Planes, Trains and Automobiles (and Ships & Spacecraft)
Mobility Cyber Security

Andy Davis, Transport Assurance Practice Director

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Global experts in cyber security & risk mitigation

1500+
Employees worldwide

35+
Offices across Europe, North America, Asia-Pacific & Middle East

1999
NCC Group was formed in June 1999

15,000
Helping 15,000 organisations worldwide to manage risk & limit threat of cybercrime
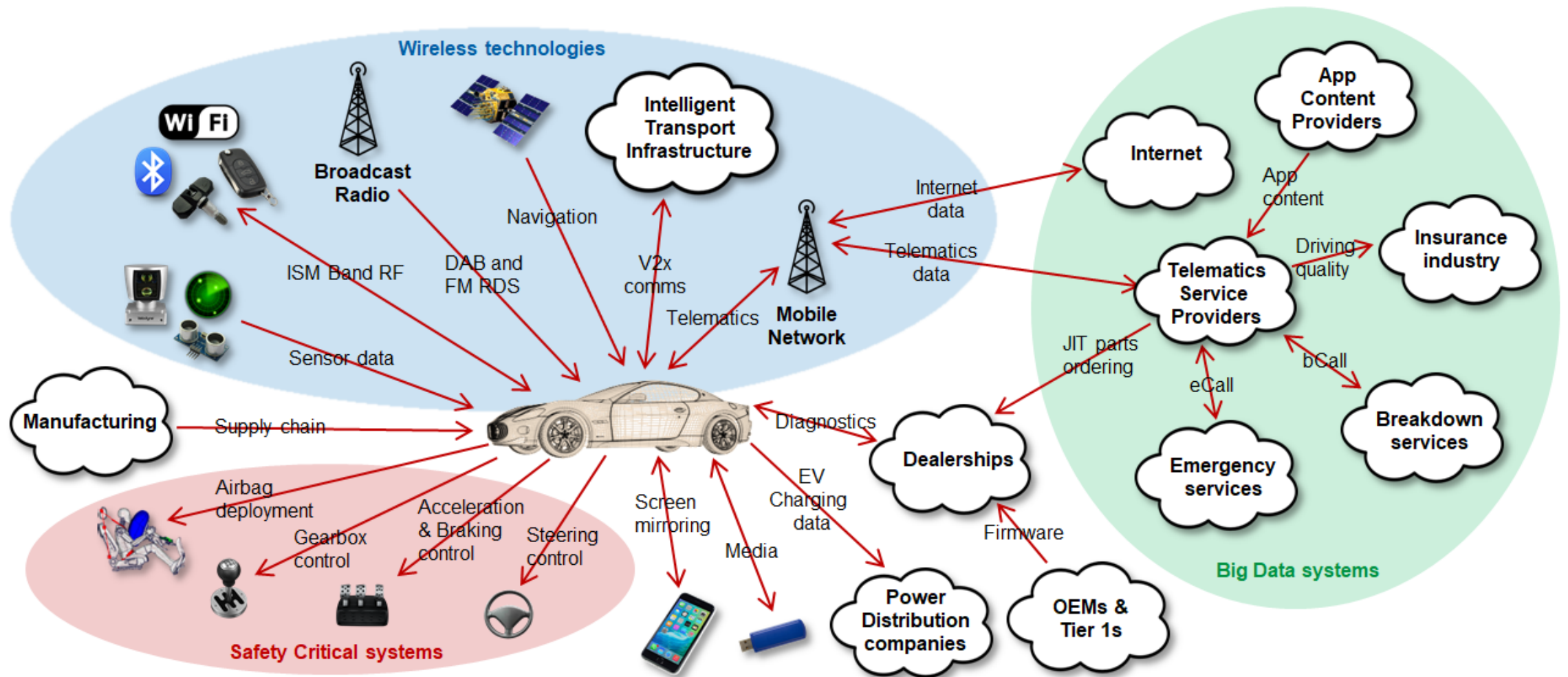
£233.2m
Group Revenue for year end May 2018

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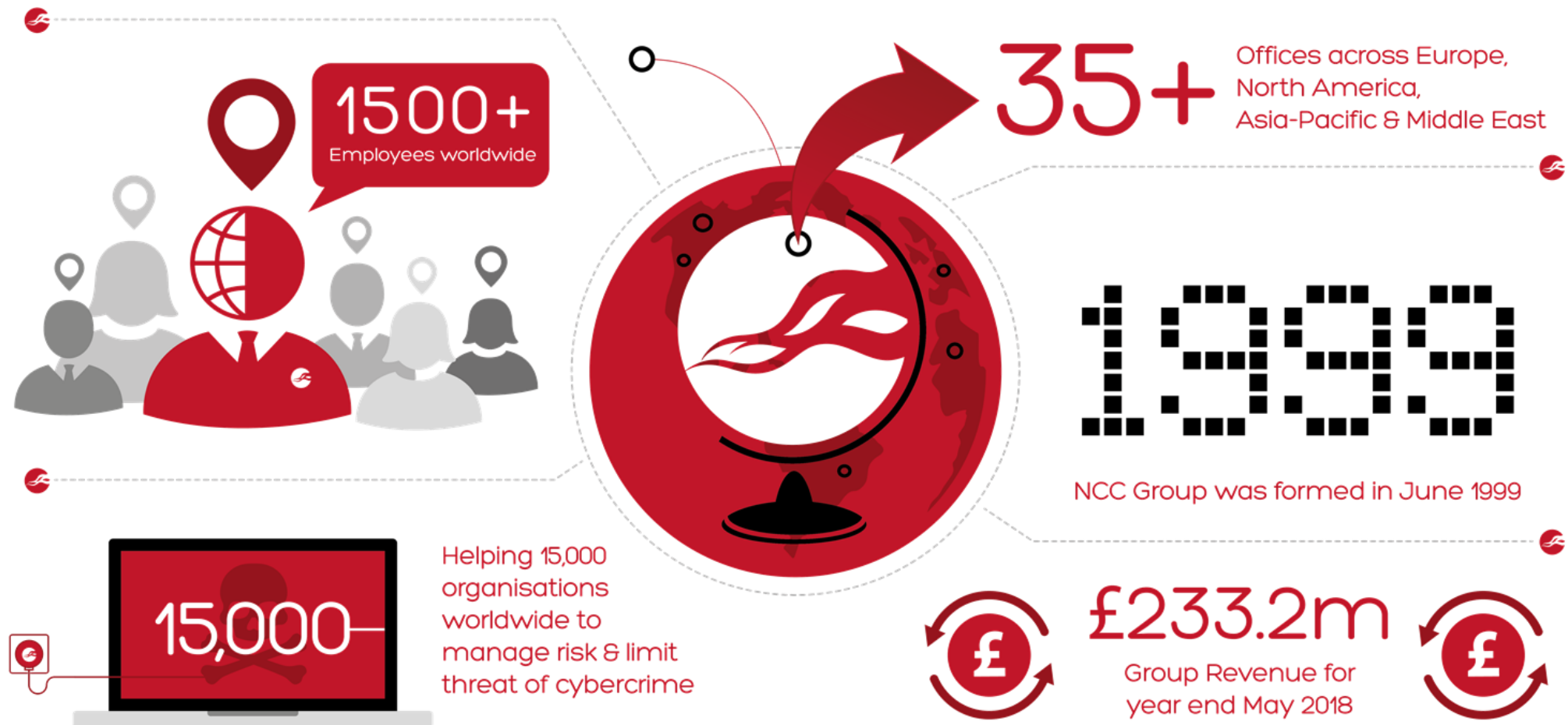
Agenda

- Size of the challenge

- Levels of cyber security maturity

- Lessons not being learned

- Progress being made

- The future

- Q&A

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What is the size of the challenge?

Attack Surface Overviews

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Wireless technologies

WiFi
Bluetooth
Broadcast Radio
Intelligent Transport Infrastructure
Mobile Network

Navigation
ISM Band RF
DAB and FM RDS
V2x comms
Telematics
Sensor data

Internet data
Telematics data

Internet
App Content Providers
App content
Telematics Service Providers
Driving quality
Insurance industry
JIT parts ordering
bCall
eCall
Breakdown services
Emergency services

Big Data systems

Manufacturing
Supply chain
Diagnostics
Dealerships
EV Charging data
Firmware

Airbag deployment
Gearbox control
Acceleration & Braking control
Steering control
Screen mirroring
Media
Power Distribution companies
OEMs & Tier 1s

Safety Critical systems

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Harbours

Office IT systems connected to the Internet

AIS (Automatic Identification System) gateways

VTS (Vessel Traffic Services)

ICS (Industrial Control Systems)

Navigation

GNSS (Global Navigation Satellite System) data

Electronic chart data

ECDIS (Electronic Chart Display Information System)

eLoran

Rigs

DP (Dynamic Positioning) systems

Malware inadvertently introduced via Internet browsing and USB memory sticks

Ships

AIS transceivers, LRIT (Long-range Identification and tracking)
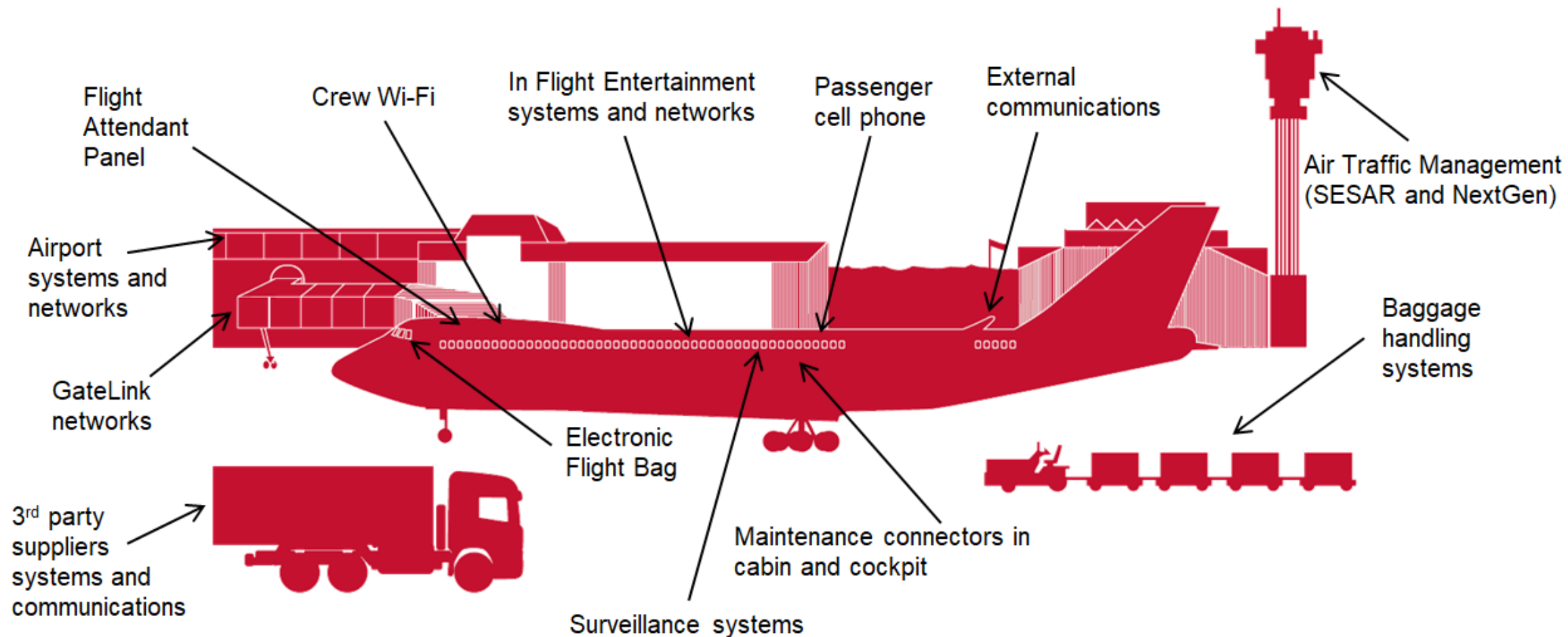
Fleet broadband

DSC (Digital Selective Calling), Man-in-water beacons

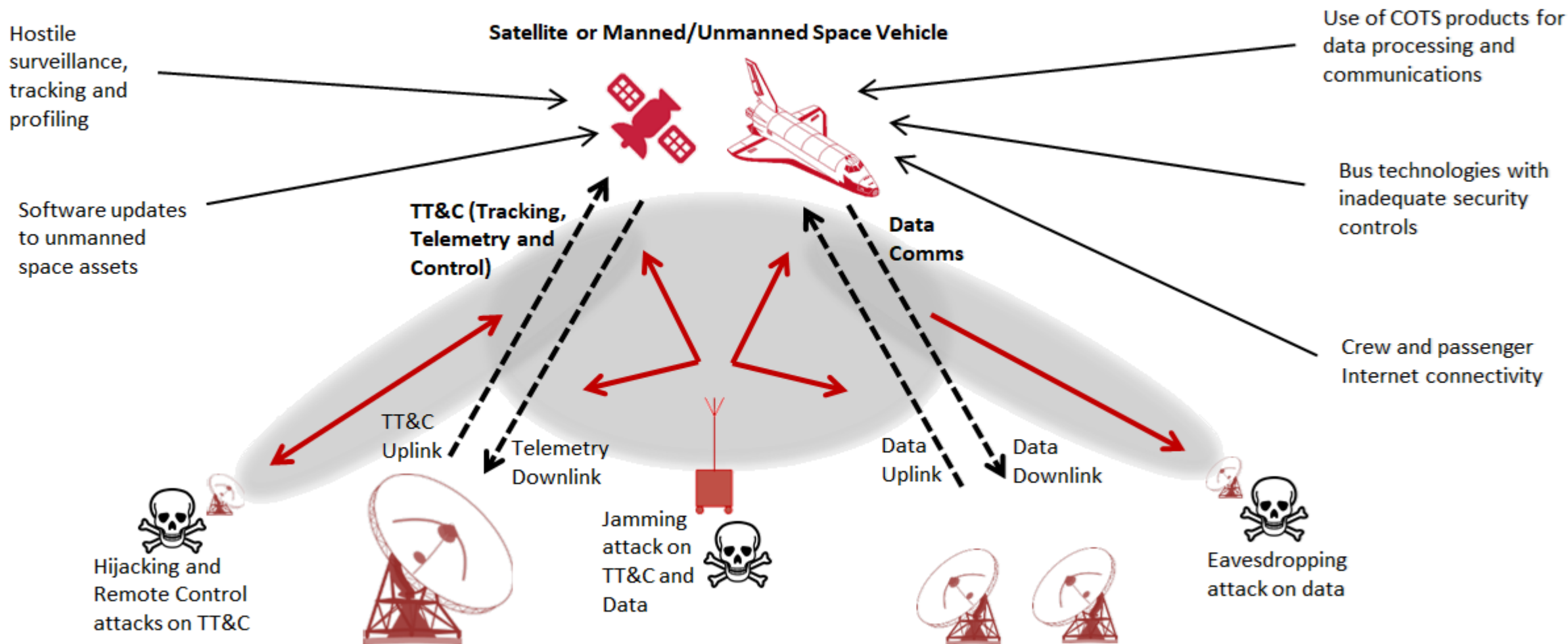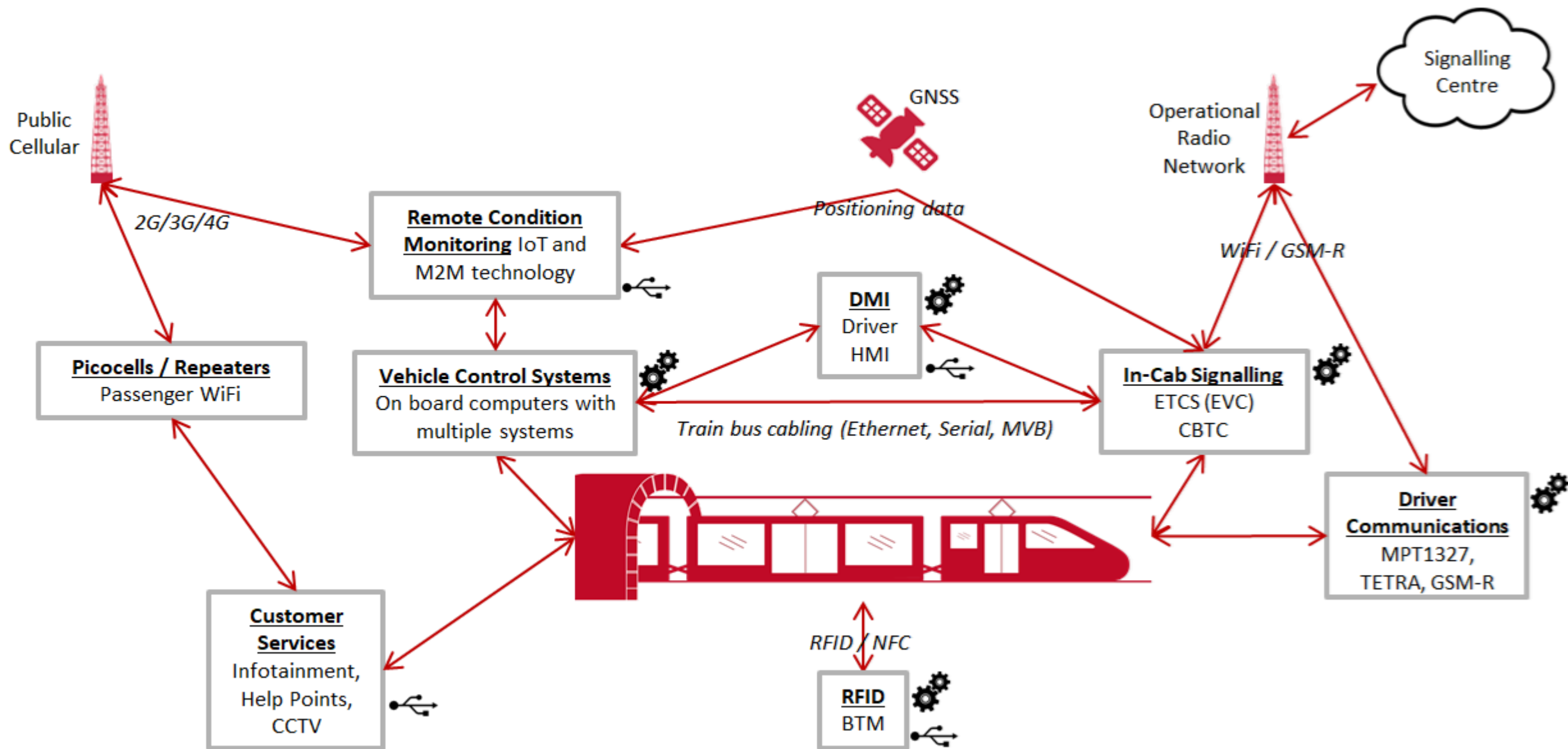Data sharing between systems via USB memory sticks
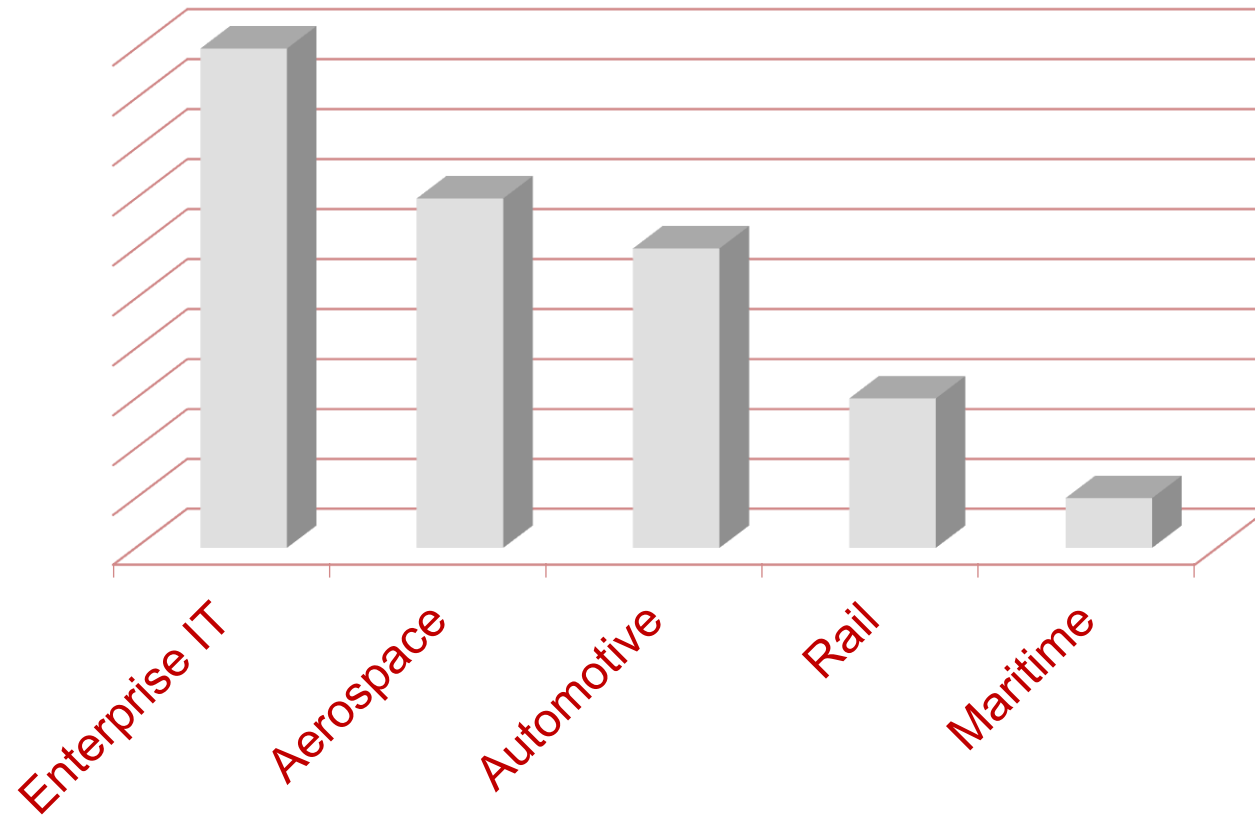
Lack of segregation between systems

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Satellite or Manned/Unmanned Space Vehicle

Hostile surveillance, tracking and profiling

Software updates to unmanned space assets

Use of COTS products for data processing and communications

Bus technologies with inadequate security controls

Crew and passenger Internet connectivity

TT&C (Tracking, Telemetry and Control)

Data Comms

TT&C Uplink

Telemetry Downlink

Data Uplink

Data Downlink

Hijacking and Remote Control attacks on TT&C

Jamming attack on TT&C and Data

Eavesdropping attack on data

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Relative levels of cyber security maturity by industry

Enterprise IT · Aerospace · Automotive · Rail · Maritime

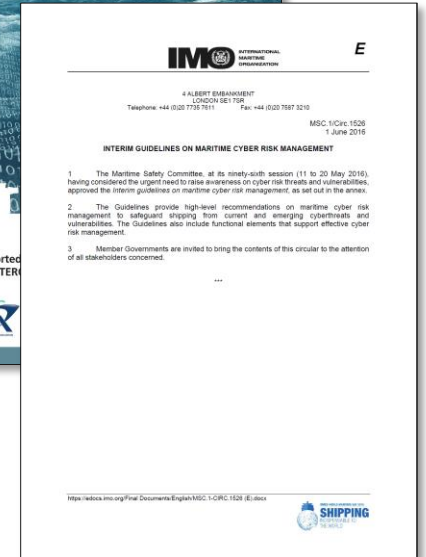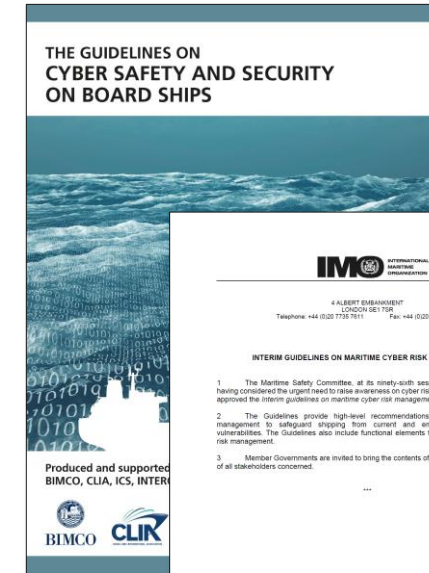* Based on my experience at NCC Group
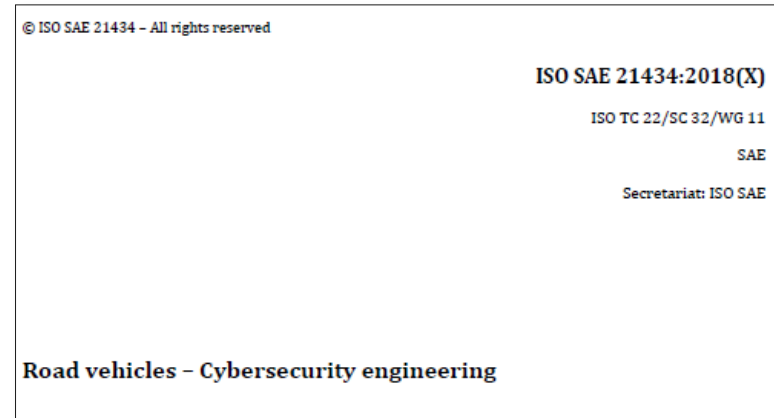
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Lessons not yet being learned (between verticals)

- Embedded systems developer mind-set

- Safety $\neq$ Cyber Security

- Insecure data comms - CAN bus for satellites

- Segregation - TT&C shared with data

- COTS / Open Source software - needs to be security tested and regularly updated

The only mistake in life is the lesson not learned.

— *Albert Einstein* —

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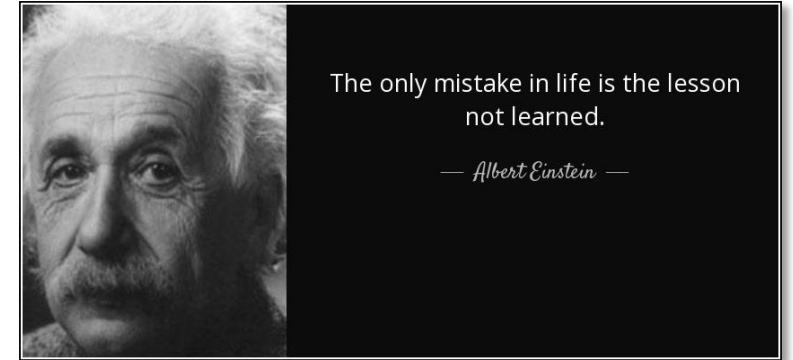
Progress being made

- Guidance documentation

- Standards being developed

- Security Programmes – SDL

- Cyber security awareness is increasing

ISO SAE 21434:2018(X)

ISO TC 22/SC 32/WG 11

SAE

Secretariat: ISO SAE

Road vehicles – Cybersecurity engineering

THE GUIDELINES ON
CYBER SAFETY AND SECURITY
ON BOARD SHIPS

Produced and supported
BIMCO, CLIA, ICS, INTER...

MSC.1/Circ.1526
1 June 2016

INTERIM GUIDELINES ON MARITIME CYBER RISK MANAGEMENT

Training

- System Design Architecture
- Asset Protection Definition
- Threat Modelling
- Define Counter Measures
- Best Practice Guidance
- Security Assessment
- Incident Response Planning

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The Future – what challenges lie ahead?

- Multi-modal transport systems:
  more communication between transport verticals

- 5G mobile communication:
  more devices with connectivity / greater bandwidth

- V2X (Vehicle to everything):
  privacy concerns / inter-vehicle malware

- Autonomous Vehicles and Artificial Intelligence:
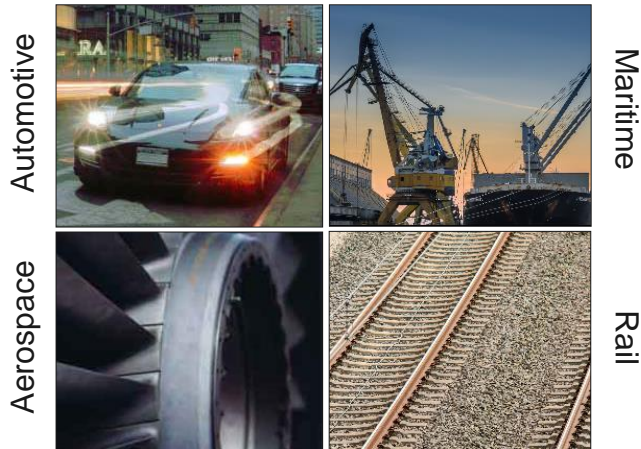 safety concerns / new attack classes

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Questions?

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