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## Examples of Industries Served

- Centrifuge Manufacturers
- Pellet Mill Manufacturers
- Heavy Machine Manufacturers
- Irrigation Equipment Manufacturers
- Tool and Die Manufacturers
- Food Service Companies
- Medical Equipment Manufacturers
- Medical Researchers



# Case Study

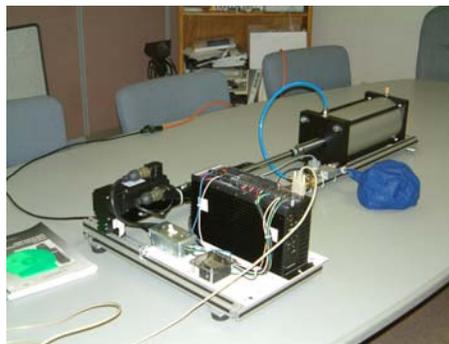
## Opportunity:

The radiological department of a local hospital approached Controlled Motion Dynamics with an unusual idea. They needed to be able to track tumors on the lungs of patients while the patients were breathing. Having this data would allow for more precise radiation treatment applications. With the existing system the operator would estimate when to apply the radiation based on spirometer readout (a spirometer is a device that measures the airflow in and out of a lung). The operator would watch the spirometer and decide when the lung was still or at rest and then would apply the treatment. The radiology department asked CMDI to design and build a device that would simulate a person's breathing based on actual patients' spirometer files. Lung simulation machines already exist for anesthesiologist training, but the cost was outside the budget of the department.

## Solution:

### *Design and Implementation:*

- Using a 6" bore by 12" stroke air cylinder (this approximately equals the volume of a human lung), a Dwyer pressure transducer, an Axiom Plus drive controller combo and a Tol-O-Matic RSA actuator, CMDI designed a machine to simulate a human breathing.
- CMDI used a combination of sequential logic and ladder logic in order to program the machine motion.
- CMDI programmed the operator interface with Visual Basic to be used on the existing computer system.
- When a file is downloaded and the simulation started, the RSA drives the cylinder in and out; this forces air into and out of the artificial lung. The lung will "breathe" in



the same way as the patient whose file was downloaded, allowing the doctors to observe the lungs' behavior in real time.

Using existing components and motion expertise, Controlled Motion Dynamics was able build a lung simulation device for a fraction of the cost of commercially available machines.