A SET OF SOFTWARE TOOLS AND METHODOLOGY FOR MODEL DRIVEN LIVE TEST DATA PROCESSING, VISUALIZATION AND LOGGING

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ABSTRACT

At Embraer Flight Test Department, it has been found necessary to improve the effectiveness of tests during certain flight test campaigns while reducing the occurrence of test repetitions due to less than ideal test validation during flight. As a result, a project is being developed to create a methodology and a set of software tools to accomplish that. This set of tools is called ATLAS (Algorithm in Test Loop Analysis System) whose main purpose is to provide "on-line" test data processing capabilities while testing airplane prototypes. By using this set of tools, test engineers can make more effective decisions, based not only on acquired data but on actual test results, obtained by data processing/analysis which is test concomitant.

The ATLAS main characteristics are:
- It allows the processing of "live" acquired test data parameters with the generation of results as derived parameters;
- Data analysis is done by mathematical methods implemented using engineering tools (currently using MatLab/Simulink®) instead of software development tools;
- It was designed as an hierarchy of tools which provides data acquisition, data sources merging, data distribution to mathematical methods and results collection, data logging of both acquired and processed data and, on top of that, a generic data visualization tool;
- The implementation of the mathematical methods is done in the form of models diagrams which are run inside the test loop, accepting input parameters (both acquired or previously processed) and providing the results as derived output parameters. It is not necessary to generate code from the models diagrams (the models themselves are run), providing more in-test flexibility and faster response in test preparation;
- It features an "off-line" log files playing tool for log reviewing and playing which is useful for test debriefing or post test additional data processing;
- A database of models, visualization screens and any other test related resources can be maintained, allowing for their reuse in future, if necessary;

The use of this software package is expected to promote a culture change in the company, moving the workload peak from post test data analysis phase to test preparation phase. By doing so, higher test effectiveness and higher level of in-test decision can be achieved with improvements in test efficiency, reduction of test repetition occurrence and, as a consequence, the reduction of test phase related costs.