RadarPost
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An ACT Toolkit for ANSYS Electronics Desktop (AEDT)
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RadarPost - Overview

- Name of the app: RadarPost
- Target application: ElectronicsDesktop
- Description: Automate analysis post-processing for radar Range Profiles, Waterfall plots, Inverse Synthetic Aperture (ISAR) images and Range-Doppler maps.

The version of the App and the supported versions of ANSYS are the ones indicated on the App Store.
ACT App Store

- [https://appstore.ansys.com/shop/ACTApps_act%20apps](https://appstore.ansys.com/shop/ACTApps_act%20apps)

- Great place to get started
  - A library of helpful applications available to any ANSYS customer
  - New apps added regularly
  - Applications made available in either binary format (.wbex file) or binary plus scripted format (Python and XML files)
  - Scripted extensions are great examples
  - Documentation and training materials available on the ANSYS Customer Portal:
Information

• Please pay attention to paragraph 9 of the CLICKWRAP SOFTWARE LICENSE AGREEMENT FOR ACS EXTENSIONS regarding TECHNICAL ENHANCEMENTS AND CUSTOMER SUPPORT (TECS): “TECS is not included with the Program(s)”

• Report any issue or provide feedback related to this app please contact:

  Contact email address: Arien.Sligar@ansys.com
Binary App Installation

Installing from the Electronics Desktop:

1. From the Electronics Desktop framework, select the “View” option
2. Click on “ACT Extensions”
3. Press “+” symbol in the top right corner of the ACT Home application page
4. It will open a file dialog to select the “RadarPost.wbex” binary file
5. The extension is installed

Loading the extension:

1. From the Extension Manager, click on your extension and choose ‘Load Extension’
2. The extension is loaded

Notes:
• The extension to be installed will be stored in the following location: %AppData%\Ansys\[version]\ACT\extensions
• The installation will create a folder in this location, in addition to the .wbex file
• Example for [version]: v180
RadarPost ACT Extension

Post-process radar pulse simulations to develop reports for four popular types of radar target imaging.

- Range (echo) profile
- Waterfall plot
- Inverse Synthetic Aperture Radar (ISAR) image
- Range-Doppler map image

Plane Wave Excitations

Coupled S-param Post-processing
RadarPost Toolkit

Select from among the active projects and designs open in AEDT.

Select the type of imaging you wish to perform (Range Profile, Waterfall, ISAR, Doppler-Range).

Choose from among the drop-down box items that the toolkit makes available. The Real and Imaginary Data items should correspond to Report definitions created by RadarPre. Multiple Window Function types are available, and apply to the frequency-to-time domain transformations in order to suppress transform sidelobes.

Click “Generate Report” to initial post-processing. Report images will be generated in the Reports tree.
Range Profile post-processing

- Run after simulation
- Uses \{\text{Re}, \text{Im}\} scattered field data reports defined by RadarPre
- Can be used for any of multiple Look Angle definitions created by RadarPre for Waterfall plot setup
- Select Window function for freq-time domain transform
- Generate Report will create the Result
Waterfall Plot post-processing

- Run after simulation
- Uses \( \{\text{Re}, \text{Im}\} \) scattered field data reports defined by RadarPre for Waterfall
- Select Window function for freq-time domain transform
- Generate Report will create the Result
ISAR Image post-processing

- Run after simulation
- Uses \{Re,Im\} scattered field data reports defined by RadarPre for Waterfall
- Select Window function for freq-time domain transform
- Generate Report will create both 3D and 2D ISAR contour plots
Range-Doppler Maps

- Does not rely on RadarPre setups
- Operates on scattered S-parameter data sets from parametric analysis that correspond to a radar frame:
  - Multi-frequency sweep (chirp/pulse)
  - Multiple chirps/pulses
- S-parameter data sets must be stored in the Report, separated by Real and Imaginary for each radar channel
Range-Doppler Maps (2)

- Run after single or multi-frame near-field radar simulation
- Uses \( \{\text{Re}, \text{Im}\} \) scattered S-param (terminal) data reports; processes one channel at a time
- Set Velocity Ambiguity to the total Velocity Range window used to determine the Coherent Processing Interval and the pulse repetition frequency (PRF)
- Select Window function for freq-time domain transform
- Generate Report will create both 3D and 2D Range-Doppler contour maps
Range-Doppler Maps (3)

- Large multi-frame radar simulations may be computed using LS-DSO (large-scale distributed solve objects) on large HPC systems.
- RadarPost can read the full multi-frame data set and process all Range-Doppler Maps at once.
- Check “LS-DSO” box, and load the LS-DSO output definition files (*.sdef) that correspond to the radar channel of interest.
  - The *.sdef files are usually found in the project results directory, under the `project.aedtresults\RSMxxxx\results\` subdirectory.
- “Generate Report” will automatically generate Range-Doppler maps for all frames in the project Results folder.
Thank you

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