

# Counter-Deception Decision Support

**Dr. Frank Stech &  
Dr. Chris Elsaesser**  
**703-983-5920 • [stech@mitre.org](mailto:stech@mitre.org)**

MITRE Sponsored Research

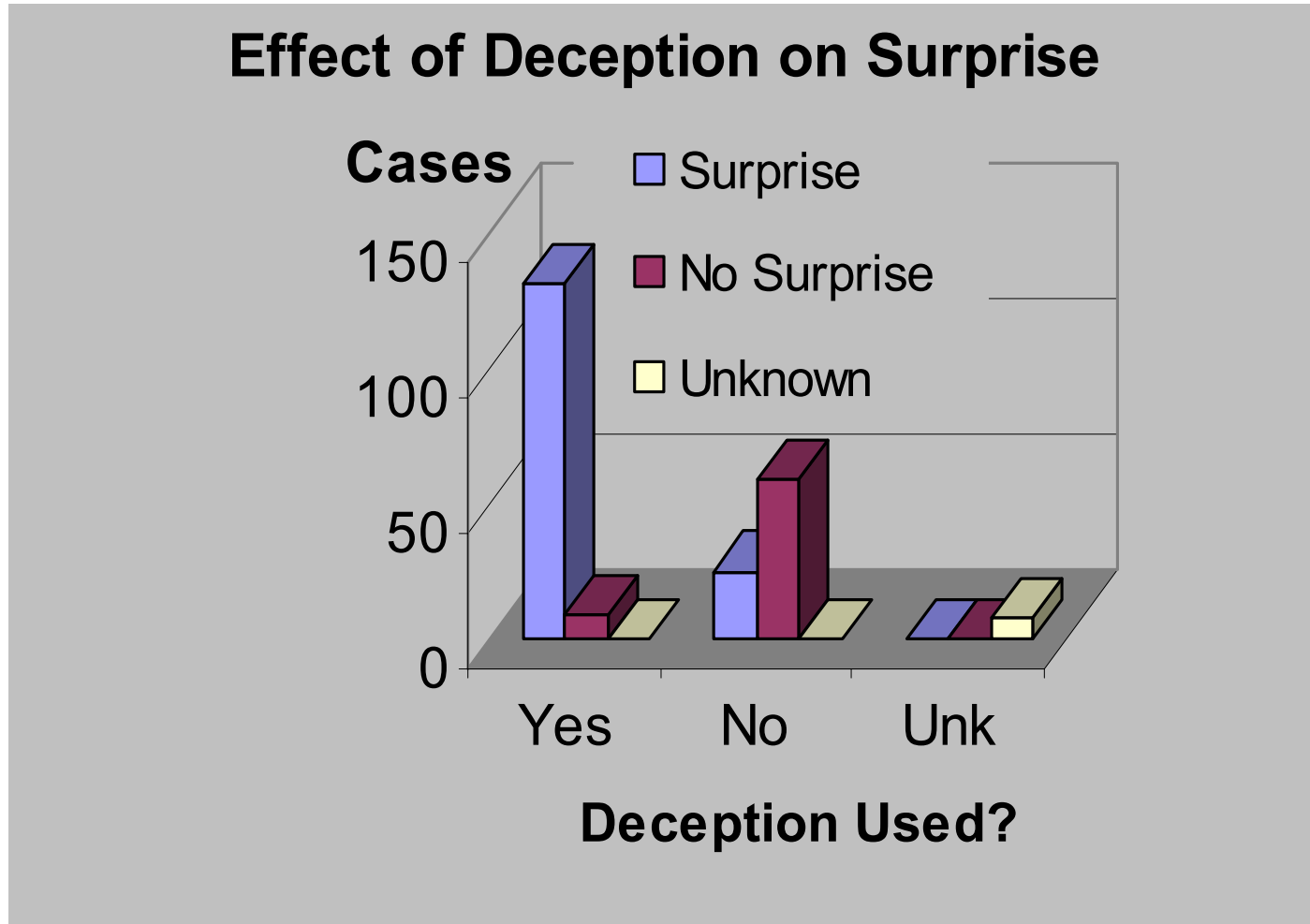


**MITRE  
Technology  
Program**

# Problem

- Recent, spectacular failures to recognize deceptions:
  - Iraqi WMD development
  - Indian & Pakistani nuclear tests
  - Operation Allied Force
- Counter-deception (C-D) tradecraft:
  - Unsystematic
  - Counts on technological sensors and perception
    - “crown jewels and silver bullets”
- Deception and counter-deception are *cognitive*, not perceptual, phenomena
  - The problem is *analysis*, not sensing

# Background



**Source:** Barton Whaley, *Stratagem: Deception and Surprise in War*.  
Cambridge, MIT Center for International Studies, 1969.

# Objective

- **Combine psychology of decision making with theory of deception**
  - Deception taxonomy
  - Deception cognitive model
  - Cognitive limits and decision biases to yield a psychological framework with corresponding deception tactics.
- **Make framework operational**
  - Automatically generate deception hypotheses
    - counterfactual reasoning
    - assumption-based planning
    - temporal reasoning
  - Bayesian belief networks to monitor hypotheses

# Activities

- **Catalog relevant cognitive limits and biases based on review of the literature**
- **Develop**
  - **Deception taxonomy**
  - **Deception cognitive model**
- **Adapt off-the-shelf tools to implement the cognitive model**
- **Create a decision support system**
- **Experiment with verification and quantification of decision support capabilities**

# Highlight

Goal: Evidence-weighted Estimation  
Support + Estimate Debiasing

Deception Evidence Interpretation & Hypothesis Generation

Evidence Filter Framework

Collection Limits

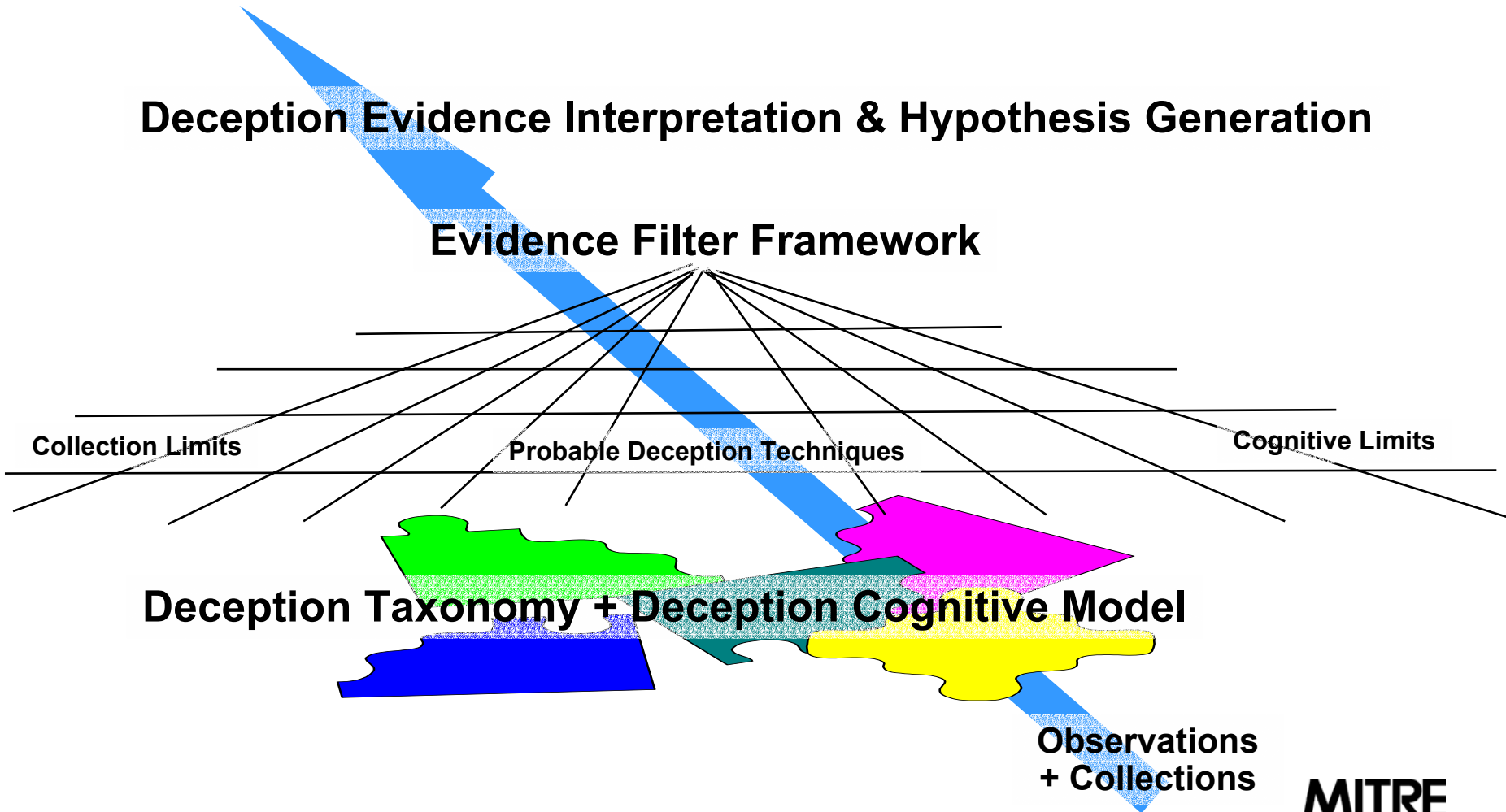
Probable Deception Techniques

Cognitive Limits

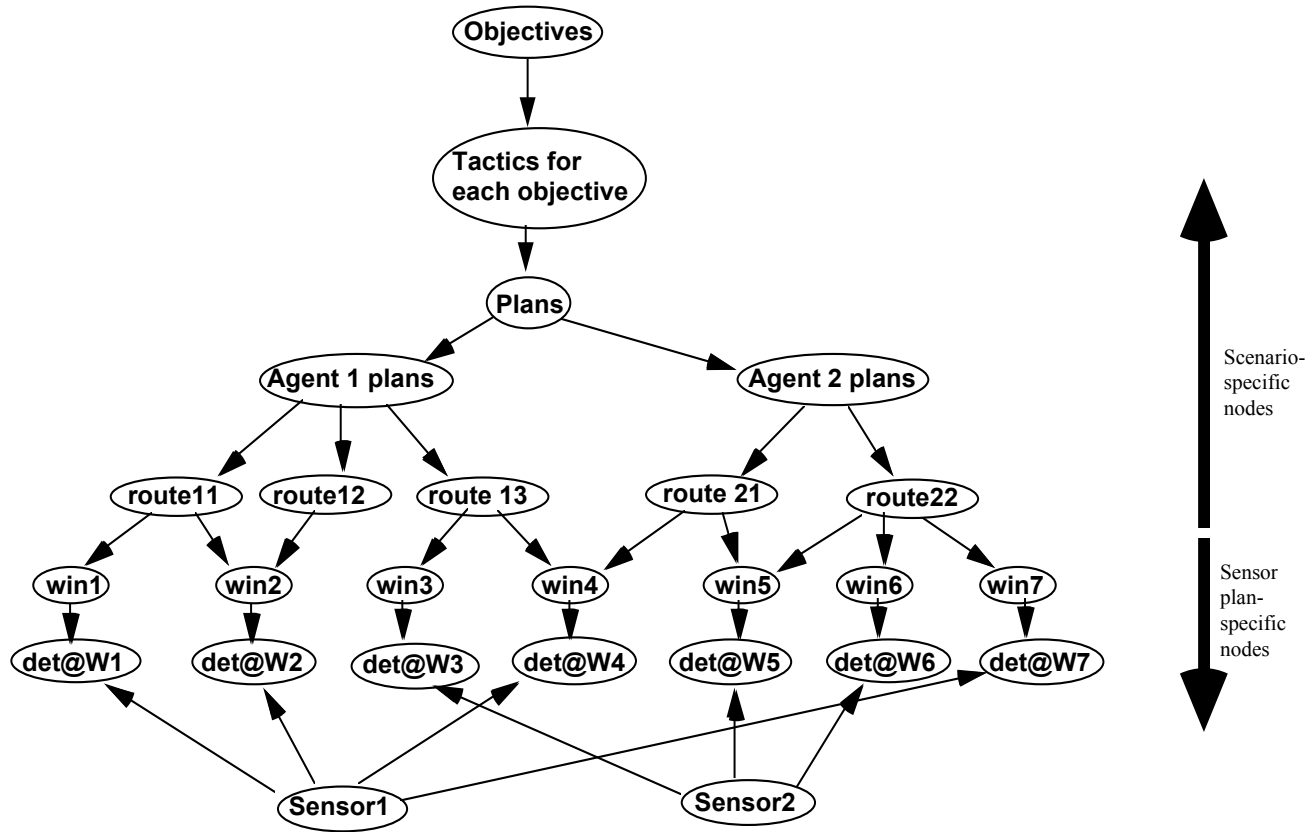
Deception Taxonomy + Deception Cognitive Model

Observations  
+ Collections

**MITRE**



# Demonstration

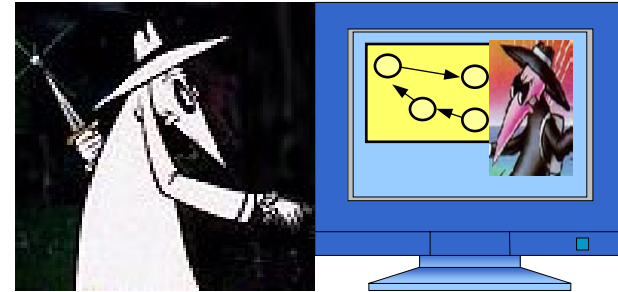
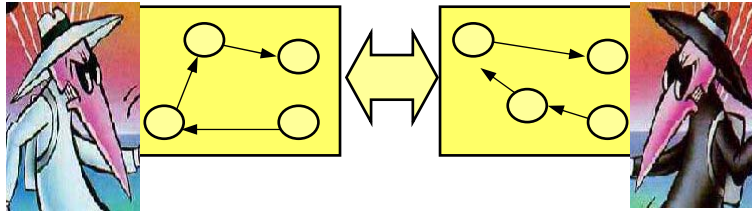


Automatically generated Bayesian network

# Impacts

- **Counter-Deception Community:**
  - Denial and deception taxonomy for intelligence analysis
  - Psychological & process model of counter-deception analysis
- **Analytic Community:**
  - Link denial and deception methods to limits and biases of cognitive processes
  - Counter-deception decision support
- **Information Operations Community:**
  - Air Force: Deception planning support system
    - IO Planning Tool ACTD (AFIWC)
- **Treasury/IRS/Customs: Fraud detection, financial laundering, sting planning, counter-smuggling & contraband operations**

# Future Plans



- **Modeling:** Taxonomy + Cognitive Model + Cognitive Limits & Biases → Deception Framework
- **Computation:** Identify meaningful/non-meaningful observables that do/do not distinguish courses of action
- **Experimentation:** test ability to reliably generate and recognize deceptions