

A Young Engineer's View of System Architecture & Design

"If you can't measure something, you can't design it"



■ By Jehanzeb Noor

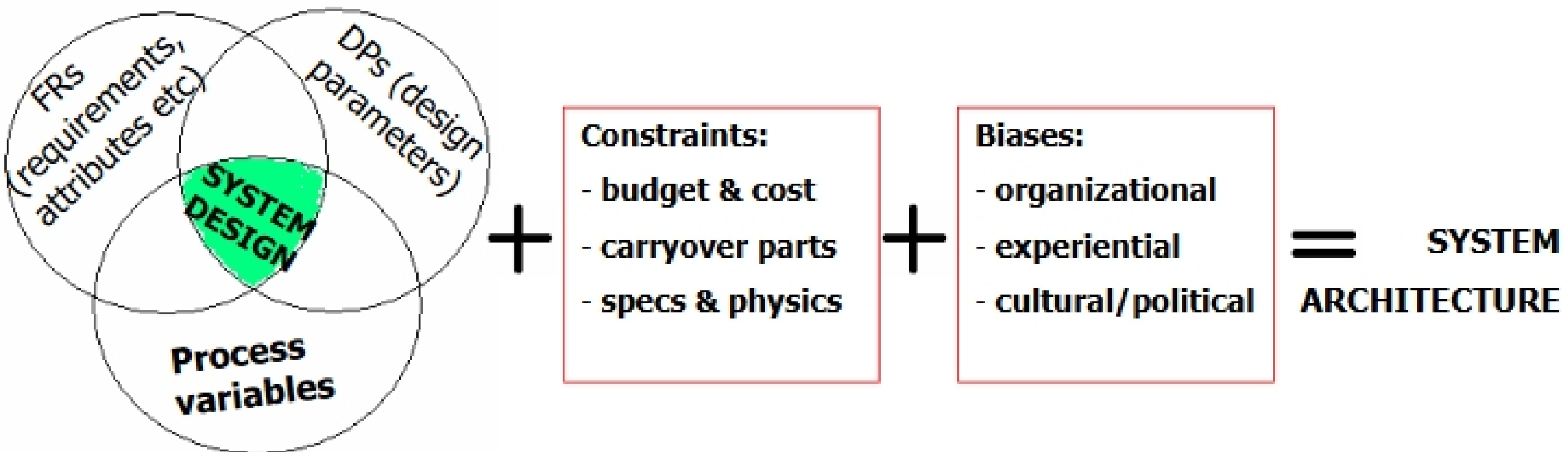
- S.B. MIT '04 (mechanical engineering/finance)
- Work: trading, machine design, ship propeller design
- Research: closure systems design/attribute conflicts
- S.M. Mechanical Engineering (automotive industry) '07



Defining System Architecture

- Characteristics that define the functional, spatial, dynamical, informational, and energy transferal relationships for components to enable system-level designs and analyses
- Thought: mechanical designs highly coupled and complex
- Approach: some designs can be broken down to modules. Most functional requirements depend on many components
- Most MechEs would agree that most problems are hard as many requirements need to be satisfied by few components
- Good/elegant designs reduce redundancy, achieve robustness to variations, optimize system-level attributes
- Cross-disciplinary and on-the-field experience is important
- Process standardization and challenging legacy are big deals

Architecting a Complex System



- Architecting a system is an iterative and lengthy process
- In the world of engineering practice, system architecture entails firefighting or rework (bad design and complexity)
- Tools: Design structure matrix, network, datum flow chain