An Automated Solution to Estimate Solar Energy Using OpenFOAM

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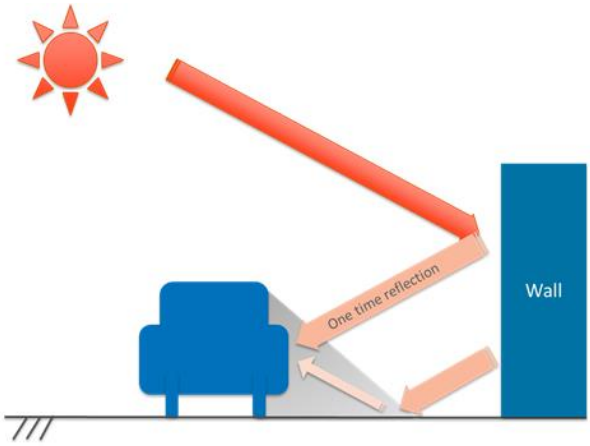
The objective of this project was to optimize size, shape and position of solar panels on exterior of Solar Hybrid Vehicle. so that maximum amount of solar energy could be converted into usable electric energy. Application could be utilized for solar grid systems.

During this work, solar load capability of OpenFOAM has been enhanced to take reflectivity into account. One-time reflection from one to all visible faces was modelled with the new OpenFOAM development. Current capability is being released with v1906.



Later a dedicated automated application based on ESI-multi-domain simulation platform has been created, which eventually gives user flexibility to select various cities, time slots, weather conditions on different days across the globe. Current application will perform DOE of runs to find our incident solar energy and efficiency of solar panels. As run matrix progresses, required images and electrical wattages on the panels will be exported to a spreadsheet for further review and detailed investigation.

Developed application could be used to find out heat load on the building, which will be helpful in decision making of HVAC unit of building/ large enclosures.