About Searen

Searen leads in water processing innovation, performance, and cost-benefits for recirculating aquaculture system (RAS) fish farms, fish hatcheries, and shellfish producers. Searen makes and sells the patented VAL™ (Vacuum Airlift ™), chiefly in North America. VAL™ delivers superior results in three ways:

1. **VAL™ is the only technology that delivers superior biosecurity by combining water processing, fine particulate extraction, and gas exchange in a single device**. Via higher biomass throughput**,** it delivers healthier livestock, higher yield, and reduced risk of poor taste and human illness.
2. **VAL™ uniquely protects the environment**. It improves air quality inside processing plants by venting to the outside. By capturing and sealing pollutants while doing so, it also protects the outdoors.
3. **In both new and retrofit installations, VAL™ delivers higher profits multiple ways**:
   - Lowers capital spending up to 80% by handling multiple functions and eliminating external pumps.
   - Cuts operating costs up to 80%; eliminates consumables, complexity, moving parts contacting water. A low head system with low air/water exchange, it limits water heating/cooling, cutting energy use.

Background

Searen was founded by French aquaculture expert Emmanuel Briquet to market VAL™ water treatment technology in North America. Briquet has 30 years of fish farm operating experience, long relationships with VAL's™ French developers, and an American wife who drew him to the U.S. Searen was granted exclusive rights to VAL™ patents in North and South America and has since earned additional patent claims of its own.

Searen has five active North American projects (four in aquaculture, one in groundwater remediation) and 2019 revenues of $240,000. Current prospects have the potential to double revenues in 2020. A marketing program planned to launch in summer 2020 would raise the estimated run rate above $1,000,000 by spring 2021. Planned new product and service offerings (below) would add materially to revenues. (N.B.- As a food industry sector, aquaculture facilities have remained operational throughout the Covid-19 pandemic.)

Market Overview

Aquaculture is a $4B+ U.S. industry. In Asia-Pacific, where it is older, the market is many times larger. Demand for healthy, low cost protein has produced a five-year industry average growth rate of 12%. The estimated market for the VAL ™ is > $300MM, in three principal segments:

- Hatcheries that provide seedlings to fish farms.
- Land-based Recirculating Aquaculture Systems (RAS)
- Shellfish (clams, crabs, lobsters, mussels, oysters, shrimp, etc.)
- The target market importantly includes designers, distributors, and integrators of operating systems.

Unique in aquaculture, multi-function VAL™ quickly improves efficiency, durability, and cost:
- By replacing multiple single-function systems in existing land-based farms
- When designed from the start into new farms instead of single-function systems.

Technology Overview

In hatcheries, VAL™ removes undesirable gases through fine bubble gas exchange and vacuum extraction. Injecting oxygen into the processed water stream raises oxygen levels to ensure healthy, energetic fry. An airlift pump, VAL™ eliminates the need for separate pumps and consumes low pumping energy. Both are key cost benefits.

In RAS, VAL's™ foam fractionation (flotation or protein skimming) injects fine air bubbles into water.

- Micron-sized air bubbles attach to surface-active particles and carry them to the free surface forming a concentrated foam layer that is then removed.
- Unlike other means, this allows removal of particles < 40 μm producing high quality water.
- Micro-particle extraction makes this an effective biosecurity tool extracting bacteria, viruses, toxic micro-algae, parasites and off flavor producing compounds.

Searen hatchery, RAS, and shellfish case histories and technical white papers are available on request.

Intellectual Property

Vacuum Airlift™ technology was created and patented by IFREMER, a French research institute that conducts cutting-edge research in sustainable development and ocean science. It granted Coldep SAS an exclusive global license in 2011. Searen gained an exclusive sub-license for the Americas in 2013.

Vacuum Airlift™ technology is patent protected in the United States and Canada. A patent is pending in Brazil. Searen's has exclusive use of U.S. patent 7,771,515 and all future U.S. patents associated with the Vacuum Airlift™. The sub-license grants Searen freedom of market selection, local manufacturing, and authoring and ownership of new patents developed by Searen R&D.

The U.S. patent is approved for 20 claims and a continuation was recently filed for 20 more. Searen has identified and trademarked vacuum airlift nomenclature including VAL™ and Vacuum AirLift™.

Products and Manufacturing

Over 100 units have been installed worldwide, mostly by Coldep in Western Europe. Searen customers are in California, Arizona, Utah, Iowa, Florida and Ohio. Active prospects are in upstate New York, Virginia and Calgary, Canada.

The six VAL™ models vary chiefly by capacity (45 to 6,600 gallons per minute). These fiberglass units are produced by a Moroccan composites manufacturer that also makes them for Coldep, and in Nova Scotia, Canada. Additional capacity is available in Oxnard, California.

Team

Emmanuel Briquet (CEO) has over 30 years experience in sustainable marine production, including the founder of Provence Aquaculture (www.provaqua.com), the first certified-organic fish producer in the Mediterranean. He lead's Searen's sales efforts and is liaison with the patent holders and manufacturers. He moved to the U.S. to found Searen in 2012, following marriage to his American wife.

John Brooks (CFO) has extensive financial management and sales experience in software and commercial real estate. He received an MBA from the Carlson School of Management (University of Minnesota) prior to joining Searen.

Tom Andrews (CTO) joined Searen in 2015 with 30+ years of technical design, engineering management, and business development experience at companies including Rockwell International and Westinghouse. He has a master of mechanical engineering from Cal State Fullerton and a master's degree in electrical engineering from the University of Southern California.