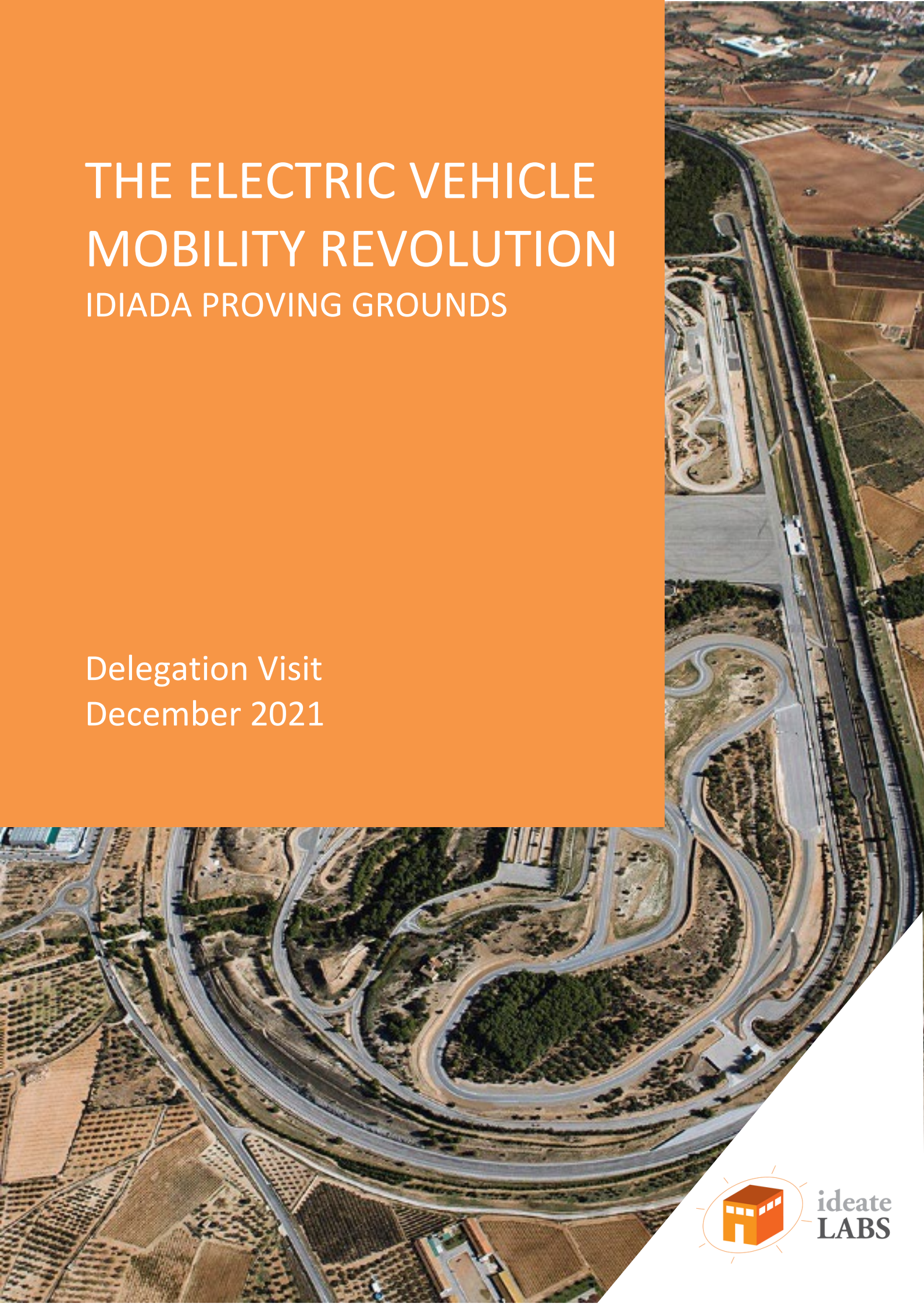
THE ELECTRIC VEHICLE MOBILITY REVOLUTION

IDIADA PROVING GROUNDS

Delegation Visit
December 2021



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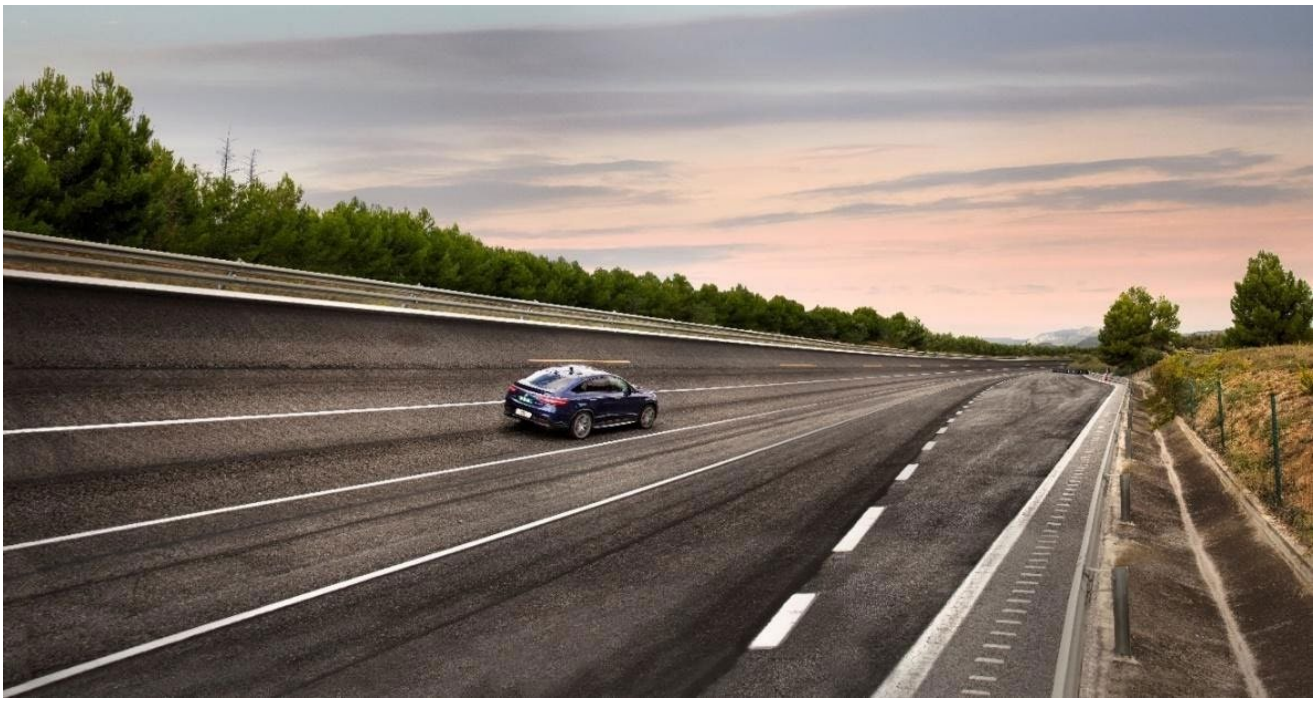
INTRODUCTION - Senator Hueso



Dear Senate Colleagues,

I write to inform you of our recent delegation visit to the APPLUS IDIADA Proving Ground in Spain and offer insight into California's opportunity to truly lead in Electric Vehicle (EV) production, autonomous vehicle development, and overall transportation mobility insight.

APPLUS is a testing and development facility that serves all of Europe and is connected to an international network of proving grounds, research, and development. IDIADA has a twenty-plus-year history in this field and continues to evolve. As such, they are preparing for the expansion of the electric vehicle industry and look forward to promoting even greater levels of innovation, customer/user focus and sustainability in the mobility industry.

I thank APPLUS IDIADA CEO Josep-Maria Farran and his team for taking the time to showcase their work and provide us with a glimpse of what is potentially in California's future. Their lifetime commitment to this work is more than apparent in the daily function and operations of the proving ground. I also thank Jose Atilio Hernandez and the ideateLABs team for collaborating in this effort and look forward to developing a premier EV proving ground in California.

Please find below some quick insights on our visit to the IDIADA Proving Ground in Spain as well as some recommendations for California. I hope this brief demonstrates the impact an EV proving ground will have on California's EV infrastructure, as well as the overall economy of the state as well.

Sincerely,

Senator Ben Hueso
Chair, Energy, Utilities and Communications Committee
California State Senate

OVERVIEW

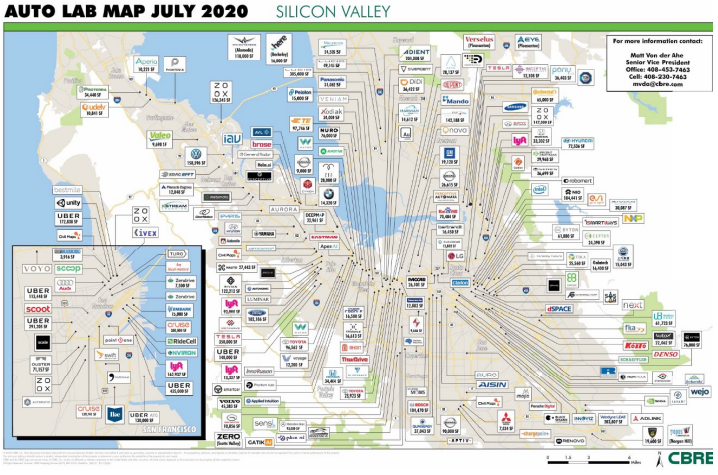
The Need to Address the Mobility Revolution

Globally, a mobility revolution is underway. Vehicles are on a path to becoming Automated, Connected, Electric, and Shared (ACES).

- **Automated**: From basic driver assistance features (i.e. cruise control and automatic braking), all the way to autonomous self-driving cars.
- **Connected**: Vehicles will communicate more and more with the people, vehicles, and infrastructure around them.
- **Electric**: The electrification of vehicles is rapidly evolving in a major shift away from the internal combustion engine.
- **Shared**: Fleets of vehicles will provide on demand services, greatly reducing the overall need for individual car ownership.

These trends drive huge improvements in both safety and the reduction of greenhouse gases.

The automobile is the most regulated, reported, and tested consumer product in existence. It is also undergoing a complete transformation. The industry, as it has done for decades, must continue to test and its innovation. However, California is missing out on the opportunity to capitalize on this need and growth because it lacks a full scale all-encompassing automotive testing facility.



There is huge demand for a testing facility within close proximity to the engineering talent in the Silicon Valley. California has a once in a generation opportunity to address this need, keep the innovation in our state, and lead the nation in the mobility revolution.

Maps on the previous page detail the explosive growth and demand for automotive research and development in the Silicon Valley has surged from a handful of companies in 2012 to more than 200 today. *This represents billions of dollars of investment occurring in California.*

Potential Growth of the Electric Vehicle (EV) Industry
Replacing most internal combustion engine vehicles with electric vehicles is a monumental task, yet it is something that, as a society, we are trying to make happen over the next few decades. There will be huge impacts from this effort on both manufacturing and infrastructure. Jobs to support the EV industry, which don't even exist today, will be in high demand in the not-so-distant future. By having the proper testing facility in California, we can keep the innovation local and train our residents to service this burgeoning industry as it evolves.

MOBILITY PROVING GROUNDS

Prior to launching any vehicle (i.e. car, motorcycle, tank, ship, etc.) to the market, manufacturers must thoroughly test it on proving grounds or test tracks for on-road and off-road vehicle testing. Proving grounds:

- Provide a wide range of controlled, safe and secure conditions for new vehicles and technologies to be thoroughly tested.
- Test for safety, energy, fuel economy, emissions, durability, noise, crash, crash simulation, performance, etc.
- Are generally spread over large areas and roads; most are situated far from densely populated areas.
- Many are privately owned by large automotive manufacturers for in-house testing. But there are several privately owned proving grounds open to the public.

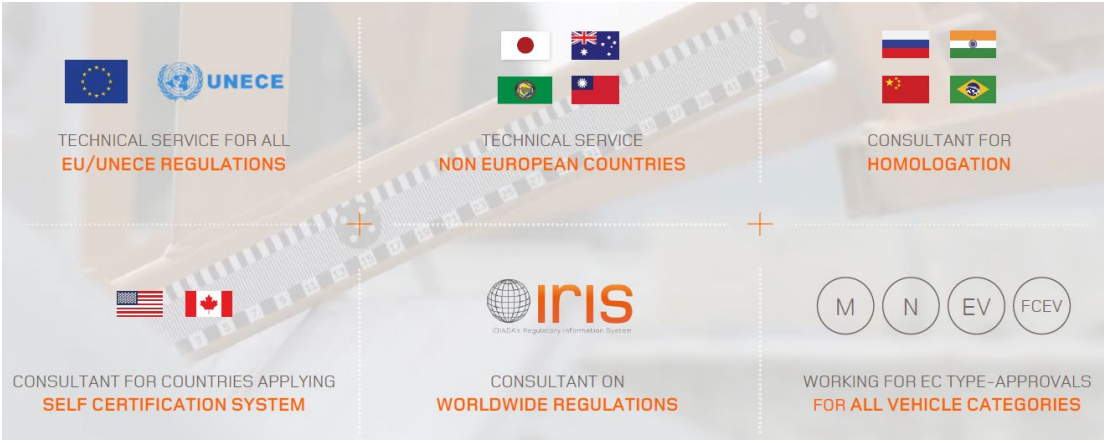
IDIADA

IDIADA is a worldwide partner for automotive mobility specializing in engineering, testing, and certification/ homologation (whole vehicle approval). Established in 1971 in the Barcelona Institute for Applied Automotive Research, the company

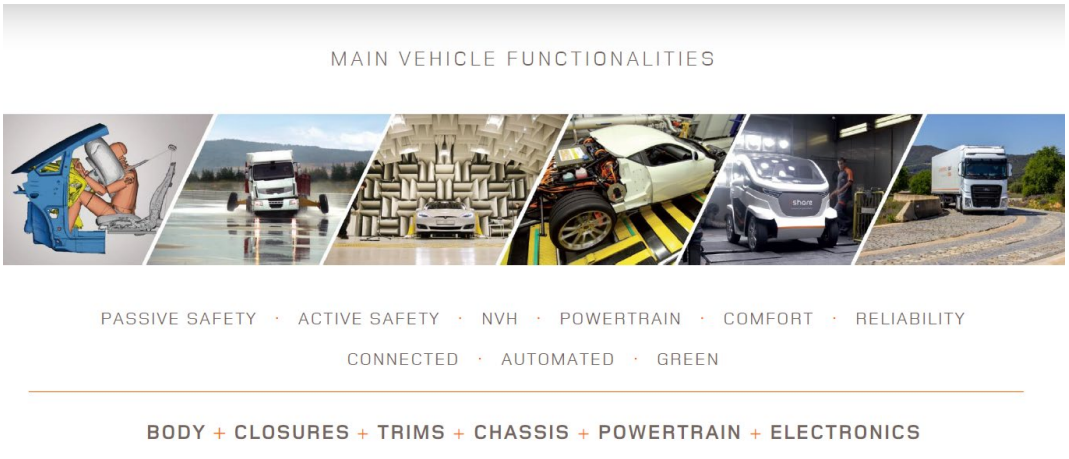
was privatized in 1999 as IDIADA Automotive Technology A.T. SA (80% owned by Applus+ and 20% by the Government of Catalonia). It employs about 2,600 professionals and provides services to leading vehicle manufacturers in 22 countries, 56 locations. Its extensive network of global business units and branch offices allow it to tailor their services to meet clients' needs and remain at the forefront of ever-changing regulations. Specifically, IDIADA provides the following services to enable companies worldwide to improve their productivity as well as levels of technology and innovation.

ENGINEERING

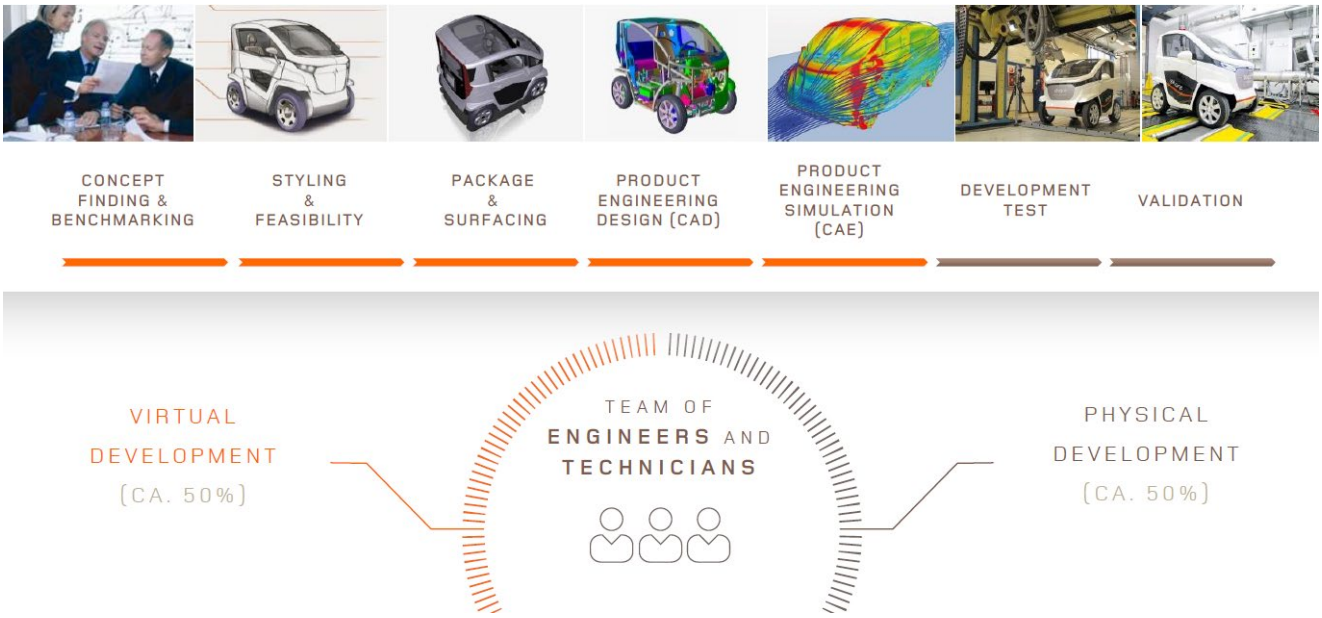
CERTIFICATION/OMOLOGATION



PROVING GROUND TESTING



TESTING FACILITY DESIGN and DEVELOPMENT



Main Figures
- More than 100 Test Facilities projects
- Management of 6 technical centers
- Projects done in 23 countries

Design & Development
- 50 Test Tracks design projects
- 30 Laboratories projects
- 15 development studies for technical centers
- Full construction support for 4 technical centers and more than 15 other construction projects worldwide

Research & Development
- 10 In house research projects for new products and services.

Electric, Connected and Automated Vehicles
- More than 20 projects related to design, development and construction of test facilities for CAV and EV.

Test Tracks Validation
- More than 30 projects related to test track validation and commissioning

Digital Test Facilities
- 5 projects related to development of Digital test facilities for virtual testing

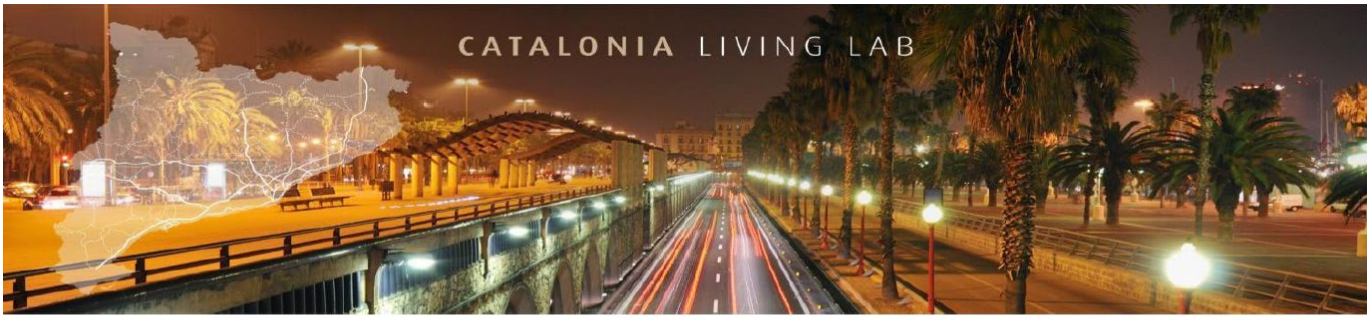
https://www.youtube.com/watch?v=OZkZrHu2tJc

Automotive manufacturers established at IDIADA include:

At the local level, IDIADA's unique public-private partnerships with universities (the Institut Andreu Nin and Institute of El Vendrell) resulted in the creation of and co-instruction in vocational trainings, Dual Trainings and apprenticeships in Automotive Engineering, Administration and Finance, Transport and Logistics, Multi-platform Applications, and Automation and Industrial Robotics Development for faculty, staff and students.

IDIADA's program, "Yo, ingeniera" promotes gender equality in the mobility industry via targeted outreach, sponsorships, and partnerships.

Additionally, Catalonia Living Lab, a partnership between IDIADA and the Government of Catalonia that tests autonomous vehicles in the city of Barcelona by coordinating real time data with the transportation sector.



Main objective

Cover all CAV related development and testing needs with Catalan (public) infrastructures and industry.

Environments

- Engineering offices
- Virtual simulation
- Laboratories
- Proving grounds
- Public roads

Consortium members

- Government of Catalonia
- Cluster of Catalan Automotive Industry
- Applus+ IDIADA (Technical Lead)
- OEMs: SEAT, Nissan
- TIERs: Ficosa, Sensefields
- Others: Cellnex, Autopistas, CVC, IRI, …

Catalonia Living Lab partners include:

saba · Institut de Robòtica i Informàtica Industrial · SEAT · Member of aurora Network · MOBILE WORLD CAPITAL BARCELONA · FICOSA · Ajuntament de Barcelona · cellnex driving telecom connectivity · ciac Clúster de la Indústria d'Automoció de Catalunya · NISSAN · CARNET Cooperative Automotive Research Network · CVC Computer Vision Center · autopistas an Abertis company · servei català de Trànsit · Generalitat de Catalunya

Lessons Learned

The IDIADA site in Catalonia exemplifies 20 years of progress. Stemming from an idea at a University, IDIADA now leads much of the world in testing, development, and certification. Of note: IDIADA has recognized the need to focus on Electric and Autonomous vehicles as well as the need to have a world-wide footprint.

Key Lessons

1) *Public-private partnerships multiply the benefits of the proving ground to both the local and regional economy*

Applus+ IDIADA intentionally integrates itself into its local economy. It contracts with companies close to its facilities as a way to measure its value add to local economies.

Given the company's size and its overlap with the country's manufacturing sector, Applus+ IDIADA is a driving force for the Catalan economy in the automotive industry. In 2010, it purchased more than €24 million from a wide variety of production industries.

It is important to note that a significant part of this demand for goods and services is met by Catalan businesses; the €14.9 million in purchases from companies in Catalonia accounts for 62% of total Applus+ IDIADA procurement.

ECONOMIC IMPACT

SOURCE: SURVEY PERFORMED IN 2020 BY THE UNIVERSITY URV OF TARRAGONA

- Each euro of direct demand (company, employees and clients) generates 2,87 € to the overall local economy
  - In 2019, the direct demand raised up to **162 M€**, generating **465 M€** to the overall local economy
- Impact on job creation: **5.267** additional jobs

- Investment in R&D
  - **23 M€** between 2015 and 2019
  - The spending per employee (4.492 €) is 4,5 times higher than the average in Catalonia (999 €)

	Income Impact (A)	Employment Impact (C)
IDIADA	465.515.325	5.267
	GDP (B)	Employed (D)
Catalonia	250.597.000.000	3.478.100
Tarragona region	20.662.700.000	345.700
	(A)/(B)	(C)/(D)
IDIADA/Catalonia	0,19%	0,15%
IDIADA/Tarragona	2,25%	1,52%

999 €

Catalonia average

4.492 €

Applus+ IDIADA

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2) *Proving grounds can be leveraged for mutually beneficial local workforce partnerships with 2 and 4-year colleges and universities.*

IDIADA's partnership with several local universities allow them to customize education, align industry needs, skills training, professional development, and continuing education to better attract, train, upskill and diversify its workforce.

3) *There is a science to attracting industry. Successfully adapting to the needs of the industry and clients largely depends on ensuring:*

- Government support and commitment in the investment and implementation of the center
- Clearly defined Proving Ground requirements (facilities, test targets, users, etc.)
- Optimized design of the facilities cost-effectiveness-capabilities
- Optimized and steady growth adapted to industry, market and user needs.
- Center Location (site location, topography, nearby services, weather conditions), etc).
- High quality facilities
- Highly qualified levels of personnel skills and capabilities.

4) *There is a growing need in the EV/autonomous industry for proving grounds*

The growth of the automotive industry worldwide, particularly the explosion of mobility companies in the Silicon Valley, coupled with rapidly changing technology and innovation result in a greater need for testing and certification.

5) *The United States, and in particular, California is a target for many international EV/Autonomous vehicle companies*

IDIADA is looking to continue expanding in North America. In 2013, it set up a branch office in Detroit as the center for its homologation and certification support. Other product-development activities for North American clients offered using its own and third-party test facilities include:

- Passive safety testing (including NHTSA official tests)
- Active safety/ADAS testing (including NHTSA official tests)
- Vehicle dynamics
- Braking systems
- Durability and reliability
- Field operational testing
- Certification and Homologation testing (and Homologation approvals).

BENEFITS OF ESTABLISHING A MOBILITY PROVING GROUND IN CALIFORNIA

- Significantly **increases access to open use proving grounds** -- California currently does not have, but desperately need, a comprehensive world class mobility proving ground.
- More than **$1.1B that stays in California** for research and development.
- Significantly impact recurring funding streams including the County General Fund and the 1% Property Tax Distribution of which millions can be earmarked for education.
- Generates millions of dollars from one-time funding streams like County and School Development Impact Fees (DIF's), Regional Transportation Impact Mitigation Fee, etc.

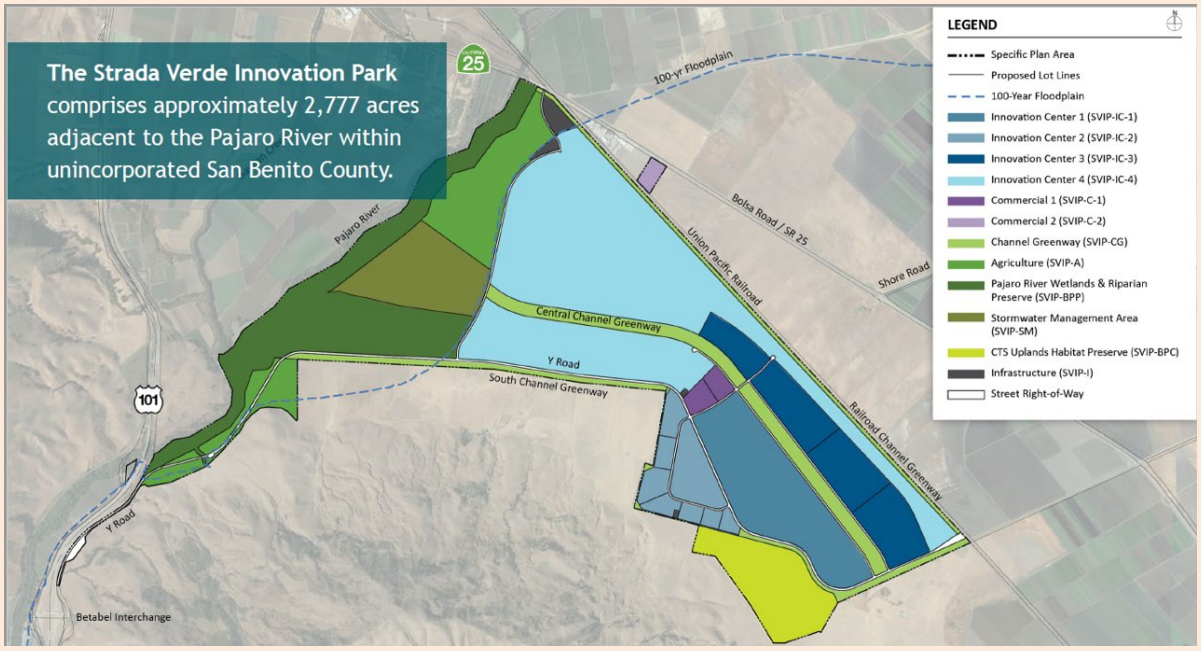
- Creates vertical **integration from higher education to workforce training and employment**.
- Increases employment and labor income by creating about 5,500 permanent jobs and payrolls over $300 million, with an average labor Income of $55,651 per job.
- Construction of this type of project could cost $2.33 billion and create more than 18,000 one-time jobs and payrolls of about $1.23 billion, with average labor income of $68,133 per job.
- Leverages **state investments** in electric vehicle infrastructure.
- Maximizes **innovation** and an explosion of tech companies exponentially growing in the Silicon Valley over the past decade.
- Creates partnerships with educational institutions to develop **Mobility Career Pathways**, Certification Programs, Pre-Apprenticeship programs.

STRADA VERDE INNOVATION PARK

Strada Verde proposes to develop a Technology Advancement Research Mobility Automotive Center ("TARMAC") and business park, a world-class research and development campus.

It encompasses 2,777 acres within unincorporated San Benito, California, 30 minutes from Silicon Valley. Ensuring technology, innovation and workforce development are seamlessly integrated and fully supported, TARMAC will include:

- Premier **proving ground** and **Driver Experience Center**
- Access to Technology-based **Employment and Workforce Training Center**
- Dedicated **Research Park** and **Data Center**
- Access for educational institutions and community to a state-of-the-art **Learning Lab**
- Construction of a multi-story building to serve as a **satellite campus for Gavilan College** dedicated to students, faculty and staff related to a mobility (EV/AV) career pathway
- Industry partnerships to support **work-based learning**
  - Apprenticeships
  - Internships
  - Job Shadowing
  - Mentorships
- Beneficiary of **community giving** initiatives



RECOMMENDATIONS

1. As California positions itself to lead the nation and world on mobility infrastructure investments and support like electric vehicles, it should also lead by example and develop a premier mobility proving ground.
    a. The proving ground should maximize the exponential growth and multi-billion dollar investment of EV in the Silicon Valley.
    b. The proving ground should connect research, development, innovation, and workforce training to ensure California stays with, if not ahead of, the technological curve.
2. Given the advancement of Mobility Proving Grounds in other countries and states, and their role as an industry and revenue driver, California should streamline and expedite the development of a proving ground, particularly around:
    a. Permitting processes of infrastructure projects
    b. Expedite the California Environmental Quality Act (CEQA) Review by allowing for legal challenges to CEQA to be reviewed within 175 days.
3. California should ensure agencies and departments include an electric vehicle proving ground as part of the larger plan for EV development and scaling, including but not limited to:
    a. California Energy Commission (CEC)
    b. California Public Utilities Commission (CPUC)
    c. Air Resource Board
    d. Governor's Office of Business and Economic Development (GO-Biz)
    e. State Public College Systems (Universities of California; California State Universities; California Community Colleges)
4. California should invest in expanding and deepening Mobility Career Pathways or other forms of partnership with the Community Colleges and system
    a. Curriculum development
    b. Pre-apprenticeship and employment opportunities
    c. Joint marketing and communication campaigns about the expanding direction of this industry
5. California should begin to foster stronger relationships with the automotive industry to better gauge and help guide the growth of the industry and its utilization of a proving ground.
6. California should explore methods to connect existing investments with the development of a mobility proving ground
    a. EV Research and Development
    b. Workforce Training

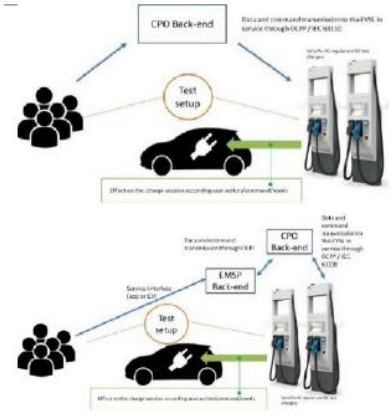
APPENDIX A

SAMPLE TESTING FOR EV INFRASTRUCTURE

eCHARGE4DRIVERS

ELECTRIC VEHICLE CHARGING INFRASTRUCTURE FOR IMPROVED USER EXPERIENCE

https://cordis.europa.eu/project/id/875131
www.echarge4drivers.eu



Objectives:

- The vision of eCharge4Drivers is to focus on the users and substantially improve the EV charging experience, within cities and on long trips, making it at least as convenient as refuelling an ICE vehicle, and to support investors and authorities to deploy new charging infrastructure and services in a user-centric and sustainable way. The userfriendly charging systems and interoperable services of this project will be demonstrated in 10 areas, including metropolitan and nationwide ones along the TEN-T network and cross-border routes.

Jun 2020 – May 2024

IDIADA Activities:

- Definition of Plug & Charge guidelines and implementation
- Develop a methodology and tools to test the interoperability of end-to-end communication between different charging station manufacturers, vehicle manufacturers and back-end systems of CPOs, roaming platforms and eMSPs.
- To define recommendations for regulatory and harmonisation actions

APPENDIX B

SAMPLE TESTING FOR FUTURE MOBILITY CAV

LAB Center for Mobility. Testing Area for Connected and Automated vehicles in public roads.The Netherlands 2017-2018

- Market research
- Analysis of the testing requirements
- Test equipment definition
- Financial analysis
- Cost estimation
- Concept Design
- Business case