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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

<b>Technology Area</b>	<b>Technologies*</b>
1. <b>ADVANCED SEMICONDUCTORS TECHNOLOGIES</b>	<i>*The technologies listed for each area are a likely focal point for risk assessment but are not exhaustive</i> <ul style="list-style-type: none"><li>• Microelectronics, including processors</li><li>• Photonics (including high energy laser) technologies</li><li>• High frequency chips</li><li>• Semiconductor manufacturing equipment at very advanced node sizes</li></ul>
2. <b>ARTIFICIAL INTELLIGENCE TECHNOLOGIES</b>	<ul style="list-style-type: none"><li>• High Performance Computing</li><li>• Cloud and edge computing</li><li>• Data analytics technologies</li><li>• Computer vision, language processing, object recognition</li></ul>
3. <b>QUANTUM TECHNOLOGIES</b>	<ul style="list-style-type: none"><li>• Quantum computing</li><li>• Quantum cryptography</li><li>• Quantum communications</li><li>• Quantum sensing and radar</li></ul>
4. <b>BIOTECHNOLOGIES</b>	<ul style="list-style-type: none"><li>• Techniques of genetic modification</li><li>• New genomic techniques</li><li>• Gene-drive</li><li>• Synthetic biology</li></ul>
5. <b>ADVANCED CONNECTIVITY, NAVIGATION AND DIGITAL TECHNOLOGIES</b>	<ul style="list-style-type: none"><li>• Secure digital communications and connectivity, such as RAN &amp; Open RAN (Radio Access Network) and 6G</li><li>• Cyber security technologies incl. cyber-surveillance, security and intrusion systems, digital forensics</li><li>• Internet of Things and Virtual Reality</li><li>• Distributed ledger and digital identity technologies</li><li>• Guidance, navigation and control technologies, including avionics and marine positioning</li></ul>
6. <b>ADVANCED SENSING TECHNOLOGIES</b>	<ul style="list-style-type: none"><li>• Electro-optical, radar, chemical, biological, radiation and distributed sensing</li><li>• Magnetometers, magnetic gradiometers</li><li>• Underwater electric field sensors</li><li>• Gravity meters and gradiometers</li></ul>

<b>7. SPACE &amp; PROPULSION TECHNOLOGIES</b>	<ul style="list-style-type: none"> <li>• Dedicated space-focused technologies, ranging from component to system level</li> <li>• Space surveillance and Earth observation technologies</li> <li>• Space positioning, navigation and timing (PNT)</li> <li>• Secure communications including Low Earth Orbit (LEO) connectivity</li> <li>• Propulsion technologies, including hypersonics and components for military use</li> </ul>
<b>8. ENERGY TECHNOLOGIES</b>	<ul style="list-style-type: none"> <li>• Nuclear fusion technologies, reactors and power generation, radiological conversion/enrichment/recycling technologies</li> <li>• Hydrogen and new fuels</li> <li>• Net-zero technologies, including photovoltaics</li> <li>• Smart grids and energy storage, batteries</li> </ul>
<b>9. ROBOTICS AND AUTONOMOUS SYSTEMS</b>	<ul style="list-style-type: none"> <li>• Drones and vehicles (air, land, surface and underwater)</li> <li>• Robots and robot-controlled precision systems</li> <li>• Exoskeletons</li> <li>• AI-enabled systems</li> </ul>
<b>10. ADVANCED MATERIALS, MANUFACTURING AND RECYCLING TECHNOLOGIES</b>	<ul style="list-style-type: none"> <li>• Technologies for nanomaterials, smart materials, advanced ceramic materials, stealth materials, safe and sustainable by design materials</li> <li>• Additive manufacturing, including in the field</li> <li>• Digital controlled micro-precision manufacturing and small-scale laser machining/welding</li> <li>• Technologies for extraction, processing and recycling of critical raw materials (including hydrometallurgical extraction, bioleaching, nanotechnology-based filtration, electrochemical processing and black mass)</li> </ul>

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 For the Secretary-General  
  
**Martine DEPREZ**  
 Director  
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