Supplementary information

A) The DEMOBASE project in a snapshot (objectives in terms of demonstators, matrix distribution of WPs and technical/scientific task distribution

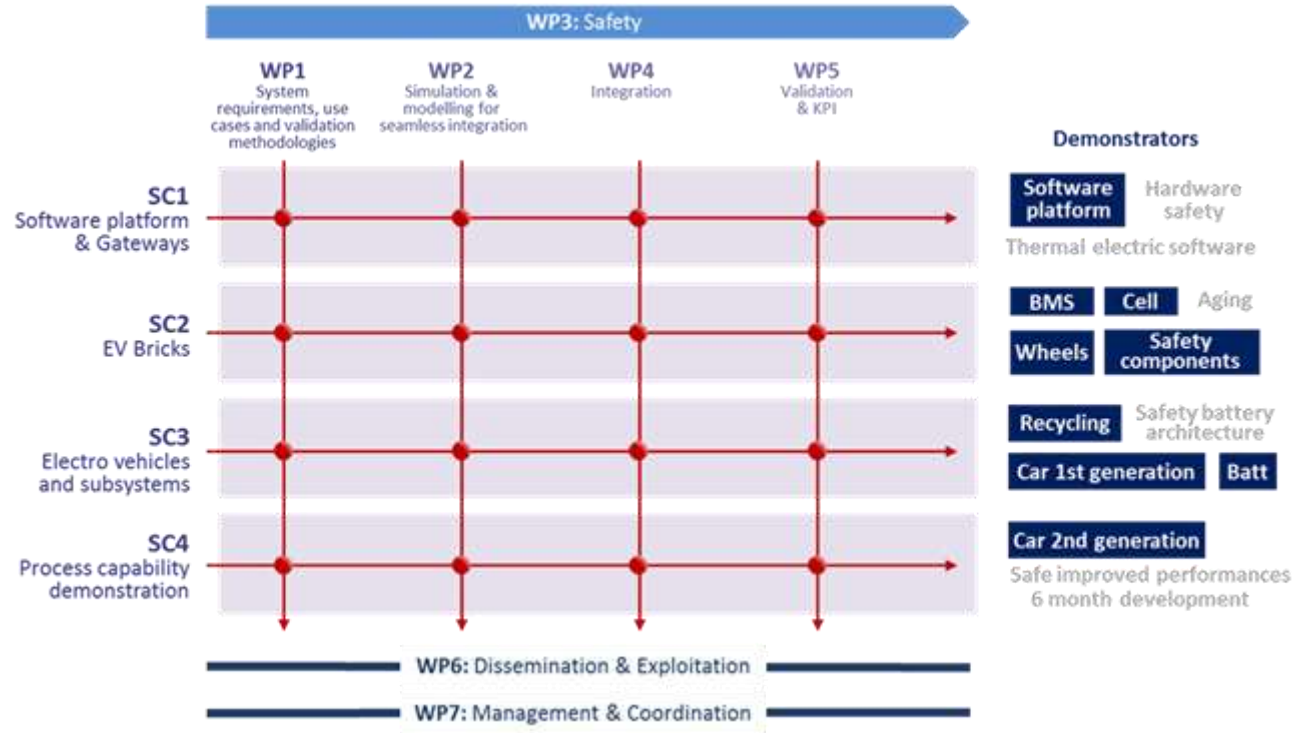
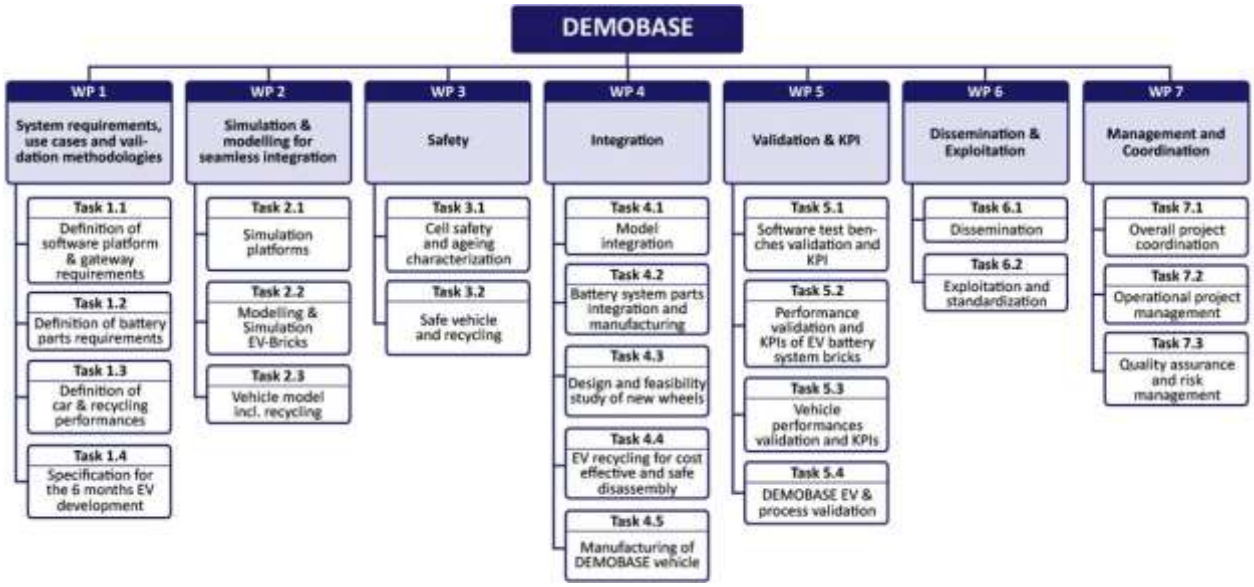


Fig S1: crosslinked activities distribution between WPs and EV technologic development bricks



Fi. S2: distribution of tasks within WPs of the DEMOBASE project

B) Main target performance indicators (KPIs) versus objectives defined for main technologic bricks of the seamless fast EV development process targeted in the project

To evaluate the progress made in the DEMOBASE project, the project was divided in 5 categories of targeted breakthroughs, hereafter listed:

- Software testbench validation
- Safety improvement
- Cost reduction
- Battery mains switch
- Cell Specification

For each category here are the main results and goal reached:

1- Software testbench validation

- Iteration 1: Toolchain and server automation, with dummy scenario achieved.
- Iteration 2: Workflow for export and integration of FMUs in a commercial system modelling toolchain validated.
- Iteration 3: test scenario successfully performed for a larger vehicle system.
- Toolchain made available for other project members.

2- Safety improvement

- Propagation tests at module scale toward fail-safe operating mode → propagation between cells of the same cluster but efficiently impeded to the adjacent clusters (clusters 1 and 3)
  - → Experimental confirmation of the failsafe behavior at module level
  - → Validate this behaviour prediction by IFPEN models
  - → Validate the behaviour prediction by INERIS CFD model for clusters arrangement in DEMOBASE pack design

3- Cost reduction

- Large scale manufacturing of full body frame, wheel hub suspensions, axle frame, suspensions, skeleton of doors: <5 M€ total investment
- Design and Prototype of new body frames achieved in few weeks
- All developed solutions have been tested by the most severe auto tests, and implemented in the DEMOBASE demo vehicles that were running by the end of the project.

4- Battery mains switch

- A MOS device with RDSon <10mW and >600V breakdown voltage was developed and tested
- Integrated into a prototype battery main switch the intended functionality was demonstrated

- A prototype with integrated T-measurement (to enhance safety) was developed and demonstrated

5- Cell Specification

- Operational prototype High energy NMC811 / graphite cell with specific energy of 250 Wh/kg and 600 Wh/l obtained

C) List of scientific communications and publications in peer reviewed journals and project deliverables (available to the public further disseminating more specific data and results from the DEMOBASE project:

All communications and published papers are accessible to the public (mostly as post print or preprint versions), on DEMOBASE project website : https://www.demobase-project.eu/dissemination/ (late access august 2021).

For the attention of the potential readers and users of these materials as useful citations, full references of those documents are listed hereafter: they can be accessed in their final version and format by subscribers of concerned journals.

C1) Publications

- S. Bockrath, A. Rosskopf, S. Koffel, S. Waldhör, K. Srivastava and V. R. H. Lorentz, "State of Charge Estimation using Recurrent Neural Networks with Long Short-Term Memory for Lithium-Ion Batteries," *IECON 2019 - 45th Annual Conference of the IEEE Industrial Electronics Society*, 2019, pp. 2507-2511, doi: 10.1109/IECON.2019.8926815.
- PETIT, Martin; ABADA, Sara; MINGANT, Rémy; BERNARD, Julien; DESPREZ, Philippe; PERLO, Pietro; BIASIOTTO, Marco; INTROZZI, Riccardo; LECOCQ, Amandine; MARLAIR, Guy, DEMOBASE project: Numerical simulation for seamless integration of battery pack in light electric vehicle, Proceedings of the 32nd Electric Vehicle Symposium (EVS32), Lyon, France, May19- 22, 2019
- K. Chayambuka, G. Mulder, D.L. Danilov, P.H.L. Notten, A modified pseudo-steady-state analytical expression for battery modeling, Solid State Communications 296 (2019) 49–53, https://doi.org/10.1016/j.ssc.2019.04.011
- C. Chen, J. F. M. Oudenhoven, D. L. Danilov, E. Vezhlev, L. Gao, N. Li, F. M. Mulder, R.-A. Eichel, P. H. L. Notten: Thin Film Batteries: Origin of Degradation in Si-Based All-Solid-State Li-Ion Micro-Batteries, Adv. Energy Mater. 30/2018,https://doi.org/10.1002/aenm.201870134
- D. Li, Hu Li, D.L. Danilov, L Gao, J. Zhou, R.-A. Eichel,, Y. Yang[a,**], P. H.L. Notten, Temperature-dependent cycling performance and ageing mechanisms of C6/ LiNi1/3Mn1/3Co1/3O2 batteries, Journal of Power Sources 396 (2018) 444–452, https://doi.org/10.1016/j.jpowsour.2018.06.035
- G. Marlair, A. Lecocq, P. Perlo, M. Petit, D. N'Guyen & P. Desprez, Promoting Fire Safety in Innovating Design of Electric Vehicles: The Example of the EU-FUNDED DEMOBASE Project Proceedings 5th Int. Conf. on Fires in Vehicles (FIVE 2018), (Eds.P. Andersson et Ola Willstrand), October 3-4, 2018, Borås, Sweden, pp 91-93], RISE Safety, Fire Research

- D. Li, H. Li, D. L. Danilov, L. Gao, X. Chen, Z. Zhang, J. ZhouR.-A. Eichel , Y. Yang, P. H.L. Notten, Degradation Mechanisms of C6/LiNi0.5Mn0.3Co0.2O2 Li-ion Batteries Unraveled by Non-destructive and Post-mortem Methods, Journal of Power Sources 416 (2019) 163–174, https://doi.org/10.1016/j.jpowsour.2018.06.035

- N. Kazemi, D. L. Danilov, L. Haverkate, N. J. Dudney, S. Unnikrishnan, Peter H.L. Notten, Modeling of All-Solid-State thin-film Li-ion Batteries: accuracy improvement, Solid State Ionics 334 (2019) 111–116, https://doi.org/10.1016/j.ssi.2019.02.003

- L.H.J. Raijmakers, D.L. Danilov, R.-A. Eichel, P.H.L. Notten, A review on various temperature-indication methods for Li-ion batteries, Applied Energy 240 (2019) 918–945, https://doi.org/10.1016/j.apenergy.2019.02.078

- K. Chayambuka, G. Mulder, D.L. Danilov, P.H.L. Notten, From Li-Ion Batteries toward Na-Ion Chemistries: Challenges and Opportunities, Advanced Energy Materials, 2001310 (2020), https://doi.org/10.1002/aenm.202001310

- H.J.Raijmakers, D.L.Danilov, R.-A.Eichel, P.H.L.Notten, An advanced all-solid-state Li-ion battery model, Electrochimica Acta, 330 (2020), 135147, https://doi.org/10.1016/j.electacta.2019.135147

- C. Di Bari, A. Lecocq, G. Marlair, B.Truchot, M. Mazzaro, M. L. Mele, P., "Recent safety focused overall analysis, testing and accident reviews towards safer e-mobility and energy storage" https://www.ri.se/en/five/five2020/papers", supporting paper in electronic proceeding of the 6th International Conference of fires in vehicles (FIVE 2020), see https://www.ri.se/en/five/five2020/papers (last access on August 2021 17th)

C2) Public Deliverables

- Deliverable 6.2 (Project presentation)

C3) Posters

- J. Bernard et al (IFPEN), "Numerical simulation for seamless integration of a safe battery pack in light electric vehicle as a contribution to the DEMOBASE project", poster presentation at AABC Europe 2019 (9th European Advanced Automotive Battery Conference), 27-31 January 2019, Strasbourg, France

- P. Perlo et al, IFEVS, "Demobase: Design and Modelling for improved Battery Safety and Efficiency", poster presentation at Transport Research Arena: Vienna 2018 – A digital era for transport-Solutions for society, economy and environment

C4) Oral Presentations

- G. Marlair et al (INERIS), "Promoting fire safety in innovating design of electric vehicles: the example of the EU-funded DEMOBASE project", Oral Communication to FIVE 2018 congress

- B. Truchot et al (INERIS), "FireFOAM to Model inside Battery Thermal Disorder Propagation" Oral communication at 10th FM Global open source CFD Fire Modelling workshop, Norwood (MA, USA), May 201, 30th-31st

- Z. Wang (Accurec), “The role of battery recycling in raw material supply for EV application”, oral communication to presentation at AABC Europe 2019 (9th European Advanced Automotive Battery Conference), 27-31 January 2019, Strasbourg, France
- C. Di Bari & G. Marlair, “Recent safety focused overall analysis, testing and accident reviews towards safer e-mobility and energy storage”, joint oral communication at FIVE 2020 symposium, see ttps://www.ri.se/en/five/five2020/presentations (last access August 2021 17th)