GETTING STARTED WITH THE NVIDIA DRIVE AGX ORIN DevKit

FOR DRIVE AGX SDK DEVELOPER PROGRAM MEMBERS

October 2022

# WELCOME TO DRIVE AGX

Covers:

▶ Intro to the NVIDIA DRIVE AGX Orin™ platform

▶ Step by step guide to register your device

▶ Instructions on how to join the NVIDIA DRIVE AGX™ SDK Developer program

▶ A navigation through the Start page
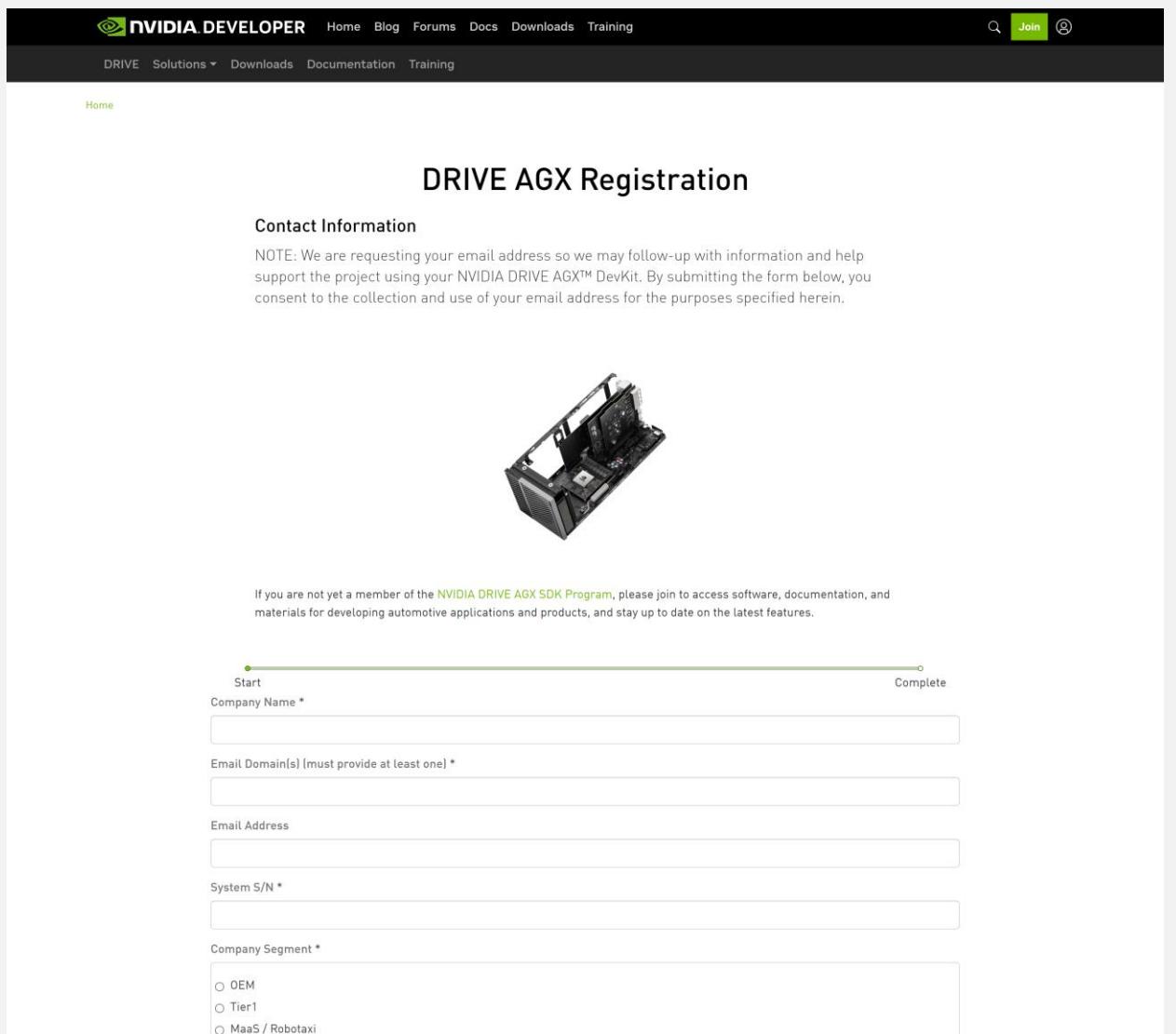
Link to Welcome to the DRIVE AGX Platform

REGISTRATION

First things first – register your DevKit on the Registration Page. This will ensure an optimal experience for you and help us to provide support.

START PAGE

Up next, visit the Start Page. It is your gateway to explore the DRIVE AGX Platform.

[Link to Registration Page](#)

[Link to Start Page](#)

KEY WEBSITES FOR DRIVE AGX ORIN

DevKit Register Page
Step by step guide to register your DevKit

developer.nvidia.com/drive/register

DevKit Start Page
How to Navigate DRIVE Developer Page

developer.nvidia.com/drive/start

DevKit Setup Page
Step by step guide to setup your DevKit

developer.nvidia.com/drive/setup

KEY WEBSITES FOR DRIVE AGX ORIN

|	
Downloads Link to access software releases	developer.nvidia.com/drive/downloads
Docs Comprehensive documentation	developer.nvidia.com/drive/documentation
Forum Ask questions or browse threads	forums.developer.nvidia.com/c/autonomous-vehicles/drive-agx-orin/
Hyperion Sensors For additional supported sensors, please refer to DRIVE AGX Orin Sensors and Accessories	developer.nvidia.com/drive/ecosystem-hw-sw
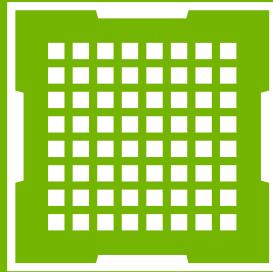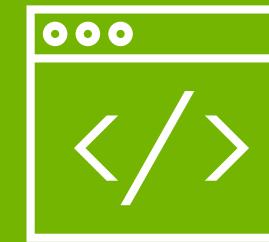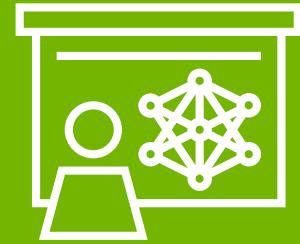
NVIDIA.

RESOURCE OVERVIEW

Hardware Setup

SDK

Training

Need Help?

HARDWARE SETUP

PRODUCT BRIEF

Covers:
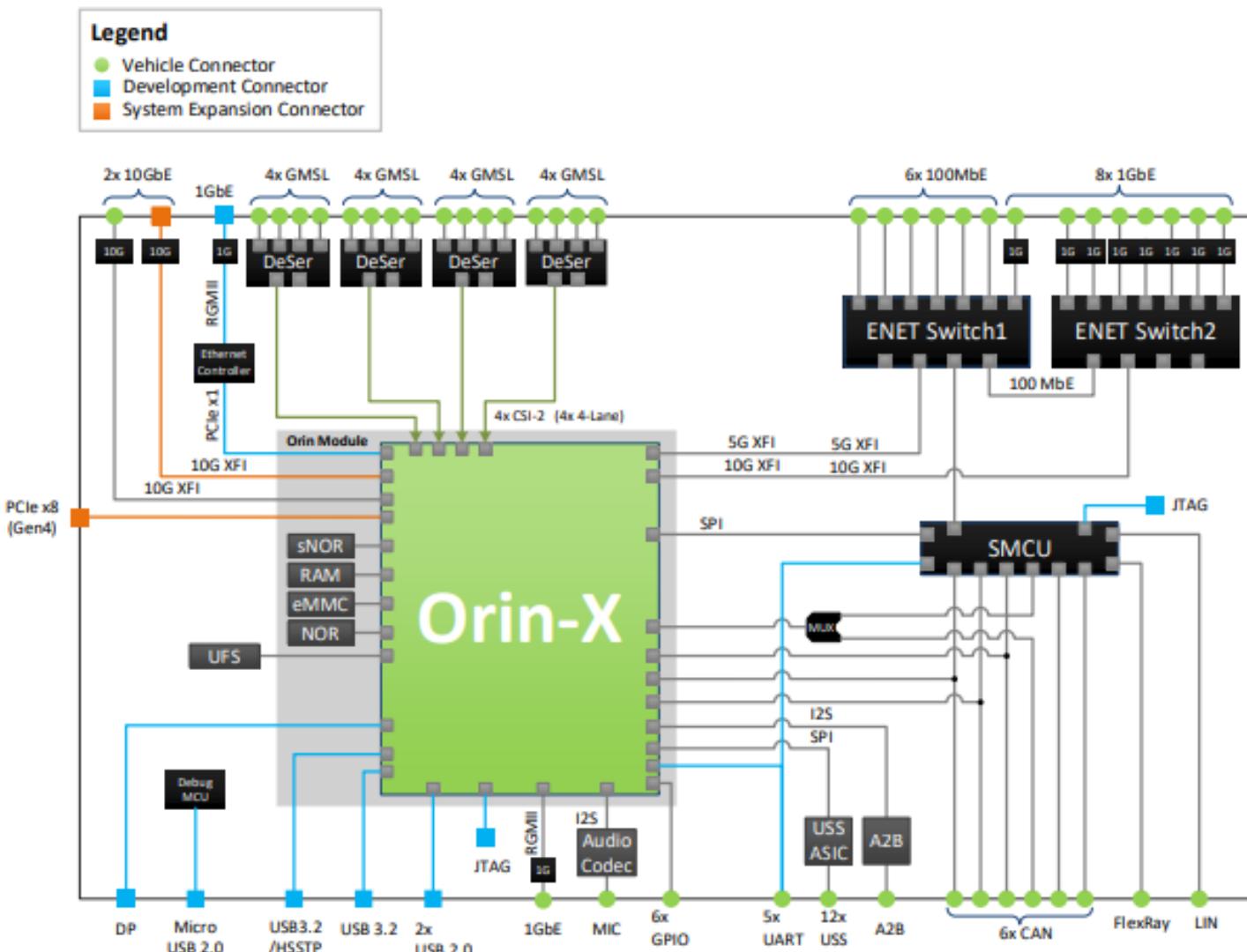
▸ Product features

▸ Highlights mechanical & electrical specification

▸ Provides list of hardware interfaces

Link to Product Brief

NVIDIA DRIVE AGX Orin Developer Kit

Product Brief

Figure 1-2. High-Level Block Diagram

HARDWARE QUICK START GUIDE
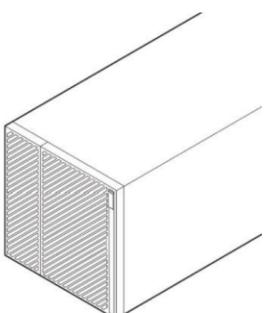
Covers:

▸ Components list

▸ System Connectors

▸ DevKit versions

▸ Steps required to run the DevKit for the first time

Link to Hardware Quick Start Guide


# NVIDIA DRIVE AGX Orin Developer Kit
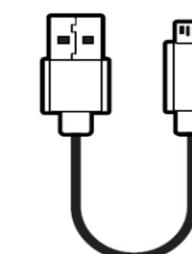
Hardware Quick Start Guide
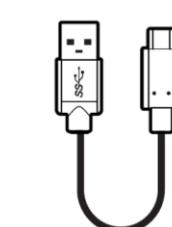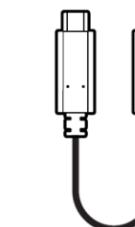
|		
Developer System	AC Power Cable	Micro USB Cable
Type A-to-C USB Cable	Type C-to-C USB Cable	Camera Splitter Cable
Dual HMT-D Splitter	Quad HMT-D Splitter	NIC Adapter
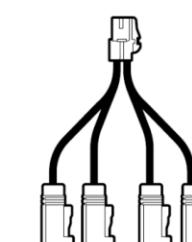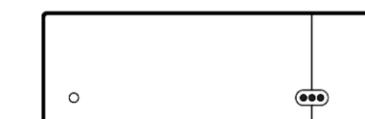
MECHANICAL & INSTALLATION GUIDE

Covers:
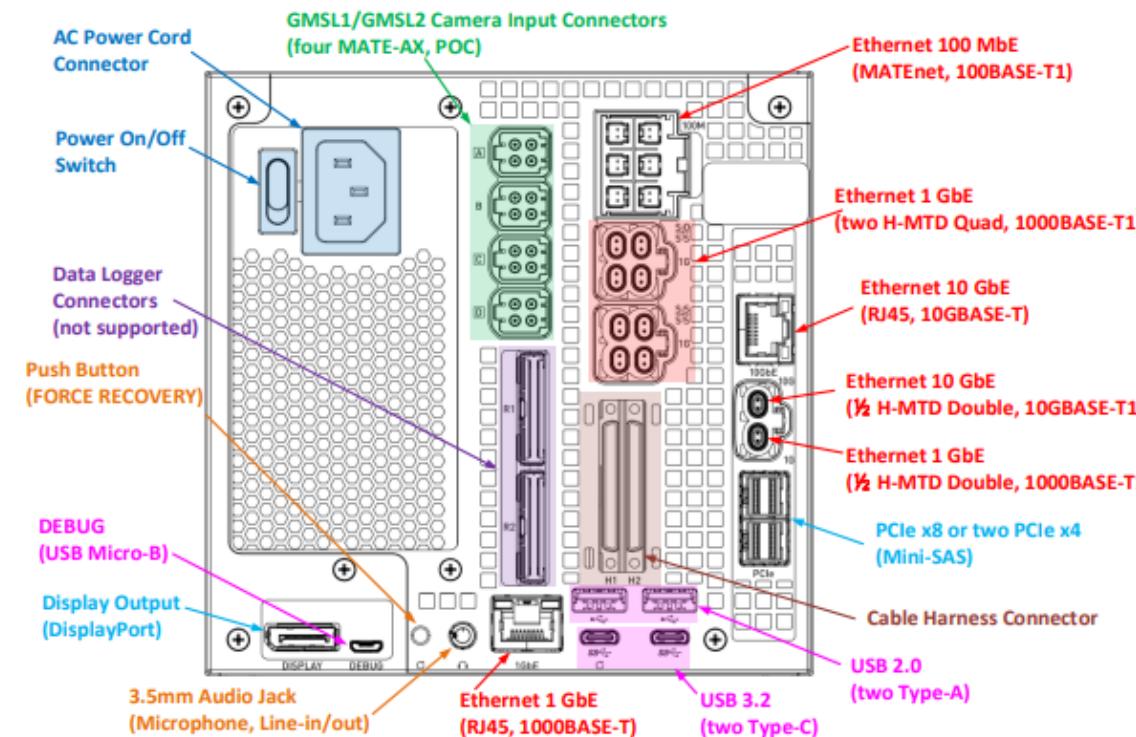
▶ Mechanical dimensions

▶ Mounting considerations

▶ Interface connections

▶ Environmental requirements

▶ Electrical installation

Link to Mechanical and Installation guide

NVIDIA DRIVE AGX Orin Developer Kit Mechanical and Installation Guide

Installation Guide


Figure 2-1. Rear Panel Connectors
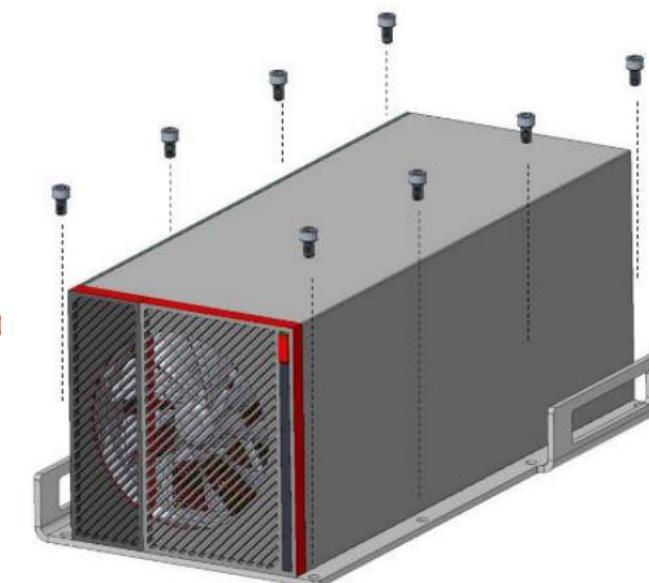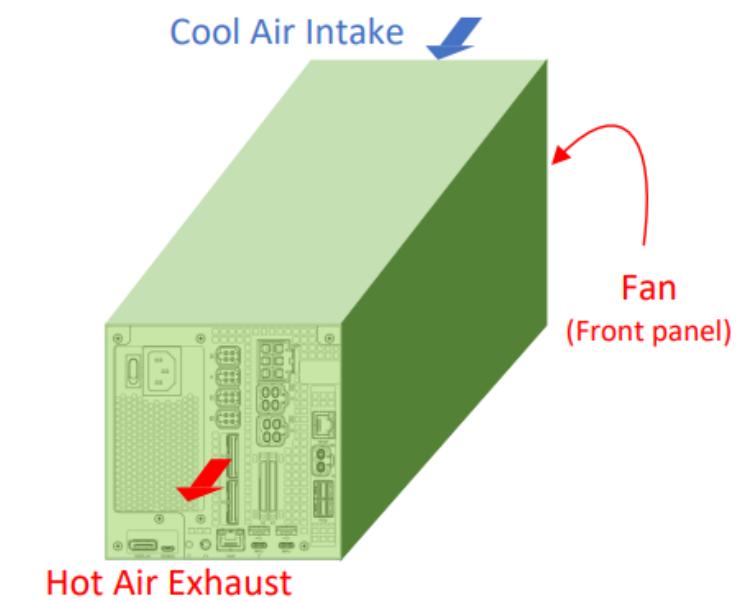
Figure 1-3. Airflow Direction

SUPPORTED SENSORS
AND ACCESSORIES

Hardware for DRIVE AGX Orin that is supported by NVIDIA and our partners

Covers:
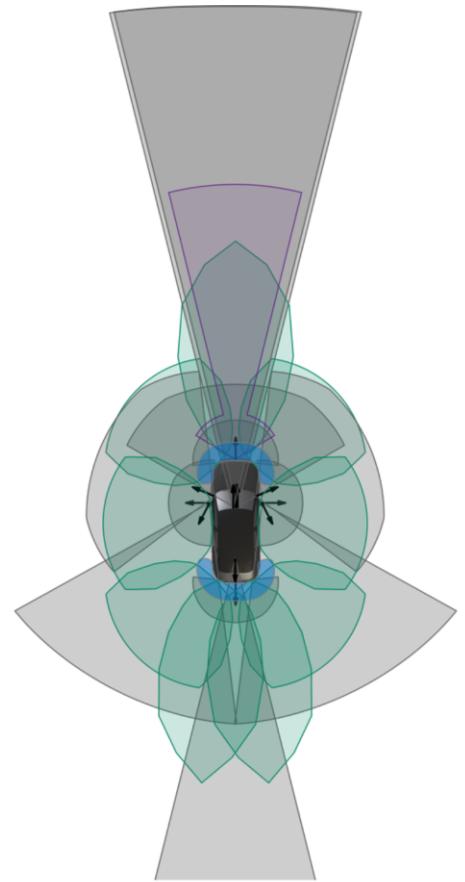
▶ Cameras

▶ Lidars

▶ Radars

▶ IMU / GNSS devices

▶ USS/RCS

▶ Hardware accessories

Link to DRIVE Hyperion 8.1 Sensors and Accessories

Link to DRIVE AGX Orin Sensors and Accessories

Hyperion 8.1 Sensor Specifications

Sensor Qty & Type	Function	Details
8 exterior cameras	Wide & tele vision	Sony IMX728, 8.3Mpx
4 exterior cameras	Fisheye near vision	Sony IMX623, 3.0Mpx
6 radars	Corner & side sensing	Hella Short Range Radar
3 radars	Front & rear sensing	Continental 1x Imaging and 2x Long Range Radars
1 lidar	Front redundant sensing	Luminar
3 interior cameras	Driver monitoring system	1x OVT - OV2311, 2Mpx
	Occupant monitoring system	2x OVT - OX05B1S, 5Mpx
2 IMUs	Vehicle odometry detection	1x Continental SC13SI, 1x Bosch MMP
1 GNSS	Vehicle position detection	U-blox

Cameras
A mix of wide-angle fisheye cameras for near vision, paired with high-fidelity wide and tele 8MP cameras for detecting longer distances.

Lidars
Front center automotive-grade lidar for an additional layer of redundant vision, as well as a rooftop high-resolution lidar for ground-truth (GT) data collection

Radars
Multiple radars for overlapping front, side, and corner visibility and redundancy, with increased angular and vertical resolution for complex urban driving.

IMU / GNSS
Vehicle position and odometry sensing for precise localization.

USS / RCS
Ultrasonic sensors for parking space measurement and maneuvers. Road condition sensors for assessing road wetness to adapt vehicle dynamics control.

Hardware Accessories
Hardware accessories for DRIVE AGX Orin Developer Kits.

SDK

DRIVE OS AND DRIVEWORKS INTRO

The DRIVE SDK website shows architecture and major components of the SDK

The DRIVE OS website provides more details on the DRIVE OS modules and tools

The DRIVEWORKS website shares insights on each module under its architecture

Link to DRIVE SDK
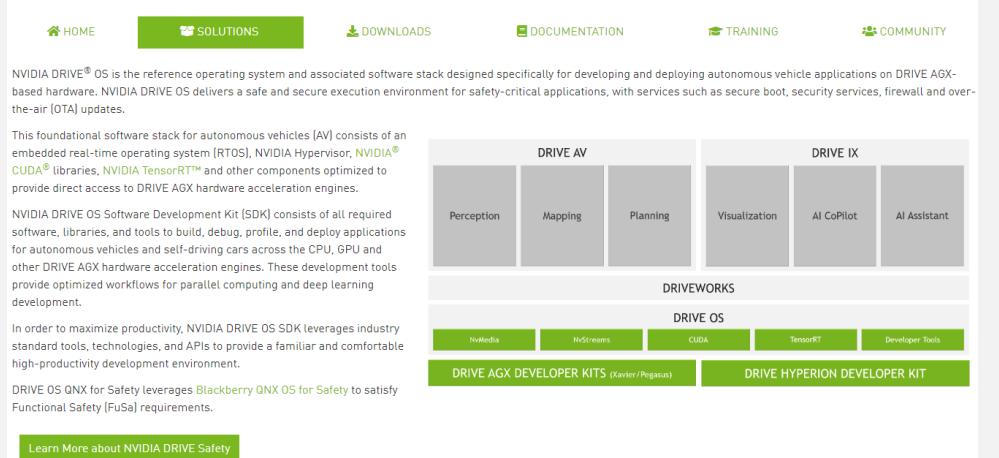
Link to DRIVE OS
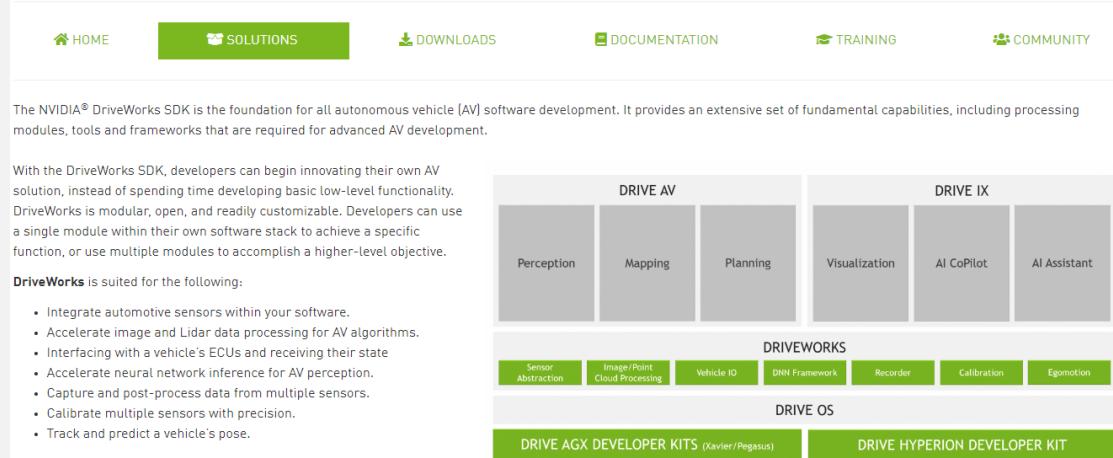
Link to DriveWorks

DOWNLOADS

Provides access to all relevant DRIVE SDK releases, including Release Summary, Installation Guides, Release Notes, etc.

Note: DRIVE OS 6.0.4 supports installation via Docker containers and SDK Manager.

[Link to DRIVE Downloads Site](#)

[Link to Details on NVIDIA DRIVE Platform Docker Containers](#)

[Link to Details on NVIDIA SDK Manager](#)

[Link to Details on DRIVE OS Docker](#)

NVIDIA. DEVELOPER   Home   Blog   Forums   Docs   Downloads   Training

DRIVE   Solutions ▾   Downloads   Documentation   Training

Home > DRIVE > NVIDIA DRIVE Downloads

NVIDIA DRIVE Downloads

This page provides access to DRIVE SDK for developers using NVIDIA DRIVE® hardware. See Automotive Hardware and Automotive Software for more details.

For support, please post any queries or issues in the Forums.

Please note, download requires membership to the NVIDIA DRIVE® AGX SDK Developer Program for DRIVE Orin and DRIVE Xavier, and to the NVIDIA DRIVE® PX 2 SDK Developer Program for DRIVE PX 2.

Use the product filters below to select appropriate downloads for your hardware platform

Showing 7 downloads.

Filter...	Title	Version	Release Date
▾ PRODUCT			
☐ DRIVE Orin	› DRIVE OS [DRIVE Orin Latest] New	6.0.4	2022/08/29
☐ DRIVE Xavier	› DRIVE OS and DriveWorks [DRIVE Xavier Latest]	5.2.6	2021/10/20
☐ DRIVE PX 2	› DRIVE OS and DriveWorks	5.2.0	2021/01/21
☐ DRIVE Sim	› DRIVE Software [DRIVE Xavier Latest]	10.0	2019/11/15
	› DRIVE Software	9.0	2019/05/28
	› DRIVE OS with DriveWorks [DRIVE PX 2]	5.0.10.3	2018/10/04
	› DRIVE Sim	Early Access	Coming Soon

DRIVE OS [DRIVE Orin Latest] New   6.0.4   2022/08/29

Update to NVIDIA DRIVE® OS 6.0.4 Linux SDK:

Either install with NVIDIA SDK Manager, **OR** NVIDIA DRIVE OS Docker Containers through NVIDIA GPU Cloud (NGC).

Documentation is publicly available under **DRIVE Orin**.

After updating your software, be sure to review DRIVE OS 6.0.4 Installation Guide to finalize your DRIVE AGX System Setup.

Supported hardware:

- NVIDIA DRIVE AGX Orin™

a. NVIDIA SDK Manager:

- Requires Ubuntu 20.04 on the host PC.
- Install the most up-to-date version of the NVIDIA SDK Manager.

b. NVIDIA DRIVE OS Docker Containers:

- Requires Ubuntu 20.04 or Ubuntu 18.04 on the host PC.
- Learn more about NVIDIA DRIVE Platform Docker Containers.
- Please activate your access to the NGC 'drive' organization by clicking through the NGC activation email you received.

Submit questions or feedback in the DRIVE AGX Orin Forum. We want to hear from you!

Additional links:

- DRIVE OS 6.0.4 Blog Post

DOWNLOADS

🔒 DRIVE OS 6.0.4 Release Notes
📝 DRIVE OS 6.0.4 Installation Guide
⬇ a. NVIDIA SDK Manager
⬇ b. DRIVE OS Docker

More Information ›

DOCUMENTATION OVERVIEW

A collection of documentation that helps you to develop with your DRIVE AGX Orin DevKit, includes:

- ▶ Developer Kit documents
- ▶ Sensors & Accessories
- ▶ DRIVE OS software documentation
- ▶ Developer Tools
- ▶ Licenses

Link to DRIVE Documentation

DRIVE Orin

DRIVE AGX Orin Developer Kit

- DRIVE AGX Orin Product Brief
- DRIVE AGX Orin Developer Kit Hardware Quick Start Guide
- 🔒 DRIVE AGX Orin Mechanical and Installation Guide
- DRIVE AGX Orin Regulatory Compliance and Safety Guide

Sensors & Accessories

- DRIVE Hyperion 8.1 Sensors and Accessories

  Sensors for DRIVE Hyperion 8.1 and DRIVE AGX Orin. Accessories for DRIVE AGX Orin.

DRIVE OS 6.0.4 Linux SDK

- 🔒 DRIVE OS 6.0.4 Linux Release Notes
- DRIVE OS 6.0 Installation Guide for NVIDIA Developers
- DRIVE OS 5.x to 6.0 SDK Migration Guide
- DRIVE OS 6.0 Linux SDK Developer Guide
- DriveWorks 5.6 SDK Reference Documentation
- 🔒 DriveWorks 5.6 System Task Manager (STM) User Guide
- DriveWorks 5.6 Compute Graph Framework SDK Reference Documentation
- CUDA Toolkit 11.4
- TensorRT 8.4.11
- cuDNN 8.3.3

Developer Tools

- Nsight Systems
- Nsight Graphics
- SDK Manager

Licenses

- DRIVE OS 6.0 Linux Third-Party Software Licenses
- DriveWorks 5.x Third-Party Software Licenses

DRIVE OS 6.0 INSTALLATION GUIDE

A step-by-step guide introducing the Drive OS 6.0

A guide for how to download the DRIVE OS using either SDK Manager or Docker

Some tips for building & Running sample applications for DRIVE OS 6.x on linux

Link to DRIVE OS 6.0 Installation Guide

DRIVE OS 6.0 Installation Guide for NVIDIA Developer

Search

Welcome to NVIDIA DRIVE OS 6.0

NVIDIA DRIVE® OS 6.0 is the reference operating system and associated software stack designed specifically for developing and deploying autonomous applications on DRIVE AGX-based hardware. NVIDIA DRIVE® OS delivers a safe and secure execution environment for safety-critical applications, providing services such as secure boot, security services, firewall, and over-the-air updates.

- Introduction
- Requirements for Your Development Environment
- Installation Methods
    - NVIDIA SDK Manager
    - Download and Install DRIVE OS Docker
    - Setting Up DRIVE OS Linux
    - Finalize DRIVE AGX Orin System Setup
- Build and Run Sample Applications for DRIVE OS 6.x Linux
- Appendix. DRIVE Platform Supported Boards
- Additional Resources
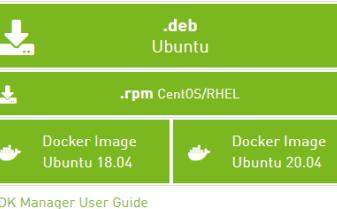
SDK MANAGER

Provides an end-to-end development environment
setup solution for NVIDIA DRIVE®


Link to NVIDIA SDK Manager
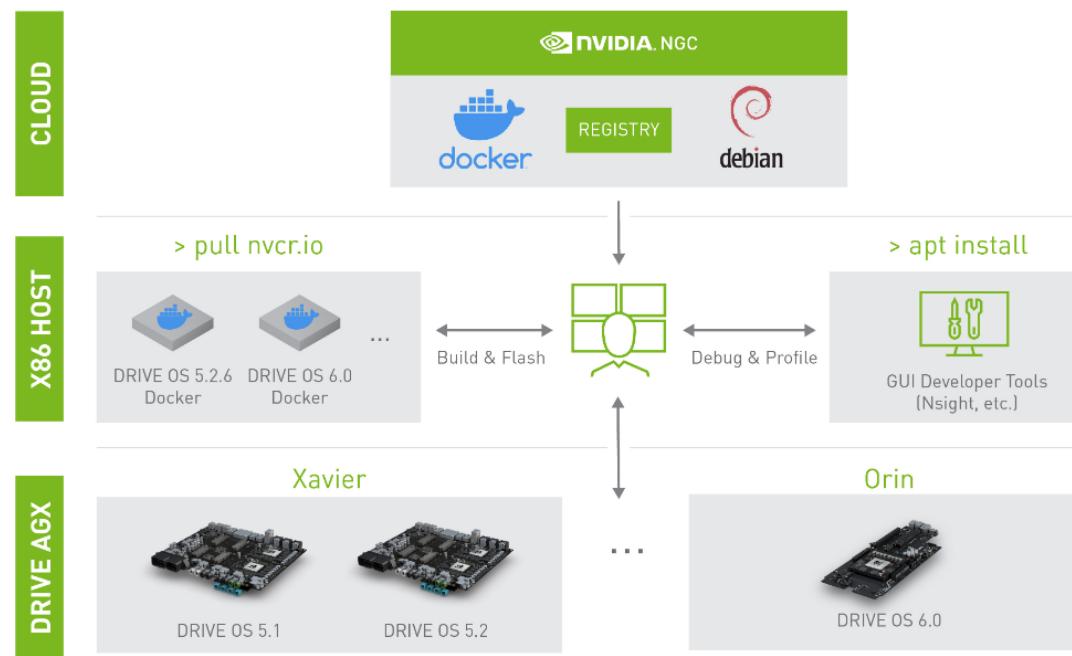
Link to DRIVE SDK Manager download & Run

NGC DOCKER

A quick intro to the NVIDIA Docker Containers
concept

Link to NVIDIA DRIVE Platform Docker Containers

DRIVE OS 6.0 DEVELOPER GUIDE

NVIDIA DRIVE OS is the reference operating system and software stack for developing and deploying AV applications on DRIVE AGX

Important documentation sections:

Board Setup & Configuration

Components & Interfaces

System Programming

Mass Storage Partition Configuration

NVIDIA DRIVE Utilitites

Link to DRIVE OS 6 Linux SDK Developer Guide

NVIDIA DRIVE OS 6.0 Linux SDK Developer Guide

Search

Welcome to NVIDIA DRIVE OS 6.0

NVIDIA DRIVE® OS 6.0 is the reference operating system and associated software stack designed specifically for developing and deploying autonomous applications on DRIVE AGX-based hardware. NVIDIA DRIVE® OS delivers a safe and secure execution environment for safety-critical applications, providing services such as secure boot, security services, firewall, and over-the-air updates.

- Overview
- Installation
- Setup and Configuration
- Flashing
- Embedded Software Components
- System Software Components and Interfaces
- Understanding Security
- System Programming
- Bootloader Programming
- Mass Storage Partition Configuration
- NVIDIA DRIVE Utilities
- Manifest
- API Reference
- NVIDIA DRIVE OS 6.0 Third-Party Software Licenses
- Legal Information

DRIVEWORKS DOCUMENTATION

The DriveWorks SDK provides an extensive set of fundamental capabilities, including processing modules, tools and frameworks for advanced AV development

Important documentation sections:
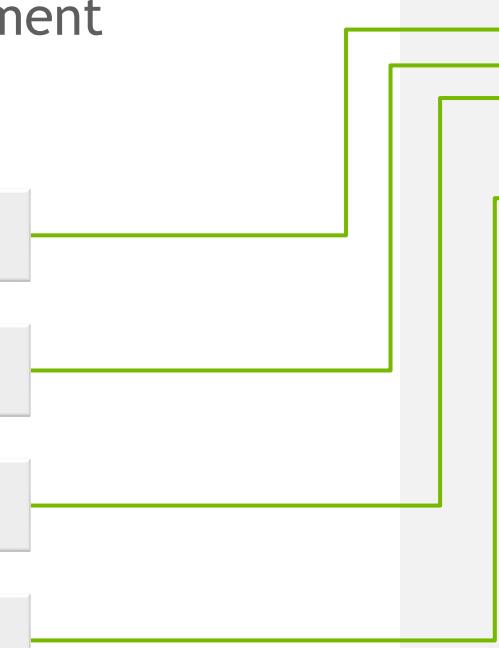
Getting Started

Modules: Functional Components

Sample Code

Guide for porting from previous releases

Link to DriveWorks Documentation

TRAINING

NVIDIA TRAINING

NVIDIA provides a wide list of learning tools to help in your development journey

NVIDIA has the following verticals that can help you,

- ► GTC talks
- ► DRIVE Videos / DRIVE Labs
- ► Webinars
- ► Deep Learning institute courses

Link to DRIVE Training

GTC SESSIONS

- ▶ Throughout the GPU Technology Conference (GTC)

- ▶ Relevant research such as state-of-the-art algorithms are showcased

- ▶ Customers show their work on top of the DRIVE platform

- ▶ The NVIDIA DRIVE team provides update on the DRIVE hardware and software

Link to GTC22 March DRIVE Developer Day

Link to GTC22 March Automotive

GTC

GPU Technology Conference (GTC)

Register for the GPU Technology Conference (GTC), which highlights the latest breakthroughs in autonomous vehicles, AI, HPC, accelerated data science, healthcare, graphics, and more.

Additionally, you may view our DRIVE Developer Day sessions, which offer deep dives into safe and robust autonomous vehicle development by clicking below.

DRIVE Developer Days 2022

Finally, you can view the extensive catalog of recorded presentations on the future of self-driving technology through NVIDIA On Demand by clicking below.

Explore On-Demand
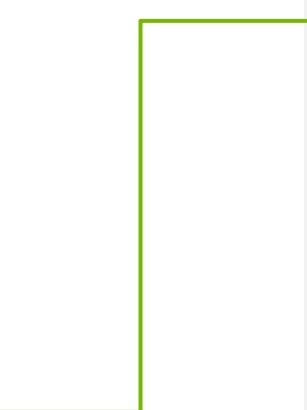
DRIVE WEBINARS

A comprehensive list to increase your learning

35+ Video-Webinars all focused on DRIVE

Requires NVIDIA Developer Login

Link to DRIVE Webinars

NVIDIA On-Demand
Featured Playlists   FAQ   Advanced Search

All DRIVE Webinars ⤴

29 sessions

38:47

Thank you for joining!
The webinar will begin shortly.

For the best viewing experience and audio quality, we recommend
using a wired Internet connection and make sure your computer
speakers (or headset) are turned on and the volume is up.

Integrating Custom Sensors Using NVIDIA DriveWorks

January 2020

Hope Allen, Product Manager, DriveWorks, NVIDIA
Aaraadhya Narra, Senior Solutions Architect and Deep Learning Institute certified instructor, NVIDIA

In this webinar, we will cover how to implement and use the sensor plugins for different sensor types such as radar, lidar, and camera. Such plugins will make it possible for developers to bring new sensors into the DriveWorks SAL and to implement the transport and protocol layers necessary to communicate with the...

38:25

Thank you for joining!
The webinar will begin shortly.

For the best viewing experience and audio quality, we recommend
using a wired Internet connection and make sure your computer
speakers (or headset) are turned on and the volume is up.

Developing a Camera Pipeline Using NVIDIA DriveWorks

January 2020

Hope Allen, Product Manager, DriveWorks, NVIDIA
Rajani Janardhana, Senior Systems Engineer, NVIDIA

This webinar covers the steps to develop camera image processing software on the DriveWorks SDK. Using this platform, developers can implement a range of capabilities seamlessly and with high performance. This webinar includes DriveWorks image basics, low-level Computer Vision modules, and Feature Tracking and...

37:17

How to Use the Console

Slides   Q&A   Resource List

Help   Media Player   Speaker Bios   Feedback Survey

Integrating DNN Inference into Autonomous Vehicle Applications with NVIDIA DriveWorks SDK

May 2020

Hope Allen, Product Manager, DriveWorks, NVIDIA
Shay Alon, Automotive Software Solution Architect, NVIDIA

The NVIDIA DriveWorks SDK can significantly speed autonomous vehicle development time. It provides the framework and tooling to import, optimize and infer networks for AV applications that use deep neural networks (DNNs). DriveWorks encapsulates NVIDIA TensorRT to provide a modular, standardized and...

DRIVE VIDEOS

There are numerous videos that showcase applications that can be developed on top of the DRIVE platform

▸ **DRIVE Labs videos**
are short-form videos that dive into specific self-driving algorithms

▸ **DRIVE Dispatch videos**
provide Brief updates from our AV fleet, highlighting new breakthroughs

Link to DRIVE Videos

DEEP LEARNING INSTITUTE (DLI) COURSES
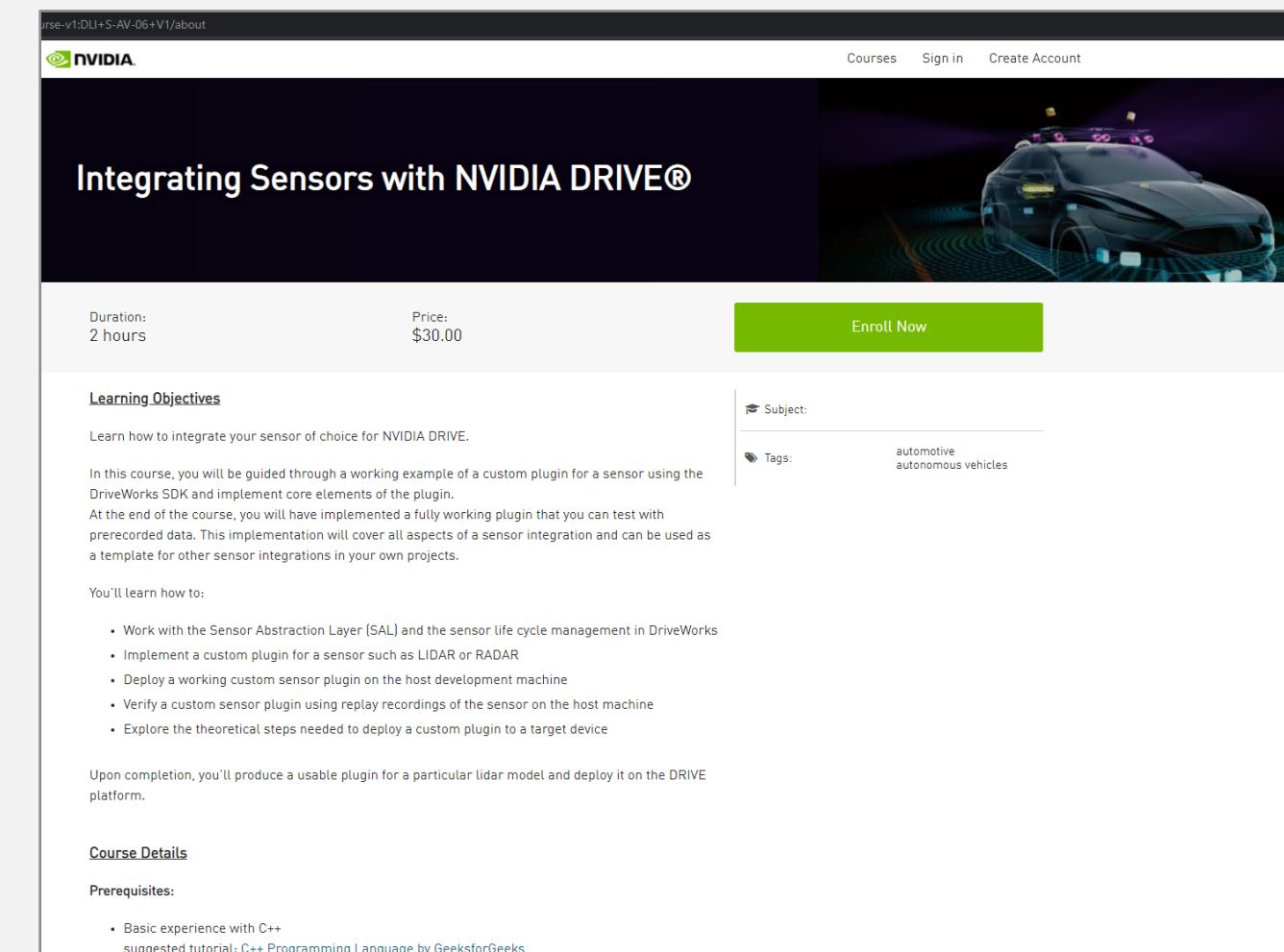
Numerous self-paced and instructor-led courses,
Some recommendations:

▸ Integrating Sensors with NVIDIA DRIVE

▸ Fundamentals of Accelerated Computing
  with CUDA C/C++

▸ Optimization and Deployment of TensorFlow
  Models with TensorRT

▸ Deep Learning at Scale with Horovod

Link to Deep Learning Institute
Link to Course Catalog PDF

NEED HELP?

GOT STUCK? TRY TO...

Check Out the DRIVE OS and DriveWorks Documentation
Comprehensive documentation that includes many samples that illustrate how to leverage the DRIVE SDK

Browse the Support Forum
The Forum contains 1000+ experiences of other users with answers by our support team. If your question is not already covered — feel free to raise it

Submit a Bug
Raise a bug if suggested by the Forum Support team or via NVONLINE if applicable.
Our tech teams will support with information and guidance

Contact your Distributor or NVIDIA Representative
The issue persists? Contact your Developer Relations Manager or Account Manager

SUPPORT FORUM

The Forum contains an ever-evolving collection of customer questions and answers by our support team.

If your question is not already covered
— feel free to raise it

The Forum team usually replies within 24h

Raising questions in the Forum requires Developer Login

Link to DRIVE AGX Orin Forum

IF FORUM CAN'T HELP
Report a Bug

▸ Reporting a Bug on NVIDIA Developer (aka DevZone) for confidential content

▸ Login to https://developer.nvidia.com/drive

▸ In upper right user picture, click the down arrow

▸ Select "Account"

▸ In the left navigation menu, select "My Bugs"

▸ Select "Submit a New Bug" (in upper right green box, or within text of bounded green box)

▸ Fill in the details of your feedback, request or issue

▸ IMPORTANT:
  ▸ When Filing a Bug, be sure to include the Platform Name — e.g. [DRIVE AGX Orin] in the summary, and
  ▸ Select DRIVE [Autonomous Driving] for Relevant Area

▸ If you have any issues, please contact InfoDRIVEPX@nvidia.com

▸ Request: Create one bug per issue: do not file multiple issues in the same report

Account
Log out

My Profile

My Programs

My Applications

My Bugs

My Forms

Submit a New Bug
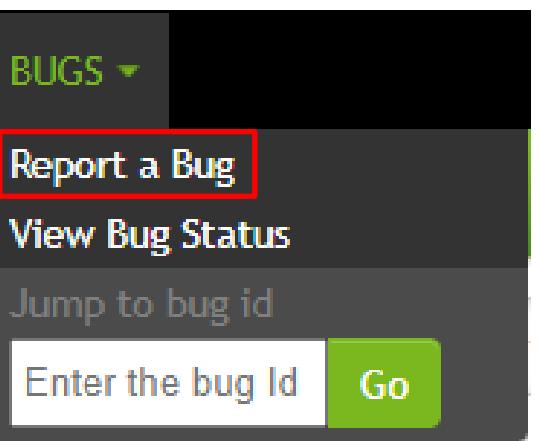
NVONLINE
Report a Bug

▶ Report a Bug on NVONLINE

▶ Login to https://partners.nvidia.com/

▶ In upper left, select BUGS > Report a Bug

▶ Fill in the details of your feedback, request or issue

▶ IMPORTANT: When filing Bug, under Project
  ▶ Click Project
  ▶ Select DRIVE
  ▶ If you do not have this project, please contact InfoDRIVEPX@nvidia.com

▶ Request: Create one bug per issue; do not file multiple issues in the same report

▶ Tracking a Bug (track status, provide additional information)

▶ In upper left, select BUGS > View Bug Status

FILE A NVBUG — DETAILS
(1/2)

FILE A NVBUG — DETAILS
(2/2)

Synopsis: enter the bug title using [PartnerName][Platform][SW] <Short Description>, e.g. [MyCmpny][DRIVE PX 2 AutoChauffeur][V4.1L] Camera not responding.

Description: describe your issue with as much details as possible. For e.g. and if applicable:
- SDK/PDK version used on the host and target: Example – V4.1L Alpha 2.0 4.1.2.0
- Target Platform: DRIVE PX 2 AutoChauffeur, DRIVE PX 2 AutoCruise, DRIVE PX 2 – G3 (dGPU), DRIVE AGX Xavier or Pegasus
- Detailed description of the issue with step-by-step instructions to reproduce the failure
- Repeatability (<10% / 30% / 50% /100%)
- Impact of issue: e.g., how this is affecting your project
- Attach log files (under Attach file:)

Remember to SUBMIT your report!

NVIDIA