

## Design

- Many years expertise in design of scientific instrumentation for very large facilities and projects (multi \$m) – especially synchrotron beamlines.
- Leading Edge 3D CAD Design Tools - Solidworks (inc. Pro/E translation).
- 2D layout and scheme work with AutoCAD.
- Website based project 'folders' and exchange of information by optimised tools (e.g. animated edrawing).

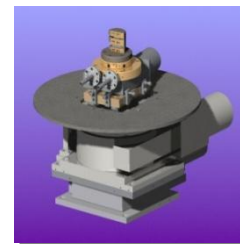
## FEA

- World class ANSYS & COSMOS FEA tools – default standards in scientific community.
- Linear mechanical stress & strain studies + non-linear (plastic, large deformation).
- Thermal - conduction, convection, radiation.
- Thermal stress/strain.
- Transient and time dependent thermal shock.

# Design & Analysis Services

## Design

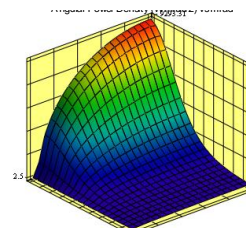
By using the best in leading design software (AutoCAD & Solidworks) and with IDT staff possessing many decades of accumulated experience in the field, IDT can offer a cost competitive mechanical design service across a wide ranging spectrum of scientific and precision instrumentation. We specialise in the area of synchrotron X-ray/VUV and IR beamlines.



3D animated e-drawings (emulation)

## Finite Element Analysis

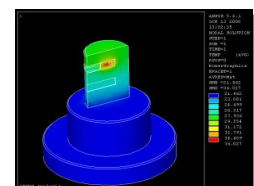
IDT can offer engineering analysis studies which are incisive and accurate to give confidence in and make informed decisions about your project. More than just a safety check, FEA studies can be very cost effective - IDT have undertaken studies of only a few days in scope that have resulted in potential savings of \$100K+.



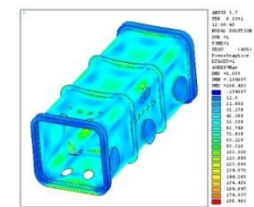
Gaussian Power density modelling

Examples of the type of analysis undertaken include;

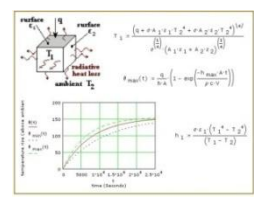
- **Mechanical stress** – e.g. pressure vessels & windows
- **Mechanical strain** - e.g. Micro-deflection due to self weight (body load)
- **Mechanical vibration** e.g. Random ground vibration in sensitive optic mounts.
- **Thermal** - conduction, convection, radiation - e.g. Radiative heat loss in satellite cooling pump.
- **Thermal Stress/Strain** - e.g. Transient thermal shock in synchrotron X-ray absorbers.
- **Fluid Flow** - e.g. heat convection in electronics enclosure
- **Electromagnetic** - e.g. Mapping delta B gradients in dipole magnets.



Thermal Analysis (diamond crystal)



Stress Analysis (Pressure Vessel)

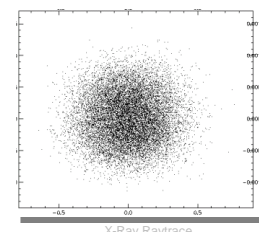


Validation calculation using MathCAD

We use ANSYS and COSMOS as our FEA packages. All work is quality controlled (to ISO9000 guidelines) with a full report, traceability to original source and reference material, plus work backed up by validation (hand) calculations.

## Other

IDT are able to offer other services in specialist areas such as power density and spectral absorption calculations plus X-ray raytracing for synchrotron beamline optics.



X-Ray Raytrace