



DOE SBIR/STTR SUCCESS

OPTIMAL SOLUTIONS INC.

While working at GE Global Research as a chemical engineer and interfacing with large chemicals companies such as GE Plastics (now known as SABIC), Dr. Vijay Hanagandi had a business idea. He realized that hundreds of millions of dollars could be saved by companies that produce and ship large quantities of any type of product by optimizing production and transportation simultaneously – in a single step instead of relying on heuristic approaches and common logistic practices.

“Manufacturers who operate large supply chains” Dr. Hanagandi says, “have one common objective—they want to use the minimum amount of money per pound of product when bringing the product to the market”. This might not seem like a difficult task, but in reality there are so many aspects to consider. For example, one can save a lot of money by deciding

FACTS

PHASE III SUCCESS

At the end of Phase II OSI's products have been implemented in industrial applications at FORTUNE 500 customers. The projected ROI is 5X the DOE SBIR investment in 5 years.

IMPACT

OSI's software, DaRRT™ can change the game for large supply chains enabling 5% cost savings by using optimization technology to produce and distribute products efficiently.

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where to fill up on diesel and calculating the shortest route that serves the most clients, factoring in traffic, terrain, and weather. But this is just one part of the story. Conversion of raw materials into products has many cost tradeoffs which can be optimized for the best raw materials and energy utilization. Also, storage can be very expensive and a company can be more profitable when producing just the right amount of product clients request in real time.

Optimal production, inventory, and distribution decisions can be achieved only when the composite production and distribution problem is solved simultaneously. Being able to do this requires a complex mathematical model that takes in account the many variables involved, such as production and storage costs, variations in energy and gasoline costs with time and location, real-time traffic, and weather data, as well as telemetry data for monitoring product inventory at customer locations. This is why shortly after leaving GE to found his own company, Optimal Solutions, Inc. (OSI), Dr. Hanagandi hired computer scientist Paul Miller to develop an innovative piece of software capable of handling all the needed variables and yielding an optimal logistic solution in real-time.

However, full development of the software, which is today marketed under the trademark DaRRT™, needed substantial R&D and plenty of time on High Performance Computing (HPC) platforms in order to run the optimization routines and get results near real-time. This is precisely the opportunity OSI received when Dr. Hanagandi won two SBIR Phase I awards with the Department of Energy (DOE) and the National Science Foundation (NSF), and a subsequent Phase II SBIR award with DOE, starting in 2011. “The Phase II DOE SBIR grant gave us the unique opportunity to explore the development of cutting-edge optimization models and solution algorithms to jump start our software development” Dr. Hanagandi said, “something that would have been very difficult to achieve without the SBIR program”.

Fast-forward to 2018, OSI has sold its first license of DaRRT™ to a large industrial gas company with a presence in over 50 countries. After this initial deployment, OSI aims to negotiate a global license for DaRRT™ with this customer. During initial testing, DaRRT™ has demonstrated over 5% savings in fuel consumption, which is a game-changer in this industry. DaRRT™ runs 1000 times faster on HPC hardware when compared with standalone servers. OSI’s algorithms can also run much faster on regular corporate servers for many industrial size problems. DaRRT™ can be readily adapted to other industries like production and distribution of chemicals, petroleum products, metals, and cement. OSI’s achievements are particularly impressive considering that they are linked to just one DOE SBIR Phase II project, which ended in 2016.

Optimal Solutions, Inc. products have been implemented successfully in real-life industrial applications at some of its FORTUNE 500 customers. In this journey to develop DaRRT™, OSI partnered with FICO – the maker of XPRESS optimization solver – a partnership that has helped the development of DaRRT and brought it closer to marketplace success.

In OSI's current installation, the company’s return is expected to be 5X the DOE investment spread across a 5 year period with two multi-national clients. The total revenue will be significantly higher as DaRRT gathers street credibility and OSI sells it to other industrial gases customers and to customers in other verticals.

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