Diagnostics of a cold gas thruster with electron beams DENIS PACKAN, JEAN BONNET, PAUL-QUENTIN ELIAS, ONERA — In this study, we demonstrate the possibility of measuring the number density and the velocity in the plume of a cold gas thruster, using electron beams and optical diagnostics. The electron beam is generated by a secondary-emission electron gun. For number density measurements, the electron beam fluorescence technique is used, in a nitrogen plume. The intensity of the fluorescence signal, once calibrated, gives the absolute number density in the plume. For velocity measurement, done in an Argon plume, the electron beam is used to populate excited states of Argon. Laser Induced Fluorescence measurements at 772 nm are then done from one of this excited state to yield the velocity in the plume. These two techniques could be used together to map the plume, and thus measure mass flow rate, beam divergence or thrust vector.