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The instrument ASPOC onboard Double Star TC-1 and first results of spacecraft potential control

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The instrument ASPOC actively controls the potential of the Double Star spacecraft TC-1 in a near-equatorial orbit. It employs liquid metal ion sources to generate an Indium ion beam which adds to the natural charging currents and thereby limits the spacecraft potential to a low positive value. The instrument is based on heritage from the Cluster mission, but carries newly designed ion emitters. These changes and the resulting capabilities are described. The spacecraft potential affects the measurements of the electron spectrometer PEACE on board. The details of this interaction can be investigated by operating the ion emitter at different currents and in all environments along the orbit of the spacecraft. Results from the first year of the mission are highlighted. Examples are presented showing that the controlled, low potential allows to detect cold electrons in the plasmasheet and to measure magnetosheath fluxes with higher accuracy. Part of the improvement is due to a lower flux of photo-electrons entering the sensors if the potential is low. The response of the photo-electrons to ion beam current and spacecraft potential can be studied with ASPOC as well, and the main features of this interaction are presented.