



DO-178B & DO-254: Big Bang or Evolution?

HighRely Inc.



North America's Fastest Growing Avionics Services Company

Agenda

- What are DO-254 & DO-178B?
- Virus: Why Spreading?
- Adopting & Future: Bang or Evolve?
- Cost Vs. Benefit: Dollars & Sense
- Key Aspects
- Big Bang or Evolve?
- Top 10 Mistakes
- The Future

What are DO-178B & DO-254?

- Certification standards for airborne equipment:
 - » DO-178B = Software
 - » DO-254 = Hardware
- Regulated by the FAA
- Required if it flies in commercial U.S. airspace
- Covers full engineering lifecycle:
 - Planning (CM, QA, Development, Testing)
 - Development (Requirements/Design/Implementation)
 - Testing
 - Certification

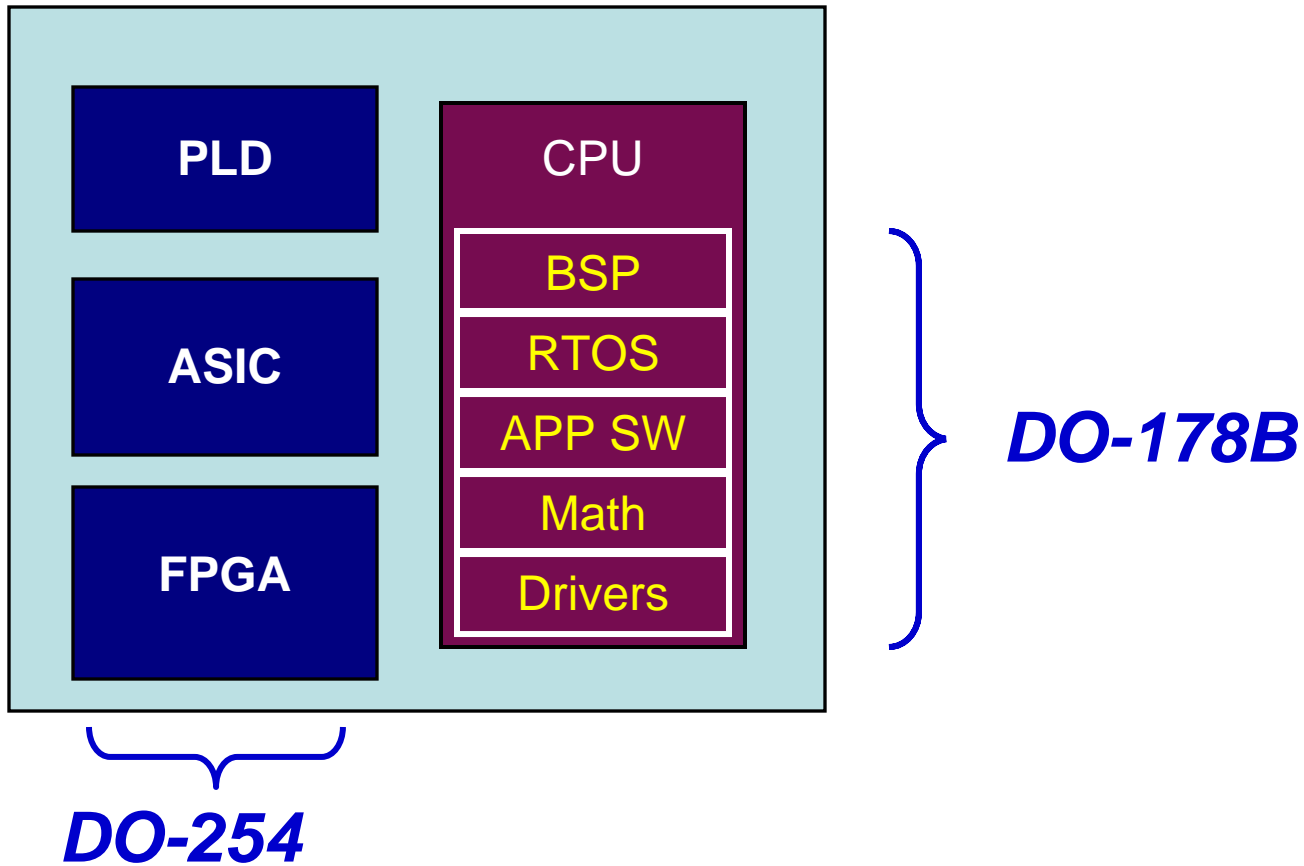


DO-178B & DO-254 Key Attributes?



1. Detailed planning
2. Five Criticality Levels (A, B, C, D, E)
3. Consistency & Determinism
4. Traceability to detailed requirements
5. Path testing
6. *“Guilty Until Proven Innocent”*

Scope of DO-178B & DO-254?



DO-178B & DO-254 Structure

1. Overview

2. System Aspects

3. Lifecycle

4. Planning *Process*

5. Development *Process*

6. Verification

7. Configuration Mgmt

8. Quality Assurance

9. Certification Liaison (DERs)

11 – 12. : Data & Considerations

A. Objectives by Cert Level

Planning

Development

Correctness

Verification in DO-178B & DO-254

- Integrated testing versus components
 - » *Mercedes & Yugo*
 - » *Air Lauda*
- Robustness Testing:
 - » *break the white-box*
- Actual Testing vs. Analysis/Inspection

Sony Betamax or Microsoft Windows?

- DO-178B/DO-254 Increasing in Scope:

- Military
- UAVs
- Foreign countries
- Ground-based systems



- Vendors on board: DO-178B/DO-254 Compliant tools/products:

- HighRely Certification Center
- GreenHills Certifiable RTOS
- Polyspace Code Analyzer
- Vector Software Testing Tools

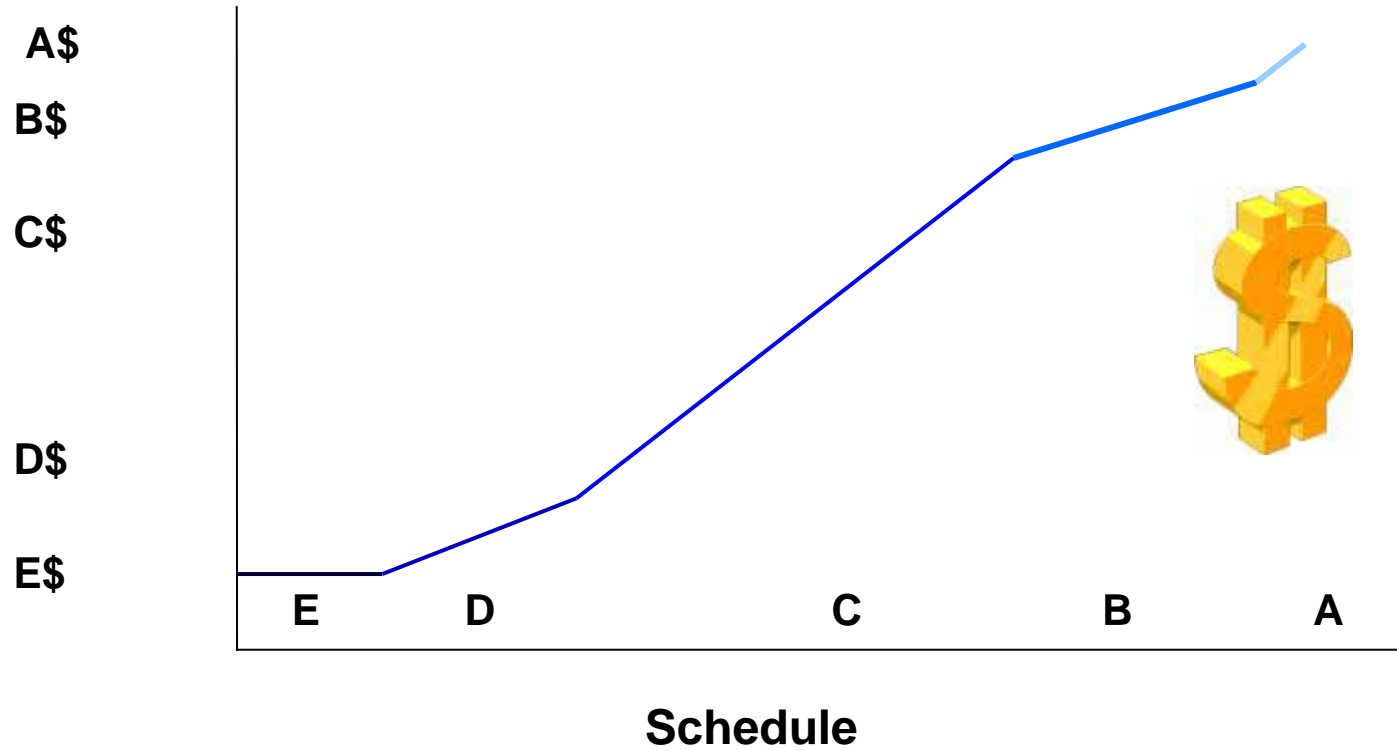
Dollar\$ And \$ense

- DO-178B & DO-254 Should add only **25% - 40%** to development costs.
- But industry average is +**75% - 150%**
- **So Why The Disparity?**

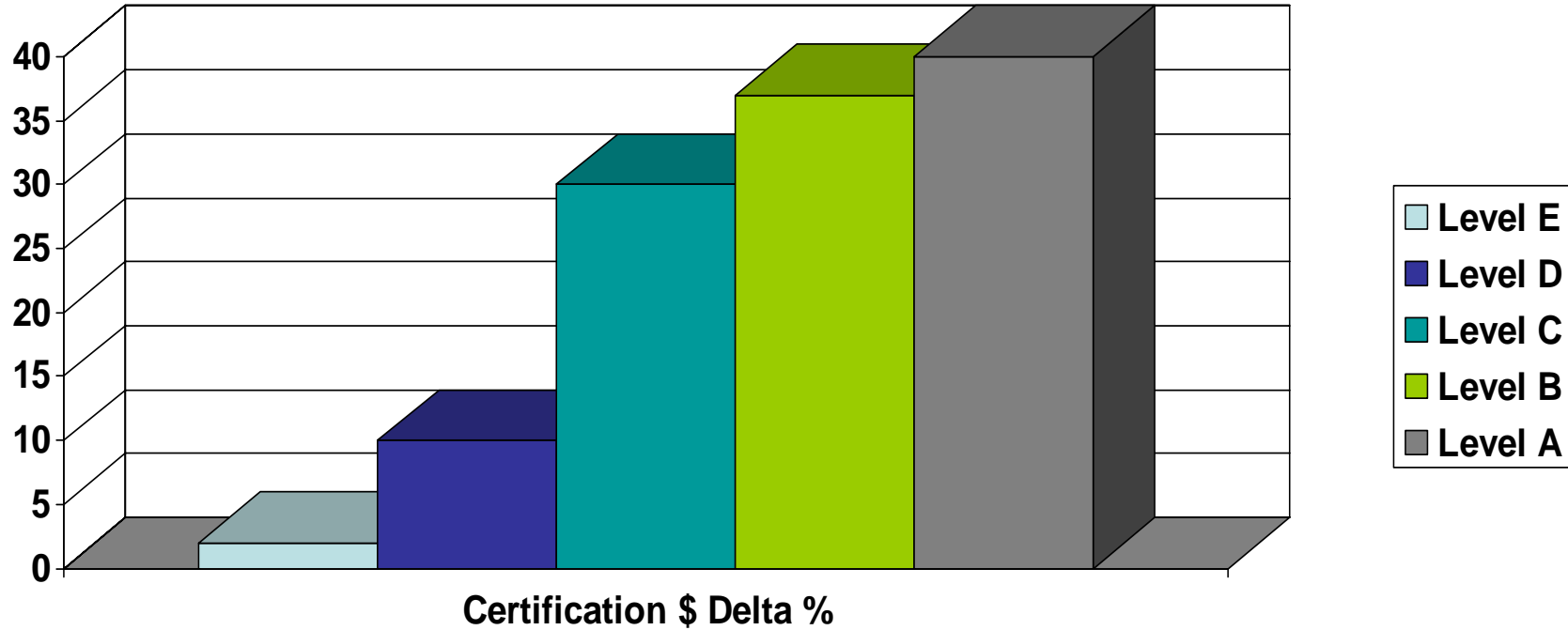


Cost/Schedule Of DO-178B & DO-254

Criticality Level - Cost



Cost Differential per Criticality Level



Cost Versus Benefit: Why?

- Obviously, DO-178B/DO-254 Add Costs. Why adopt?
- Benefits:
 - \$ Greater Re-usability
 - \$ Higher Quality
 - \$ Improved Management Visibility
 - \$ Improved Schedule Attainment
 - \$ Improved Safety Record
 - \$ Wider Market Penetration
- (Note: for more DO-178B/DO-254 Cost/Benefit info, request HighRely's whitepaper at www.highrely.com)



The Reality

- If in Aerospace, must be smart on DO-178B & DO-254
- Favorable Benefits Versus Cost
- But how to adopt?
 - Big Bang? Or
 - Evolution?



If You Are A Newcomer ...

Big Bang!!

- Bite the bullet and embrace
- Iterative adoption does NOT work
- The overnight cultural revolution & mentor

Big Bang Approach

Big Bang!!

- Procure Formal Training
- Develop RoadMap to Implementation:
 - 5 Key Process Plans
 - Identify Risks/Strategies
 - Identify 3rd party Tools/Products: RTOS, Rqmts Tracking, Functional Testing, Structural Testing, CM, Code Analysis
 - Tool Qualification
 - FAA or Certifying Agency Coordination





HIGH RELY
Reliable Embedded Solutions

HighRely: Rely On Us

If you have solid track record:

Evolve

- **Understand Recent FAA Rulings & DO-178C**
- **Consider OOT, New Tools/Products, Security, Etc.**
- **Perform DO-178B and/or DO-254 Gap Analysis**
- **Perform Cost Versus Efficiency Analysis for DO-178B/DO-254**
- **Refine Internal Processes**

Top DO-178B & DO-254 Mistakes?

1. *Neglecting “Independence”*
2. *Science projects versus proven technologies*
3. *Creating custom RTOS & Tools*
4. *Inadequate formal plans and not following them*
5. *Inadequate level of detail in Requirements*
6. *Inadequate and non-automated Traceability*
7. *Excessive code iterations via inadequate reviews/tools*
8. *Lack of path coverage capture during functional tests*
9. *Lack of automated testing = Expensive Regression Test*
10. ***<New problem due to lack of expert planning>***

The Future ...



- Increased COTS Products
- Increased scope of DO-178B/DO-254 (ground, naval, commercial industry)
- Increased FAA scrutiny
- C++, OO, Hardware Tools
- Use of formal modeling/methods
- Improved methods for schedule/cost
- Clarification from FAA
- Industry working groups



- For more information or 1-day DO-178B Training here on November 10:
 - » www.highrely.com
 - » info@highrely.com
- For dozens of DO-178B & DO-254 Whitepapers:
www.highrely.com/whitepapers

