A further simulation study of ionospheric effects on SAR imaging

H.ZhengčňL-L.Li, F. Li

Institute of Electronics, Chinese Academy of Sciences, Beijing 100080

fli@mail.ie.ac.cn

The ionospheric effects on SAR imaging are studied by simulation. Three factors: ionospheric refractive index spectrum, outer scale size of ionosphere turbulence, and the aperture size have been in consideration respectively. following are the main conclusions.

1. Kolmogorov spectrum is of more seriously effects on the SAR imaging than that of two-parameter spectrum.

2. The impact of the ionospheric irregularity on the SAR image resolution decreases to a negligible level when outer scale size of ionosphere turbulence above 10^5m. The decreasing of the out scale value will result in a substantial degradation of the image resolution. When irregularity scale value is small than 10^3m, the 3-dB spread will be large than 270m which is unacceptable for most practical SAR imaging situations.

3. In opposition to the normal radar, increment spaceborne SAR antenna aperture size will creates the signal pulse broadening. Meanwhile the increment of SAR antenna aperture size has effect of smoothing the SAR signal.