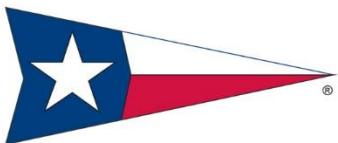


TruNavigator and OptiSolv

Stochastic Optimization in a Probabilistic Simulation Environment

LONE 
STAR ®

THE RIGHT ANSWER

TruNavigator and OptiSolv

Stochastic Optimization in a Probabilistic Simulation Environment

Probabilistic simulation with integrated stochastic optimization is the current pinnacle for predictive and prescriptive analysis. Traditionally, probabilistic simulation and optimization have been separate disciplines, with differing solutions addressing each area of need, due to the complexity and computational intensity of the approaches. Today, these two approaches can be used together with powerful results. Blending probabilistic simulation and stochastic optimization offers important breakthroughs in managing business and technical challenges.

We offer two key definitions to help frame the balance of this paper:

Probabilistic Simulation – An automated model that incorporates uncertainty through the representation of inputs as distributions, not deterministic data points, and utilizes approaches such as Monte Carlo methods to determine the likelihood of occurrence of an outcome. Simulations can include scientific simulations, engineering simulations, signal processing simulations, conflict simulation, business simulation and many others. These simulations can be useful for business analysis, risk modeling, system modeling, and enterprise simulations, among others.

Stochastic Optimization - Stochastic Optimization refers to maximizing or minimizing a mathematical output when one or more relevant variables are represented stochastically. Most early optimizers required deterministic mathematics. Non-linear stochastic optimization, especially in a scalable form, is difficult. Lone Star is one of the few organizations who has addressed this issue.

How TruNavigatorSM Integrated with OptiSolvTM Can Best Meet this Critical Area of Need?

Probabilistic Simulation Optimization

For a number of years, software for probabilistic simulation optimization has partially addressed this need. A handful of Microsoft Excel plug-ins and proprietary software applications enabled limited capability and were quite slow due to processing limitations and inefficient approaches, even when applied to relatively small efforts.

Often such applications were left to run for hours or days. Complex strategic or operational decisions faced by large organizations have been difficult and expensive to solve, requiring teams of experts, big development budgets, and many months or years of time.



This is where Lone Star's TruNavigator with OptiSolv stands out from competing alternatives. TruNavSM offers next generation capabilities for analyzing and solving business issues and decisions in the presence of complexity and uncertainty. It finds optimal solutions in seconds or minutes, where others may take hours or days, if they can solve them at all. And, it can optimize models with thousands of decision variables, all stochastic - unthinkable for the other solutions.

TruNavigator with OptiSolv achieves these remarkable results because it incorporates advanced computational efficiency leveraging 21st century processors, and, because it is based on advanced numerical methods.

Model Analysis

The advantage of probabilistic simulation optimization is that it assumes virtually nothing about the structure of the model to be optimized. The optimizer does not constrain whether uncertain parameters may depend on decision variables. The objectives and constraints may be non-linear or non-convex functions of the variables.

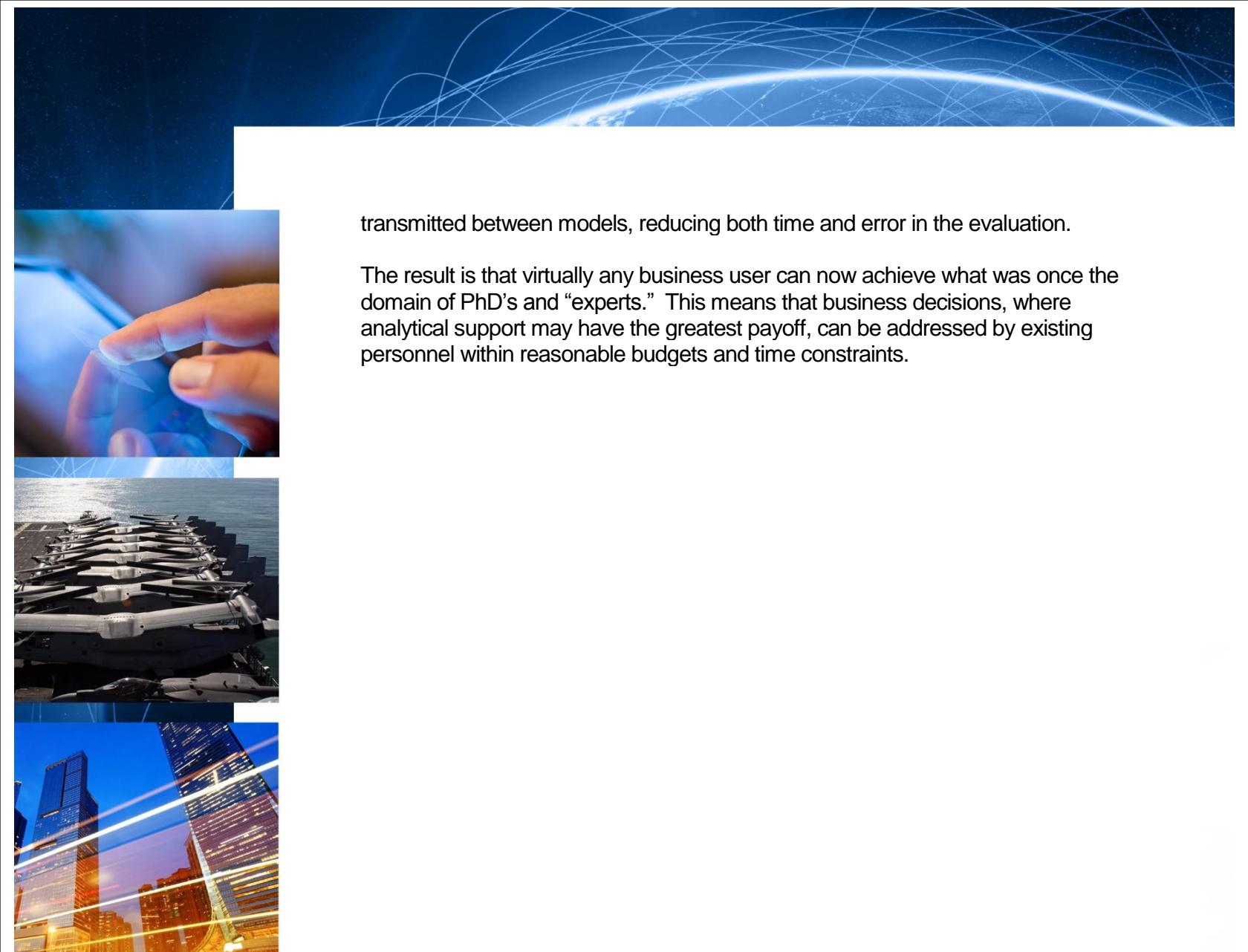
Earlier approaches have significant limitations in the realm of optimization. Frequently, when highlighting their capabilities, they use examples, which when further explored, were nothing more than linear models that required basic sampling methods to solve.

In TruNavigator with OptiSolv, Lone Star's solution offers by far the highest performance probabilistic simulation optimization to date. It is designed to address both linear and non-linear issues and is capable of optimizing across multiple dimensions. Lone Star's solution is driven by transparent inputs that ensure no "black box" optimization formulas. OptiSolv does more than just find the optimum solution. It evaluates and identifies the model structure to optimize the portion of the model that is impacted by the affected decision. This approach ensures effective and efficient results that are explainable to key decision makers.

Ease of Use

In the past, defining probabilistic simulations and optimization models with uncertain parameters and chance constraints has been the province of experts. However, even most PhDs in Operations Research and decision science have only heard of these methods. Few have used them to solve practical problems. TruNavigator with OptiSolv resets the analytics market. Models with all the features described in this paper can be architected easily and rapidly designed, ultimately leading to real world solutions achieving optimal results.

Uncertainties are inherently defined in the TruNavigator modeling approach, and in a manner fully compatible with the OptiSolv optimization engine. This approach enables the easy evaluation of virtually any strategic or operational issue that is driven by uncertainty. In addition, the graphic nature of TruNavigator and how the information is processed means that users don't need to know programming or complex mathematical formulas. The integrated nature of the applications ensures that no data needs to be



transmitted between models, reducing both time and error in the evaluation.

The result is that virtually any business user can now achieve what was once the domain of PhD's and "experts." This means that business decisions, where analytical support may have the greatest payoff, can be addressed by existing personnel within reasonable budgets and time constraints.



Lone Star Aerospace, Inc.
4555 Excel Parkway | Suite 500
Addison, TX 75001
Tel: 972-690-9494
Fax: 972-690-9495

National Capital Region Office
1800 Diagonal Road | Suite 600
Alexandria, VA 22314
Tel: 571-366-1710
Fax: 703-647-6009

Patuxent River Office
44425 Pecan Court
Suite 125
California, MD 20619
240-718-8963

www.lone-star.com