The Dynamic OODA loop: Amalgamating Boyd's OODA Loop and Cybernetic Approaches to C2

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Outline

- What is required of a model of C2?
- The OODA loop
- Shortcomings of the OODA concept
- Cybernetic approaches to C2
- Shortcomings of the cybernetic approach
- How can we develop a general model of C2?
- The Dynamic OODA loop
- What does the DOODA loop do for us?

What is Required?

- Concepts are important because they guide our thinking and practice
- The concepts must be both descriptively and presecriptively adequate
- To be *descriptively adequate*, they must include important aspects of the C2 function
- To be *prescriptively adequate*, they must be
  - consistent with military theory and
  - capable of guiding fruitful development of C2 systems

Current Approaches

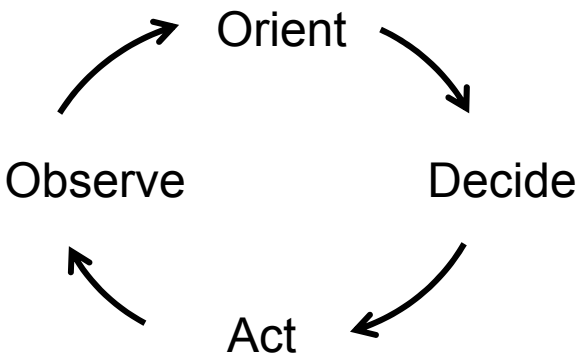
- Boyd´s OODA Loop is the dominant approach in discussions of C2 today
- The cybernetic approach is the dominant approach in research on C2

Boyd's OODA loop

- The OODA loop is by far the most popular concept of C2 today
- It is part of the doctrine of all US services, as well as that of many other countries
- It started in an attempt to explain why US fighter pilots were more successful than their adversaries in the Korean war

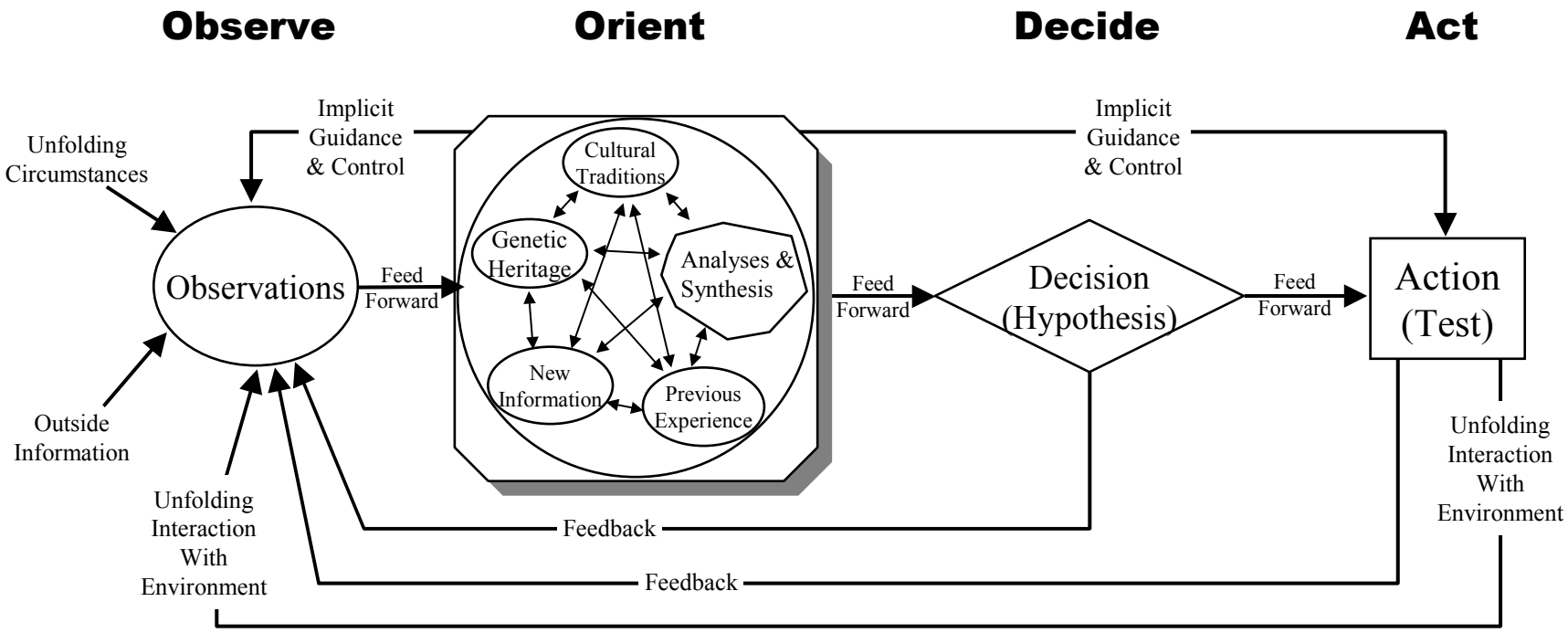
F-86 vs. Mig-15

- The F-86 provides better opportunities for Observation
- The F-86 provides better opportunities for Orientation due to powered controls
- US Pilots were better trained than their adversaries which enabled them to Decide and Act faster



Faster OODA loop

The Modified OODA Loop



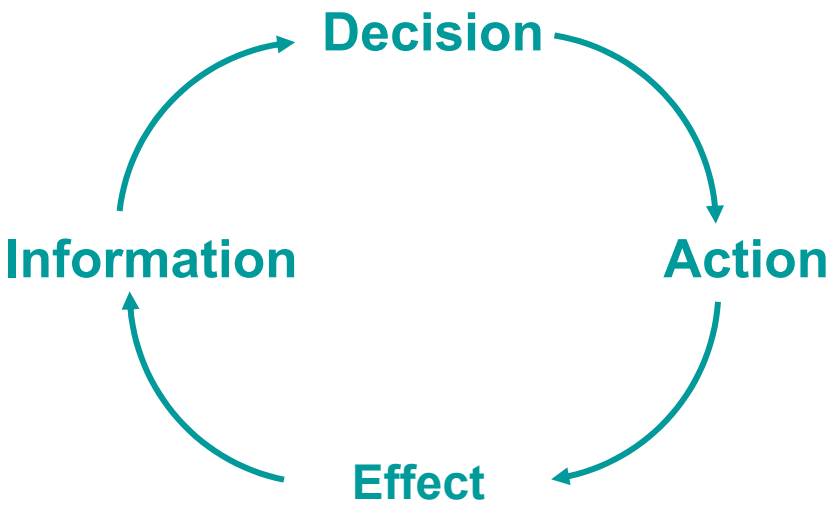
Why is the OODA Loop Inadequate?

- It does not include a representation of the environment and the effects of the decisions
- This leads to a focus on the decision process (speed of decision, ”getting inside the adversary’s OODA loop”) at the expense of other factors that may be just as important
- Getting inside the enemy’s OODA loop is important, but it is not all:
- Example: Would the Arab Air Forces have been more effective than the Israeli Air Force if they had gotten inside the OODA loop of the Israeli?
- The answer is no: The OODA loop is not prescriptively adequate
- To be fair: Boyd did not discuss ”winning and losing” in terms of the OODA loop but in terms of the effects that decisons would have.

Cybernetic Approaches to C2

- The cybernetic approch is the most popular approach to research on C2
- It differs from the OODA loop in that includes an explicit representation of the effects of action in the environment

The Dynamic Decision Loop (Lawson, Wohl, Brehmer and many others)



- There is a variety of cyberetic approaches
- A common feature is that C2 is seen as a form of dynamic decision making
- The problem in dynamic decision making is to handle the delays
- The Dynamic Decision Loop makes it possible to represent all sources of delay

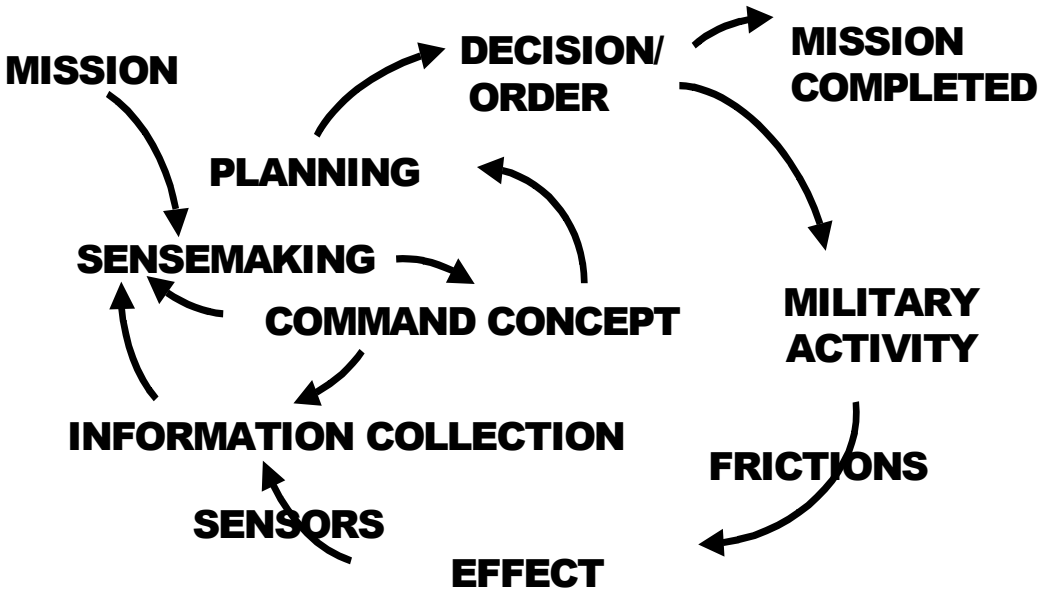
Shortcomings of the Cybernetic Approach

- A reactive conception of C2 (cf., Builder, et al. 1999)
- It is too general; it is not descriptively adequate
- It does not provide guidance in the development of C2 procedures and systems

Towards A General Model of C2

- How C2 has been conducted has varied; it was not conducted in the same way by Alexander as by General Schwartzkopf
- We cannot develop a general theory of C2 from the study of C2 processes in actual cases only
- C2 must be described in terms of *functions,* i.e,, what the C2 system must accomplish
- Historical studies indicate that the functions of C2 have always been the same even though the processes and procedures have varied (e.g., van Creveld, 1985)

The Dynamic OODA Loop (DOODA Loop)



- Describes the *functions* that a C2 system must fulfill and thus what is required for succesful C2
- All important delays are represented in the model
- It does not depict C2 as a purely reactive process
- It represents an amalgamation of Boyd's OODA loop, cybernetic approaches to C2, and the functions identified by van Creveld
- It is consistent with current military theory

What Does the DOODA Loop Do for Us?

- It provides a specification of what functions are required for effective C2
- It can be used as a device for integrating research on C2, hopefully turning the current explosion of results into an implosion
- It guides research
- It specifies what might need support
- The problem in developing C2 support becomes to develop the processes, procedures and systems that make it possibe to fulfill the functions
- Testing C2 support can be done by testing the extent to which the processes and systems developed actually fulfill the functions required for effective C2

QUESTIONS
OR
COMMENTS?