

PERFORMANCE CHARACTERIZATION OF AIR BREATHING ENGINE

VERTICAL:
AEROSPACE & DEFENCE

SERVICE:
ENGG. SOFTWARE
DEVELOPMENT

TECHNOLOGY:
CFD + CONTROLS &
DYNAMICS

Our customer in Republic of Korea is engaged with conceptual design & development of supersonic air breathing engine. The engine is based on mixed-compression air intake, subsonic combustor, fuel injection system & a nozzle. A mathematical model was desired to be developed for estimating & understanding its working over its flight envelope. The development of such multi-component mathematical model required a multi-disciplinary group with deep expertise in development of numerical simulation tools.

Zeus Numerix selected the most appropriate techniques for component wise simulation and then integrated them all into a common framework for system level performance prediction. It included 3D CFD simulations for air intake, 1D detailed chemical kinetics of JP-10 for subsonic combustor and empirical modules for fuel injection & nozzle functioning. A novel system level dynamics framework to integrate the component modules was designed & implemented.

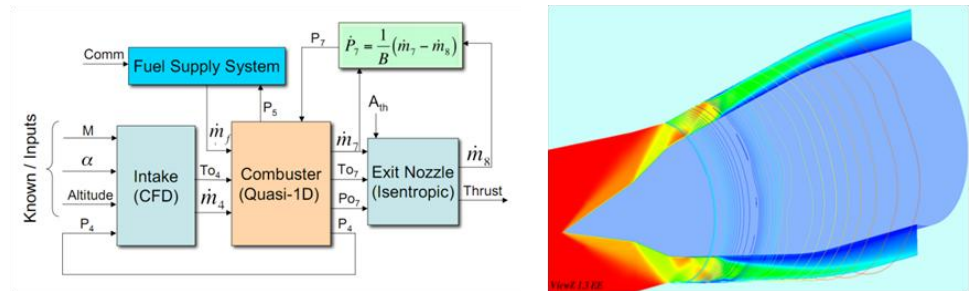


Figure 27: Global and local models for modeling of RAMJET engine

Customer was provided with a well documented integrated framework, its validation studies & analysis report. The framework was further used by customer to devise control strategies for this engine. Through this engagement with Zeus Numerix, customer overcame the critical constraint on availability of R&D resources with expertise in development & usage of numerical methods.