



## Organizational Agility

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### Evolution of C2

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## Why Organizational Agility?

- Complex Endeavours
  - Complexity in Environment
  - Complexity in “Self”
    - Effects-Based Thinking
    - Comprehensive Approach
    - Network Enabled Capability



## Defining Organizational Agility

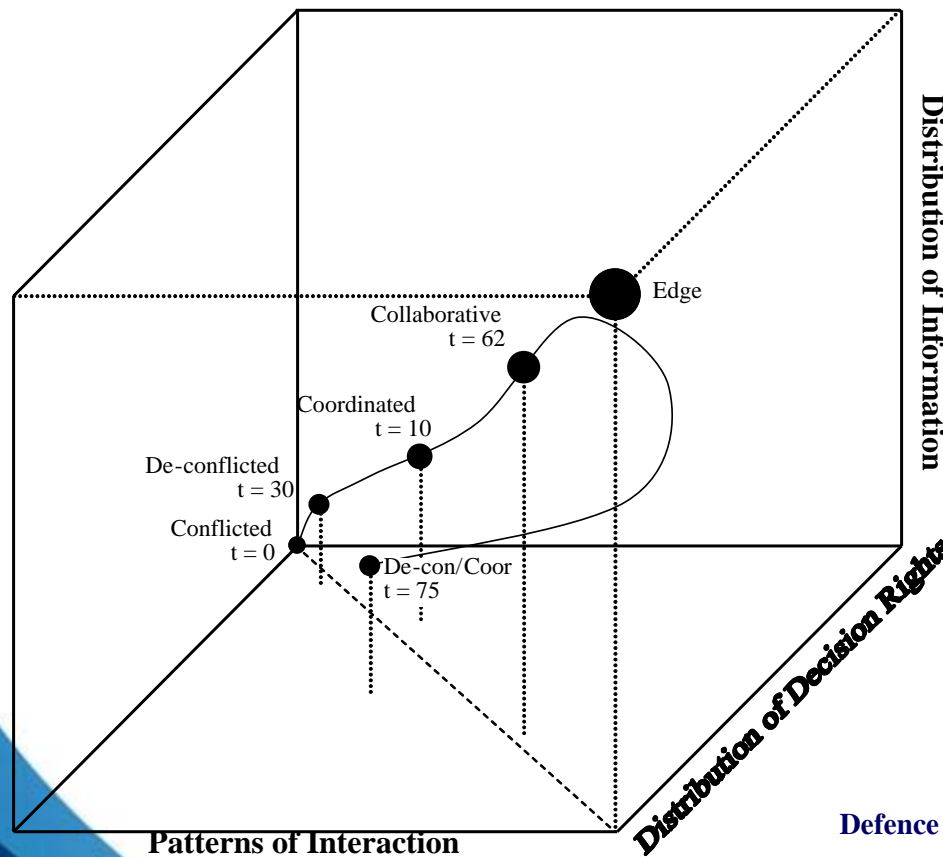
- (Merriam-Webster, 2009)
  - Agility: The quality or state of being agile: nimbleness, dexterity (played with increasing agility)
  - Nimble: Quick and light in motion: agile (nimble fingers)
  - Dexterity: Readiness and grace in physical activity; especially: skill and ease in using the hands (manual dexterity)





# Defining Organizational Agility

- Agility is the ability to
  - recognize a change in situation complexity, and therefore
  - transition between C2 (GM) approaches (SAS-065, 2010)

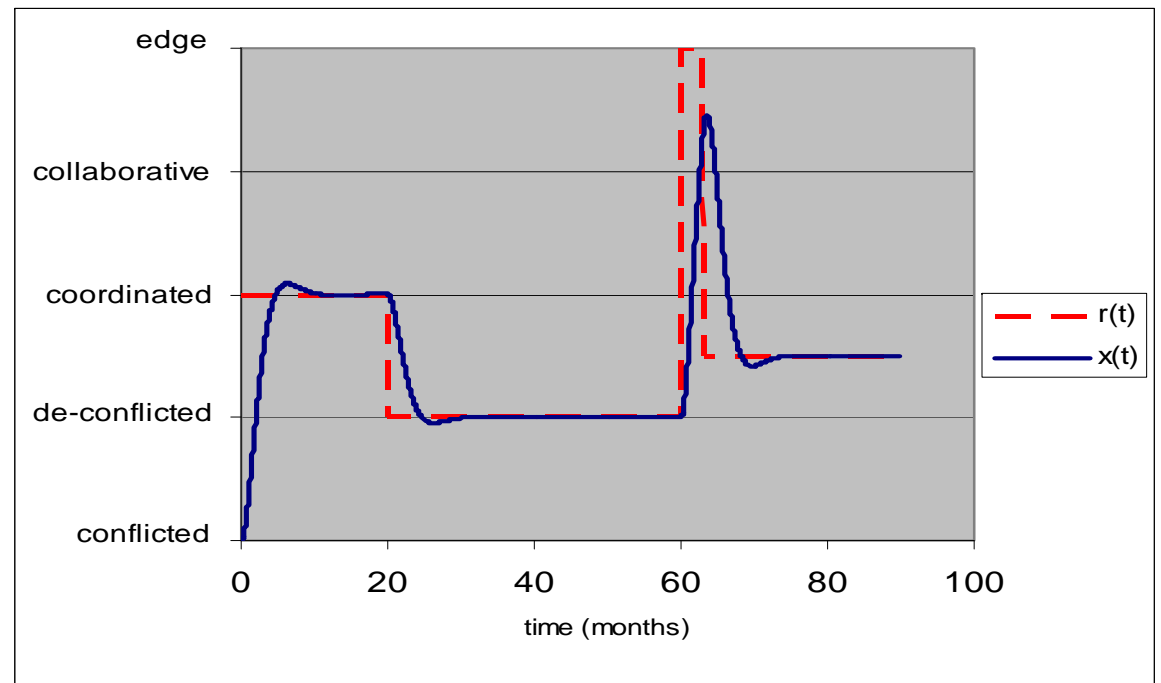
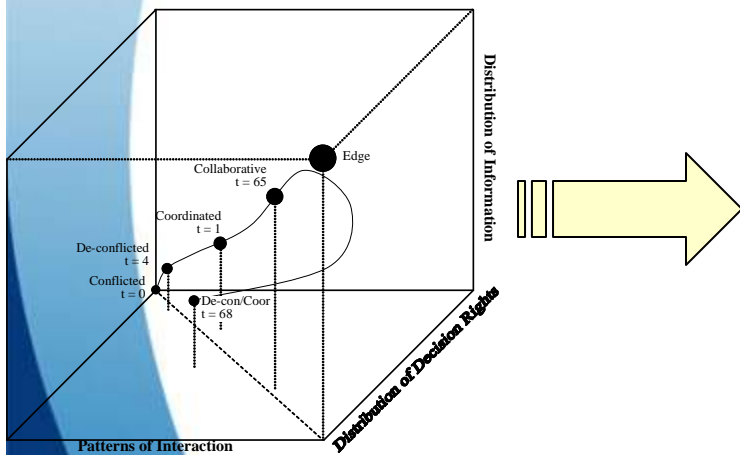


C2 (GM) Approach Space



# GM Approach Dynamics Model

- Converting the **Governance and Management (GM) Approach** space trajectory into the time domain.



## Assumption:

Conversion from complex situation to required GM approach is known

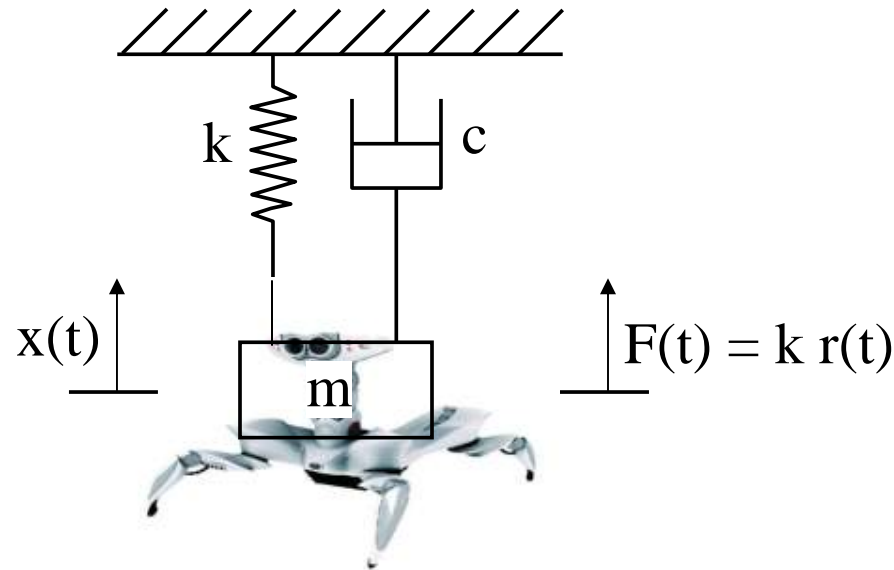
GM approach is a continuous function of time





## GM Approach Dynamics Model

- We postulate that **GM Approach transitions** have similar dynamic features as a mass-damper-spring **motion system** such as in robotic limbs.



### Organization Attributes

m – size

c – resistance/willingness

k - flexibility

$$F(t) = kr(t) = m\ddot{x}(t) + c\dot{x}(t) + kx(t)$$



## GM Approach Dynamics Model

- The change in GM Approach momentum (speed  $\times$  size) is equal to the sum of GM Approach forces (factors that influence the GM approach over time).

$$m\ddot{x}(t) = kr(t) - c\dot{x}(t) - kx(t)$$

Where

$m$  – organization **size** (mass, inertia)

- Not sure how to measure (no. of people? no. of resources?)

$c$  – organization resistance (**willingness**) to change

- Generally speaking, **willingness** to change is related to **governance**

$k$  – organization **flexibility** (stiffness)

- Generally speaking, **flexibility** is related to **management**





# M&S Demonstration

## Scenario

$t = 0$ : complex endeavour **requires** a **coordinated** GM approach.

$t = 0^+$ : organizations' own GM approaches **conflict** with each other.

$t > 10$ : Collective **converges** onto a **coordinated** GM approach.

$t = 20$ : The situation is stable, business rules are established, and a **de-conflicted** GM approach is **required**.

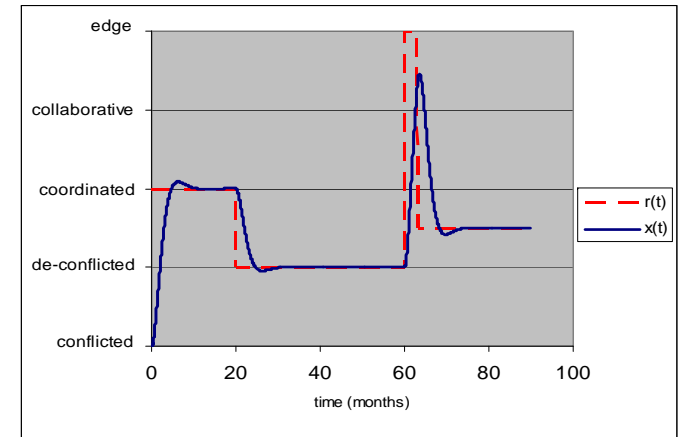
$t > 30$ : Collective operates with a **de-conflicted** GM approach in the **steady state**.

$t = 60$ : a catastrophic event occurs that **requires** an **edge** GM approach.

$t = 60^+$ : The collective responds to the demand, passes through **collaborative**, but never achieves edge GM approach (too massive, not willing, too flexible).

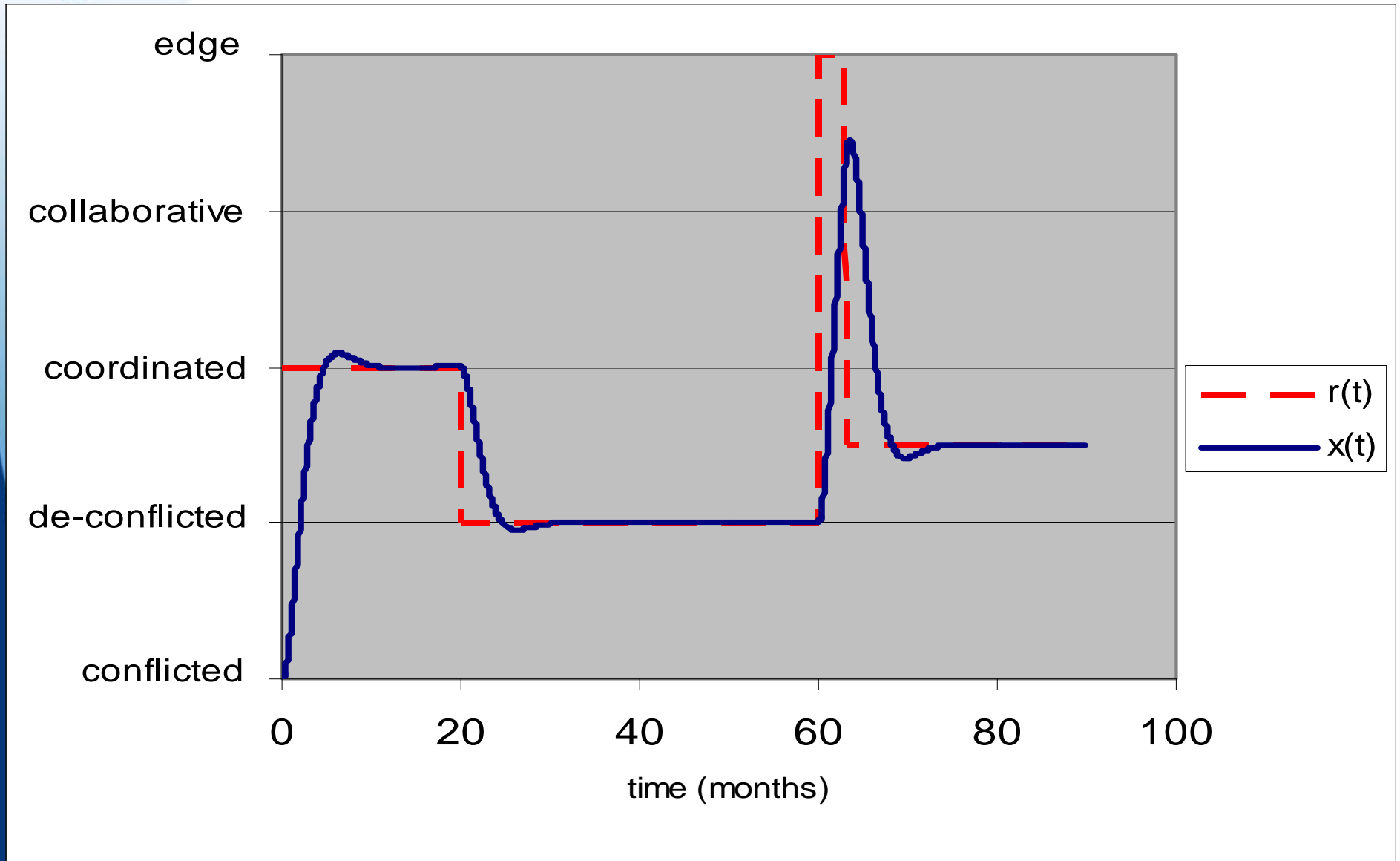
$t = 63$ : the event subsides after 3 months to where the situation **requires** a GM approach somewhere between **coordinated** and **de-conflicted**.

$t > 75$ : For the given size, willingness to change, flexibility (and other organizational factors), the collective is able to **converge** onto a GM approach between **coordinated** and **de-conflicted**.





# M&S Demonstration





## M&S Demonstration

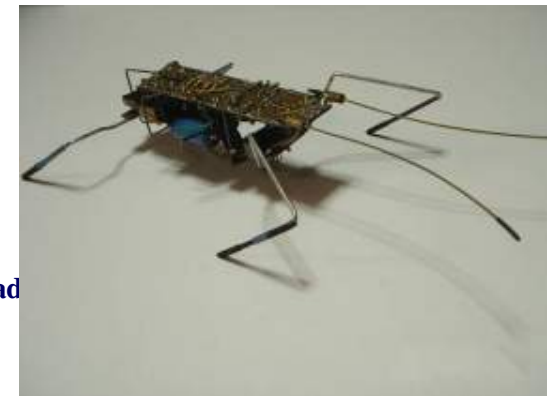
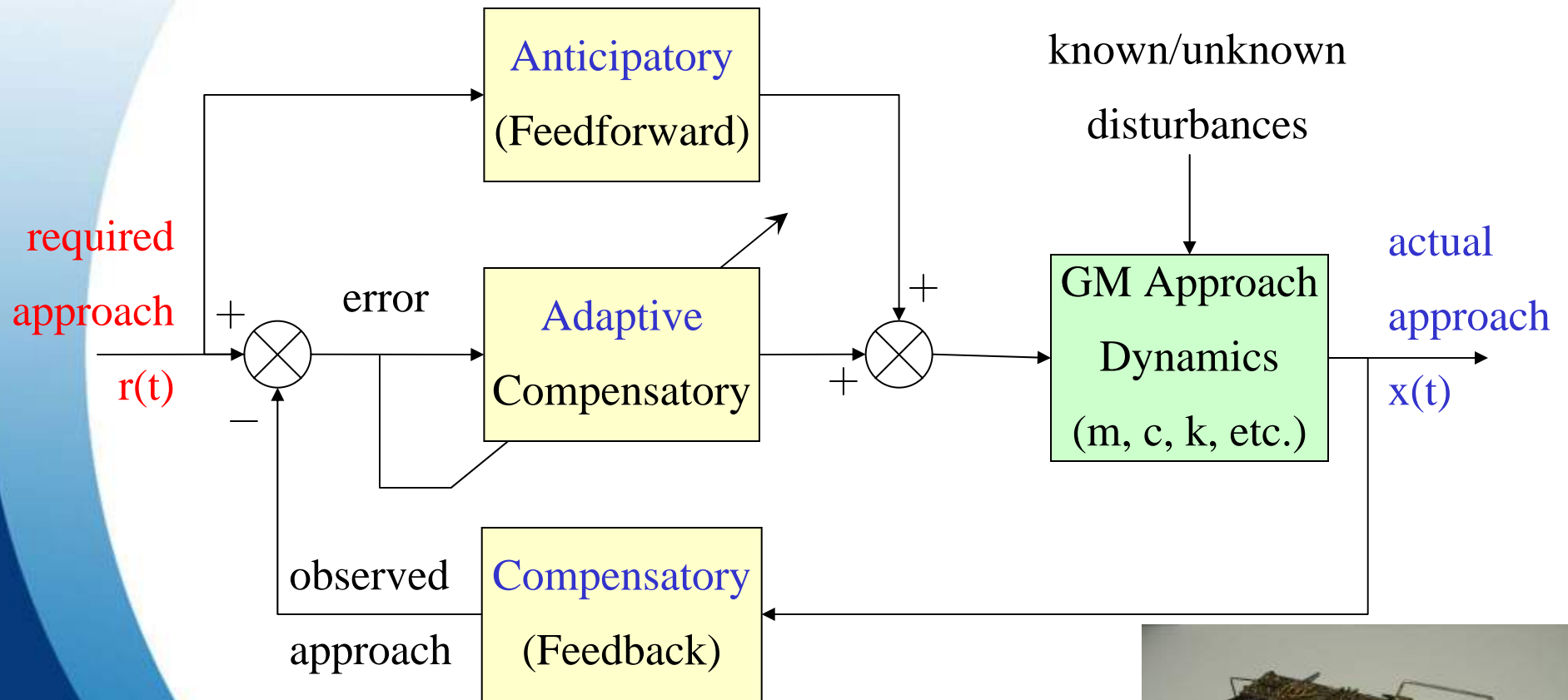
- GM approach dynamics (response time, minimum overshoot, etc.) can be **improved** by adjusting **organizational attributes**
- **Compensatory, Adaptive, Anticipatory, and Learning** techniques may be employed to adjust the model parameters.





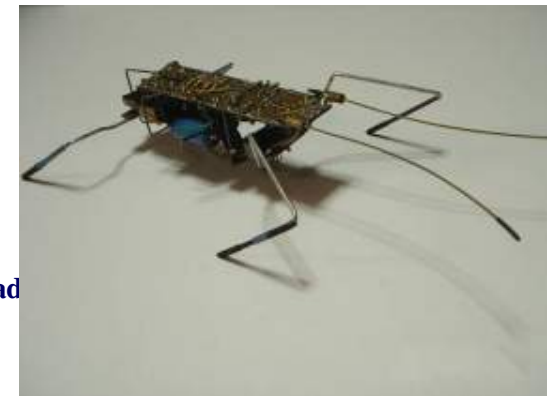
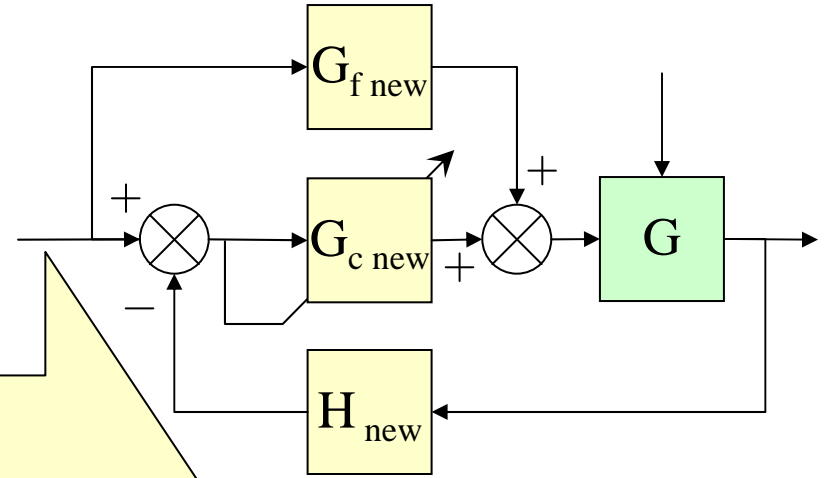
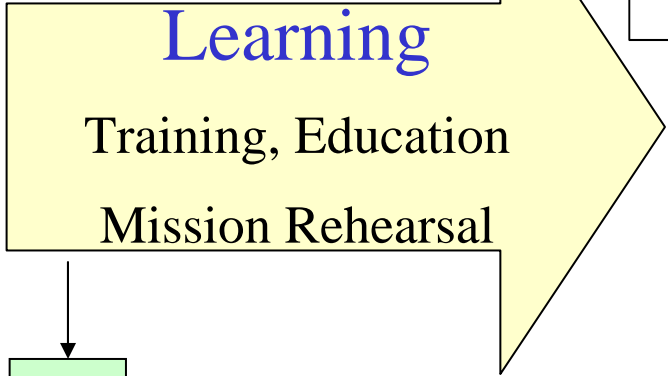
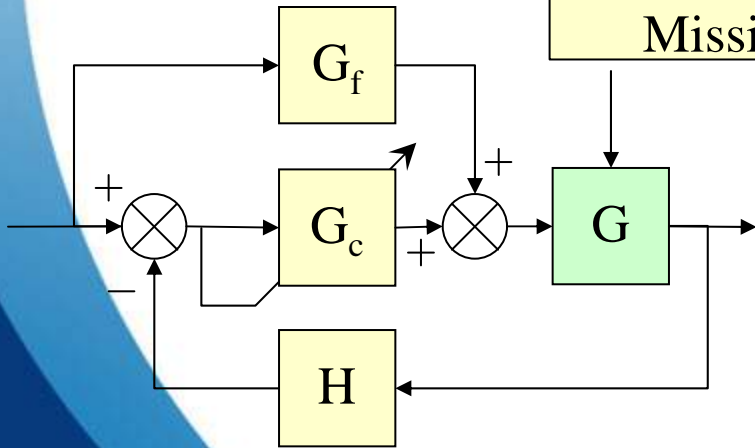
## New Agility Perspective

- While SAS-065 suggests agility is the ability to transition between GM approaches, this perspective views **agility** as a set of **organizational behaviours** that **improve** the transitions between GM approaches by adjusting **organizational attributes** such as size, willingness to change, and flexibility.
- **Organizational Behaviours associated with Agility** (from a robotics metaphor):
  - **Compensatory**
    - Organizations with compensatory behaviours set the conditions for a stable response (i.e., feedback mechanisms).
  - **Adaptive**
    - Adaptive solutions (“online” attribute adjustments) are powerful when the organizational attributes are not known precisely.
  - **Anticipatory**
    - Anticipatory methods strive to “cancel out” real-world, known disturbances
  - **Learning**
    - Learning (“offline” attribute adjustments) involves training, education, mission rehearsal, lessons learned, etc.



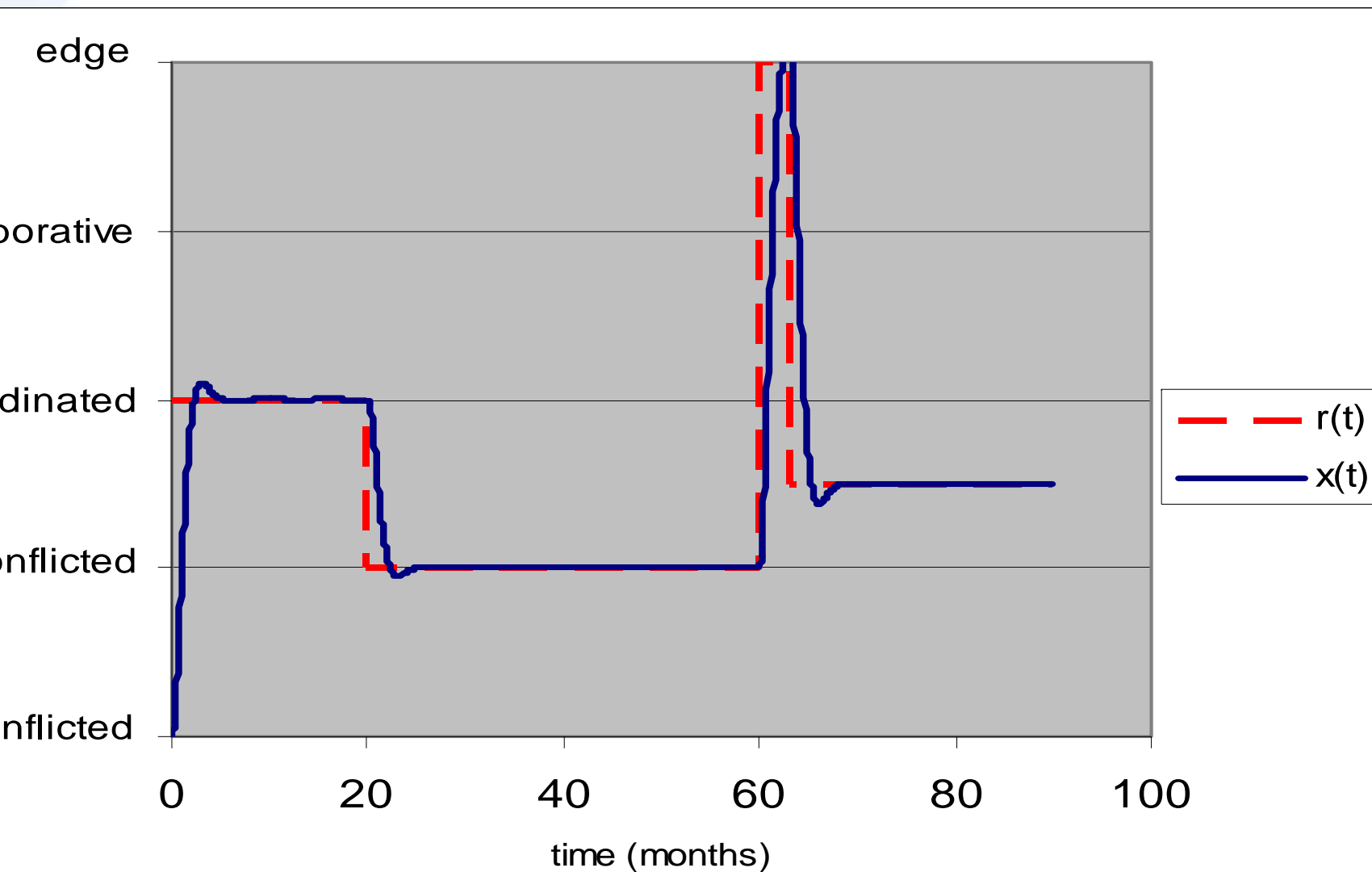


$G_f$  – Anticipatory (Feedforward)  
 $G_c$  – Adaptive and Compensatory  
 $H$  – Compensatory (Feedback)  
 $G$  – GM Approach dynamics





# New Agility Perspective (Compensatory Demonstration)







# Conclusions

- Organizational Agility
  - Is a key enabler for a collective as they work effectively and efficiently towards common objectives during a complex endeavour.
  - Is an organization's inherent ability to **optimize** its own attributes using **compensatory**, **anticipatory**, **adaptive**, and **learning** methods.
- New Concepts
  - Organizational Momentum
  - Size
  - Willingness to Change
- Next Steps
  - M&S Demonstrations
  - Case Study Evidence
  - Experimental Evaluation



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