



Cross-Government Space Domain Awareness (SDA) Requirements Publication

Version 2.1 – 2024



UK Government

Contents

2

Introduction

2

Domain

2

Cross-Government SDA Requirements

3

Summary

4

Annex A – User Requirements

6

Annex B – System of Systems Requirements

18

Annex C – Acronyms and Definitions



The Ministry of Defence (MOD) and UK Space Agency (UKSA) launched a dual use civilian-military National Space Operations Centre (NSpOC) in May 2024, that will generate Space Domain Awareness (SDA) through a centralised System of Systems (SoS) approach for the provision of SDA. The Cross-Government Space Domain Awareness Requirements (herein requirements) were established to inform the development of the SoS, which includes the entire SDA chain from sensors and data processing through to readouts for policymakers.

The purpose of these updated requirements is solely to provide transparency and inform industry and academia about potential future needs within the government space sector. It is important to emphasise that the presentation of these requirements does not imply a commitment to issue a tender or contract in the future. The intention is to create awareness and maintain open communication, allowing for early engagement and clarity, but without guaranteeing any specific procurement activities.

Introduction

The UK National Space Strategy and Defence Space Strategy (NSS and DSS), published in 2021 and 2022, lay out the ambitious vision of the UK in the space domain. They provide a clear strategic direction aimed at delivering improved SDA while emphasising the importance of a unified approach across civil and defence sectors. Collaboration between the various government stakeholders for SDA is pivotal to achieving the set objectives, including the establishment of the NSpOC. As part of this comprehensive initiative, SDA is to be achieved through a SoS approach. This approach entails leveraging opportunities to collaborate with international partners and acquiring commercial off-the-shelf solutions that complement national capabilities while safeguarding sensitive data and ensuring capability assurance. The foundation for this approach is a set of Cross-Government SDA requirements developed collaboratively by the MOD, UKSA, and various other government stakeholders.

Domain

The space domain has grown increasingly congested and complex, necessitating the use of space surveillance and tracking techniques to detect, track, and identify objects in space. SDA, as defined in Joint Doctrine Publication

0-40¹, is about providing security-focused, decision-quality information that can be used to successfully mitigate adversary space effects and support the integration of allied space effects into multi-domain operations. To realise this vision, a SoS approach is being adopted – the SoS is being developed as the backbone (both hardware and software) of the NSpOC capability.

This approach entails combining data from various sensors and fusing it with operational and intelligence sources to enhance SDA. It encompasses space, ground, and link segments. SDA is inherently dual-use (civil and military), with sensor data potentially serving a multitude of functions. The focus is on developing a cohesive and integrated system that can effectively analyse activities in space and provide comprehensive domain awareness.

Cross-Government SDA Requirements

As elements of the requirements are sensitive in nature, some information has been redacted from this publicly available version. The full unredacted requirements document offers more detail on measures of performance, justification, and priority status, for example. More detailed subsets of these requirements will be shared appropriately as part of procurements for various elements of the SDA SoS.

Annexes A and B outline the redacted current set of UK SDA Requirements, covering both operational user requirements and technical system requirements. These requirements have been generated and reviewed by key Cross-Government stakeholders, but it is important to note that they are not exhaustive. The space domain is rapidly evolving, and these requirements will be reviewed annually and expanded upon to adapt to the changing nature of the operating environment. Priority areas have been highlighted in the annexes in order to demonstrate critical areas of focus for the UK government's SDA aspirations. A select number of performance thresholds of an appropriate classification have been included in **Annex B** alongside a limited number of the system requirements.

Annex A focuses on operational user requirements, including areas such as orbital events assessment, conjunction analysis, and space object characterisation. These requirements are designed to ensure that space activities are monitored, assessed, and understood comprehensively.

Annex B delves into the technical system requirements, providing the technical specifications and criteria for the SoS. Specific requirements are identified, such as orbital regimes, object size detection criteria, sensor revisit rates, and resolvable separation distance, among others. Note, some requirements have been retired since the first version of this document was published, these do not appear in this version.

Summary

The decision to set broad strategic requirements for SDA is rooted in the recognition of the complex and dynamic nature of the space domain. Space has become increasingly crowded and contested, with various actors engaging in activities ranging from satellite deployments for peaceful purposes to actions with potential security implications. A high-level approach acknowledges that SDA is not a singular, isolated effort but a multifaceted and interconnected endeavour.

Additionally, the adoption of a SoS approach reflects the need to integrate a variety of sensors, capabilities, and data sources to comprehensively understand and respond to activities in space. This broader strategic focus allows for flexibility and adaptability in the face of evolving threats and technological advancements. By maintaining high-level requirements that are subject to regular review and expansion, the UK can remain agile in responding to the ever-changing landscape of the space domain.

In line with the NSS and DSS, a Cross-Government approach has been adopted to establish these high-level SDA requirements, forming the foundation for a dual-use, civil and military SDA SoS. Annual reviews and collaboration with stakeholders are essential to keep pace with operational and technological advancements in this rapidly evolving domain.

¹ JDP 0-40 – UK Space Power, Sep 22

Annex A – UK Space Domain Awareness Requirements – User Requirements

ID	Requirement Heading	Requirement Description	Priority
UKSDA-UR-100	UK Spacecraft Licencing and Compliance Monitoring	The SoS shall allow verification of compliance of UK-licenced spacecraft to licence conditions, for all orbits of interest and including beyond Earth orbit	
UKSDA-UR-102		- To enable assessment and monitoring of compliance with space debris mitigation lifetime requirements	
UKSDA-UR-105		- To support monitoring of the EM spectrum for compliance and interference with respect to spectrum	
UKSDA-UR-106		- To support monitoring of orbital position compliance	
UKSDA-UR-200	Conjunction on Launch Assessment	The SoS shall support the identification and assessment of potential conjunctions on launch (COLA)	
UKSDA-UR-300	Orbital Events Assessment	The SoS shall enable detection, characterisation and attribution of orbital events	
UKSDA-UR-400	Space Sustainability	The SoS shall ensure sustainability of space and strengthen the UK's reputation as a responsible space-faring nation, providing the UK with the evidence and expertise to inform and influence international technical standards and guidelines	
UKSDA-UR-500	Risk Assessment	The SoS shall provide adequate and appropriate risk assessment, of both terrestrial (on the ground, at sea and in the air) and in-space risks	
UKSDA-UR-501		- Assess terrestrial risks to life, property, public health and the environment from current and potential UK-licenced RSOs	
UKSDA-UR-502		- Assess in-space risks to life, property and the environment from current and potential UK-licenced RSOs	
UKSDA-UR-503		- Assess terrestrial risks to UK life, property, public health and the environment from orbital debris and other nation's RSOs	
UKSDA-UR-504		- Assess in-space risks to UK life, property and the environment from orbital debris and other nation's RSOs	
UKSDA-UR-505		- Provide timely information to reduce the risk from in-space hazards to UK Critical National Infrastructure (CNI) or UK-licenced RSOs e.g. provision of conjunction warning and fragmentation break-up information	
UKSDA-UR-506		- Assess the terrestrial risk to life, property, public health and the environment from UK launch activities	
UKSDA-UR-600	Dual Use Applications	The SoS shall allow UK users to concurrently exploit both Civilian and Military capabilities and capacity, providing and/or requiring SDA data	
UKSDA-UR-700	Collaboration Policies	The SoS shall support fostering and development of appropriate national, international, and commercial collaboration and data/information sharing policies	
UKSDA-UR-800	Independent UK SDA data and assurance capabilities	The SoS shall facilitate development SDA data and UK sovereign assurance capabilities, e.g. through sensor capability, and direct data acquisition rights from non-UK assets	★
UKSDA-UR-900	Independent UK SDA national capabilities and skills	The SoS shall develop sovereign UK SDA capabilities, e.g. through development of hardware and software capabilities, and national skills and expertise growth in SDA	★
UKSDA-UR-1100	Operational Space Picture	The SoS shall enable the development of a high-quality operational space picture, to enable decision-making by the Military and Other Government Departments	
UKSDA-UR-1101		The SoS shall provide data, models, and tools to support predictive and retrospective analyses	★
UKSDA-UR-1102		The SoS shall provide systems to enable the execution of timely C2	★

ID	Requirement Heading	Requirement Description	Priority
UKSDA-UR-1200	Primary Payload Deployment	The SoS shall provide confirmation of primary payload deployment, with timely identification of objects prioritised for UK registered and/or launched objects during the launch and early operation phase	
UKSDA-UR-1400	RSO Characterisation	The SoS shall enable RSO characterisation, including characterisation of cooperative and non-cooperative RSOs	
UKSDA-UR-1500	Warning Enabling Services	The SoS shall provide UK Users access to appropriate services for the provision of appropriate alerts and extant Warning Enabling Services as required, including but not limited to the following: - Direct Ascent ASAT Warning - Space Weather - Orbital Events - Satellite warning services - International Treaty Obligations	
UKSDA-UR-1600	EM Spectrum Monitoring	The SoS shall provide support to the monitoring and reporting of EM spectrum interference, jamming, and spoofing to, in and from space	
UKSDA-UR-1700	Space Environment Monitoring	The SoS shall support the generation and understanding of space weather/ environment information, to enable effective decision making and actions	★

Annex B – UK Space Domain Awareness Requirements – System of Systems Requirements

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-100	Licence Compliance and Monitoring	The SoS shall support the analysis of compliance to licence conditions for UK licenced spacecraft, for all orbits of interest, including beyond Earth orbit		
UKSDA-SR-102		- Enable assessment of compliance with space debris mitigation or other applicable requirements		
UKSDA-SR-105		- Support monitoring of the EM spectrum for compliance and interference with respect to spectrum		
UKSDA-SR-106		- Support monitoring of RSO orbital position compliance		
UKSDA-SR-200	Conjunction on Launch Assessment	The SoS shall support Conjunction on Launch Assessment (COLA)		
UKSDA-SR-300	Orbital Event Assessment	The SoS shall be capable of orbital event identification, assessment and event refinement, see sub-requirements for orbital event types		★
UKSDA-SR-301		- Direct Ascent Anti-Satellite		
UKSDA-SR-302		- Co-orbital Anti-Satellite		
UKSDA-SR-303		- Conjunction		
UKSDA-SR-304		- Re-entry		
UKSDA-SR-305		- Rendezvous		
UKSDA-SR-306		- Proximity Operations		
UKSDA-SR-307		- Active Debris Removal		
UKSDA-SR-308		- In-Orbit Servicing		
UKSDA-SR-309		- In-Orbit Manufacturing		
UKSDA-SR-310		- Fragmentation		
UKSDA-SR-311		- Orbital Slot/Parameter Changes		
UKSDA-SR-312		- Orbital Manoeuvres		
UKSDA-SR-313		- Secondary Object Release		
UKSDA-SR-314		- RSO Physical Change		
UKSDA-SR-315		- Space Weather (Natural change to environment)		
UKSDA-SR-316		- Other Radiation (Artificial change to environment)		
UKSDA-SR-317		- Electromagnetic Interference		
UKSDA-SR-318	- Orbit Insertion			
UKSDA-SR-400	Event Notifications and/or Warnings	The SoS shall be capable of producing notifications and/or warnings of events of interest with user definable thresholds at varying levels of severity		★
UKSDA-SR-500		The SoS shall provide notifications and/or warnings for appropriate users in a timely fashion		★
UKSDA-SR-600	Manoeuvre Planning	The SoS shall be capable of manoeuvre planning and optimisation primarily for conjunction avoidance, although the capability should have the capacity to be utilised for other purposes as required		
UKSDA-SR-700	Object Size Detection	The SoS shall be capable of sufficient RSO size detection in all orbits of interest to enable maintenance of SDA	See sub-requirements	

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-701	Object Size Detection	The SoS shall be capable of sufficient RSO size detection to maintain SDA in LEO	Detect objects of at least 10cm characteristic length	
UKSDA-SR-702		The SoS shall be capable of sufficient RSO size detection to maintain SDA in MEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-703		The SoS shall be capable of sufficient RSO size detection to maintain SDA in HEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-704		The SoS shall be capable of sufficient RSO size detection to maintain SDA in GEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-705		The SoS shall be capable of sufficient RSO size detection to maintain SDA in BEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-800	Object Track Association	The SoS shall be capable of RSO observation to track association to enable catalogue maintenance		★
UKSDA-SR-801		The SoS shall associate each RSO observation with a specific track		
UKSDA-SR-802		The SoS shall assign each RSO observation a probability of association against each potential track		
UKSDA-SR-803		The SoS shall associate each RSO observation/track with a specific catalogued RSO or support creation of a new catalogue entry (UCT)		
UKSDA-SR-804		The SoS shall assign each observation/track a probability of association against each potential catalogued RSO or UCT		
UKSDA-SR-805		The SoS Data shall include UCTs where observation/track to catalogued RSO association fails		
UKSDA-SR-806		The SoS shall be capable of track-to-track correlation of UCTs		
UKSDA-SR-807	The SoS shall be capable of producing tracks of sufficient length and accuracy to enable propagation forward to next expected observation as per SRs 12xx/13xx			
UKSDA-SR-900	Data Time Stamp	The SoS Data shall be timestamped with sufficient accuracy and precision for all orbits of interest	1 millisecond accuracy and precision	
UKSDA-SR-1000	Object Surveillance	The SoS shall be capable of providing surveillance on all RSOs that can be detected by the SoS for SDA purposes	Survey and produce ephemeris, detection thresholds as per sub-requirements	★
UKSDA-SR-1001		The SoS shall be capable of providing surveillance of all detectable RSOs in LEO	Detect objects of at least 10cm characteristic length	
UKSDA-SR-1002		The SoS shall be capable of providing surveillance of all detectable RSOs in MEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-1003		The SoS shall be capable of providing surveillance of all detectable RSOs in HEO	Detect objects of at least 1m in characteristic length	

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-1004	Object Surveillance	The SoS shall be capable of providing surveillance of all detectable RSOs in GEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-1005		The SoS shall be capable of providing surveillance of all detectable RSOs in BEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-1100	Object Tracking	The SoS shall be capable of tracking all detectable UCT/catalogued RSOs for SDA purposes	Track RSO/UCTs and produce ephemeris, detection thresholds as per sub-requirements	★
UKSDA-SR-1101		The SoS shall be capable of tracking all detectable UCTs/catalogued RSOs in LEO	Detect objects of at least 10cm characteristic length	
UKSDA-SR-1102		The SoS shall be capable of tracking all detectable UCTs/catalogued RSOs in MEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-1103		The SoS shall be capable of tracking all detectable UCTs/catalogued RSOs in HEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-1104		The SoS shall be capable of tracking all detectable UCTs/catalogued RSOs in GEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-1105		The SoS shall be capable of tracking all detectable UCTs/catalogued RSOs in BEO	Detect objects of at least 1m in characteristic length	
UKSDA-SR-1200	Revisit Rate (High Priority)	The SoS Data shall have sufficient minimum revisit rates for High Priority RSO/UCTs in all orbits of interest to enable catalogue maintenance	See sub-requirements	
UKSDA-SR-1201		The SoS Data shall have sufficient minimum revisit rates for high priority RSO/UCTs in LEO	100 catalogued objects tracked once per their orbit	
UKSDA-SR-1202		The SoS Data shall have sufficient minimum revisit rates for high priority RSO/UCTs in MEO	100 catalogued objects tracked once per their orbit	
UKSDA-SR-1203		The SoS Data shall have sufficient minimum revisit rates for high priority RSO/UCTs in HEO	100 catalogued objects tracked once per their orbit	
UKSDA-SR-1204		The SoS Data shall have sufficient minimum revisit rates for high priority RSO/UCTs in GEO	100 catalogued objects tracked once per their orbit / 250 catalogued objects multiple times per day	
UKSDA-SR-1205		The SoS Data shall have sufficient minimum revisit rates for high priority RSO/UCTs in BEO	100 catalogued objects tracked once per their orbit	
UKSDA-SR-1300	Revisit Rate (Routine Priority)	The SoS Data shall have sufficient minimum revisit rates for Routine Priority RSO/UCTs in all orbits of interest to enable SDA	See sub-requirements	
UKSDA-SR-1301		The SoS Data shall have sufficient minimum revisit rates for routine priority RSO/UCTs in LEO	all catalogued objects once per 48 hours / all catalogued objects once per 24 hours	

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-1302	Revisit Rate (Routine Priority)	The SoS Data shall have sufficient minimum revisit rates for routine priority RSO/UCTs in MEO	all catalogued objects once per 48 hours	
UKSDA-SR-1303		The SoS Data shall have sufficient minimum revisit rates for routine priority RSO/UCTs in HEO	all catalogued objects once per 48 hours / 2,000 objects daily	
UKSDA-SR-1304		The SoS Data shall have sufficient minimum revisit rates for routine priority RSO/UCTs in GEO	all catalogued objects once per 48 hours	
UKSDA-SR-1305		The SoS Data shall have sufficient minimum revisit rates for routine priority RSO/UCTs in BEO	all catalogued objects once per 48 hours	
UKSDA-SR-1400	24 hour coverage	The SoS Data shall comprise sensing data covering both day and night-time to enable both tracking and characterisation	The SoS shall be capable of capturing sensing data 24 hours per day	
UKSDA-SR-1500	Resolvable Separation Distance	Post tracking/surveillance, the SoS shall be capable of resolving all closely spaced RSOs in all orbits of interest	See sub-requirements	
UKSDA-SR-1501		The SoS shall be capable of identifying and independently tracking all closely spaced RSOs in LEO	Minimum separation distance 50m	
UKSDA-SR-1502		The SoS shall be capable of identifying and independently tracking all closely spaced RSOs in MEO	Minimum separation distance 1km	
UKSDA-SR-1503		The SoS shall be capable of identifying and independently tracking all closely spaced RSOs in HEO	Minimum separation distance 1km	
UKSDA-SR-1504		The SoS shall be capable of identifying and independently tracking all closely spaced RSOs in GEO	Minimum separation distance 1km	
UKSDA-SR-1505		The SoS shall be capable of identifying and independently tracking all closely spaced RSOs in BEO	Minimum separation distance 5km	
UKSDA-SR-1600	Launch and Ballistic Tracking	The SoS shall be capable of detecting and/or tracking launch and ballistic activities (such as sub-orbital vehicles etc.)		
UKSDA-SR-1601		The SoS shall be capable of detecting and/or tracking launch/ballistic activities that exceed 100km altitude		
UKSDA-SR-1602		The SoS shall be capable of tracking and/or detecting sub-orbital events which go above 50km but do not exceed 100km		
UKSDA-SR-1603		The SoS shall support the tracking and analysis of potential debris fallout from UK Space launches and foreign launches with UK satellites on-board		
UKSDA-SR-1700	SoS Data Capability (Dataset Management)	The SoS shall enable the management of collected data and all available data sources and data products to ensure efficient and effective exploitation		
UKSDA-SR-1800	SoS Data Capability (Independence)	The SoS shall include UK-owned systems to provide additional data and security resilience by reducing the UK dependency on other nations, and providing timely and UK prioritised access to trusted data sources		★
UKSDA-SR-1900	SoS Capability (Resilience)	The SoS shall be resilient to single-point failures		

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-2000	SoS Capability (Resilience)	Upon failure, the SoS and all individual hardware and software elements shall fail into appropriate safe modes, i.e., telescope domes should close upon failure etc		
UKSDA-SR-2100		Upon failure, the SoS shall be repaired within a specified timeframe in accordance with individual system requirements		
UKSDA-SR-2300	SoS Capability (Assurance)	The SoS shall include appropriate assurance capabilities		★
UKSDA-SR-2400	Data Storage	The SoS shall provide a multi-user (Civilian, Military and Commercial) low latency data access via a data repository and a shared software capability		★
UKSDA-SR-2401		The data repository shall be scalable and flexible		
UKSDA-SR-2402		The data repository shall be capable of storing historical archival data		
UKSDA-SR-2500	Data Protective Marking and Governance	Data shall be held in and disseminated from the SoS at the lowest possible protective marking, as per policy, to facilitate public, commercial, and academic use, where possible		
UKSDA-SR-2501		The SoS shall have definable user access rights/controls		
UKSDA-SR-2502		The SoS data shall have an appropriate audit trail		
UKSDA-SR-2503		The SoS shall allow for the flagging and/or purging of data assessed to be spurious/inaccurate		
UKSDA-SR-2504		The SoS shall provide a system to lower or raise the classification level of SST artefacts and data		
UKSDA-SR-2600	Data Dissemination	Data shall be delivered into the SoS with an appropriate Interface Control Document		
UKSDA-SR-2700		SoS Data shall be tagged with appropriate sharing rules/restrictions to enable maximum sharing without commercial/classification compromise		
UKSDA-SR-2701		All data on the SoS will be handled/disseminated in accordance with the security classification guide, including encryption where appropriate		
UKSDA-SR-2800	Fusion	The SoS shall be able to fuse multiple data types and/or models		
UKSDA-SR-2900	Data Compatibility (Data Ingest)	The SoS shall be able to ingest data from all contributing sensors and all relevant data formats		
UKSDA-SR-3000	Data Formats	Appropriate data format standards, such as CCSDS and other relevant standards, shall be used for data generated by, or for, the SoS		
UKSDA-SR-3100	Uncertainty Data	The SoS Data shall always include and propagate appropriate uncertainty data		
UKSDA-SR-3200	Sensor Bias and Accuracy	The SoS shall be able to utilise observation data that includes sensor biases and accuracy		
UKSDA-SR-3300	Agility	The SoS shall utilise a user configurable (push/pull) data delivery approach for maximum utility based on mission needs		

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-3400	Flexible Tasking	The SoS shall have flexible tasking capabilities based on user and mission priorities		
UKSDA-SR-3500	Tasking Notice	Sensor in the SoS shall be capable of being tasked and providing a receipt of response within a required timeframe		
UKSDA-SR-3600	Data Delivery Latency	Sensors in the SoS shall deliver the required data to the requestor within a required timeframe		
UKSDA-SR-3700	Attribution	The SoS shall support the attribution process for unforeseen events in space (whether accidental, irresponsible, or nefarious)		
UKSDA-SR-3800	System Automation	The SoS shall utilise automated workflows, however, human intervention shall remain possible across the data chain, from sensor tasking through to data interpretation		★
UKSDA-SR-3900	Human Consumption	The SoS shall produce decision quality data products to facilitate action by decision makers		★
UKSDA-SR-4000	Public Utilisation	The SoS shall produce outputs capable of public consumption by a non-space specialist, e.g. pictorial visualisations of orbital events		★
UKSDA-SR-4100	Adaptability	The SoS shall be easily reconfigurable and scalable		★
UKSDA-SR-4300	Calibration	The SoS sensors shall be regularly calibrated to quantitatively assess and improve data accuracy		
UKSDA-SR-4400		The SoS Data shall include sensor calibration data, at a minimum precision bias		
UKSDA-SR-4500	Cross-cueing	The SoS shall be capable of cross-cueing of different sensors in the system		
UKSDA-SR-5700	Minimum feature size	The SoS Data shall comprise minimum feature size information to enable satellite characterisation	See sub-requirements	
UKSDA-SR-5701		The SoS Data shall comprise of minimum feature size information at sufficient resolution to enable characterisation of RSOs in LEO	10cm	
UKSDA-SR-5702		The SoS Data shall comprise of minimum feature size information at sufficient resolution to enable characterisation of RSOs in MEO	10cm	
UKSDA-SR-5703		The SoS Data shall comprise of minimum feature size information at sufficient resolution to enable characterisation of RSOs in HEO	10cm	
UKSDA-SR-5704		The SoS Data shall comprise of minimum feature size information at sufficient resolution to enable characterisation of RSOs in GEO	10cm	
UKSDA-SR-5705		The SoS Data shall comprise of minimum feature size information at sufficient resolution to enable characterisation of RSOs in GEO		
UKSDA-SR-7300	RSO Characterisation	The SoS shall be capable of detecting and characterising all detectable RSOs for SSA and SDA purposes, which shall include, but not be limited to, the following RSO information for all orbital regimes of interest:		
UKSDA-SR-7301		- Object Active/Inactive		

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-7302	RSO Characterisation	- Status Change Detection		
UKSDA-SR-7303		- Rotation Rate		
UKSDA-SR-7304		- Identification of Satellites (NOR-AD/COSPAR ID)		
UKSDA-SR-7305		- Attitude Determination		
UKSDA-SR-7306		- Mass		
UKSDA-SR-7307		- Physical Dimensions		
UKSDA-SR-7308		- Construction Materials		
UKSDA-SR-7309		- Conjunction Avoidance Capability Assessment		
UKSDA-SR-7310		- Identification of Satellite Type/Class e.g. bus type		
UKSDA-SR-7311		- Satellite Payload Identification		
UKSDA-SR-7312		- Capability Assessment (The evaluation of an RSOs ability to operate its subsystems and to what degree)		
UKSDA-SR-7313		- History of Orbital Changes and Manoeuvres		
UKSDA-SR-7314		- Fault/Anomaly Detection		
UKSDA-SR-7315		- Payload Activity		
UKSDA-SR-7316		- Associated EM Activity		
UKSDA-SR-7317		- Damage Assessment (The evaluation of damage or loss caused by an event)		
UKSDA-SR-7318		- Verification of passivation procedures		
UKSDA-SR-7319		- Payload Deployment		
UKSDA-SR-7320		- Rotation Axis		
UKSDA-SR-7400		Object Characterisation (LEO Latency)	The SoS shall provide characterisation of LEO RSOs at a sufficient rate for the following tasks:	See sub-requirements
UKSDA-SR-7401	- Object Active/Inactive		2,000 objects weekly	
UKSDA-SR-7402	- Status Change Detection		2,000 objects weekly	
UKSDA-SR-7403	- Rotation Rate		400 objects monthly	
UKSDA-SR-7404	- Identification of Satellites (NORAD/COSPAR ID)		400 objects monthly	
UKSDA-SR-7405	- Attitude Determination		400 objects monthly	
UKSDA-SR-7406	- Mass		400 objects monthly	
UKSDA-SR-7407	- Physical Dimensions		400 objects monthly	
UKSDA-SR-7408	- Construction Materials		400 objects monthly	
UKSDA-SR-7409	- Conjunction Avoidance Capability Assessment		400 objects monthly	
UKSDA-SR-7410	- Identification of Satellite Type/Class e.g. bus type		400 objects monthly	
UKSDA-SR-7411	- Satellite Payload Identification		400 objects monthly	
UKSDA-SR-7412	- Capability Assessment (The evaluation of an RSOs ability to operate its subsystems and to what degree)		400 objects monthly	
UKSDA-SR-7413	- History of Orbital Changes and Manoeuvres		400 objects monthly	
UKSDA-SR-7414	- Fault/Anomaly Detection		400 objects monthly	
UKSDA-SR-7415	- Payload Activity		400 objects monthly	
UKSDA-SR-7416	- Associated EM Activity		400 objects monthly	
UKSDA-SR-7417	- Damage Assessment (The evaluation of damage or loss caused by an event)		400 objects monthly	
UKSDA-SR-7418	- Verification of passivation procedures	400 objects monthly		

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-7419	Object Characterisation (LEO Latency)	- Payload Deployment	400 objects monthly	
UKSDA-SR-7420		- Rotation Axis	400 objects monthly	
UKSDA-SR-7500	Object Characterisation (MEO Latency)	The SoS shall provide characterisation of MEO RSOs at a sufficient rate for the following tasks:	See sub-requirements	
UKSDA-SR-7501		- Object Active/Inactive	all UK catalogued objects monthly	
UKSDA-SR-7502		- Status Change Detection	all UK catalogued objects monthly	
UKSDA-SR-7503		- Rotation Rate	all UK catalogued objects monthly	
UKSDA-SR-7504		- Identification of Satellites (NOR-AD/COSPAR ID)	all UK catalogued objects monthly	
UKSDA-SR-7505		- Attitude Determination	all UK catalogued objects monthly	
UKSDA-SR-7506		- Mass	all UK catalogued objects monthly	
UKSDA-SR-7507		- Physical Dimensions	all UK catalogued objects monthly	
UKSDA-SR-7508		- Construction Materials	all UK catalogued objects monthly	
UKSDA-SR-7509		- Conjunction Avoidance Capability Assessment	all UK catalogued objects monthly	
UKSDA-SR-7510		- Identification of Satellite Type/Class e.g. bus type	all UK catalogued objects monthly	
UKSDA-SR-7511		- Satellite Payload Identification	all UK catalogued objects monthly	
UKSDA-SR-7512		- Capability Assessment (The evaluation of an RSOs ability to operate its subsystems and to what degree)	all UK catalogued objects monthly	
UKSDA-SR-7513		- History of Orbital Changes and Manoeuvres	all UK catalogued objects monthly	
UKSDA-SR-7514		- Fault/Anomaly Detection	all UK catalogued objects monthly	
UKSDA-SR-7515		- Payload Activity	all UK catalogued objects monthly	
UKSDA-SR-7516		- Associated EM Activity	all UK catalogued objects monthly	
UKSDA-SR-7517		- Damage Assessment (The evaluation of damage or loss caused by an event)	all UK catalogued objects monthly	
UKSDA-SR-7518		- Verification of passivation procedures	all UK catalogued objects monthly	
UKSDA-SR-7519		- Payload Deployment	all UK catalogued objects monthly	
UKSDA-SR-7520	- Rotation Axis	all UK catalogued objects monthly		
UKSDA-SR-7600	Object Characterisation (HEO Latency)	The SoS shall provide characterisation of HEO RSOs at a sufficient rate for the following tasks:	See sub-requirements	

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-7601	Object Characterisation (HEO Latency)	- Object Active/Inactive	all UK catalogued objects monthly	
UKSDA-SR-7602		- Status Change Detection	all UK catalogued objects monthly	
UKSDA-SR-7603		- Rotation Rate	all UK catalogued objects monthly	
UKSDA-SR-7604		- Identification of Satellites (NOR-AD/COSPAR ID)	all UK catalogued objects monthly	
UKSDA-SR-7605		- Attitude Determination	all UK catalogued objects monthly	
UKSDA-SR-7606		- Mass	all UK catalogued objects monthly	
UKSDA-SR-7607		- Physical Dimensions	all UK catalogued objects monthly	
UKSDA-SR-7608		- Construction Materials	all UK catalogued objects monthly	
UKSDA-SR-7609		- Conjunction Avoidance Capability Assessment	all UK catalogued objects monthly	
UKSDA-SR-7610		- Identification of Satellite Type/Class e.g. bus type	all UK catalogued objects monthly	
UKSDA-SR-7611		- Satellite Payload Identification	all UK catalogued objects monthly	
UKSDA-SR-7612		- Capability Assessment (The evaluation of an RSOs ability to operate its subsystems and to what degree)	all UK catalogued objects monthly	
UKSDA-SR-7613		- History of Orbital Changes and Manoeuvres	all UK catalogued objects monthly	
UKSDA-SR-7614		- Fault/Anomaly Detection	all UK catalogued objects monthly	
UKSDA-SR-7615		- Payload Activity	all UK catalogued objects monthly	
UKSDA-SR-7616		- Associated EM Activity	all UK catalogued objects monthly	
UKSDA-SR-7617		- Damage Assessment (The evaluation of damage or loss caused by an event)	all UK catalogued objects monthly	
UKSDA-SR-7618		- Verification of passivation procedures	all UK catalogued objects monthly	
UKSDA-SR-7619		- Payload Deployment	all UK catalogued objects monthly	
UKSDA-SR-7620		- Rotation Axis	all UK catalogued objects monthly	
UKSDA-SR-7700	Object Characterisation (GEO Latency)	The SoS shall provide characterisation of GEO RSOs at a sufficient rate for the following tasks:	See sub-requirements	
UKSDA-SR-7701		- Object Active/Inactive	all UK catalogued objects monthly	
UKSDA-SR-7702		- Status Change Detection	all UK catalogued objects monthly	

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority	
UKSDA-SR-7703	Object Characterisation (GEO Latency)	- Rotation Rate	all UK catalogued objects monthly		
UKSDA-SR-7704		- Identification of Satellites (NOR-AD/COSPAR ID)	all UK catalogued objects monthly		
UKSDA-SR-7705		- Attitude Determination	all UK catalogued objects monthly		
UKSDA-SR-7706		- Mass	all UK catalogued objects monthly		
UKSDA-SR-7707		- Physical Dimensions	all UK catalogued objects monthly		
UKSDA-SR-7708		- Construction Materials	all UK catalogued objects monthly		
UKSDA-SR-7709		- Conjunction Avoidance Capability Assessment	all UK catalogued objects monthly		
UKSDA-SR-7710		- Identification of Satellite Type/Class e.g. bus type	all UK catalogued objects monthly		
UKSDA-SR-7711		- Satellite Payload Identification	all UK catalogued objects monthly		
UKSDA-SR-7712		- Capability Assessment (The evaluation of an RSOs ability to operate its subsystems and to what degree)	all UK catalogued objects monthly		
UKSDA-SR-7713		- History of Orbital Changes and Manoeuvres	all UK catalogued objects monthly		
UKSDA-SR-7714		- Fault/Anomaly Detection	all UK catalogued objects monthly		
UKSDA-SR-7715		- Payload Activity	all UK catalogued objects monthly		
UKSDA-SR-7716		- Associated EM Activity	all UK catalogued objects monthly		
UKSDA-SR-7717		- Damage Assessment (The evaluation of damage or loss caused by an event)	all UK catalogued objects monthly		
UKSDA-SR-7718		- Verification of passivation procedures	all UK catalogued objects monthly		
UKSDA-SR-7719		- Payload Deployment	all UK catalogued objects monthly		
UKSDA-SR-7720		- Rotation Axis	all UK catalogued objects monthly		
UKSDA-SR-7800		Object Characterisation (BEO Latency)	The SoS shall provide characterisation of BEO RSOs at a sufficient rate for the following tasks:	See sub-requirements	
UKSDA-SR-7801			- Object Active/Inactive	all UK catalogued objects monthly	
UKSDA-SR-7802	- Status Change Detection		all UK catalogued objects monthly		
UKSDA-SR-7803	- Rotation Rate and Rotation Axis		all UK catalogued objects monthly		
UKSDA-SR-7804	- Identification of Satellites (NOR-AD/COSPAR ID)	all UK catalogued objects monthly			

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-7805	Object Characterisation (BEO Latency)	- Attitude Determination	all UK catalogued objects monthly	
UKSDA-SR-7806		- Mass	all UK catalogued objects monthly	
UKSDA-SR-7807		- Physical Dimensions	all UK catalogued objects monthly	
UKSDA-SR-7808		- Construction Materials	all UK catalogued objects monthly	
UKSDA-SR-7809		- Conjunction Avoidance Capability Assessment	all UK catalogued objects monthly	
UKSDA-SR-7810		- Identification of Satellite Type/Class e.g. bus type	all UK catalogued objects monthly	
UKSDA-SR-7811		- Satellite Payload Identification	all UK catalogued objects monthly	
UKSDA-SR-7812		- Capability Assessment (The evaluation of an RSOs ability to operate its subsystems and to what degree)	all UK catalogued objects monthly	
UKSDA-SR-7813		- History of Orbital Changes and Manoeuvres	all UK catalogued objects monthly	
UKSDA-SR-7814		- Fault/Anomaly Detection	all UK catalogued objects monthly	
UKSDA-SR-7815		- Payload Activity	all UK catalogued objects monthly	
UKSDA-SR-7816		- Associated EM Activity	all UK catalogued objects monthly	
UKSDA-SR-7817		- Damage Assessment (The evaluation of damage or loss caused by an event)	all UK catalogued objects monthly	
UKSDA-SR-7818	- Verification of passivation procedures	all UK catalogued objects monthly		
UKSDA-SR-7819	- Payload Deployment	all UK catalogued objects monthly		
UKSDA-SR-7820	- Rotation Axis	all UK catalogued objects monthly		
UKSDA-SR-7900	Characterisation Evidence	All characterisation assessments shall be delivered with supporting data, evidence and an estimate of accuracy	Evidence and accuracy data is provided with all characterisation assessments	
UKSDA-SR-8000	Characterisation Delivery	Characterisation results including confidence but not including evidence shall be provided in a timely fashion for high priority RSOs	24 hours	
UKSDA-SR-8100		Characterisation results including confidence and evidence shall be provided in a timely fashion for high and routine priority RSOs	Weekly	
UKSDA-SR-8300	System Maintenance	All software and hardware of the SoS shall be supported and maintained throughout its life		
UKSDA-SR-8400	EM Monitoring	The SoS shall support the monitoring and reporting of EM spectrum interference, jamming, and spoofing to, in and from space		

ID	Requirement Heading	Requirement Description	Thresholds Civil / Military	Priority
UKSDA-SR-8500	Space Environment Monitoring and Forecasting	The SoS shall support space environment monitoring through utilisation of space weather data, modelling and decision-tool processing capabilities		★
UKSDA-SR-8501		The SoS Data shall include space environment data and reports containing all information relevant to support operational needs including Post Event Analysis and user configurable notifications		
UKSDA-SR-8502		The SoS Data shall provide forecasts for space weather	4 days	
UKSDA-SR-8503		The SoS Data shall be capable of processing Space Weather data to produce assessment of impacts to specific missions		
UKSDA-SR-8504		The SoS shall support modelling, simulation and characterisation of the space environment and everything in it		
UKSDA-SR-8600	Mission Impact Reports	The SoS shall be capable of ingesting user/mission impact reports and incorporate data/information as appropriate		
UKSDA-SR-8700	User Training	The SoS shall include appropriate training materials to enable appropriate user integration		★

Annex C – Acronyms and Definitions

Acronym	Definition	Additional Notes
BEO	Beyond Earth Orbit	Beyond Earth orbit is the region beyond GEO, bounded herein to within the solar system, but cis-lunar in the first instance
C2	Command and Control	Mil Def - JDP040 - here this pertains to C2 of Sensors, NSpOC, space enterprise, Multi-Domain Integration and Multi-national operations
Catalogue	Catalogue	A database of RSO (and/or future RSOs/UCTs)-specific positional, characterisation, and/or other data/information
CCSDS	Consultative Committee for Space Data Systems	Committee that develops space standards
CNI	Critical National Infrastructure	Assets that are essential for the functioning of UK society and/or the economy
COLA	Conjunction on Launch Assessment	Orbital Downrange clearance, Note: US definition different (US-L-COLA). The Conjunction on Launch Assessment is the process of identifying potential conjunctions between the planned trajectory of a launch vehicle in time against other space objects, such as trackable debris, active spacecraft, inactive spacecraft, and rocket bodies, and analyst objects not in any public catalogues, as well as any Space Stations (e.g., ISS, Tiangong) and vehicles transiting to and from it
EM	Electromagnetic	Physical interaction among electric charges, magnetic moments and electromagnetic fields
GEO	Geosynchronous Regime	Note: The use of GEO in requirements encompasses the various GEO regions and associated graveyard orbits as discussed below
GEO-Stat	Geostationary Orbit	Equatorial Orbits at 35,786km altitude
GEO-Sync	Geosynchronous Orbit	Geosynchronous orbits have a minimum altitude 35,586km, and maximum altitude of 35,986km, with maximum +-15 degrees inclination, as per IADC guidelines
GEO-Incl	Highly Inclined Geosynchronous Orbit	Geosynchronous orbits have a minimum altitude 35,586km, and maximum altitude of 35,986km, with minimum +-15 degrees inclination
GEO-Grave	Graveyard Orbits above Geosynchronous region	The graveyard region exist above Geosynchronous Orbits, extending from 35,986km to 37,000km
HEO	Highly Elliptical Orbit	Orbit whose eccentricity is greater than 0.25. Typically used for transfer orbits. An object in a HEO could pass through both LEO and GEO regions
IADC	Inter-Agency Space Debris Coordination Committee	The Inter-Agency Space Debris Coordination Committee (IADC) is an international forum of space agencies, authorised governmental or inter-governmental entities for the coordination of activities related to the issues of human-made and natural debris in space
LEO	Low Earth Orbit	LEO is defined herein as an orbit where apogee and perigee are both within 2,000km altitude
MEO	Medium Earth Orbit	MEO is defined as the region between LEO and GEO, from 2,000km to 35,586km altitude
RSO(s)	Resident Space Object(s)	A man-made object in space, excepting objects on ballistic trajectories
SDA	Space Domain Awareness	The provision of security-focused, decision-quality information that can be used to successfully mitigate adversary space effects while supporting the integration of allied space effects into multi-domain operations. (From JDP-040 UK Space Power)
SoS	System of Systems	A set or arrangement of interdependent systems that are related or connected to provide an enhanced measure of capability. The loss of one component system will degrade the performance of the whole but not necessarily affect the performance of the individual systems. In this case the SDA SoS shall include (but not limited to) sensors, software, data ingestion, data storage, data handling, data dissemination, data processing and analysis, training and simulation, data and information visualisation, and interface (internal and external) capabilities
SSA	Space Situational Awareness	The provision of sufficient understanding of the risks and hazards associated with domain congestion and complexity to enable safe and effective space operations. (From JDP-040 UK Space Power)

Acronym	Definition	Additional Notes
SST	Space Surveillance and Tracking	The detection, tracking and identification of objects in or entering the space domain, using data from sensor observations and satellite operators, sufficient to deliver effective space situational awareness, space domain awareness and missile warning. (From JDP-040 UK Space Power)
Surveillance	Surveillance	Persistent monitoring of a particular region of space in order to detect RSO/UCTs
Tracking	Tracking	Directed detection of a specific RSO/UCT and generation of a sequence of positional information
UCT	Uncorrelated Tracks	Where a series of observations have been correlated as belonging to the same object, but that object has not yet been identified



Developed by the Ministry of Defence and the UK Space Agency, with support from:

