

Micromidas
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Customer Success Story

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Autodesk Inventor and Autodesk Algor Simulation software are playing key roles in the evolution of Micromidas technology and processes. Autodesk software has helped the Micromidas team get up to speed and evolve our chemical and process engineering in record time.

—John Bissell
Chief Executive Officer
and Co-Founder
Micromidas

The Autodesk Clean Tech Partner Program supports early-stage clean technology companies with design and engineering software they can use to accelerate their development of solutions to the world's most pressing environmental challenges. For more information visit autodesk.com/cleantech.

The next big thing is tiny.

Micromidas uses Autodesk® software to turn polluting, biosolid sludge into advanced plastics.



Micromidas Mobile Refinery, Rear View. Image courtesy of Micromidas.

As freshly minted graduates of the University of California at Davis, John Bissell, Ryan Smith, and Casey McGrath might have been considered greener than the technology they were presenting. Still, after an early success at a University of California entrepreneurial competition, the new grads, full of youthful enthusiasm, headed to a 2008 clean technology national competition sponsored by the Environmental Protection Agency (EPA) in Washington, D.C. Competing against some 400 universities, they had only modest expectations. Their technology, however, was judged sufficiently unique and ambitious for them to win the competition. Not long after their triumph, Micromidas was born.

While researching microbial-based wastewater treatment at their alma mater, the Micromidas team developed unique processes for transforming the carbon in organic wastewater into fully biodegradable plastics. Disposing of biosolids—also known as “sludge”—has proven to be an extremely expensive and complex problem. Rather than being incinerated, which creates greenhouse gases, or deposited in landfills, carbon and other nutrients in wastewater biosolids are gobbled up by microbes harnessed by Micromidas from soil and water.

During the Micromidas biorefinery process, flake-like particles of polyhydroxyalkanoates (PHA) are produced from the sequestered carbon. As much as 65 percent

of the sludge is refined in this process, with the remainder immediately recycled through the system. Micromidas then sanitizes the PHA flakes and converts them into pellet form. Customers can then use the PHA pellets to create products out of the resulting PHA plastics.

The PHA plastics created from Micromidas pellets are expected to be safe for use with food and can be used for such things as biodegradable medical sutures. Since PHA plastic comes from organic materials, it degrades in landfills or other composting environments in a matter of months, as opposed to petroleum-based plastics that can require centuries to fully degrade. What's more, PHA bioplastics are situationally recyclable, making them an earth-friendly packaging alternative.

Micromidas is developing a unique way to introduce its technology to municipal wastewater treatment plant authority customers. Its Mobile Biorefinery, a pilot plant built on a flatbed truck capable of traveling to and plugging into wastewater treatment plants across the United States, will demonstrate how wastewater streams can be turned into PHA flakes for bioplastics. This rolling show will enable Micromidas to demonstrate the compelling benefits of biosolid disposal technology to potential customers at their own sites.

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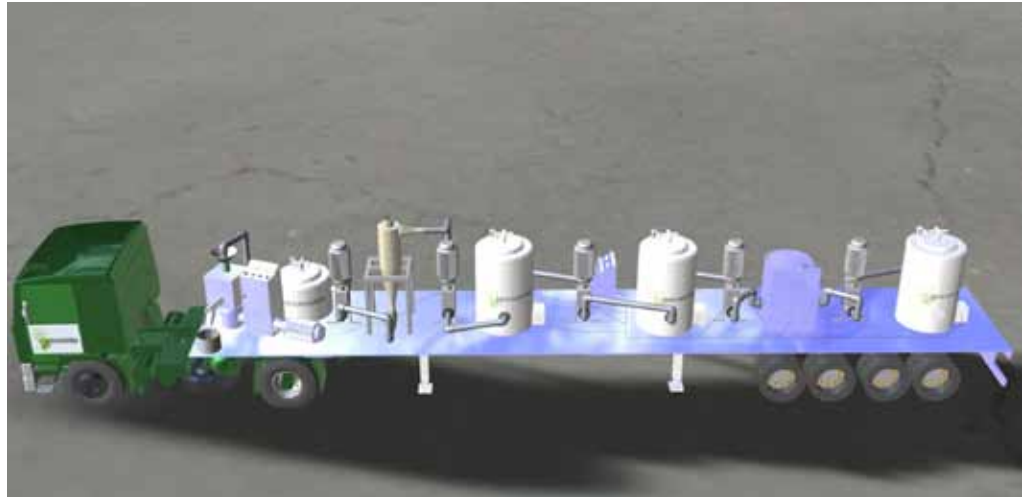
“Autodesk Inventor and Autodesk Algor Simulation software are playing key roles in the evolution of Micromidas technology and processes,” says John Bissell, chief executive officer and co-founder of Micromidas. “Autodesk software has helped the Micromidas team get up to speed and evolve our chemical and process engineering in record time.”

Micromidas used Autodesk® Inventor® software and a Digital Prototyping workflow to design, visualize, and simulate its bioreactor and Mobile Biorefinery systems. Showing a validated digital prototype of its system to customers on-site means Micromidas can more effectively communicate the efficiency of biosolid disposal processes in a real-world wastewater treatment plant.

Micromidas is currently using Autodesk® Algor® Simulation software to precisely visualize and analyze a wide variety of design scenarios for its refinery reactor within the real-world context of a wastewater treatment plant.

“Measuring fluid dynamics interactions across the Micromidas technology platform is critical to achieving optimal results,” explains Ryan Smith, chief technology officer and co-founder of Micromidas. “Algor Simulation software has yielded more detailed, trustworthy designs, and reduced time to market for Micromidas.”

Time will tell if biodegradable plastics can fully replace petroleum-based plastics. For its part, however, the Micromidas team knows well that the benefits of using earth-friendly microbes to solve environmental problems are undeniable. Make no mistake: tiny microbes are the next big thing.



Micromidas Mobile Refinery, Top View. Image courtesy of Micromidas.



Micromidas Mobile Refinery, Side View. Image courtesy of Micromidas.

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