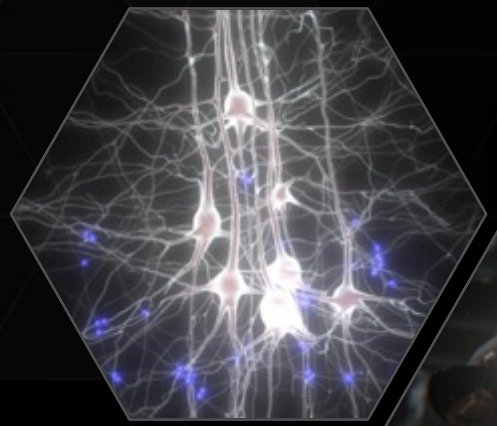
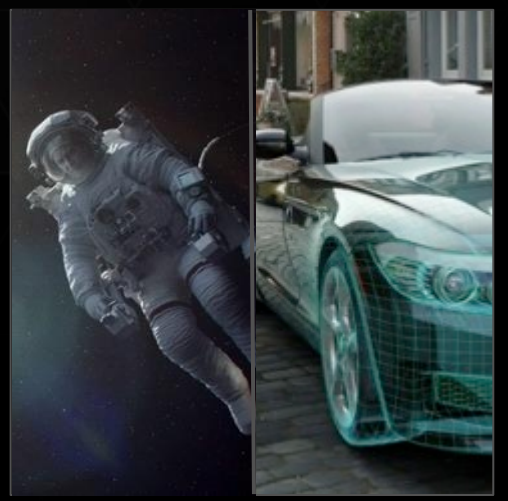
RISE OF GPU'S IN EMBEDDED COMPUTING

Doug MacMillan
Director, Mobile & Embedded Marketing



THE LEADER IN VISUAL COMPUTING

GAMING



DESIGN and
VISUALIZATION

HPC

AUTO

TAKING OUR VISION TO REALITY

NVIDIA CUDA

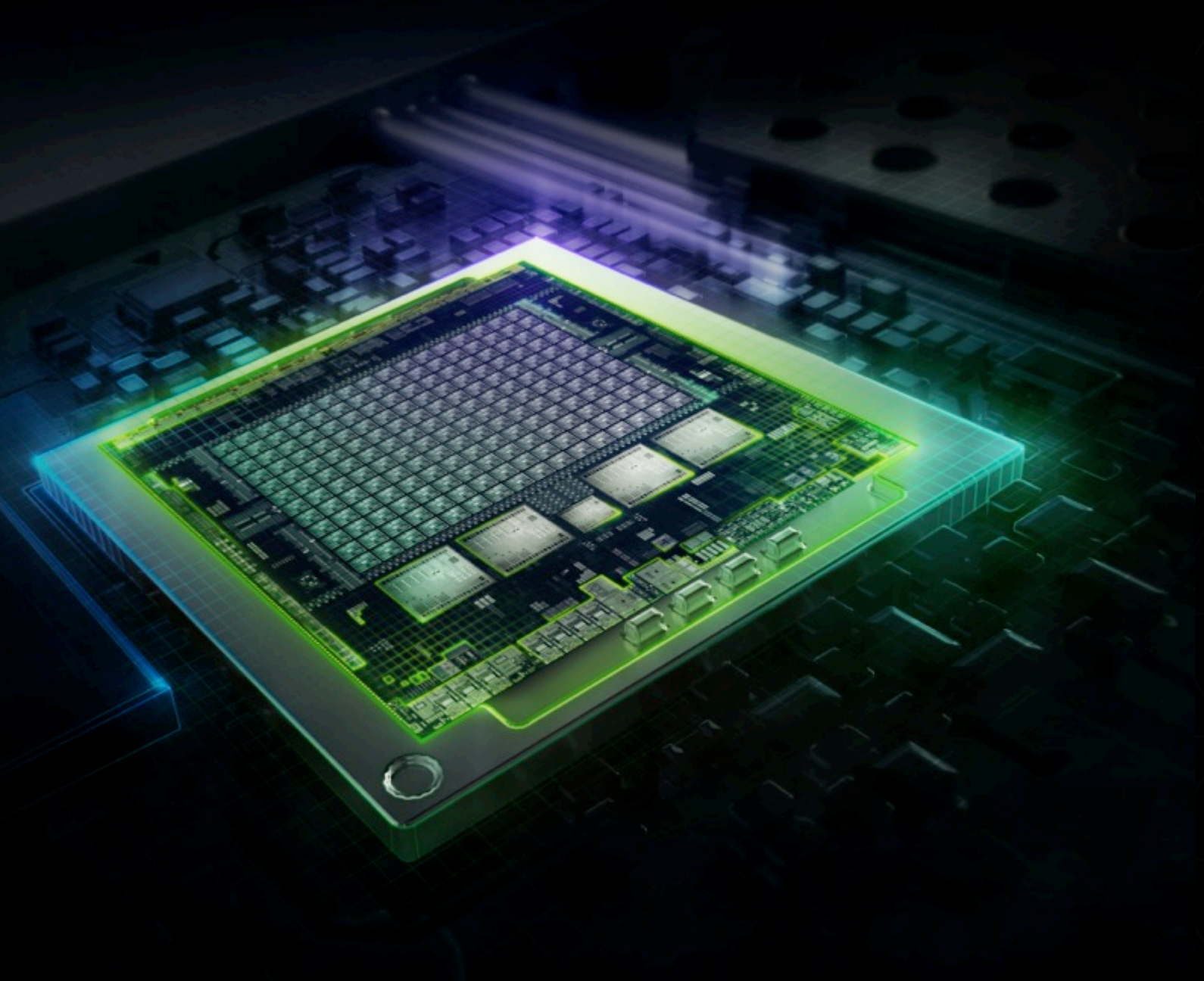
World's most pervasive parallel programming platform

8,000 Institutions with CUDA Developers

2,200,000 Toolkit Downloads

506,000,000 GPUs Shipped

738 University Courses In 62 Countries



TEGRA K1

IMPOSSIBLY ADVANCED

NVIDIA Kepler Architecture

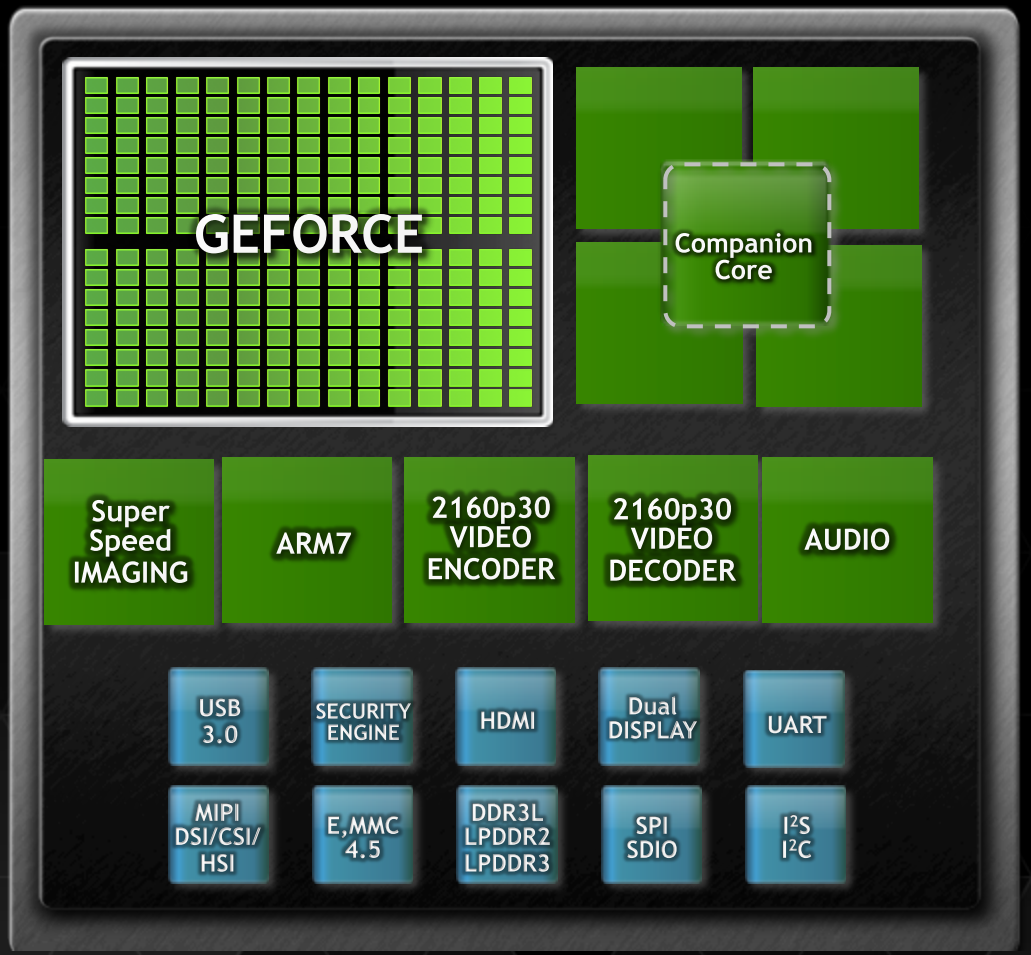
4-Plus-1 Quad-Core A15

192 NVIDIA CUDA Cores

Over 300 GFLOPS

5 Watts

TEGRA K1 OVERVIEW



CPU	Quad Core Cortex A15 *With 5th Battery-Saver Core; 2MB L2 cache*
GRAPHICS	Kepler GPU (Open GL 4.3, OpenGL ES3.0) *192 CUDA cores, 10x AP30 performance*
CAMERA	Dual ISP3 *100MP sensor support, 3x CSI-2 (x4, x4, x1)*
MEMORY	Dual Channel Memory *DDR3L-1866*
VIDEO	2160p30 Decode and Encode *Supports H.264 and VP codecs*
POWER	Lower Power *28HPM Process, Companion Core, PRISM2*
DISPLAY	4096x2160 @24Hz (HDMI) *High Speed HDMI 1.4a, eDP, DSI*
SECURITY	Advanced HW-accelerated Security *HDCP, Secure Boot, DRM*
STORAGE	eMMC 4.5 *200MB/s (HS200 mode)*
I/O	Rich Embedded Interfaces *e.MMC 4.5, USB 3.0, USB 2.0, SDIO 3.0*

TEGRA K1: UNLOCKING NEW APPLICATIONS

Computer Vision

Robotics

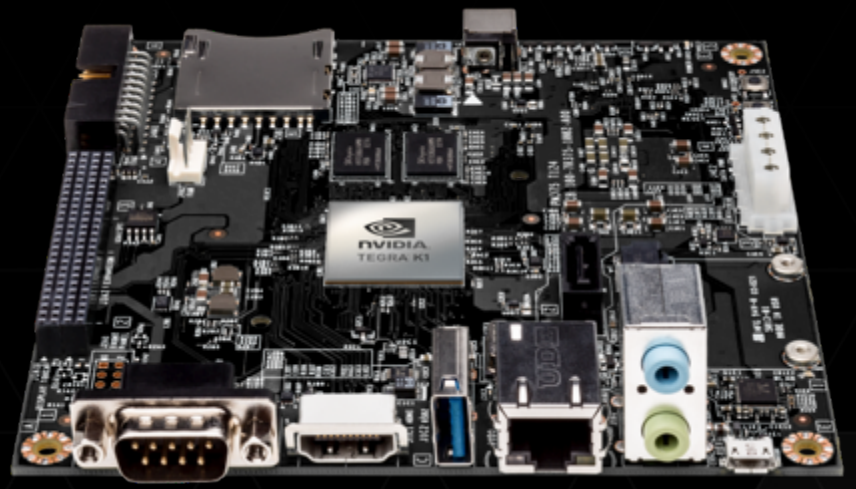
Surveillance

Medicine

Defense

JETSON TK1 DEVELOPER KIT

SOC	Tegra K1 Quad Core Cortex A15 *With 5th Battery-Saver Core; 2MB L2 cache*
GRAPHICS	Kepler GPU (Open GL 4.3, OpenGL ES3.0) *192 CUDA cores, 327 GFLOPs*
MEMORY	Dual Channel Memory *2 GB DDR3L-1866*
USB	Super Speed *1x USB 3.0 + 1x USB 2.0*
PCI-E	PCI-E Generation 2 *1x half-mini PCIe slot*
NETWORKING	Gigabit Ethernet *10/100/1000M via RTL8111GS*
DISPLAY	Up to UltraHD/4K *High Speed HDMI 1.4a*
STORAGE	On Board eMMC *16 GB*
AUDIO	ALC5639 Audio Codec *Headphone Out, MIC In*
Expansion	Rich Embedded Interfaces *DP, SPI, I2C, CSI-2 (1x1 + 1x4)*



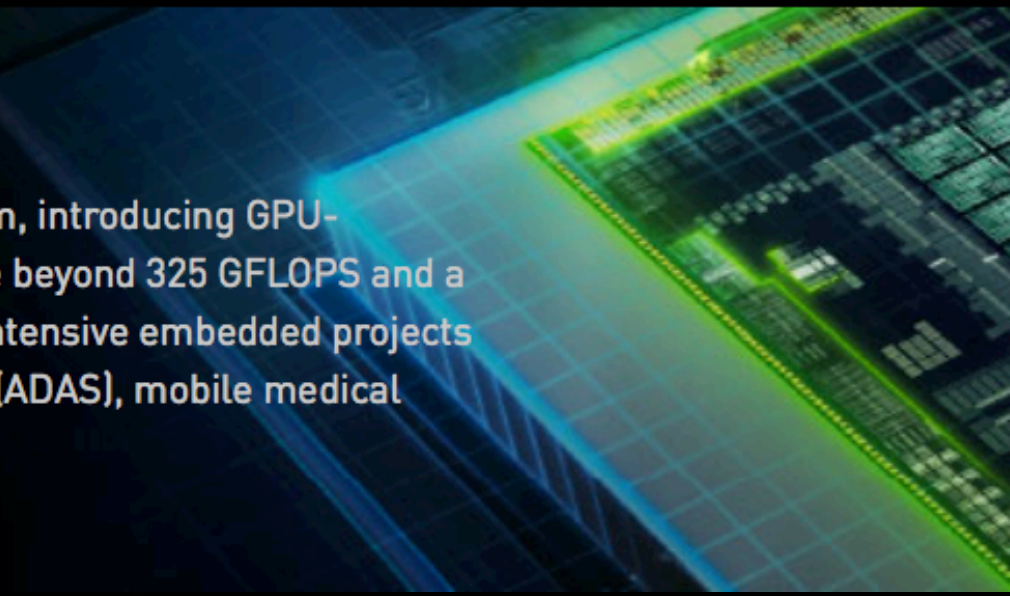
"Having the level of performance and energy efficiency Jetson TK1 offers can potentially support the development of robots with real-time object recognition and compelling autonomous navigation capabilities"

Chris Jones, Director of Strategic Technology Development
iRobot Corporation

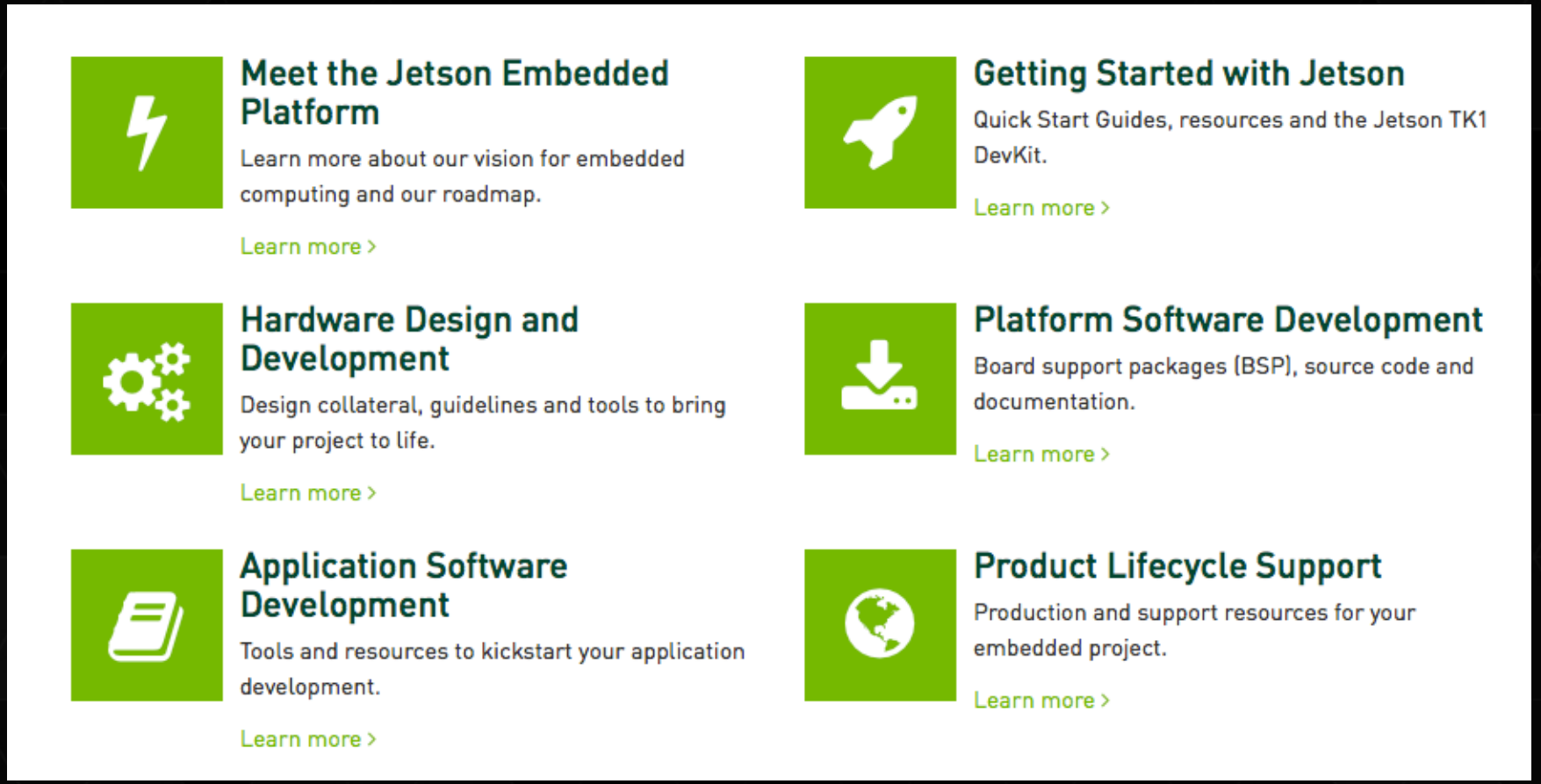
Jetson: The Platform

MEET THE JETSON EMBEDDED PLATFORM

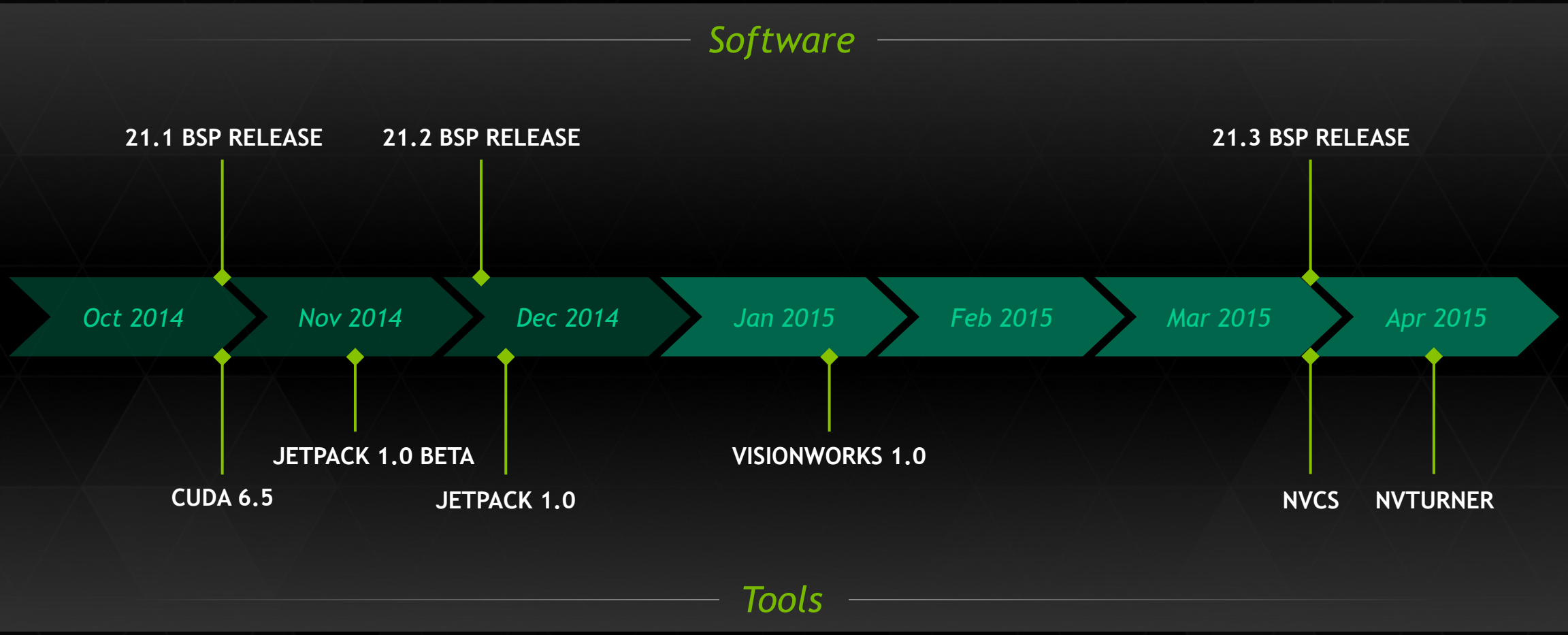
NVIDIA Jetson is the world's leading embedded computer vision platform, introducing GPU-accelerated parallel processing to the mobile market. Raw performance beyond 325 GFLOPS and a sub-10W power budget make Jetson the leading solution for compute-intensive embedded projects like autonomous robotic systems, Advanced Driver Assistance Systems (ADAS), mobile medical imaging, and Intelligent Video Analytics (IVA).



Portal: Sneak Peek



Embedded roadmap



BSP Features

21.1	21.2	21.3
ES 3.1	ISP Support / limited release	ISP Support / stable API
GL 4.4	GLX Security Fix	Internal/External Feedback Fixes
Reduce Flashing Time	TK1 24x7 Use Case support for CD575 SKU	
Gstreamer 1.0 Features	Internal/External Feedback Fixes	
CUDA 6.5		
Enhanced support for 3rd-Party USB BT/WiFi Devices		
NVMap and Shellshock Security Fix		
Internal/External Feedback Fixes		

JetPack Features

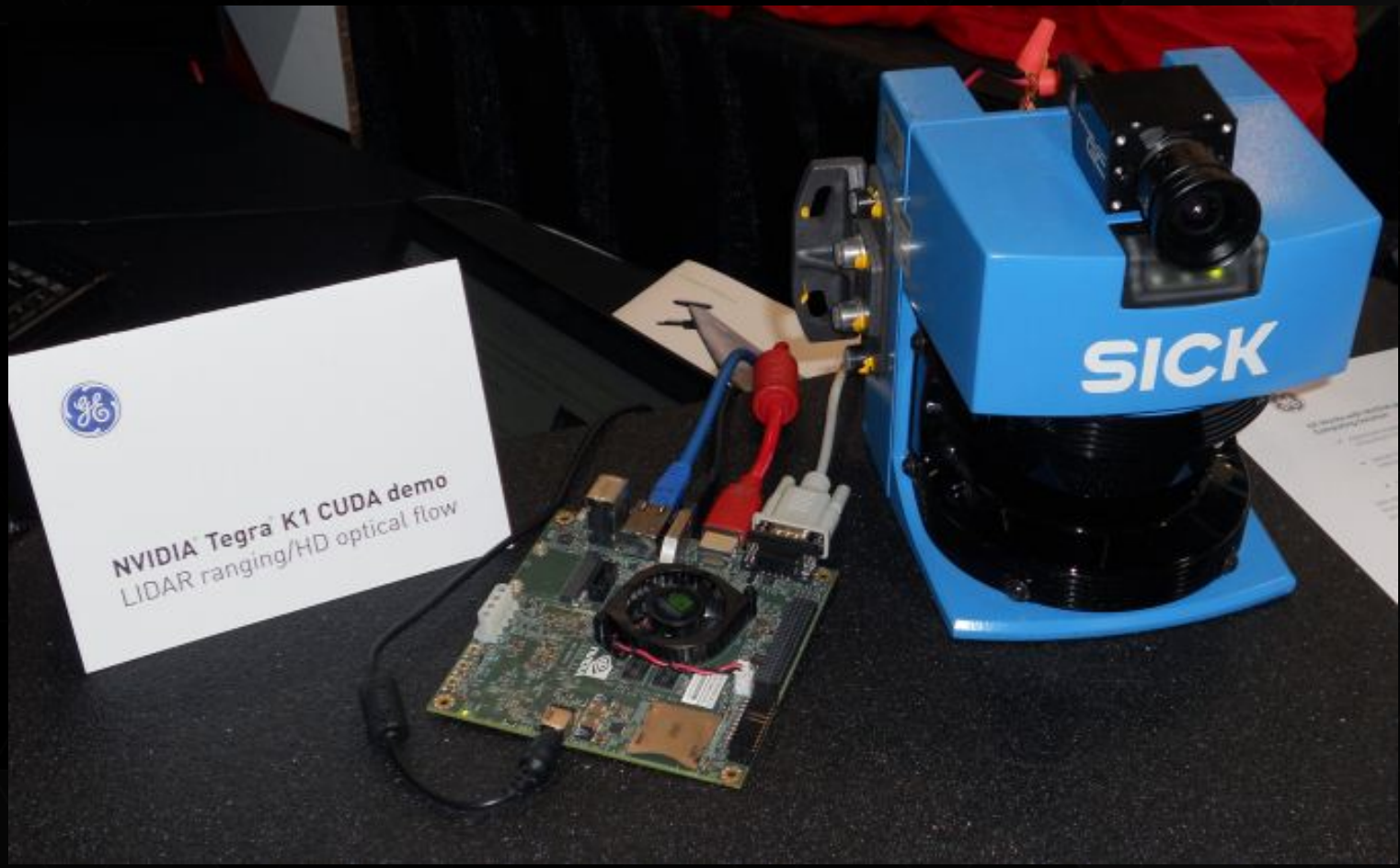
JETPACK 1.0 Beta	JETPACK 1.0
OS Image Pull	Tegra System Profiler 2.2
CUDA Toolkit 6.5: Nsight Eclipse Edition • Visual Profiler	Tegra Graphics Debugger 1.2
OpenCV	PerfKit
GStreamer	
OpenVX	
Tegra System Profiler 2.1	
PerfKit	
OpenGL SDK Samples	

CUDA 6.5 features

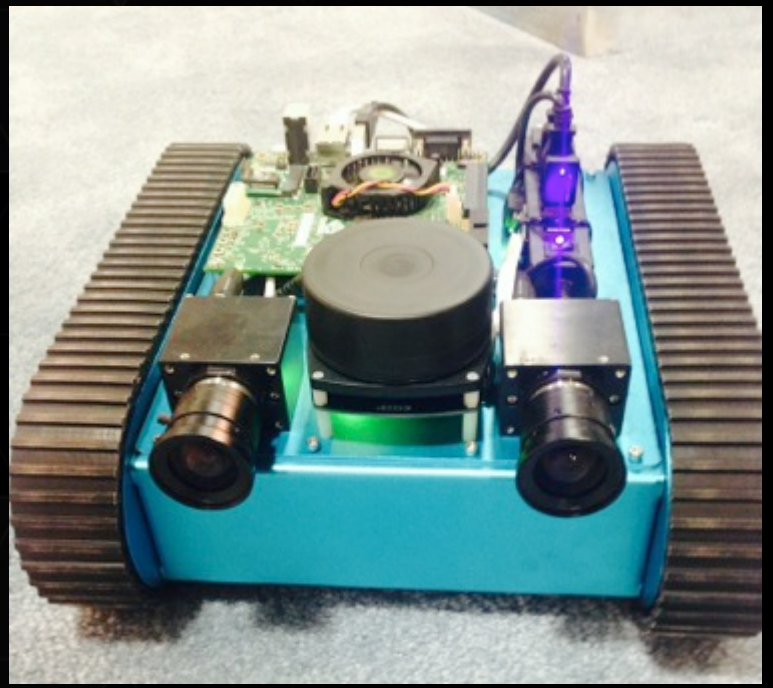
FEATURES	
Unified Memory	Math Library Optimization
Drop-in BLAS	GPU Direct RDMA
Multi-GPU Libraries	CUDA Fortran tools support
cuFFT Callbacks	IDE support for remote development

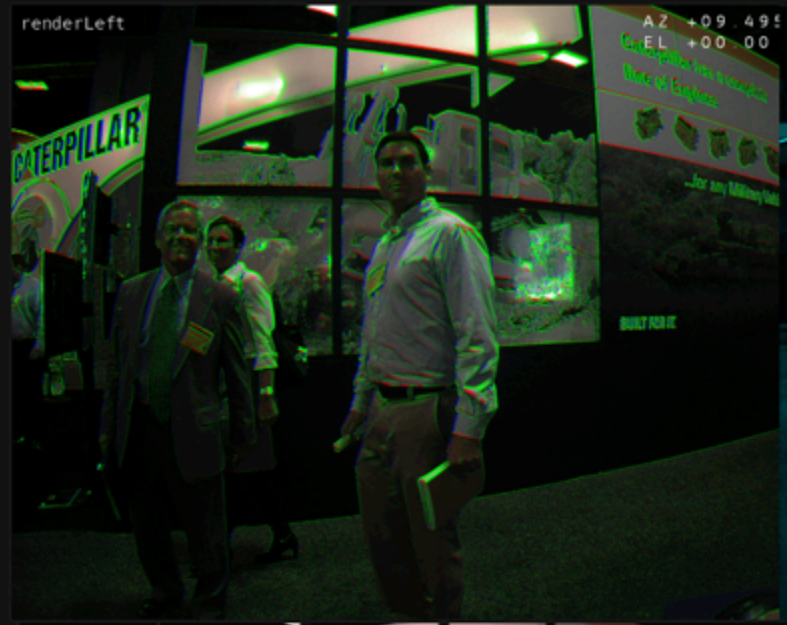
Partner Examples

GTC 2014


NVIDIA Tegra K1 CUDA demo
LIDAR ranging/HD optical flow
SICK

Version 2.0




renderLeft
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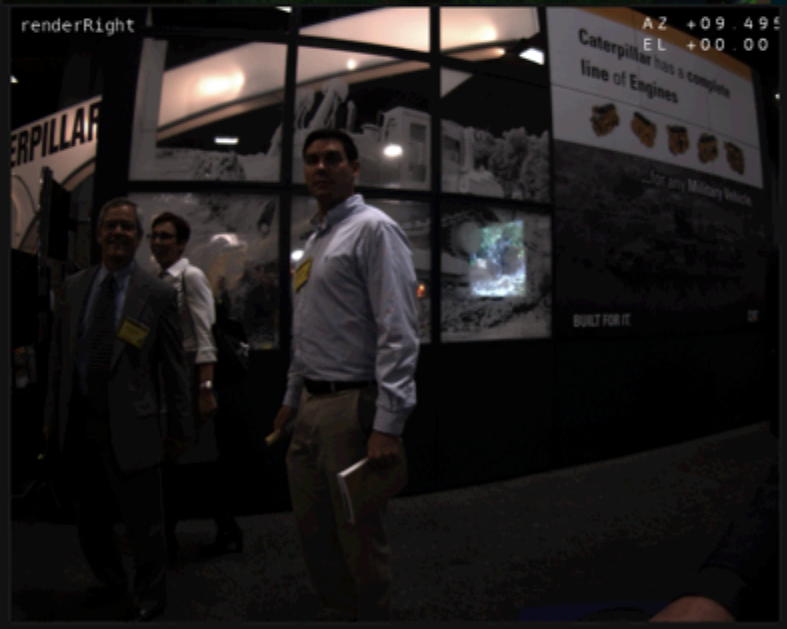
EL +00.00


renderH264
BAT 13.88V


Gradient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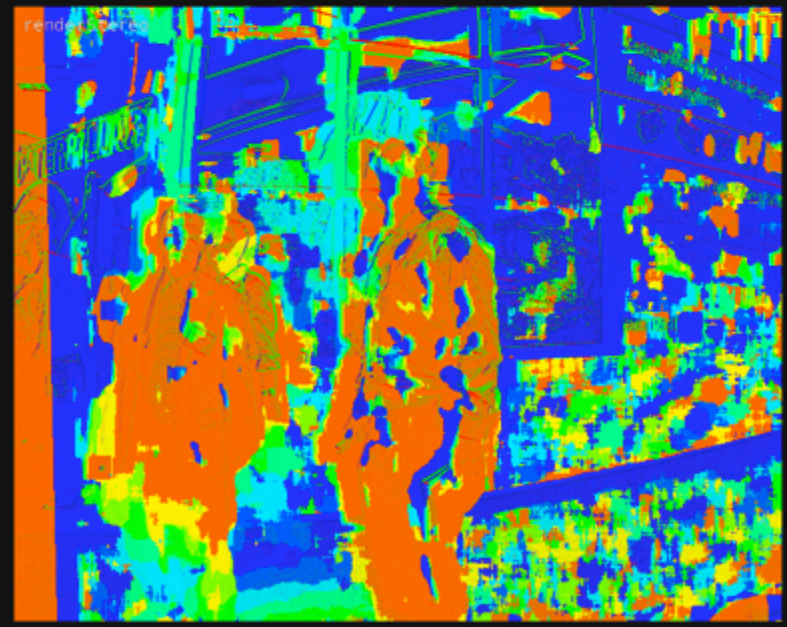
EL +00.00


renderLIDAR


renderStereo

GEIP Pan/Tilt Live Tracking video

NVIDIA Embedded Computing

Start Development Immediately

NVIDIA CUDA

OpenGL

Leverage the best drivers and APIs

Rapid path to production

Thank You!

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NVIDIA VisionWorks Toolkit is still in development and not yet released to developers. In the meantime, please use the Tegra accelerated OpenCV library, which you can download at https://developer.nvidia.com/jetson-tk1-support.”