Cosmological inflation, which is the leading hypothesis to resolve the problems in the Big Bang theory, predicts that primordial gravitational waves were created during the inflationary era. Measurements of polarization of the CMB radiation are known as the best probe to detect the primordial gravitational waves. While the discovery of gravitational waves would in itself be a landmark event, it would also have a profound impact on cosmology; this is because it would allow us to determine the energy scale of the inflation. From the viewpoint of high-energy physics, the energy scale of the grand unified theories (GUTs) is a very natural energy scale for the occurrence of inflation. Further, next-generation CMB polarization experiments are expected to be sufficiently sensitive to explore the GUT scale. Therefore, CMB polarization is a unique tool for studies in both cosmology and high-energy physics.

In this review, the current experimental status and prospects of future projects will be discussed, emphasizing the importance of a future space satellite that will provide ultimate sensitivities. As an example of such projects, the LiteBIRD satellite will be described in some detail.