Vayu Theory: Addressing Uncertainty with Science and Control Inputs

By Jim Kiles with Reginald Beer, August Kiles, Patrick Hompe & Gelu Vrabie July 10, 2020

Vayu performs computations on complex data from natural and industrial processes at every point in time based on all relevant accessible data from earlier points in time.

When a system exhibits uncertain, changing conditions, each point in time corresponds to an instantaneous but evolving "state of affairs". Each instant in time for each control surface exists in a unique state because of what previously happened and what will impact the state of affairs at every future point in time for that surface through memory of the system.

Vayu is based on the simple premise of identifying a relevant state of affairs at as many known, specific points in time as possible, then applying accepted scientific theory coded in algorithms to all the relevant historical data to develop a predicted state of affairs at future points in time. Vayu then identifies whether a preferred future optimal dataset could exist and, if so what control inputs would cause the preferred result and bring about an optimized state of affairs.

Vayu then simulates the success of the proposed control input and its impact on future system performance for the forecast time period. High performance computing allows Vayu to run millions of calculations on all known datasets to compute the control inputs that will bring about the optimal system characteristics and the process begins again, updated with a new data from the evolved system inputs.

Key to the Vayu process is the existence of advanced scientific theory and algorithms about the specific system conditions, an understanding of preferred (optimized) results, and a set of potential control inputs that can bring about the known optimal results.

Finally, Vayu then assesses performance of its process to quantify the success of the specific implementation. This enables the final key Vayu step, the refinement of the driving formulas for more accuracy in achieving optimal results.