



# Spreading the Safety Driven Design Idea Virus

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Disclosure



**Honeywell**



GE  
Energy



**Medtronic**



sasol  
reaching new frontiers



**ConocoPhillips**

**ExxonMobil**

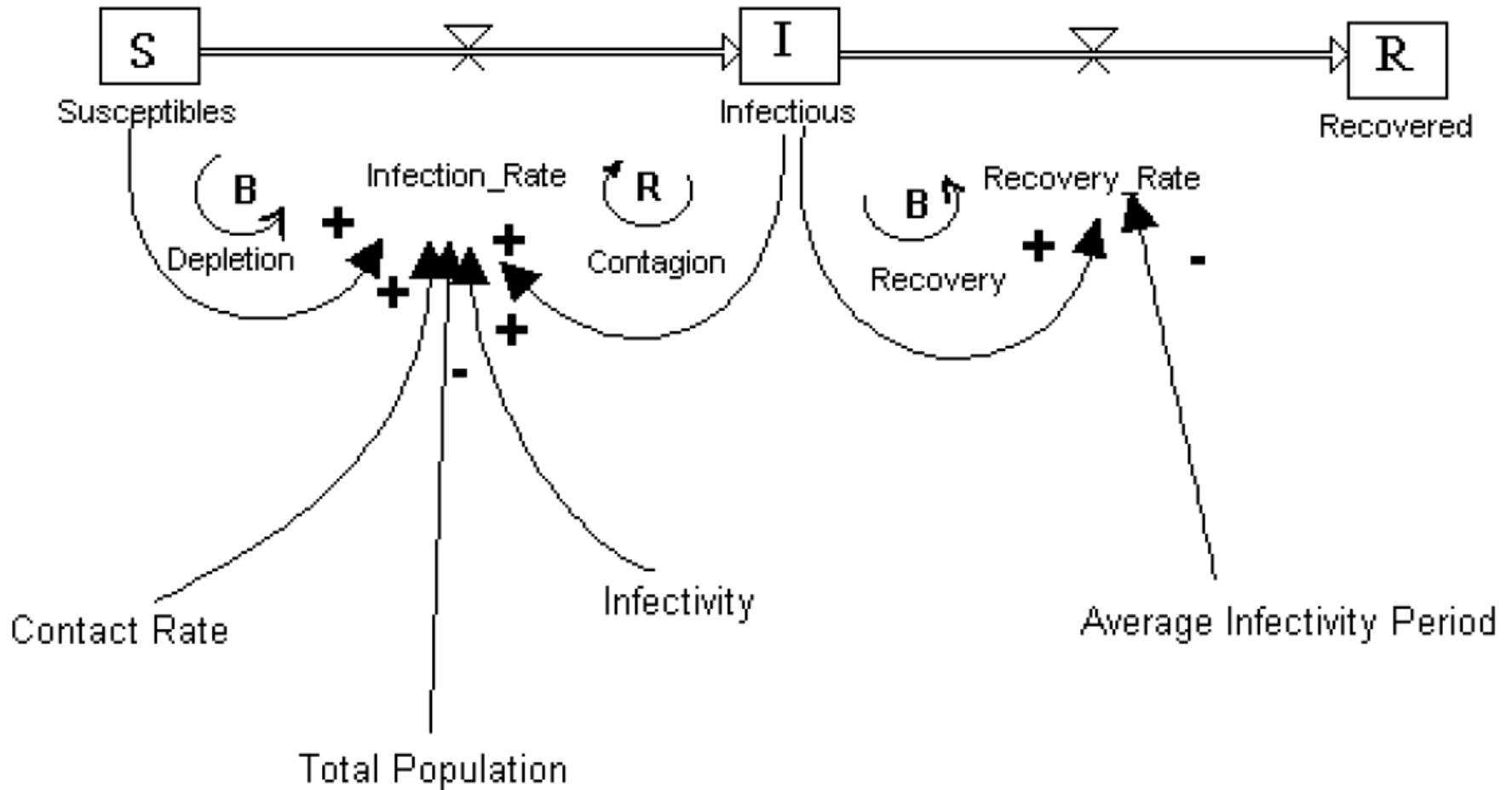


ALCOA



**Synocrude**

# Causal Loop Diagram: Spread of a Virus



Source: Burns & Musa: Structural Validation of Causal Loop Diagrams—July 2001, Atlanta SD Conference

**Spread Rate = Contact Rate x Virulence  
x (Susceptibles + Infecteds + Resistant)**

# Spreading the Safety Driven Design Idea Virus

1. *Really know your stuff*
2. *Enlist Infecteds*
3. *Maintain high Contact Rate*
4. *Increase Virulence*
5. *Help Susceptibles*
6. *Understand Resistors*

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**x (Susceptibles + Infecteds + Resistants)**

# 1. *Really know your stuff*

- You are Infected #1
  - Comes naturally to control engineers
  - Comes with <<painful>> experience
  - Easier for iNtuitives
- Be prepared
  - History of safety
  - Safety driven design and its alternatives
  - Organizational change dynamics
  - See Appendix for References

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## 2. *Enlist Infecteds*

1. Get Leadership support or at least permission
2. Choose the right Vector:
  1. Concentrate: Godin's "Hive"
  2. Then Spread: Godin's "Sneezers"
3. Gladwell's Connectors, Mavens and Salespeople

$$\text{Spread Rate} = \text{Contact Rate} \times \text{Virulence} \\ \times (\text{Susceptibles} + \text{Infecteds} + \text{Resistants})$$

### 3. *Maintain high Contact Rate*

- Choose the right place to start
  - Help out a project
  - Find project where not too late to apply
  - Couple the STPA “caboose” to a corporate initiative “train” which has already left station
- Be persistent, it can take a long time to introduce a new way of thinking about things
  - Initially focus on just the concept
  - Practices and rigor will come later

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## 4. Increase Virulence

- Make it easy to spread
  - Avoid lingo – may need to translate
  - Metaphors – even poor ones – may be necessary
  - Give examples / counterexamples
- Use stories initially
  - Short
  - Memorable
- Later, use other media
- Perfect is the enemy of the good

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## 5. *Help Susceptibles*

- People who are most prone to be infected
- Those whose resistance is low (potential for acceptance is high)
- What they're currently doing isn't working
  - Project
  - Initiative
  - Program
- Recent or imminent accident

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## 6. *Understand Resistants*

- For many, hard to “see”:
  - Myers-Brigg
  - Sinclair’s Law
  - Misaligned inputs or objectives
- Help them see:
  - Model Based Development, Simulation
  - Examples from other domains
  - Understand the cognitive biases at play
  - Empathize

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# Specific Activities

- Demonstrate (if true) that your domain has changed
  - Role of software and humans, component interactions
  - Techniques which were successful in the hardware world may not be successful in software and wetware worlds
    - Perrow's normal accident theory
    - Boiler example
    - Complexity cliff
    - Organized complexity
  - It's not the pilot's fault
- Integrate with modeling and simulation
- Quantify safety and other emergent properties
- Sometimes you have to go outside to affect the inside
  - Presentations at internal and external venues
  - Bring in experts / consultants: Nancy Leveson, her students, or Safeware
  - Plenty of examples from other domains which others will appreciate

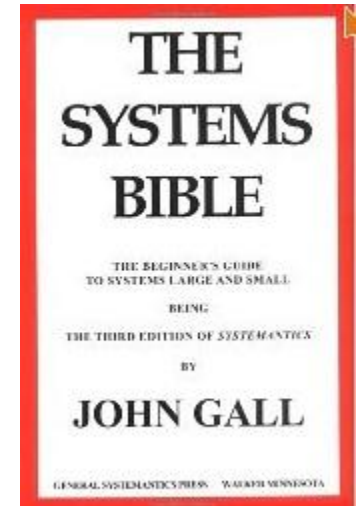
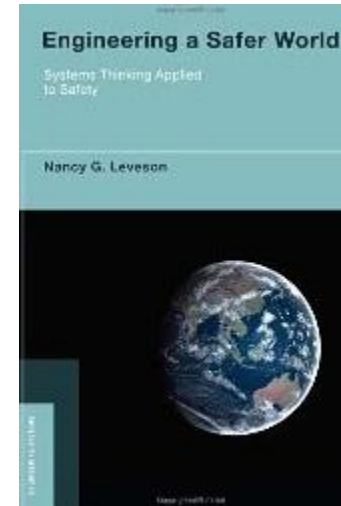
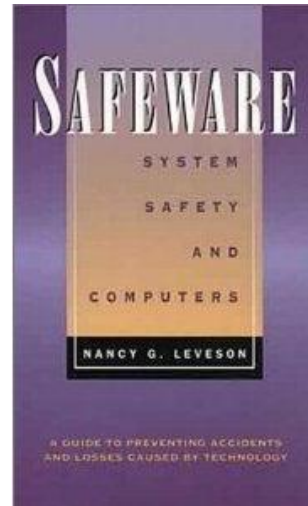
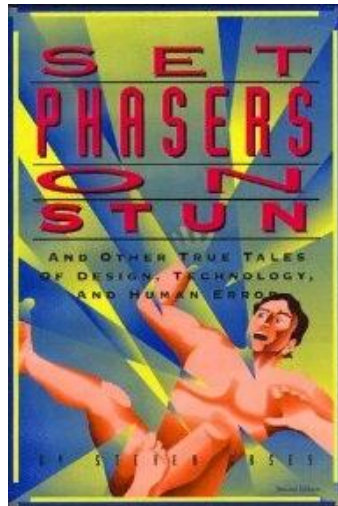
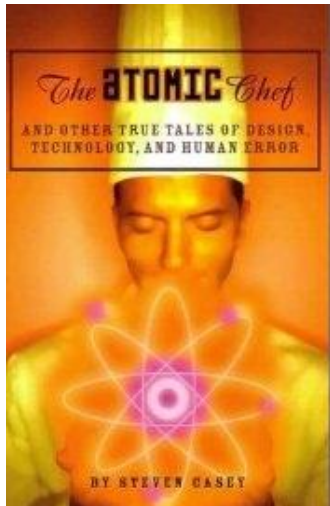
## *Is it worth it?*

“Nobody spreads an ideavirus as a favor to you. They do it because it’s remarkable, thought-provoking, important, profitable, funny, horrible or beautiful. If your idea doesn’t become a virus, it’s most likely because it didn’t deserve to become a virus.” – Seth Godin



# Recommended Reading – System Safety

1. <http://sunnyday.mit.edu>
2. “The Atomic Chef” and “Set Phasers on Stun” by Steven Casey
3. “Safeware” and “Engineering a Safer World” by Nancy Leveson
4. “Systems Bible” by John Gall



# Recommended Reading – Organizational Change

1. “Gunfire at Sea – A Case Study in Innovation”, by Elting Morison
2. “Unleashing the Ideavirus” by Seth Godin
3. “The Tipping Point” by Malcolm Gladwell
4. “Change the Way You Lead Change” by David Herold, Donald Fedor
5. “The Heart of Change” by John Kotter, Dan S. Cohen

