

## Keynote Address

**Werner Magnes**

**(Space Research Institute, Austrian Academy of Sciences)**

### Development of Space Magnetometers in Austria

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With spaceborne magnetic field measurements it is possible to investigate the interior of planets, moons and asteroids which have either an intrinsic or a crustal magnetic field. Furthermore, precise knowledge of the magnetic field is essential to derive fundamental information about the environment surrounding different bodies in the solar system as well as to explore the interplanetary space.

The first magnetometer developed in Graz was launched aboard the Russian (former USSR) VENERA-13 satellite to Venus in 1981. Others investigated Mars, asteroids and comets. The main targets of current and future missions will be the Earth, Mercury, Mars and Jupiter. The major international partners for the development of magnetometers, which must be well suited for the hostile space environment, are the Technical University of Braunschweig, the Imperial College London and the University of California, Los Angeles.

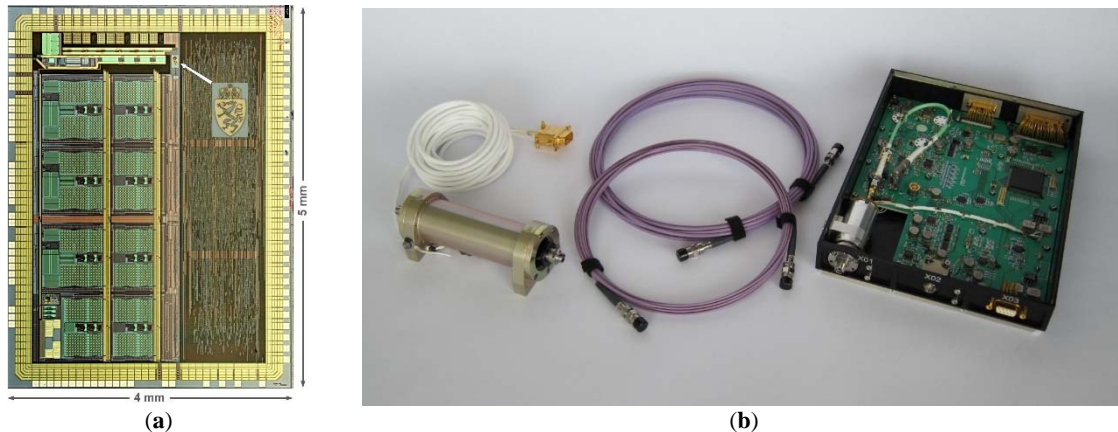
During the last years, the focus has been on the miniaturization of the near sensor electronics [1], [2] (Figure 1a) and the development of a new quantum interference based magnetometer, which was launched into low Earth's orbit aboard the Chinese CSES mission in February 2018 [3] (Figure 1b).

#### References

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2. Russell, C. T.; Anderson B. J., Baumjohann W., Bromund K. R., Dearborn D., Fischer D., Le G., Magnes W., et al: The Magnetospheric Multiscale Magnetometers, *Space Science Reviews*, **2014**, *199*, 189-256, doi:10.1007/s11214-014-0057-3, online: <https://link.springer.com/article/10.1007/s11214-014-0057-3> (accessed on 27 05 2018).
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**Figure 1.** (a) Space qualified Applications Specific Integrated Circuit for the readout of the fluxgate magnetic field sensors onboard NASA's Magnetospheric Multiscale Mission; (b) Flight model of the Coupled Dark State Magnetometer which was launched to its maiden flight on a Chinese rocket in February 2018.

## About Werner Magnes



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Werner Magnes is vice director of the Space Research Institute (IWF) of the Austrian Academy of Sciences. He obtained his PhD from the Graz University of Technology, A. He has worked on the development and calibration of space borne fluxgate magnetometers since 1992. Since 2002, he is in charge of the overall magnetometer development activities of IWF. He is Co-Investigator for the ESA Rosetta/Lander (comet Tschurjumow-Gerassimenko), ESA Venus Express, NASA MMS (Earth magnetosphere), ESA BepiColombo (Mercury) and ESA J-MAG/JUICE (Jupiter) magnetometers as well as project manager of the SOSMAG space weather magnetometer aboard the South Korean GEO-KOMPSAT 2A satellite.

Since 2008 he has managed the technology uplift of a quantum interference magnetometer which is developed in close cooperation with the Institute of Experimental Physics of the Graz University of Technology. The maiden flight of this newly developed instrument took place aboard a Chinese science mission in February 2018.

Dr. Magnes is also involved in lecturing about audio signal processors and development of space qualified hardware at the Graz University of Technology.