# Safety Vs Security A tale of two updates

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- This talk is about Philosophy and culture
- I will talk mainly about Industrial embedded systems.
- All projects are different. No project have all the constraints
- My definitions

Safety Anything related to reliability

Security Anything related to hostile takeover

We will discuss "Why embedded systems suck at security" But just a small part.

# Show of hands: who's who





#### Safety people



Security people





#### People with both hats





Safety is here to ensure that the system "always works as expected"

- Correct is not enough. You need to prove it.
  - Software<sup>1</sup>
  - Hardware
  - Tools (compilers)
  - No dynamic memory allocation
  - Proofreading the generated Assembly code
- It is easier to prove that a bug has no consequence than to prove that a fix is correct
- Any change is a safety change
- All assumptions must be documented and checked at every level.

Safety people are paranoid freaks

But our planes and trains are incredibly safe.



<sup>1.</sup> Machine learning is going to be...interesting

Security is here to ensure that the system "can't be used out of its purpose"

- Everything is an attack vector
- Any little hole is potentially a leap-frog to a whole exploit
- Security is a race
  - Find the weakness before the malevolant
  - Find a fix as fast as possible, temporary breakages are OK.
  - Deploy as fast as possible.
  - Embargoes are OK.
- The whole world is out to get you

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But attacks are a real thing and the security culture has measurable results







Code must be proven and certified

Security -



Must react quickly to attack



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- Usage range is clearly defined



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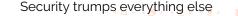
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- Deployment time is controlled by the user
- (Very) long term support
  - You can't trust your subcontractors to survive
  - You can't trust your technologies to survive
  - You can't trust your engineers to survive





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You have to choose... Bricked or Pwned? "As needed" is not realistic

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Linux Variable, but usually a rolling release. (Debian: automated daily updates)

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Yes but... What about our vulnerability window?

### So... To summarize the problems



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It is impossible to reconcile both sides. Let's look at ways to mitigate the problem.



# How to mitigate that problem



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- Containers
- Hypervisors
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#### Plan for security updates

- Include an update agenda in your maintenence process
- Plan an End of Life for your products and document it



The End!



Thank you! Questions?