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The space value-chain explained

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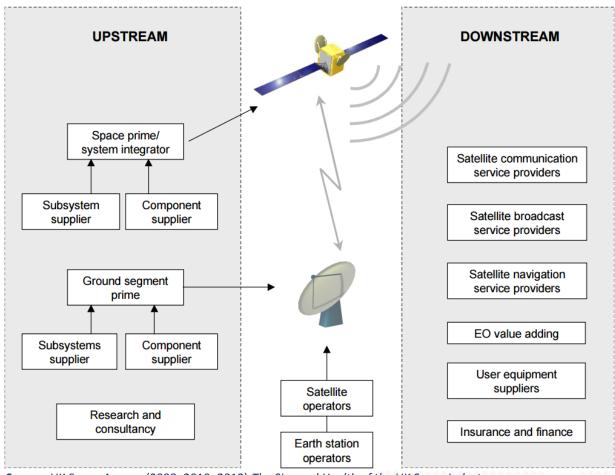
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Traditional view: the 'Space Industry'





Source: UK Space Agency (2008, 2010, 2012) The Size and Health of the UK Space Industry

Modern view: the 'Space Economy'



"The Space Economy is the full range of <u>activities</u> and the <u>use</u> of resources

that create and provide value and benefits to human beings in the course of exploring, understanding, managing and utilising space. Hence, it includes all public and private actors involved in developing, providing and using space-related products and services, ranging from research and development, the manufacture and use of space infrastructure (ground

stations, launch vehicles and satellites) to **space-enabled applications** (navigation equipment, satellite

phones, meteorological services, etc.) and the scientific knowledge generated by such activities.

It follows that the Space Economy goes well beyond the space sector itself, since it also comprises the increasingly pervasive and continually changing impacts (both quantitative and qualitative) of

space-derived products, services and knowledge on economy and society."

The 'Space Economy' Value Chain



Space manufacturing	Space operations	Space applications	Users
Launch vehicles and systems	Launch provision and brokerage services	Direct-To-Home (DTH) provision	Security, safety & resilience
Satellites, payloads, spacecraft	Proprietary satellite operation (incl. sale/lease of capacity)	Very Small Aperture Terminal (VSAT) network provision	Game-changing services
Ground segment systems and equipment	Third-party ground segment operation	Value-Added Resale (VAR) / Value- Added Services (VAS)	Climate and environmental services
Scientific and engineering research and consultancy		User equipment supply	More efficient public sector services
			e-Connectivity
=	Ancillary services	=	Non-users
Financial and legal services	Insurance and brokerage services	Consultancy and applied research	R&D and knowledge spillovers
	Other support products and services		Externalities

Source: London Economics (2015) The Case for Space 2015

UK Space Economy (2012/13)



Space manufacturing

£0.9bn Turnover (8% of total) UK global share*: 1.8% 5,800 direct employees £0.3bn direct GVA

Space operations

£1.5bn Turnover
(12% of total)
UK global share*: 11.2%
4,800 direct employees
£0.8bn direct GVA

Space applications

£9.3bn Turnover
(78% of total)

UK global share*: 10.3%

26,000 direct employees
£3.9bn direct GVA

Users

Market creation/access
Productivity boost
Cost avoidance/efficiency
Enhanced risk/decision-making
Better policymaking
Improved emergency services
Informed disaster response
Time savings

Ancillary services

£0.2bn Turnover (2% of total); UK global share: n/a 700 direct employees; £0.2bn direct GVA

Total UK space turnover (2012/13): £11.8bn

UK share of global space economy**: **6.3%-7.7%**

Direct Gross Value-Added (GVA): £5.1bn

Direct Employment: 37,000

Source: London Economics (2015) The Case for Space 2015

Non-users

R&D and knowledge spillovers, externalities, environment

^{*} Estimate compared to OECD The Space Economy at a Glance 2014 (adopts a similar segmentation).

^{**} Estimate compared to The Space Foundation The Space Report 2014 and OECD The Space Economy at a Glance 2014, respectively.

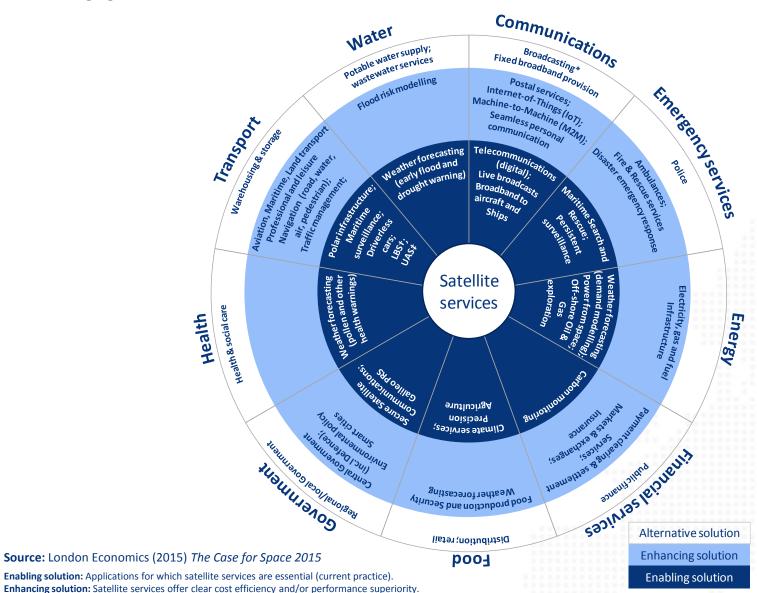
Space ... enables a wide array of applications/users





... supports all 9 National Infrastructures





Enabling solution: Applications for which satellite services are essential (current practice).

Alternative solution: Application could be achieved with terrestrial (non-satellite) solutions, but satellite services may be chosen based on cost or performance grounds.

*: Alternative solution for recorded broadcasting, but enables live broadcasting. **: Location-Based Services. ***: Unmanned Aerial Systems.

... supports almost all other sectors of the UK economy



Economic sectors supported by space-enabled services (2013)

SIC section	Sector	Intensity of satellite use
Α	Agriculture, forestry and fishing	••••
В	Mining and quarrying	••••
С	Manufacturing	●0000
D	Electricity, gas, steam and air conditioning supply	••••
E	Water supply, sewerage, waste management, and remediation activities	●0000
F	Construction	00000
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	●0000
Н	Transport and storage	C000
I	Accommodation and food service activities	●0000
J	Information and communication	COOO)
K	Finance*	••••
L	Real estate activities	●0000
M	Professional, scientific and technical activities	••••
N	Administrative and support service activities	••••
0	Public Administration and Defence; Compulsory Social Security**	00000
P	Education	••••
Q	Human health and social work activities	•••••
R	Arts, entertainment and recreation	●0000
S	Other service activities	00000
Т	Activities of households	00000
	Total	

Legend: •••••: The whole sector is fully enabled by space; ••••: space plays a strong, central role (it cannot be inferred that space generates 4/5=80% of activity); •••(): space plays a support role; ••(): space plays a minor, but not negligible role; •(): space plays a supporting supplies, generating footfall); (): space plays no role. Values quoted do not infer a valuation of the utility of space services, but rather the total value of sectors supported. † Each sector has been assigned an 'intensity of satellite use' factor using subjective judgement based on industry knowledge.

^{*:} data from House of Commons Library, Financial Services: contribution to the UK economy, 2015; **: data from Public Administration, Defence and Compulsory Social Security Industry Review – 2014. Source: London Economics analysis of ONS data

Space eco-system: Linkages and sustainability



Inter-linkages between Upstream and Downstream

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Space eco-system: Linkages and sustainability



Re-investment Upstream is critical for the sustainability of the eco-system

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Thank you.

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