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ASSEMBLY, INTEGRATION AND TEST OF THE MAIUS-B PAYLOAD FOR THE SOUNDING  
ROCKET MISSIONS MAIUS-2/3

**Abstract**

After a successful launch (January 2017) of the first sounding rocket mission housing experiments on matter-wave interferometry, MAIUS-1 (Matter-Wave Interferometry under Microgravity) two sounding rocket missions, MAIUS-2 and MAIUS-3, are planned to perform sequential and simultaneous dual-species atom interferometry with Bose-Einstein condensates (BEC) of Potassium-41 and Rubidium-87. The scientific payload of the MAIUS missions will be launched on-board a VSB-30 sounding rocket from Esrange in Sweden. This allows for approximately 300 s of microgravity conditions and therefore offers a microgravity environment for experiments on timescales not accessible in ground based experiments. During ascent of the rocket, vibrational loads of up to 1.8 g RMS in the frequency range of 20-2000 Hz and accelerations of up to 13 g can occur. Furthermore, static loads, caused by the re-entry and the landing, can be as high as 50 g. Both missions MAIUS-2 and MAIUS-3 fly the same payload called MAIUS-B. The five main subsystems - physics package, laser system, electronics, laser electronics, and the batteries need to withstand this challenging environment, which requires an extensive environmental test campaign. After the successful Critical Design Review (CDR) of the payload end of 2018, the final design of the scientific payload of MAIUS-B has been finalized and will be presented in this paper as well as an overview on the five main subsystems. The assembly, integration and Test (AIT) are currently ongoing. The AIT activities, status and results will be explained in detail. This covers AIT of the different payload systems, the Ground Support Equipment (GSE), the hull segments, and the umbilicals for water and power/data connection. The paper will also give an outlook towards the final payload integration, bench tests and environmental test on the pathway towards a launch of MAIUS-2 in fall 2021.