

Back-projection Processor

Using the “alossim_1d.dat” simple one-dimensional point target simulation of an ALOS1 PALSAR-like radar, write a back-projection processor to focus the data in the azimuth dimension. This problem uses a simplified geometry of a straight-line spacecraft trajectory, parallel to a flat Earth, assumes the data has been range-compressed, and that you are back-projecting in azimuth at the range distance appropriate to the angle specified below. For simplicity, assume that range migration is negligible, so you only need to worry about the range history along the straight-line path.

- Relevant simulation information is as follows:
 - o Wavelength: 0.23605710 (m)
 - o PRF: 1655.629000 (Hz)
 - o Antenna Length (along-track): 8.9 (m)
 - o Spacecraft velocity 7592 (m/s)
 - o Look angle to ground range 38.7 (degrees)
 - o Height of spacecraft above earth. 692000. (m)
- “alossim_1d.dat” is a flat binary file, with no headers.
 - o Number of lines: 1
 - o Complex sample format: (float32,float32)

How many point targets are present? What is their relative location?

Experiment with different resolutions. How do the targets appear to change?