The ESA Rosetta spacecraft reached comet 67P/Churyumov-Gerasimenko (67P) in August 2014, and over the course of the 2.5 year mission, many outbursts were seen. Close to perihelion in August 2015, a display of 34 outbursts on 67P (Vincent et al. 2016) were observed with the Optical, Spectroscopic, and Infrared Remote Imaging System (OSIRIS) and the Navigation Camera (NAVCAM). Many of these were also detected by the Microwave Instrument for the Rosetta Orbiter (MIRO). We hope to better understand the physics creating outbursts on the surface of comets and derive the dust/gas ratio by using the OSIRIS/NAVCAM images (more sensitive to the dust) and MIRO spectra (more sensitive to the gas). We use a Collisionless Gas Simulation to model the gas flow from the nucleus and in the coma, and are improving our fully-collisional DSMC model to calculate the excitation state of gases in the coma. The resulting gas models will then be used in a radiative transfer calculation to accurately simulate MIRO spectra. We have added dust-grains to our collisionless gas model, with dust trajectories controlled by gas drag, gravity and radiative pressure. We assume that the dust particles start with zero velocity at the nucleus surface, and are initially accelerated by gas flow perpendicular to the surface. A distribution of dust sizes is included in the model. Mie theory is used to calculate the optical properties of the dust, and we are in the process of simulating sunlight scattered by the dust particles. At the time of the meeting, we will present the physics of the models being used and hope to be able to compare simulated visible-wavelength images with OSIRIS and NAVCAM data.