The ionosphere has a significant influence on trans-ionospheric radio-wave propagation that is progressively more pronounced as the frequency is decreased. For SAR applications at *L*-band frequencies there is a significant ionospheric effect, particularly in the auroral and equatorial zones where natural ionospheric irregularities frequently occur. For possible new SAR systems at UHF and lower frequencies the ionosphere is likely to have severe effects at times. An understanding of the range of ionospheric effects and their temporal and spatial morphology should help mitigate adverse effects on SAR imaging applications. The major effects of the ionosphere are group delay, refraction, and scintillations. The fluctuations in phase and amplitude due to ionospheric irregularities (commonly called scintillations) may act to disrupt the effectiveness of the radar signal decoding. In this talk we review these major ionospheric effects, the variations with radio-wave frequency, and suggest possible possible methods to maintain data integrity.