mmWave Joint Communication and Sensing (JCAS/ISAC) Testbed
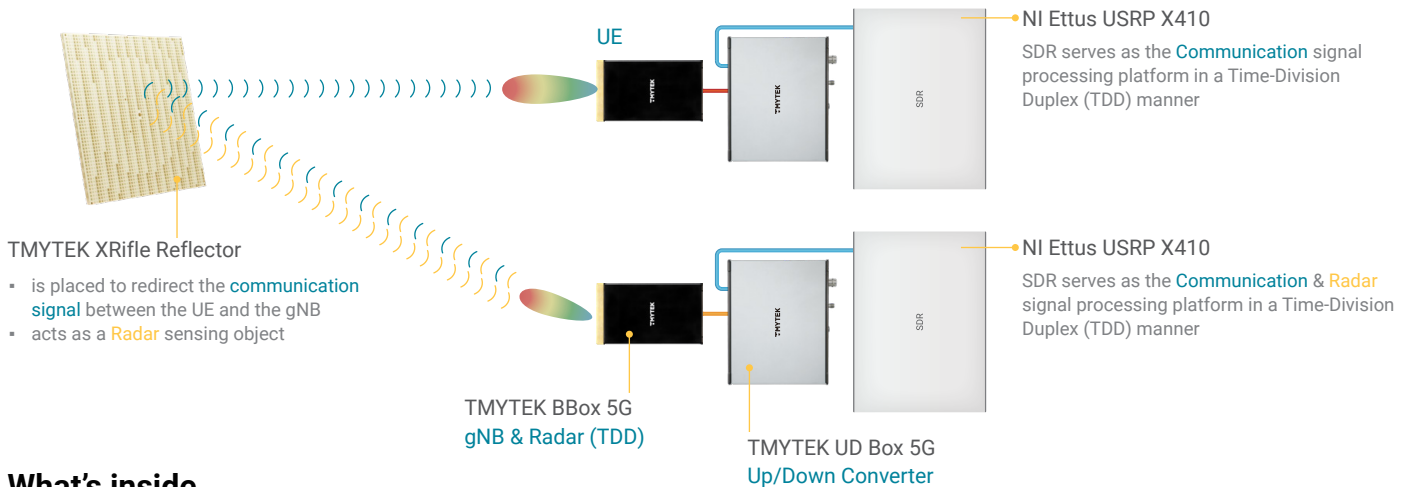
What can you do

- Communication and sensing practice
- 5G channel modeling
- Distance and angle analysis for localization and tracking
- CW/FMCW/Pulsed Doppler radar*

*Refer to CW/Pulsed radar testbed

Who need this testbed

- Academic and research institutions
- Communication researcher
- Radar/sensing researcher

UE

NI Ettus USRP X410

SDR serves as the Communication signal processing platform in a Time-Division Duplex (TDD) manner

TMYTEK XRifle Reflector

- is placed to redirect the communication signal between the UE and the gNB
- acts as a Radar sensing object

NI Ettus USRP X410

SDR serves as the Communication & Radar signal processing platform in a Time-Division Duplex (TDD) manner

TMYTEK BBox 5G
gNB & Radar (TDD)

TMYTEK UD Box 5G
Up/Down Converter

What's inside

Hardware: mmW-Coverage Solution

- **TMYTEK UD Box 5G:** Frequency up/down converter
- **TMYTEK BBox:** Beamformer (n257, n258, n260, n261)
- **TMYTEK XRifle Reflector:** (8 types of IN/OUT angle)
- **NI Ettus USRP X410:** Baseband transceiver
- **SPI control cable:** (NI X410 ←→ BBox)

Software:

- TMYTEK UD Box/BBox Control GUI
- TMYTEK UD Box/BBox Control API: Python, LabView, C++, C#, MATLAB
- GNU radio, LabVIEW, MATLAB/Simulink compatible
- UHD customized for BBox beam control