



# Space Technology

## Game Changing Development

### Materials Genome Initiative Element

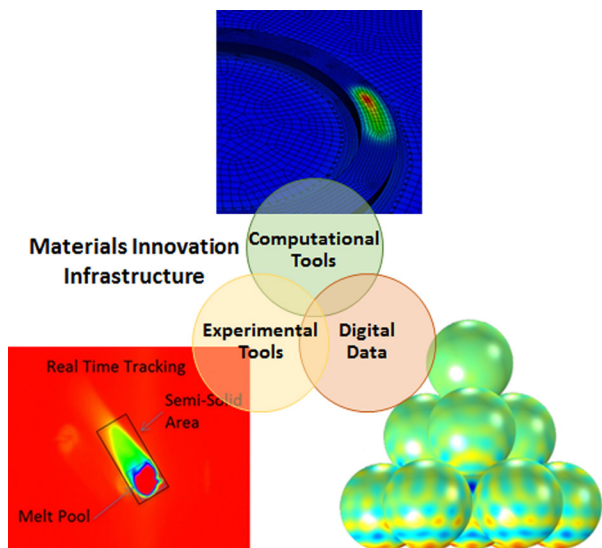
NASA is committed to developing new materials and manufacturing methods that can enable new missions with ever increasing mission demands. Typically, the development and certification of new materials and manufacturing methods in the aerospace industry has required more than 20 years of development time with a costly testing and certification program. To reduce the cost and time to mature these emerging technologies, NASA is developing computational materials tools to improve understanding of the material and guide the certification process.

NASA's Materials Genome Initiative (MGI) element is a multi-center effort within the Advanced Manufacturing Technology project, which is funded by the Game Changing Technology Program, managed by NASA Langley Research Center. NASA's MGI element is consistent with the national

Materials Genome Initiative, which was announced by the office of the President in 2011. NASA's effort is currently focused on developing computational materials tools to reduce the cost and time to develop and certify components manufactured using novel additive manufacturing processes for aerospace vehicles. Additive manufacturing allows for near net shape processing to reduce material waste, and time and cost of traditional, subtractive, manufacturing.

NASA is developing physics-based computational models to predict the melt pool, where powder or wire precursors are heated by a laser to form a solid component, the microstructural evolution, and material behavior. These tools will be used to develop basic understanding to optimize the manufacturing process and to guide the certification process.

# NASAfacts



Physics-based models of powder consolidation, in-situ monitoring of the melt process and 3D models of the thermal history are used to predict material evolution and material behavior.