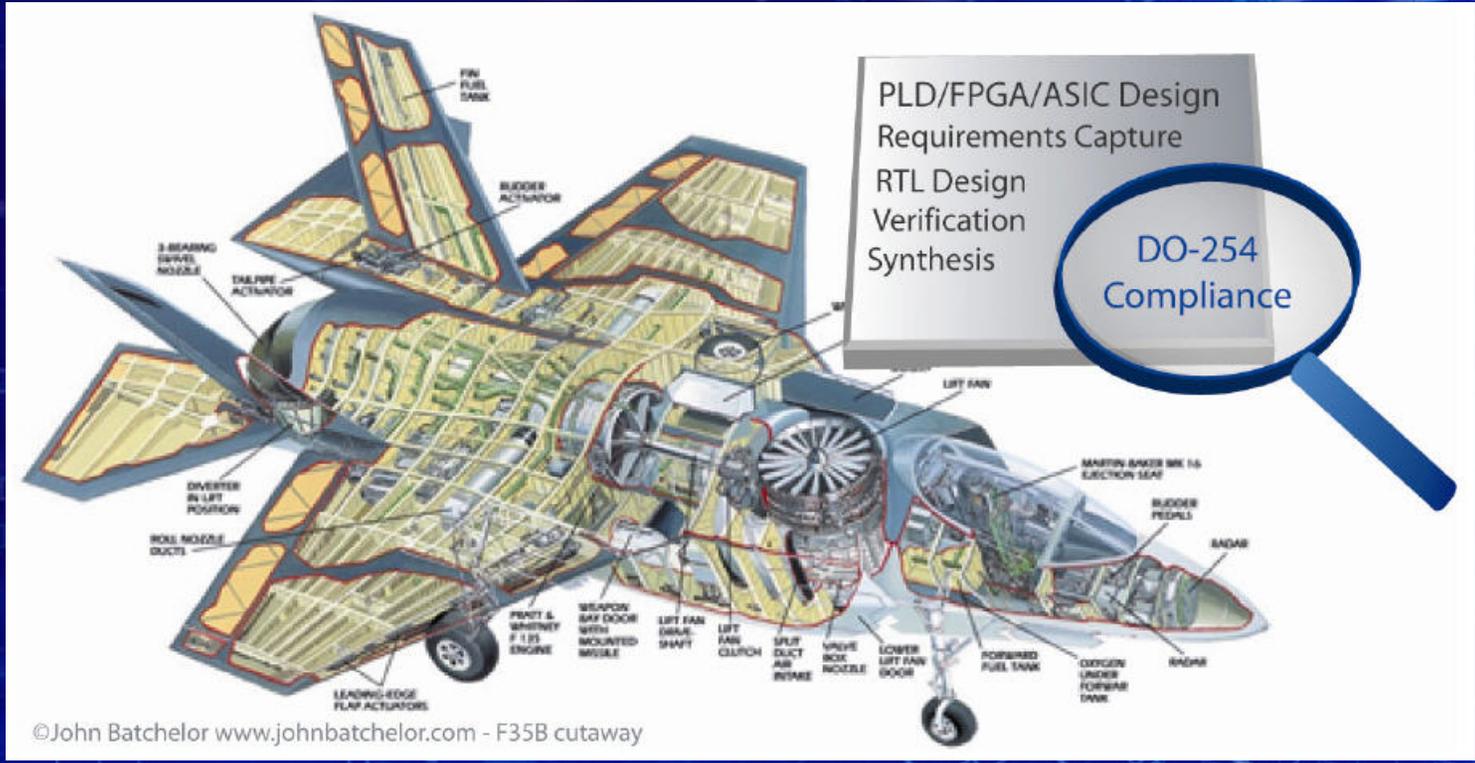


# DO-254 Compliance

*Pitfalls, Challenges, and Solutions*

For MAPLD  
2008



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DO-254 Program Mgr

Sept 18, 2008



# DO-254 Background



In 2005, the FAA\* began enforcing a new standard for HW (PLD/FPGA/ASIC) design



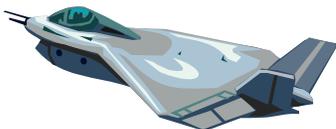
This standard is known as DO-254, “Design Assurance of Airborne Electronic Hardware”



DO-254 is based on a similar SW standard (DO-178B)



DO-254 today applies to civil aviation but is spreading to some military projects



DO-254 is a concern because it adds significant time, risk and cost\*\* to design projects

# What DO-254 Is...and Isn't

- It's like a guide that shows you where you need to be
- It does not tell you how to get there
  - That is up to you to determine
- It does not tell you what you need to watch out for
  - That's for you to learn



# DO-254 in the Aircraft Certification Process

## System Safety Assessment

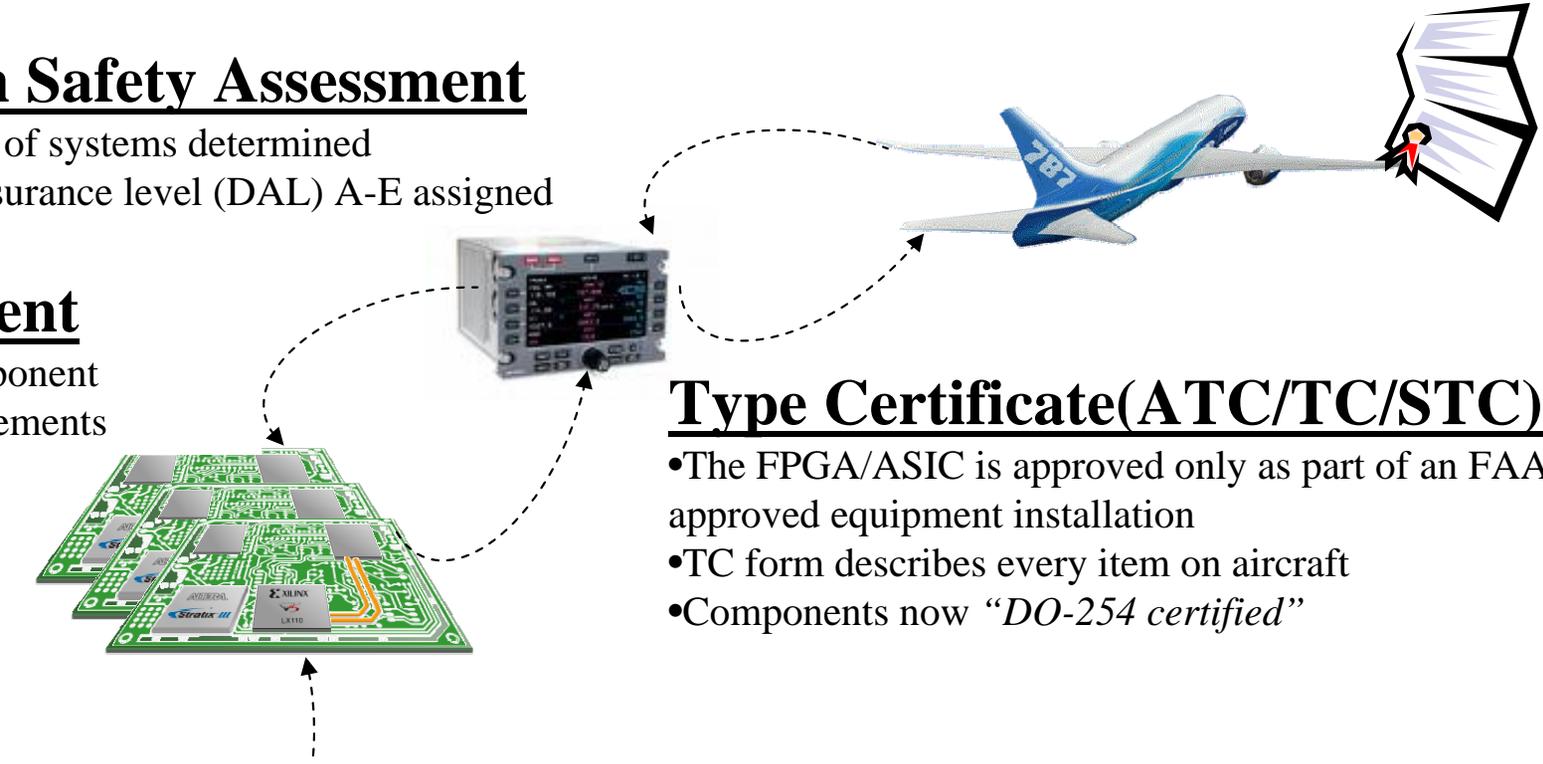
- Criticality of systems determined
- Design assurance level (DAL) A-E assigned

## DAL of Component

- DAL handed down to component
- Determines DO-254 requirements

## Type Certificate(ATC/TC/STC)

- The FPGA/ASIC is approved only as part of an FAA approved equipment installation
- TC form describes every item on aircraft
- Components now “DO-254 certified”



## FPGA/ASIC

- Built to DO-254 standards as reviewed by DER

## DO-254 Compliance

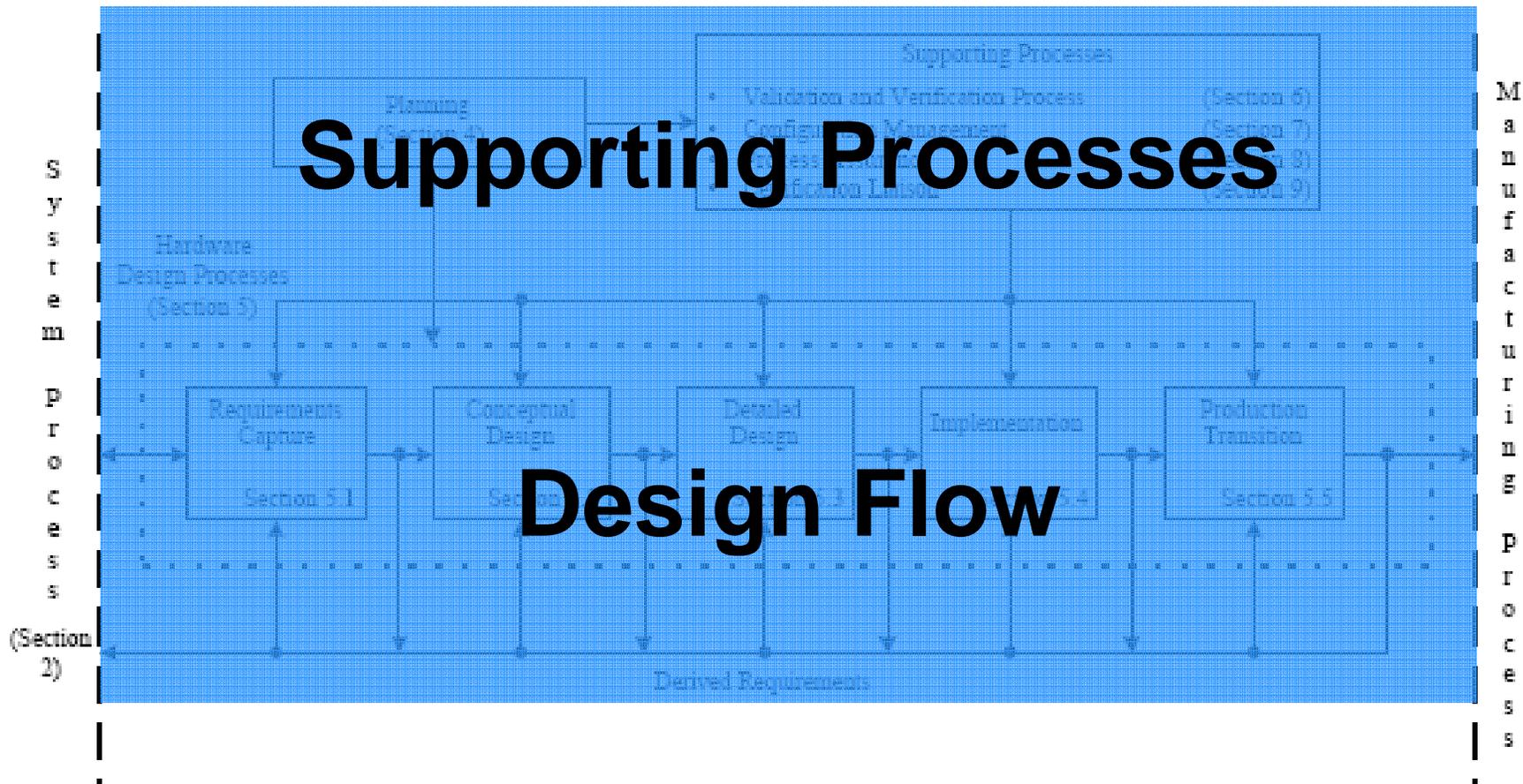
- DER form 8110-3 submitted to FAA recommending approval of the ASIC/FPGA

Timeline

~2 years

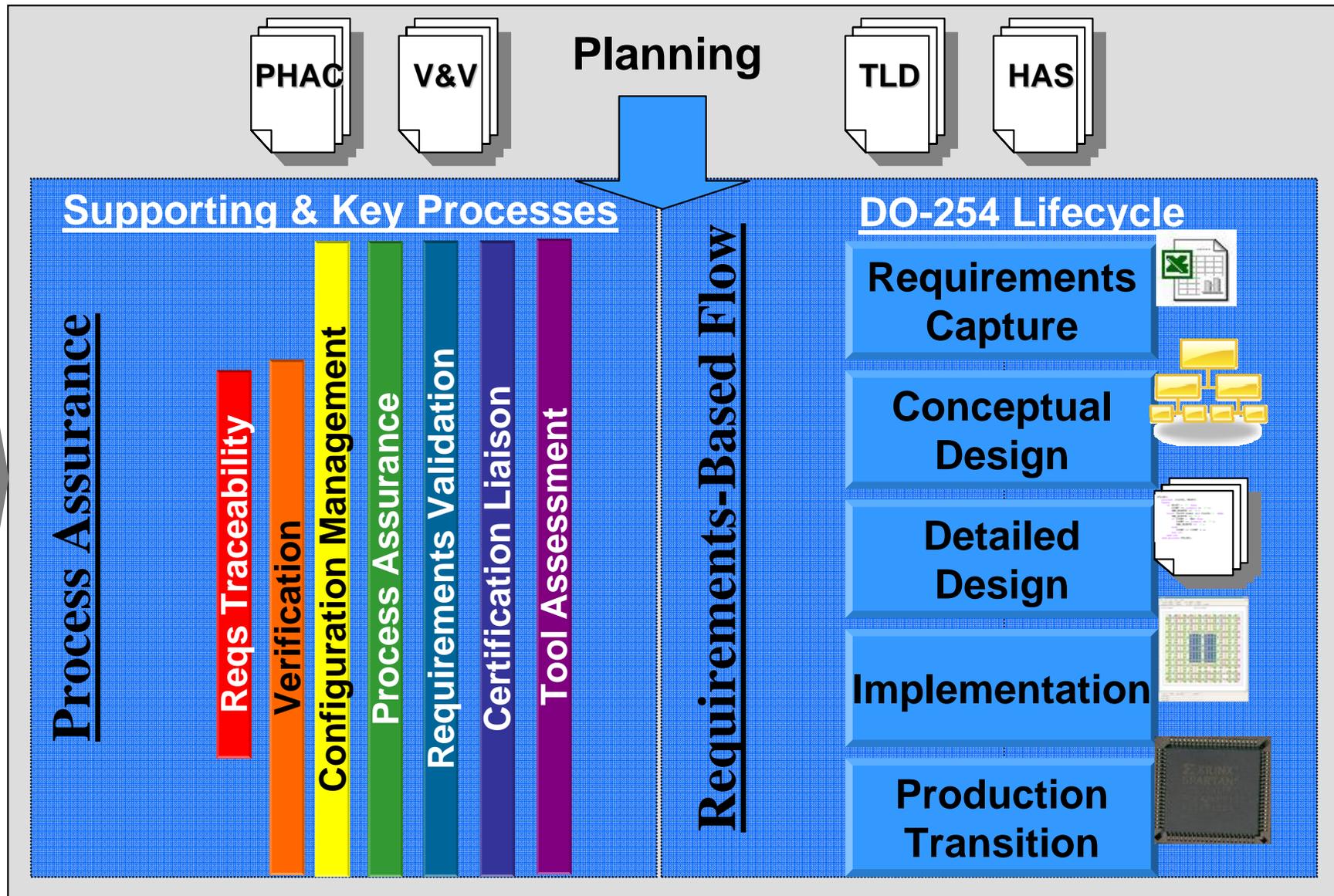
# What is DO-254?

*A Requirements-Based Design Flow with Strict Process Assurance*

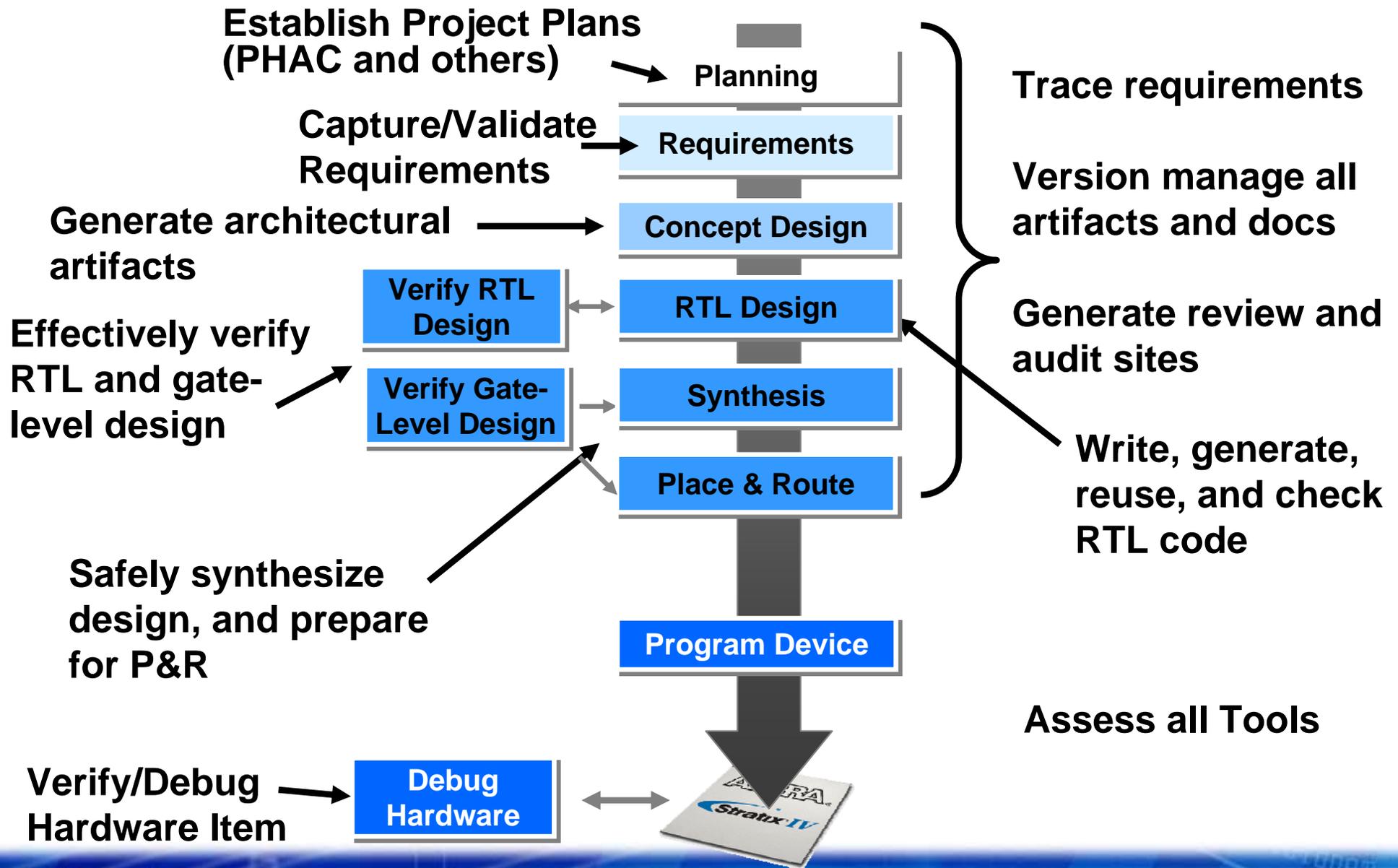


**DO-254 Process as you'd see it shown in the DO-254 Spec**

# A Look Inside DO-254



# A DO-254 Compliant FPGA Flow



# Common\* Issues We are Seeing

## Issue

- Companies are engaging in DO-254 programs without proper preparation
- Companies think they can “get around” DO-254
- Requirements traceability is a reactive process
- Groups within a company don’t talk and share information
- Companies don’t consider reuse or future uses of current design
- Companies are struggling with verification
- Tool qualification is difficult

## Result

- Lots of mis-steps and rework, failed audits, costs increasing 400%
- Parts cannot be used (or reused) for in-flight systems
- Failed audits, much rework and increased expense
- Each group re-invents the wheel, wasted resource
- Comply to lowest level, and then have to re-certify
- Losing bids, avoiding projects, producing poor quality products
- Much time spent on this task

# Let's Talk about A Few of These

## Issue

## Result

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>■ Companies are engaging in DO-254 programs without proper preparation</li></ul> | <ul style="list-style-type: none"><li>■ Lots of mis-steps and rework, failed audits, costs increasing 400%</li></ul> |
| <ul style="list-style-type: none"><li>■ Companies think they can “get around” DO-254</li></ul>                         | <ul style="list-style-type: none"><li>■ Parts cannot be used (or reused) for in-flight systems</li></ul>             |
| <ul style="list-style-type: none"><li>■ Requirements traceability is a reactive process</li></ul>                      | <ul style="list-style-type: none"><li>■ Failed audits, much rework and increased expense</li></ul>                   |
| <ul style="list-style-type: none"><li>■ Groups within a company don't talk and share information</li></ul>             | <ul style="list-style-type: none"><li>■ Each group re-invents the wheel, wasted resource</li></ul>                   |
| <ul style="list-style-type: none"><li>■ Companies are struggling with verification</li></ul>                           | <ul style="list-style-type: none"><li>■ Losing bids, avoiding projects, producing poor quality products</li></ul>    |
| <ul style="list-style-type: none"><li>■ Companies don't consider reuse or future uses of current design</li></ul>      | <ul style="list-style-type: none"><li>■ Comply to lowest level, and then have to re-certify</li></ul>                |
| <ul style="list-style-type: none"><li>■ Tool qualification is difficult</li></ul>                                      | <ul style="list-style-type: none"><li>■ Much time spent on this task</li></ul>                                       |

# Before Your First Project...

## Issue

- Companies are engaging in DO-254 programs without proper preparation

## Result

- Lots of mis-steps and rework, failed audits, costs increasing 400%

## Instead



Hot  
Tip #1

Invest in training (its worth it!)



Hot  
Tip #2

Work with your DER early in your project



Hot  
Tip #3

Consider having methodology assessments

- Both for compliance and for methodology efficiency

# Requirements Tracing...

## Issue

- Requirements traceability is a reactive process

## Result

- Failed audits, much rework and increased expense

## Instead



**Hot Tip #1**

**Take a proactive approach**

- Plan for requirements management and traceability as part of the process



**Hot Tip #2**

**Don't assign this job to the intern**

- Value this effort as a key part of the flow



**Hot Tip #3**

**Consider automation**

# Verification...

## Issue

- Companies are struggling with verification

## Result

- Losing bids, avoiding projects, producing poor quality products

## Instead



**Get a verification methodology assessment**



**Educate yourself on new methodologies**

- Understand the benefits and skill sets required



**Consider consulting experts to reduce risk**

- Get your team trained and project underway quickly

# Tool Assessment and Qualification...

## Issue

## Result

- Tool qualification is difficult
- Much time spent on this task

## Instead



Hot  
Tip #1

Understand the meaning and purpose



Hot  
Tip #2

Work with tool vendors who will support you



Hot  
Tip #3

Whenever possible, take the “Independent Output Assessment” approach

# For More Information

- Visit [www.mentor.com/go/do-254](http://www.mentor.com/go/do-254)
  - Download publications and information
  - Register for DO-254 training
    - Next training: Seattle, Sept 23-24
- Email [michelle\\_lange@mentor.com](mailto:michelle_lange@mentor.com)
  - Questions
  - Request product information
  - Arrange a visit or demo
- Any Questions?

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