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System architecture of the upcoming BE-OI ice-coring-drill drive-chain

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The upcoming deep ice-coring project Beyond EPICA Oldest Ice (BE-OI) in Antarctica requires a robust and capable electrical drive-chain. The design goal was to increase the useable mechanical power of the drill motor as well as the data transfer between the surface and the downhole section by keeping the system as compatible as possible to existing dill systems.
The system consists of a brushless-direct-drive electrical motor with controller, a high voltage DC power supply and modem pair, which operates over a 4 km long steel armoured coaxial cable. Component tests was conducted by shallow coring of about 100 m at Neumayer 3 (2016) and
80 m EastGRIP (2017). Additionally a full drive-chain test deployment was performed in the EDML borehole up to 2600m depth in December 2018.

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