OKTAL-SE
Synthetic Environment

EO ✓
AEO ✗
RF ✗
GNSS ✗

SE-PLUME

RAY ✓

SIMULATE JET AIRCRAFT PLUME SIGNATURE

FAST ✓

SE-PLUME, extension of the SE-Workbench-EO, is the most advanced and validated solution on the market to compute aircraft infrared signatures.

Features

- Plume modelling
- Thermal skin computation
- Plume rendering
- Real time & non real time capacity
- Based on FLUENT™ or OpenFOAM for fluid dynamics computation

- Integrated with SE-WORKBENCH-EO
- Addresses military and civil aircrafts (with gas turbine engines)

Plume Modeling

SE-PLUME is a set of tools that are used for physically pre-computing the plume and the skin heating of the aircraft body due to friction in the steady atmosphere.

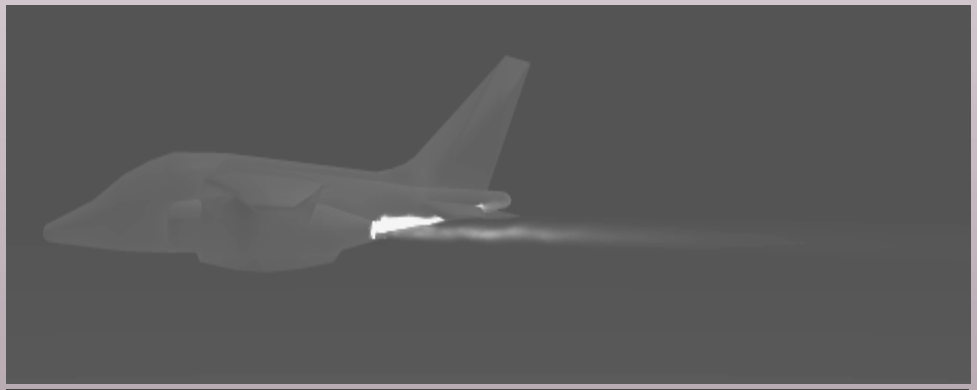
SE-PLUME provides a dedicated GUI that permits to configure the flight configuration (such as speed, aircraft position, atmospheric conditions…).

The software tools generate files that are compatibles with SE-SCENARIO:

- **A plume characterized by a point set defining its physical properties: molar concentrations of gas species, temperatures and pressures**
- **A thermal definition file of the aircraft body skin temperatures**

Non real time and real time rendering

The plume and skin temperatures pre-computed using SE-PLUME are then ready for rendering in non real time with SE-RAY-IR and real time for SE-FAST-IR



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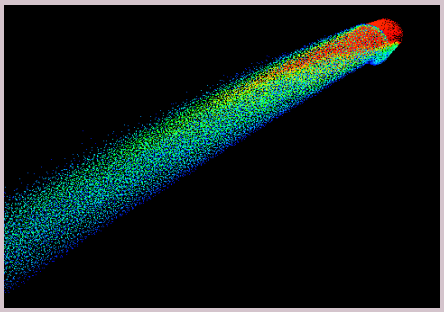
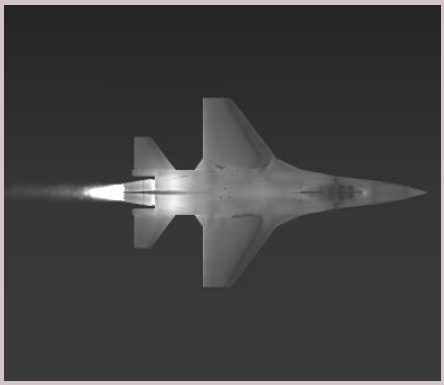
Benefits

- Generates aircraft EO signatures even in the case of poor data availability
- Unique and validated simulation tool for plume simulation



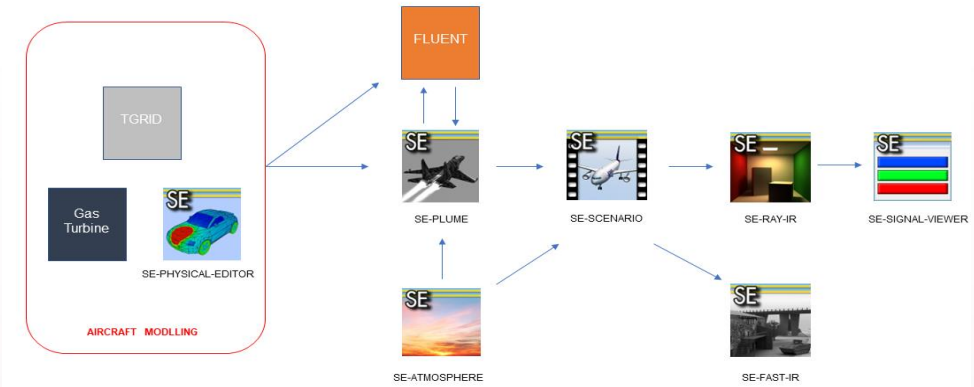


System requirements

Windows

Linux

Integrated architecture



SE-PLUME is an integrated tool that enables to parameterize and interface dedicated physical pre-computation software

SE-PLUME converts Computational Fluid Dynamics results to plume and thermal data compatible with the SE-WORKBENCH-EO world

Validated results

The SE-PLUME process is based on the combination of highly trustable COTS, phenomenological models, validated models & SE-WORKBENCH-EO physics. The validation process includes comparison with other codes (ONERA/CRIRA & NATO/NIRATAM)

Plume analysis and edition

A scientific visualisation of a plume according to its properties (temperature, pressure and species molar fractions) is provided that permits to analyse and modify the generated plumes

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