



Strasbourg, 3.10.2023
C(2023) 6689 final

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

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