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MMS dayside magnetospheric observations during Active Spacecraft Potential Control (ASPOC) operation

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The NASA's Magnetospheric Multiscale (MMS) Mission was successfully launched in March, 2015. The region of scientific interest of MMS is in a tenuous plasma environment where the positive spacecraft potential may reach an equilibrium as high as several tens of Volts. The Active Spacecraft Potential Control (ASPOC) neutralizes the spacecraft potential by releasing positive indium ions and thereby controlling the spacecraft potential. While the method has been successfully applied on other spacecraft such as Cluster and Double Star, new developments in the design of the emitters and the electronics are enabling lower spacecraft potentials and higher reliability compared to previous missions. The floating potential in the dayside magnetosphere usually does not reach a high level compared to the night side lobe region. Yet, understanding the role of the very cold plasma component is one of the important topics for the dayside magnetic reconnection. Detecting such cold plasma require a very low spacecraft potential. In this paper, we present the initial results of ASPOC performances and also show some examples of dayside MMS observations when ASPOC was operating.