

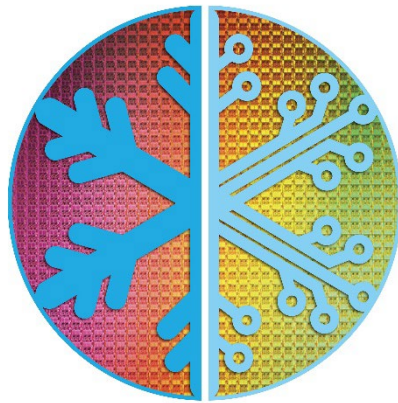
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Advanced Research on Cryogenic Technologies for
Innovative Computing



ARCTIC

ARCTIC - Deliverable report

D8.5- Initial Exploitation Plan

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About ARCTIC

The rise of quantum technology has opened the eyes of the ICT industry with respect to cryogenics. It is considered an enabler bringing in quantum functionalities and enhanced system performance and we are observing a massive growth of cryogenics from coolers to cryogenic electronics and photonics. ARCTIC is a joint effort of top European RTOs, industrial fabrication facilities, and leading application partners (23 industrial among which 14 SMEs, 7 RTO, 6 academic), sharing the vision to take a joint EU step towards the era of cryogenic classical and quantum microsystems. We aim to close the gap between qubit research and interfacing control machinery, highly needed for scaled-up quantum systems. The main goal of ARCTIC is to develop scalable cryogenic ICT microsystems and control technology for quantum processors. The technologies developed will have applications in many fields from sensing to communication, leading to important cross-fertilization that will strengthen the forming European ecosystem on cryogenic classical and quantum microsystems. ARCTIC will advance semiconductor technologies and materials, and tailor these for QT requirements and cryogenic applications. Multi-scale physics and data-driven models, cryogenic PDK modelling, device characterization, circuit design activities will support the development of cryogenic microelectronics. We will develop quantum processor platforms and broaden the applicability of microelectronic devices and circuits for cryogenic operation by developing cryo-compatible ultra-low loss substrates and thin-films, microelectronic and photonic circuits, semiconductor packaging and heterogeneous-integration techniques and benchmark the developed technologies.

Scientific and Industrial ARCTIC-demonstrators and applications are driving our developments enabling the European industry to maintain and expand its leading edge in semiconductor components and processes and QT and strengthen sustainable manufacturing technologies.

ARCTIC consortium members



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Publishable summary

This is an internal deliverable describing the initial exploitation strategy of ARCTIC. With exception of the information in the current section “Publishable summary”, the content of this report is confidential.

Within ARCTIC’s first 6 months, the individual exploitable results (ER) per consortium member were collected. Together with a defined Exploitation Board, the ER’s were grouped into 8 Key Exploitable Results (KER), in close connection with the existing project structure. The outcome of this initial exploitation plan is the KER:

- Improved cryo materials to fabricate cryogenic devices and components;
- Simulation software for cryogenic technologies;
- Simulation and control software for qubits;
- Methodologies for controlling and reading qubits;
- Emerging electronic and photonic devices;
- Knowledge of how to perform 3D integration and packaging with cryo compatible materials.
- Methods to screen high quantity of novel cryogenic devices and accelerate testing at ultra-low temperature;
- ARCTIC Quantum Community for Cryogenic Testing.

