Abstract: In this thesis, we study two different topics: collisional probability between two bodies and dynamics of the sporadic meteoroids in the Solar System. Determination of the collision probabilities in the Solar System is one of the important problems in modern celestial mechanics. Here, we generalize classical theories of the collisions between two bodies by Öpik, Wetherill or Greenberg by including the Kozai-Lidov oscillations, a mechanism that significantly change orbital eccentricity and inclination in the Solar System. Sporadic meteors have been studied for many decades providing a wealthy resource of data. Here, we build dynamical steady-state models for all known populations observed in the sporadic meteoroid complex based on the latest and most precise data provided by Canadian Meteor Orbit Radar (CMOR). Our models using the latest theories for cometary populations in the Solar System accurately describe observed sporadic background population. Our results are in agreement with observations provided by space probes *IRAS* and *LDEF*.