



Getting Started

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Aerial RAN CoLab Over-the-Air is a full-featured platform targeted for next generation wireless evolution, easing developer onboarding and algorithm development in real time networks. ARC-OTA equips developers, researchers, operators, and network equipment providers with all requisite components necessary to deploy a campus network for research. [Here is a ten minute video](#) introducing ARC-OTA.

Aerial RAN CoLab Over-the-Air is a developer launchpad that can be used to shape 6G research. It provides a radio network as the innovation sandbox. It is a C-programmable full stack that can help fast-track experimentation and help validate and benchmark results. The ARC-OTA platform enables algorithm design for promising baseband technologies in the 6G ecosystem, including terahertz (THz) band communications, very-large-scale antenna arrays, reconfigurable intelligent surfaces, digital beamforming, spectrum sharing, and the Internet of Things. The workloads associated with all the above items are intrinsically GPU-friendly.

ARC-OTA offers an invaluable platform for next generation wireless communications, and we look forward to collaboration and contributions from developers to extend our blueprints and recipes to help us shape and evolve the platform.

ARC-OTA 1.3 Software Release Manifest

Component	Version
Aerial CUDA-Accelerated RAN (Layer 1)	23-4
OAI gNB	2024.w15
OAI CN	2024.w15
Sterling Skywave Service Management	v0.4.0

Note

Only Layer 1 from Aerial CUDA-Accelerated RAN will be used by ARC-OTA in this release.

ARC-OTA Developer Content Map

Product Brief	Provides information about the current release capabilities of the ARC-OTA.
Installation Guide	Describes the hardware bill of materials (BOM), network component configuration, and software required to install ARC-OTA.
Tutorials	Includes video walkthroughs to ease developer onboarding.
On-Boarding Help	Includes references to reading material, GPU onboarding, and a teaching course for CUDA-C.
Developer Use Cases	Provides information about projects onboarded on the platform.
Release Notes	Outlines the software APIs and functionality as well as any limitations of the current release.
Developer Extensions	Provides information about extensions developed for ARC-OTA.
Licensing	Provides licensing information regarding ARC-OTA.
Publications	Lists noteworthy publications associated with ARC-OTA.
Support	Provides help with the ARC-OTA.
Background	Describes related technologies.

Glossary

Term or Abbreviation	Description
ARC-OTA	Aerial RAN CoLab – Over The Air
BBU	Baseband Unit
BF3	BlueField-3
BFP	Block Floating Point
CI/CD/CT	Continuous Integration, Continuous Delivery, Continuous Testing
CN	Core network, which provides coordination between different parts of the access network and also provides connectivity to the internet. For additional information, refer to this page

cuBB	GPU accelerated 5G signal processing pipeline, including cuPHY for Layer 1 PHY and cuMAC for L2 scheduler
CU	Centralized Unit
CUDA	Compute Unified Device Architecture
cuPHY	CUDA implementation of 5G PHY layer signal processing functions
Layer 1 from CUDA Accelerated RAN	CUDA GPU software libraries/tools that accelerate Physical Layer, 5G RAN compute-intensive processing
DL	Downlink
DU	Distributed Unit
FDD	Frequency Division Duplex
FAPI	API for hardware components implementing 3GPP physical layer functions and “software stacks” implementing higher layers.
gNB	Next Generation Node B, a component of the 5G mobile communication standard
GPU	Graphical Processing Unit
HW	Hardware
K8s	Kubernetes
MAC	Medium Access Control
MU-MIMO	Multi-User Multiple-Input and Multiple-Output
mMIMO	Massive MIMO
NGC	NVIDIA GPU Cloud
NGAP	NG Application Protocol
NVIPC	NVIDIA inter-process communication standard
OAI	Open Air Alliance
OAM	Operations, Administration and Maintenance
O-RU	Open RAN Radio Unit
PHY	Physical Layer
RAN	Radio Access Network

RF	Radio Frequency
RIC	Radio Intelligent Controller
RLC	Radio Link Control
RRU	Radio Resource Unit
SDK	Software Development Kit
SNR	Signal-to-Noise Ratio
SR-IOV	Single Root Input/Output Virtualization
SW	Software
TDD	Time Division Duplex
TTI	Transmission Time Interval
UE	User equipment
UL	Uplink

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