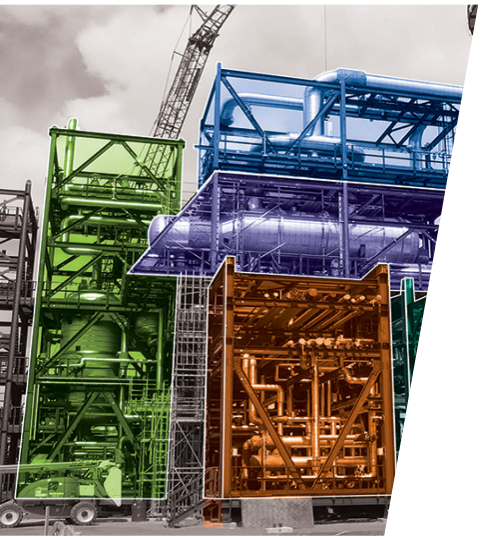
ADVANCING PROCESS INTENSIFICATION TECHNOLOGIES FOR U.S. MANUFACTURING

RAPID (Rapid Advancement in Process Intensification Deployment), a Manufacturing USA® institute, resolves manufacturing process barriers to enable firms to be leaner, cleaner, and greener and become more compact, modular, productive. and profitable.

Manufacturing USA, a public-private partnership with 14 manufacturing institutes across the nation, connects companies, academic institutes, non-profits, and local, state, and federal entities to solve industry-relevant advanced manufacturing challenges in new technology areas with the goals of enhancing industrial competitiveness and economic growth and strengthening national security.



Technology Focus Area

Process industries include chemicals, oil and gas, pulp, and paper. Modular chemical process intensification has long been known to lead to energy efficiencies in process industries but it also has been riddled with barriers to adoption. Costs, complexities, insufficient software and design tools, lack of standardization, and limited knowledge has made modular chemical process intensification difficult for most manufacturers to leverage. RAPID is integrating approaches—in sectors such as chemical and commodity processing, natural gas upgrading, and renewable bioproducts—to overcome barriers and enable companies to improve productivity, reduce waste, and cut operating costs. Focusing further on modeling and simulation, intensified process fundamentals, and industrial systems modularization will enable RAPID to broaden use of process intensification technologies across diverse industry sectors.

Approach to Innovation and Collaboration

RAPID brings together partners in industry, academia, government, and nonprofits to collectively overcome manufacturing challenges in modular chemical process intensification to increase efficiency processes for firms. This is done through:

- Funding projects that prototype technologies and adapt innovations to maximize accessibility to commercial applications across industries
- Building deployment channels across the supply chain and industrial process sectors, as well as the design of a modeling knowledge-base to accelerate the adoption of modular solutions
- Education and workforce development projects including online webinars and a summer intern program providing undergraduate and graduate students with hands-on training and immersion in process intensification projects

LEARN MORE + CONNECT WITH RAPID

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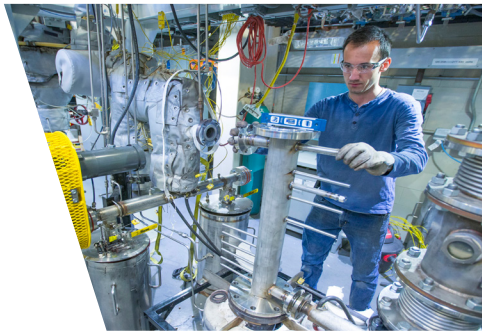
COLLABORATIVE PROJECT EXAMPLES

"RAPID's focus on educating and training the next generation of PI leaders is critical to finding talented young people who will contribute to innovation within the manufacturing sector of the chemical process industries."

– Paul Dimick, General Manager, IntraMicron, Inc.

MODULAR SOLAR-THERMOCHEMICAL CONVERSION PLATFORM: Oregon State and Pacific Northwest National Lab are partnering with RAPID to advance specific equipment manufacturing needs to accelerate the commercial adoption of solar thermo-chemical technologies.

REDUCING CO_2 EMISSIONS FROM NATURAL GAS PRODUCTION: With support from RAPID, Praxair and Georgia Tech are using a proprietary nitrogen-selective adsorbent to scale down a pressure swing adsorption system that can remove nitrogen from natural gas at the wellhead. This would enable the separation of hydrocarbon immediately upon production and sale of it to customers instead of being flared—avoiding losses of saleable hydrocarbons and reducing CO_2 emissions.



REDUCING THE USE OF PETROLEUM PRODUCTS IN TRANSPORTATION AND ELECTRIC GENERATION: Iowa State University's Bioeconomy Institute and Easy Energy Systems are developing a modular system to convert biomass into sugars, which can then be converted into ethanol and other fuels. This would replace the common enzyme-based process through a new technology called autothermal pyrolysis that uses heat (without oxygen), and could provide new markets for modular manufacturers and new uses for agricultural residues.

"RAPID is helping to simplify a process that can be daunting to a small company. It's a significant benefit for a small business like ours."

– Dr. Hannah Murnen, VP Business Development, Compact Membrane Systems

"We've been able to put theory into practice and develop commercial applications from our research based on the substantive feedback and input we have received through our involvement with RAPID."

– Professor Robert C. Brown, Director, Bioeconomy Institute, Iowa State University