



# CYBER SECURITY AND RESILIENCE SYMPOSIUM

## TOWARDS A RESILIENT AVIATION CYBERSPACE

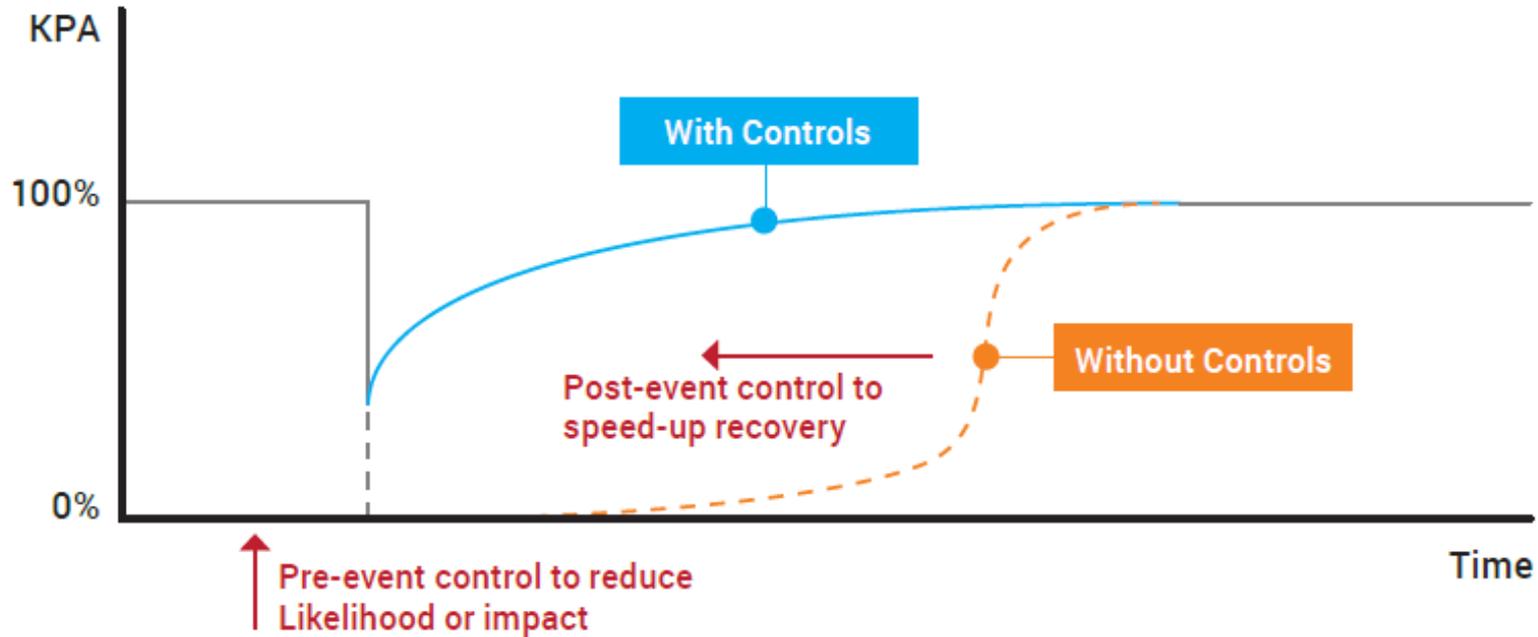
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Moving from cyber-security towards cyber-resilience:  
EUROCONTROL's approach

***Patrick MANA***  
***EATM-CERT Manager***



## BECOME **CYBER-RESILIENT** ... ALL TOGETHER





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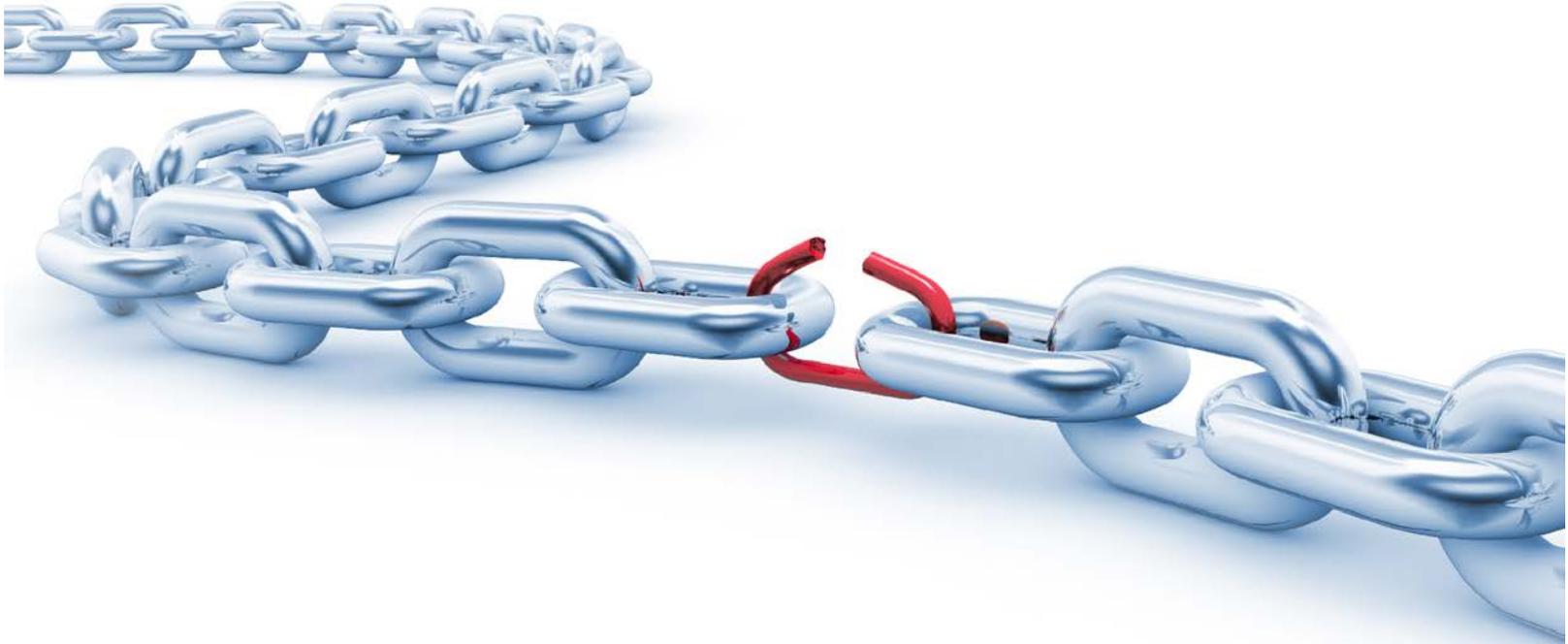
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CONNECTING  
THE WORLD

All together ... as we are as strong as the weakest link





## Investing in Humans



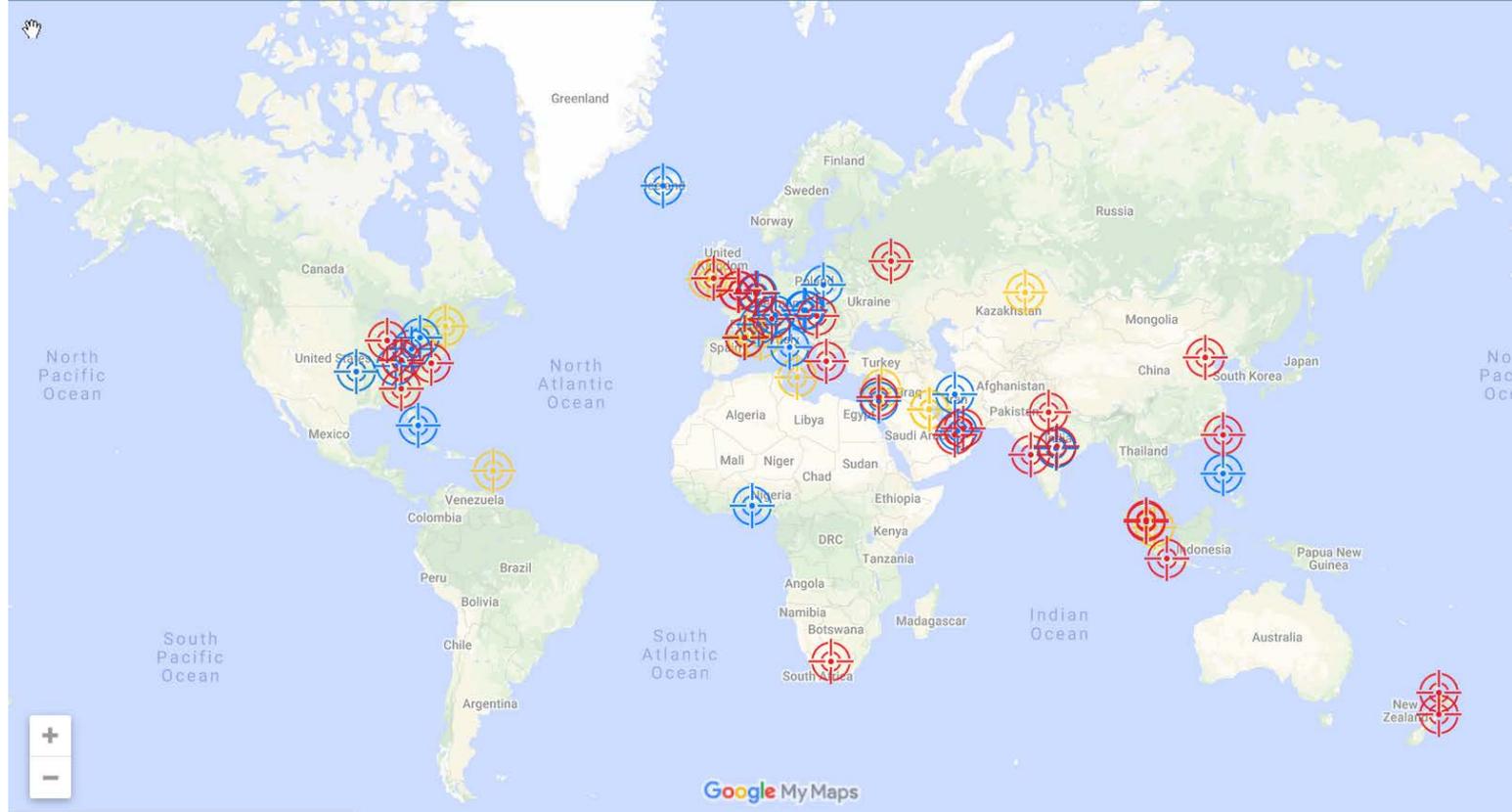
CEO & Senior Management



Staff



### EATM-CERT Aviation Cyber Events Map



<https://www.google.com/maps/d/embed?mid=1ptVlmaOCZqoPiN-zsomzbrVQD-RS7BXGk&ll=34.59336701774148%2C10.416074099999946&z=2>



# Adapting processes





## EACCC CYBER 2018 EXERCISE SCENARIO

- Through getting access to a common network infrastructure and exploiting specific vulnerabilities in the surveillance infrastructure, the perpetrator manipulates the performance of the ANSP systems in a way that is not recognizable as cyber-attack.
- Air Traffic Control (ATC) centers in the directly affected States running on approximately XX% capacity reductions due to performance issues;
- Breaking News from media reports that an organization is claiming that they have cyber-attacked these centers and they will continue with attacks on all other ATC centers in Europe;
- EACCC to coordinate and share information

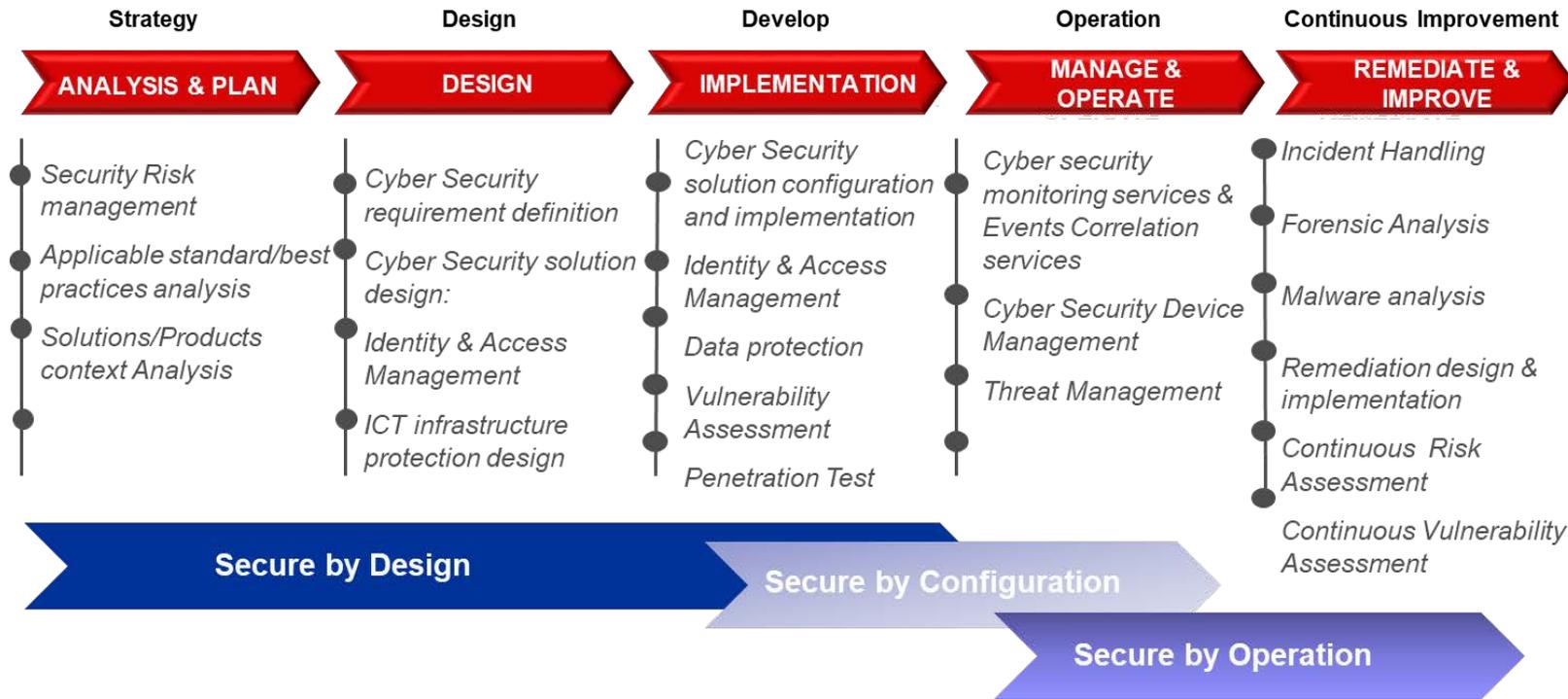


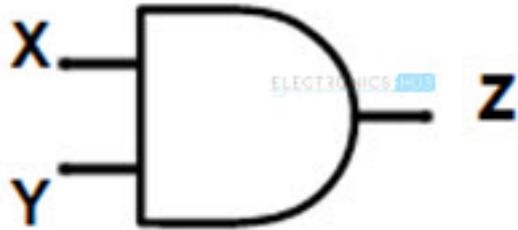
### Directly affected states:

BULGARIA  
ITALY  
MONTENEGRO  
SERBIA  
THE NETHERLANDS



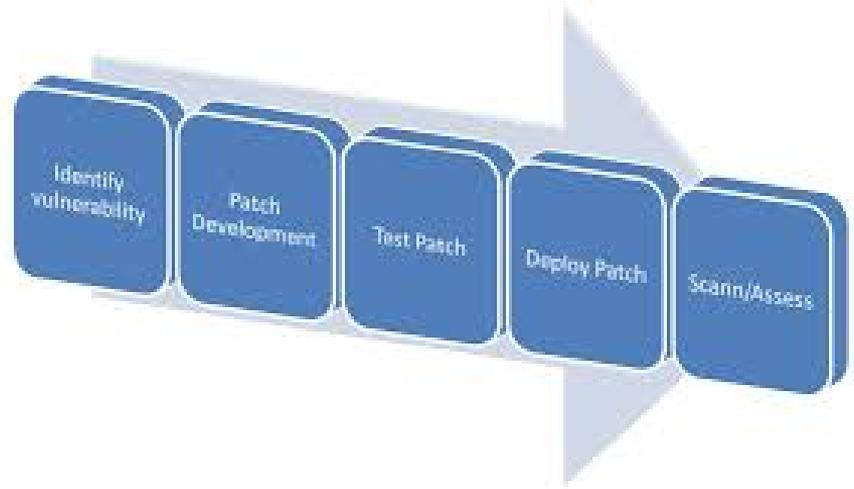
# Applying a secure development lifecycle





**AND gate**

Revisiting safety assessment  
From a security point of view



Vulnerability/patch management



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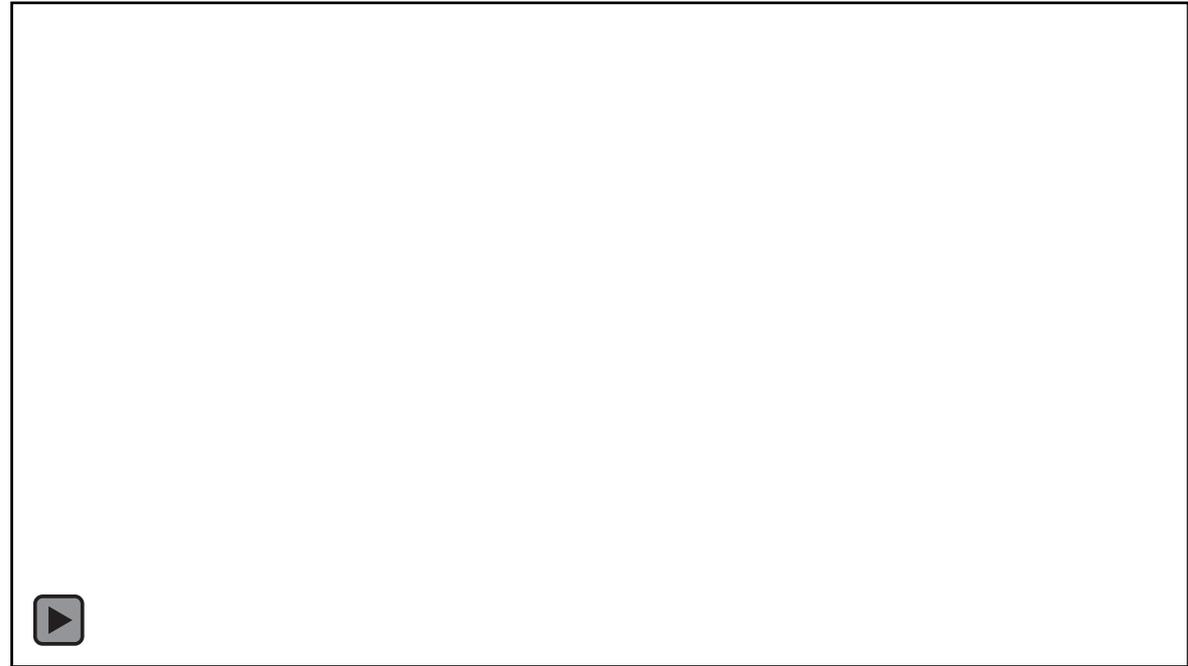
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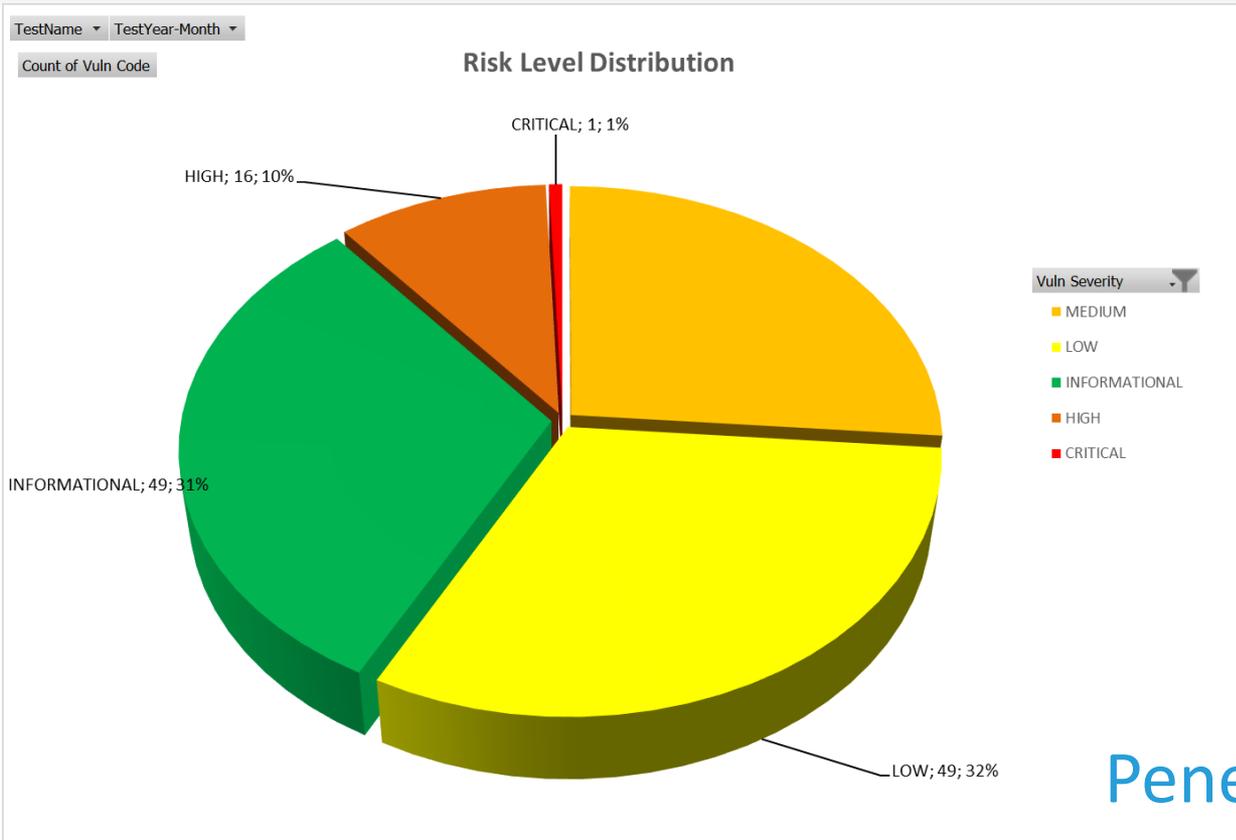


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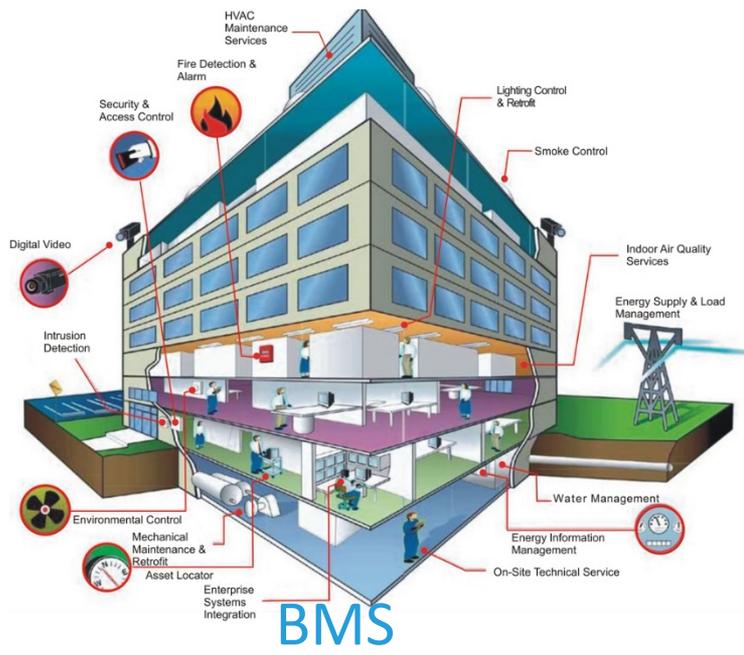
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## Penetration test





# Penetration test



Power Supply



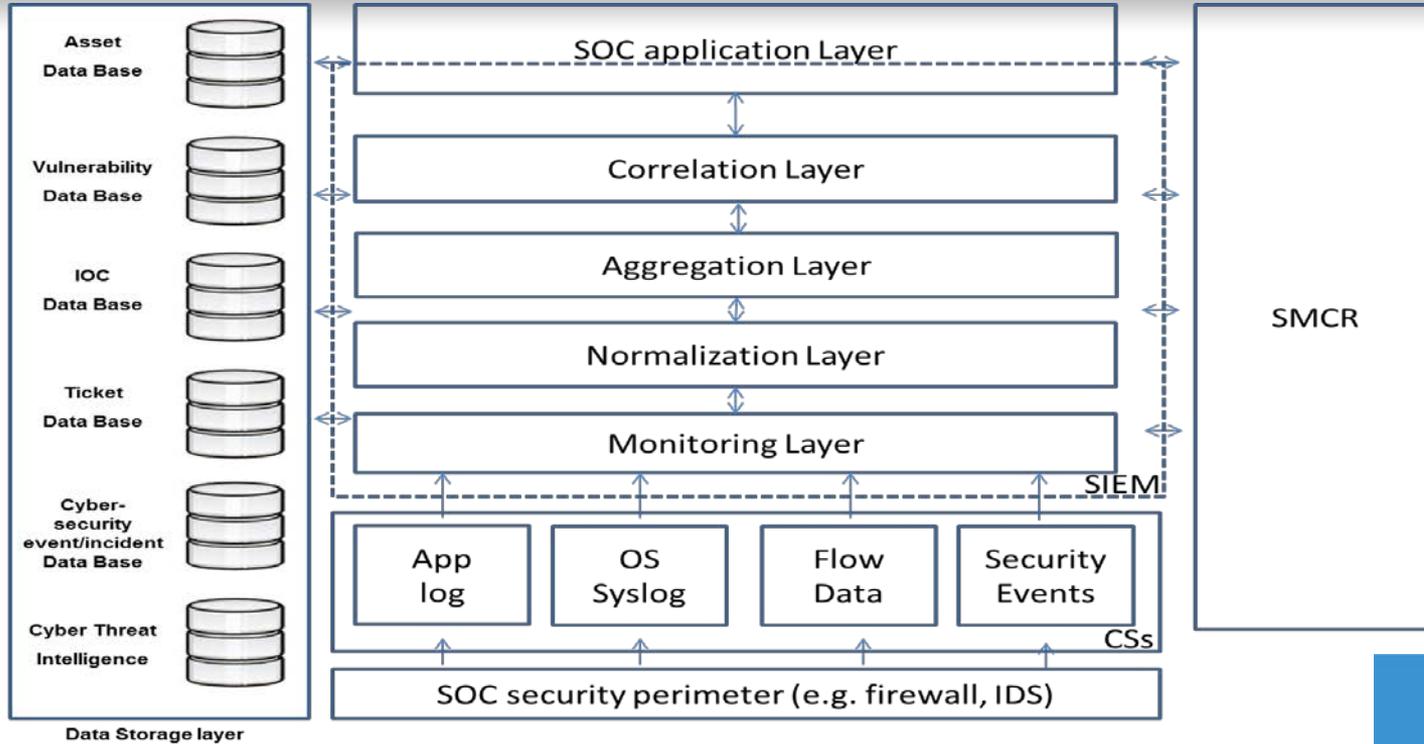
HVAC



Safety	Security
<ul style="list-style-type: none"><li>• System easy to use (no access control)</li><li>• Real-time system (performance requirement)</li><li>• Straightforward system (though redundancies may cause complexity)</li></ul>	<ul style="list-style-type: none"><li>• Locked system (access control)</li><li>• Code execution control (i.e. antivirus) → non predictive</li><li>• In depth protection (encryption, monitoring, access control)</li><li>• Patch + patch + patch + patch...</li></ul>



e.g. a zero-day ~ months to many years





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# Building a Trust Framework



Cyber Strategy  
& Action Plan

Secure Exchange of info



Regulatory framework (ESCP)

Regulations

AMC

Guidance

Standards



# Sharing cyber information



Industry



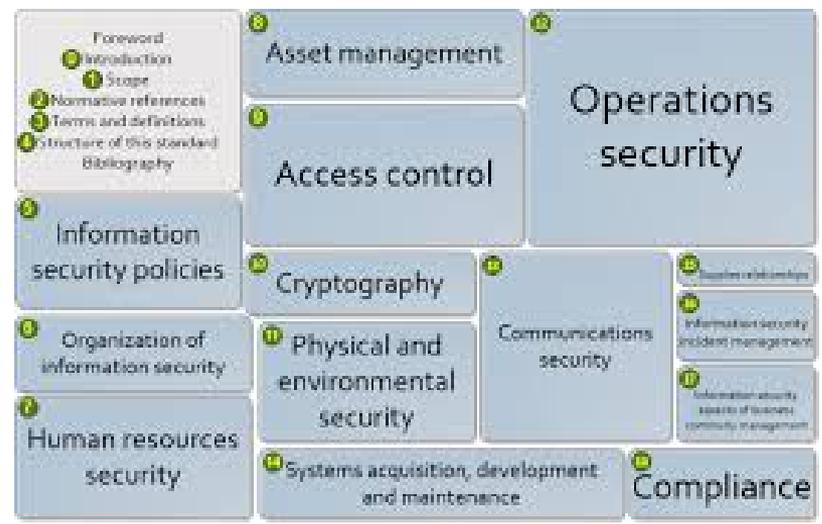
Services of common interest



TLP:WHITE & GREEN  
Researchers – vulnerability disclosure  
Media Management



## Use proven standards



ISO 27K



NIST 800



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Being cyber secure is an illusion ... let's become cyber resilient all together as we are as strong as the weakest link.

Cyber resilience will not make you 100% cyber-proof but will assure your business!

AND YOU CAN'T DO IT ALONE ...

so let's support the establishment of a cyber-resilience framework.



```
mirror_operation == MIRROR_Z :
mirror_mod.use_x = False
mirror_mod.use_y = False
mirror_mod.use_z = True
mirror_ob.select = 1
mirror_ob.select = 1
```

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Thank You