EUROPEAN
COMMISSION

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ANNEX

**ANNEX**

**to the**

**Commission Recommendation**

**on critical technology areas for the EU's economic security for further risk assessment with Member States**

**ANNEX**

**List of 10 critical technology areas for the EU's economic security**

| | Technology Area | Technologies*<br>**The technologies listed for each area are a likely focal point for risk assessment but are not exhaustive* |
|---|---|---|
| 1. | **ADVANCED SEMICONDUCTORS TECHNOLOGIES** | • Microelectronics, including processors<br>• Photonics (including high energy laser) technologies<br>• High frequency chips<br>• Semiconductor manufacturing equipment at very advanced node sizes |
| 2. | **ARTIFICIAL INTELLIGENCE TECHNOLOGIES** | • High Performance Computing<br>• Cloud and edge computing<br>• Data analytics technologies<br>• Computer vision, language processing, object recognition |
| 3. | **QUANTUM TECHNOLOGIES** | • Quantum computing<br>• Quantum cryptography<br>• Quantum communications<br>• Quantum sensing and radar |
| 4. | **BIOTECHNOLOGIES** | • Techniques of genetic modification<br>• New genomic techniques<br>• Gene-drive<br>• Synthetic biology |
| 5. | **ADVANCED CONNECTIVITY, NAVIGATION AND DIGITAL TECHNOLOGIES** | • Secure digital communications and connectivity, such as RAN & Open RAN (Radio Access Network) and 6G<br>• Cyber security technologies incl. cyber-surveillance, security and intrusion systems, digital forensics<br>• Internet of Things and Virtual Reality<br>• Distributed ledger and digital identity technologies<br>• Guidance, navigation and control technologies, including avionics and marine positioning |
| 6. | **ADVANCED SENSING TECHNOLOGIES** | • Electro-optical, radar, chemical, biological, radiation and distributed sensing<br>• Magnetometers, magnetic gradiometers<br>• Underwater electric field sensors<br>• Gravity meters and gradiometers |

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|---|---|---|
| **7.** | **SPACE & PROPULSION TECHNOLOGIES** | • Dedicated space-focused technologies, ranging from component to system level<br>• Space surveillance and Earth observation technologies<br>• Space positioning, navigation and timing (PNT)<br>• Secure communications including Low Earth Orbit (LEO) connectivity<br>• Propulsion technologies, including hypersonics and components for military use |
| **8.** | **ENERGY TECHNOLOGIES** | • Nuclear fusion technologies, reactors and power generation, radiological conversion/enrichment/recycling technologies<br>• Hydrogen and new fuels<br>• Net-zero technologies, including photovoltaics<br>• Smart grids and energy storage, batteries |
| **9.** | **ROBOTICS AND AUTONOMOUS SYSTEMS** | • Drones and vehicles (air, land, surface and underwater)<br>• Robots and robot-controlled precision systems<br>• Exoskeletons<br>• AI-enabled systems |
| **10.** | **ADVANCED MATERIALS, MANUFACTURING AND RECYCLING TECHNOLOGIES** | • Technologies for nanomaterials, smart materials, advanced ceramic materials, stealth materials, safe and sustainable by design materials<br>• Additive manufacturing, including in the field<br>• Digital controlled micro-precision manufacturing and small-scale laser machining/welding<br>• Technologies for extraction, processing and recycling of critical raw materials (including hydrometallurgical extraction, bioleaching, nanotechnology-based filtration, electrochemical processing and black mass) |

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For the Secretary-General

Martine DEPREZ
Director
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EUROPEAN COMMISSION