



January 20, 2021

AccuBeat Management,
Mr. Benny Levy, CEO and Chief Engineer
Dr. Avinoam Stern, President and Chief Scientist
Mr. Rony Mann, USO Project Manager

Letter of appreciation regarding the USO for the JUICE project

Dear Benny, Avinoam and Rony,

In recent weeks, the European Space Agency (ESA) has been conducting performance tests for the FM1 space model of the Ultra Stable Oscillator (USO) made by AccuBeat. After successfully passing all of ESA's stringent testing, it has been fully approved for integration into the European flagship project JUICE (Jupiter ICy Moons Explorer) spacecraft. The space qualified USO, designed and manufactured by AccuBeat, and financed by the Israeli Space Agency, will serve as the central source of timing for communications in the JUICE mission, and will be an integral part of a radio-science occultation experiment that will probe Jupiter's atmosphere by following the phase variations of the radio-waves passing through the atmosphere while the spacecraft transmits to Earth using AccuBeat's ultra-high stability frequency source.

After receiving the phenomenal ADEV results of the USO's stability as shown below, I would like to express my deep appreciation to AccuBeat for developing and manufacturing this oscillator. According to the results shown in the graph below (and taking into account the instability of the Hydrogen Maser at one second shown on the left side), the stability of the USO is almost totally flat at $1E-13$ in time constants of 1 to 1000 seconds! These are fantastic results, and in my opinion this is the most stable USO in the world for deep space missions!

Throughout the development and production of this USO AccuBeat has shown exceedingly high scientific and engineering capabilities. This oscillator was developed for the JUICE mission in which Israel is a partner in a prestigious ESA project. Our team at the Weizmann Institute, in partnership with the group of Prof. Luciano Iess from La-Sapienza University in Rome, will be leading the atmospheric science experiment for the JUICE mission. Based on the excellent stability of the USO developed by AccuBeat we expect an unprecedented science return, allowing us for the first time to characterize the vertical structure of the atmosphere of Jupiter down to a level of 2 bar at excellent accuracy.

There is no doubt that this project, and especially the outstanding results of the USO, place

the State of Israel at the forefront of global science and technology in the field of deep space exploration, and is a great pride to all of us. I wholeheartedly look forward to continuing to work together with AccuBeat on future projects and wish us all success in the future.

Yours sincerely,

Yohai Kaspi

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Associate Professor

Weizmann Institute of Science

