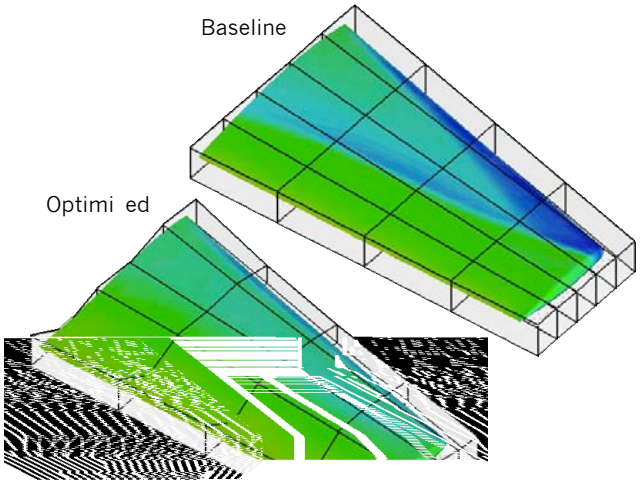



## Abo t SU$^2$

SU$^2$ is an open-so rce soft are s ite speciali ed for high-fidelit Partial Differential Eq ation (PDE) anal sis and design of PDE-constrained s stems on nstr ct red grids.

The s ite incl des C++ anal sis mod les, linked ia p thon scripts, that:

- Sol e the PDE s stem
- Decompose the domain for parallel comp tations
- Determine sensiti ities of an objecti e f nction (e.g. lift, drag)
- Deform the model and grid to perform shape optimi ation
- Perform adapti e grid refinement

Mac OS X, Lin and Windo s binar e ec tables can be do nloaded from the SU$^2$ ebsite:
**h ://  2.  a f  d.ed**

## http://s 2.stanford.ed

SU$^2$ is a c tting-edge, fle ible, open-so rce tool that can be sed for:

- High-fidelit anal sis
- Adjoint-based design
- M lti-ph sics sim lations
- Adapti e, goal-oriented mesh refinement

Doc mentation and a f ll description of c rrent and pcoming feat res are a ailable on the SU$^2$ ebsite:

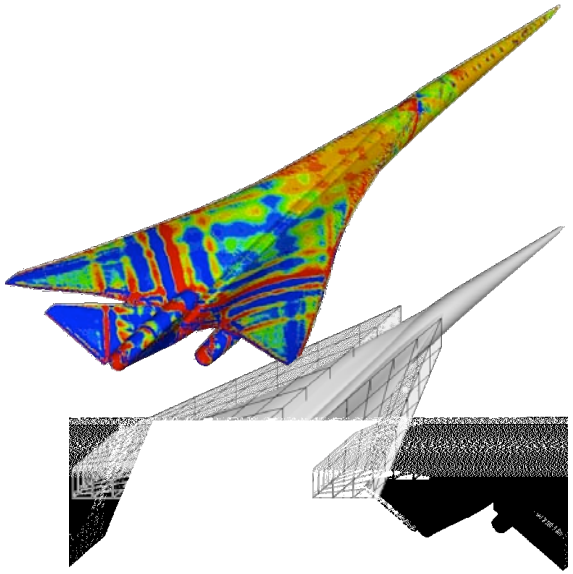
**h ://  2.  a f  d.ed**

Email the de elopment team:
**a ed-de @li . a f d.ed**

STANFORD
AERONAUTICS & ASTRONAUTICS
aerospacedesignlab

SU$^2$ is nder acti e de elopment b the Aerospace Design Laborator at Stanford Uni ersit . Visit the ADL at:

http://adl.stanford.ed



SU$^2$
STANFORD UNIVERSITY
Unstructured Code

# Open-So rce Anal sis and Design

DIE LUFT DER FREIHEIT WEHT

aerospacedesignlab

## High-Fidelit Anal sis

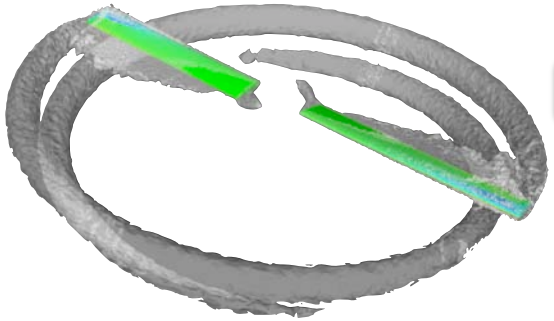
- Usable for internal and e ternal aerod namics
- Handles nstr ct red grids and incl des a Point ise pl gin for mesh generation
- E ler, Na ier-Stokes, RANS, rotating frame, a is mmetric and incompressible eq ations
- Stead and time-acc rate anal ses
- Con ergence acceleration incl ding agglomeration m lti-grid
- Parallelism sing MPI

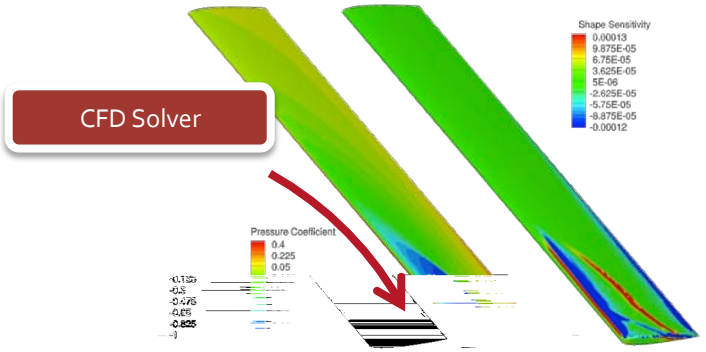
## Shape Optimi ation

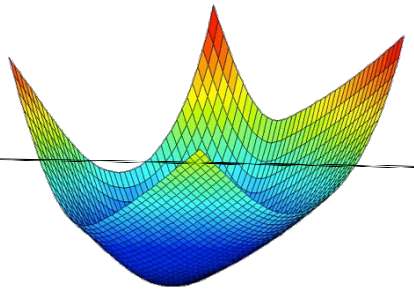
- Self-contained optimi ation en ironment sing standard p thon libraries, s ch as N mP and SciP
- Gradient comp tation sing the contin o s adjoint approach
- 3D design ariable definition sing free-form deformation bo es
- B ilt-in geometr and mesh deformation

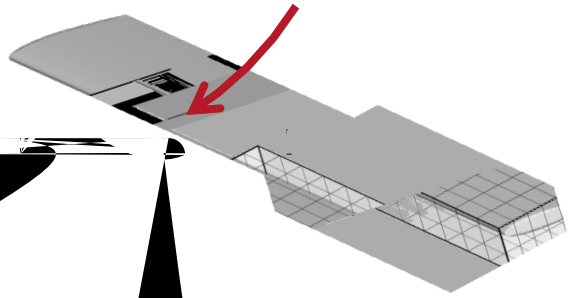
## M lti-Ph sics Sim lations

- Fle ible C++ based architect re for rapid implementation of ne eq ations and so rce terms
- Sol tion containers allo for sim ltaneo s anal sis of di eq ation sets ith tight
- Free s rface sim la ir- ater interfaces sing set method
- M lti-species sol er for sim latin d flo s in strong electri s or behind h personic sho es

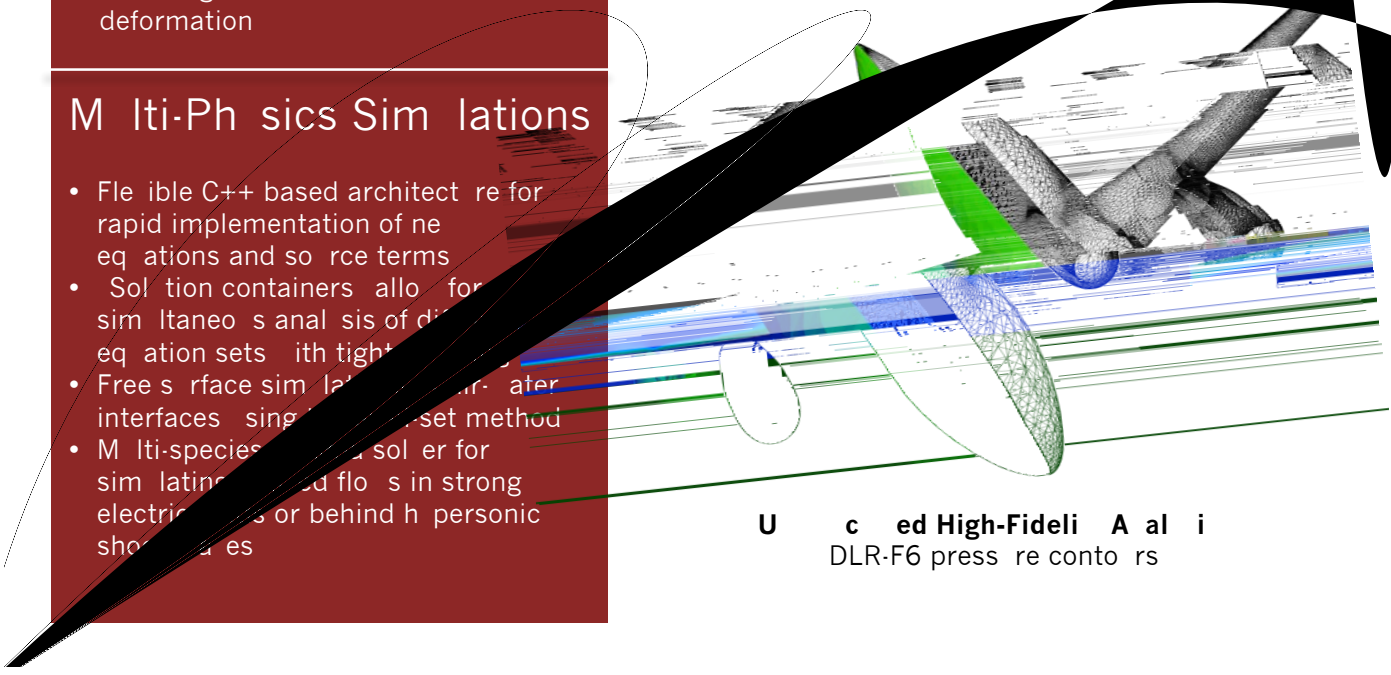




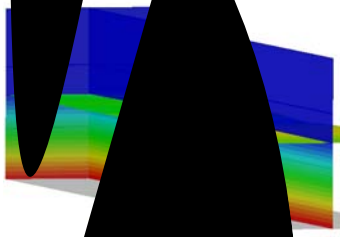





**Reac i g ie -S ke**
Electron erated b
arc heat sing o er a
s od



**U c ed High-Fideli A al i**
DLR-F6 press re conto rs




**F ee S face Si la i**
Water flo ing o er a b mp in a channel