

Dynamic Resilience: High Reliability Organizing from the Ground Up

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Daved van Stralen, M.D.

Department of Pediatrics
Loma Linda University of School of Medicine
San Bernardino County Fire Department
San Bernardino, California

Former Paramedic, Los Angeles City Fire Department

dvanstralen@ahs.llumc.edu







Esparanza Fire, California

10-26-06

■ Engine 57

- Mark Loutzenhiser, 43
- Jess McLean, 27
- Jason McKay, 27
- Pablo Cerda, 23
- Daniel Hoover-Najara, 20

- All decisions are right
- Every decision is one I would make

What is the Problem?

- What is the threat to your organization?
- Who first knows that threat?
- How does the information flow?

- Observer (watches attentively)
- Participant (takes part, shares experience)
- Participant (required to participate)

Concepts



Situation

Concepts



Situation

Science

- As development of knowledge
 - From the general to the specific
 - From the specific to the general
- As applied knowledge
 - Applied to the unknown

- Descriptive: tells us what we do
- Prescriptive: tells us how to do it

Naturalistic Systems

- Many systems derive from social-technical (Naval aviation, chemical plants); what comes can be thought of and planned for.
- Fire, law enforcement, medicine derive from the environment; you must take what comes (anything can come) with what you have and resolve it.

Naturalistic Systems

- All emergencies end
- Who gets credit for management?
- What defines success?
- What defines performance?
- For a 20,000 acre fire- could it have become a 40,000 acre fire or could it have been a 10,000 acre fire?

Gary Provansal, Div. Chief, San Bernardino County FD

- Reductionism
 - Engineering approach
 - Methodology for study
- Ontology
 - The nature of being
 - Holistic, how the parts work together

Resilience

- Ability to recover quickly with the same shape or position
- Our borders define us; our roots nourish us

The problem of command

Lt. Commander Dudley Knox, USN, 1915

- Time pressure
- Grave threat
- Great responsibility

Leadership

■ Problem solving

Racquel Calderon, RRT, Totally Kids Specialty Healthcare

■ Risks and Threats

■ Protection from threats

- Social
- Physical
- Physiological

High Reliability Organizing

From vulnerability comes the ability to engage the uncertain, time-dependent threat

You do in an emergency what you
do every day.

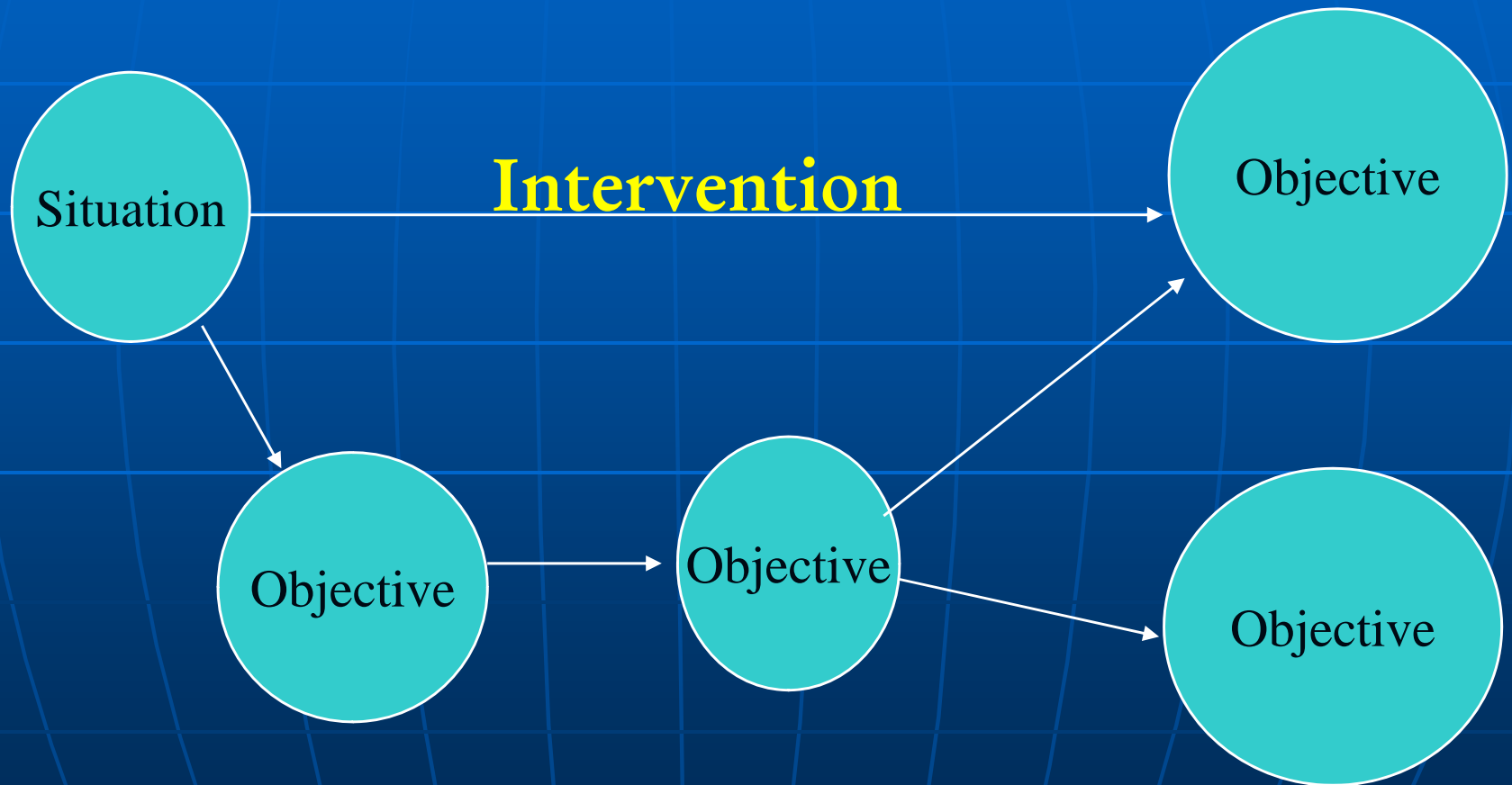
Joe Martin, Batt. Chief, LAFD (ret.)

Basic Problem Solving

- Give them the tools, they will figure it out (Kinesthetic learners)
- Situation
- Intervention
- Objective

Emergency Decision Making

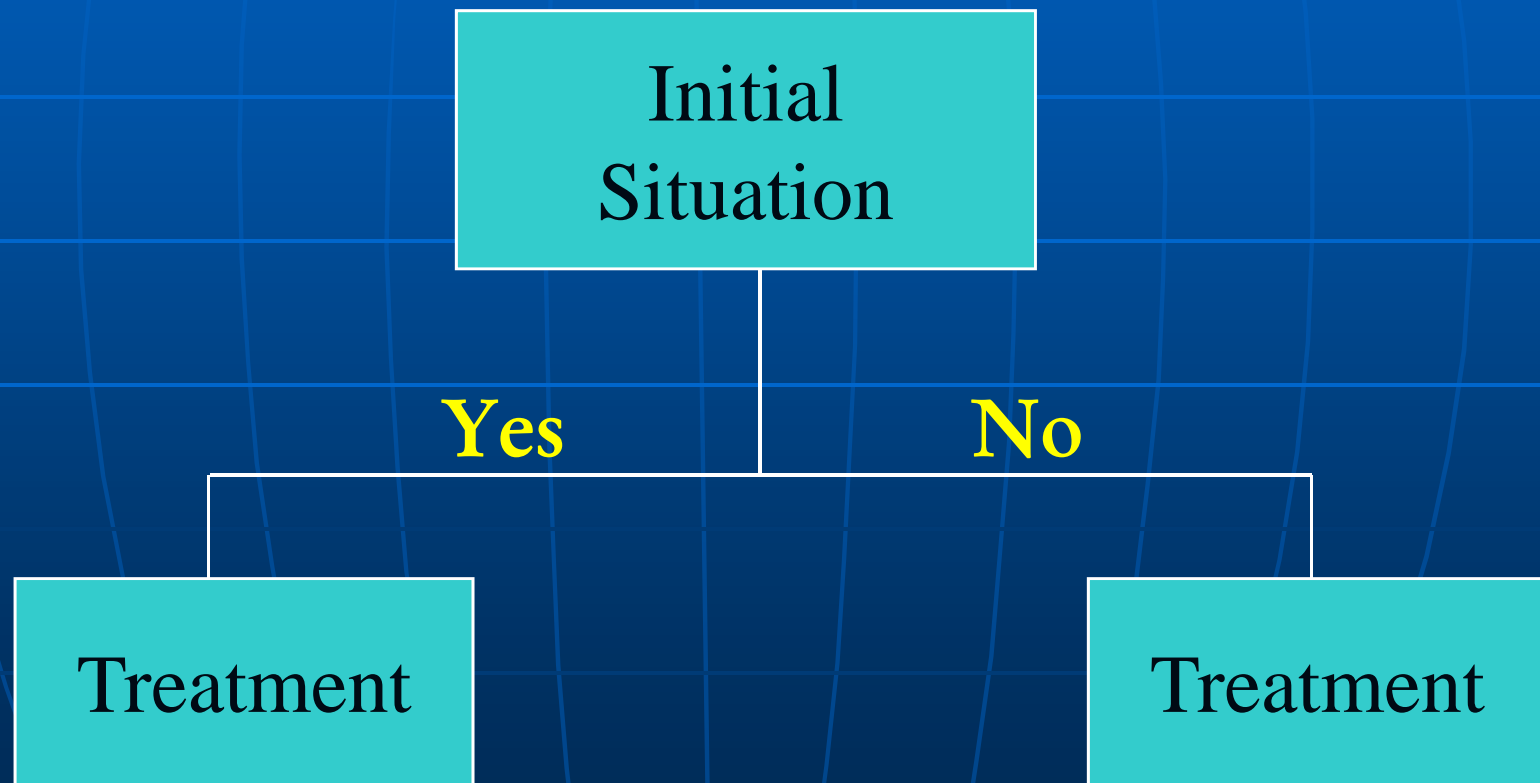
Basic Decision Problem



Emergency Decision Making

Decision Trees/Algorithms

(Sept/Oct & Nov/Dec 1964 HBR)



Definitions

■ Probability

- Risk with certainty
 - Actuarial, percentage
 - Distant future
 - Insurance underwriting
 - Static
 - Actuality, experience
 - Budgetary

■ Possibility

- Risk with uncertainty
 - Ease event occurs, facile
 - Immediate future
 - Anticipation
 - Dynamic
 - Hypothetical
 - Non-budgetary

Definitions

■ Expert

- Objective
- Education and training
- Develops salient cues
- Static, knowledge fixed-in-time
- Organizational

Definitions

■ Expertise

- Subjective
- Situational, experiential
- Rapid recognition of patterns
- Real-time function
- Interface with unstable environment

Basic Problem Solving

■ Deterministic

- Situation determines intervention
- Intervention determines outcome
- Static
- Linear, predictive

■ Indeterminant

- Unknown problem, unknown intervention
- Dynamic
- Nonlinear

■ Indeterminant Problem

- **Uncertain**
- **Threat**
- **Time dependent**

Basic Problem Solving

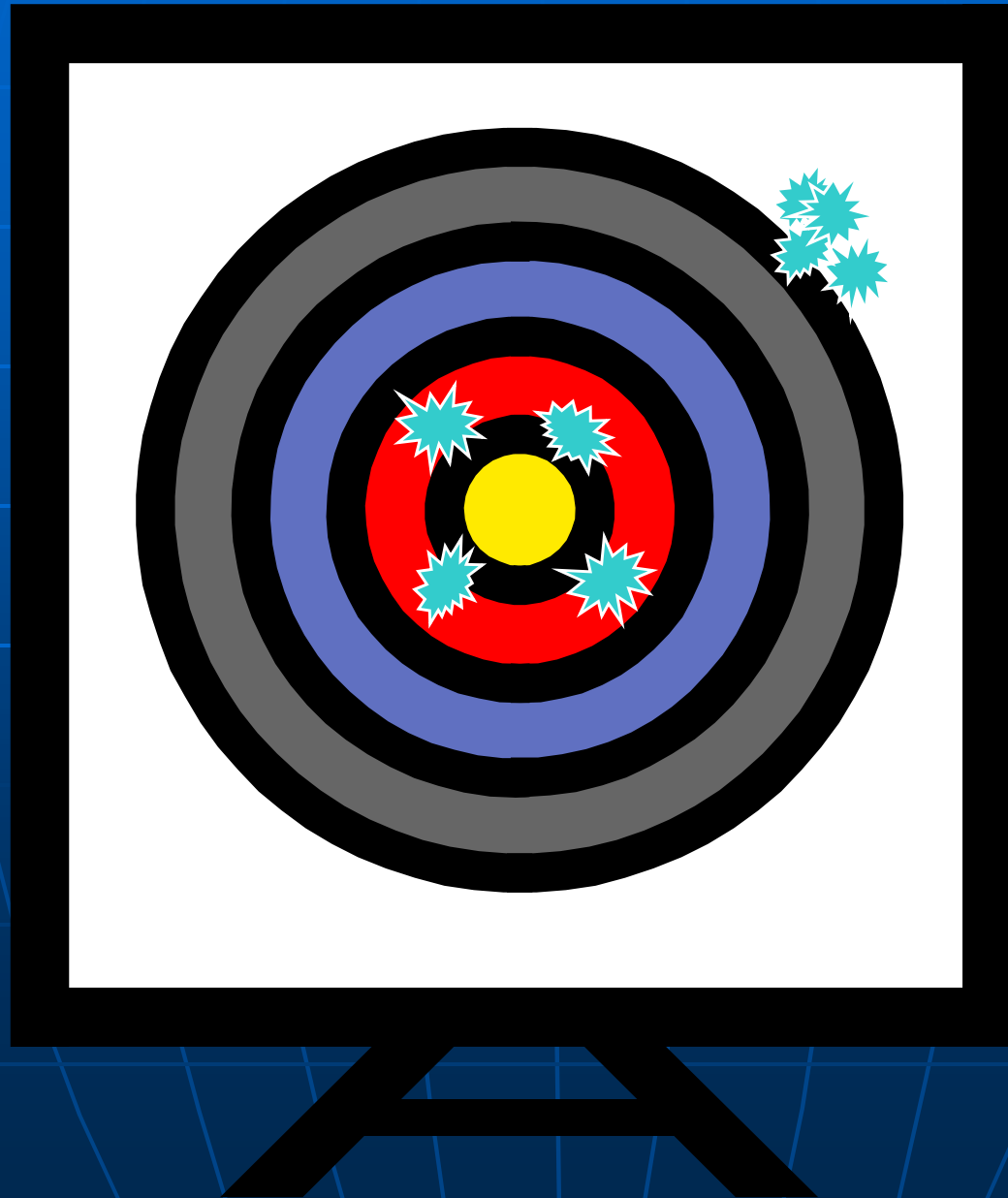
- You must act when:
 - Situation unknown, dynamic
 - Situation and intervention unknown

- Identify Objective
- Decompose Objective
- Decision migration
- Sensemaking

Target

- Ready, Aim, Fire
- Ready, Fire, Aim

Accuracy vs. Precision



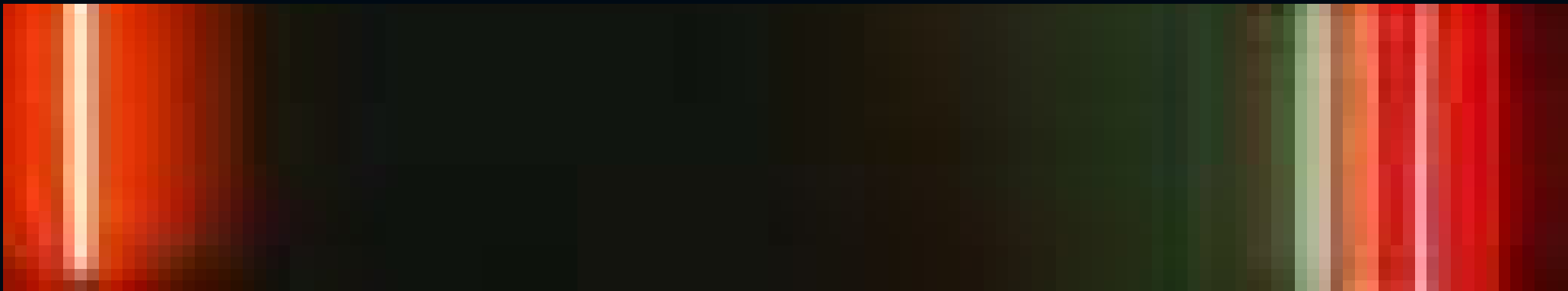
Concepts

■ Principles and Rules

- Vague
- Ambiguous
- Conflicting
- Gaps

■ Discrete yet we assume continuous or an acceptable surrounding region





Situations

■ Objectives

- Competing
- Vague (fuzzy sets)
- Ambiguous (double meaning)

■ Change

- Speed (rate of change)
- Velocity (direction of travel)
- Acceleration (rate of change of change)

Behaviors

■ Scholasticism

- Firm belief in concepts (facts and theories) as solutions
- Authoritarian

■ Coning of Attention

- Primacy of situation and objective
- Target fixation

■ Situational Awareness

- Balance concepts and situation

Tension

- Obedience as a primary value
 - Protection by appeal to authority
 - Protection by autocrat
 - Silo formation

Authority

Worker

Civilian

Authority

Worker

Civilian

Tension

Unrecognized fear

- Fight
 - Adrenaline-mediated
 - Anger
- Flight
 - Adrenaline-mediated
 - Plausible avoidance)
- Freeze
 - Cortisol-mediated
 - Inability to act)

Tension

- Creativity as a primary value
 - Problem solving
 - Knowledge occurs between heads
(Weick)

Tension

Concepts
Principles
Rules

Situation
Problem

Innate Uncertainty Rule

- Linear, Time-Variant Systems
- Time and Location
- To know what, the system provides insufficient time.
- To know when, the system provides incomplete information.
- **What** is happening **now** can not be known.

Response to Uncertainty

■ Engineering Model

- Reductionism
- Algorithm, Policies, Procedures, Plans, Rules

■ The problem

- Every situation bifurcates; every bifurcation bifurcates
- Every response bifurcates; every bifurcation bifurcates

■ Well planned course of actions do not play out

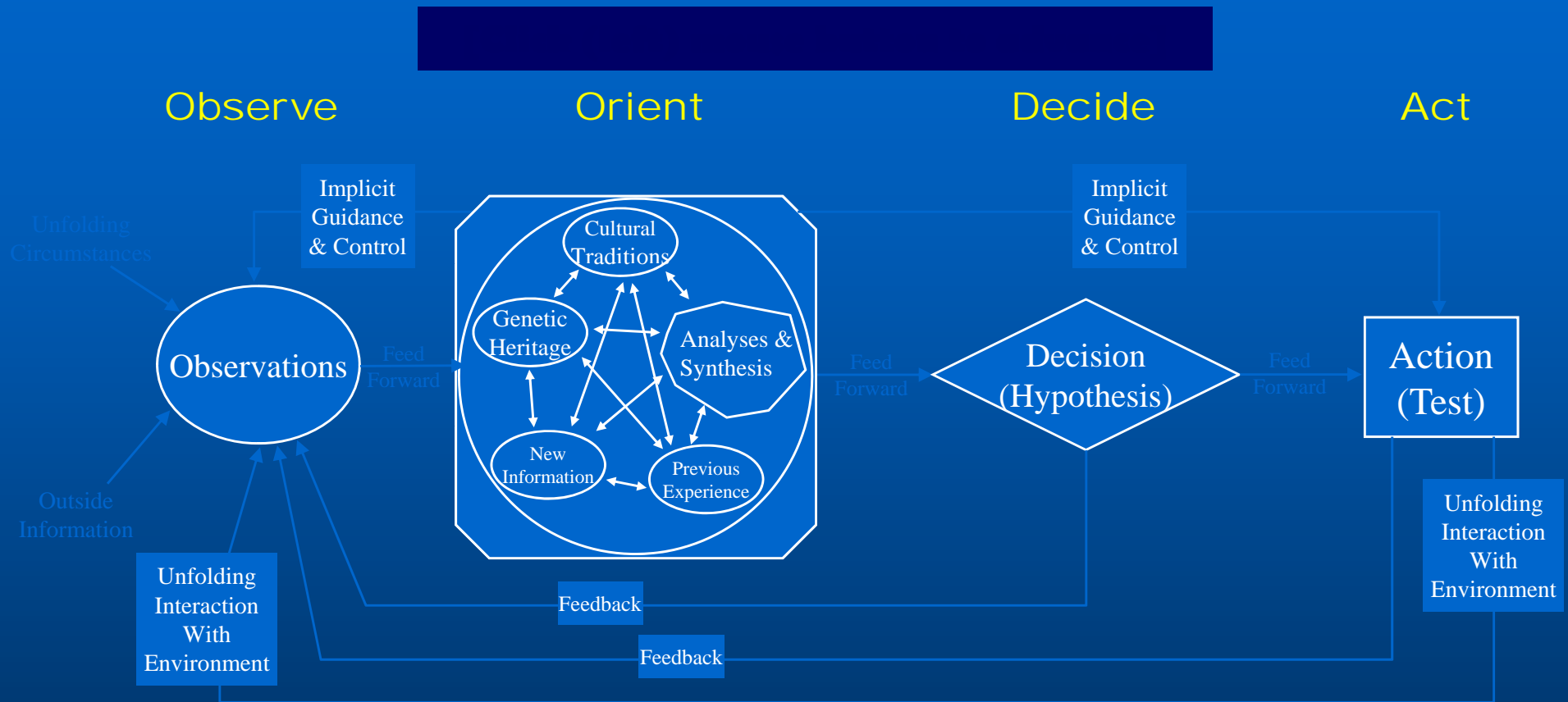
Response to Uncertainty

- When everything is predicted, nothing is predicted
- When every action is possible, planning is not

Response to Uncertainty

- Combat Model (John Boyd)
 - OODA Loop
- Response to forced action under uncertainty
- Adaptive Rule-breaking vs. Constrained Improvisations vs. Freelancing

The OODA “Loop” Sketch



Note how orientation shapes observation, shapes decision, shapes action, and in turn is shaped by the feedback and other phenomena coming into our sensing or observing window.

Also note how the entire “loop” (not just orientation) is an ongoing many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

Competitive advantage comes from quickness over the entire “loop,” not just or even primarily from the O-to-O-to-D-to-A sequence.

Sensing

Detection as the problem

- Weak signal
- Noise
- Fatigue

Noise as the problem

- Noise attenuation (squellch)
- Strong signal
- Endurance

Sensing

■ Nose

- For danger
- Direct to brain and limbic system (emotion)
- Fatigues

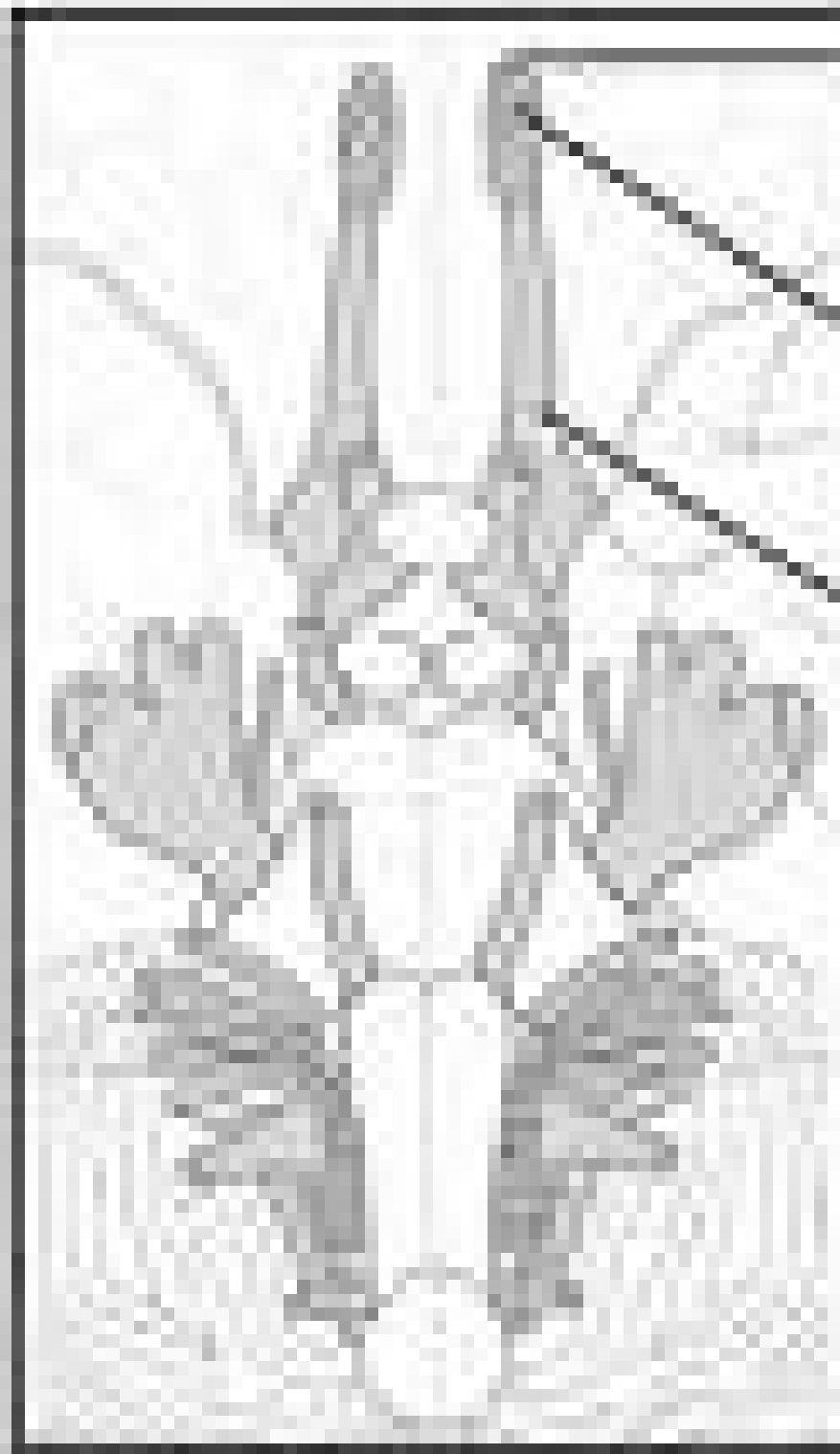
■ Eyes or Ears

- Sensitivity is filtered
- Eye can go direct to amygdala (face in the crowd)
- Ear can go to unconscious (alarm system while asleep)

Sensing

■ Lens vs. Filter

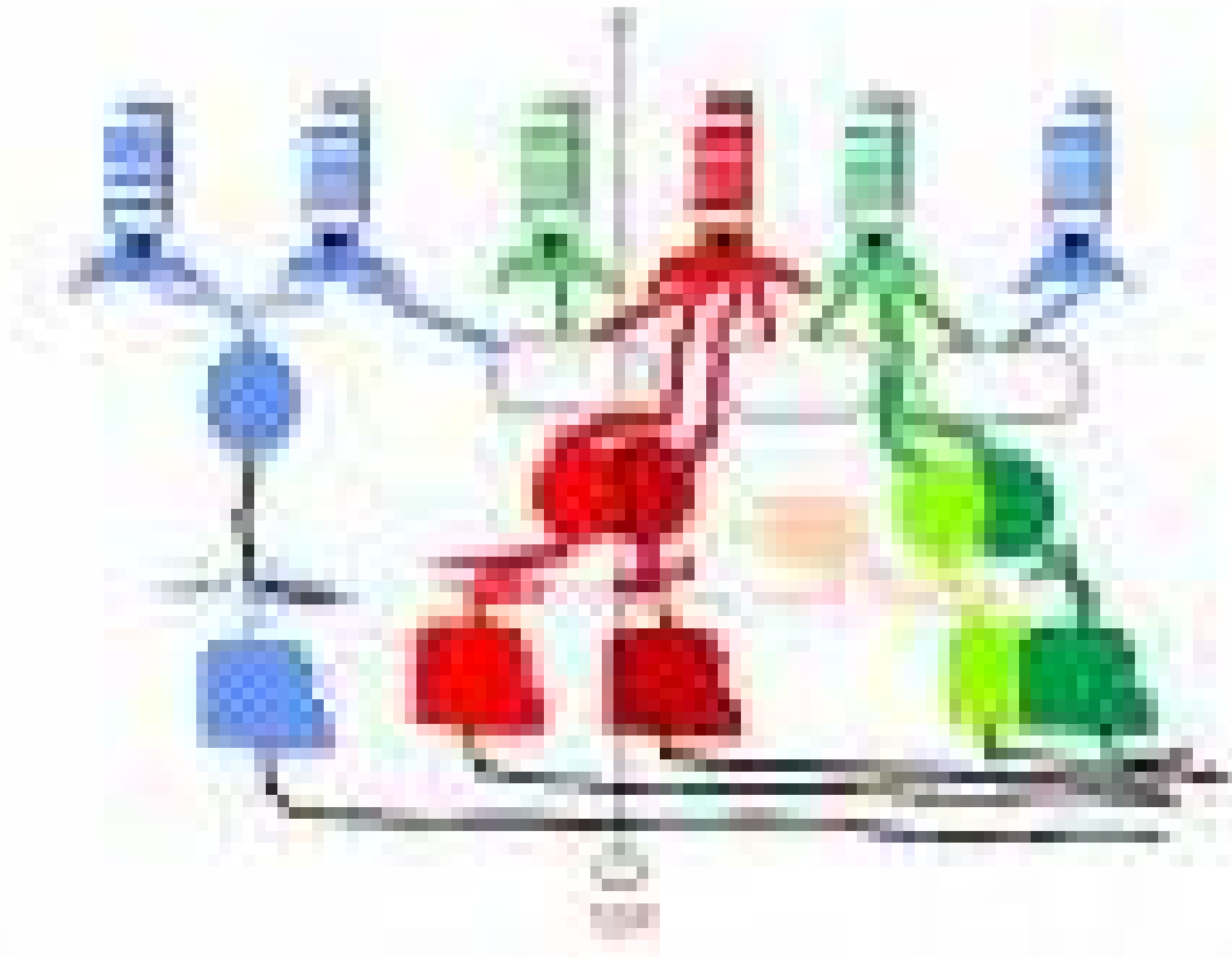
- Benefits
- Risks



Calyfactory
tract

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Observe

- Observation only
- Do not evaluate or process in detail

Orient

- Culture
- Human performance
- High Trust vs. Low Trust
 - High trust system: change in response to real-time experience
 - Low trust system: rigid in response to real-time experience

Decide

- Hypothesis
- Constrained improvisation vs. Freelancing

Decide

- Hypothesis testing
- Self-efficacy
 - The individual can affect outcome

Observe

- Response to action
- Learn what works through action
- Response to action probes the problem structure

Embrace Failure

- Not a matter of mistake but how fast you correct your mistake
- How many doors do you kick before you find the door that opens?
- To teach we need to talk about the closed doors
Joe Martin. Batt. Chief, LAFD (ret)

Embrace Failure

- We define our value by our success
- We also define our value by our failures
- Goal is to define value separate from success and failure

Embrace Failure

- Build on your strengths; strengthen your weaknesses
- Your friends hurt you; your enemies help you
- It is your weakness where you will fail

Threats to Decision Making

■ Availability

- First thing you think of is the most important

■ Representativeness

- What you see represents the situation

■ Chunks of information

- We can only work with 5-5 chunks of information (5-7 rule)

■ Vigilance vs. Hypervigilance

- Think through actions as you act vs. change for change sake

■ Overconservative revision

- Takes more information to change than to commit

Team Formation

- Crew Resource Management
 - How did a well-maintained airplane with well-trained crew crash?
 - Removes authority gradient
 - Improves information flow
- Team by status and role
- Team by shared objective

What Do We Do as Leaders?

■ Relation building

- How do we know if the captain is mad at US? (Dan Sullivan, Chief, Fire Training, Crafton Hills College)

■ We lead through relationship

- Read our people

■ Dynamic non-event

- Watch your team for facial expressions and tone of voice (Jim Holbrook, Ed.D., emergency services program, Crafton Hills College)

■ Bring harmonics to the team

What Do We Do as Leaders?

- Sometimes the wisest use of power is the decision not to use it.
Chief Justice Earl Warren

What Do We Do as Leaders?

■ The 72 hour rule

- It must explain yesterday
- It must be used tomorrow

What Do We Do as Leaders?

■ Humor

- Redirection of anger
 - Range from diplomatic to sarcastic
 - May signal alienation
- Mastery
 - Found in younger members
 - May signal beginning of competence
- Reservoir of goodwill
 - Found in mature members
 - Allows blunt communication during crisis

What Do We Do as Leaders?

- Inclusiveness
- Internalized values develops passion
- Imposed values lead to resentment
- As leaders
 - What got us into this?
 - What keeps us in?
 - The reasons we developed passion differ from our later passion

Words from an Old Captain

- You are the most qualified. There may be others more qualified but they were not available. Therefore we will back you 100%.
- There are a thousand things going on, you can only see one hundred. You can only act on ten.
- I may see a different hundred. I may act on a different ten. That does not mean I am better than you, only different.

Engagement and Resilience

- In the final analysis, an army moves forward because a soldier believes in himself enough to get out of the foxhole and move forward.

Our imagination should help us,
not hurt us.

Brian Keith

"The Russians Are Coming, The Russians Are Coming"

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