Braunschweig, August 24th 2011

Dear Sirs,

the Bachelor thesis of Roman Pavelka comprises the theoretical basic principles of a fluxgate magnetometer, a review of magnetometers currently applied in space missions and an experimental part in which he exercises his theoretical background in practice.

The physics to understand the fluxgate mechanism are very well presented. Explaining the fluxgate sensor by a transformer, which becomes non-linear if the primary current drives the magnetic material into saturation and which becomes non-symmetric if an external field is applied is very descriptive. Various sensor geometries and the functionality of the main electronics modules (drive, sense and feedback) are well understood.

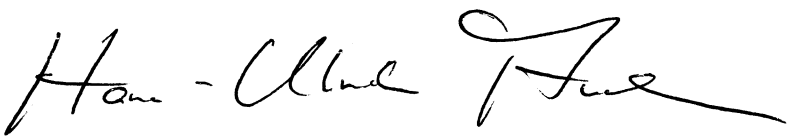
Both presented magnetometers for measurements on satellites, the Oerstedt magnetometer and the Themis magnetometer, are well selected. The Oerstedt mission requires a challenging precision for measuring the full Earth field vector absolutely, therefore this instrument – together with a star camera - is the standard instrument for investigating internal field sources by Low Earth Orbit satellites. The Themis magnetometer uses robust technologies for sensor (wide temperature range) and electronics (near sensor digitisation) and operates on many satellites in the Earth magnetosphere and on missions to extraterrestrial objects.

It is very commendable that in the very short time of a Bachelor project a fully functional magnetometer has been build up, starting from a push pull output stage for the drive circuitry and a hand made sensor up to a processor controlled acquisition system. It is a pleasure to see, that the work with fundamentals has been given the prominence.

It cannot be expected that the complex behaviour of parameter like temperature dependence is investigated, however basic features like noise, offset, linearity should be expected in the chapter "Testing". In plots showing the experimental results labels and units are missing. The aim to measure sun triggered activities of the Earth magnetic field has been expressed in the abstract. It is a little bit dissatisfying that all the effort spent before in theory and hardware does not culminates in the promised measurement result. Apparently not sufficient time for testing left and/or the advisors spend not sufficient advertence to that point.

Roman Pavelka did a great job in his theoretical analysis, he presented the state of the art clearly and he designed and manufactured both, a fluxgate sensor and electronics. He demonstrates that he is able to turn his theoretical knowledge over in a fully functional magnetic field experiment. The only drawback is the lack of test results describing the features of the magnetometer. For that reason the work can only be classified as very good (B) and not as excellent.

Sincerely,



Hans Ulrich Auster