

# Perspectives on private and institutional human spaceflight

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# Overview

- Institutional spaceflight
- Commercial spaceflight and future space exploration
- Space Industry Act 2018
- The role of international agreements

# UK Space Agency

- Co-ordinate UK civil space activity
- Encourage academic research
- Support the UK space industry
- Raise the profile of UK space activities at home and abroad
- Increase understanding of space science and its practical benefits
- Inspire our next generation of UK scientists and engineers
- License the launch and operation of UK spacecraft
- Promote co-operation and participation in the European Space programme



# Institutional Spaceflight

- Role of the astronaut / cosmonaut / taikonaut / vyomanaut etc...
  - Specific tasks have evolved
  - But fundamental *purpose* remains...
    - Scientific discovery
    - Exploration
    - ‘Public relations’ (AKA ‘inspiration’ AKA ‘outreach’ etc)
- The emphasis between these might change – but essentially this is what these people who train to fly into space are there to do

# Institutional Spaceflight

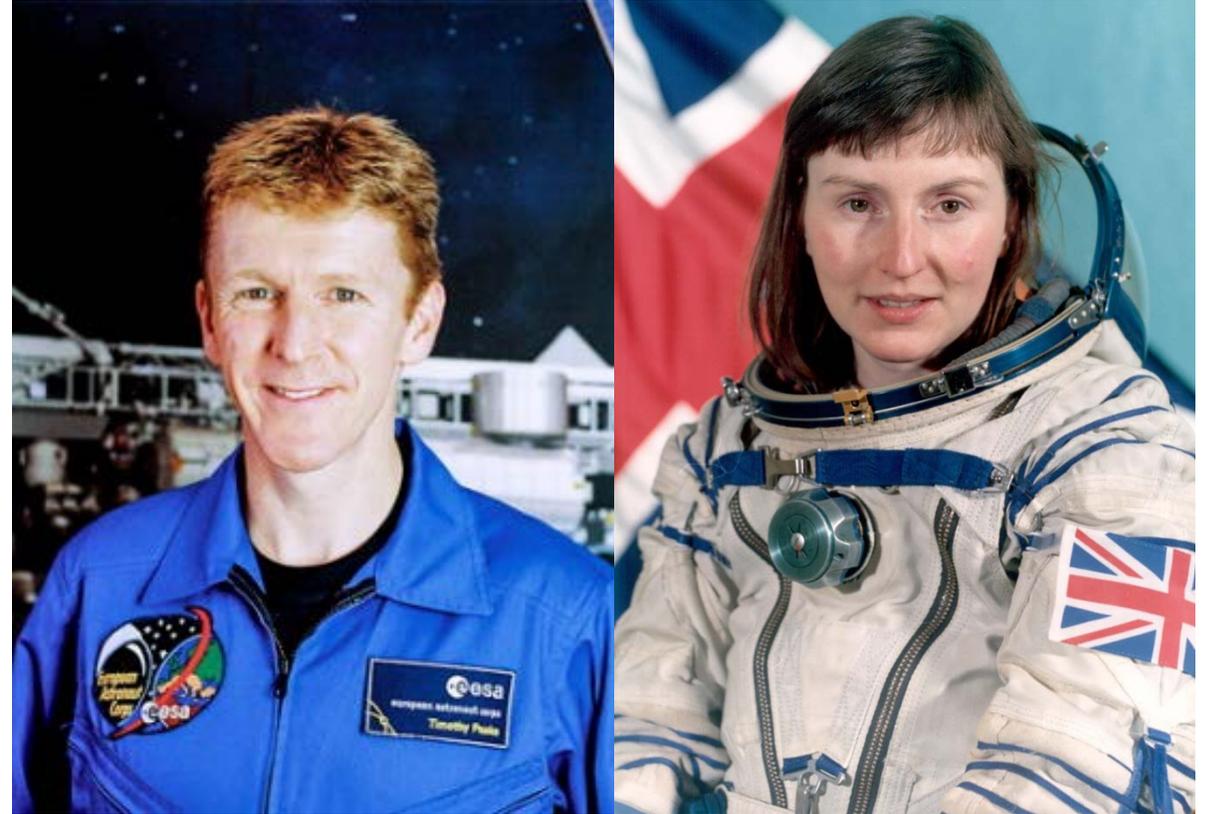
- Fundamental objectives remain – e.g. *National Strategy for Space Environments and Human Spaceflight* goals (abridged):
  - Science and technology
  - Education
  - Collaboration
  - Industry
  - Commercial human spaceflight



# Institutional Spaceflight

- UK invests in human spaceflight through participation in relevant ESA programmes
  - *First UK astronaut Helen Sharman – not govt funded*
  - *First UK ESA astronaut Tim Peake*

...and will continue to invest

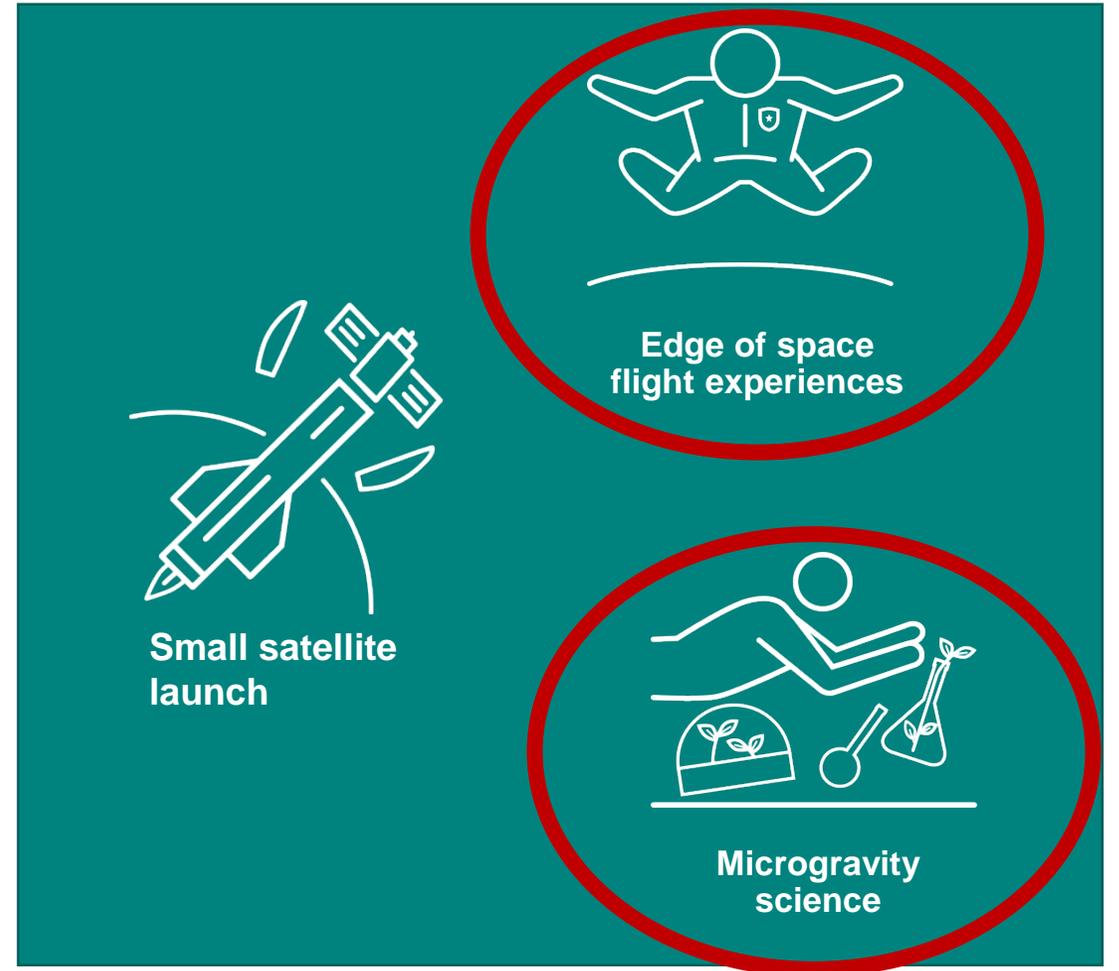


# Institutional Spaceflight

- Various degrees of commercial models currently within purview of institutional programmes
  - ESA 'Partners for space Exploration'
  - CASIS; COTS; CCDev etc
  - *Catapult* model in UK
- In this changing landscape, 'personnel of a spacecraft' (per *Rescue Agreement* 1968) seems an entirely appropriate description for all those we would expect to be travelling into space under the auspices of such programmes

# Commercial Spaceflight

- The categories of person travelling into space are significantly broadened under new commercial models
- The UK's commercial spaceflight programme is oriented to three markets:
  - small satellite launch;
  - microgravity research;
  - space 'tourism'



# Commercial Spaceflight

- Significant potential for growth
- Science and exploration-driven missions, however, continue to be institutionally led



Small satellite launch



Edge of space flight experiences



Microgravity science

# Commercial Spaceflight

- Growth of commercial spaceflight requires changing – or arguably expanding – role of space agencies and the state
  - Harnessing **complementarity** between these approaches
  - Focussing on **strategic objectives**, however they are delivered
  - **Regulation and oversight** critical to safe and sustainable development

# The Space Industry Act



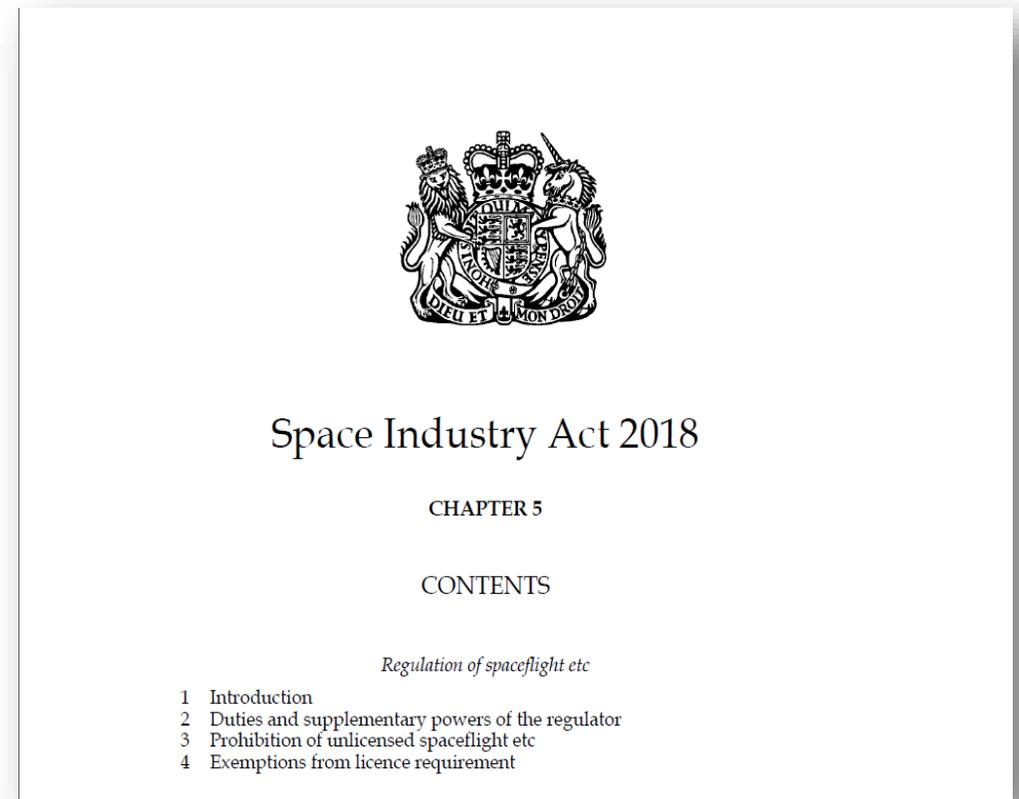
- **The Space Industry Act** received Royal Assent on 15 March.
- It's a major milestone in establishing the environment for **safe, responsible** and **commercial operations** from UK spaceports.
- The result of collaboration across UK Government Departments.
- **Safety** of the uninjured general public is at the **heart of this Act**.
- The Act's provisions also ensure that spaceflight activity taking place from the UK space is done so in compliance with the **UN space treaties**.



# The Space Industry Act



- The Act is designed to provide a high-level enabling framework for commercial spaceflight operations.
- Provides a comprehensive regime in one place.
- Draws on existing space and aviation regulation.
- Act contains a number of delegated powers to make secondary legislation.
- Secondary legislation is more flexible and can be adapted to keep pace with the development with this emerging market.



# The Space Industry Act



- The Act follows the Outer Space Act 1986 definition of *space object*
- The Act does not define astronaut – or any other individuals on board a spacecraft
- Section 9 (9):

*For the purposes of this Act, taking part in spaceflight activities includes being carried in a spacecraft or carrier aircraft without being involved in the operation of it.*



## Space Industry Act 2018

CHAPTER 5

CONTENTS

*Regulation of spaceflight etc*

- 1 Introduction
- 2 Duties and supplementary powers of the regulator
- 3 Prohibition of unlicensed spaceflight etc
- 4 Exemptions from licence requirement

# International Agreements

- The *Rescue Agreement* is a good example of an international agreement whose drafting has preserved its relevance
- The general principle holds – and should continue to hold in an age of commercial spaceflight and private astronauts or other individuals visiting space
- However... potential ambiguity over whether e.g. visiting scientists or private citizens are covered under terms of the *Rescue Agreement*, or simply under terms of ordinary humanitarian considerations
  - ...ultimately – who bears the costs?
- This question might become more acute when the individuals concerned are private citizens – whether we deem them ‘astronauts’ or not

# International Agreements

- Tension could arise where private actors want to have their cake (e.g. freedom to launch as and when required with minimal state oversight) and eat it (e.g. leaving international obligations wholly to the state)
- Sensible, proportionate regulation at a *national* level, developed in collaboration with industry, might ameliorate this

- The challenge for government is to enable this new sector whilst retaining sufficient oversight
- UN Treaties are invaluable for consistency and mutual understanding in a global and dynamic field – but review in light of a changing world is necessary
- National legislation must also reflect this whilst enabling new operating models

# Questions?

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