

### SPACE POLICY AND LAW COURSE 2018

#### CASE STUDY 2: UK LAUNCH

The UK has announced (2017) an intention to grow a capability to launch satellites into orbit from the UK, as part of a bigger effort to grow the size of the UK Space Economy. The launch proposals envisage both vertical and horizontal launch.

1. What orbital regimes are likely to be reachable from the UK? What constrains this? Is the resulting capability a 'good fit' for the rest of the UK space economy?
2. What existing activity might be impacted by establishment of a launch capability? (probably easiest to consider vertical and horizontal launch separately here...)
3. What existing legal agreements must the UK Government take into account in promoting the establishment of such a facility?

#### Solutions and discussion

1. Geography, specifically the need to allow a safe area to guard against mishap on launch will probably constrain UK launch activity to northerly launch tracks (even these constrained by the Faeroes and by Iceland). So polar orbits (favoured for earth observation) should be achievable. (NB that 'sun-synchronous' orbits are very slightly retrograde (96 degrees inclination is typical for LEO). GEO is inherently unreachable from the UK, certainly commercially (will never compete with equatorial sites). Launcher size scales with the satellite being launched, so UK leadership in small satellites certainly less constraining than larger payloads.
2. Lots! For vertical launch, constraints include range safety and security, environmental impact, integration with maritime activity and aviation (civil and military), weather constraints, terrestrial logistics/communication links (need to deliver and store fuel, launchers and payloads to/at the site). In principle, horizontal launch less constraining. Air launch from aircraft would need integration with existing air traffic, and some safety/security limits at the spaceport – I suggest it wouldn't sit comfortably at a major civil airport from now. Air launch technology less mature than vertical launch, though not unknown. True horizontal launch to space (space-planes) still some way off, though keep watching Reaction Engines!
3. OST/Registration convention/Launch state responsibilities are obvious. Remember RF spectrum issues (ITU). Consider ITAR if working with the USA, and MCTR in any case.