Preliminary evaluation of control strategy by means of simulation

D2.1

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1 Publishable Executive Summary

The INCOBAT WP2 is dedicated to the definition and simulation of different algorithms in order to deal with the battery pack management. The aims are:

- Battery life time extension
- Battery range extension
- SoF (SoC and SoH) Enhancements

The project will look at more accurate algorithms and their performance requirements. This should increase battery life but also, more importantly, allow for a predictable battery life. This is essential for creating a viable market for battery leasing and pricing. Currently, because the lifetime of a battery pack cannot be reliably predicted for different driving patterns and charging operations the cost of leasing is much higher than it needs to be. Predictable battery life will allow the price of leasing to be calculated more accurately, leading to more business opportunities.

The main task is to investigate, by means of a dedicated toolchain, battery and BMS performance within description of vehicle behavior and during real world conditions. The task requires the integration of the advanced battery, BMS models and infrastructural interfaces (developed in other project tasks) in order to carry out simulations analyzing different boundary conditions and scenarios.

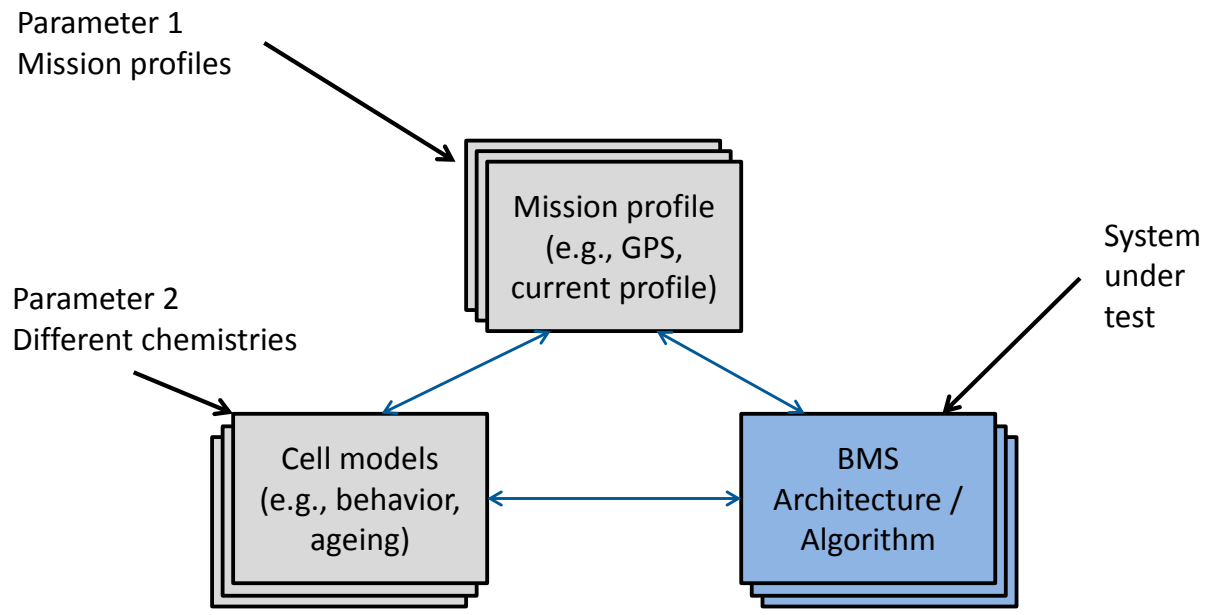

Figure 1: Simulation framework overview

In the context of INCOBAT, two approaches for computation of the battery state estimation are proposed: Electrochemical Impedance Spectroscopy (EIS) and model-based estimation of SoC, SoF and SoH. This simulation framework provides an efficient environment to analyze the expected performances and support design decision for the different approaches while migrating to a multicore platform. Note that

this is an ongoing work, and that the final simulation results (taking into account all architectures decisions) will be described in the deliverable D2.4 BMS behaviour simulations over different configurations and scenarios.

The proposed framework shall have a strong relationship with the WP4, where the cell characterization tests are performed, to determine suitable parameters for the modeling of the cells. Input data from the WP4 could be used parameterize the cell model, and different chemistries of the cell under test will allow validation of the algorithm in different scenarios.

Furthermore, different mission profiles will allow to run the simulation over real world conditions, verifying the correctness of the BMS algorithms.