

QMPC

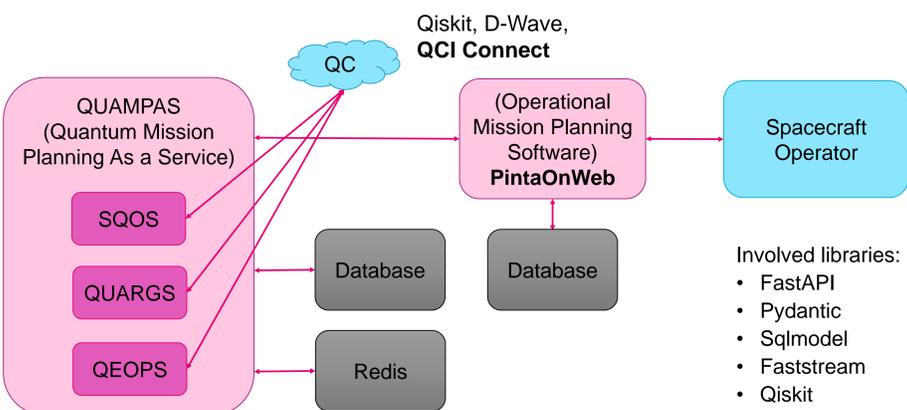
Optimization for Mission Planning in Spacecraft Operations

QMPC solves three realistic mission planning problems using various quantum algorithms and creates an interface between the classical planning system and quantum computers.

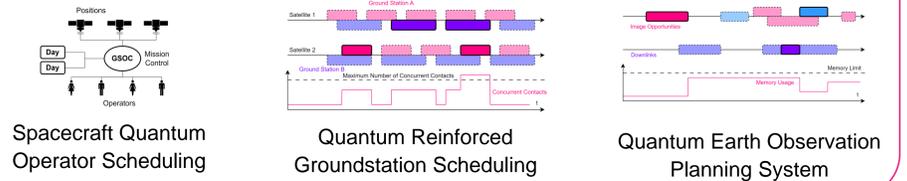
- Applications
- Optimization



Integration of QC Services into Operational Environment at GSOC



Three Sample Problems in Mission Planning

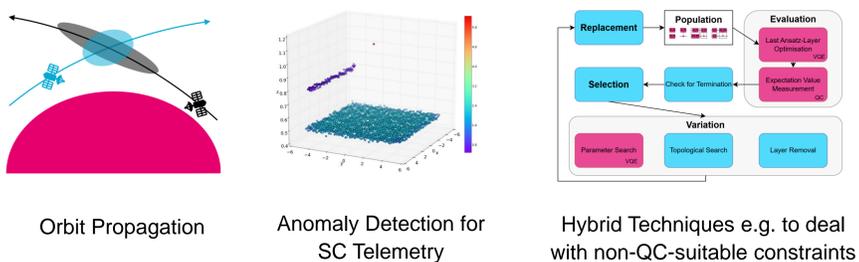


Benchmarking of Various Optimization Algorithms

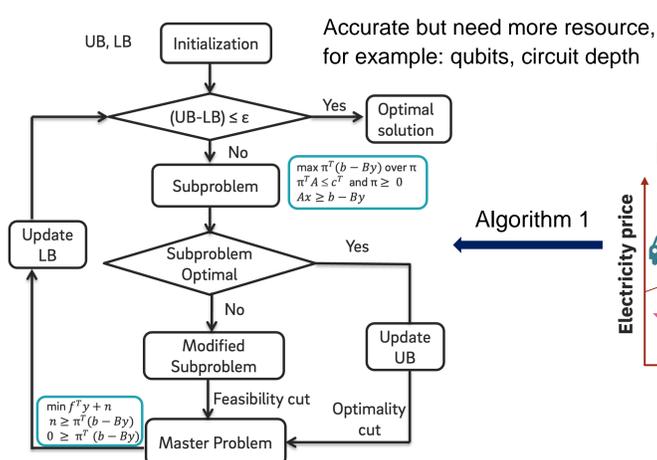
Algorithm	SQOS	QUARGS	QEOPS
SCIP	✓	✓	
OR-Tools			✓
Grover	✓		
D-Wave Ocean		✓	
Quark			✓
QAOA	✓	✓	
VQE	✓		✓
F-VQE	✓		
E-VQE		✓	

Further potential algorithms: AdaptVQE, ExcitationSolve, Recursive QAOA
 QUARGS and QEOPS allow for mixed-integer versions

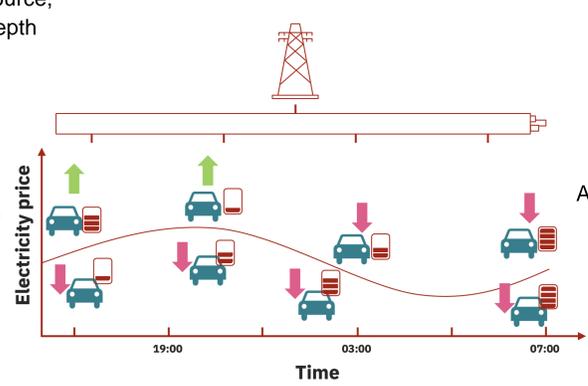
Finding suitable Problems in Spacecraft Operations for Quantum Computing



Hybrid Benders Decomposition For Exact DESS Optimization

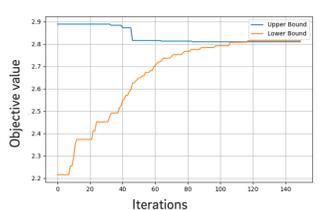
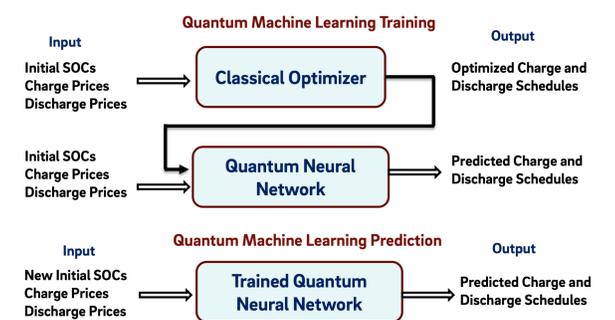


DESS Problem e-on

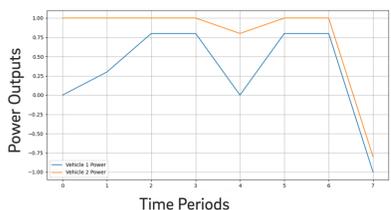


Data Driven Approach Using Quantum Neural Network

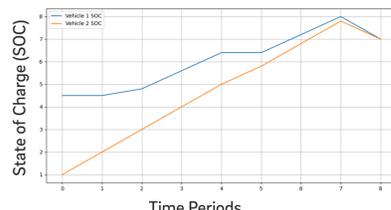
Less accurate but need less qubits, circuit depth. Good for when fast decision is needed



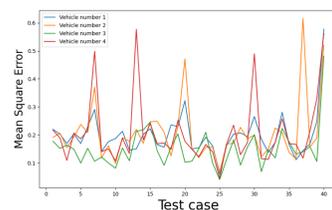
Convergence Curve for hybrid BD



Sample Power output profile from hybrid BD



Sample SOC profile from hybrid BD



MSEs from QML prediction for 40 test samples



More information about the project on our website

A project of



Contractor



Contact

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Get in touch. We enable quantum!

