



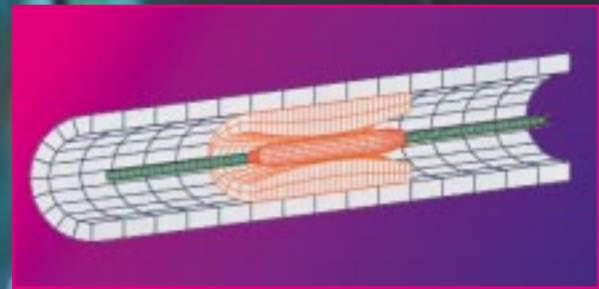
# Medical Product Development Better...Faster...Lower Cost

SES is a full service biomedical engineering consulting company. We offer a state-of-the-art approach to medical product development that is a synergy of advanced engineering simulation, combined with customized product and materials testing technologies, all geared to solving the toughest problems in a fraction of the time. We offer the expertise, experience, and facilities to get your company's medical products to market faster, with increased reliability and lower final costs.

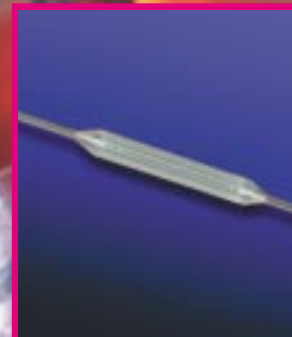
## Medical Implants & Surgical Devices

Our ability to test, predict, and optimize in-vivo structural, thermal, or fluid mechanical function is one of SES's unique capabilities. We provide predictive analysis based functional evaluation and custom testing services to companies in several areas, including:

- **Cardiovascular devices:** Arterial grafts, Anastomoses devices, Self-expanding and endo-luminal stents, Balloon catheters
- **Endoscopy products & surgical devices:** Ligation devices, Tissue scissors, Soft tissue staples
- **Orthopedic implants & devices:** Total joint replacements, Fracture fixation devices, Intra-medullary devices, Resorbable implant materials
- **Tissue engineered implants:** Cartilage, Ligaments, Tendons, Fibrocartilage
- **Dental implants:** Endosseous, Subperiosteal, and Transosteal



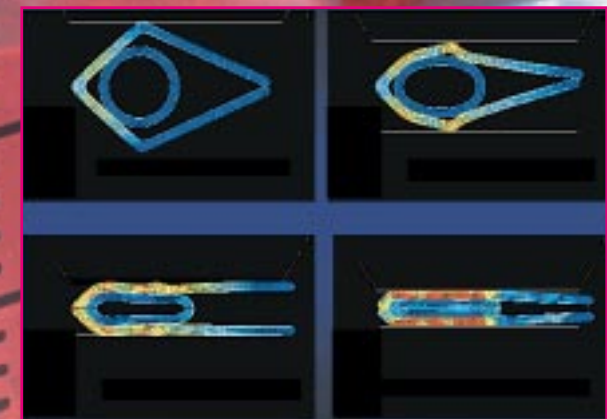
FEA model of stenosed artery with fixed-wire design balloon catheter in position prior to inflation



PET angioplasty balloon

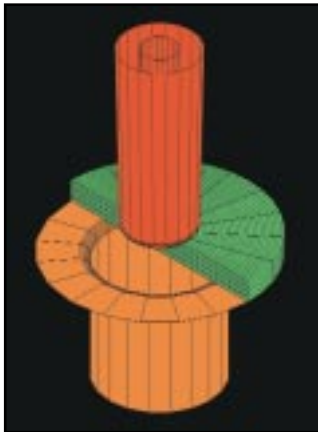


Self-expanding stent

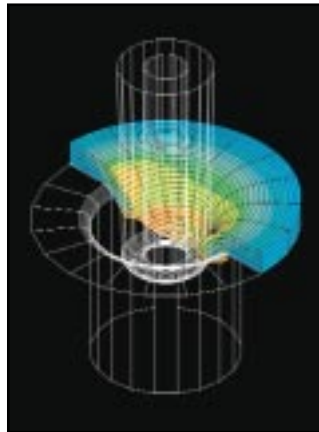


Elastic-Plastic forming simulation for a ligation clip used to shut off blood vessels during surgery.

## Medical-Pharmaceutical Packaging & Drug Delivery Systems



Hyperelastic finite element model of luer insertion into elastomer membrane.

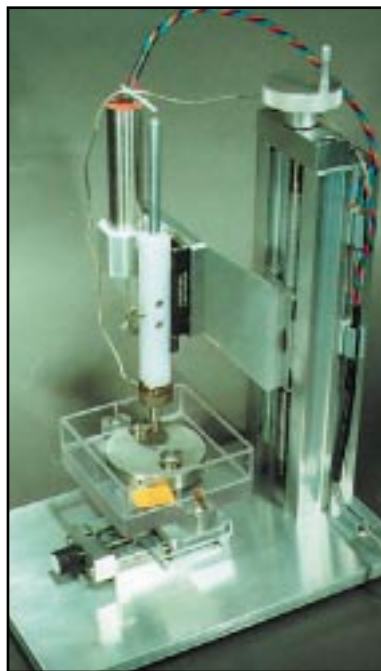


Stresses in membrane during luer insertion

SES offers a unique suite of tools to solve the complex problems associated with designing functional, safe medical packaging, and drug delivery systems. We have developed effective design, predictive analytical and computational methods, along with customized material and product testing capabilities to support and accelerate the development of packaging and drug delivery systems. SES experience in this area includes:

- Microbial sealing
- Peelable opening features
- Gas and vapor permeability
- Shelf life
- Snap-fit assemblies
- Sterilization effects on material properties
- Material performance in service (creep, relaxation, stress cracking, fatigue, fracture)
- Child resistance and tamper evidence

## Custom Test Development & Systems Integration



Compression tester for tissue engineered products

With emerging new materials applications, manufacturing processes, and device innovations, the need for an experienced outsourcing partner that can provide custom test development and integration services is greater than ever before. SES Materials Technology Group and the Systems Integration Group address these needs for clients with a broad base of experience. We routinely develop custom test

systems, which are often integrated for control, data acquisition and analysis.

### Custom test systems at SES include:

- Creep, stress relaxation tests for polymeric materials
- Biaxial test systems (bubble rheometer)
- Tensile impact testing machines
- Seal integrity test systems
- Fatigue test frames for polymeric materials
- Friction testing systems
- Environmental stress crack resistance tests for polymers
- Compression testing systems for tissue engineered cartilage
- Convective drying facility/windtunnel
- Drop/impact test systems

**For more information about our unique medical product development capabilities call SES MEDICAL DEVICE TECHNOLOGIES today.**

**Cincinnati 513-336-6701 • Houston 281-955-2900**

**Atlanta 770-449-7887 • Denver 303-530-0525**

**Chicago 847-692-6310**

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