

AI IN THE DRIVER'S SEAT

DANNY SHAPIRO | AUTONOMOUSTECH | OCTOBER 31, 2018

FORCES SHAPING COMPUTING



BEYOND MOORE'S LAW - 1000X EVERY 10 YEARS

ACCELERATED COMPUTING

COMPUTERS WRITING SOFTWARE

EVERYTHING THAT MOVES WILL BE AUTONOMOUS



Cars





Delivery Vans

Buses

Tractors

Trucks



NVIDIA SELF-DRIVING SAFETY REPORT



www.nvidia.com/drive



WHAT A HUMAN SEES



WHAT THE AI CAR SEES



INSIDE THE WORLD'S FIRST AUTONOMOUS VEHICLE PLATFORM Scalable From Level 2+ to Level 5







XAVIER

Autonomous Machine Processor Architected for Safety



Most Complex SOC Ever Made | 9 Billion Transistors, 350mm², 12nFFN | ~8,000 Engineering Years

END-TO-END PLATFORM FOR SAFETY



UNIFIED HARDWARE & SOFTWARE ARCHITECTURE



BUILDING AI FOR SELF-DRIVING IS HARD

Every deep neural net in the DRIVE Software stack needs to handle 1000s of conditions and geolocations





Perception

Camera-based Mapping



Free Space Perception



Camera Localization to HD Map



Distance Perception



LIDAR Localization to HD Map



Weather



Path Perception



LIDAR Perception



Scene Perception



SELF-DRIVING SCALE TODAY AT NVIDIA

12-camera+Radar+Lidar RIG mounted on 30 cars	1,500 labelers	4,000 GPUs in cluster = 500 PFLOPs
1PB collected/week	20M objects labeled/mo	100 DRIVE Constellation Simulation clusters Hardware-in-the-loop
15PB active training+test dataset	20 unique models 50 labeling tasks	1PB of in-rack object cache per 72 GPUs, 30PB provisioned

DRIVE SIM SENSOR CONFIGURATOR







DRIVE SIM ENVIRONMENT CONFIGURATOR





DRIVE SIM ARCHITECTURE





HARDWARE IN-THE-LOOP

DRIVE SIM

DRIVE AV















Euro NCAP Test Emergency Braking











Euro NCAP Test Emergency Braking



MULTI-SENSOR SIMULATION







HARDWARE IN-THE-LOOP







NVIDIA DRIVE PLATFORM ADOPTION ACROSS TRANSPORTATION



TENWAY

Group

BRIMAN



MOBILITY SERVICES

TIER

TIER ONES

MAPPING

SPECIALTY

пиго

NVIDIA DRIVE – WORLD'S FIRST AUTONOMOUS VEHICLE PLATFORM



DRIVE IX Available Now



DRIVE AGX XAVIER DEVELOPER KIT Available Now



DRIVE AV Available Now



NVIDIA AGX PEGASUS TEST DRIVE

OCTOBER 2, 2018

80 KILOMETERS 4 HIGHWAY INTERCHANGES 10 LANE CHANGES 0 DISENGAGEMENTS





