

mmWave on the TI-Resource Explorer: Examples, Applications, and Experiments

Industrial Radar Applications Team

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1

Introductions

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2

Agenda

- Introduction to mmWave Content on TI-Resource Explorer
- Experiments
- Chirps
- Labs
- Outlook for new content through 2018

Introduction to mmWave Content on TI-Resource Explorer

12/20/2017

4

What is the TI-Resource Explorer? dev.ti.com/tirex

- TI-Resource Explorer is centralized location for not only example application projects but also reported experimental data.
- mmWave team (both Industrial and Automotive) is adding new content here regularly
- mmWave content is in three different modules
 - Chirp Database
 - Experiments
 - Labs

TI Resource Explorer Select a Device or Board

Device Documentation

Software

- SimpleLink CC13x0 SDK - v:1.50.00.08
- SimpleLink MSP432P4 SDK - v:1.50.00.12
- SimpleLink MSP432E4 SDK - v:1.55.00.21
- SimpleLink CC2640R2 SDK - v:1.50.00.58
- SimpleLink CC3220 SDK - v:1.50.00.06
- SimpleLink SDK Plugins
- C2000Ware - v:1.00.02.00
- C2000Ware_DigitalPower_SDK - v:1.00.00.00
- mmWave SDK - v:01.01.00.02
- mmWave Training - v:1.6.1

Chirp Database

Experiments

- Response of Radar to Rain**
- Measuring Object Height with mmWave Radar
- Detecting Walls of Different Materials
- Detecting Quarters Using mmWave
- Very Fine Motion Detection

Labs

- mmWave SDK Demo - 14xx
- mmWave SDK Demo - 16xx
- 4K FFT Stitching Algorithm
- High Accuracy Range Measurement - 14xx
- High Accuracy Range Measurement - 16xx
- ROS Point Cloud Visualizer
- Water vs Ground Classification Demo
- Vital Signs Demo
- Drone Altitude Demo
- Traffic Monitoring Demo
- Intelligent Lighting and Factory Automation Demo

Response of Radar to Rain


Results

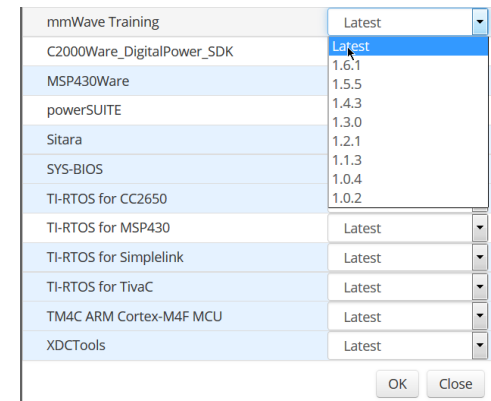
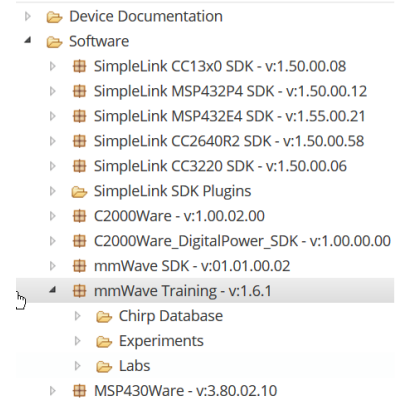
The steps presented above were repeated for Dry, Light rain and Medium rain conditions. The Scatter Plots and Range Profile Plots were used to determine if the object could be detected and the results are summarized below:

1. The object was detected in both dry and rainy conditions.
2. Rain on the antenna radome, and on objects in the static scene can cause diffraction, which lowers the peak value, and with multiple objects lowers the SNR.

| Condition | Result | Visualizer Plot |
|-------------------------|-----------------|-----------------|
| No Rain (Dry) | Object Detected | |
| Light Rain (Misty rain) | Object Detected | |
| Medium Rain | Object Detected | |

Navigating to the TI-Resource Explorer

- Two ways to do this
 - dev.ti.com/tirex and bookmark this web page (ctrl + d).
 - Code Composer Studio in **View** → **Resource Explorer**
- Navigate to folder called **Software** and then to **mmWave Training – v:1.6.1** (or latest version)
 - **Note: This folder will be renamed [mmWave Sensors – Industrial Toolbox](#) in the near future**
- If a different version of **mmWave Training** is displayed
 - Click on **Package Picker** icon in top right corner: 
 - Select version **Latest** for **mmWave Training** and click **OK**



Outlook for new content through 2018

12/20/2017

7

Outlook

- Errata is found on [E2E mmWave Forum](https://e2e.ti.com/support/sensor/mmwave_sensors/f/1023)
 - https://e2e.ti.com/support/sensor/mmwave_sensors/f/1023
- New Content for January 2018
 - Labs
 - Gesture Recognition
 - Fluid Level Transmitter
 - Autonomous Robotics – Sense and Avoid
 - Experiments
 - Wire Detection
 - Gestures in front of glass
 - Chirps
 - Various chirps for particular objects