

Siemens PLM Software

LMS Imagine.Lab for aircraft electrical systems

Facilitating verification of reconfiguration strategies and network transient studies

Benefits

- Validate the design and sizing of variable frequency generators, auxiliary power units or ram air turbines
- Easily verify and validate reconfiguration strategy
- Significantly optimize overall energy consumption
- Seamlessly study transient flight conditions

Summary

LMS Imagine.Lab™ software for aircraft electrical systems helps you design the electrical network of any aircraft. The electrical aircraft solution is based on LMS Imagine.Lab Amesim™ software for multi-domain system simulation. Using a scalable approach, the solution allows you to manage multidisciplinary systems for advanced aircraft electrical network design.

Using this solution's electrical libraries – including electric motors and drives, electromechanical, electrical basics and converters, and aircraft electrics – helps you face the new challenges of creating a more electric aircraft.

An energy balance modeling approach ensures that you can analyze the electrical systems and their components in complex networks, as well as account for thermal integration within the complete aircraft from the very beginning of the design process.

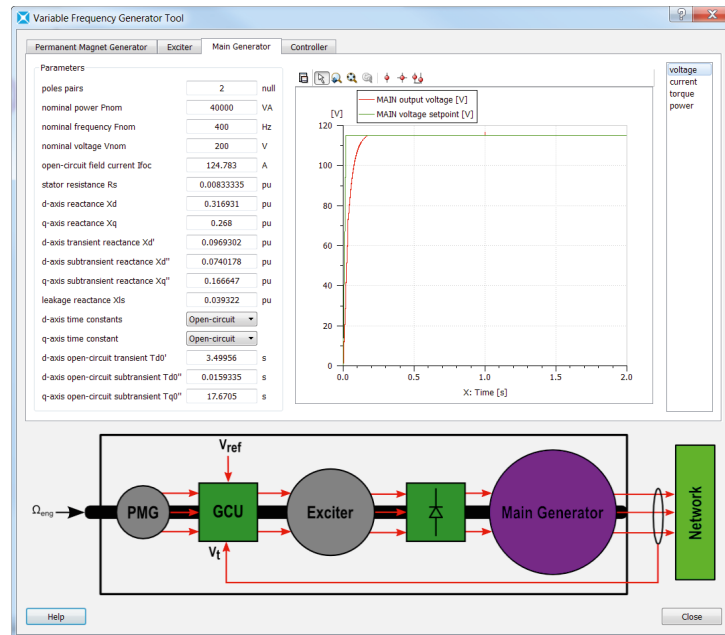
The electrical aircraft simulation solution helps you design safer, more reliable actuators such as steering and braking systems, and enables you to better analyze the impact of network reconfiguration in case of failure. With its Simulink® co-simulation capability, you can also integrate generator controls and ensure proper and efficient energy transmission to the network.

Postprocessing tools (such as the fast Fourier transform and linear analysis) allow you to assess network power quality, hence you are able to analyze aircraft electrical systems long before the first flight to ensure that certification tests will be successful.

LMS Imagine.Lab for aircraft electrical systems

Features

- Three levels of modeling for aircraft electrical systems and components
- Full integration with the LMS Amesim multi-domain libraries
- Dedicated components for electrical analysis
- Average model for static converters
- Power budget and load shedding definition



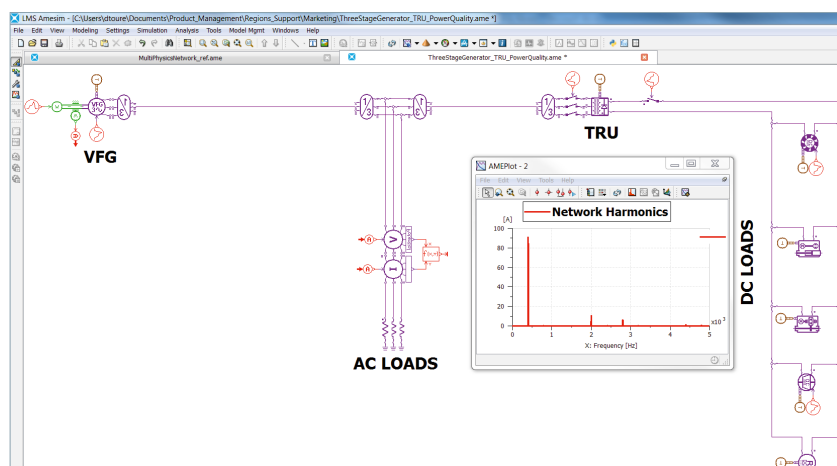
Power generation system modeling

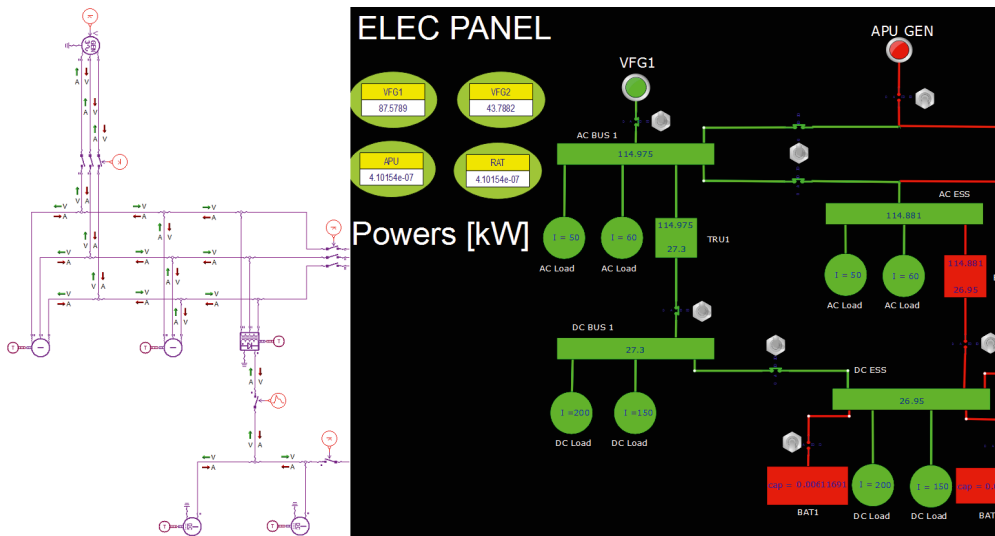
With the electrical aircraft solution, you can consider different levels of modeling for variable frequency generators (VFG) and transformer rectifier units (TRU) depending on the available data at a given design phase. The solution enables you to

seamlessly evaluate the interaction between TRU and generator performance. You can validate the impact on the gearbox shaft by assessing the torque pulsation and the recovery time for network voltage.

Moreover, the solution allows you to carry out the complete transient analysis by integrating the electric generator into the overall network, as well as optimize the thermal integration by controlling the temperature of winding and power electronics.

In addition, the solution helps you design static inverters and ram air turbines (RAT) to ensure optimal emergency power generation for essential systems such as the flight controls and landing gear.





Electrical network analysis

The electrical aircraft solution allows you to assess the needed electrical power throughout the complete flight mission. You can define the network architecture and validate the electrical network reconfiguration strategy in case of incidents (for example, load-shedding scenarios). A dedicated dashboard enables an exhaustive analysis of connected and powered/unpowered equipment.

Power consumer modeling

The electrical aircraft solution allows you to select an actuation technology by comparing the efficiency of full electromechanical and electrohydraulic actuation. The solution enables you to account for overall energy needs, assess electrical/mechanical transients and understand the impact on the surrounding environment by facilitating the study of heat release.



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