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Statement of Requirement for the R-Cloud Space Systems Strategic Capability

Introduction:

The Defence Science and Technology Laboratory (Dstl), which is part of the UK Ministry of Defence (MOD), is refreshing its commercial agreement for Science and Technology (S&T) research contracts, known as R-Cloud (Research Cloud).

MOD places extensive fundamental, experimental and applied research with industry and academic suppliers and wants to broaden access for this supply base, reducing the cost of trading with MOD and enabling agile contracting. R-Cloud complements MOD's other contracting mechanisms and academic and industry suppliers of S&T research are now invited to apply to join MOD's research supplier community within the Space Systems Strategic Capability.

This statement of requirement relates to suppliers joining R-Cloud within the Space Systems capability area. R-Cloud provides a low barrier to entry for potential suppliers and offers direct access to MOD's current and future research requirements. Academic and industrial suppliers of Space Systems research are invited to apply to R-Cloud if you are a supplier of Science and Technology Research in this area.

Space Systems - Statement of Requirement

Space Systems covers all aspects of Defence & Security (D&S) space systems from underpinning enabling services like analysis; design and manufacture of space equipment and sub-systems; space launch & range; through-life operation of satellites (including groundstation), or terrestrial-based space systems like those used for the surveillance of space; through to the application of space systems for defence and security exploitation/benefit.

The Space technology to be integrated could be software, firmware or hardware and may have been developed by third party organisations through Ministry of Defence (MOD), Other Government Department (OGD) or Private Venture (PV) funding, or indeed may have been supplied by an overseas coalition partner organisation, whether government, industrial, or academic.

The requirement is broken down into 4 Broad Capability Areas based on the segmentation of the UK space economy as defined in UK Space Agency sponsored report entitled: *"Size and*



Health of the Space Industry 2016¹: Space Enablers, Space Manufacturing, Space Operations and Space Applications.

The scope of coverage of topics related to Space Enablers includes, but is not limited to, the following:

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| a) Horizon Scanning and technology watch of space systems | d) Balance of investment analysis of space systems |
| b) Technical Analysis of Space Systems | e) Space modelling and Simulation |
| c) Operational Analysis of Space Systems | f) Space Software |
| | g) Space trials and experiments |
| | h) Space Facilities |

The scope of coverage of topics related to Space Manufacturing includes, but is not limited to, the following:

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| a) Future space manufacturing technologies and capabilities | o) Space sensors (space-based & ground-based) |
| b) Future satellite and payload technologies and capabilities | p) Active Radio frequency sensors/antennas |
| c) Satellite production (all sizes) | q) Electro optic and radio frequency sensors |
| d) Spacecraft fabrication | r) Multi-spectral & hyperspectral sensors |
| e) Satellite system architectures | s) Sensor fusion |
| f) Satellite constellations and formations (all sizes) | t) Groundstation & terminals |
| g) Satellite payloads (all sizes) | u) Future s&t launch & range technologies and capabilities |
| h) Radiation hardening | v) Space (endoatmospheric) propulsion engines and powerplants technology |
| i) Magnetic and electrical countermeasures | w) Space (exoatmospheric) propulsion engines and powerplants technology |
| j) Spacecraft interoperability | x) Space launchers |
| k) Other spacecraft protection | y) Manned spacecraft research |
| l) Spacecraft maintenance, refuelling & re-commissioning | |
| m) Space-based robotics | |
| n) Space-based lasers | |

The scope of coverage of topics related to Space Operations includes, but is not limited to, the following:

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| a) Future space situational awareness technologies and capabilities | e) Upper atmosphere and near space environment (natural) |
| b) Surveillance of space | f) Upper atmosphere and near space environment (man-made) |
| c) Tracking of space objects (natural and man-made) | g) Space control |
| d) Removal of space objects (natural and man-made) | h) Space resilience |
| | i) Space launch & range |
| | j) Spacecraft trajectories and re-entry |

Space
Systems

- k) Ground support systems for space launch vehicles

The scope of coverage of topics related to Space Operations includes, but is not limited to, the following:

- a) Future application space technologies and capabilities
- b) Cyber in space
- c) Quantum computing in space
- d) Cognitive/neuro sciences, machine learning or autonomy in space
- e) Space data fusion & data science
- f) Space imagery
- g) Space data
- h) Other space products
- i) Electronic surveillance measures (esm) – non-communications
- j) Electronic surveillance measures (esm) - communications
- k) Space-based communications
- l) Future science & technology communication technologies and capabilities
- m) Communication security
- n) Radiofrequency (rf) communications
- o) Optical communications
- p) Protocol technology
- q) Geographical (geo) science
- r) Position, navigation & timing (pnt)
- s) Tagging, tracking and location (ttl) from space