



Five C's of the Future

Michael J. Assante



Successful strategies must proceed from the premise that cyberspace is continuously contested territory in which we can control memory and operating capabilities some of the time but cannot be assured of complete control all of the time or even of an control at any particular time.

*-Richard Danzig,
Surviving on a Diet of Poisoned Fruit*

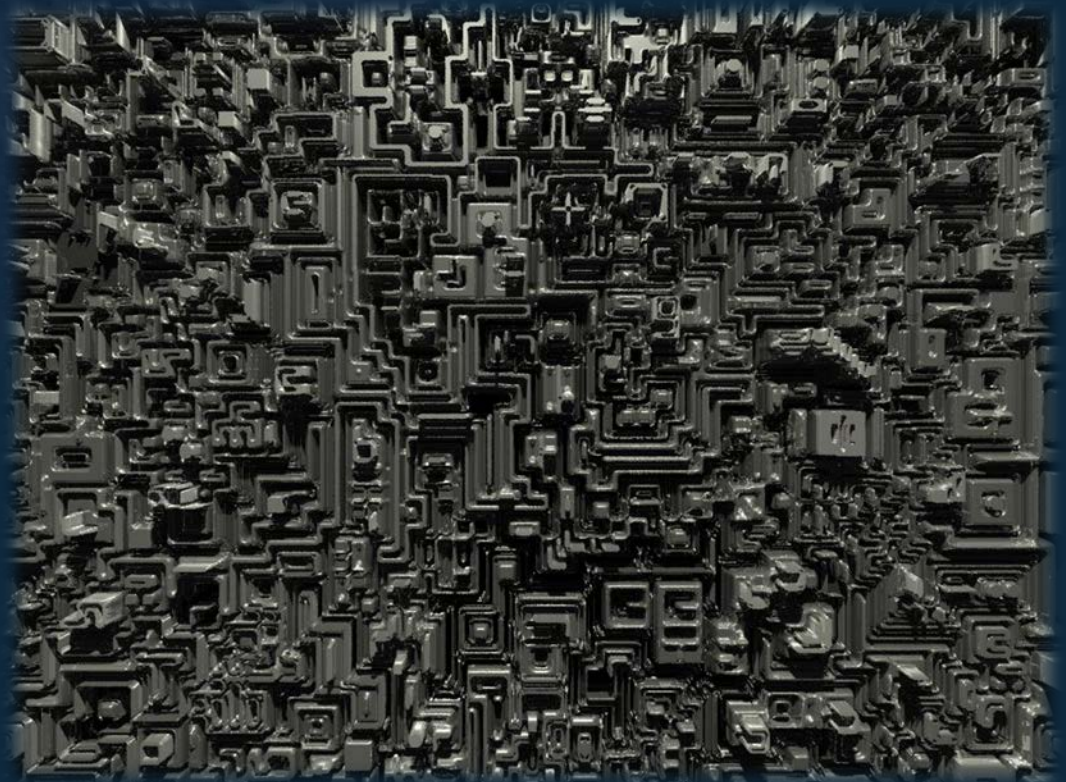


- Convergence/
Concentration
- Connectivity





- Complexity





- Growing complexity & consequences
- Not being able to appreciate the extent of risk in a software-reliant system-of-systems
- Complexity increases opaqueness, attack surfaces/paths, and reduces predictability
- Speed of change inside a system increases inter/dependencies
- Cyber Consequence Informed Engineering



“Handelsblatt, Airbus Chief Strategy Officer Marwan Lahoud blamed the crash on engine control software that was incorrectly installed during final assembly.”

“This is what the computers apparently did on the doomed flight, just as they were designed to do.” A person familiar with the engines added, “Nobody imagined a problem like this could happen to three engines.” When it did, without the data parameters it was impossible for pilots to keep the aircraft airborne.

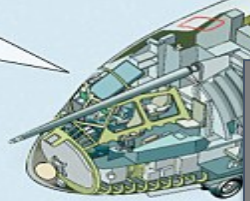
■ **DEFENCES:** An infra-red warning system, missiles, chaff and flares as decoys. It is also equipped with armour-plating and bulletproof windscreens

■ **CARGO:** The vast interior can carry an NH-90 transport helicopter, a Chinook, a container truck or two infantry vehicles. It has room for 125 stretchers plus an intensive care unit. It can hold 116 fully-equipped paratroopers

■ **PROPELLERS:** Each turbo-prop engine has eight blades measuring 5m tip-to-tip. Their design allows the plane to descend steeply to avoid incoming enemy fire



50% increase in performance faster than previous military aircraft



“A more insidious source of common-mode failures is a design fault that causes redundant copies of the same software process to fail under identical conditions” -- is exactly that which can be masked by complexity precisely because complexity ensures under-appreciated mutual dependence.

Dan Greer, Blackhat 2014



ECU





Eye's wide open

- Mission
 - Mindset
 - Determination
- Design requirements
 - Protect the bus
 - Sensor integration
 - Controller decision making
 - Assigning confidence
 - Detecting suspect data
 - Assigning confidence
 - Safety oversight/over watch
 - Authentication



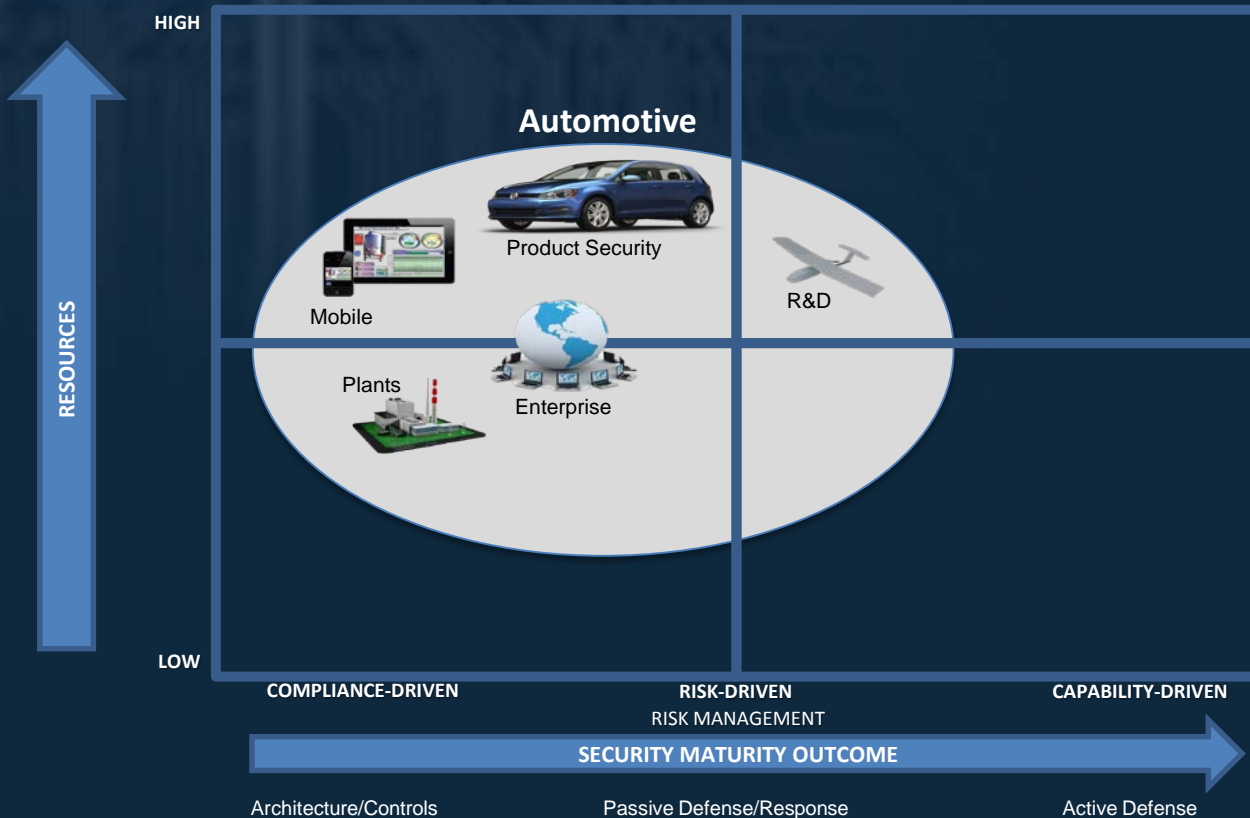
Intellectual energy and ability to learn & act

- Competency
- Collaboration





Universe of security efforts





Successful organization's

- Possess the right culture to be a learning organization
- Develop skilled people and integrated functional teams
 - Identify desired competencies
 - Invest in training programs
 - Reward excellence and team accomplishments
- Are the product of practice & teamwork
- Shift from highly structured groups to loosely structured groups
 - Everyone supports the people with the best skills for the problem at hand



Integrating disciplines & skills

- People from diverse specialties are different
 - Don't naturally speak the same language
 - Adhere to different mental models
 - Use different lens
 - Apply different tools
- Requires training and shared perspective
 - Begins by filling knowledge gaps & shared understanding
 - Continues through shared experience and purpose
- Skills must be practiced
 - Individually and in functional teams



Thank You

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