EXPLORING THE CAPABILITIES OF LIBS AND LA-ICP-MS FOR HIGH-SPEED IMAGING. **C Derrick Quarles Jr.**,[1] Benjamin T. Manard,[2] Joe Petrus,[3] Lisa Balke[4], Uwe Karst[4], [1]Elemental Scientific, Inc., Omaha, NE, USA; [2]Oak Ridge National Laboratory, Oak Ridge, TN, USA; [3]Elemental Scientific Lasers, Bozeman, MT, USA; [4]University of Münster, Münster, Germany. (Derrick.Quarles@icpms.com)

The use of laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) has become an intriguing option for elemental imaging. This technique offers high-speed (≥1000 Hz), highly-spatial (nm to µm) information with excellent detection limits (sub-ppb to ppb). The only negative for ICP-MS is that it utilizes an atmospheric plasma generated by argon gas, therefore, atmospheric elements (H, N, O) and F (ionization potential is higher than that of Ar) are not accessible. Laser-induced breakdown spectroscopy (LIBS), when operated in a helium purged atmosphere can excite and detect H, N, O, and F, in addition to all other elements on the periodic table. Thus, combining LIBS and LA-ICP-MS provides elemental coverage for the entire periodic table. In this work, an 193 nm nanosecond excimer laser (imageGEO) is combined with a high-speed laser ablation cell and two LIBS detectors (multi-channel CMOS detector and an ICCD based detector). This presentation will go over how this combined LIBS and LA-ICP-MS technology works, in addition to going into applications that cover the geochemistry, battery, nuclear materials, and life science areas.