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- The UN Treaties relating to space activities address the international obligations and liabilities of States Party to those Treaties.
- In most States responsibility for the conduct and regulation of space activities and for the sources of funding were often fragmented with a number of different bodies being involved. The tendency, as the nature of space activities and the space industry have evolved, has been for States to establish space agencies to coordinate the funding and oversight of civil space activities. (Control of military space activities usually remains with the military authorities.)
- Some of the leading space nations realised the importance of coordinating their space activities in this way at an early stage of development of space activities. Now most leading States engaged in space activities have a coordinating space agency or its equivalent.

Some Leading National Space Agencies

		<u>Established</u>
▪ USSR	CCCP	1955
▪ USA	NASA	1958
▪ France	CNES	1961
▪ Germany	DLR	1969
▪ India	ISRO	1969
▪ Israel	ISA	1983
▪ Italy	ASI	1988
▪ Canada	CSA	1989
▪ South Korea	KARI	1989
▪ China	CNSA	1993
▪ Japan	JAXA	2003
▪ UK*	UKSA	2011

* Previously represented by BNSC

- An executive agency of the Department for Business, Innovation and Skills (BIS). Reports to the Minister of State for Universities and Science. Does not have separate legal status.
- Effective 1 April 2011 when relevant responsibilities of other bodies were transferred to it.
- Responsible for UK civil space activities.

- UK civil space policy (see UK Space Agency Civil Space Strategy 2012 – 2016):
 - Advice to HMG;
 - Management and funding of activities through ESA or bilateral basis;
 - Representation of UK at international organisations and meetings (incl. EU);

- Outreach programme;
 - Collaboration / partnership with other bodies e.g. Technology Strategy Board;
 - Facilitating access to data from E.O. Systems and exploit opportunities;
 - A vehicle for helping to develop growth in the space sector.
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- Manages the statutory duties of HMG under the Outer Space Act.
 - Develops space policy.
 - Mission Statement :

"to work at the heart of UK efforts to explore and benefit from space. To provide funding for a range of programmes and work closely with national and international academic, education and community partners."
 - Expenditure greater than £250 million (Annual Report and Accounts 2011 – 2012).

- Organisation :
 - Chief Executive
 - Technology, Science and Exploration Directorate to oversee national programmes and involvement in ESA (including ESA management and advice to industry on ESA programme participation).
 - Policy and Operations Directorate to provide budget / corporate management and policy and core services in space activities, including spectrum policy and OSA licensing.
 - Growth, Applications and EU Programmes Directorate to oversee IGS work, E.O., EU programmes and space policy.
 - Guidance is provided by a Space Leadership Council composed of the Minister and CEOs of leading UK space business.

- ESA was created in 1975 (From the existing European Launcher Development Organisation (ELDO) and European Space Research Organisation (ESRO) as an intergovernmental organisation. ESA's role is to coordinate the efforts and resources of its (now 20) Member States to enable them to participate in a range of space activities which would not be economically feasible for individual States and also not technically feasible for some.
- ESA has its own Convention (constitution) of 30 May 1975 defining the objectives of the organisation, basic principles of the way it operates and the rights and obligation of its Member States to each other.

- There are Committees of its Member States which determine further policies, procedures and budgets and approval of programmes. These Committees include the ESA Council at Ministerial level, the Council, the Administrative and Finance Committee (AFC) and the Industrial Policy Committee (IPC). For operational matters it has Programme Boards for each of the main areas of activity e.g Human Space Flight, E.O., Launchers, Science, Telecomms, Navigation.

- Major facilities:
 - HQ is Paris.
 - Technical Centre ESTEC in Noordwijk, Netherlands:
 - Operations Centre at Darmstadt, Germany.
 - EO Centre (ESRIN) near Rome.

- Major facilities:
 - Astronaut Centre (EAC) Cologne.
 - Astronomy Centre (CSG) Madrid.
 - Launch Centre (CSG), Kourou, French Guiana.
 - Space Weather Centre etc (REDU) Belgium.
 - Space Applications Centre, Harwell, UK.

- It sets quality and technical standards and guidelines and it has its own well-established procurement procedures and practices.
- it is party to International Treaties but it does not in any way legislate with respect to space activities.
- The purpose of ESA is to undertake space research and applications purely for peaceful purposes; to develop the capabilities of the European space sector and to ensure its worldwide competitiveness.
- It elaborates policies and conceives programmes for the approval of its Member States and manages those programmes. To the maximum possible extent the execution of programmes is contracted to companies in its Member States (i.e. not performed by ESA itself).

- Work is awarded on a competitive basis to the extent possible subject to a need to observe the concept of “juste retour” and to comply with the industrial policy requirements of its Member States.
- There is a mandatory part of its financial budget funded by contributions of Member States based on GDP. Around 85% of its budget is for “optional programmes” for which Member States decide on their level of financial involvement – an à la carte menu.
- ESA has legal personality and certain privileges and immunity from national and international legislation but is expected to behave in a lawful and responsible way. It represents the interest of its Member States but its reputation and influence depend not only on its technical achievements and excellence but also on its behaviour. (see Convention Article XV and Annex 1).
- ESA cooperates with and is funded by the EU on some major programmes such as Galileo and GMES. On Galileo, managed by ESA but wholly funded by the EU, the EU’s procurement procedures and practices are applicable.

- ESA has become increasingly dependent on the EU for funding (Galileo and GMES (Copernicus)). The EU has designs to take over control of ESA with implications for its funding and its operating rules and procedures. ESA and its Member States have resisted, for the moment with success but this remains a longer term possibility.
- For decades, the UK has been a relatively low contributor to ESA as compared to its industrial capacity and size of its economy. In 2012 it announced a significant (25%) increase in its budget contribution to ESA for the next five years.
- A new ESA establishment has been established at Harwell. Its main focus is on Telecommunications, Integrated Applications and Earth Observation which have good potential for commercial exploitation; an essential aspect of the UK's space strategy. The ESA Telecomms Directorate will be moved to Harwell and it is expected that within three years the establishment will have a permanent staff of around 100.

- For many years France has been the largest contributor to the ESA budget. It has now been overtaken by Germany. Both contribute around Euro 750 p.a.. With the increase in its contribution, the UK (approx. Euro 300 p.a.) has overtaken Italy as the third largest contributor.
- In terms of contributions by GDP, Luxembourg has now overtaken Belgium as the top contributor (3.2% compared to 1.5% for France).

- There are differences between the membership of ESA and of the EU but the core membership is the same.
- The EU has been directly involved in space activities through its Framework 7 research programme and in funding major ESA programmes such as Galileo and Copernicus.
- The EU is a law making body and Member States are expected to adopt and observe EU legislation. (ESA has immunity with respect to certain EU procurement legislation e.g. The State Aid provisions which enables ESA to apply its “juste retour” concept in award of contracts).
- In May 2007, 29 European countries expressed support for a European Space Policy by resolution of the Space Council, a meeting of EU and ESA Councils on space activities, which they declared to be of strategic importance to Europe for reasons of commercial activities, security and defence.

- The Treaty of Lisbon (2009) explicitly affirms the EU's interest in space policy as a “shared competence” with other institutions such as individual EU Member States and ESA.
- In Dec 2012, the EU issued a proposal that it should have overall responsibility for ESA space activities in the same way that it does for the European Defence Agency. It cites, as reasons, questions of accountability to the European Parliament and objections to the “juste retour” concept in procurement activities (in principle the EU approach is based solely on “value for money”). The EU aspirations are strongly opposed by many ESA Member States. Also, there is the problem that a number of ESA Member States are not part of the EU.
- In February 2013 the EU adopted a much watered-down version of its proposal. It glossed over the differences in procurement processes and proposed a “cost-benefit analysis and impact assessment” of ways the EU and ESA could work together.

- The EU is currently facing many budgetary pressures which are reflected in reduced funding for on-going space programmes .
- In 2008 the EU issued a draft international Code of Conduct for Outer Space Activities. Several States including Australia, Japan and Canada indicated their agreement in principle. It was rejected by China, Russia, India and Brazil. The USA declared the Code to be too restrictive and therefore unacceptable but, in January 2012, indicated that it would accept the draft code as a working basis for a new COC.

- Article VI of the Outer Space Treaty of 1967 introduced the need for appropriate national legislation in respect of private space activity without defining what that should be.
- A number of States (20+) have enacted legislation governing the space activities of their nationals and to license space activities.
- The principal purpose of such legislation is to ensure that the State Party can implement its own obligations under the UN International Treaties.
- There has been a significant increase in the number of commercial space activities and recognition of the strategic importance of space activities both for security and for commercial reasons.

- In recent years many States have enacted new legislation or have announced an intention to amend existing legislation. This has often been motivated by the perceived need to create a favourable environment for general commercial space activities.
- New space activities such as space tourism and further developments in satellite based navigation systems raise new liability issues and may necessitate updating of national legislation in this respect.
- Also, the increasing use of Earth Observation information as evidence in legal and administrative proceedings is likely to lead to legislation at national level with regard to the introduction of standards and certification (this already exists in some States).

- In 2012 the International Law Association (ILA), an international non-governmental international body, adopted guidelines for a “Model Law for National Space Legislation” (“the Sofia Guidelines”).
- The model law could provide a useful reference for States considering adopting legislation at national level or considering amendments to existing legislation.
- As with most guidelines for laws of this type it is a statement of broad principles and requirements. Detailed requirements and operational procedures then need to be elaborated in the form of associated rules , regulations and procedures which can be more readily amended and updated in future.

The UK Outer Space Act 1986 (1)

- “ An Act to confer licensing and other powers on the Secretary of State to secure compliance with the international obligations of the United Kingdom with respect to the launching and operation of space objects and the carrying on of other activities in outer space by persons connected with this country”.
- Act extends to England and Wales, Scotland and Northern Ireland. Also, subsequently, by Order in Council it applies to the Channel Islands, the Isle of Man and dependent territories.
- There are fifteen sections. The scope is to prohibit space activities (as defined) without a licence, to set out criteria for the grant of a licence, the terms of a licence, to establish a Registry of space objects, to create offences, to provide for means of enforcement, to provide for subsidiary regulations, to introduce an obligation to indemnify HMG against claims.

- The Act applies to the :
 - Launching or procuring the launch of a space object;
 - Operating a space object; and to
 - Any activity in outer space

By:

- UK nationals
- Scottish firms
- Bodies incorporated under UK law.

- Section 10 requires a licensee to indemnify the government against any claims made against the government in respect of damage or loss arising out of activities carried out by the licensee. This liability is unlimited. The extent of the indemnity distinguishes the UK from other space-faring nations. (Other countries specify limits of liability, which vary).
- Act provides for there to be supplementary regulations defining the content and form of licence applications, the procedure for applying for and granting of licences, applicable time limits, payments etc.
- Section 5 sets out the terms of a licence. The activities, the licence period, the conditions. There are provisions regarding the conduct of operations: the avoidance of contamination of outer space and of interference with the activities of others: the avoidance of breach of international obligations of the UK also a requirement for the licensee to “insure himself against liability incurred in respect of damage or loss suffered by third parties”. (There is no specific reference to the amount of required insurance being specified in separate regulations but this is implicit.) End of life conditions.

- UKSA administers the licensing activities on behalf of HMG. Once a licence is granted licensees are obliged to:
 - Permit reasonable access to documents and inspection and testing of facilities and equipment by UKSA
 - Inform UKSA of any changes in licence activities and seek approval
 - Prevent contamination of outer space and earth's environment
 - Avoid interference in activities of others
 - Avoid breach of UK's international obligations
 - Preserve national security of UK
 - Insure against TPL for launch and in-orbit ops (UK Gov. to be named as additional insured)
- Innovation and Growth Strategy (IGS) report of February 2010 recommended that the “unlimited liability” requirement be amended to provide a specified limit of liability to create a “level playing field “.

- In 2011, citing a need to create a “level playing field”, the Chancellor and the Minister for Space announced plans to remove the unlimited liability and to set new reduced requirements for the amount of launch and in-orbit insurance (consistent with a general UK objective to promote commercial space activities).
- Process is being implemented in two steps:

Step 1: achieved in July 2011 with reduction of the compulsory insurance requirement from £100M to Euro 60M (but retaining freedom to set higher limit for specific licence applications where justified due to risk).

Step 2: to change OSA to introduce the concept of limited liability also at Euro 60M for the majority of missions (liability and insurance requirements could be waived for Cubesats)

- UKSA initiated a consultation process with respect to Step 2 changes. Inputs were required to be provided by end of August 2012. Results were expected by end of 2012 but due to high number of inputs announcement of results was extended to mid 2013.

- Since 2007, there has been a flurry of activity. South Korea, The Netherlands, Belgium, France and Austria have amended their Space Acts. UK, Germany and USA have initiated processes to amend existing provisions.
- Main motivation seems to have been to ensure that industry of the State concerned is well-positioned to pursue commercial opportunities for space activities.
- Whilst the UK was the only State to have licensees subject to unlimited liability, the levels of liability set by different States do vary significantly. (New UK limit of Euro 60M seems to follow example of France)
- So far, only the USA seems to have introduced new legislation to provide for space tourism.

- France amended its Space Act in 2010, primarily to formalise the practice that had been followed for many years. The Government assumes liability for damages above Euro 60M (although in specific cases it could be higher). This is of particular relevance because of the role of Arianespace as launch service provider utilising the Ariane Vega and Soyuz launchers from Kourou. (ESA takes responsibility for the insurance of test flights of these launchers and assumes TPL liability for damages above Euro 60M when an ESA payload is launched from Kourou on one of those launchers.)
- For the following States the required TPL insurance level is as indicated with the Govt. assuming liability for damages in excess of the insured amount:
 - Japan - \$166M
 - Russia - \$300M
 - China - \$100M

The US Commercial Space Launch Act (CSLA) (1)

- The CSLA is the cornerstone of the regulation in the USA of commercial space activities. It was signed into law in 1984 under President Reagan. It was amended in 2004.
- CSLA provides for regulation by the Department of Transportation (DOT) Office of Space Transportation.
- The present Act requires US licensees to insure in respect of TPL for an amount of up to \$500M and up to \$100M for damage to US government property with a Government indemnity of up to \$1.5bn and the licensee assuming liability for the excess of claims above that level. (There are requirements relating to categories of persons insured and for reciprocal waivers of liability.)
- In June 2012 The US Government Accountability Office (GAO) issued a report reviewing these provisions, making a comparison with the equivalent provisions in China, France and Russia and suggesting that US firms should benefit from similar provisions. This suggestion is under consideration.

- The USA is the first (and only) State to introduce legislation regarding liabilities relating to space tourism. In 2004 the amendment to the CSLA requiring a release excusing the US government from liability and introduced the concept of “informed consent” to be certified by space flight participants that they were in full possession of the facts relating to the risks involved and providing for waiving liability of the operator in the case of incidents causing injury or death. The FAA was nominated as regulator.
- The amendment gave an eight year window for the private sector to initiate its operations with the idea to have relatively loose regulation to permit the sector to develop. However, so far there has not been a commercial sub-orbital commercial space tourist flight and the window was been extended for one year.
- It remains to be seen how well this waiver of liability will stand up in the event of incidents involving the injury or death of participants with possible challenges from dependents and the likely claim that insufficient information was provided so that consent was not “informed consent” to the waiver of liability.

- The time window expires at the end of 2013 and the indemnity provisions which protect companies from third party damage claims will have to be extended.
- There are a number of Spaceports in the US which has prompted a number of US States such as Florida, Virginia, Texas, California, Colorado and New Mexico to pass legislation at State level relating to space tourism. One obstacle to space tourism operations proceeding was the potential liability of contractors and manufacturers notwithstanding any waiver of liability for operators. The required exemption of liability for manufacturers was provided by new legislation enacted in January 2013 in the State of New Mexico after Virgin Galactic threatened to pull out of the planned operations there.

- A set of US Government regulations that control the export and import of defence-related articles and services on the US Munitions List (USML). This List includes products and services used in space activities.
- These regulations implement the control provisions of the Arms Export Control Act (AECA).
- The Department of State, Directorate of Defense Trade Controls (DDTC), interprets and implements ITAR. Division III specifically handles space and missile technology.
- Broadly speaking, export of an article subject to ITAR and of Technical data to non US nationals can only be made subject to approval of the US authorities under Technical Assistance Agreements and Licences.
- The stated goal is to safeguard US national security and further US foreign policy objectives.

- Physical enforcement of import and export laws at border crossings is performed by Customs and Border Protection, an Agency of the Department of Homeland Security.
- Technology relating to satellites and to Launch vehicles became more carefully protected after launch failure of a Space Systems Loral Intelsat 708 satellite in 1996.
- ITAR does not apply to info relating to general scientific, mathematical or engineering principles commonly taught in schools and colleges or information legitimately in the public domain.
- Over the years there has been controversy and debate in the US on the adverse impact of ITAR restrictions on commercial space sales, on restricting best international students studying in the US and inhibiting international cooperation on scientific projects.

- Europeans have also complained that the extent of restrictions is not constant with some permitted components sometimes subsequently being added to the restricted list.
- US commercial space sales have undoubtedly been severely impacted to the benefit of European competitors. Thales now promotes its ITAR-free satellites (which can thereby be launched by Chinese launchers).
- For more than a decade ESA has sought to reduce its dependence on US electronics components but still an ESA satellite is likely to have around 60% of its electronics components sourced from the USA.(7-8 years ago this was about 75%). A major problem for European suppliers is the level of sales they can achieve (are dependent on an ESA “buy European policy”).

- The EU Framework 7 Programme for R&D has also placed some emphasis on developing European components and coordinates its development efforts with that of ESA .
- There have been recent relaxations of the ITAR restrictions which should help to increase the competitiveness of US contractors. This new legislation gives the US President the discretion to relax export restrictions for certain satellite technologies. However, there is some unease amongst European component suppliers that a relaxation of ITAR restrictions will threaten their own prospects of having a economically viable customer base.
- Virgin Galactic Chairman, Richard Branson, says that ITAR rules will prevent the company from operating outside of the USA unless the company receives a specific waiver. At the same time he acknowledges the favourable regulatory regime in the USA (re liabilities) which is not matched in Europe.

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