A John Boyd Sampler

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Tarkenton & Addams, Inc.
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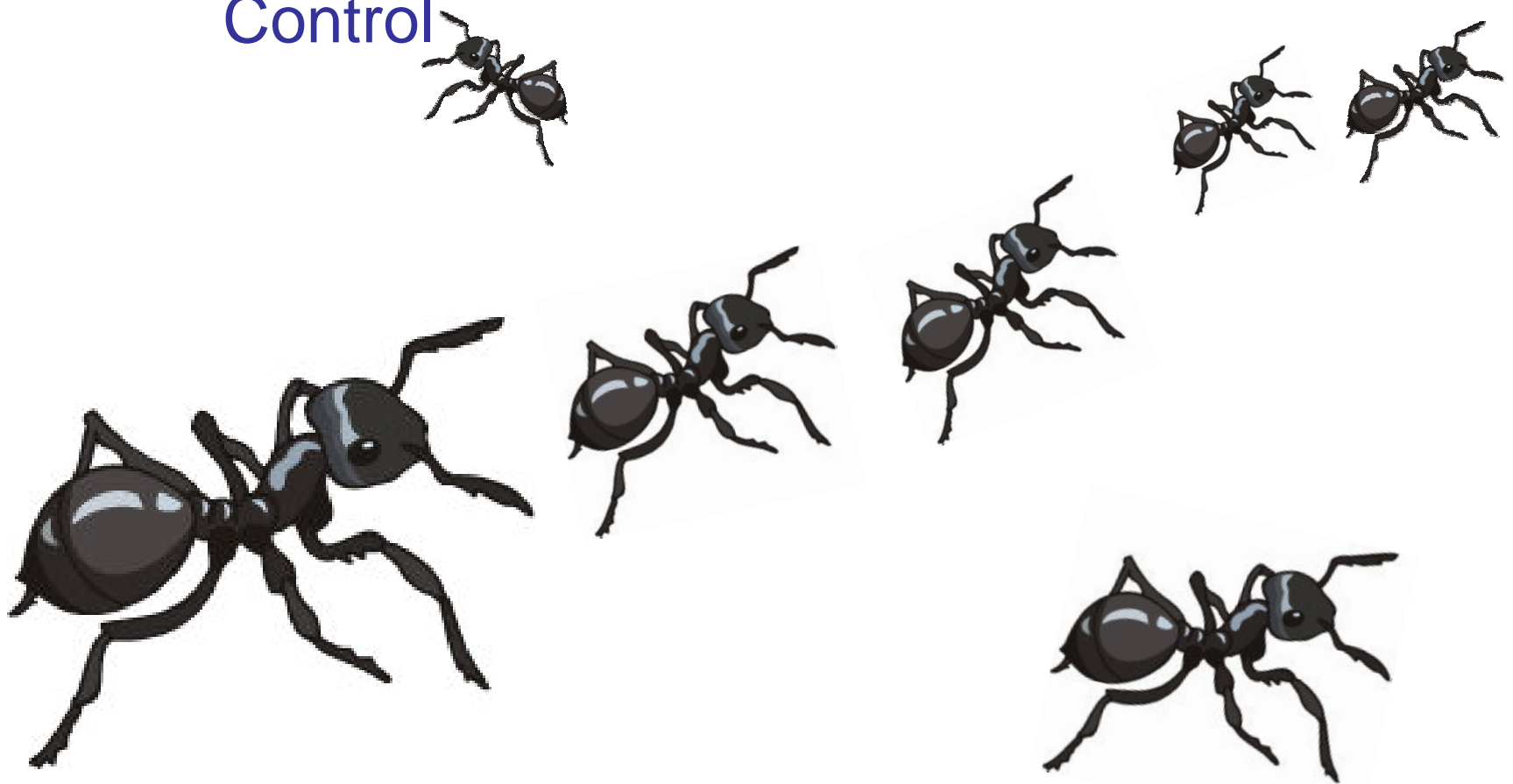
Agenda

- Overview, with an emphasis on "command and control"

- Application:

> - Interweave menace-uncertainty-mistrust with tangles of ambiguity-deception-novelty
>
> - Generate uncertainty, confusion, disorder, panic, chaos
>
> - Shatter cohesion, produce paralysis, bring about collapse
>
> - Become an extraordinary commander

Part 1: Command and Control

(Unless otherwise cited, all quotes are from Boyd's *Organic Design for Command and Control*, May 1987.)

Point of departure

"Biological organizations put innovation and creativity at the 'top' of the hierarchy (in the brain), just the opposite from their position in most human-made organizations (as corporations or nations), where the structure becomes increasingly rigid toward the top."
Erich Jantsch, quoted in *Looking Glass Universe*

Boyd wondered how we could design human organizations that exhibit the same innovation and creativity at the top as biological, "organic" organizations.

Other point of departure: friction

- The atmosphere of war is **friction**.

- Friction is generated and magnified by menace, ambiguity, deception, rapidity, uncertainty, mistrust, etc.

- Friction is diminished by implicit understanding, trust, cooperation, simplicity, focus, etc.

- In this sense, **variety and rapidity** tend to magnify friction, while **harmony and initiative** tend to diminish friction.

Underlying issue

How do we:

- Reduce friction on our side, while

- Magnifying it on the other side?

Or equivalently:

- How do we generate harmony/initiative so that we can exploit variety/rapidity?

As a commander in Vietnam I wanted to *unleash* my Marines on the enemy, not control them.

Col Mike Wyly, USMC (Ret.),
"Thinking Like Marines"
http://www.belisarius.com

This suggests, as a goal:

A command and control system, whose secret lies in **what's unstated or not communicated** to one another (**in an explicit sense**)—in order to

- Exploit lower level initiative, yet
- Realize higher level intent, thereby
- Diminish friction and compress time, hence
- **Gain both quickness and security**.

Key: implicit over explicit

The key idea is to **emphasize implicit over explicit** to gain a favorable mismatch in friction and time (ours lower than any adversary) for superiority in shaping and adapting to circumstances.

OK, but how do we "emphasize implicit over explicit?"

Arrange setting and circumstances so that leaders and subordinates alike are given the opportunity to continuously interact with the external world, and with each other,

- in order to more quickly make many-sided implicit cross-referencing projections, empathies, correlations, and rejections

- as well as create the similar images or impressions, hence **a similar orientation needed to form an organic whole**.

Why?

In such an environment, a harmony, or focus and direction, in operations is created by the bonds of *implicit communications* and *trust* that evolve as a consequence of:

- the similar mental images or impressions

- each individual creates and commits to memory

- by repeatedly sharing the *same variety* of experiences

- in the *same* ways.

Once you've done this,

A *similar implicit orientation* for commanders and subordinates alike will allow them to:

- Diminish their friction and reduce time, thereby permit them to:
  - Exploit variety/rapidity while maintaining harmony/initiative, thereby permit them to:
    - Get inside adversary's O-O-D-A loops, thereby:
      - » Magnify adversary's friction and stretch-out his time (for a favorable mismatch in friction and time), **thereby:**

Deny adversary the opportunity to cope with events/efforts as they unfold.

This idea has deep roots

Those whose upper and lower ranks have the same desire are victorious. **Sun Tzu.**

Harmony among people is the basis of the Way of military operations. **Wang Xi.**

If we can cooperate with like minds, people will fight of their own accord, and much can be accomplished. **Liu Ji.**

Generally, the spirit of the opponent may be taken as the focus of the mind. **Miyamoto Musashi.**

Non-military example

"If fireground commanders read the situation correctly, their expectencies should match the events. When they are wrong, they can quickly use their experience to notice anomalies." Gary Klein, *Sources of Power*

If Klein is correct (and I believe that he is) then a common expectency or orientation will produce the benefits between and among fireground commanders that Boyd suggests.

In a nutshell

The aim is not to increase our *capacity* to perform command and control. It is not more command and control that we are after. **Instead, we seek to decrease the amount of command and control that we** *need*.

We do this by replacing coercive command and control methods with spontaneous, self-disciplined cooperation based on

- low-level initiative
- a commonly understood commander's intent
- mutual trust, and
- implicit understanding and communications.
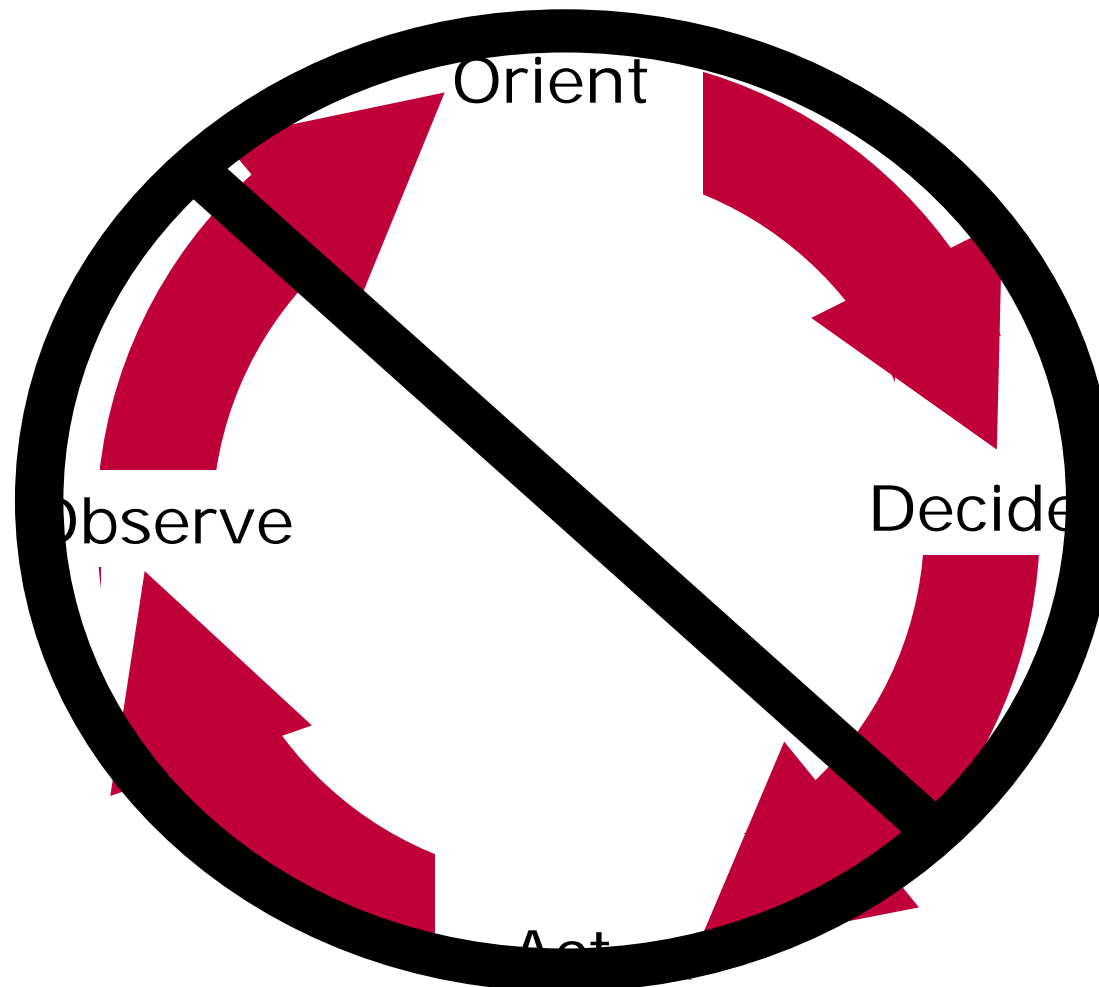
MCDP 6, *Command and Control*

OODA and C2

- OODA loop is the C2 loop

- Operating inside adversary's OODA loop means same thing as operating inside his C2 loop

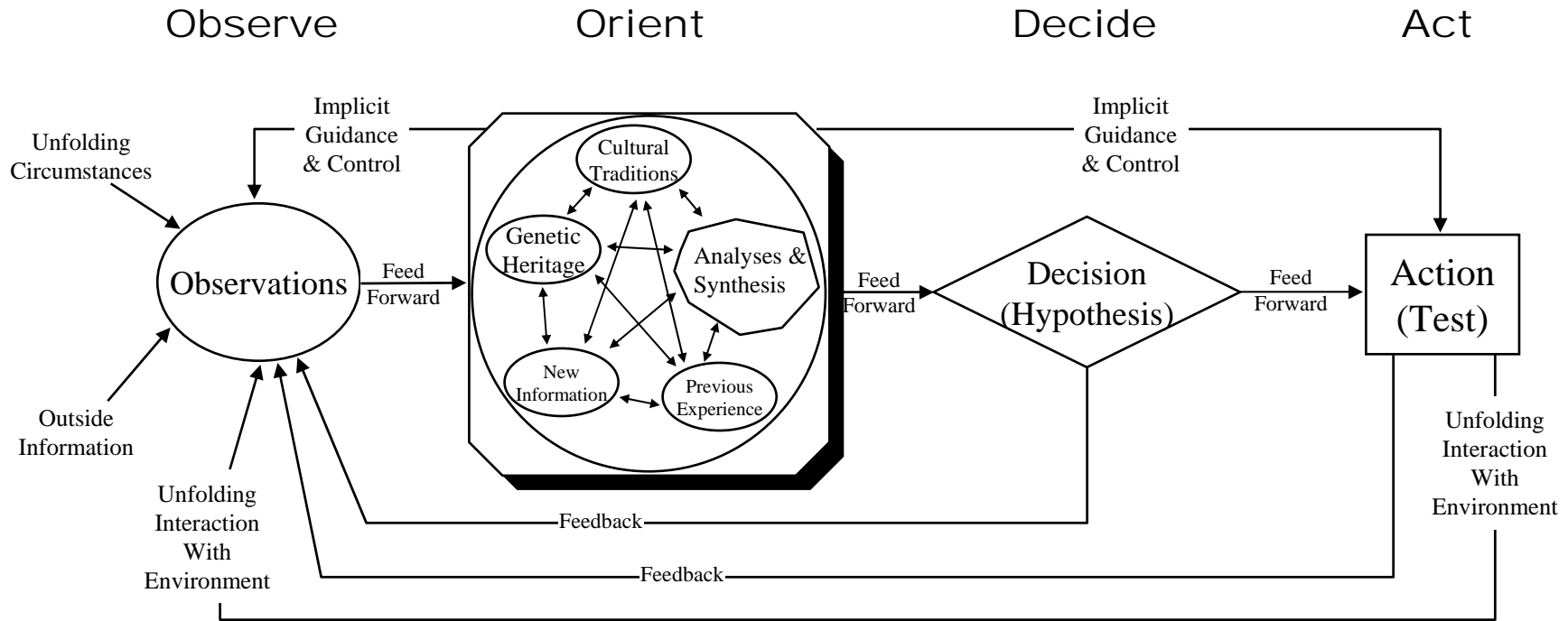- Raises question (as Boyd would say):

What is an "OODA Loop"?

This ain't it
(at least not very often)

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This is

Observe	Orient	Decide	Act

Unfolding Circumstances

Implicit Guidance & Control

Observations

Feed Forward

Cultural Traditions

Genetic Heritage

Analyses & Synthesis

New Information

Previous Experience

Feed Forward

Implicit Guidance & Control

Decision (Hypothesis)

Feed Forward

Action (Test)

Outside Information

Unfolding Interaction With Environment

Feedback

Feedback

Unfolding Interaction With Environment

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.

John R. Boyd, 1992

Pumping up OODA "loop" speed

Observe **Orient** **Decide** **Act**
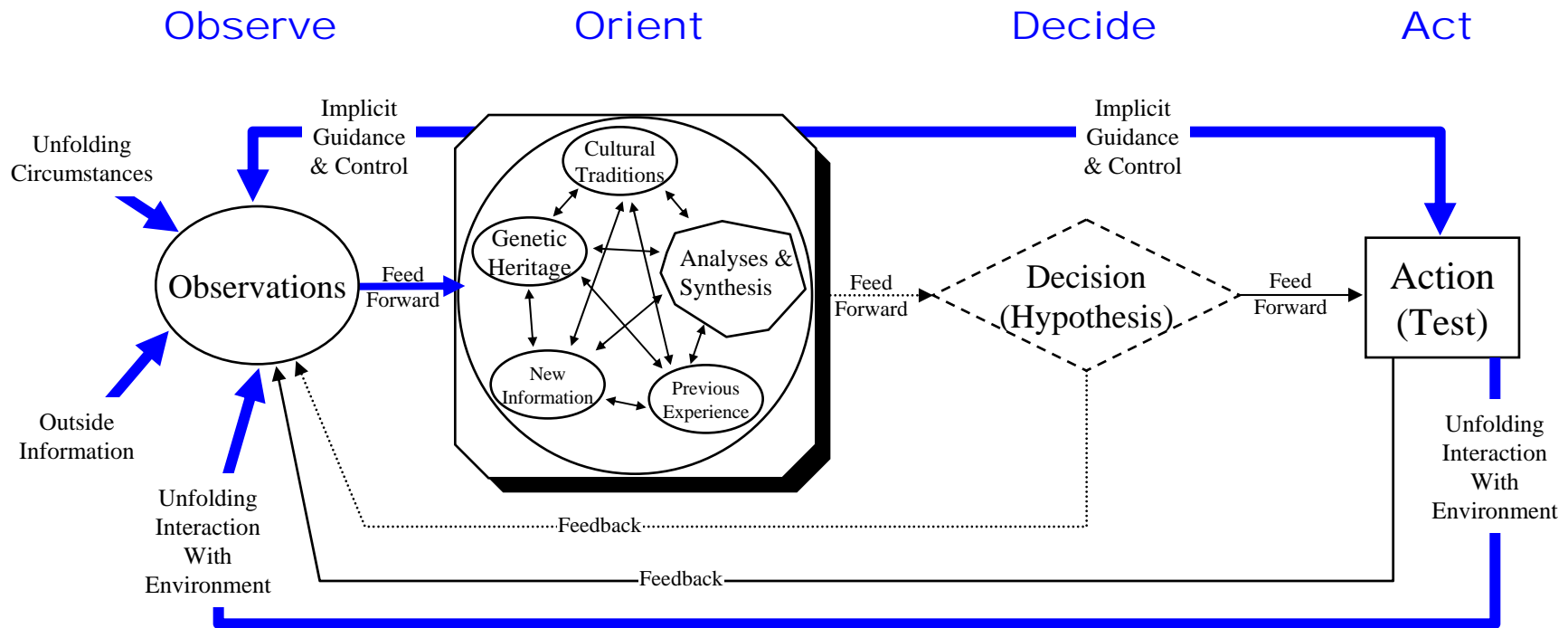
"Orientation is the *Schwerpunkt.*" *Organic Design*, 16.

"Emphasize **implicit** over **explicit** in order to gain a favorable mismatch in friction and time (ours lower than any adversary's)." *Organic Design*, 22.

"Interaction permits vitality and growth, while isolation leads to decay and disintegration." *Strategic Game*, 29.

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OODA Loops in Special Ops

Military analysts say we are becoming skilled disciples of John Boyd. That is, we execute the Boyd Loop—observation, orientation, decision, action (OODA)—far better and far quicker than our enemies. In fighter pilot parlance, we continue to "turn inside" the enemy and enjoy continuous tactical advantage … the enemy is kept confused and disordered.

Dick Couch, *The Finishing School*, p. 258.

Orientation

- Orientation *is an interactive process* of *many-sided implicit cross-referencing projections, empathies, correlations and rejections* that is *shaped by* and

    shapes the interplay of *genetic heritage, cultural tradition, previous experiences, unfolding circumstances, and analyses and synthesis.*

- It is a "far from equilibrium" process. Like a whirlpool, when it's not operating, it doesn't exist at all.
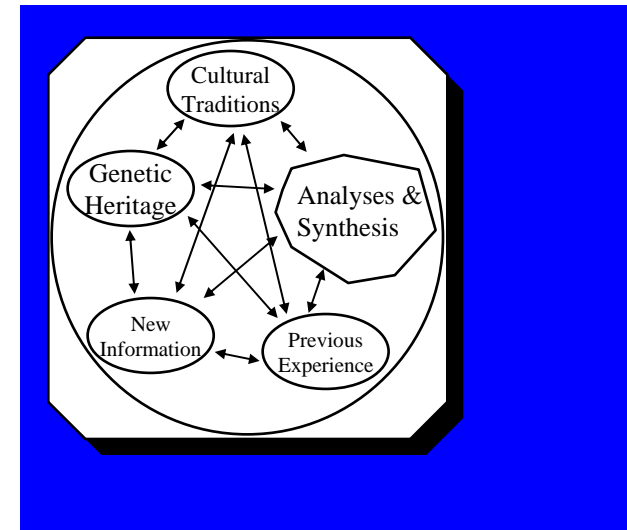
Orientation rules!

Based on the Boyd OODA Loop, the real control parameter is that which determines **whether there is just one, 16, or an infinity of available states.** Or in other words, it is the parameter that would cause us to prefer one state under one set of conditions and another state under a different set of conditions. It would seem, then, that the actual main control parameter is Orientation.

Dr. Linda P. Beckerman,
"The Non-linear Dynamics of War"
http://www.belisarius.com

Orientation is indeed the *Schwerpunkt*

In other words, orientation not only selects an action or decision—implicitly or explicitly — **it controls the range of selectable actions** (variety.)

Thus the time needed to reorient (rapidity) is in a real sense, the primary measure of "quickness" of the entire loop.

Implicit guidance and control

"It's nonsense all the same," Einstein retorted to the young Werner Heisenberg.

"It's pointless to attempt to build theories on observables, for, after all, it is the theory itself that tells physicists what can and cannot be observed."

in Briggs and Peat,
Looking Glass Universe, *p. 45.*

Operating inside their OODA loop

"It's like they're moving in slow motion." —Boyd describing "operating inside opponents' OODA loops."

"It's like you're commanding both sides." — typical impression of a successful *cheng / ch'i* operation. [*cheng* - "orthodox, expected," while *ch'i* - "unorthodox, shocking, irregular." By operating inside an opponent's OODA loop, you will find it much easier to set up and exploit *cheng / ch'i* situations.]

OODA loop: summary

- The ability to operate at a faster tempo or rhythm than an adversary enables one to fold adversary back inside himself so that he can neither appreciate nor keep up with what's going on.

- He will become disoriented or confused

Once this condition is achieved, it makes no difference what weapons remain in his hands.

C2 - wrap up

In this sense, the C&C we are speaking of seems more closely aligned to *leadership* (rather than command) and to some kind of *monitoring* ability (rather than control) that permits leadership to be effective.

Monitoring?

In other words, leadership with monitoring, rather than C&C, seems to be a better way to cope with the multi-faceted aspects of uncertainty, change, and stress. On the other hand, monitoring, per se, does not appear to be an adequate substitute for control. Instead, after some sorting and reflection, the idea of *appreciation* seems better. Why? First of all, appreciation includes the recognition of worth or value and the idea of clear perception as well as the ability to monitor. Moreover, next, it is difficult to believe that leadership can even exist without appreciation.

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A & L

Pulling these threads together suggests that ***appreciation and leadership*** offer a more appropriate and richer means than C&C for shaping and adapting to circumstances.

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Appreciation

Appreciation, as a part of leadership, must provide assessment of what is being done in a clear, unambiguous way. In this sense, appreciation must not interact nor interfere with the system, but must discern (not shape) the character/nature of what is being done or about to be done.
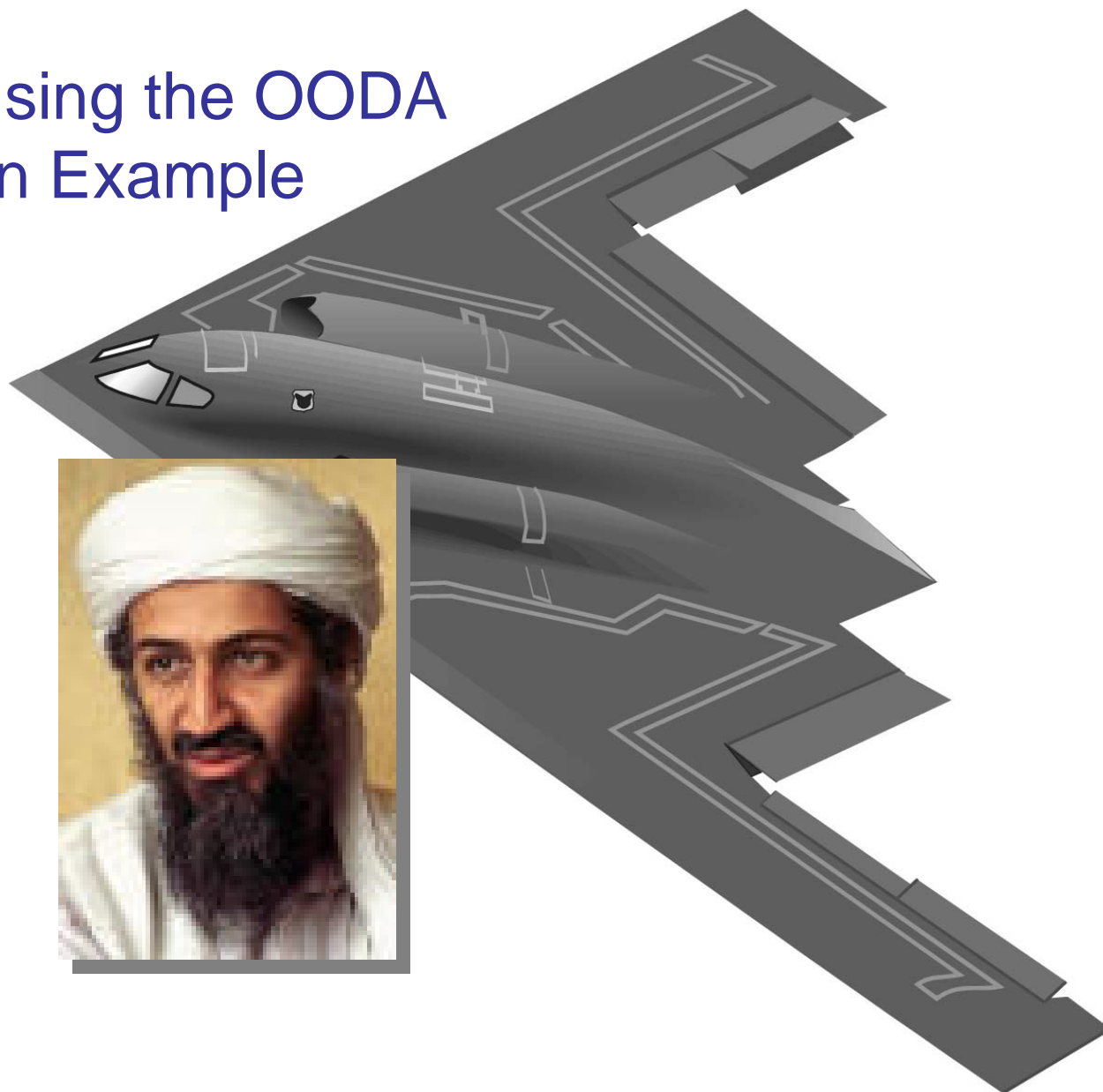
Leadership

Leadership must give direction in terms of what is to be done also in a clear unambiguous way. In this sense, leadership must interact with the system to shape the character or nature of that system in order to realize what is to be done.

Part 2: Using the OODA Loop - An Example

The standard model

The superiority in numbers is the most important factor in the result of combat … the direct result of this is that the greatest possible number of troops should be brought into action at the decisive point — Clausewitz, Book III, Ch, VIII

Essence of the standard model: structure vs. structure

Each of the sides in a conflict forms a *system*.

- Range of enemy alternatives can be bounded
- Enemy actions are predictable
- Effects of our actions on the enemy are predictable

Corollary #1: Conflict can be modeled.

Corollary #2: What decides in the model decides on the ground.

# Apply the standard model to the following:

Conventional Scenario (non-nuclear):

- The two sides are roughly equal: 140 divisions, 1,500 aircraft, 4,000 tanks

- Side A has more heavy artillery

- Both sides are fully mobilized

- Both sides know that political & terrain considerations will force the battle into a pre-defined 200-mile gap

- Side A will play defense, Clausewitz's ' superior form of combat (i.e., ties go to Side A)

Assignment: Assess the results after 30 days.

What really happened
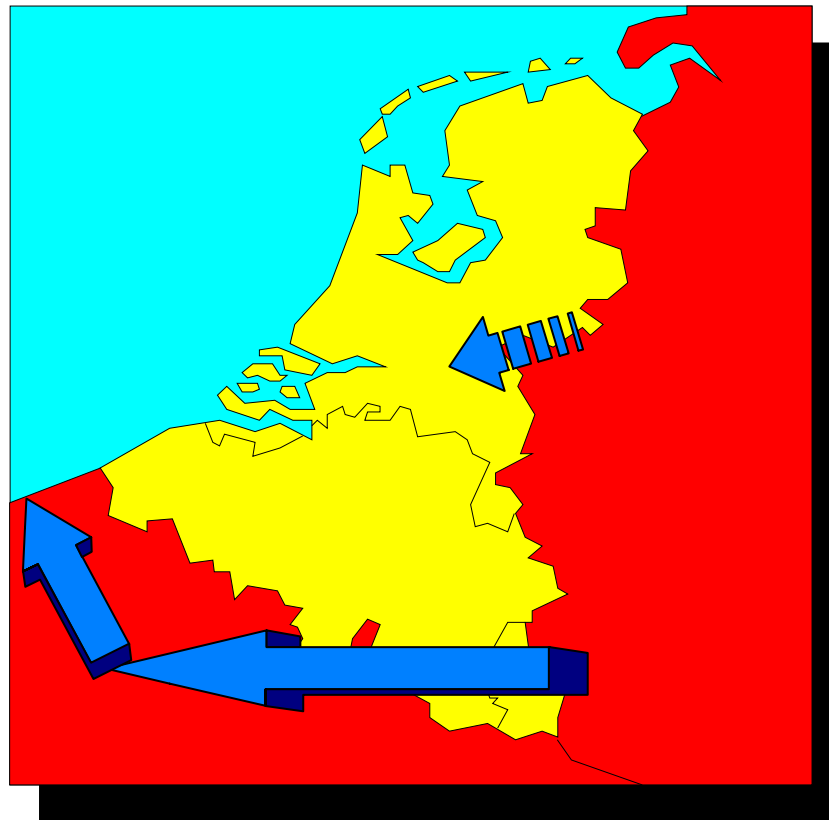
The Germans (Side B) reached the Channel in 10 days.

It was no fluke

Arabs vs. Persia, Byzantine Empire	633 - 732
Mongols vs. China, Russia, etc.	1211 - 1260
American Colonies vs. Great Britain	1775 - 1781
Germany vs. France, England, Belgium, Holland	1940
Israel vs. Arab States	1947 - 1973
Algeria vs. France	1954 - 1961
Vietnam vs. United States	1958 - 1975
Afghanistan vs. USSR	1980 - 1988
Chad vs. Libya	1987

(etc.)

First orientation

We have been led astray by computerized wargames … because the primary determinant of victory in these exercises is a preponderance of firepower— Gen. James H. Polk, USA, "The Criticality of Time in Combat"

Second orientation

But Ked-Buka was a Mongol general and he was not impressed by numbers — James Chambers, *The Devil's Horsemen*
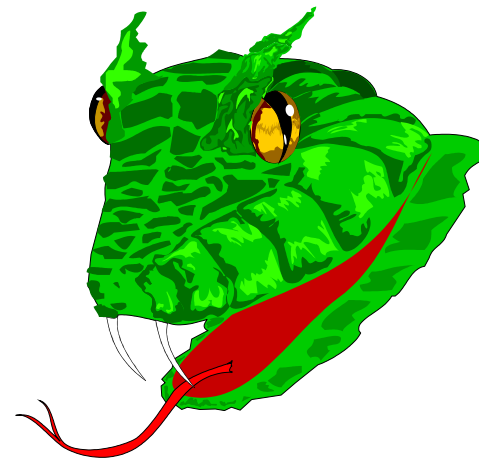
Third orientation

According to my assessment, even if you have many more troops than others, how can that help you win?

Sun Tzu

What are conventional methods missing?

Ways not to play the standard game

- Disguise, diversify, and demassify the system

- Acquire weapons of mass destruction on mobile systems

- Where immobile, be invisible (practice *ninjitsu*)

- When attacked, mutate (& choose an asymmetrical and unpredictable response)

- Attack information (esp. in the prewar phase)

Col Richard Szfranski, USAF,
Then-Chair of National Military Strategy,
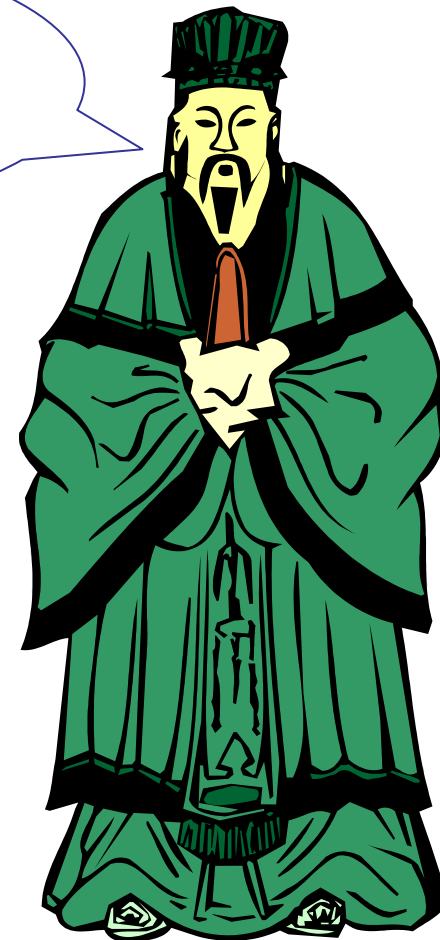Air War College

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Foundation: ambiguity

The paradox of ambiguity was an exact science in the Taoist literature of higher psychology*

How so?

- Formlessness

- Preparation of the opponent
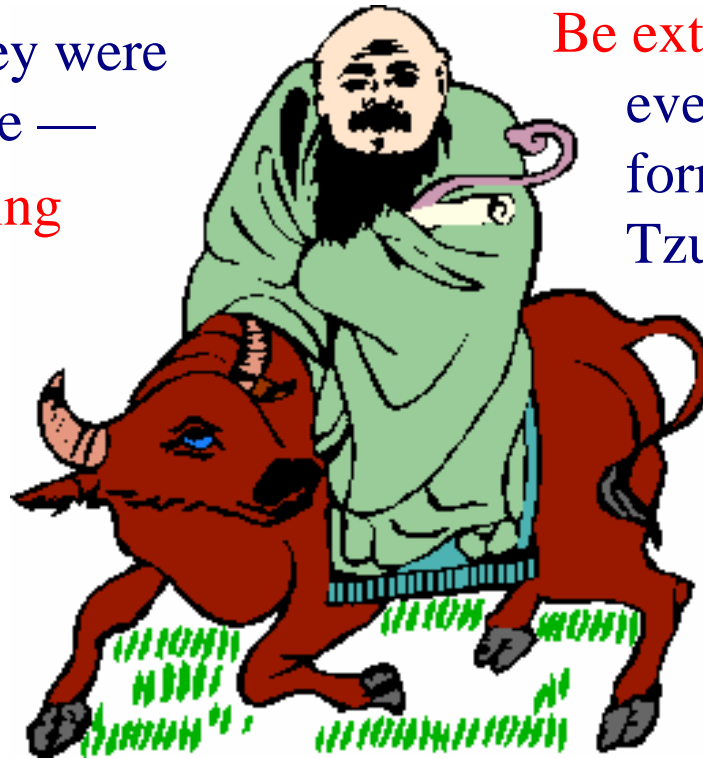
- Fight on the moral plain

*Thomas Cleary, Introduction to
The Art of War

The mysterious East

Skilled warriors of old were subtle,

Mysteriously powerful,

So deep they were unknowable —

Tao Te Ching

Be extremely subtle even to the point of formlessness — Sun Tzu

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Can you be formless and effective?

Military formation is like water…the form of a military force is to avoid the full and attack the empty
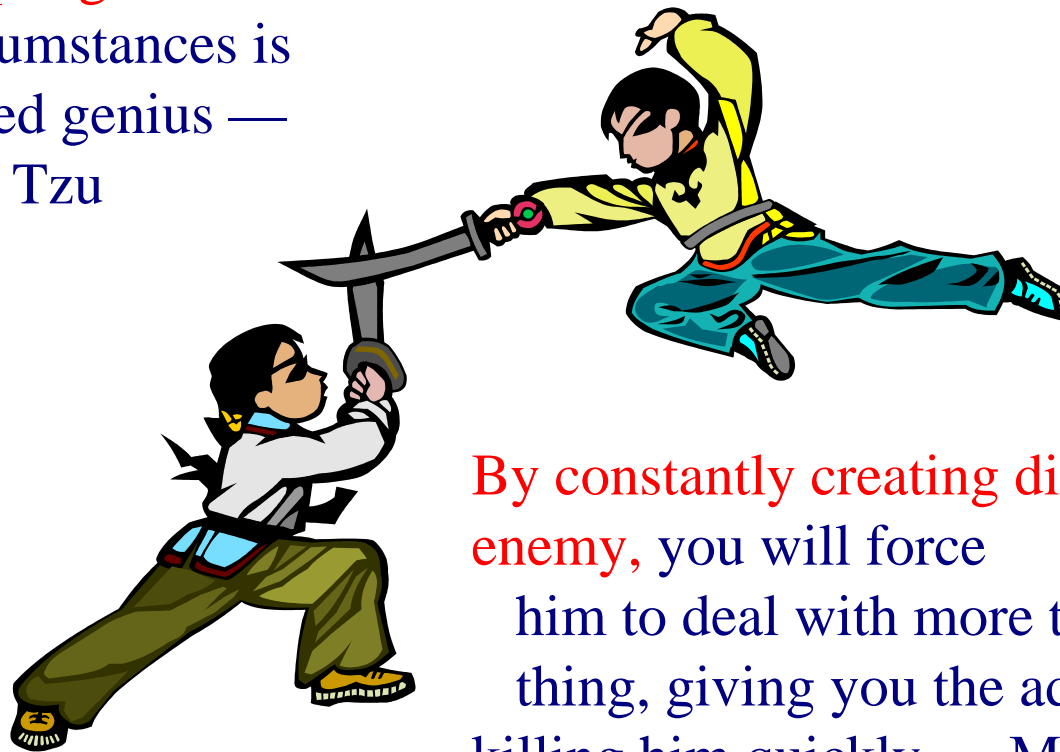—Sun Tzu

Anything that takes shape can be countered —*The Masters of Huainan*

Agility

The ability to gain victory by changing and adapting to circumstances is called genius — Sun Tzu

By constantly creating difficulties for the enemy, you will force
    him to deal with more than one
    thing, giving you the advantage in
killing him quickly — Musashi

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Mental agility

Strategy is a system of ad hoc expedients — von Moltke (the Elder)

If your mind stops on the sword your opponent is swinging at you, a gap opens up, and in that gap, your action falters — Zen Master Takuan

Operate inside adversary's OODA loops … thereby … Enmesh adversary in an amorphous, menacing, and unpredictable world of uncertainty, doubt, mistrust, confusion, disorder … — Boyd

Quickness

The condition of a military force is that its essential factor is quickness, taking advantage of others' failure to catch up, going by routes they do not expect, attacking where they are not on guard.
—Sun Tzu

Rommel believed that in the consequent unpredictable fighting, his own swiftness of action and the training of his troops would bring victory — Douglas Fraser, *Knight's Cross*

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Time

With a time advantage, numbers don't count — Gen James H. Polk

One action has grown out of another with such rapidity that there has never been a time when men could quietly plot against him — Machiavelli on Ferdinand of Aragon

Strategy is based on quickness, not speed. … In combat, you are not in a contest of strength and you are not in a race — Musashi

Time & agility in (recent) action

It was also a plan that depended on mental and physical agility, multiple thrusts, bypassing resistance, reinforcing success wherever it was achieved, and creating chaos—then thriving on that chaos. … That their (the Iraqis') every reaction, like the French in 1940, might in fact be the right one at the time they made the decision, but would also be irrelevant as our pace of operations had made it so.

<div style="text-align: right">

BGen John F. Kelly, ADC
1st MARDIV
Marine Corps Gazette, February 2004

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First synthesis

Ancient strategists, and a few modern ones, saw that somehow, a concept like agility/quickness could produce formlessness
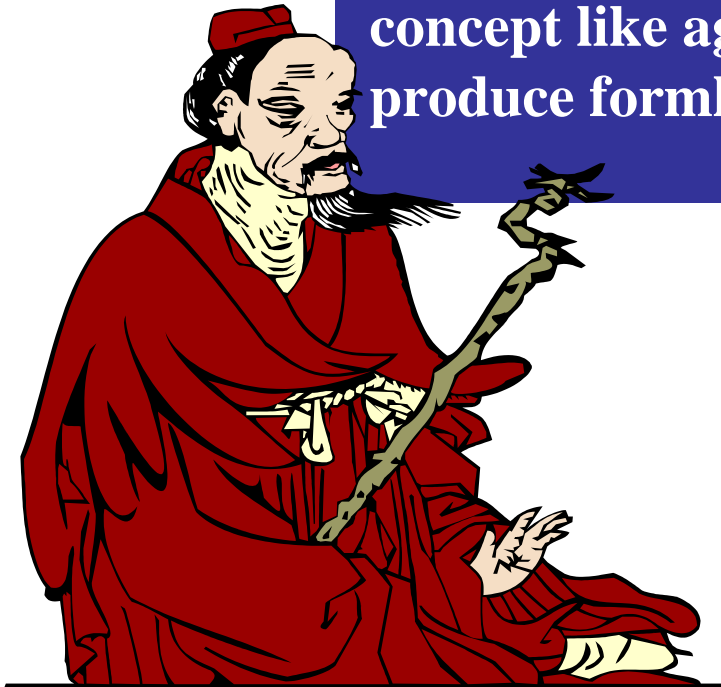
Preparing the opponent

Victorious warriors win first and then go to war, while defeated warriors go to war first, then seek to win — Zhang Yu

It is essential that you control the enemy and make slaying him a simple thing to do … There is nothing wrong with escaping from combat if you honestly cannot win the fight — Musashi

Interweave menace-uncertainty-mistrust with tangles of ambiguity-deception-novelty as basis to sever adversary's moral ties and disorient … Boyd.

One way to prepare your opponents

The unorthodox (*ch'i*) and the orthodox (*cheng*) give rise to each other like a beginningless circle—who could exhaust them?
—Sun Tzu
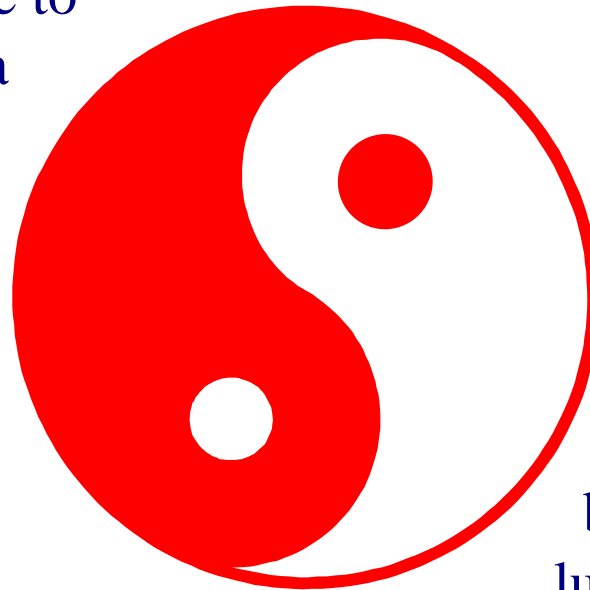
Nothing is not orthodox, nothing is not unorthodox. Victory without both amounts to a lucky win in a brawl.
—Ho Yanxi

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Meet Miyamoto Musashi

- Considered Japan's greatest swordsman

- Master of calligraphy, art, etc.

- Wrote *A Book of Five Rings* (1645)

- Victor of 60 sword fights

Second synthesis: The Musashi Inequality

Note that $(0.9885)^{60} < .50$

[What this says is that the strategists of the Taoist / Zen school did not consider strategy a matter of probabilities. You don't win 60 times in a row by leaving anything to chance.]

Musashi on Boyd

- ## Action flows from orientation

  - (The tempo of) actual combat is extremely fast and demands that you act and react without thinking. 73

- ## Quickness, not speed

  - "Speed" does not necessarily mean being faster than the enemy. It means being smarter than the enemy. 37

  - Flexibility is a very important attitude ... Attack where the enemy is not expecting you to. 69

- ## Maneuvering in time

  - Confusing the enemy is achieved by constantly forcing the enemy to redirect his efforts. 77

Hanshi Steve Kaufman trans.

Moral dimension of combat

Recognized by Clausewitz as permeating "the whole being of war" and usually of greater influence than the purely physical. (Book III, Ch. III)

Clausewitz defined three "chief moral virtues:"

- The talents of the commander

- The military virtue of the army

- Its national feeling

Other ideas on moral forces

Ibn Khaldun (the first modern historian, d. 1395) concluded that the side with the stronger group feeling usually wins.

The Tao of military operations lies in harmonizing people. When people are in harmony, they will fight on their own initiative, without exhortation — Zhuge Liang

Generally one may consider the spirit of the opponent as the point of concentration — Musashi

Effect of moral warfare (an example)

Lacking victories over their
competitors, and unable to defend
themselves from their bosses, they lash
out at each other, making unity of
purpose even harder
to achieve — quality
guru Joseph Juran

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Waging moral warfare

Idea: Á la Musashi, defeat the opponents' spirit first, before proceeding to a decision in cold steel.

Practicing martial arts, assess your opponents; cause them to lose spirit and direction so that even if the opposing army is intact it is useless—this is winning by the Tao. Zhang Yu

… but also influence the uncommitted or potential adversaries so that they are drawn toward our philosophy and are empathetic to our success— Boyd.

A toolkit for moral warfare

- – Ferocity

- – Surprise

- – Deception & lies

- – Ambiguity

- – Sow jealousy, dissent, etc.

- – Pump up mistrust

And then there's *rhythm* and *time*.

Rhythm??

There are times during a conflict when the rhythm of the opponent goes haywire and he begins to collapse.

The opponent collapses when his time comes and his rhythm is broken.

You use an advantageous rhythm to arrest the powerful determination of the adversary's motivation.

—Musashi

A modern view of rhythm

Observe, Orient, Decide, and Act more
inconspicuously, more quickly, and with more
irregularity …

Permits one to:

**Generate uncertainty, confusion, disorder,
panic, chaos … to shatter cohesion, produce
paralysis, and bring about collapse.**
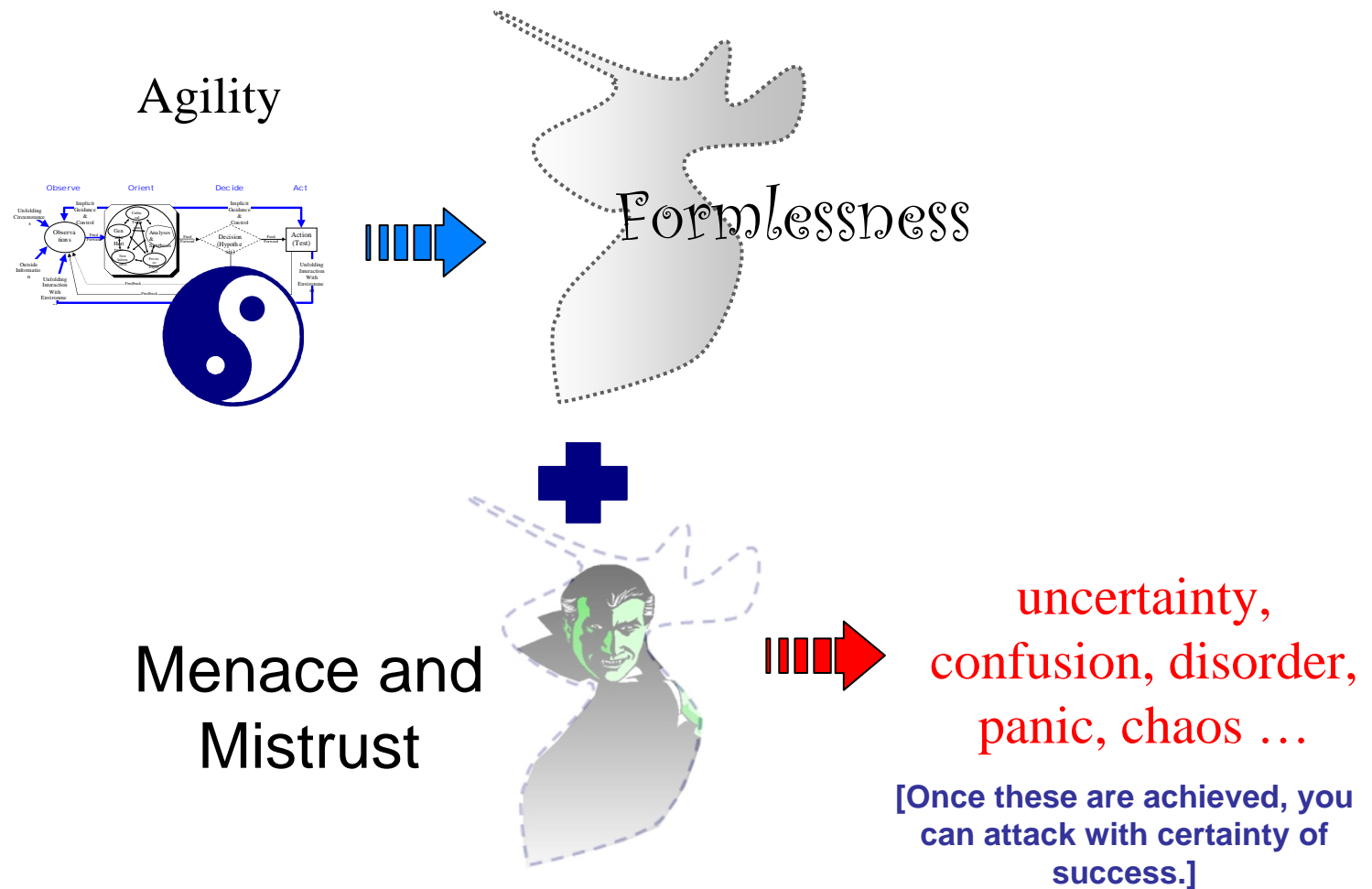
Boyd *Patterns of Conflict*, 132

3rd synthesis: Moral effects of timing and rhythm

Ancient strategists, and a few modern ones, also saw that by using timing and rhythm, one could attack the all-important moral forces that distinguish an army from a mob.

Using the model: *One* pattern of conflict

Agility

Formlessness

Menace and Mistrust

uncertainty, confusion, disorder, panic, chaos …

[Once these are achieved, you can attack with certainty of success.]

Final thoughts

There is a whole world of strategy out there, dedicated to ideas like:

You can control your opponents

You can achieve your goals

You don't *have* to do things that are really dumb

The debate about maneuver warfare is thankfully over…
I think for much of this we can thank Cols John Boyd,
USAF(Ret) and Mike Wyly, USMC(Ret), and certainly
my friend, William Lind, from Ohio, all men I have
known and worked with in the past.

BGen John F. Kelly, ADC
1st MARDIV
Marine Corps Gazette, April 2004

More Boyd, coming in June

THE STRATEGY OF JOHN R. BOYD APPLIED TO BUSINESS

CERTAIN TO WIN

Chet Richards

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Questions?

Comments?