SYNERGY-00003 | HAQCES

Cronoprogramma di attuazione

Milestone	*Descrizione Milestone*	*Annualità 1* Anno 2027	*Annualità 2* Anno 2028	*Annualità 3* Anno 2029
M1.1 Infrastructure Access Established M1.2 Quantum Internet Architecture Defined	Establish a coordinated framework for access to national HPC, AI, cloud and quantum computing resources, aligning infrastructure capabilities with project requirements. Define access and allocation mechanisms and support the integration of complementary resources for hybrid HPC–quantum workflows. Define a roadmap for national quantum communication infrastructure, identifying existing initiatives, priority QKD and Quantum Internet routes, infrastructure gaps and future development needs. Establish an integrated R&D facility for designing, prototyping and validating quantum communication systems, including photonic technologies, QKD, entanglement-based systems, synchronization and single-photon detection.			
M2.2 Software Development internal review M2.1 Efficiency Benchmark Suite and Metrics M2.3 AI for Quantum Architecture Search	Develop quantum and quantum-inspired algorithms by combining classical numerical methods for large-scale quantum simulation with novel algorithms for NISQ and fault-tolerant devices. include tensor-network simulations, variational quantum algorithms, monomial-propagation methods, benchmarking and quantum error mitigation and correction. Develop novel AI architectures that reduce computational and energy costs while maintaining performance, reliability, transparency and interpretability, supported by advanced computational infrastructures. Develop hybrid quantum–AI methodologies for automated quantum circuit design and the training and optimization of machine-learning models. Integrate AI-driven circuit design, tensor-network machine learning, and quantum and quantum-inspired optimization into scalable, reusable workflows across heterogeneous classical and quantum computing environments.			
M3.1 Quantum Communication Laboratory Upgrade M3.2 Green AI Metrics	Develop sustainable, trustworthy and human-centric AI through energy-efficient models, multimodal architectures, tensor-network machine learning, explainability, AI governance and safety frameworks. Assess the environmental footprint of AI and hybrid HPC–quantum workflows through energy metrics and benchmarking methodologies, supporting responsible deployment and the evaluation of future green quantum advantage.			
M3.3 Sovereign AI pipeline validation M3.4 Benchmark optimization use cases and performance metrics defined	Combine privacy-preserving edge AI, post-quantum cryptography, quantum communication and quantum-inspired algorithms to address cybersecurity and secure networking challenges. Develop and validate solutions for secure communications, transparent cybersecurity analysis, fraud detection and anti-financial crime applications under realistic operational conditions. Develop quantum computing pipelines for biomolecular modelling, quantum chemistry, molecular discovery, drug discovery and materials design. Explore AI- and quantum-enabled clinical decision-support tools based on multimodal clinical data and QUBO optimization for patient pathway allocation, supported by advanced HPC technologies.			
M4.1 Kick-off M4.2 First industrial workshop Overall Innovation Poles activity	Support the creation of a national ecosystem integrating AI, HPC, and quantum technologies by fostering collaboration among research centres, industry, and public stakeholders. Focus on networking and capability building in the first year, the development and validation of technology-transfer and industrial engagement actions in the second year, and the consolidation of exploitation, dissemination, and sustainability initiatives in the final year. Assess the industrial impact and strategic opportunities arising from the convergence of quantum computing, HPC and AI, examining use cases, technological maturity and adoption pathways. Analyse cybersecurity implications, post-quantum cryptography strategies, industrial ecosystems and value chains to develop a roadmap for industrial uptake.			

Cronopramma delle rendicontazioni

Piano dei costi				
Milestone	**M1.1, M1.2, M2.2, M3.2, M4.1, M4.2**	**M2.1, M2.3, M3.1, M3.3, M3.4,**	**Results consolidation**	**Totale**
HUB National Center for HPC Big Data and Quantum Computing	**249.824,65 €**	**99.824,65 €**	**99.824,65 €**	**449.473,94 €**
Poli d'Innovazione	249.824,65 €	99.824,65 €	99.824,65 €	449.473,94 €
NQSTI Società consortile a responsabilità limitata	**47.943,89 €**	**47.943,89 €**	**47.943,89 €**	**143.831,66 €**
Poli d'Innovazione	47.943,89 €	47.943,89 €	47.943,89 €	143.831,66 €
Future Artificial Intelligence Research (FAIR) Foundation	**47.943,89 €**	**47.943,89 €**	**47.943,89 €**	**143.831,66 €**
Poli d'Innovazione	47.943,89 €	47.943,89 €	47.943,89 €	143.831,66 €
Fondazione RESTART	**47.943,89 €**	**47.943,89 €**	**47.943,89 €**	**143.831,66 €**
Poli d'Innovazione	47.943,89 €	47.943,89 €	47.943,89 €	143.831,66 €
UNIVERSITÀ DEGLI STUDI DI PADOVA	**184.284,31 €**	**112.368,48 €**	**103.379,00 €**	**400.031,79 €**
Ricerca Industriale	184.284,31 €	112.368,48 €	103.379,00 €	400.031,79 €
Politecnico di Milano	**181.287,82 €**	**109.371,99 €**	**100.382,51 €**	**391.042,32 €**
Ricerca Industriale	181.287,82 €	109.371,99 €	100.382,51 €	391.042,32 €
CINECA Consorzio Interuniversitario	**160.312,37 €**	**88.396,54 €**	**79.407,06 €**	**328.115,97 €**
Ricerca Industriale	160.312,37 €	88.396,54 €	79.407,06 €	328.115,97 €
CNR - Consiglio Nazionale delle Ricerche	**458.763,05 €**	**185.482,91 €**	**151.322,89 €**	**795.568,85 €**
Ricerca Industriale	458.763,05 €	185.482,91 €	151.322,89 €	795.568,85 €
ThinkQuantum Srl	**492.923,08 €**	**299.649,29 €**	**106.375,49 €**	**898.947,86 €**
Ricerca Industriale	462.958,15 €	269.684,36 €	76.410,56 €	809.053,07 €
Sviluppo Sperimentale	29.964,93 €	29.964,93 €	29.964,93 €	89.894,79 €
Intesa Sanpaolo Spa	**492.923,08 €**	**299.649,29 €**	**106.375,49 €**	**898.947,86 €**
Ricerca Industriale	462.958,15 €	269.684,36 €	76.410,56 €	809.053,07 €
Sviluppo Sperimentale	29.964,93 €	29.964,93 €	29.964,93 €	89.894,79 €
Algorithmiq Italia Srl	**420.407,96 €**	**265.788,91 €**	**212.750,99 €**	**898.947,86 €**
Ricerca Industriale	270.583,31 €	115.964,27 €	62.926,35 €	449.473,93 €
Sviluppo Sperimentale	149.824,65 €	149.824,64 €	149.824,64 €	449.473,93 €
iStella Spa	**151.322,90 €**	**97.386,02 €**	**56.933,35 €**	**305.642,27 €**
Ricerca Industriale	141.134,82 €	87.197,94 €	46.745,28 €	275.078,04 €
Sviluppo Sperimentale	10.188,08 €	10.188,08 €	10.188,07 €	30.564,23 €
TOT Previsioni di spesa	**2.935.880,87 €**	**1.701.749,74 €**	**1.160.583,09 €**	**5.798.213,70 €**
Piano delle erogazioni	**I anticipazione pari a 80% (max 80%)**	**II anticipazione pari a 10%**	**/**	**Saldo 10%**
	3.737.825,23 €	467.228,15 €	0,00 €	467.228,15 €

Largo Antonio Ruberti n. 1 – 00153 Roma
Indirizzo di PEC: dgprogric@pec.mur.gov.it
Tel. 06 5849 7469 - C.F.: 96446770586