

Enerficiency

Utilizing Drone Technology to Improve Industrial Compressed Air Leak Auditing

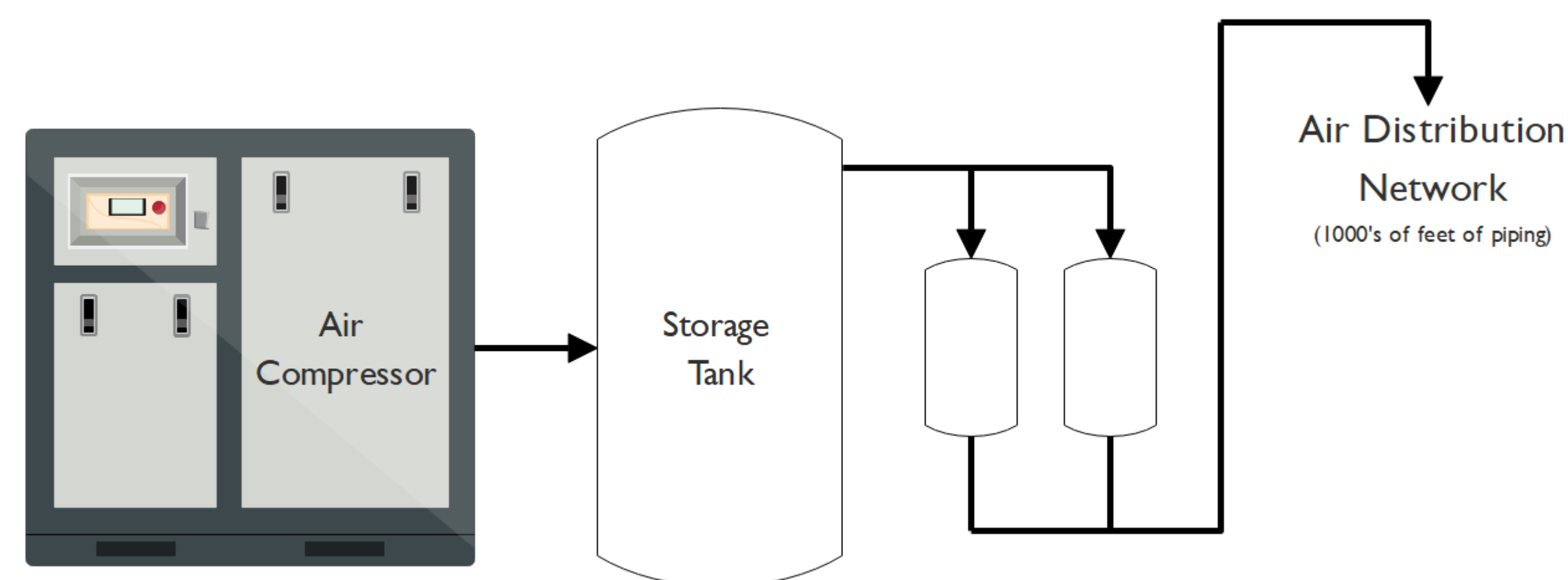
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Value Proposition

Enerficiency couples drone technology with its **leak detection and management software**. This makes it **easier and cheaper** for energy service providers to acquire and retain industrial customers for compressed air leak detection and repair services. In this way, we facilitate the reduction of energy waste in the industrial sector.

Relevance of Compressed Air

Compressed air is a key utility in industrial manufacturing facilities. **10%** of energy in the U.S. industrial sector is used to compress air. This compressed air is used as a pneumatic energy source to operate valves, instruments, and tools. A typical facility contains 1000's of feet of piping distributing compressed air from the compressor to the various end-users. This network of piping is prone to leaks – air leaks account for **20 - 30%** of energy consumption of compressed air systems in the U.S.



Research

We conducted **95 interviews** with industry experts, sales and technical staff at existing leak detection service providers, and management personnel at industrial facilities.

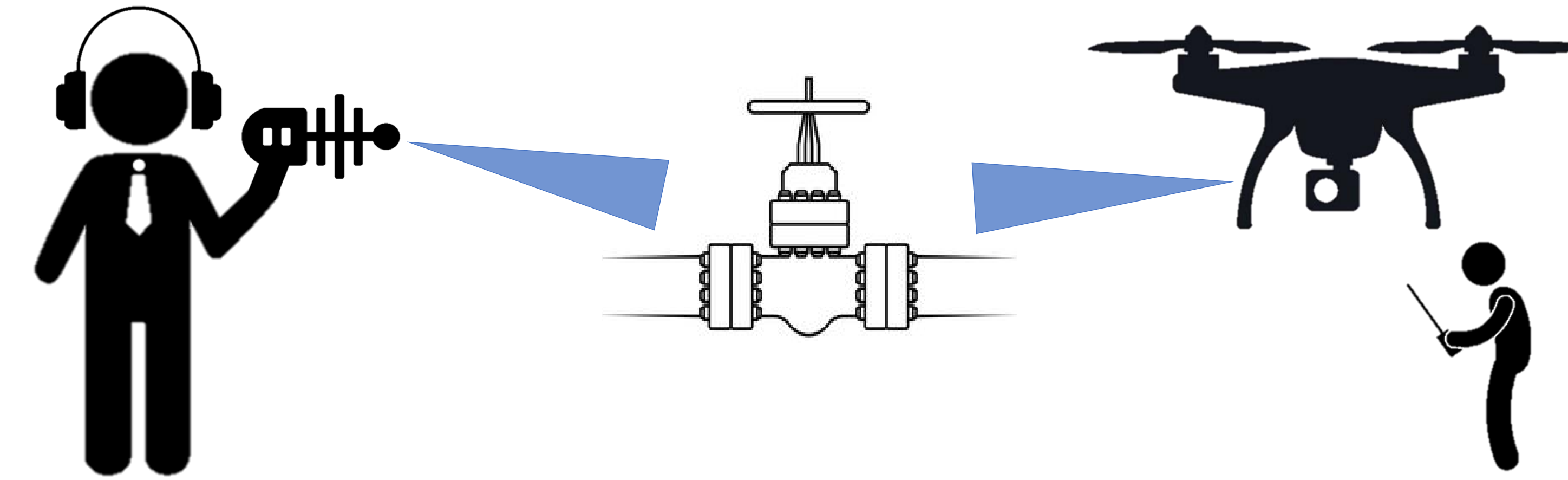
Key takeaways:

- **Duration** and **cost** of audit are key drivers of customer purchase decision.
- **Non-implementation** of leak management and repairs following an audit is high due to a variety of **economic, financial, and logistical** considerations.

Existing Auditing Process

A technician(s) walks around the manufacturing facility and searches the piping network for leaks.

The technician uses a handheld ultrasonic sensor to listen for and locate leaks with a point-and-aim technique. The technician must listen for leaks using headphones that are attached to the sensor.



The technician tabulates the leaks detected during the audit in a spreadsheet and physically tags leaks so that they can be located later for repair.

Typical Environmental & Financial Impact

Annual financial and environmental impact potential of air leaks at a typical mid-size manufacturing facility:

Financial Impact - \$70,000

Leak Size	# of Leaks	Annual Cost
1/32"	70	\$10,710
1/16"	50	\$30,700
1/8"	8	\$19,672
1/4"	1	\$9,839

Environmental Impact - 550 tons CO₂ equivalent



Equivalent to the emission of **117 cars**.

Enerficiency's Auditing Process

A certified drone pilot operates and monitors the drone to search the piping network for leaks.

The drone algorithmically locates and catalogs the leaks using the on-board ultrasonic leak detector and associated analyzer.

Enerficiency's software is used to pin-point leak locations on a 3D facility map. A facility operator then uses the map to find and physically tag the leaks.

Benefits of Enerficiency's Approach

Time savings – the algorithmic precision of drones allows audits to be completed in a fraction of the time compared to the fuzzy logic of a technician with a handheld detector.

Superior database management – 3D mapping and analytics capabilities of the software better enable development of leak management and repair programs than the traditional spreadsheet style database. Consequently, improving the post-audit implementation rate.

No need for backup – our audit process only requires one person – the pilot. The traditional process requires a facility employee to be present with the technician in order to advise location tag names for the spreadsheet.

Next Steps

Proof of concept - develop a **minimum viable product** and conduct a mock audit to validate the **technical and financial viability** of the idea.

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