

# SURVICE

ENGINEERING COMPANY

## GEOMETRIC MODELING

### BACKGROUND

Geometric models are 3-D computerized representations of systems used to support a variety of end-uses, including engineering design and analysis, preparation of engineering drawings and schematics, configuration management, testing, technical and training documentation development, and feasibility/adequacy studies. SURVICE-developed geometric models are regularly used both internally and by its customers to support survivability-related studies and analyses such as vulnerability assessments, ballistic penetration analyses, radar cross section and infrared (IR) detection analysis, Sustainability Predictions for Army Spare Component Requirements for Combat (SPARC) analyses, and synthetic aperture radar (SAR) studies. The level of detail required and modeled in the geometric model depends on the type of analysis being performed.

### DEVELOPMENT PROCESS

The SURVICE Engineering Company is highly skilled in developing geometric models of complete domestic and foreign aircraft, rotorcraft, ground systems, watercraft, missiles, structures, or individual components/systems. We are experienced in using numerous modeling formats, including FASTGEN, BRL-CAD, ACAD, SolidWorks, AutoCAD, and Creo/ProEngineer. In addition to the aforementioned Government and commercial CAD software, SURVICE utilizes geometric processing tools such as PolyWorks, GeoMagic, MAGICS, RapidForm, HyperMesh, Cubit, and Rhino 3-D to manipulate and convert point cloud datasets and polygon meshes to the required deliverables.

Geometric models can be developed “from scratch” using a variety of data sources, including manufacturer’s line drawings, intelligence data, photographs, or other types of design data. In addition, SURVICE has a wealth of experience converting manufacturers’ CAD



*Rotorcraft Geometric Model*

files into applicable formats for development of target descriptions, FEA and CFD meshes. We have also developed a number of tools for conversion, visualization, and utilization of geometric data, to include high-performance raytracing tools. Many of these tools are used by industry and government users. And when design data are not available, SURVICE can leverage its state-of-the-art 3-D coordinate measurement and laser scanning equipment and processes to collect and postprocess data from physical assets efficiently .

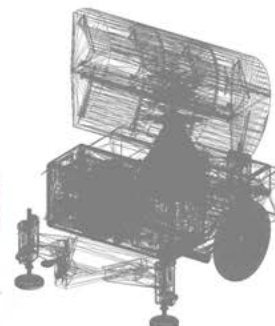
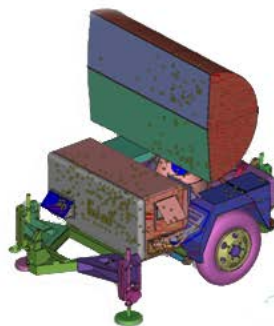
*Physical System*

*SolidWorks*

*Magics 3-D*

*BRL-CAD Wireframe*

*BRL-CAD Rendering*



*Experienced With Large Variety of Geometry Input and Output Formats*

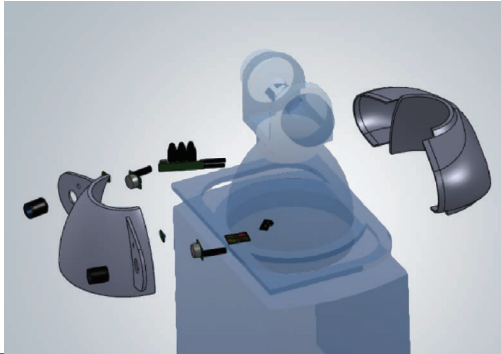
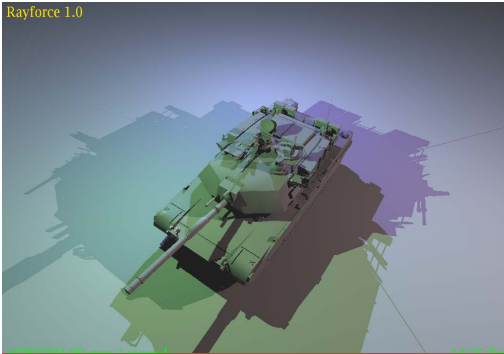
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*3-Dimensional Models for All Industries and End Uses*

## USE CASES

- Perform Survivability / Vulnerability / Lethality Analysis Modeling – RF and thermal signature, ballistics, blast, hydrocode simulation
- Conduct aerodynamic / CFD analyses in support of performance studies
- Accurately and efficiently examine and model mounting space, geometries, attachment points, and integration options – in parametric, editable formats
- Model and view for visibility/readability/performance – cockpit, man-machine interface, workspace, controls, exterior lights, sensors, instruments, antennas
- Explore integration options without actual fabrication or mock-up
- Provide accurate, as-built geometric model inputs for structural analyses, RF propagation, and other engineering studies
- Rapidly generate geometric files of objects for archiving, documentation, viewing, measuring, data sharing, and illustration
- Facilitate transition of designs to production – tooling, jigs, fixtures
- Support signature analysis and maintenance and repair plans/issues
- Prepare models for and produce 3-D-printed prototypes or end products