

Australian Systems Safety Conference 2018

Safe Autonomous Systems Require Changes in Business Relationships

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Background



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- ✦ Autonomous systems in surface mining: trucks, trains and drills ... and more systems coming
- ✦ Two major benefits:
 - ▀ Repeatability and consistency
 - ▀ Safety – remove the person from danger
- ✦ Technology, operations, people and processes are all changing – but the commercial relationship needs to change as well



The Commercial Mining Landscape is ...



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- Predominantly existing suppliers:
 - ▼ Accustomed to developing and delivering mining machinery
 - ▼ Autonomy is well outside their 'wheelhouse'
- Mostly adaptations of existing products:
 - ▼ New control and sensing systems
 - ▼ New data fusion
- Built on existing relationships and commercial arrangements:
 - ▼ New competitive tension with the digital giants (resources, buying power)



Why is this important?

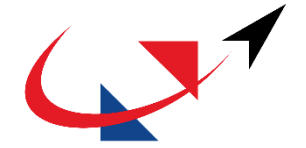


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- A company is required to:
 - ▼ Provide a safe workplace **So Far As Reasonably Practicable**
 - ▼ Develop, implement, monitor and improve safe systems of work
 - ▼ Be satisfied that systems are safe SFARP
- Autonomous systems present a particular challenge:
 - ▼ New metrics in reliability, availability and maintainability
 - ▼ Safety versus productivity: who wins?



The Car Yard analogy ...



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Problems: Commercial Relationships and Suppliers



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- Lots of existing suppliers and relationships
- Suppliers are protective of IP; they will (almost) universally **not** share:
 - ▼ Safety data
 - ▼ Design data
 - ▼ Requirements (if they have them)
 - ▼ Test results
 - ▼ FMEA / FMECA
 - ▼ Incident data
- Software releases need extensive testing



So, how can a company ensure that a system is safe without this information?

So then ... what needs to change?



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- Either more trust or less ...
- Suppliers need to recognise that they have a duty of care too
- Design and implement improvements in:
 - ▼ Access to safety and design data
 - ▼ Development methodologies
 - ▼ Customer engagement
 - ▼ Software release testing
- Otherwise, a customer may be forced to select a different product because they can prove it is safer



Now what: Relationships



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- ✦ Review your own relationships:
 - ▼ Suppliers
 - ▼ Customers
 - ▼ Internal engineering and supply teams
- ✦ For the customer:
 - ▼ Should you exploit your position of power?
 - ▼ Early adopters need to have more information; without it, the leading edge is unachievable
- ✦ For the supplier:
 - ▼ Are you meeting your customer's need for a safe system of work?



Now what: Safety Engineering



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- ✦ Maintaining the status quo is over:
 - ✦ Organisational change is paramount
 - ✦ Managers must drive the uptake of technology and all that it brings
 - ✦ Commercial and legal departments need to adapt or risk becoming a bottleneck
- ✦ Don't just roll over when the supplier says they can't provide something
- ✦ Consider:
 - ✦ Buying IP (via licence or in full) from suppliers
 - ✦ Broadening the contractual definition of IP
 - ✦ Using a trusted third party (but bring \$\$\$)



Now what: Contracting vs Partnering



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- Depends on supplier, customer and product:
 - ▼ Partnering is preferred, especially for developmental systems
- As technologies mature, simpler contracting mechanisms will suffice
- BUT ... autonomous systems CANNOT be treated as an off-the-shelf solution:
 - ▼ Configuration
 - ▼ Role
 - ▼ Environment



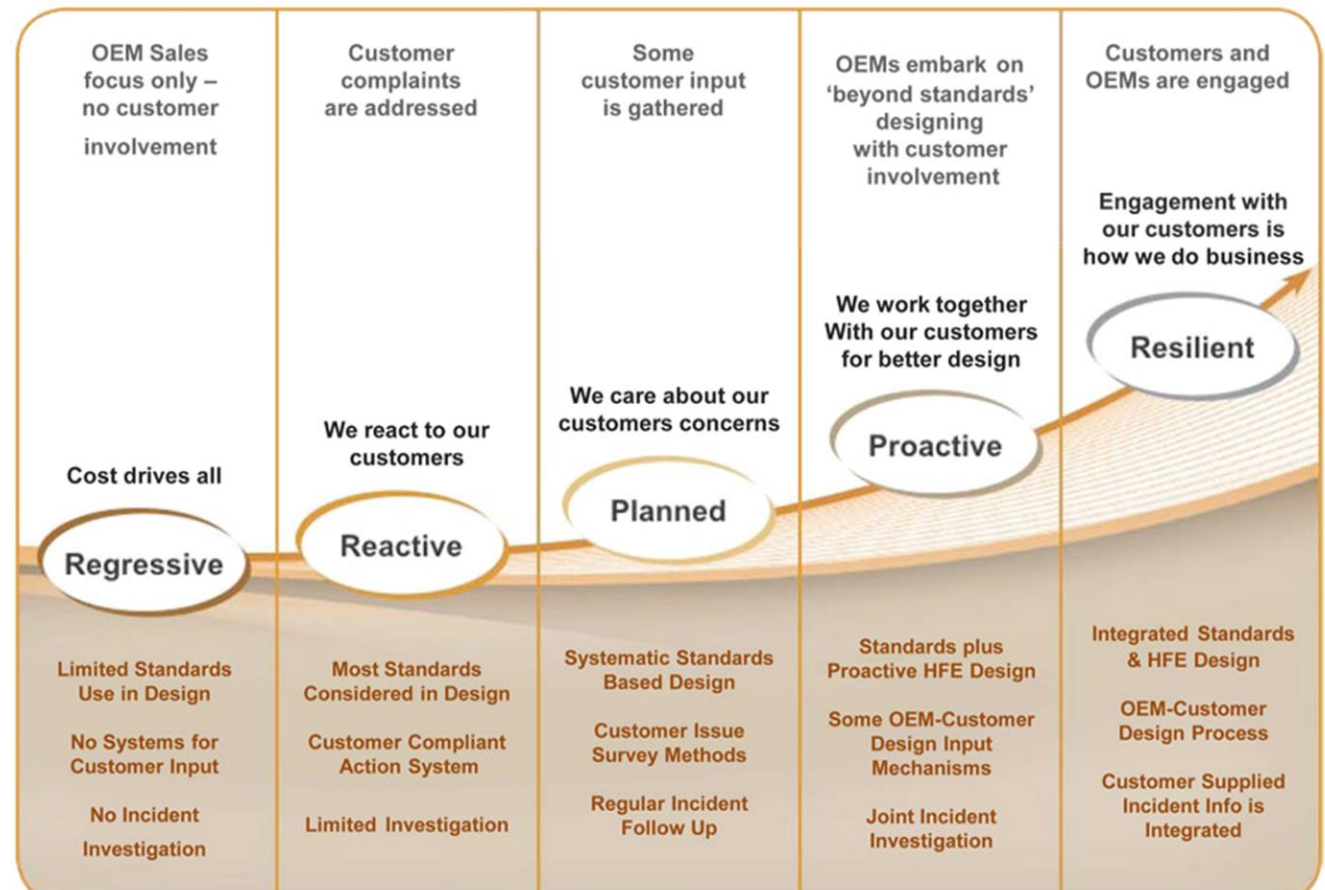
EMESRT – Making solid progress...



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- OEM design maturity:
 - ▶ Engagement
 - ▶ Integration
 - ▶ Joint/Partnering approach
- How do we build risk into this maturity model?
 - ▶ Functional safety flows down to designers ...
 - ▶ Decision-making based on design evidence ... or lack thereof

EMESRT OEM Design Maturity Chart

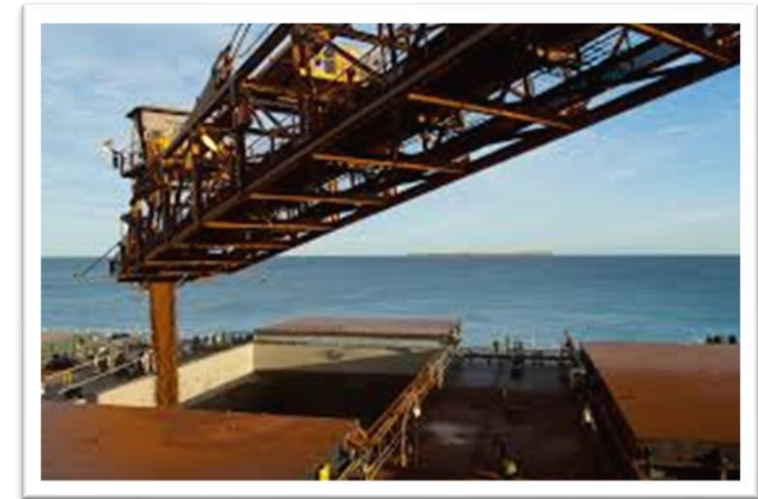


What do we really want?



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- As customers, we want:
 - ▼ Assurance that system design, construction, operation and maintenance has a supporting safety program
- As suppliers, we want:
 - ▼ To use good standards for design and development (because our customers will demand it)
- All parties want:
 - ▼ Commercial and legal departments to support proper safety engineering by understanding the actual constraints in an autonomous world
- Remember: you're a safety leader.
It's time to lead.



Want to know more?



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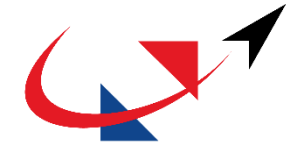
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Questions and Discussions



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I'm pretty sure this one's photoshopped