

**OBSERVER PERCEPTION-REFLECTION  
DYNAMICS:  
A SHARED PARADIGM IN  
HUMAN-MACHINE TEAMING FOR ADAPTIVE  
PREPAREDNESS**

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# In a Nutshell:



- ❑ In this white paper, we discuss the conceptual dynamics of an observer, and the cycle of observation.
- ❑ Observation process could be modelled as creation of a graph point in the individual and collective memory
- ❑ Such graph can be used as a collective reference of state and truth value regarding an event

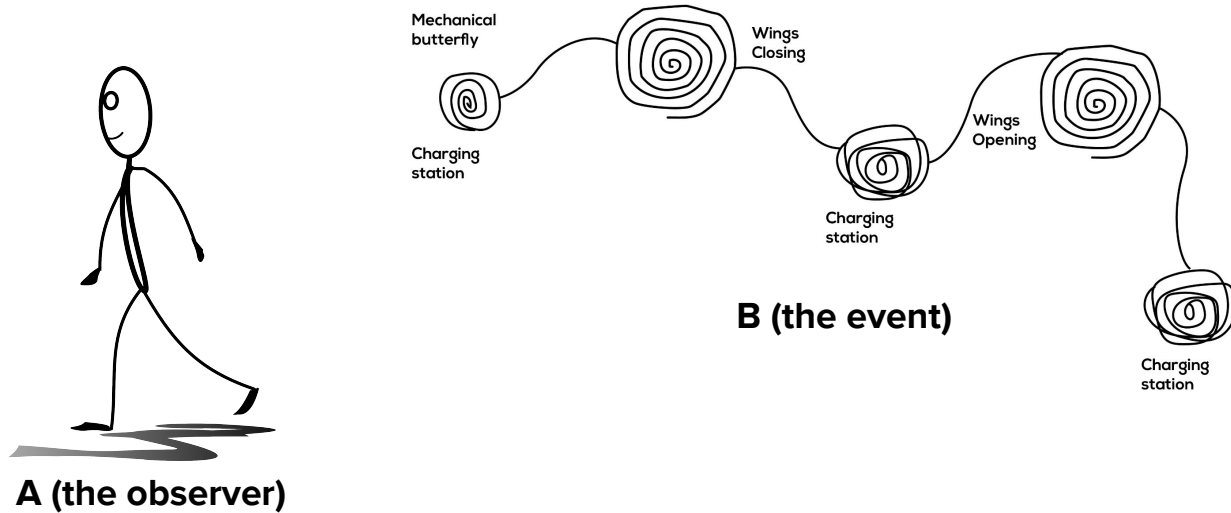
# Assumptions:

- ❑ Observer as a generic entity, able to sample signal and create a record it
- ❑ Honest observer - records and readily relay anything they happen to perceive
- ❑ Observation is done using an eye

# The Observation Setup

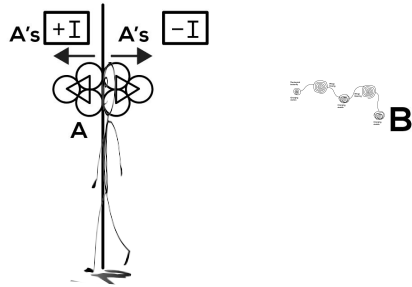
## The Event Object Behind Primary Observer

Suppose a random interesting event occurs behind the observer.  
Say an alien ship makes an appearance somewhere behind the reference observer

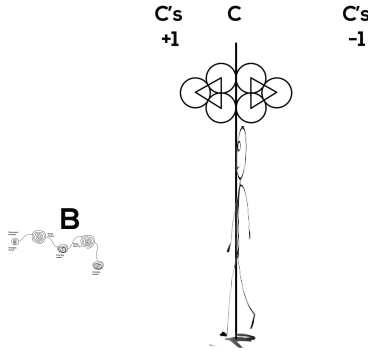


# The Observer

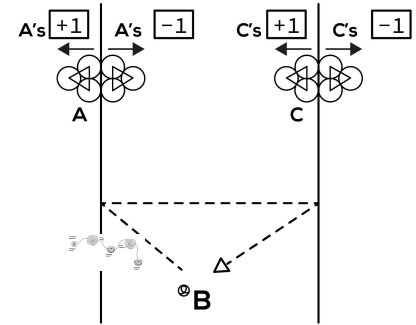
## Observer's vantage point and direct observation



Observer A,  
his positive and  
negative observation  
spectrum,  
and object B in A's  
observational -ve  
(Let I represent  
input)



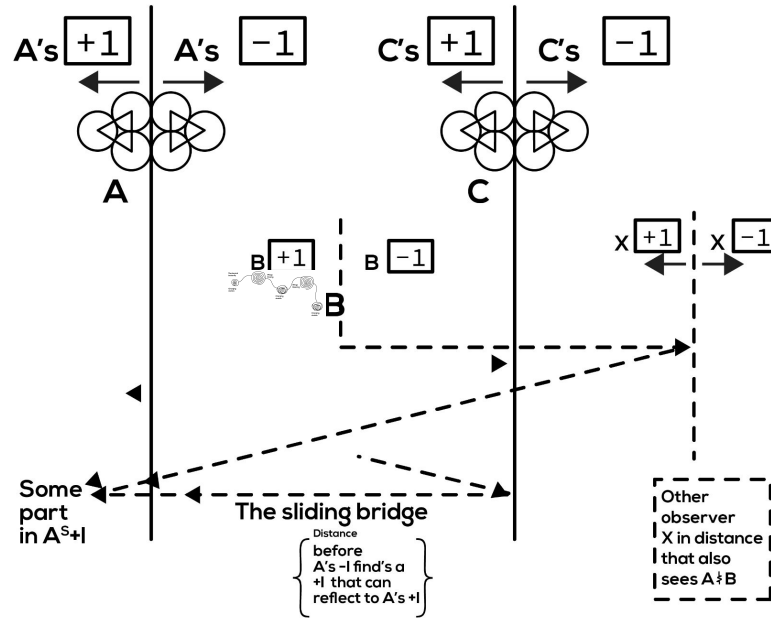
Observer C, who as an  
object is negative to A,  
has a vantage point that  
has event B within the  
positive spectrum of  
their observational  
universe.



Now event B can  
be accounted for  
if Observer C is  
sampled as a  
witness.

# Secondary Observation

## Indirect observation through recorded accounts



Observer A latently observes Object B through signals received from its primary observers

## Conditions for observation, negative and positive observation spectrum

- Observers existence at suitable vantage point necessary condition for observation
- An event occurring outside field of view of an observer might as well not have happened

Let's call the space where an observer cannot directly observe, their negative observation spectrum  $\Rightarrow$  can be modelled as observer's eye collecting negative signal

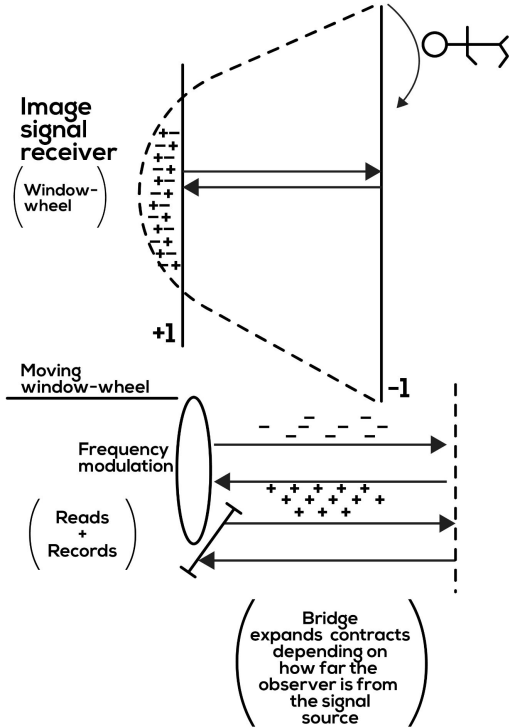
Negative signal events can later be learned about through a second hand record and hence observed latently  
 $\rightarrow$  negative signal inverted

If and when a negative signal is inverted to positive depends on availability and proximity of valid inverter i.e. an observer that has the event in their positive

For an observer to relay record of an event to another observer, they need to have created and recorded a memory of it

# The Observer's eye

Signal reader, inverter, recorder

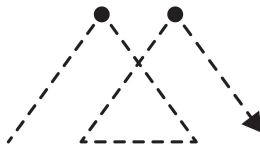
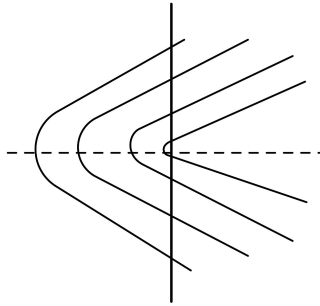


- The observer's eye is a signal reader and recorder
- Signals collected can be positive or negative
- Inversion of negative signal can be compared to development of a film negative or flipping of a mirror image



# The Observer Limitations

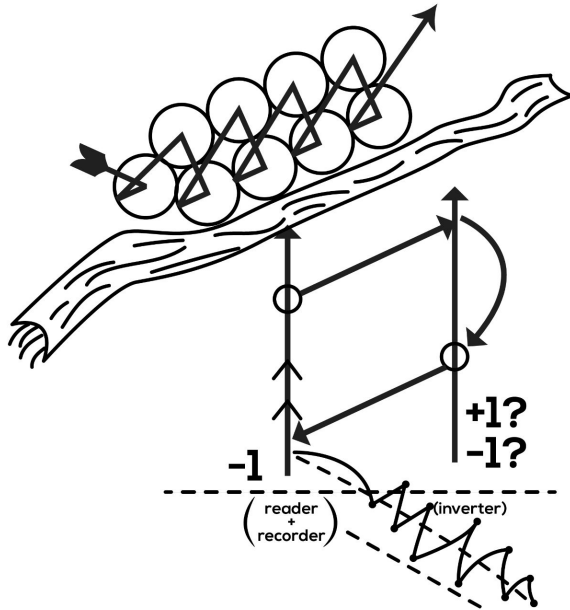
## The range of the observer's eye



- The observer's eye has a restricted frame size and rotation radius
- The structural rules of the eye dictate its range.
- The eye changes its focus due to movement of either the observer or the subject being observed.
  - Hence signal collection flips between positive and negative

# The Observer Observing:

The observer's eye observing and recording observations on the memory graph

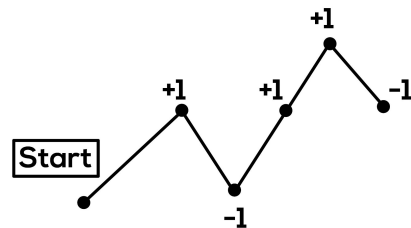
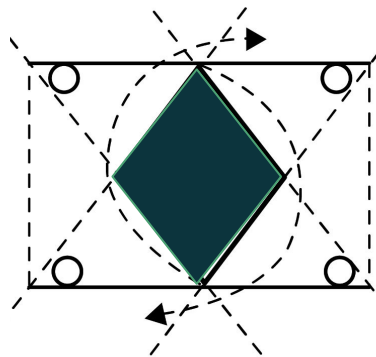
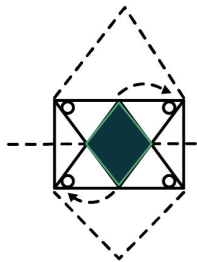
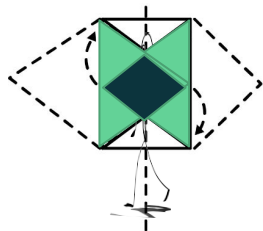
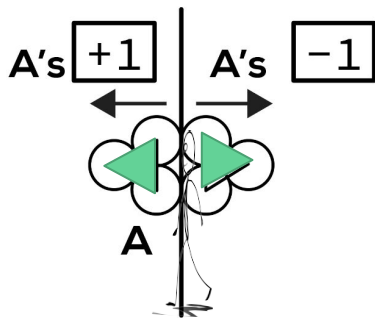


- The distance from signal source to observer's eye determines how fast the signal is received and recorded

Observer's reader and recorder looking to the distance but with perspective on the object limited by vantage position

# The Observation

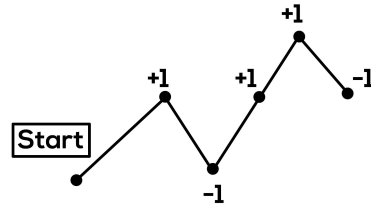
Projection - reflection and formation of the observation unit





# The Event Record

- In order to compute a weight to value an event, observers can relay that event to a common reference observer and that observer can graph an aggregate account of the event.



- Even though different observers may offer varying accounts, the graph will tend towards a truth value that reflects the community observation
- A practical of this is the stock market.
- The stock market as a cognitive observer receives secondary signal regarding a bubble-inducing event and reflects it accordingly
- In the advent of blockchain based smart contracts, more forms of self-graphing event records are possible

# Potential Applications:

- The stock market as a form of crowd-sourced accounting for events salient to the community, has allowed for meaningful prediction of upcoming economic states based on what has been seen previously.
- A similar model could be applicable to crowdsourcing security information
- Different users can draw utility from this reference observer, to anticipate key changes in various security scenarios
- This would increase the capacity for adaptive preparedness in the cybersecurity space

-- Thanks!! --