

# A multipurpose SQUID receiver for electromagnetic measurements

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## ABSTRACT

Geophysical exploration is getting more and more difficult – many of the easy explorable ore-bodies are exploited or under production. Finding new mines requires new technologies and tools. Transient Electromagnetics (TEM) is widely used in mineral exploration, but conventional sensors (especially induction coils) cannot fulfil the needs anymore: deep targets, very conductive targets or targets under conductive overburden are much better (or sometimes only) detectable using SQUIDs. IPHT and Supracon AG are developing low temperature SQUID magnetometer systems for ground based TEM for Anglo American (AOL). As AOL is applying these systems worldwide it is necessary to harden the systems for all conceivable application scenarios.

The new multipurpose SQUID system features two orthogonal sets of SQUIDs of different sensitivities: the “low” sensitivity SQUIDs (about  $20\text{fT}/\sqrt{\text{Hz}}$ ) are meant for active methods like TEM that require high slew rates, while the sensitivity channels (below  $2\text{fT}/\sqrt{\text{Hz}}$ ) shall be used for passive methods (MT) or methods with low signals like TEM in slingram configuration.

Here, we report on the latest development of these systems which are now routinely used in South Africa, Australia, Finland and Canada. This paper highlights the main features of the system, gives an estimate of the intrinsic sensor noise in shielded environment as well as in the typical exploration setup and will show some results from a first MIP test.

**Key words:** SQUID, magnetic field sensor, exploration, noise