

Lot 043 - Robotics, Autonomous Systems or Artificial Intelligence

Lot Description Document

As guidance this **Robotics, Autonomous Systems or Artificial Intelligence (RAS/RAI)** Lot includes projects funded to produce innovative ways of improving the competitiveness and extending the areas/domains of coverage of the UK's Robotics, Autonomous Systems or Artificial Intelligence (RAS/RAI) Sector. The RAS/RAI sector's main application areas/domains include:

- service robotics for professional or personal applications
- robotics and artificial intelligence (AI) for inspection and maintenance
- health and social care, including assistive technologies, patient care and robotic surgery
- entertainment robotics
- next generation farming
- next generation and SME manufacturing
- autonomous transport, including automotive, aerospace and rail applications
- AI for autonomous systems

These projects contribute to the UK through economic impact and societal impact performing the related tasks faster, safer, better and at lower cost.

Robotics systems are machines (or cyber-physical systems) that are capable of carrying out actions or tasks (usually dull, dirty or dangerous) on behalf of humans. They can be remotely controlled, automated or autonomous.

Autonomous systems are systems that are capable of achieving goals or objectives by conforming to a set of rules or laws. These laws define or constrain their behaviour, without explicit execution rules. This means they have "decisional" autonomy and demonstrate emergent behaviour employing AI technologies. They may be either cyber or cyber-physical.

Regarding Artificial intelligence (AI), many different technologies need to be brought together to make an Autonomous/AI system function, including: sensing, situational awareness, natural language processing, reasoning, machine learning, knowledge representation, planning, higher level cognition or general intelligence.

A prospective Monitoring Services provider must demonstrate their capability and relevant experience to provide monitoring assurance of projects addressing any of the scope described above in this lot, which is unique, within this DPS, to the RAS/RAI Lot.

Monitoring Officers will be key personnel that will be required to interact with senior stakeholders and provide value add to the project through their presence and engagement. Demonstration of strategic thinking with self-motivation to adapt and succeed whatever the challenge and with a focus on working with people to secure organisational results.

Monitoring Officers for this Lot must have:

- Knowledge of industry bodies specific to this Lot, its manufacturers, its value streams, technological evolutions and supply chains
- Full understanding of the key stakeholders and their inter-relationships
- Intimate knowledge of start-up culture, business models and SME finances/cash flow is required
- A minimum of 36 months experience in Robotics, Autonomous Systems or Artificial Intelligence or similar relevant area (such as Electronics & Instrumentation, Instrumentation, Control Systems, Locomotion systems, Power Systems for robots/cars, Embedded Real-Time Systems, Computer Vision, Digital Signal & Image Processing, Sensor and Actuator design, Hardware & Software Development, Systems Engineering) at management / decision making level and;
 - a) hold a degree or post-graduate qualification (or industry recognised equivalent) in a scientific or technical discipline such as Computer & Electronics Engineering, Electrical Engineering, Mechanical Engineering, Mechatronics and Robotics Engineering and / or;
 - b) hold up to date Accreditation with a relevant industry body or learned society

Project management experience is essential and must be demonstrated during application to the DPS, however formal project management qualifications (e.g. PRINCE 2) are NOT required.

Applicants must confirm which categories **specific to this LOT** they specialise in that are mandatory for this Lot:

- Systems Engineering (SE) specific to Robotics, Autonomous Systems or Artificial Intelligence (RAS/RAI)
- Project management (PM) specific to Robotics, Autonomous Systems or Artificial Intelligence (RAS/RAI)

Applicants must confirm which sub-categories listed below specific to Robotics, Autonomous Systems or Artificial Intelligence (RAS/RAI) they specialise in that may be required for projects within this Lot:

- Concept and Technology Development
- System Development
- Production, Deployment, Sustainment, Disposal, etc
- Systems Modelling & Simulation

- System Verification, Validation, Certification
- System Interoperability
- Electronics
- Control Systems
- Locomotion systems
- Power Systems for robots/cars/unmanned systems
- Avionics
- Embedded Real-Time Systems
- Computer/machine Vision
- Digital Signal & Image Processing
- Sensor and Actuator design
- Hardware or Software Development
- Sensing systems
- Situational awareness
- Natural language processing
- Machine learning
- Knowledge representation
- Planning
- Higher level cognition or general intelligence
- Data analytics
- Cloud & fog technologies
- Telecommunications & Networking
- Cyber Security

Reference case studies will be required to demonstrate the Applicant's relevant experience, that demonstrates how you have successfully approached each of the following issues which are relevant to the characteristics of this Lot. Further information is available in the Applicant Guidance document.