

October 2023

Qualcomm

Recommended Hardware and Software Platforms

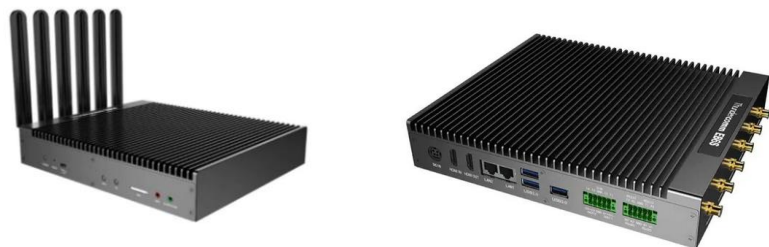
Qualcomm® Vietnam Innovation Challenge - 2024

Hardware/Software Platform Summary

No.	Device	Category	Specification	Development Environment (OS, Firmware, SDK)			Remark
				OS/Firmware	SDK/Tools	Source Available	
1	Qualcomm® Robotics RB5 Development Kit	- Robotics - ML/AI	RB5 Kit Specs	Linux Embedded (Kernel 4.19) or Ubuntu 18.04 (Kernel 4.19)	- AI framework: SNPE, TensorFlow Lite. - Qualcomm® Robotics Vision/ Computer Vision/ Hexagon™ DSP SDK - ROS2	No kernel source code available	Download resource from Thundercomm website by purchased account. Sample Apps
2	QCS610 Open Kit (QCS610)	- ML/AI - AI Camera / Edge AI	* QCS610 Open Kit Specs * QCS610 SOM Specs	Linux Embedded (Kernel: 4.9) or Android 10	SNPE, Tensorflow Lite-2.x, GStreamer1.0-1.x	Yes (OS source code)	Download resource from Thundercomm website
3	Snapdragon 600 Series (SDM660/Qualcomm SC66)	- ML/AI - Edge computing (high tier)	*Snapdragon 660 Processor *Qualcomm SC66 Product Specs	Android 9, 10	* AI framework: TensorFlow Lite, SNPE	Yes (OS source code)	Download resource from Qualcomm server by registered account.
4	Snapdragon 200 Series (SDM210/Qualcomm SC20)	- ML/AI - Edge computing (entry tier)	* Snapdragon 210 Processor * Qualcomm SC20 Product Specs	Android (7, 8) Or Linux Embedded (Kernel 3.18)	* AI framework: TensorFlow Lite, SNPE	Yes (OS source code)	Download resource from Qualcomm server by registered account.
5	MDM9207 IoT Modem (Qualcomm EC25)	- Edge computing (entry tier) - IoT gateway	*MDM9207 Processor *Qualcomm EC25 Product Specs	Linux Embedded (Kernel 3.18)		Yes (OS source code)	Download resource from Qualcomm server by registered account.
6	MDM9206 IoT Modem (Qualcomm BG96)	IoT (low power)	*MDM9206 Processor *Qualcomm BG96 Product Specs	ThreadX OS (SDK version V4.2.4)	* LLVM toolchain	No kernel source code available	- Download resource from Qualcomm server by registered account. - Sign NDA and register account to download LLVM tool (Qualcomm CreatePoint)
7	VOXL2 Flight Deck	Drone based solution	VOXL2 Flight Deck Specs	Debian Buster, Linux Kernel v4.19	PX4, ROS 1 / 2, Open CV, MAVROS, MAVSDK, Tensorflow Lite, SNPE.	Yes (OS source code)	- Download resources by registered account from ModalAI Open sourced and documented software stack - Open source PX4 flight controller support
8	TurboX EB6S Edge AI Station (Cloud AI 100)	Edge AI (high end)	* EB6S Edge AI Specs * Cloud AI 100 Specs	Linux	- Cloud AI Platform Software Development - Cloud AI Apps Software Development Kit	No	Download resource from Thundercomm and Qualcomm website.

EB6S Edge AI Station (Featuring Qualcomm® Cloud AI 100)

EB6S Edge AI Station is an edge computing device that can provide ultra-high AI performance with 15 TOPS of SoC and extensible 70/200 TOPS AI performance accelerator card. Support 24 channels FHD video decoding.



Applications:

[Smart Building](#) | [Smart Factory](#) | [Smart Grid](#) | [Smart Healthcare](#) | [Smart Traffic](#)

No.	Item	Description	Remark
1	Development Kit	EB6S Edge AI Station	
2	OS	Linux	
3	SDK	Platform SDK for Cloud AI 100 (AIC100)	

Category	Item	Description
Platform	Chipset	QRB5165N
	OS	Linux
Storage	Flash	128GB UFS3.0
	Expansion	1 x Micro SD Card slot, M.2 Con for 2280 SSD NVMe
Extensible AI performance	AI Card	200 TOPS(INT8)/100 TFLOPS(FP16)
Wireless connection	4G/5G	M.2 CON for 3042 4G / 3052 5G module, support PCIe and USB data bus
	WiFi	M.2 CON, support M.2 Wi-Fi module
	GPS	GPS, Beidou and others
Peripheral interface	HDMI	1 x HDMI out, 1080p@60fps, 1 x HDMI in, 4k@60fps
	Audio in/out	1 x MIC, 1 x Earphone
	Ethernet	2 x RJ45, Gigabit ethernet (10/100M/1000M)
	USB	3 x USB 3.0 Type-A, 1 x USB3.1 Type-C (support Video and OTG)
	Others	2 x RS485, 2 x RS232 , 4 x DI(Photocoupler), 2 x DO (Switch: Short/OFF), 1 x NanoSIM card, 1 x Micro USB(for debug), 1 x Micro USB(for 4G/5G module)
Power	DC Input	12V to 24V
Mechanical	Dimension	235mm x 200mm x 42mm (Desktop, Wall mount)

Cloud AI 100:

<https://www.qualcomm.com/products/technology/processors/cloud-artificial-intelligence/cloud-ai-100>

EB6S Edge AI Station:

<https://www.thundercomm.com/product/eb6s-edge-ai-station>

Qualcomm® Robotics RB5 Development Kit



Application Areas



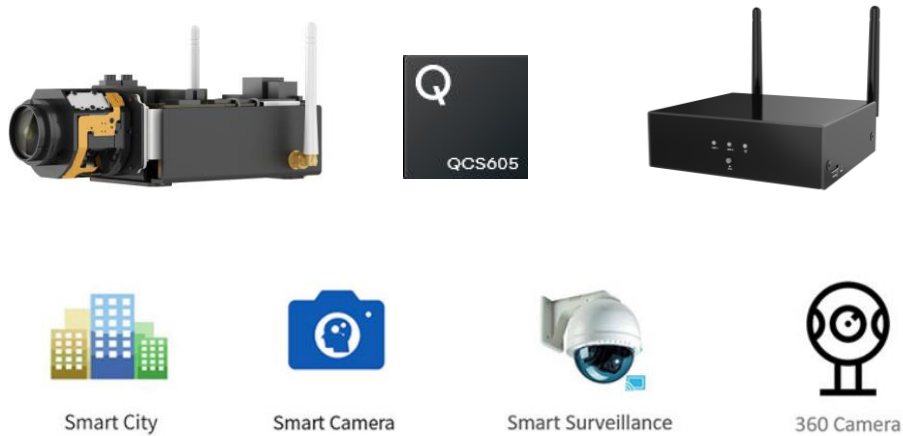
No.	Item	Description	Remark
1	Development Kit	Qualcomm® Robotics RB5 Development Kit	- Download OS/SDK from Thundercomm website. - Only binary images are available. Source code is not available.
2	OS	Ubuntu 18.04 (Kernel 4.19)	
3	SDK	Qualcomm® Neural Processing SDK for AI, Qualcomm® Robotics Vision SDK, Qualcomm® Computer Vision SDK, Qualcomm® Hexagon™ DSP SDK,	
4	NPU	15 TOPS	

RB5 Development Kit Specs

Category	Description
SOM Platform	Qualcomm® QRB5165 Qualcomm® Kryo™ 585 Qualcomm® Adreno™ 650 GPU, Adreno™ 665 VPU, Adreno™ 995 DPU Qualcomm® Hexagon™ DSP with quad HVX Qualcomm® Spectra™ 480 image processing
Camera	Vision kit(IMX577 GMSL OV9282) , & Accessories (Nuvoton® (ToF) - Sensor[MN34906] &Intel® RealSense (D435i)
Storage	128 GB UFS3.1 Onboard Storage & 1 x MicroSD Card Slot
Display	1 x HDMI 1.4 (Type A - full) on Board Connector
Memory & Storage	LPDDR4x, 4x16 bit; up to 1866MHz, 8GB RAM
Sensor	Accelerometer + Gyro Sensor (TDK ICM-42688/ ICM-42688-P) Barometric Pressure
USB	1 x USB 2.0 Micro B (Debug only), 1 x USB 3.0 Type C (OTG Mode), 2 x USB 3.0 Type A (Host Mode Only)
Wireless Connectivity	WLAN 802.11a/b/g/n/ac/ax 2.4/5GHz 2x2 MIMO n-Board WLAN Antennas
Ethernet	1 x 1GbE Ethernet
Audio	2 x Class-D on Board Speaker Amplifier, WSA8810 1 x on Board PDM MIC on Mainboard, 4 x on Board PDM MIC on NAV MEZZ
Location	GPS, Glonass, BeiDou, Galileo, QZSS, and SBAS
Expansion interfaces	High-speed connector (MIPI CSI , USB 3.0, GPIO, CCI I2C, etc) Low-speed connectors (UART, SPI, I2C, GPIO, CAN, I2S, etc)

QCS605 AI Box (featuring Qualcomm® QCS605)

High-performing, power-efficient edge computing for next-generation smart cameras and smart home applications.



No.	Item	Description	Remark
1	Development Kit	QCS605 AI Box Kit	
2	OS	Linux Embedded (Kernel: 4.9) or Android 10	
3	SDK	SNPE, Tensorflow Lite-2.x, GStreamer1.0-1.x	

Category	Item	Description
Platform	Chipset	QCS605
	CPU	Qualcomm QCS605 Kryo 300 CPU, Octa-core CPU (2x2.5GHz, 6x1.7GHz)
	GPU	Qualcomm® Adreno™ 615
	DSP	Qualcomm® Hexagon™ 685 DSP
	OS	Android 10
	Memory and Storage	LPDDR4x 8GB + eMMC 16GB
Multimedia	Display	Micro HDMI (DSI-HDMI bridge-LT9611), Resolution up to 4k/30hz Ultra HD
	Decode	4K60 10-bit: HEVC/VP9/H.264 HDR 10
	Encode	4K60 8-bit: HEVC/H.264 + 1080P60
	Audio	1xLine in, 1xLine out
Connectivity	WiFi/BT	802.11a/b/g/n/ac 2.4/5Ghz 2x2 MIMO & Bluetooth 5.0
	Ethernet	Integrated POE/RJ45 1Gbps
	Location	GPS / GLONASS
	Others	1x RS485, 2xDigital Input, 2xDigital Output, 1xUSB Type C
Dimension	123.42 x 124 x 42.5 mm	

QCS605 SoC:

<https://www.qualcomm.com/products/technology/processors/application-processors/qcs605>

QCS605 AI Box Kit:

<https://bhs.bkav.com/aibox>

TurboX C610 Open Kit (featuring Qualcomm® QCS610)

The TurboX C610 Open Kit is a cost-effective solution to evaluate the performance and build the prototype of the smart cameras and intelligent IoT devices quickly.



AI Camera



Video Conference



Surveillance Camera



360 Camera



Dash Camera



Edge Computing

No.	Item	Description	Remark
1	Development Kit	Turbox C610 Open Kit	
2	OS	Linux Embedded (Kernel: 4.9) or Android 10	
3	SDK	SNPE, Tensorflow Lite-2.x, GStreamer1.0-1.x	

Category	Item	Description
Platform	Chipset	QCS610
	CPU	2x K4G (Enyo) 2.2 GHz + 6x K4S (A55) 1.8 GHz
	GPU	Qualcomm® Adreno™ 612
	DSP	Qualcomm® Hexagon™ 685 DSP
	OS	Linux Embedded/Android
	Memory and Storage	LPDDR4x 8GB + eMMC 16GB
Multimedia	Display	1 x MIPI-DSI 4-lane, 1080p@60 fps, 1 x DisplayPort
	Decode	4K@30 fps 10-bit: HEVC
	Encode	4K@30 fps 8-bit: HEVC
	Audio	1 x 3.5mm headset, 6 x Digital Mics(From External Codec), 2 x Speaker out (From Codec)
Connectivity	WiFi/BT	WLAN 1 × 1 802.11a/b/g/n/ac and Bluetooth 5.1
	Ethernet	1 x GbE Ethernet
	Location	GPS / GLONASS
	Others	1 x USB 3.1 Type C, 1 x USB 2.0 Type A, 1 x Micro USB(For Debug), 1 x SD card;
Dimension	120 x 250 mm	

QCS610 SOM

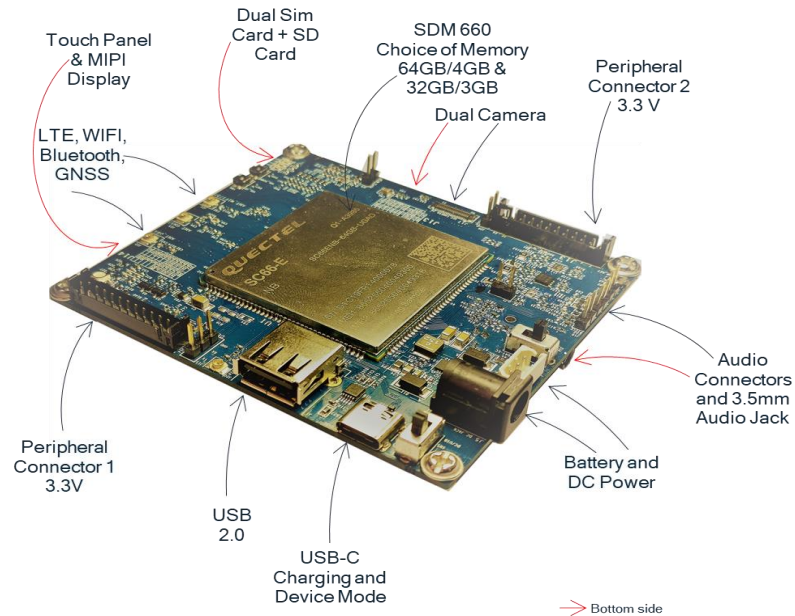
<https://www.thundercomm.com/product/c610-c410-som/>

QCS610 Open Kit:

<https://www.thundercomm.com/product/c610-c410-open-kit/>

Quectel SC66 (featuring Qualcomm® SDM660 SoC)

High Tier Solution for extensive computation applications



- Application Areas
 - Machine Learning
 - Tensor Flow
 - High Computation needs
 - Dual Camera
 - GPU

No.	Item	Description	Remark
1	Development Kit	Startup kit or Quectel EVB	
2	OS/SDK	Android 9,10 AI framework: TensorFlow, SNPE	• Sign NDA with Quectel to get resources. • OS and SDK source code are downloaded from Quectel server. • Able to customize and re-compile OS/SDK

Specifications

Android 9.0
32GB + 3GB & 64GB+4GB(optional)
SDM660(64Bit,2.2Ghz, Octacore, Kryo 260)

Features

Cellular/WIFI/BT
Dual Camera(12MP)
Peripheral Connector at 3.3V(SPI/I2C/GPIO)
Touch Display
USB 3.0 TypeC Connector
USB 2.0 TypeA Host Connector
Dual Sim
Audio: 3.5mm Jack/Loud
Speaker/Mic/Earpiece Connector
Battery

Dimensions

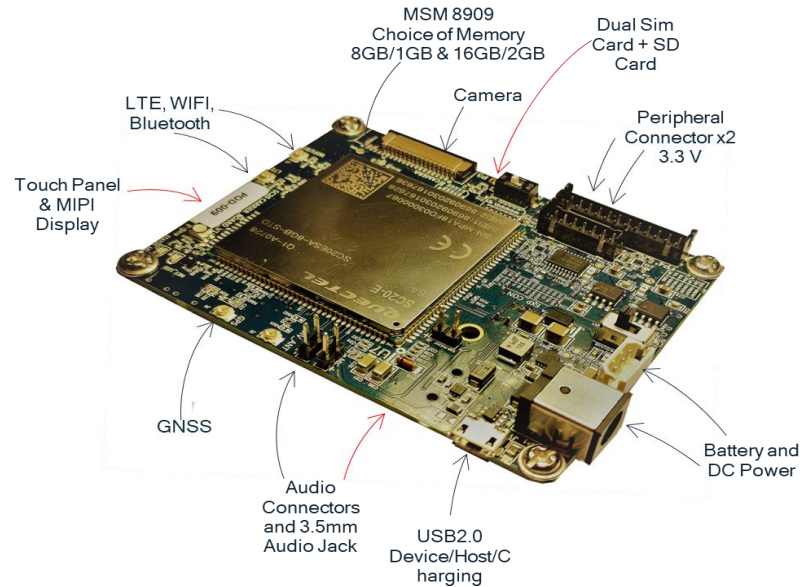
80mm x 90mm

References

[Snapdragon 660 Processor](#)
[Quectel SC66 Product Specs](#)

Quectel SC20 (featuring Qualcomm® MSM8909 SoC)

Entry Tier Solution for Smart IoT applications



- Application Areas
 - Machine Learning
 - Tensor Flow Lite
 - Gateways
 - Single Camera
 - Medical Applications

No.	Item	Description	Remark
1	Development Kit	Startup kit or Quectel EVB	*Sign NDA with Quectel to get resources. * Download source code/binary images from Quectel
2	OS/SDK	• Android (Android 7, 8) Or Linux Embedded (Kernel 3.18) • AI framework: TensorFlow Lite, SNPE	* Source code of Android and Linux OS are available

Specifications

Android /Linux
8GB + 1GB & 16GB +2GB
MSM8909 (1.1Ghz Quadcore Processor)

Features

Cellular/WIFI/BT
Peripheral Connector at 3.3V(SPI/I2C/GPIO)
5inch MIPI-DSI Touch Panel Display
MIPI CSI Single Camera 5MP
Debug with USB OTG port
Debug with UART port
Battery Charging with USB and DC-IN
SD Card Support
LED Indicators: Status and Net-Light
Dual Sim
Audio: 3.5mm Jack/Loudspeaker/Mic/Earphones

Dimensions

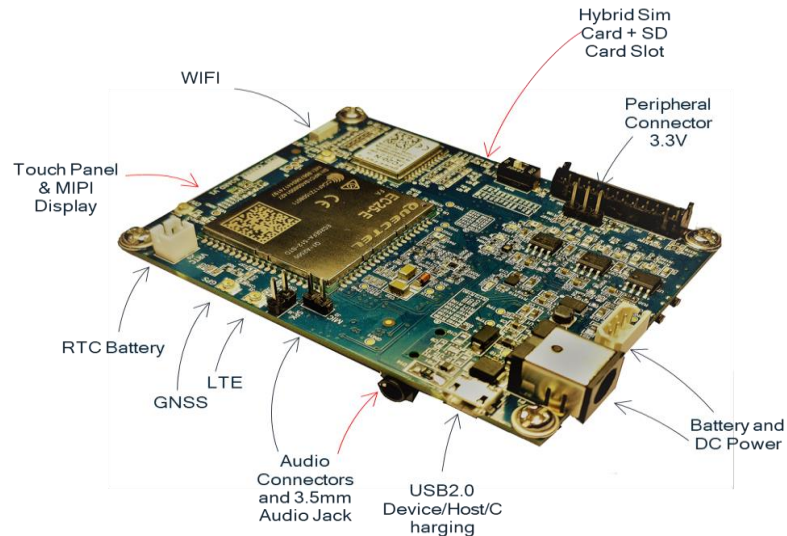
85mm x 65mm

References

[Snapdragon 210 Processor](#)
[Quectel SC20 Product Specs](#)

Quectel EC25 (featuring Qualcomm® MDM9207-1 IoT Modem)

Edge Computing and LTE Solutions



- Application Areas
 - Gateways
 - Sensor Interface
 - Edge Computing

No.	Item	Description	Remark
1	Development Kit	Startup kit or Quectel EVB	*Sign NDA with Quectel to get resources. *Download source code/binary images from Quectel.
2	OS/SDK	* Linux Embedded (Kernel 3.18)	

Specifications

Linux

MDM9207 (1.3Ghz Cortex A7 Processor)

Features

Cellular connectivity 2G, 3G, 4G

GNSS

Wi-Fi/BT

Peripherals Connector at 3.3V(GPIO, I2C, SPI, UART)

Debug with USB, Debug with UART

Battery Charging with USB and DC-IN.

SD Card support

LED Indicators: Status and Net-Light

Audio: Speaker header, Headphone jack/
Mic/Earphones

Dimensions

85mm x 65mm

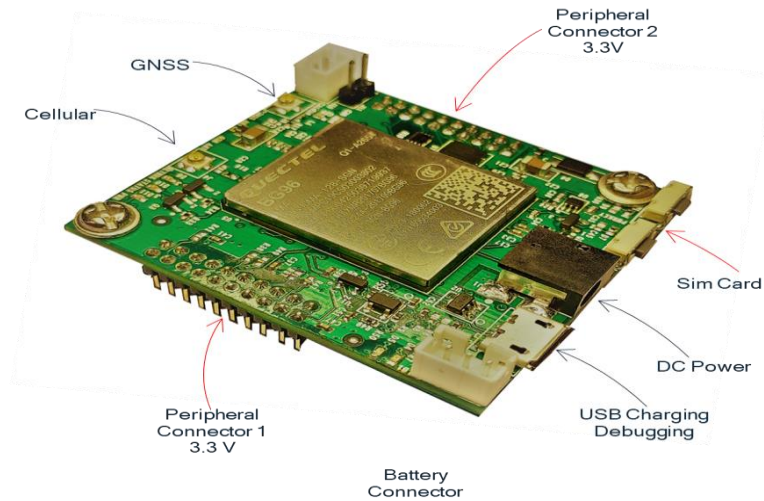
References

[MDM9207 Processor](#)

[Quectel EC25 Product Specs](#)

Quectel BG96 (featuring Qualcomm® MDM9206 IoT Modem)

Low Power IoT Solutions (NB-IoT/CAT-M1/GPRS)



- Application Areas
 - Trackers
 - Sensor Interface
 - Edge Computing

No.	Item	Description	Remark
1	Development Kit	Startup kit or Quectel EVB	• SDK source code is not available (only binaries). Sample app sources are available. • Download SDK /firmware, documents from Quectel server • Need to sign NDA with Qualcomm to enable LLVM feature.
2	OS/SDK	ThreadX OS (SDK version V4.2.4)	

Specifications

ThreadX OS
MDM9206 (1.3Ghz Cortex A7 Processor)

Features

Cellular connectivity 2G, 3G, 4G
GNSS
Peripherals Connector at 3.3V(GPIO, I2C, SPI, UART)
Debug with USB, Debug with UART
Battery Charging with USB and DC-IN.
Boot without battery with DC-IN or USB.
LED Indicators: Status and Net-Light

Dimensions

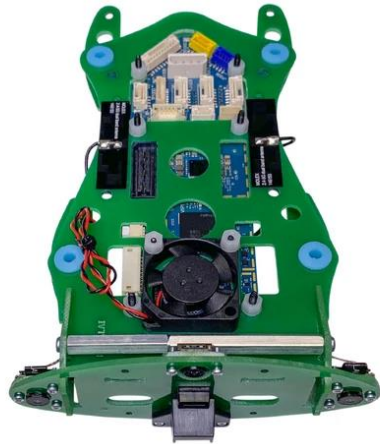
85mm x 65mm

References

[MDM9206 Processor](#)
[Quectel BG96 Product Specs](#)

VOXL2 Flight Deck

Mount and Fly Obstacle Avoidance and GPS-Denied Navigation Kit



Application Areas



Infrastructure
(Indoor/Outdoor
Asset Inspection)



E-Commerce
(Drones for
Deliveries)



Intelligent
Surveillance



Agriculture

Refs:

[VOXL2 Flight Brief and Block Diagram](#)

[Download Resource](#)

Category	Description
CPU	QRB5165, 8 cores up to 3.091GHz
OS	Debian Buster, Linux Kernel v4.19
GPU	Adreno 650 GPU -1024 ALU
NPU	15 TOPS
Flight Controller	Integrated flight controller on DSP with TDK ICM-42688 IMU and ICP-10111 Barometer
Add-on Connectivity	WiFi, 5G, 4G/LTE, Microhard (No built-in Wi-Fi)
Video Encoding	up to: 8K30 h.264/h.265 108MP still images
Computer Vision Sensors	2 Stereo Pair, 1 Tracking
Tracking Sensor	Yes
Dimensions & weight	70mm x 36mm - 16g
SDK	VOXL SDK: GPS-denied navigation, SLAM, obstacle avoidance, object recognition,
QGroundControl	Yes
Software features	- PX4, ROS 1 / 2, Open CV, MAVROS, MAVSDK, Tensorflow Lite, SNPE. - Open source Linux kernel, cross-compilers - Docker build environment for CPU, GPU (OpenCL) and DSP (Hexagon SDK) heterogeneous computer vision and deep learning processing
Other	NDA '20 Section 848 Compliant (Assembled in USA)



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