

MIDE



engineering **smart** technologies

“ Our mission is to provide innovative value-added engineering solutions. ”

## overview

Midé Technology Corporation develops, produces and markets high performance products such as piezoelectric transducers and actuators, HydroActive™ bulkhead shaft seals, and other innovative solutions; for many industries including the aerospace, automotive and manufacturing industries. Our innovative people, systems approach, and customer focus provides us with the ability to conceptualize, design and deliver these high performance, intelligent systems and services tailored to our clients' specific needs.

### Core Competencies and Advantages

- Mechanical design, integration and testing
- Digital / Analog electronics and controls
- Smart Materials Systems
- Structures and structural dynamics
- Aeroelasticity and Aero-acoustics.

We are known for our ability to transition technologies to commercial products. Our company has a strong belief in the value of licensing for intellectual property.

We have a strong base of technical expertise and have been awarded many U.S. Patents for our smart material systems. Midé has a proven track record in system approach and integration using our expert material knowledge. We have an excellent reputation with our customers and receive numerous follow-up contracts. We also regularly enter into partnership agreements with our customers.

Midé's greatest strength is its excellence at systems engineering. Whether a solution requires a mechanical or electrical engineer, sensor or actuator, Midé approaches each problem from a systems engineering point of view. All of our engineers understand how each component affects, and is affected, by the rest of the components in the entire system. We work with our customers as team members, not just vendors providing a black box that performs some function. By working side-by-side with our customer, we are able to better understand how our product must fit into our client's system. This understanding allows us to produce a solution for our customers that improves the performance of their products.

### Achievements

- Production & installation of HydroActive bulkhead shaft seal aboard DDG-51 Class Destroyers, both LCS variants, and various commercial vessels
- Positive Pressure Relief Valve flying on the International Space Station
- Wireless data logging system for Navy F-18s
- 1 million+ packaged piezo products in the field

# capabilities

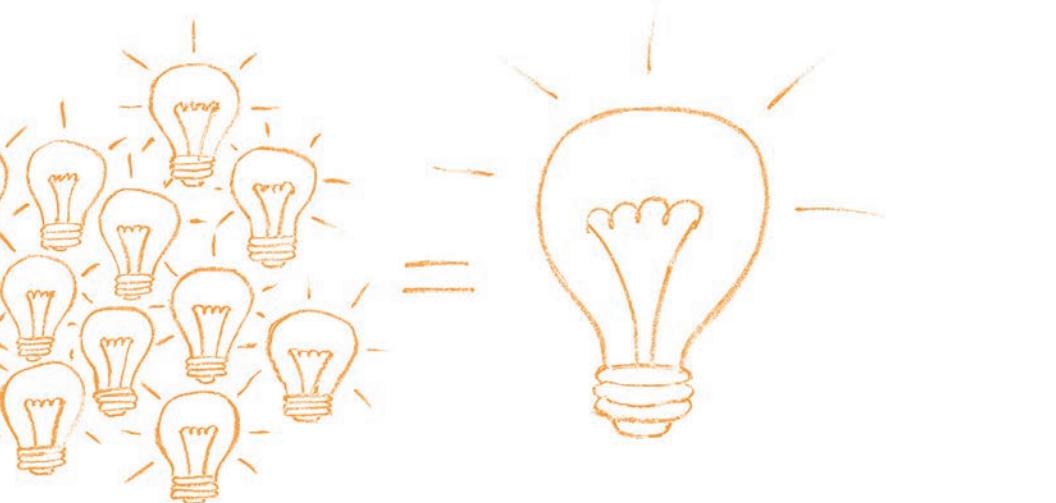
## Engineering Consulting

Midé is a leader in the application of smart materials. We continue to challenge traditional approaches to problem identification and definition with our high-powered team of practical experts. Midé remains at the forefront of the latest technological and managerial advances. Our commitment to collaborative problem solving, our willingness to apply our own resources, and our reputation for providing clients with tangible benefits while protecting their intellectual property has cemented trust and created successful long term relationships.

## Problem Solving through Modeling & Analysis

Midé's approach is to develop a basic understanding of the underlying challenges that are required to provide a solution or develop a new system.

Midé personnel have extensive experience in the modeling of coupled static and dynamic systems including; compressible/incompressible fluid systems, structures, smart material systems, robotics, thermal, aeroelastic and nonlinear systems. We also have experience in the control of electro-mechanical systems, along with the capabilities to design and implement analog and digital controllers for those systems.



## Prototype Development

Midé has extensive experience in designing, developing, and testing prototypes for a wide range of applications. We follow an iterative process to arrive at a performance and cost optimum solution for our customers.

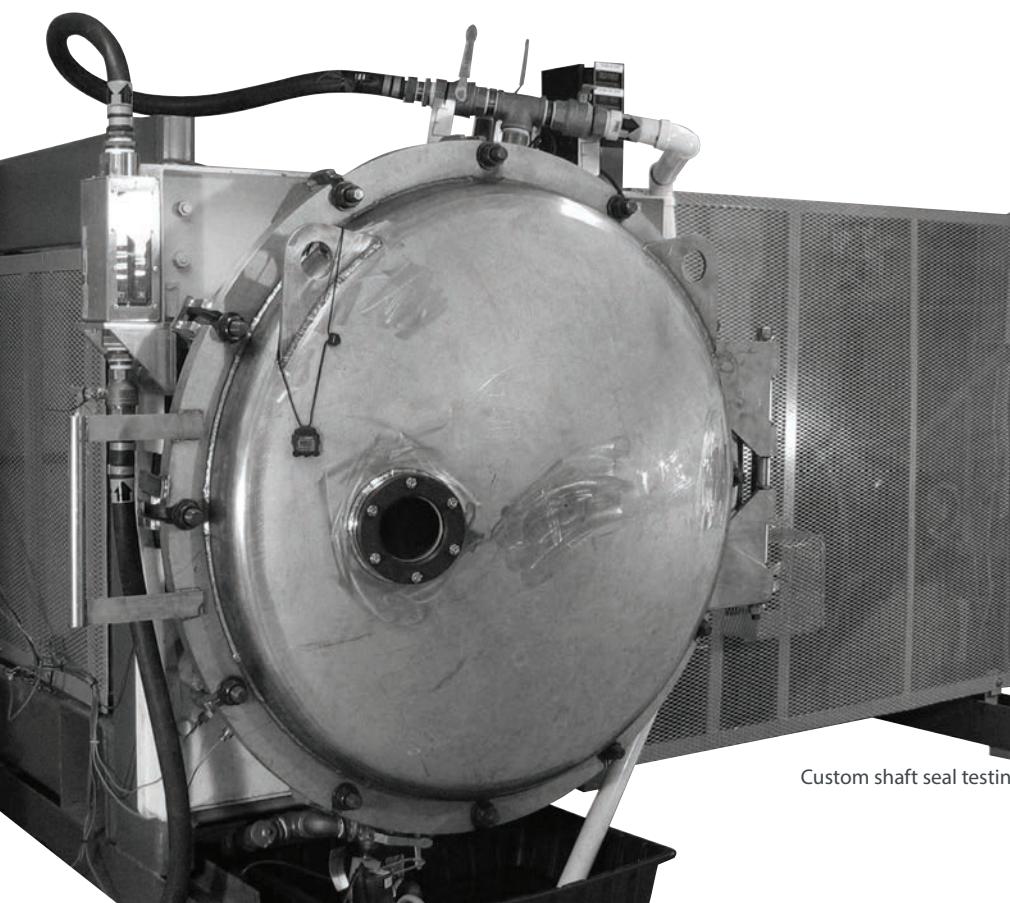
## Production

Midé has both low and medium volume production capabilities, which it utilizes to supply high quality smart materials based products to customers such as Siemens, Boeing and Lockheed Martin. Two fully equipped local manufacturing sites, and an ISO9001 certified quality system enable Midé to provide high quality products to meet our customers' challenging requirements.

# facilities

Midé's headquarters in Medford, Massachusetts is outfitted to support all functions associated with research, development and light manufacturing. This 18,000 square foot facility includes an integrated computing network for design, analysis, and program management, along with a fully outfitted laboratory for R&D and light manufacturing equipment - for our packaged piezoelectric products.

A separate 5,500 square foot manufacturing facility in Woburn, Massachusetts houses Midé's bulkhead shaft seal production area, and provides additional prototyping support.



Custom shaft seal testing rig

## Laboratory

Midé's laboratory is fully equipped to handle all research and product development needs. Midé's equipment includes: CNC lathe, 3-D printer, two milling machines, two Thermotron environmental chambers, Ling laboratory shaker, FLIR infrared camera, high speed camera, hydraulic test stands, central air pressure and pneumatic supplies, multiple data acquisition systems with calibrated sensors, signal conditioners, DSP's, signal analyzers, oscilloscopes, multimeters, industrial presses, industrial ovens and kilns. Calibration of equipment is fully documented and maintained at regular intervals.

## Manufacturing

Due to the growth of its bulkhead shaft seal business Midé added offsite heavy manufacturing space in Woburn, Massachusetts. In this space, Midé operates a 3-axis CNC mill for production and prototype work. Midé also has a forklift, granite inspection tables, calibrated measurement tools and other heavy production equipment.

## Software

In addition to its hard assets, Midé has ample software to support every development effort, including; SolidWorks CAD and Simulator, NASTRAN, Ansys, Matlab, Fortran, Labview, and Eagle PCB - for circuit design.

# technologies & products

## Smart Materials

Midé is a world leader in the application of smart material technologies. We pride ourselves in providing end-to-end system engineering solutions with smart or active materials, including;

### Hydrogels

Midé utilizes hydrophilic polymers that can absorb large amounts of water to provide a mechanical response. This can be triggered via a number of mechanisms, such as a change in temperature, salinity, or pH. Midé has used these unique characteristics to design solutions ranging from HydroActive™ bulkhead shaft seals to thermally adaptive wet suit.

#### Products:

- Reliant Premium Shaft Seals
- Omni Commercial Shaft Seals



### Piezoelectric Materials

Midé is the world leading supplier of packaged piezo actuators and sensors. Midé manufactures all its packaged piezo products in house.

Midé uses a patented packaging process, called the “Piezo Protection Advantage,” to manufacture high performance piezoceramic wafers into a copper clad protective skin that enables pre-attached leads for easy connection, and a high degree of electrical insulation. This process hermetically seals the piezos against harsh environmental elements making them robust and reliable.

We offer a line of standard products as well as custom solutions based on client needs. We also manufacture products in high volumes for our OEM customers.

#### Products:

- Vulture Energy Harversters
- QuickPack Actuators and Sensors
- SHIVR Haptic Actuators
- Piezo Fan



### Shape Memory Alloys and Super Elastic Alloys

Midé is a leading developer of Nitinol based products and has extensive expertise in the design and manufacture of shape memory alloy solutions and educational programs.

#### Products:

- Shape Memory Alloy Starter Kit

### Active Fibers

Midé is in the process of developing a thermally adaptive insulation system. This system uses active fibers to produce a change in thickness or loft of the fabric when exposed to different temperatures. The material will provide thermal protection based on environmental and body temperature, and can be used in all-weather gear, such as jackets, sleeping bags and tent linings.

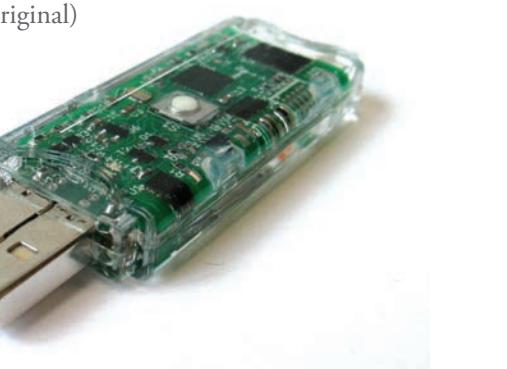
# technologies & products

## Wireless Data Acquisition

The Slam Stick™ is a high speed, ultra-portable and rechargeable USB data logger capable of measuring acceleration in three axes. The device uses a USB Port for on-the-fly configuring, charging, and downloading of data. Simple configuration software allows users to tailor the device to their specific needs. The Slam Stick X product line significantly improves on the original, by increasing sensitivity and range, battery and storage capacity, and adding additional sensors (pressure, temperature, altitude).

#### Products:

- Slam Stick X
- Slam Stick (original)



## Wearable Sensors

Midé Technology is partnering with StretchSense to offer stretchable, wearable sensor solutions (with electroactive polymers) - perfect for the unobtrusive measurement of human body motion in the animation, augmented reality, sport, healthcare, and prosthetics industries.

#### Products:

- StretchSense Wearable Sensors Kit

# markets & customers

## Markets

- Defense
- Aerospace
- Automotive
- Energy
- Industrial controls
- Pneumatic valves
- Marine industry
- Medical instruments
- Heating, ventilation & air conditioning (HVAC) equipment



## Commercial Customers:

We partner with some of our customers; however, most of these relationships are protected by non-disclosure agreements.

- Bell Helicopter
- Honeywell
- Bath Iron Works
- Lockheed Martin
- Polartec
- Boeing
- Michelin
- Siemens

## Government Customers:

### U.S. Navy

- NAVAIR
- Office of Naval Research
- Naval Surface Warfare Center
- NSWCDD
- NAVSEA

### U.S. Army

- AATD – U.S. Army Aviation and Missile Defense
- Letterkenny Army Depot
- Robert Morris Acquisition Center
- Picatinny Arsenal
- TACOM – ARDEC
- Weapons and Materials Research

### Air Force Research Lab

- Kirtland AFB
- Wright Patterson AFB
- Missile Defense Agency

### DARPA

### SOCOM

### NASA

### Langley

### Goddard

### Johnson Space Center

### Department of Homeland Security

### Department of Transportation

- Volpe Transportation Center

### Environmental Protection Agency

# about us

Midé Technology Corporation is a privately held company, headquartered in close proximity to the nation's premier high-technology research and development areas of Cambridge and Boston. Founded in 1989 by Dr. Marthinus van Schoor, a Ph.D. graduate of the Massachusetts Institute of Technology's (MIT) Department of Aeronautics and Astronautics, the company has, over the years, established a high-powered team of practical expertise. Midé maintains strong ties with MIT's School of Engineering. This relationship enables the company to remain abreast of the latest technological advances, thereby assuring our clients state-of-the-art solutions to their engineering problems.

## Management



### Dr. Marthinus van Schoor

Dr. Marthinus van Schoor (Founder, CEO and CTO) received a Ph.D. in Aeronautics and Astronautics from Massachusetts Institute of Technology, Cambridge, MA in March 1989. Dr. van Schoor has extensive qualifications and experience in a wide range of engineering fields. He holds several USA and foreign patents along with many publications in the area of composites and shape memory alloys. He has won and managed many advanced technology development programs for commercial companies, the US Department of Defense, and NASA. His designs are on commercial and naval ships, and currently flying on the International Space Station. Apart from his duties at Midé, Dr. van Schoor is also a part-time lecturer in the Aeronautics and Astronautics Department at Massachusetts Institute of Technology.



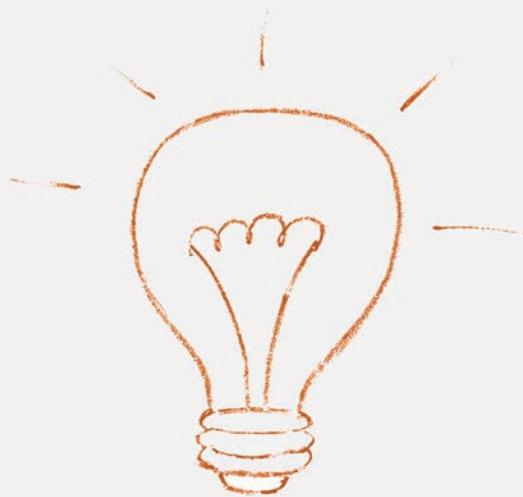
### Attila Lengyel

Attila Lengyel (President and COO) graduated from Purdue University, West Lafayette, IN with a Masters' Degree in Aeronautics and Astronautics in 1995 after completing his BS at the Massachusetts Institute of Technology. He is published in the field of aeronautics and astronautics and is the co-inventor on a number of U.S. Patents in the smart material field.



### Chris Ludlow

Chris Ludlow (VP of Engineering and CFO) received his BS in Aerospace Engineering from Boston University in 2002 and has been working for Midé ever since. He received his MBA from the University of Massachusetts Boston where he graduated top of his class in 2010. Chris focused his MBA studies on finance, marketing and product development courses to provide Midé with the best skills needed to commercialize its technologies. Chris has successfully used his degrees and experience to help Midé commercialize both SBIR and non-SBIR opportunities.



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