

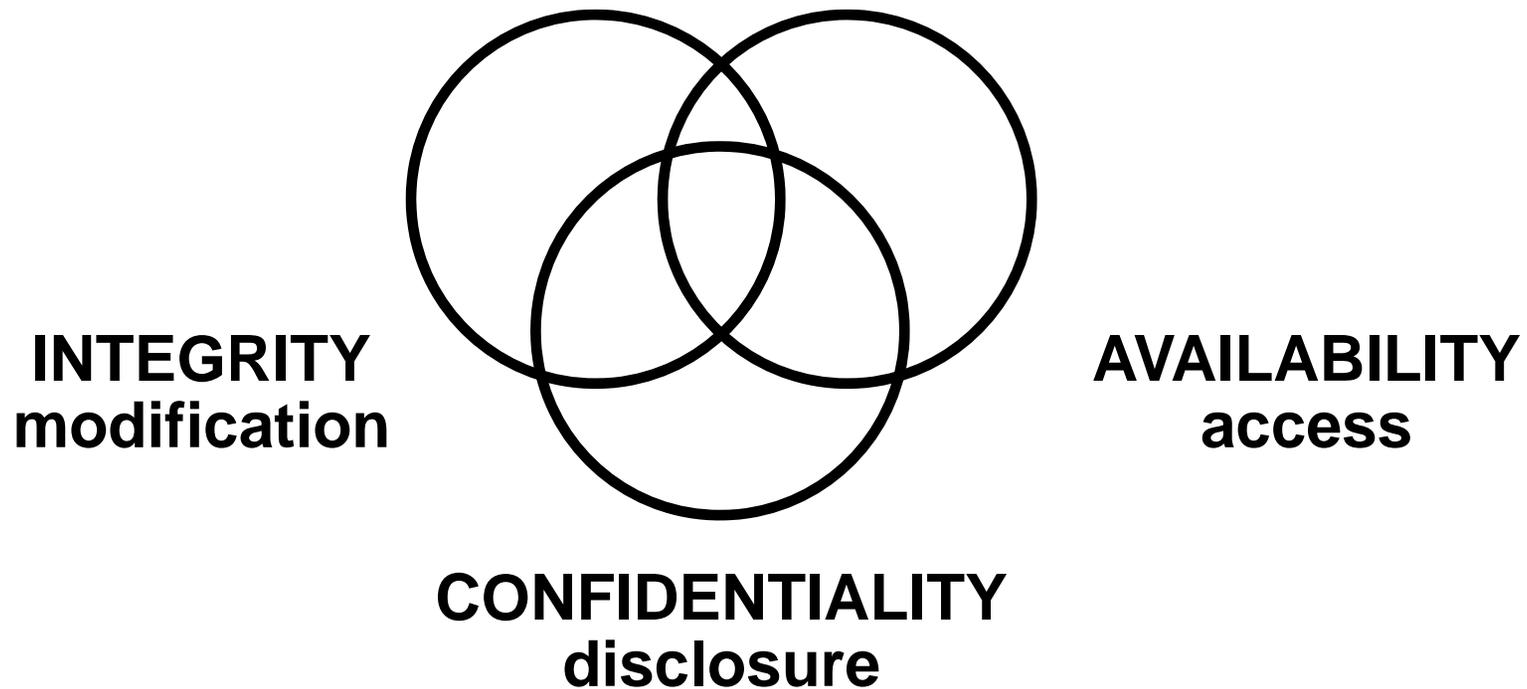
Cyber Security Research: A Personal Perspective

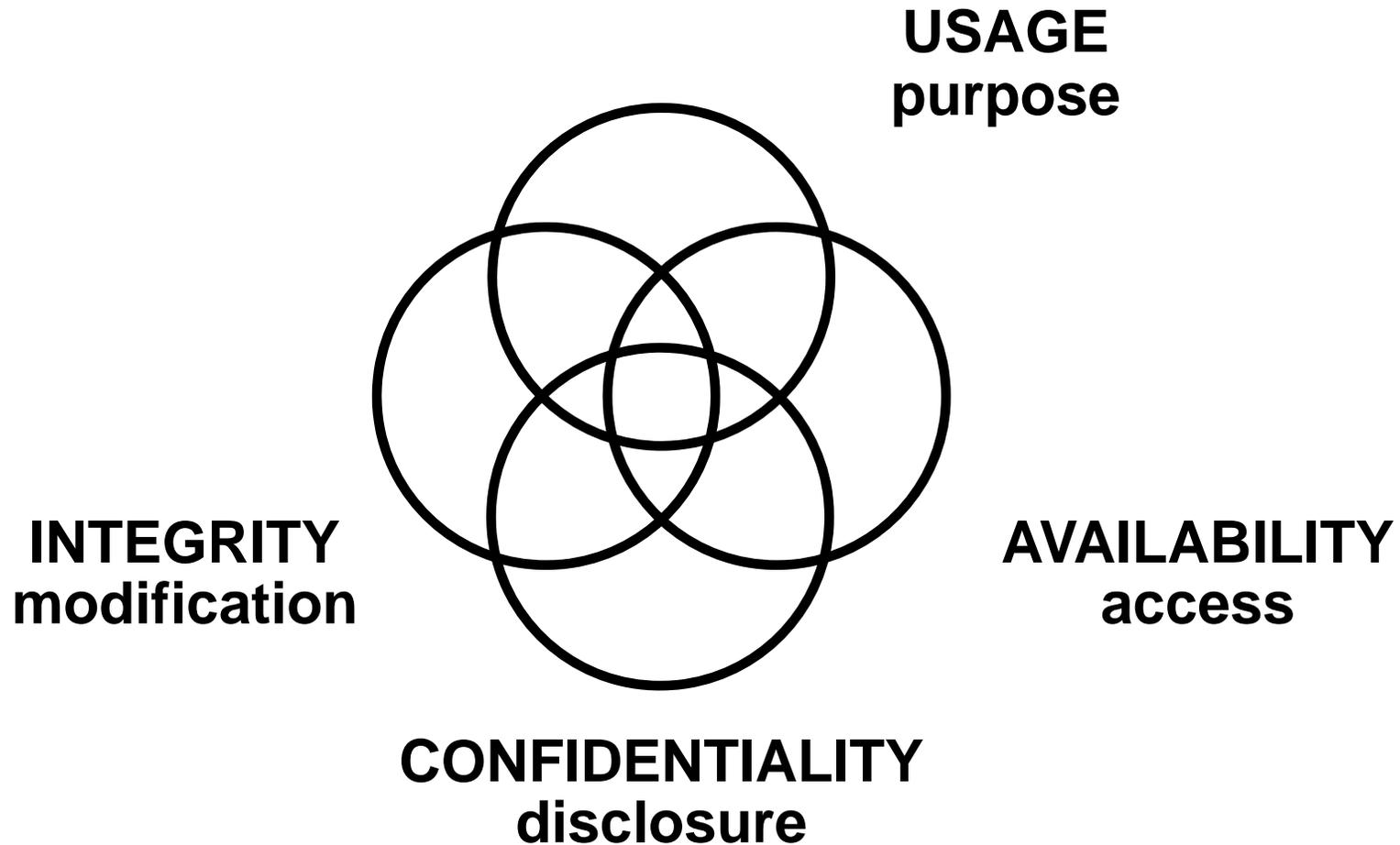
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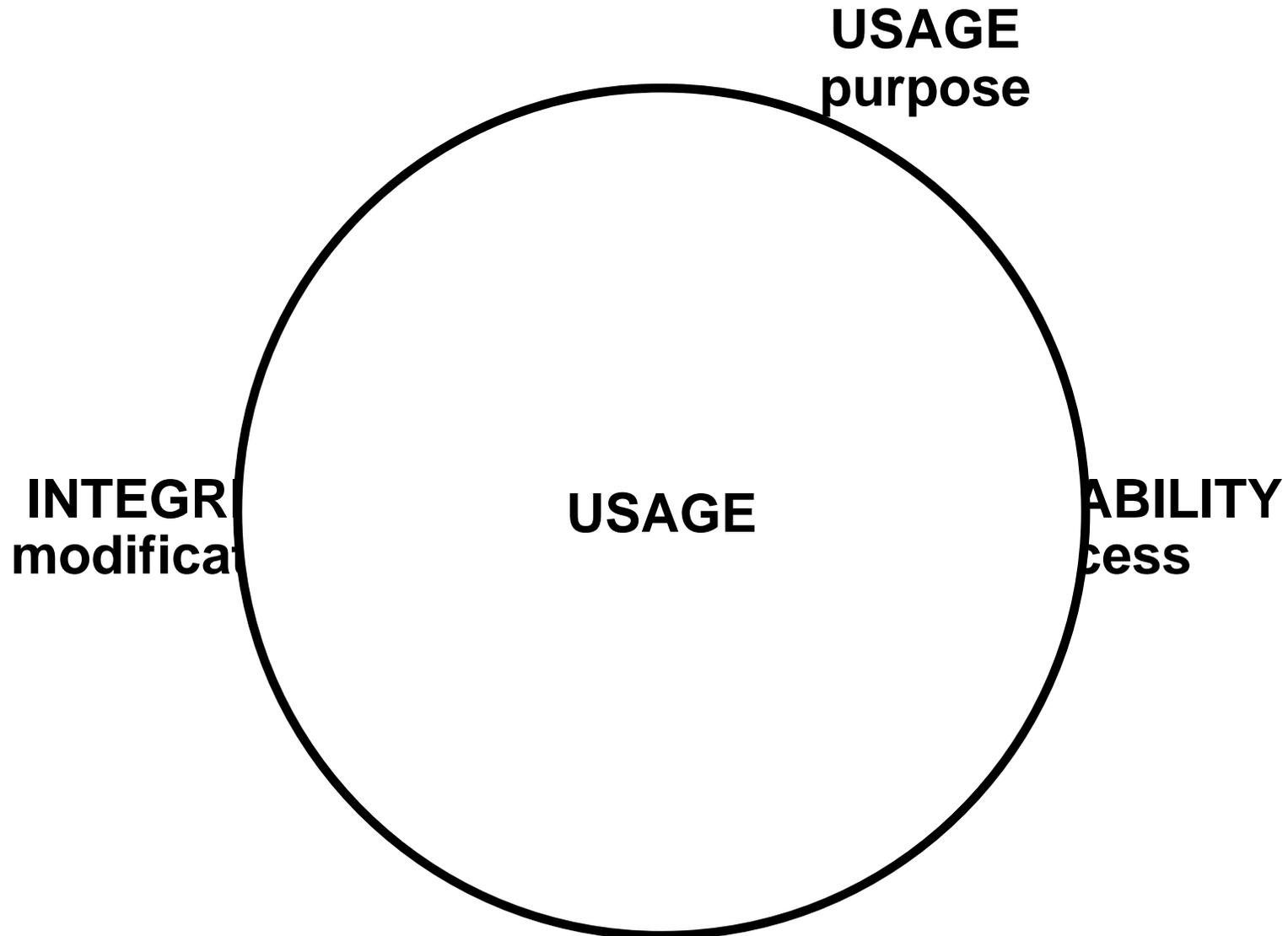
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- Cyberspace will become orders of magnitude more complex and confused very quickly
- Overall this is a very positive development and will enrich human society
- It will be messy but need not be chaotic!
- Cyber security research and practice are loosing ground









Single Enterprise

- owns all the information
- employs all the users

Multiple Interacting Parties

- no one owns all the information
- no one can unilaterally impose policy on all the users

- Computer security
- Information security =
 - ❖ Computer security + Communications security
- Information assurance
- Mission assurance
 - ❖ Includes cyber physical

- What is fundamental to cyber security?
- Where are the boundaries of a cyber system?
- What are the goals of cyber security?

➤ Enable system designers and operators to say:

This system is secure

- Enable system designers and operators to say:

This system is secure

Not attainable

- There is an infinite supply of attacks

- Enable system designers and operators to say:

This system is secure enough

Many successful examples

- The ATM (Automatic Teller Machine) system is
 - ❖ secure enough
 - ❖ global in scope
- Not attainable via current cyber security science, engineering, doctrine
 - ❖ not studied as a success story
- Similar paradoxes apply to
 - ❖ on-line banking
 - ❖ e-commerce payments

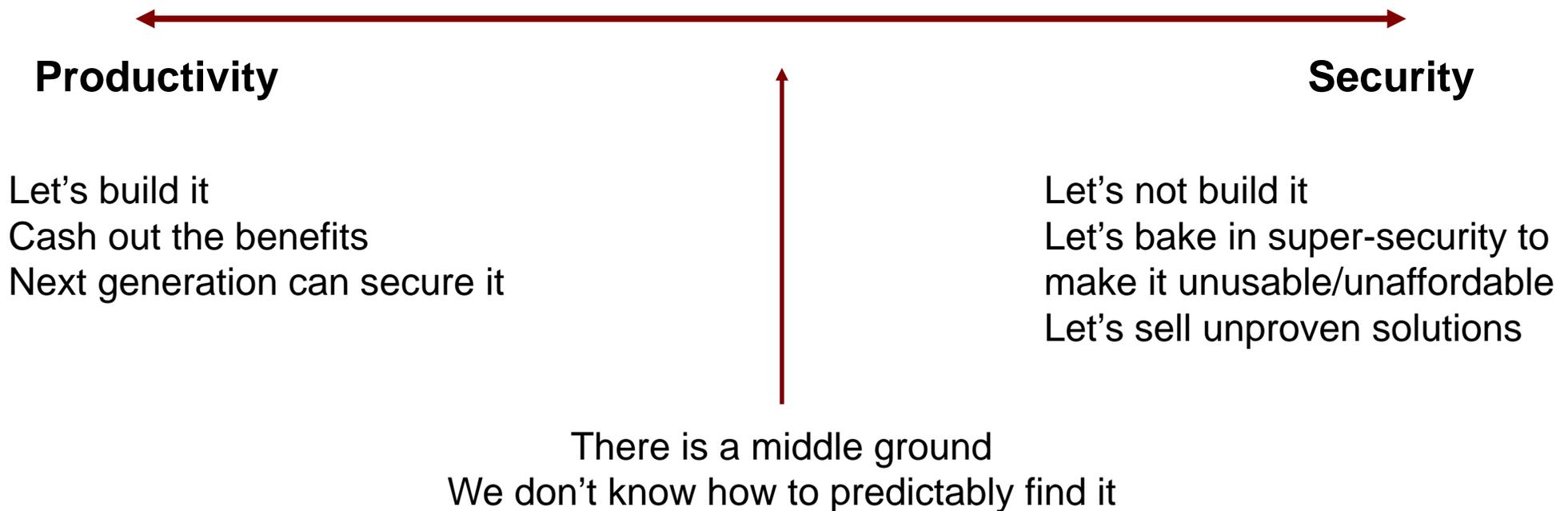
➤ **US President's nuclear football**

- Enable system designers and operators to say:

This system is secure enough

- In an innovative ecosystem the innovation drive will ensure that the bar for enough will be fairly low

➤ Cyber Security is all about tradeoffs



- **Develop a scientific discipline**
 - ❖ to predictably find the sweet spots for different application and mission contexts
 - ❖ to predictably find, incentivize and deploy microsec that leads to desirable macrosec outcomes
 - ❖ that can be meaningfully taught in Universities at all levels: BS, MS, PhD

- **Prognosis**
 - ❖ we shall succeed (we have no choice)
 - ❖ but we need to change to succeed

- Computer scientists could never have designed the web because they would have tried to make it work.
 - ❖ But the Web does “work.”
 - ❖ What does it mean for the Web to “work”?
- Security geeks could never have designed the ATM network because they would have tried to make it secure.
 - But the ATM network is “secure.”
 - What does it mean for the ATM network to be “secure”?