2000-2020: 20 YEARS OF AUTOMOTIVE TECHNOLOGY

2000 & 2010s

The evolution of the Connected Car.

2000

The Year of the Hybrid. In July, Toyota released the Prius, now the top selling hybrid. GPS Sat Nav also became mainstream in our cars as we welcome the new Millennium.

2000s

Touchscreen IVI Systems became mainstream. It was also during this decade that we saw the introduction of Bluetooth and USB connectivity, which in turn enabled many in-vehicle services that we take for granted today.

2001

Introduction of Hands-Free Bluetooth.

2002

Reversing Cameras.

2003

Automatic Parking. Advanced Dual Clutch Transmissions (DCT) were also popularized in mainstream cars.

2008

Advanced turbocharging goes mainstream.

2010s

Saw another major shift in the evolution of the Connected Car. More Driver Assist Features were added. In-car WIFI and App Integration opened the door to in-vehicle services such as playing music, providing 3D navigation and streaming real-time traffic data.

2010

Honda fitted first DVD Player in the Honda Odyssey.

2014

Tesla released their Autopilot feature, taking the industry one step closer to autonomy. In-vehicle Wi-Fi improved with the advent of 4G Hotspots. Apple entered the Automotive market with the release of CarPlay, enabling consumers of iOS devices to use these devices as a display and a controller within the car.

2015

Keyless entry becomes mainstream. Android released Android Auto to compete with Apple CarPlay and offer their customers similar in-car services.

2017

Audi launches the world's first series production L3 conditional automation system.

2018

Waymo launches Waymo One in Phoenix, AZ, the first commercial self-driving service in the US.

2019

Harley-Davidson's ground-breaking LiveWire all-electric motorcycle went on sale. Tesla's Cybertruck arrived. Ford releases electric-SUV version of the Mustang.

2020...?

WHAT IS THE STANDOUT PIECE OF AUTOMOTIVE TECHNOLOGY FROM THE PAST 20 YEARS IN YOUR OPINION, AND WHY?

Here's what our partners had to say:

Dave Zoia, Executive Director - Research, **Wards Intelligence:** "The lithium-ion battery. Electrification is one of the biggest driving forces in the industry today, and the inevitable migration to fully electric vehicles wouldn't be possible without the development of an automotive-grade lithium-ion battery."

Phil Magney, Founder & Principal, **VSI-Labs:** "Connectivity is the standout technology that has enabled a new era of location-aware services, largely safety and entertainment. And for the next era of automated driving and new mobility services, connectivity becomes the lifeblood."

Juergen Daunis, Head of IoT CV Sales Engagement, **Ericsson:** "Electric Vehicle has a huge impact, replacing big part of the traditional value chain and enabling new players to enter the market."

William Rotramel, Consultant, **AVL:** "I believe this would have to be the automotive microcontroller. Automotive electronics advancements have been the enabler to many improvements in the light duty vehicle segment. They have enabled incredible reductions in vehicle emissions and improvement in fuel efficiency. They have enabled the modern HEV and EV to become a real alternative to ICE powered transportation. The microcontroller processing speed and software advancements have improved vehicle safety by enabling the control of multistage airbags, side curtain and side seat bag protection, pre-crash control of belt restraints and active safety with ESC, ABS and AEB and smart cruise control functions. In addition, telematics has brought new entertainment streaming into the vehicles and allowed for additional safety through crash information and vehicle location features which can activate without driver interaction."

Bob Gritzinger, Industry Analyst, Advanced Propulsion and Technology, **WardsAuto:** "Adaptive cruise control, and specifically, full-range adaptive cruise control that can manage a vehicle's speed from expressway speed down to stop-and-go. Like the simple speed control that preceded it, adaptive cruise control is relatively simple to add to vehicles as manufacturers add radar sensors necessary to meet forward collision warning and automatic braking objectives. And like traditional cruise control, once drivers begin to use it and understand its capability and dependability, (or lack thereof, depending on the vehicle), they'll come to use it and rely on it. The net effect is a generally safer driving public as rear-end collisions diminish in either number or severity, even though more and more drivers are heavily distracted behind the wheel."

Andrew Jackson, Research Director, **PTOLEMUS:** "Emissions. The progress that has been made with forced induction (i.e. turbocharging, and more specifically variable lane technology) has been critical. As with it, engines have been downsized which has helped to reduce/offset the mass of the overall vehicle and increase engine efficiency.

Broadly speaking, comparing a car from 2020 (in terms of physical size/mass) to one from 2000 suggests that cars have improved around 46% in terms of fuel consumption (though this is based on manufacturers' claimed consumption figures).

I deliberately exclude hybridization from this as the technology has been niche till now, but I think this will explode over the next 10 years at least. Not least due to Regulation (EU) 2019/631 which is forcing manufacturers to lower the fleet emissions of their vehicles rapidly.

Paul Myles, Editor-In-Chief, **TU-Auto:** "Connectivity has been, and will continue to be, the greatest change to the automobile since the internal combustion engine became the powertrain of choice more than 140 years ago. That's because it not only opens the door to a myriad of potential services for helping automakers and service providers to engage with consumers at an individual level, it will be a key component in securing robust and reliable autonomous driving capabilities in years to come."