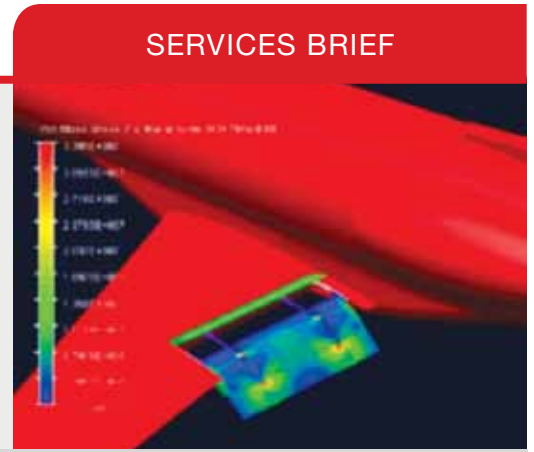


Simulation Services for the Aerospace Industry

Global Engineering Services



Simulation Assistance When You Need It

MSC Software is your partner in performing cost-effective simulation for your product development. MSC has a 50-year history of providing consulting services to aerospace. With more than 400 field engineers worldwide, MSC has the skills and capacity to understand and help you overcome your challenges. MSC engineers have expertise in structures, impact, blast, motion, controls, fluids, thermal, fatigue, and composite materials. We can be an extension of your engineering team enabling you to obtain the skills you need when you need them.

The goal of our simulation services organization is to enable you to maximize the value of your computer-aided design and engineering investments. Whatever your needs, MSC Services works with you to identify and implement customized solutions ranging from technical support and enterprise training to engineering services and custom software development.

Methods Development

Simulation can be applied to a wide range of product development and manufacturing challenges. However, it is not always obvious how to apply simulation through the product lifecycle to achieve the desired efficiency and accuracy. Development of the best methods and practices is necessary to provide a standardized, repeatable, correlated approach matched to your internal design process. MSC will work with your staff to determine the optimal modeling process; to get the results that you need, using the information and time you have at that stage of the design process. This process is correlated to physical test data to give you confidence that the simulation results are indeed predictive.

A methods development project provides a strong foundation for the application of simulation in your product development process.

Training and Technology Transfer

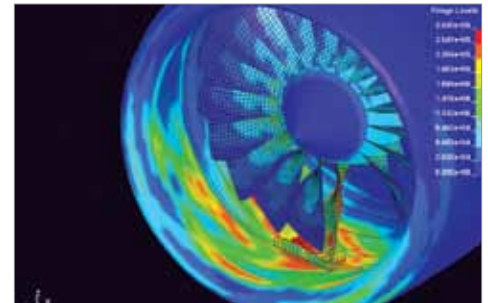
MSC offers a full range of training courses in locations throughout the world. These courses address the needs of new users of our simulation products and the needs of long time users who want to apply more advanced features. If our public classes do not meet your needs, we can prepare a custom training curriculum to be delivered at your facility.

Sometimes a training course is not sufficient to get your staff up and running with simulation with the level of efficiency you need. When that happens, technology transfer through one-on-one time with MSC's consulting engineers is recommended. MSC's engineers will provide instruction in the topics you need, using your simulation models and techniques to illustrate how to address your particular needs with maximum efficiency.

This technology transfer can be in-person and on-site, or it can be done remotely through telephone or web conferencing. The content can be customized to you: from advanced simulation techniques to more fundamental engineering topics. We can transfer our expertise to your organization.

Focus on:

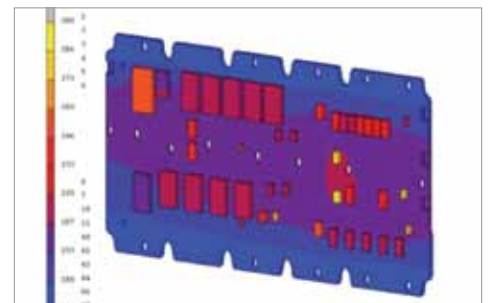
- Methods Development
- Training and Technology Transfer
- Staff Augmentation



Jet Engine Blade-Out

Broad Industry Expertise:

- Design optimization
- Aeroelasticity and flutter
- Landing gear
- Mechanical flight controls
- Environmental control systems
- Hydraulic, pneumatic, and fuel system simulation
- Thermal analysis
- Bird Strike
- Composites
- Metal forming, forging, and welding
- Fluid/Structure Interaction



Electronic System Thermal Analysis

Staff Augmentation

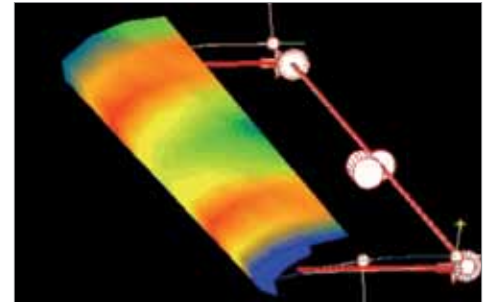
MSC's experienced team of engineers can provide the skills you need to get the job done. If you have a short-term need for simulation, or have a job that requires a skill set that you do not have in-house, MSC engineers can do it for you. Typical projects can be simple design trade studies or full-scale engineering analyses with reports ready for submittal to regulatory bodies.

Recent projects have included:

- Advanced composite aircraft loads and stress
- Electronic system thermal dissipation
- Jet engine nozzle thermal and fatigue analysis
- Aircraft flutter
- Aircraft bird strike
- Stretch forming
- Fuel system thermal management
- Nuclear inspection robotics
- Aircraft ground loads
- Manned spacecraft heat shield
- Hydraulic actuator vibration and fatigue
- Ejectors and stores separation
- Aircraft maneuver simulation
- Mars rover vehicle
- Flexible launch vehicle simulation
- Helicopter hydromechanical control system

Key Benefits:

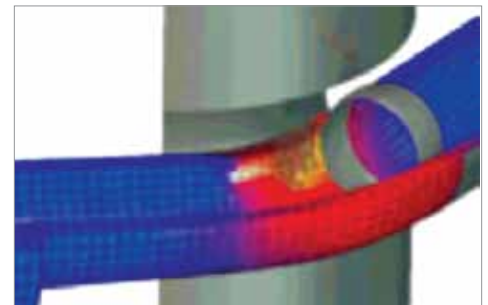
- Get specialized expertise when you need it
- Rapidly develop new methods for applying simulation to your designs
- Automate your simulation processes to provide consistency and repeatability
- Reduce the time and expense needed to implement simulation and gain new skills



Slat Mechanism Simulation



Six Degree-of-Freedom Maneuver Simulation



Forming Simulation



MSC Software Engineering Services Solution Framework

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