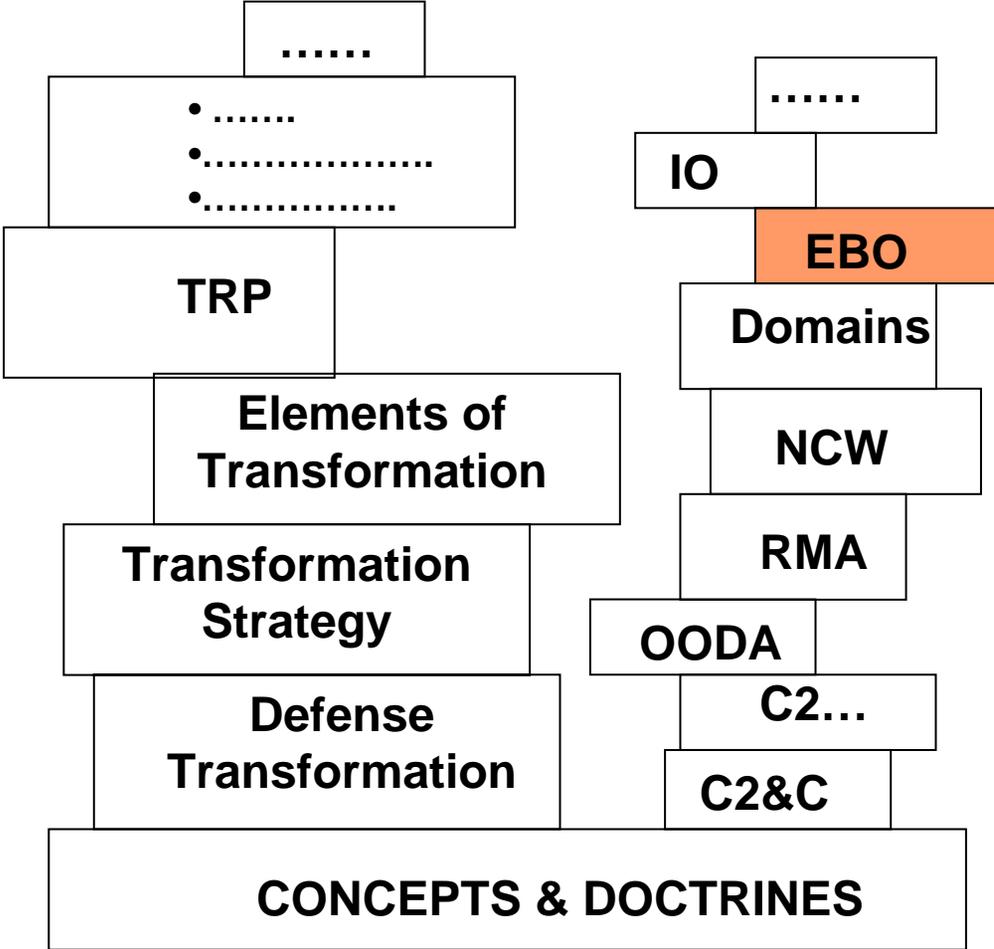


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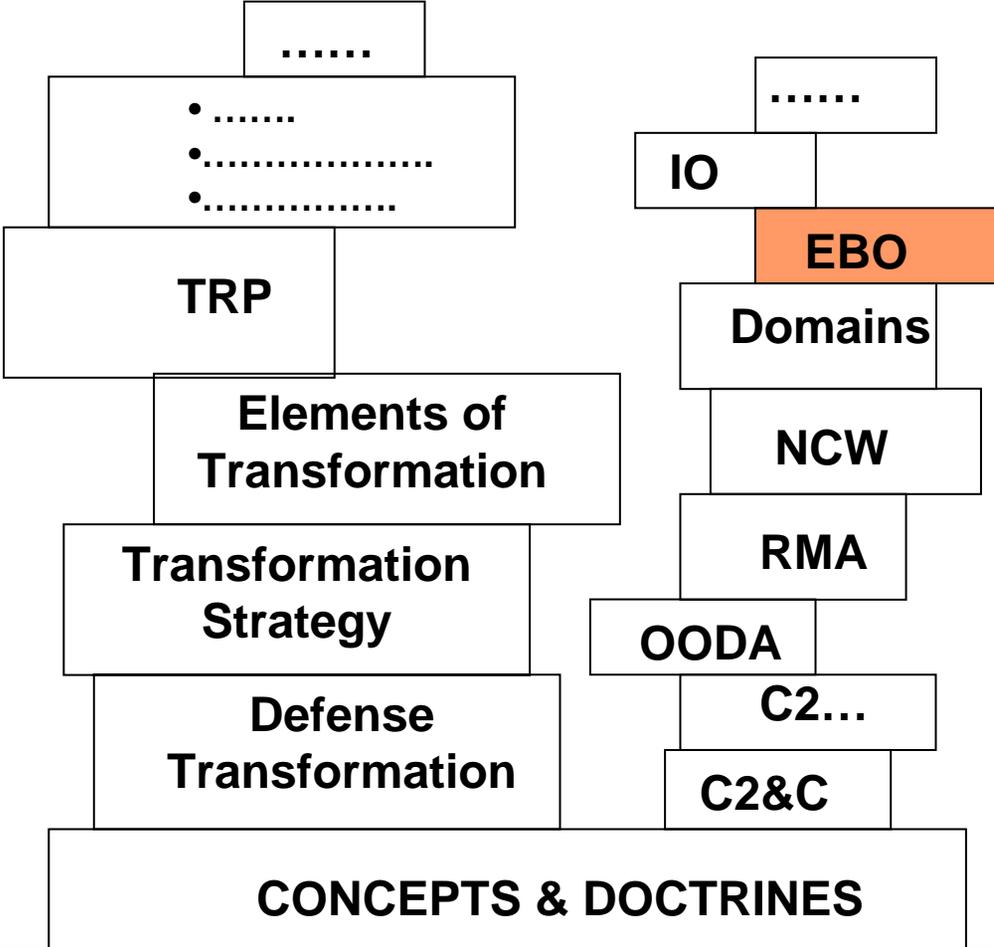
A Three Processes Effects Model Based on the Meaning of Information

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Emerging concepts and doctrines



Emerging concepts and doctrines



**Information and information exchange. Domains.
Fundamental processes for life**

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- 3. The model of three fundamental processes**
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1. Basic information meaning

Living systems – regardless of complexity – are open and interact with the environment by processes (J.G. Miller).

Two fundamental processes for life:

Information

Material-energy exchanges

Information is a fundamental process for life

1. Basic information meaning

Information is interpretable sensory impressions providing meaningful perceptions*.

Creation of information requires meaningful expressions

Information must be able to be sensed

Impressions must be meaningful – information must be understood in the receiver's sense; without any meaning – no information

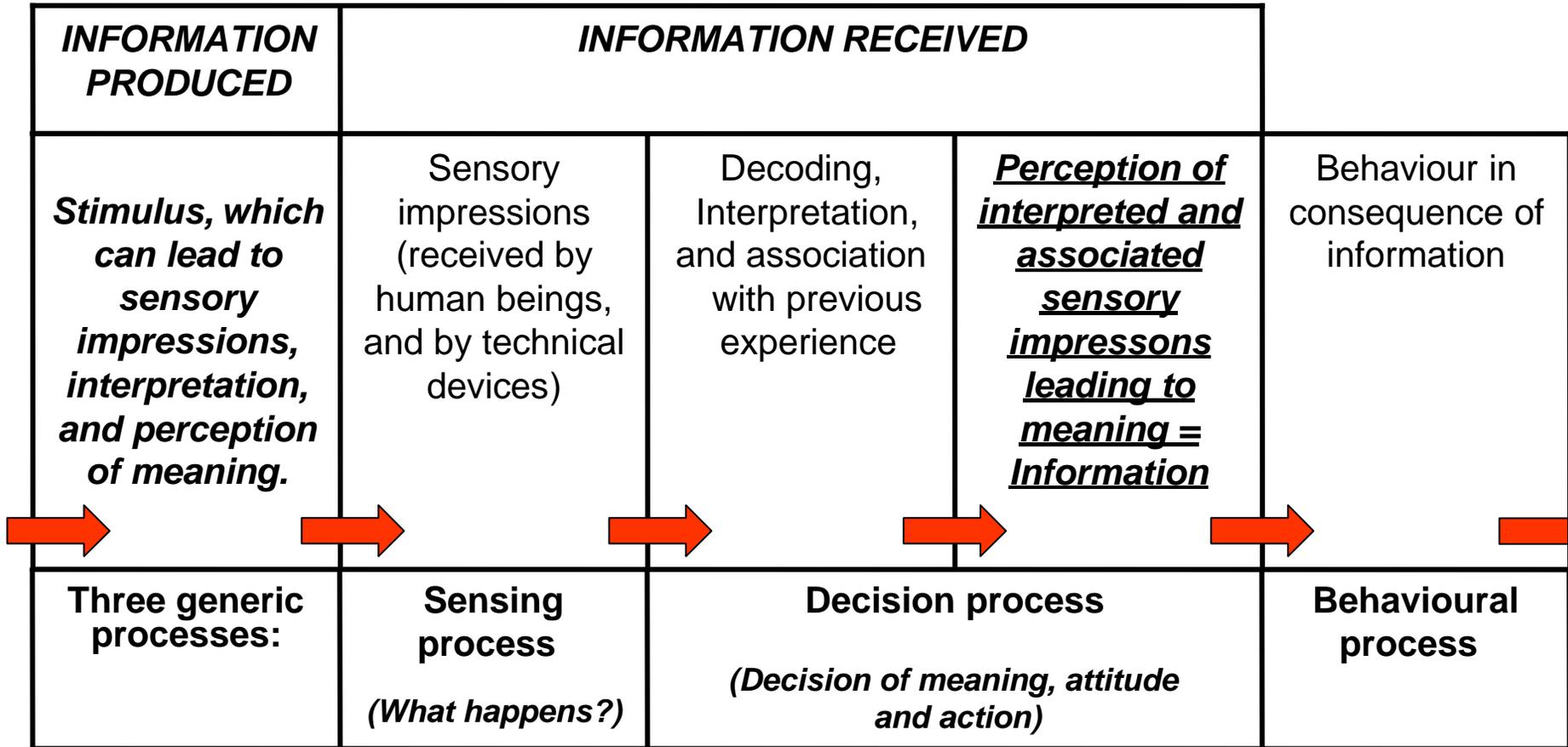
Information received is the result of a perceptual process

Information may be interpreted and perceived in different ways by different receivers and thus result in different meanings

Information is a prerequisite to initiate behaviour and is fundamental in all processes supporting life

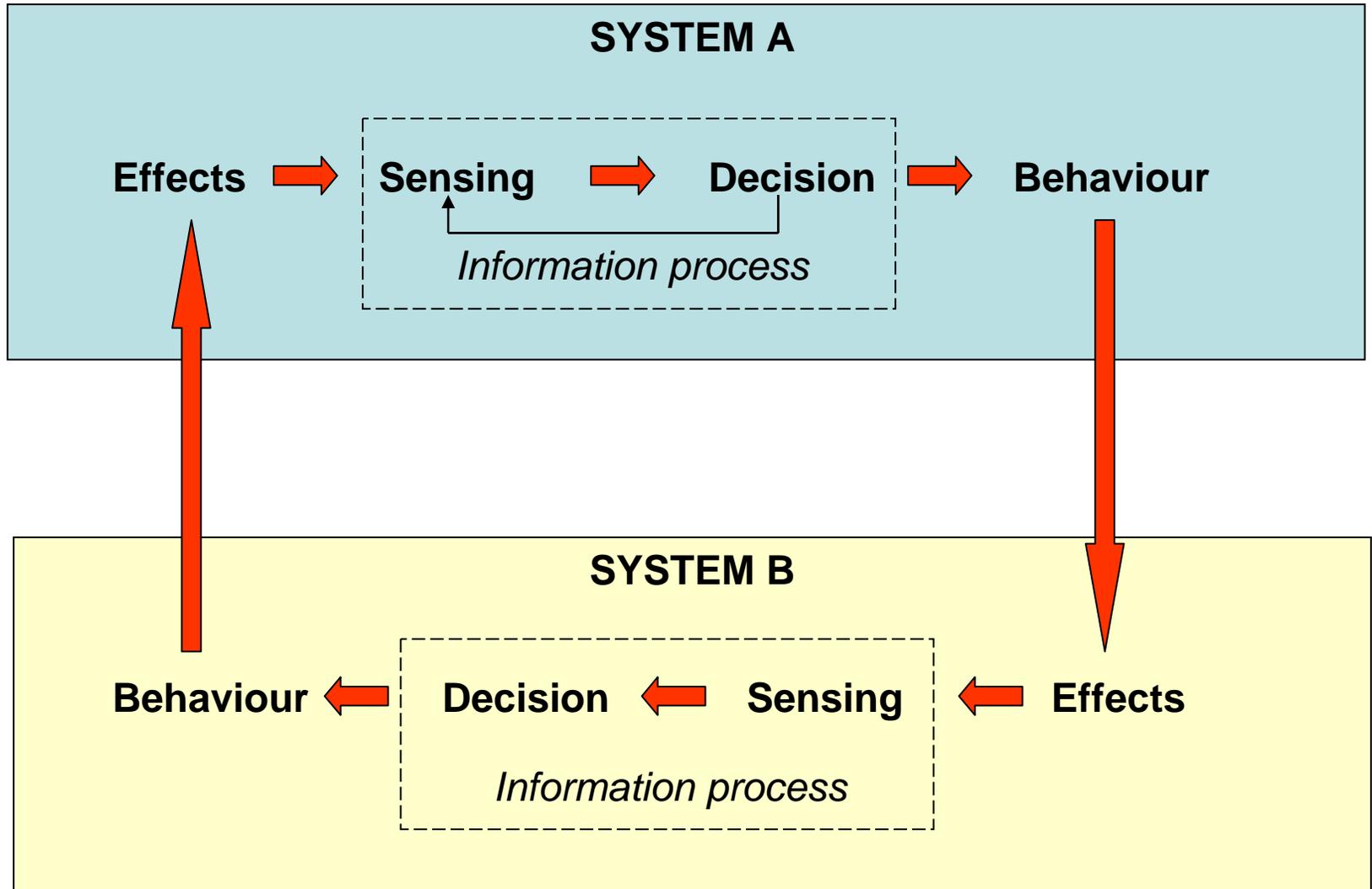
1. Basic information meaning

The information process



Note: Feedback loops are not illustrated.

1. Basic information meaning



One condition for life of any simple or complex system is interaction by means of information exchanges.

1. Basic information meaning

THREE STATES OF INFORMATION

Physical states of information

Ex: Physical objects and events, types, activity states, locations, waveforms, relations, roles. May stimulate the five human senses.

Symbol states of information

Ex: The set of symbol representation like text and sound in a language, and pictures. These form information products (e g documents, books, speeches). May be used for encoding and decoding of thoughts.

Perceptual states of information

Ex: The mind's estimate of the world state. Individually connected aspects of information based on personal life experience processes.

Note: The three states overlap one another.

1. Basic information meaning

United States of Information: Physical, Symbol, and Perceptual States.

A PERSON'S MIND

Physical + perceptual
states of information

PERCEPTUAL STATE =
= Estimation of physical,
symbol, and perceptual
states and relations of
things in the world.

Symbol + perceptual
states of information

Perceptual filter

THE PHYSICAL WORLD AROUND

Physical aspects
to be sensed
and perceived

Physical behaviour
expressed, aspects of
which may be sensed
and perceived in the
world around

Symbol aspects to
be decoded and
perceived

Symbolically
encoded aspects to
be perceived in the
world around

PHYSICAL STATES
(objects, actions, etc)

PERCEPTUAL STATES
in the world around

SYMBOL STATES
(text, sounds, pictures
etc)

1. Basic information meaning

The distinction between information products and information processes.

Producing information material is a process

It includes perceptions made by the producer.

Information material is a product.

It contains information symbol states and information perceptual states of the producer.

Information is a process.

The information material (the product) is processed through the perceptual filter of the receiver.

It includes information symbol states and perceptual states of both the producer and of the receiver.

Information products may be accessed but not other people's information, as it contains their minds.

1. Basic information meaning

Symbols, and information products made of symbols

Symbols (e g signs, letters and sounds in languages, pictures, and objects representing something) form information products.

Examples:

Data

Messages

Facts

Reports

Intelligence information

Books

Speeches

Models

Simulations

Computer programs

Media products

Financial symbols (coins, bank notes)

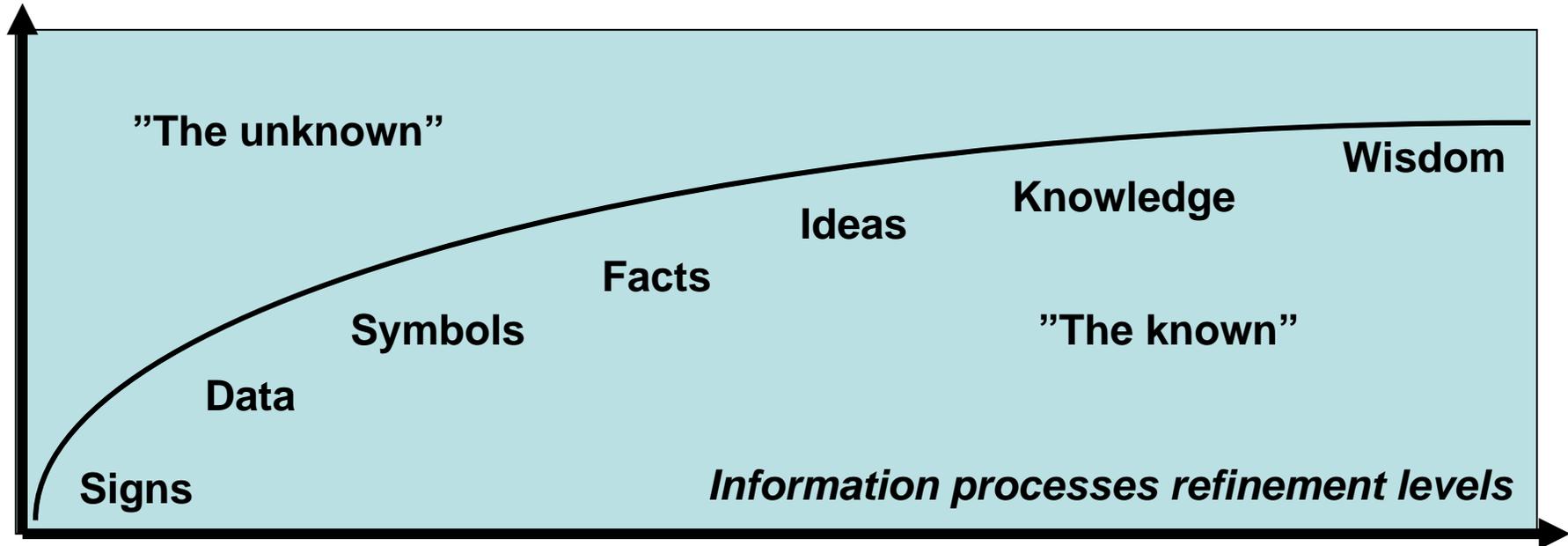
Ethnical and religious symbols

National and political symbols

1. Basic information meaning

INFORMATION PRODUCTS IN INFORMATION REFINEMENT PROCESSES

Information products sophistication levels



The act of knowing involves the processing and refinement of sensory information and includes perception, awareness, and judgement.

Technical refinement levels in multisensor data fusion are object refinement, situation refinement, impact refinement, and process refinement of physical states of information. In addition to technical fusion refinement human fusion refinement processes involve symbol and perceptual states of information.

2. Classifications based on information

A NEW CONCEPT OF THREE BASIC DOMAINS

Based on the classification of information and the semiotic distinction between physical, mental, and symbol objects a new concept of three basic domains is derived. The concept allows for dynamic interaction between the three domains. According to the new concept the world consists of three basic domains:

- ***The concrete domain***
- ***The symbol domain***
- ***The abstract domain***

Semiotics is the study of human communication, especially the relationship between words and the objects or concepts they represent.

2. Classifications based on information

THE THREE DOMAINS

THE CONCRETE DOMAIN – "the sword"

Physical objects, physical characteristics, states, and activities, tangible entities

THE SYMBOL DOMAIN

The domain where characteristics of concrete and abstract entities are transformed into representations of common systems of symbols for communication and dynamic interaction

THE ABSTRACT DOMAIN – "the mind"

The domain of the mind of all living beings, and of all intangible entities

"There are but two powers in the world, the sword and the mind. In the long run the sword is always beaten by the mind." (Napoleon Bonaparte)

Symbols are catalysts strengthening and shaping the powers of the sword and the mind.

2. Classifications based on information

Domains used in The Network Era

Three domains are described in connection with Network Centric Warfare (NCW), and Effects Based Operations (EBO)

- *The Physical Domain* ← (Physical state of info)
- *The Information Domain* ← (Symbol state of info)
- *The Cognitive Domain* ← (Perceptual state of info)

The information domain only contains the symbol state of information, while the physical state of information belongs to the physical domain, and the perceptual state of information to the cognitive domain.

3. Three fundamental processes

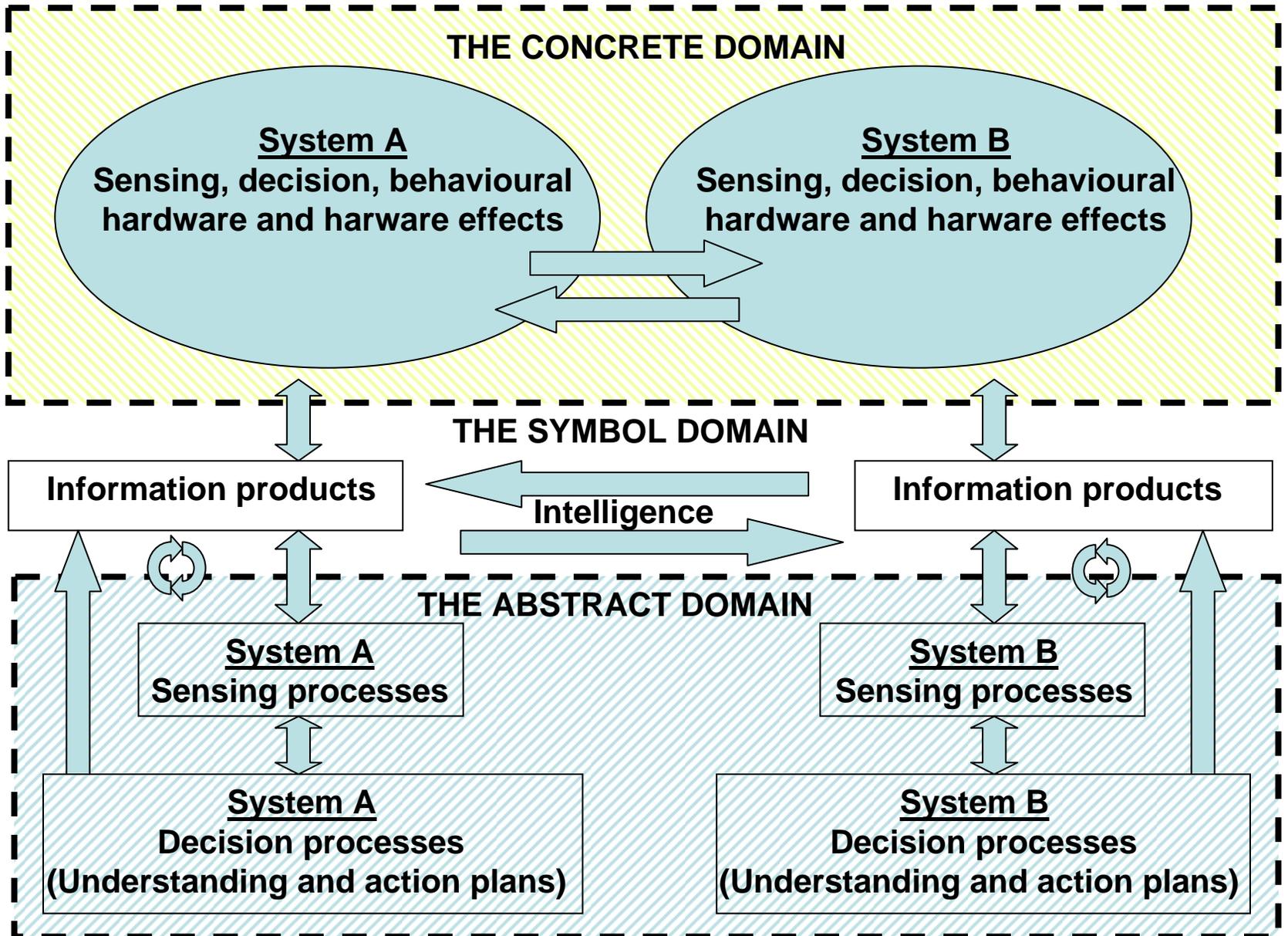
THREE FUNDAMENTAL PROCESSES

Information is the central element in all tenets of operations

The basic meaning of information is associated with the three fundamental processes:

- ***The sensing process***
- ***The decision process***
- ***The behavioural process***

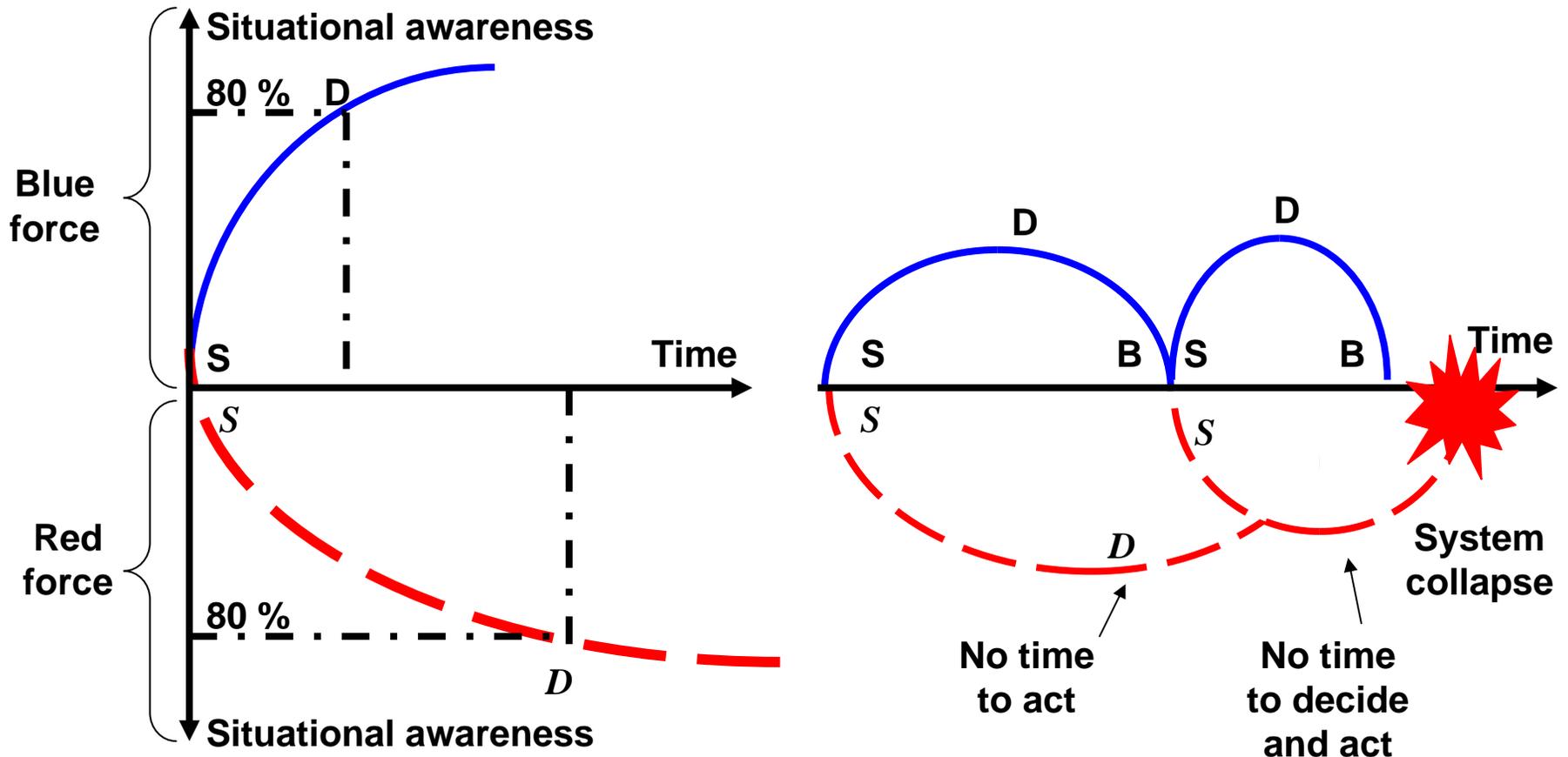
GENERALIZED MODEL OF HARD AND SOFT INTERACTION BETWEEN TWO SYSTEMS



The end state of behaviour is mutual understanding, and acceptance of conditions.

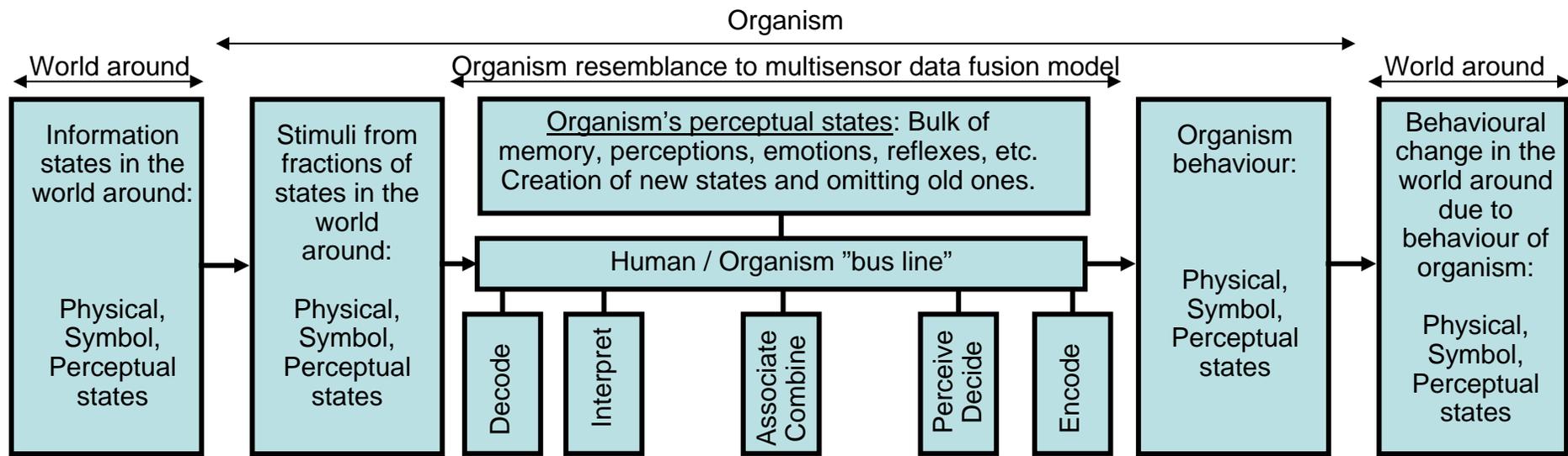
3. Three fundamental processes

THE IMPORTANCE OF TIME IN THE PROCESSES



Situational awareness increases with time and the blue force is leading. Information and situational awareness lead is a condition for action and behavioural lead.

Sensing (S), Decision (D) and Behavioural (B) processes are just in time only for the blue force



Three processes model	SENSING PROCESS	DECISION PROCESS Perceptual process including information fusion and refinement				BEHAVIOUR OF ORGANISM	BEHAVIOUR OF ENVIRONMENT
		Interpretation	Perception and decision of meaning		Decision of response		
JDL multisensor data fusion model (revised)		Attribution based estimation LEVEL 1	Situation assessment /awareness LEVEL 2	Impact / threat assessment /awareness LEVEL 3	Decision making process LEVEL 4		
Boyd's loop	OBSERVE	ORIENT			DECIDE	ACT	BEHAVIOUR OF ENVIRONMENT
Intelligence cycle	COLLECT (1)	COLLATE	EVALUATE		DISSEMINATE		COLLECT (2)

Domains in EBO	PHYSICAL	COGNITIVE			PHYSICAL
Network Era	Sensor network	Decision / command network			Effector networks

5. Conclusions

Information is central in all processes supporting life.

Information is interpretable sensory impressions providing meaningful perceptions.

Information has three states: physical, symbol, and perceptual states.

There is a distinction between information and information products. Information is a process of information products, involving the receiver's perceptions.

Three basic domains portraying the world are derived from the states of information: The concrete domain, the symbol domain, and the abstract domain.

5. Conclusions

The symbol domain is where characteristics of concrete and abstract entities are transformed into representations of common systems of symbols for communication.

The three domains in EBO and NCW can be misleading. The information domain used in EBO and NCW is a symbol domain if information is interpretable sensory impressions providing meaningful perceptions. Creation of information incorporates cognition processes.

The new concept of three basic domains is wider than the physical, information, and cognitive domains, and is considered more applicable to Effects-Based Thinking as it covers all areas of interest in society.

5. Conclusions

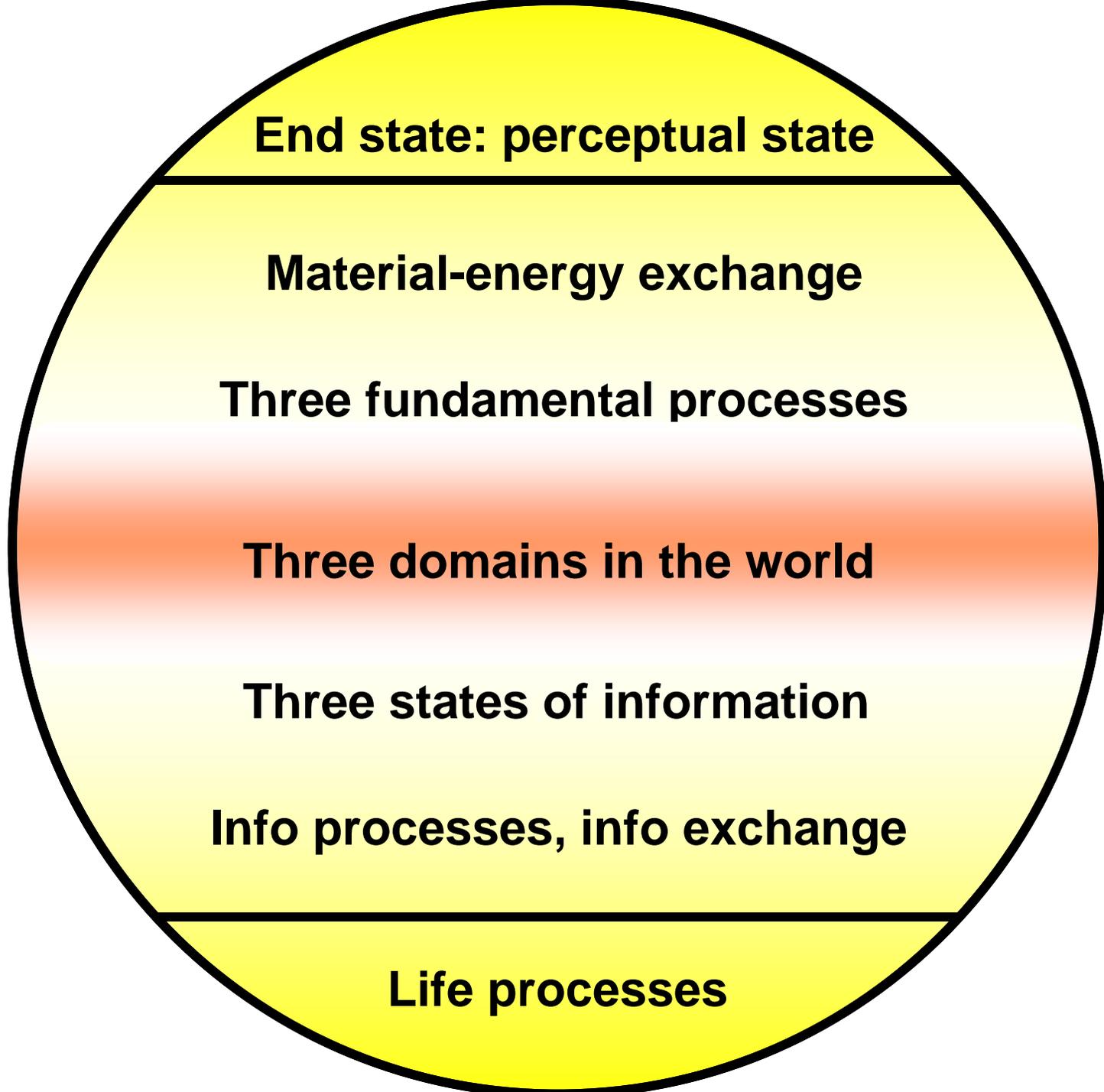
The basic meaning of information is associated with three fundamental processes: sensing, decision, and behavioural processes.

The sensing, decision, and behavioural processes, as well as the behavioural effects in the world around have physical, symbol, and perceptual states.

The information states, the basic domains, and the three fundamental processes comply with tenets in the Network Era and with Effects Based Thinking, and are believed to be especially useful in effects based analysis in the realm of the whole society.

A desirable end effect in a conflict is a change of behavioural state, and change of the perceptual state is the prime objective.

The three fundamental processes comply as concept with Boyd's OODA loop, with the revised JDL multisensor data fusion model and with the intelligence cycle.



Man

Swords

Symbols

Minds

Man

The End