



NextDroid
Intelligent Machines



W8less

ITSF November Brighton, UK

The World is Changing

- GPS jamming and spoofing is a major problem for enterprise and transportation
- Timing and synchronization
 - Moving from milliseconds to microseconds
 - Whitehouse order requires move away from GNSS derived timing

A Smart Ecosystem Requires...



Nanosecond Timing (1ns)

Micropositioning (10cm)

Guaranteed Connectivity
(<10 msec of latency)

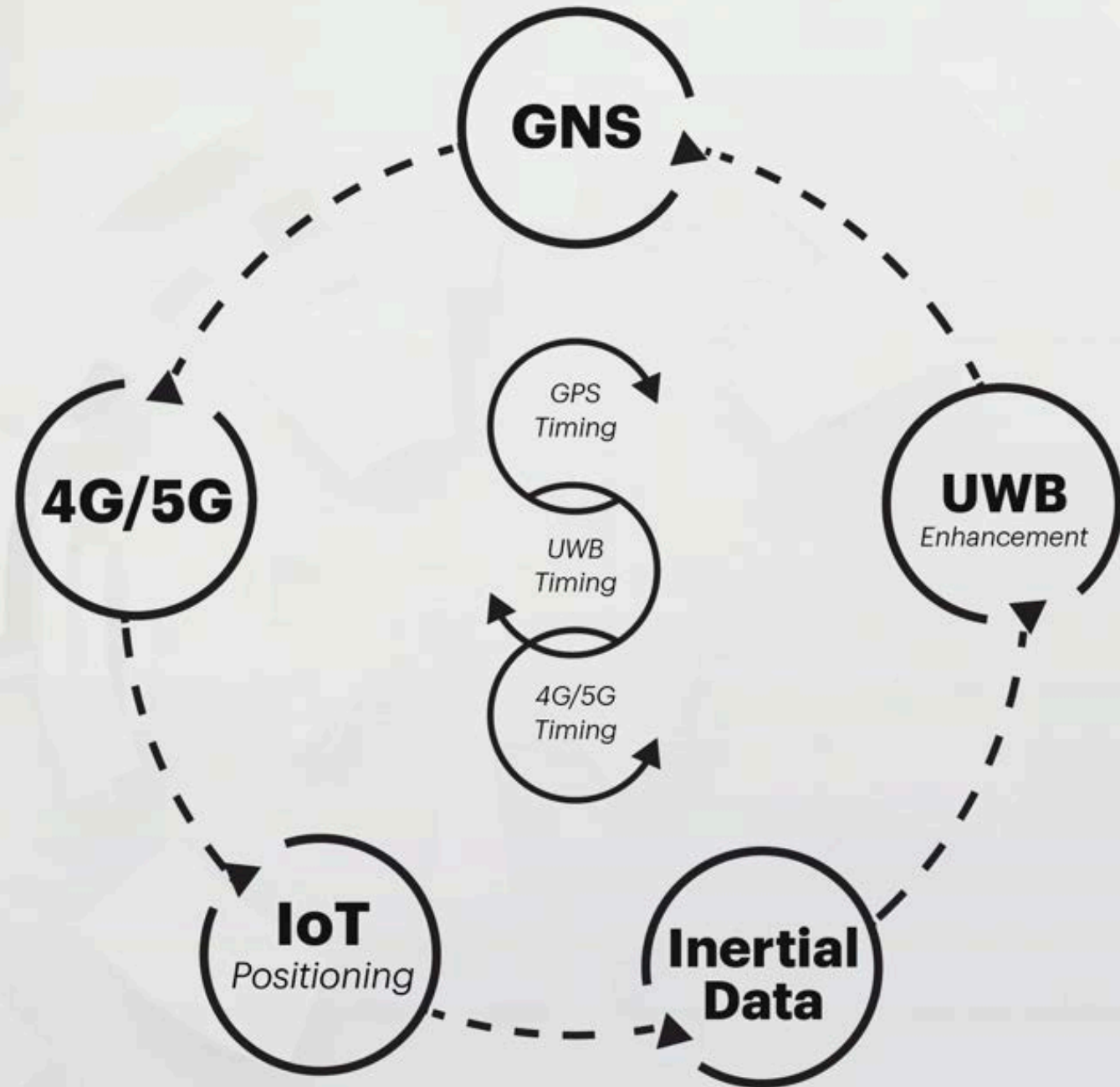
Motion-Critical Data

μ PNT

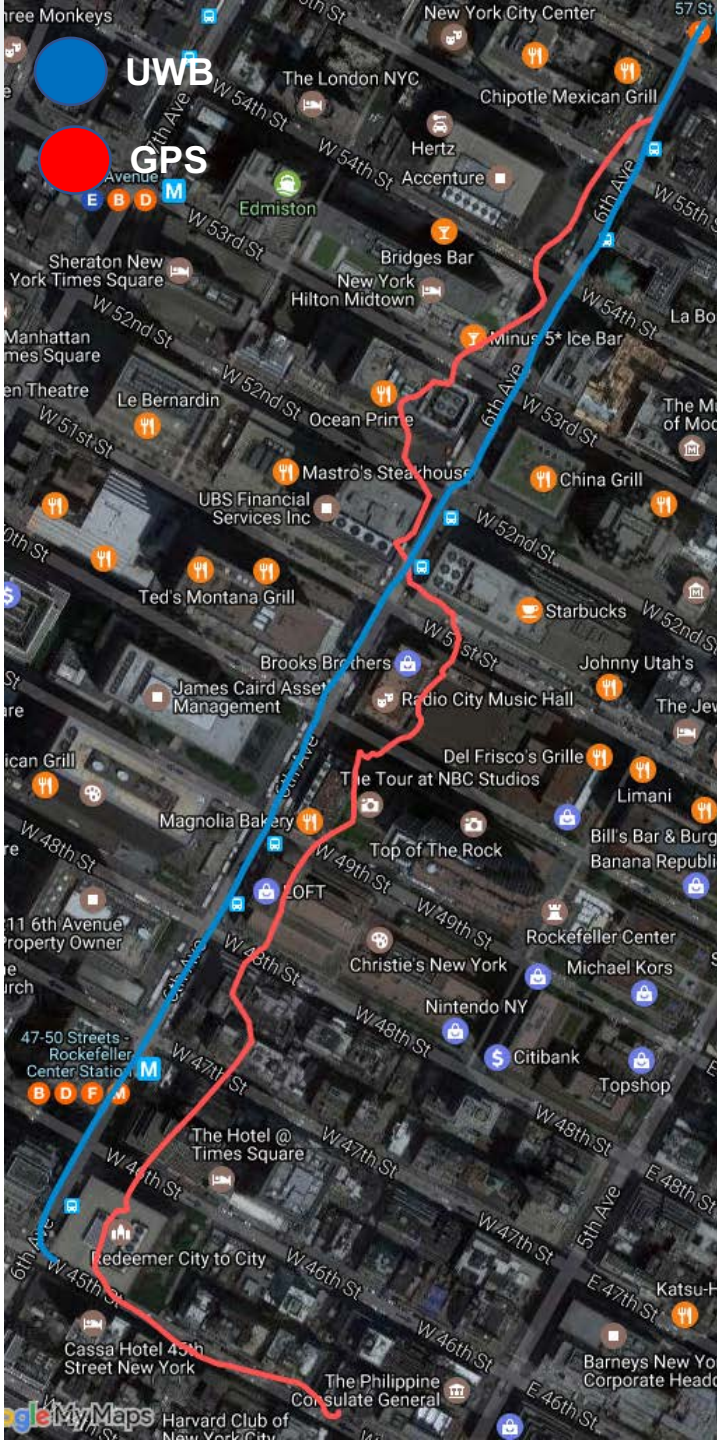
Timing & positioning

$$d = rt$$

Distance = Rate x Time







Critical Motion Requires

DOT accuracy requirement: 1.5m

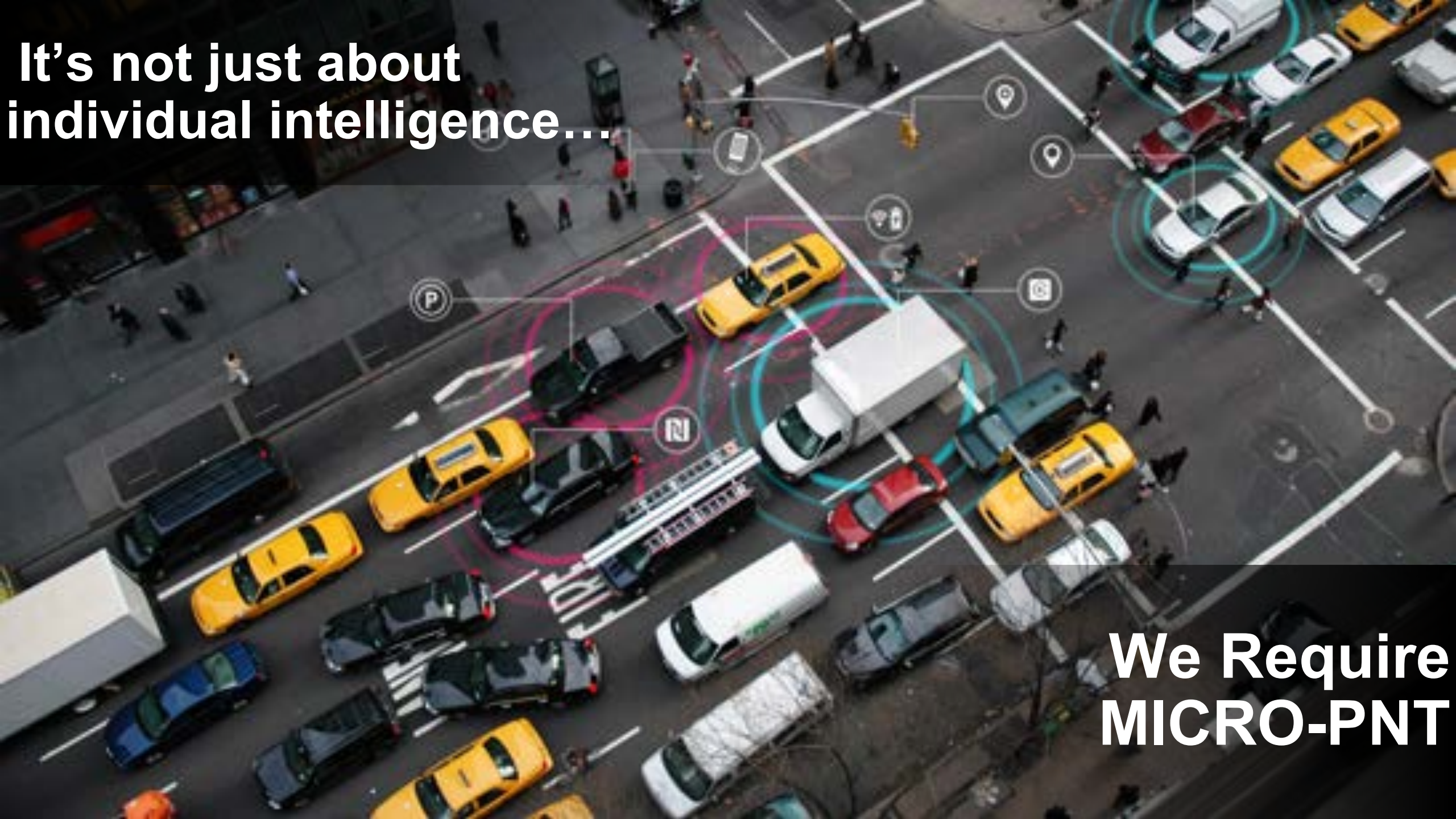
DOT accuracy objective: 10cm

	GPS	UWB
Average	~10m	~5cm
Worst Case	~50m	~0.5m

*2 pico-second pulses yield
5 centimeter-level accuracy*

MICRO-PNT

**It's not just about
individual intelligence...**



**We Require
MICRO-PNT**

μ PNT Applications



A Smart Ecosystem Based on μ PNT

Smart City of the Future

- Accurate, reliable positioning
- Connected, coordinated vehicles
- A dynamic model vs map based
- IOT Framework with 5G



Enable Next-Generation Smart City “Project P”

What Greenville, SC Wants

- *Parking Coordination*
- *Intelligent Traffic Control*
- *Autonomous Shuttles*
- *Connected Vehicles*
- *Solar & EV Charging*

What Project P Will Deliver

- *Open IoT Architecture*
- *5G Technology*
- *Micro-Positioning at the cm Level*
- *Enabling Platform for Smart Cities, Services, & Autonomy*



What We Plan to Deliver



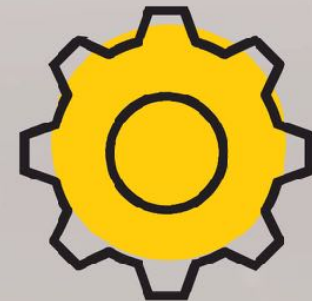
5G Positioning



Use of UWB



*Intelligent
Coordination*



*Industrial
Applications*



μPNT - Enabled Smart City on Clemson University





μ PNT-Enabled T-Mobile Greenville Smart City

Micro-Positioning

Powers a Campus-Wide
Smart Ecosystem



μ PNT-Enabled Autonomous Car

Expectation: Car can use RTK in 90% of environment

Actuality: Car can use RTK in 50-60% of environment

μPNT-Enabled Mining Project

- Autonomous Bulldozer
- Safety Kit
- Intelligent Distributed Mine Project
- Autonomous tethered Drone for Bulldozers Situation Awareness

BHP



Automotive ADAS/Autonomy



NextDroid
Intelligent Machines

MICRO-PNT ENABLES MEASUREABLE SAFETY

Autonomous driving and adaptive driver assistance depends on “measurable safety,” which in turn depends on **BETTER TIMING AND POSITIONING.**



OFFERING



VERITAS platform predicts safety outcomes:

- ▶ with any level of autonomy
- ▶ in any environment
- ▶ on any vehicle



TECHNOLOGY

- ▶ Patented centimeter level micro-positioning for ground truth
- ▶ Patented AI assesses movement relative to cars, lanes, peds., etc



THE FUTURE OF INTELLIGENT DRIVING ...

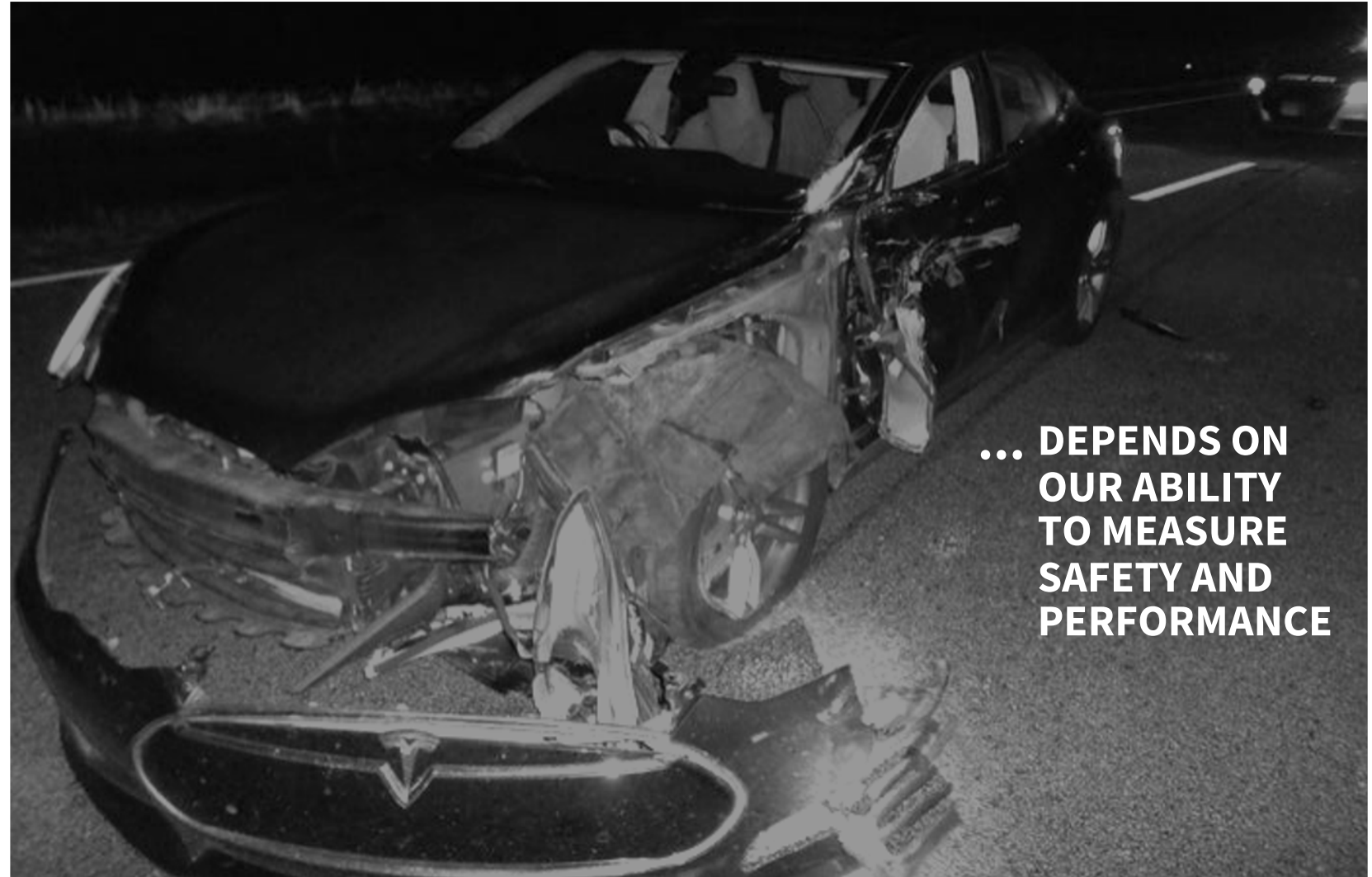
NO STANDARDS EXIST

for Measuring the Safety of
Autonomous Vehicles

- Rand

161 MILLION MILES

of testing is required to
prove the injury accident
failure rate is 20% better than
the human driver failure rate



... **DEPENDS ON
OUR ABILITY
TO MEASURE
SAFETY AND
PERFORMANCE**

THE VERITAS™ SOLUTION

AI-driven analysis of performance depends on better timing and positioning

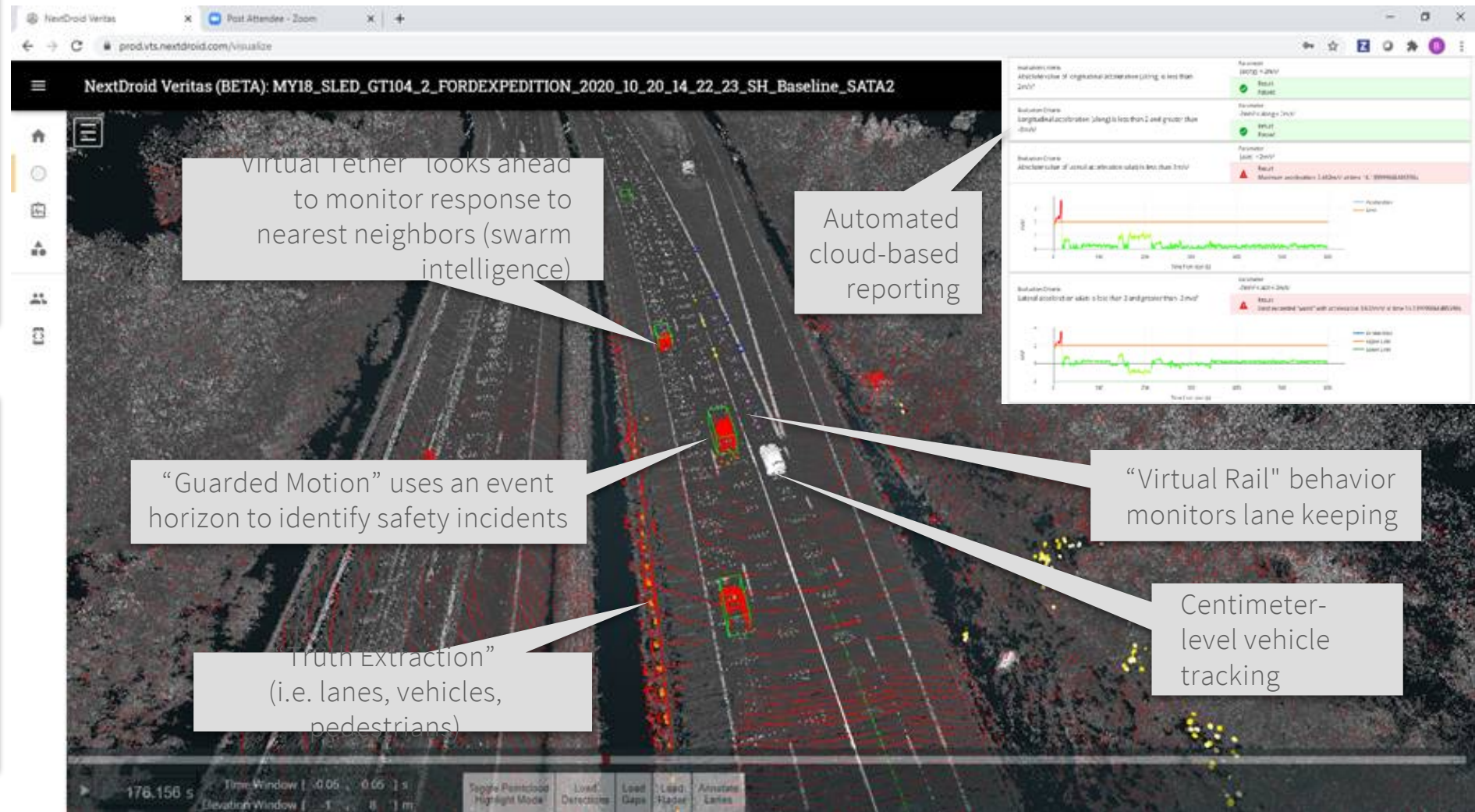
MEASURABLE SAFETY:

The missing ingredient to ADAS value

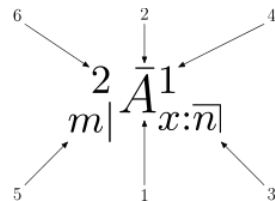
- Forbes

Predictive and ongoing driving assessment is the key to future value.

- Research & Markets



MICRO-PNT ENABLES GROUND TRUTH



MOTION INTELLIGENCE
 Predict safety outcomes with AI-driven, swarm intelligence



IMPROVED “TRUTH EXTRACTION”

Enhanced positioning for better ground truth

02

03

04

SCALABLE PROCESSING

Edge computing for low-latency, on-the-fly analysis



EMBEDDED DOMAIN EXPERTISE

Decades of experience in multiple AV, ADAS, robotics domains

01

05

AI-BASED DRIVING ANALYSIS

Recognize safety events (e.g. near misses and failure to stay in lane).

GROUND-TRUTH & ACQUIRE DATA



Installs in less than a day



Scalable Analysis Tool Suite

PLAN, ANALYZE & STORE DATA

Automated Full Assessments

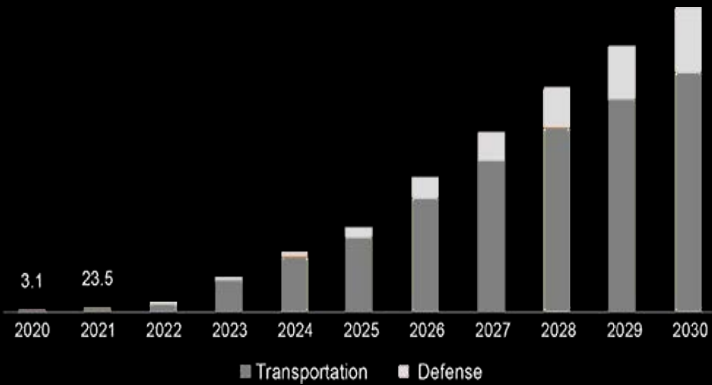


Data Visualizer & Evaluator



\$54.2B

Projected AV market hangs in the balance, waiting for objective performance measures and subsequent regulatory approval



North America self driving cars & trucks market size, 2020 - 2030 (Thousands Units)



“The global self-driving cars and trucks market size is expected to be approximately 6.7 thousand units in 2020, with CAGR of 63.1% from 2021 to 2030.”

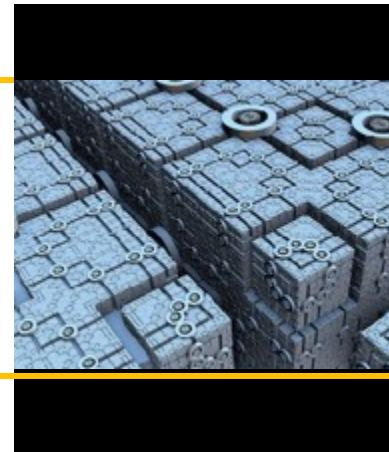
-- GrandViewResearch



phase 1 PNT ENABLES ADAS/AV

Self-driving is \$24B in 2020, with 18% CAGR (2020- 2025), but this growth requires that system-level benefit be measured and proven

-- Autonomous / Driverless Car Market-Growth, Trends and Forecast (2020 – 2025)



AV'S DIFFER

Uber spent \$2.5B, failing to grasp performance challenges.

MORE COMPLEXITY

Even more complexity hinders predictability and explainability.

1st ✘ DO NO HARM

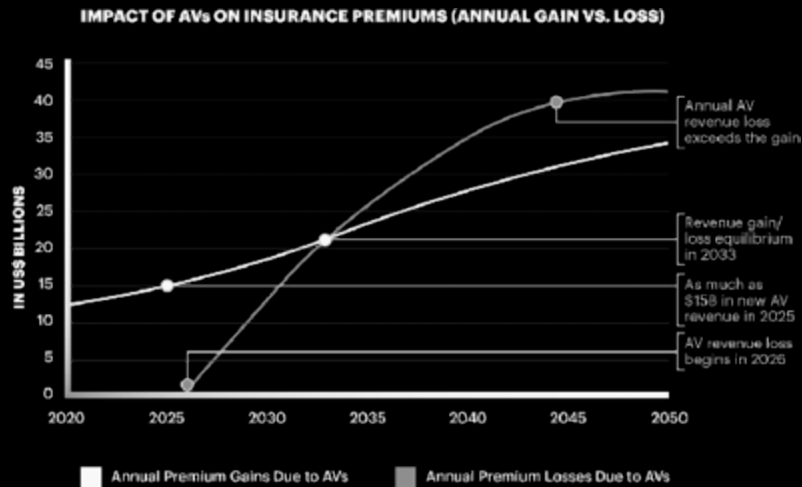
ADAS/AV may hurt overall safety due to inattention.

-- Science Daily



\$308.8 B

US Automobile Insurance Market in 2020
-- IBIS World



Estimated gains and losses in insurance premium revenues caused by autonomous vehicles (AVs)
-- Accenture

\$739.3 B

US Automobile Insurance Market in 2020
Global Auto Insurance Market

Projected to reach \$1.06 trillion by 2027, growing at a CAGR of 8.5% from 2020 to 2027.
-- Allied Market Research

2 phase

MICRO-PNT ENABLES MOTION INTELLIGENCE

The future auto insurance market will depend on AV/ADAS performance. Predictive and ongoing driving assessment is the key to future value.

-- Autonomous / Driverless Car Market-Growth, Trends and Forecast (2020 – 2025)



TELECOMS

ATT, Verizon & T-Mobile crave data-rich AV product space.



EDGE DATA

CISCO, Switch & Vapor to offer edge computing for AV use cases.



INSURANCE

Insurance leaders must link performance to cost and value.

IoT

- Capture **Data**
- Immediate **Intelligence**
- Change **Lives**