



IMAGING README AFRL/SNAS



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Introduction

Gotcha Volumetric SAR Data Set, Version 1.0

The full public release data set, referred to as the “Gotcha Volumetric SAR Data Set, Version 1.0”, consist of SAR phase history data collected at X-band with a 640 MHz bandwidth with full azimuth coverage at 8 different elevation angles with full polarization. The imaging scene consists of numerous civilian vehicles and calibration targets.

The data is stored in MATLAB binary format (*.mat files). Each file contains the phase history collected over one degree of azimuth for a single pass and a single polarization. With 8 passes and 4 polarizations per pass, the total number of files is 11,520 ($360 * 8 * 4$). The filenames are coded with the pass number, polarization, and azimuth angle. For example, file “data_3dsar_pass1_az001_HH.mat” contains the data for all pulses from 0 to 1 degree azimuth from pass 1 operated at HH polarization. Loading a file gives a single MATLAB structure with fields containing phase history data, frequencies, x,y,z-coordinate antenna locations, range to scene center, azimuth angle (degrees), and elevation angle (degrees). In addition, a simple autofocus solution is provided for the HH and VV polarizations.

The fields are:

- i.) data.fp: Phase history data (complex)
- ii.) data.freq: Column vector containing frequencies (Hz)
- iii.) data.x: Row vector containing the x-coordinate of the antenna location
- iv.) data.y: Row vector containing the y-coordinate of the antenna location
- v.) data.z: Row vector containing the z-coordinate of the antenna location
- vi.) data.r0: Row vector containing the range to scene center from the antenna location
- vii.) data.th: Row vector containing the azimuth angle (degrees) 0 degrees is the positive x-axis
- viii.) data.phi: Row vector containing the elevation angle (degrees) 0 degrees is the xy-plane
- ix.) data.af: Structure containing autofocus information (only for HH and VV data). It contains 2 row vectors:
- x.) data.af.r_correct: Row vector containing the correction for r0
- xi.) data.af.ph_correct: Row vector containing the phase correction

The following additional files are contained with the data:

1. Challenge_Pictures_Images.ppt: contains digital pictures and example processed images of calibration site and vehicle staging center.
2. Challenge_Problem_SPIE_07.rtf: contains a description of the challenge problem associated with 2D/3D high resolution imaging and data-driven autofocus.
3. Gotcha Spotlight Target Locations.xls: Excel spreadsheet with calibration target locations (ID#, point, x,y,z heading(degrees), and target diagram layout), vehicle target locations (ID#, point, x,y,z and heading(degrees)), and vehicle dimensions (ID#, L(m), and W(m)).
4. filelist.txt: contains all data information with the data fields.

NOTE: For additional information, please contact:

POC: Curtis Casteel
Curtis.casteel@wpafb.af.mil
937-904-9095

LeRoy Gorham
LeRoy.Gorham@wpafb.af.mil
937-904-9249

AFRL/SNAS
Bldg 620 Rm 102
2241 Avionics Circle
WPAFB, OH 45433