

MARTIAN POLAR SMALLSAT EXPLORER (MAPSE) K.-Michael Aye<sup>1</sup>, G. Holsclaw<sup>1</sup>, M. VanWoerkom<sup>2</sup> and G. Portyankina<sup>1</sup>; <sup>1</sup>Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder, CO 80303, USA ([Michael.Aye@lasp.colorado.edu](mailto:Michael.Aye@lasp.colorado.edu)), <sup>2</sup> ExoTerra, 10579 Bradford Rd, Suite 103, Littleton, CO 80127

**Introduction:** Advances in SmallSat technologies like attitude control and camera read-out electronics have made it possible to reduce the size of science-producing cameras to  $\approx 3 \times 1$  U (i.e. 30 x 10 x 10 cm). We are studying a SmallSat mission that would primarily focus on Martian south polar processes. Every local spring, CO<sub>2</sub> gas jets are predicted to erupt at the south pole of Mars through the seasonal CO<sub>2</sub> ice layer, as described by [1]. But, until today, no Martian remote sensing mission was able to observe these enigmatic jets, that do not have an Earth analog, in real time, we only see the deposits made. Model calculations from [2] indeed indicate an early morning to noon eruption time that was not met by a remote sensing mission yet. A secondary set of science goals will be the monitoring of water ice clouds that have a strong dependence on local time.

**Methods:** We partnered with SmallSat bus provider ExoTerra that is able to provide an ion-driven propulsion system with solar panels that provide adequate power at the Mars orbit. We have developed a preliminary optical design for a telescope that is reaching imaging capabilities near that of the MRO CTX camera. Planning this mission with a SmallSat enables us to adapt the local orbit to react on observations made.

We will present our current mission design in form of a poster.

**References:** [1] Kieffer, HH. *Journal of Geophysical Research*, 112:08005 (2007). doi:10.1029/2006JE002816. [2] Portyankina, G, Markiewicz, WJ, Thomas, N, et al. *Icarus*, 205:311–320 (2010). doi:10.1016/j.icarus.2009.08.029.