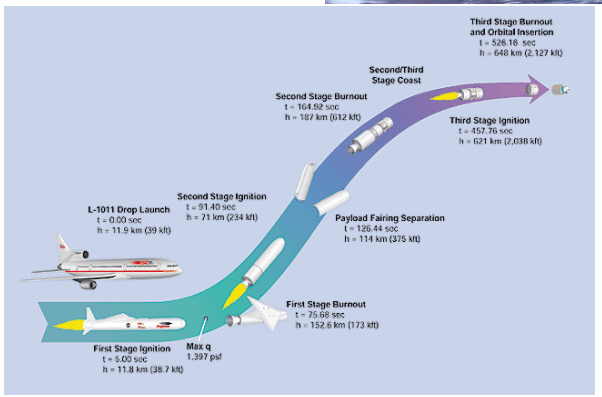
Types of Commercial Spaceflight



sub-orbital Spaceplanes



‘horizontal’ launch

vertical launch

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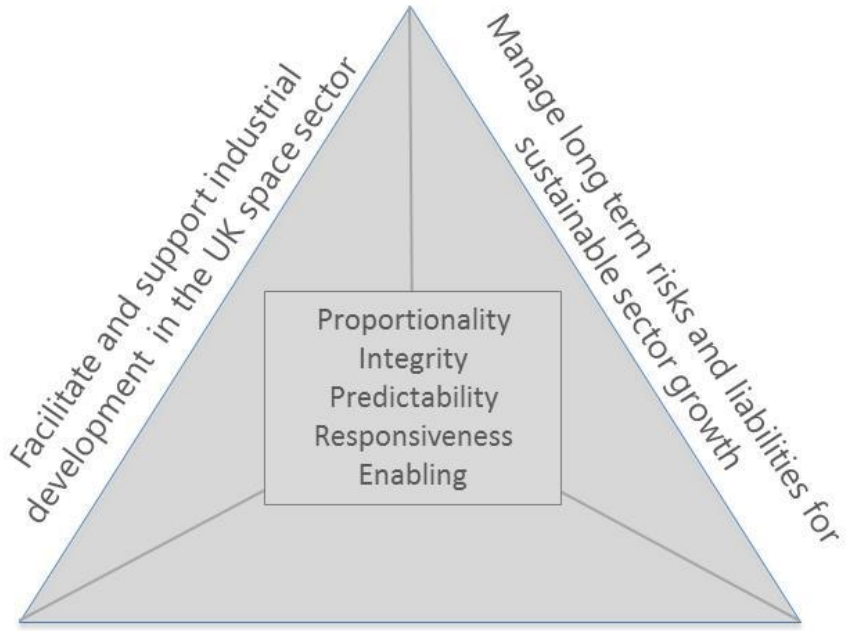
Our regulatory ethos

Our objectives and principles



Our approach

We will:

1. balance risk appropriately amongst our three objectives
2. be joined up, providing a single entry portal and one license for each activity
3. make policy in an open and transparent way, in partnership with our stakeholders

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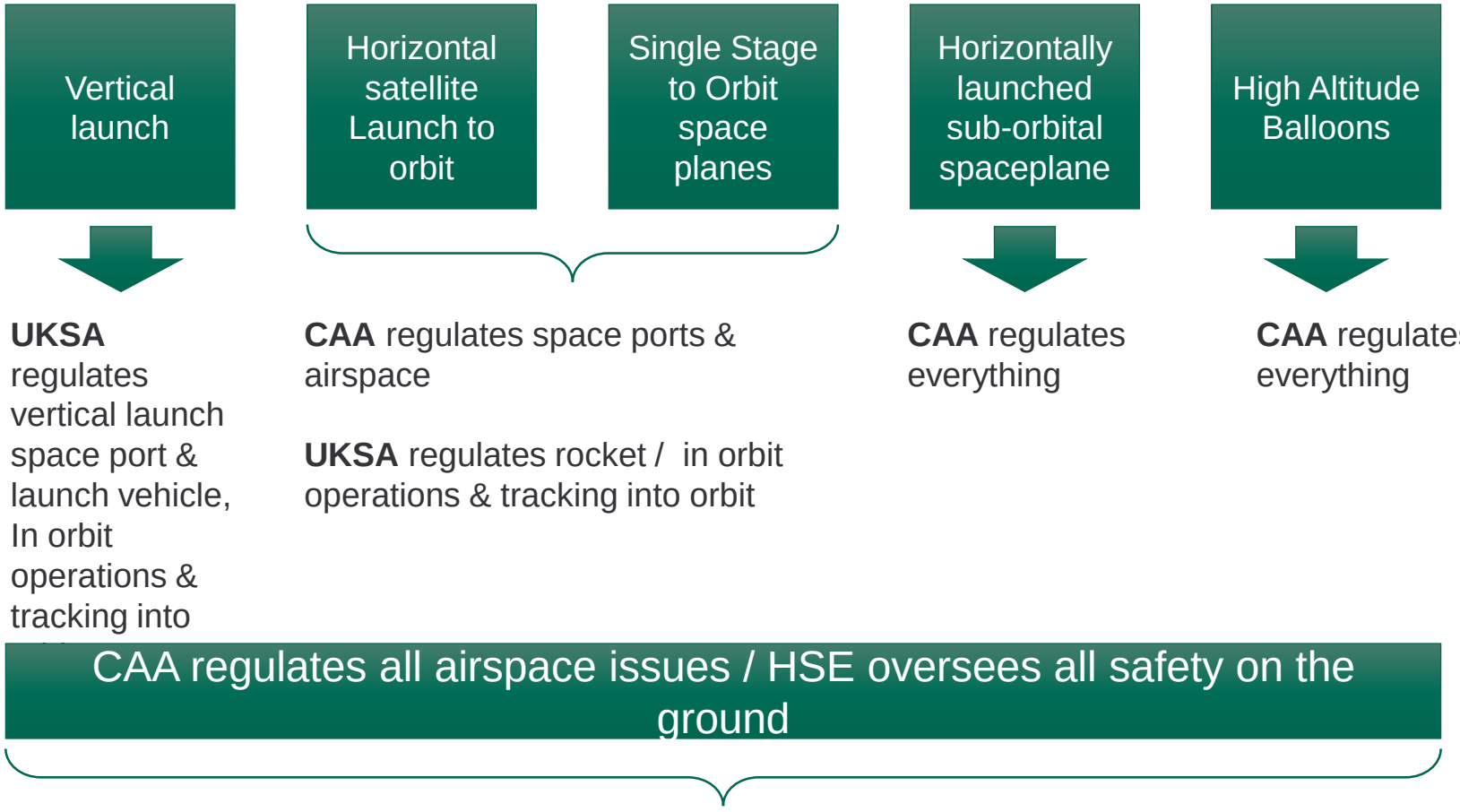
Categories of Regulated Operations



Single portal to access all regulatory functions

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What is in the Space Industry Bill?

Regulations Definitions, duties, prohibitions	**Range** Definitions, services, licensing	**Operator licenses** Operators, spaceports, T&Cs	**Delegation** Appointment of other regulators
Participants & staff Consent, fitness, qualifications/training	**Safety** Safety regulations, accidents, assistance	**Security** Exemptions, byelaws, assistance	**Enforcement** Compliance, directions, powers
Liabilities Indemnities, insurance	**Land powers** Rights, restrictions, displacement	**Sanctions** Offences, penalties, defences, sanctions	**Appeals** Panel, rights, circumstances
	Miscellaneous Charging, advice, other countries	**General** Amendments, interpretation, commencement	

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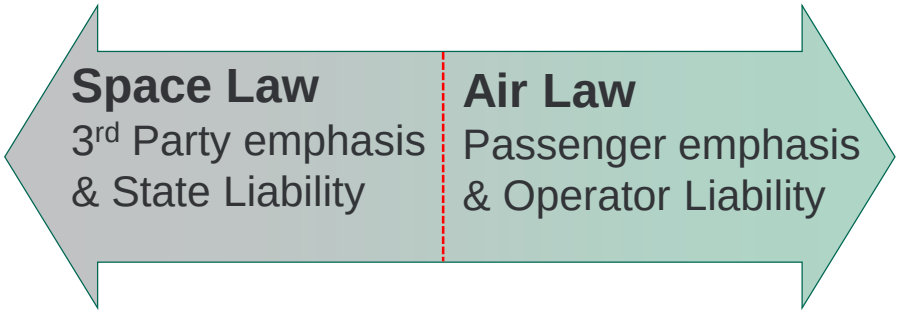
Key Issues

Liabilities



Space Industry Bill

- Operator liability with powers to cap
- Operators insured / Government indemnity
- Emphasis on 3rd party safety
- Participants & Crew - Informed consent
- New, capped UK liability

Security

- Extends current Civil Aviation security powers to space planes and space ports (tailored to reflect sensitivity / lower risk for unmanned launch)
- Includes provision for flight termination but not initially for space planes
- Nuclear payloads prohibited

Safety

- Safety is paramount – will follow HSE approach to reduce risk to "As Low As Reasonably Prac
- Licensing of individual events – certification likely to be some years away
- Risk assessments driven by risk to General Public
- Health & Safety Laboratory currently assessing risk methodologies for secondary legislation

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CAA & UKSA Regulatory Approach

- Safety of the uninvolved general public is our primary concern
- Will take a pragmatic, risk based approach; proportionate and relevant rather than overly prescriptive
- Regulation will take account of licences issued by other nations
- Will use existing requirements/standards and guidance material where available and applicable
- **Will work with industry to ensure regulations are proportionate and do not stifle development**

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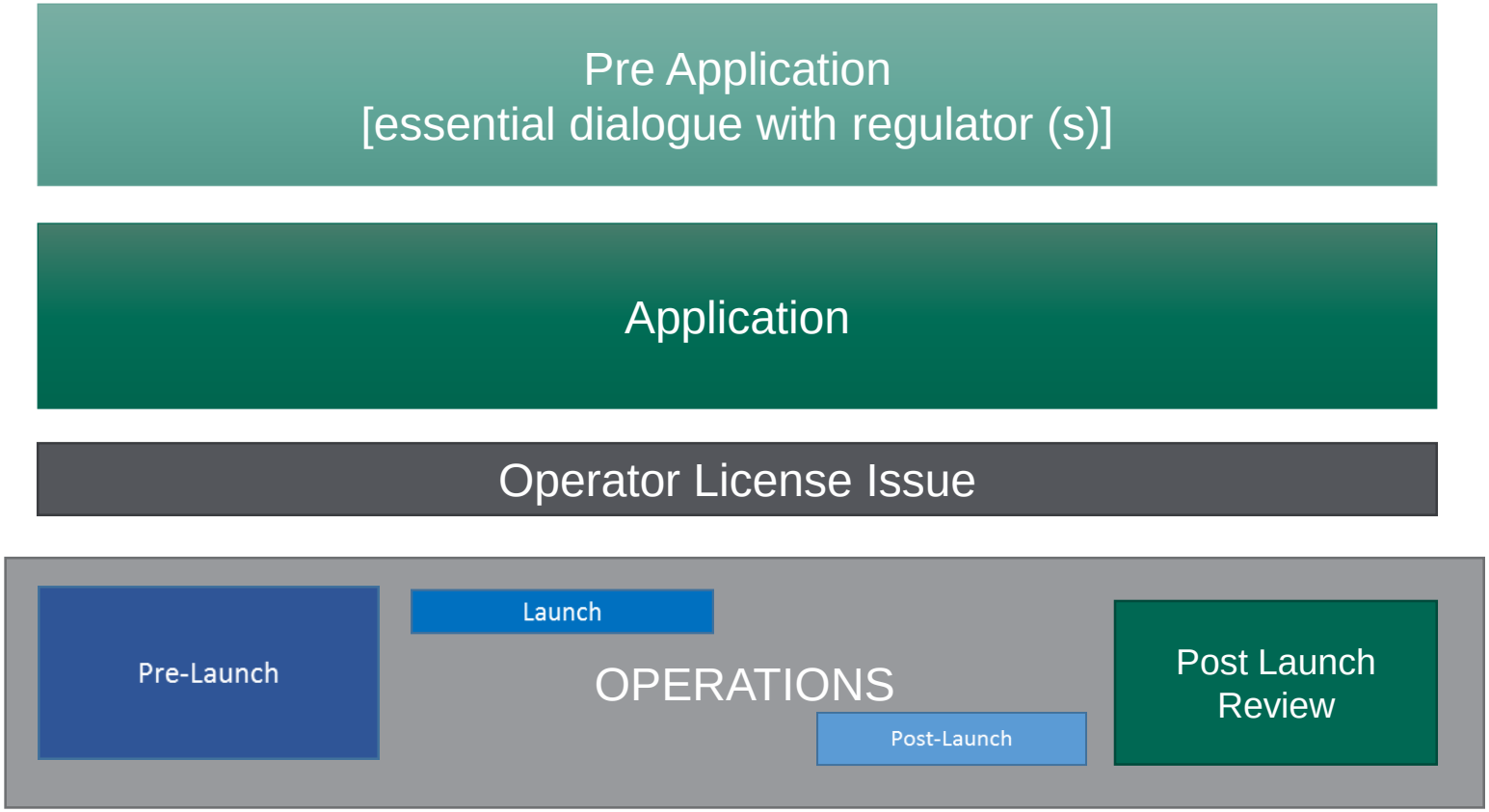
Licensing Process



Regulation Reform Programme - Overview

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Phase 1 – (Primary Legislation)

- Space Industry Bill
- Explanatory Notes
- Policy Scoping Notes
- Impact Assessment

Phase 2 – Secondary Legislation

- 6 Statutory Instruments
- 2 Stakeholder Engagement Phases (Autumn 17 / Autumn 18
- Impact Assessments
- Detailed Guidance
- Operational Process & MoU's with CAA & HSE

Phase 3 – Capability Development & Operations

- Current Licensing (incl Megaconstellations & EO)
- Skills Identification & recruitment
- Future Licensing, Compliance, Enforcement (spaceport, launch, range)
- Portal Development
- Risk Tool Development
- Space Traffic Mgmt Development & Defence Collaboration (Tracking & Launch)
- Critical National Infrastructure Assessment

June 2016 June 2017 June 2018 June 2019 June 2020

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Airspace

- It is currently planned that all spaceplane launches and the recovery of unpowered vehicles should take place within segregated airspace
  - To ensure the safety of all airspace users
  - To ensure the safety and integrity of the spaceplane operation
- The UK has existing segregated airspace that may potentially be used for sub-orbital flights

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Airspace Management

- The ASM **objective** is to achieve the most efficient use of the airspace
- Whatever the airspace solution it must be integrated with existing ASM structures and procedures to:
  - ensure the integrity of the system
  - and manage the impact on the air traffic network and other airspace users
  - Flexible use of airspace

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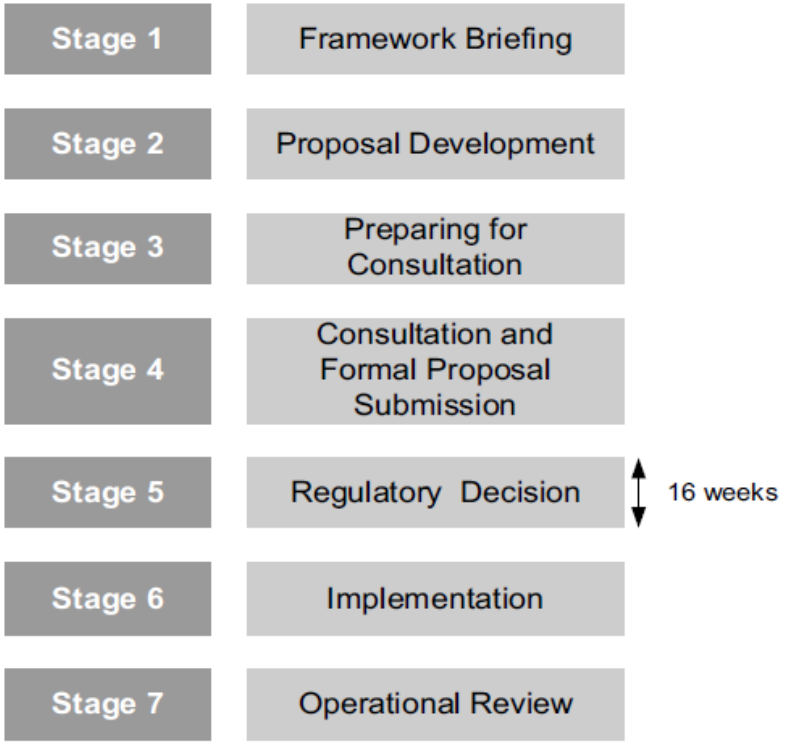
Airspace change proposal

- For a permanent operation it is likely that the sponsor will be required to submit an airspace change proposal (ACP)
- An ACP is necessary to support changes to the dimensions, classification or use of UK airspace
- Airspace change process is defined in CAP 725 CAA Guidance on the Application of the Airspace Change Process



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Sub Orbital Spaceplanes

- Sub- orbital spaceplanes have many similarities to conventional aircraft . However they have many unique aspects, eg:
  - they have rocket propulsion.
  - They fly on parabolic flight path to altitudes where conventional aircraft flight control systems do not function, so they use reaction control systems
  - Some take – off from the ground, some are air launched
  - Current designs are supersonic (Mach3+)
  - Flight profiles result in higher ‘G’ loading than normal air transport.
  - They land from a glide approach.
  - Some designs have skids rather than nose wheels
  - Current designs have limited bad weather capability
  - Maybe manned or unmanned

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Sub-Orbital Spaceplane?

- The CAA needs to be able to assess the design and development of the sub-orbital spaceplane as early as possible.

- Is the sub-orbital spaceplane already in service elsewhere, is it built but not yet in service or is it new design? The following is the proposed approach from the CAA:

  - If already in service the CAA would require a system safety assessment for the design together with access to current and historical safety performance data. (This is similar to FAA AST).
  - If built but not yet in service the CAA would require a design review and system safety assessment for the design together with access to the flight test programme.
  - If new, the CAA would require oversight of the design, development and production of the sub-orbital spaceplane. We would encourage the use of aviation standards/space standards where available and appropriate.

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Carrier Aircraft for Orbital Launch

- Carrier aircraft may be used for the launch of sub-orbital rockets, spaceplanes or for orbital launch. There are many options:
  - They may be current aircraft (military or civil) that have not been modified in any way.
  - They may be current aircraft (military or civil) that have been modified for the purpose.
  - They may be bespoke aircraft that have been specifically designed for this purpose.
- Any modification may invalidate the aircraft's type certificate and as a result will not be able to hold a current certificate of airworthiness.

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Emerging Regulatory Requirements (Carrier Aircraft)

- Regardless of which type of aircraft is used or where it is registered it is anticipated that the CAA will require oversight of the aircraft and its operation in the UK (This will also be a pre-requisite for the issue of an orbital launch licence).
- If the aircraft is unmodified then the CAA would expect it to be operated under normal aviation regulation.
- For a UK registered aircraft that has been modified for the purpose then we would expect it to be classified under Annex 2 of the EASA Basic Regulation and therefore operated under UK national regulation.
- If the aircraft has no C of A then the operation of the aircraft would be subject to a CAA permission which would have conditions attached. (Regardless of the State of Registry).