

Singapore Aviation Safety Seminar

Topics: The Challenges Faced in Manufacturing of Flight Control and Display System

SASS Singapore, 27th March 2018



Topics:

- Brief Introduction to some of Thales Evolution on Flight Control System and Cockpit Display
- From Design....Prototypingto Production
- Effective APQP
- Challenges Faced in Production
- Initiatives to Improvement Safety and Quality

Thales' Next Generation Cockpit



Thales AVIONICS 2020



Future Cockpits

Focus on:

- Safety Enhancement
- Energy Saving
- Weight Reduction
- Efficiency on flight management
- More responsive Human Machine Interface
- Customization to needs
- Costs Reduction –Low Maintenance

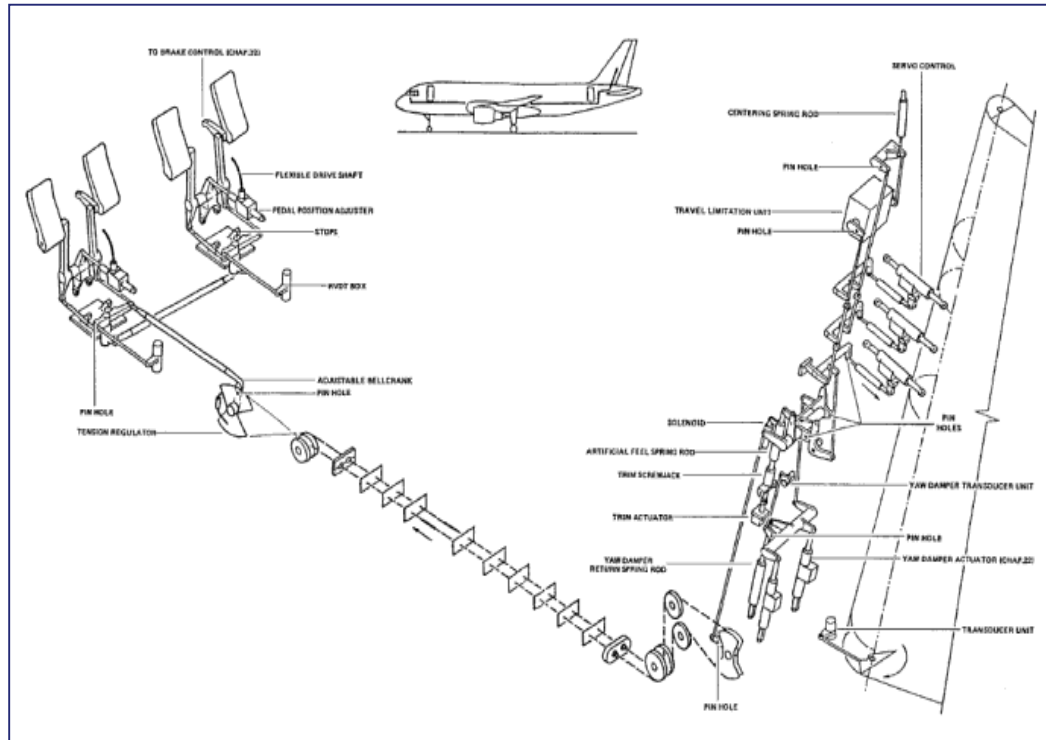


E-Rudder system overview

Rudder mechanical control



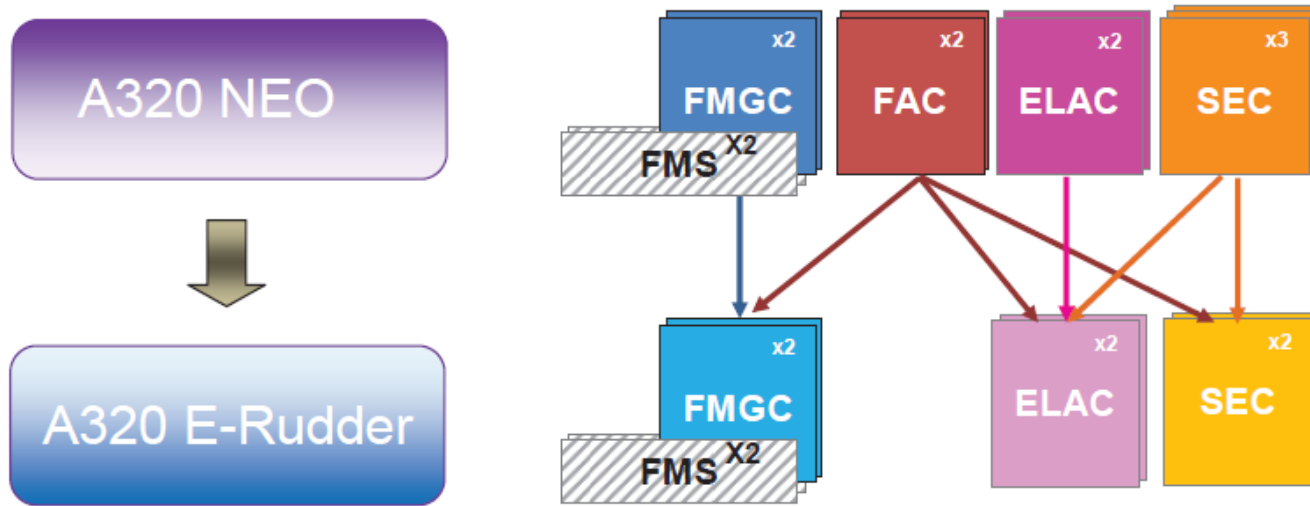
Rudder Electrical Control



Why Electrical rudder?

- Safety Enhancement
- Recurring Costs [RC] Reduction
- Weight Reduction
- Operational Reliability Improvement
- Maintenance Costs Reduction
- In-Service Provisioning Reduction

eRudder FCS computers architecture overview



Benefits : optimized architecture from 9 to 6 LRUs

- Reduced recurring price, volume, mass and consumption
- Electrical Rudder interfaces added
- ELAC redesign with state of the art framework

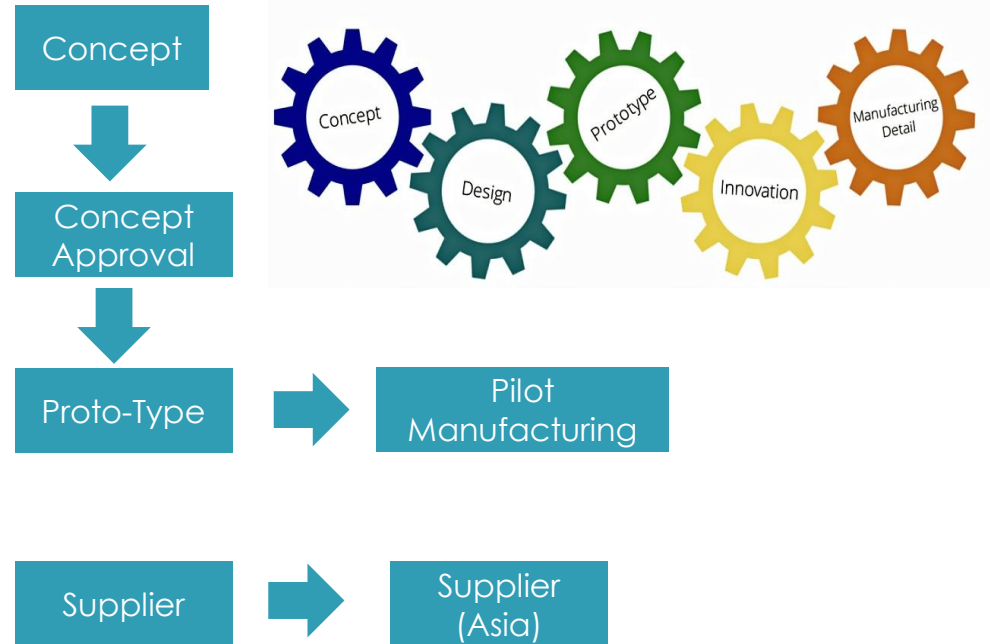
From Design....Prototypeto Production

Production Transfer

- Concurrent Engineering Review
- Configuration Management (Material)
- Proto-type to Pilot Manufacturing Verification
- Process Stability Simulation
- Test Means & Software Verification
- DFMEA to PFMEA

Supplier Transfer

- Supplier Capability & Capacity Assessment
- Supplier Qualification / Certification
- Customer & Regulation Flow-down
- Supplier FAI
- Supplier Obsolesce Management Readiness
- Counterfeit Parts Prevention



From Design....Prototype ...to Production

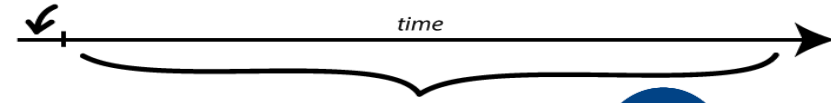
Production Readiness

- Production Readiness Review (PRR)
- Personnel Training
- Maturity of Product (FPY)
- Supplier Parts (sub-assembly) FAI verification
- Process Audit
- Product and Process Certification (PPAP)

Production Stability

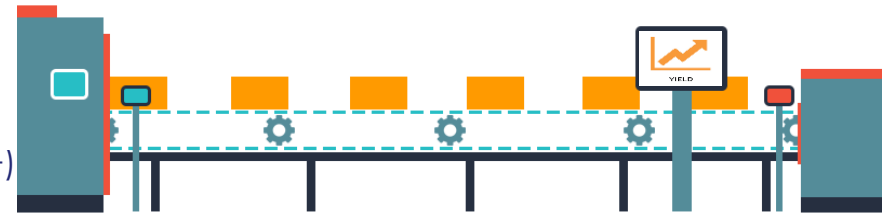
- PFMEA (Process Failure Mode & Effect Analysis)
- SPC (Statistical Process Control)
- Production Control Plan
- Customer Protection Programme
- Industrial Process Continuous Assessment (IPCA+)
- Supplier Quality Improvement Program (SQIP)
- QEPP (Quality Escape Prevent Programme)

In development

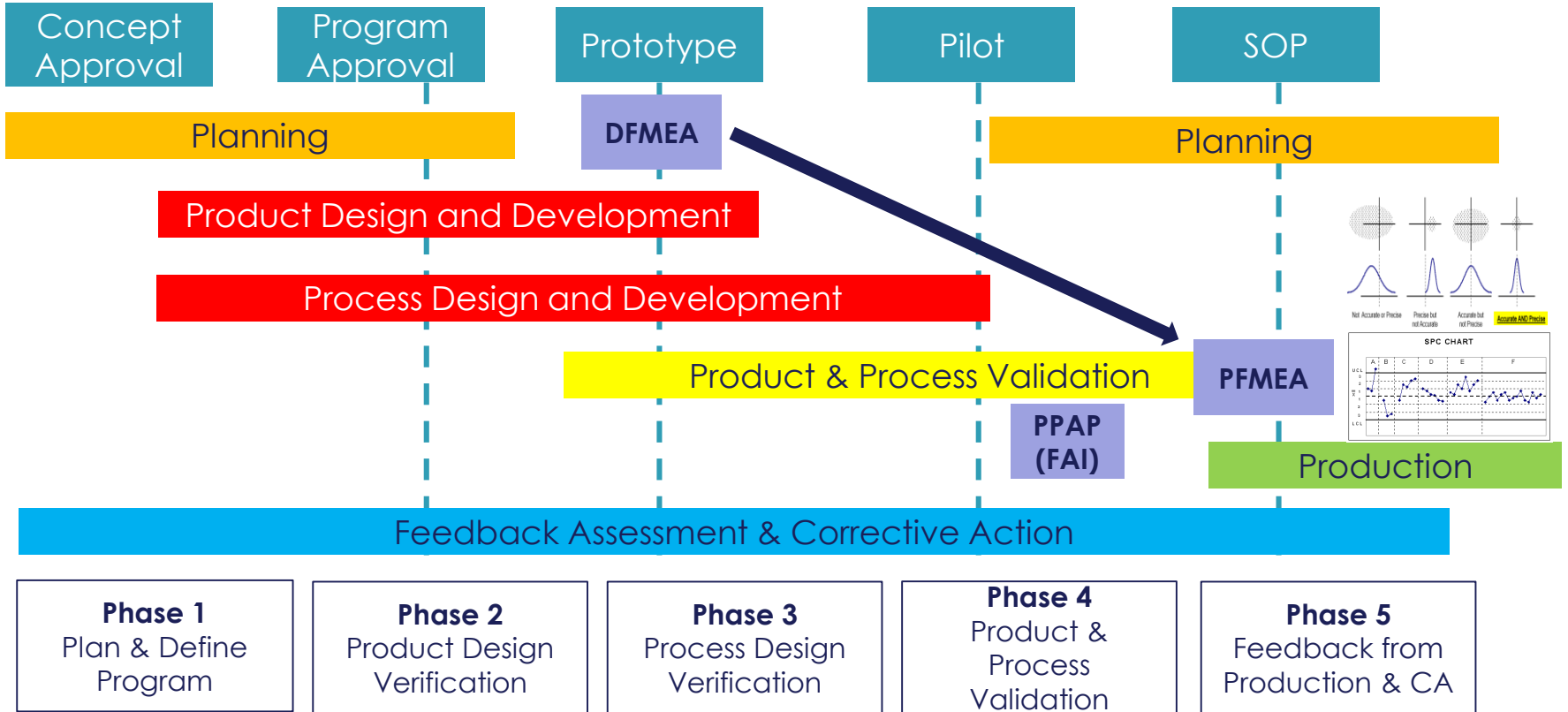


DESIGN vs. PROCESS

FMEAs



Effective APQP Implementation



Challenges Faced in Production

- Fast Consumable Market on Electronics Component
- Hight Mix, Low Volume Production
- Stringent Requirements Compare Consumers Product Requirements
- Product Evolution...Long Qualification Process
- Tier 2 to Tier 6.....Suppliers Management (e.g. Component level, Secondary Processes)
- Educating non-aerospace supplier on Aerospace processes and necessary Ethics

Initiatives to Improve Safety and Quality

- **Effective Product / Process FMEA**
- **Quality Control Plan**
- **Supplier Flow Down**
- **Reduce and Minimize Human Factor errors through Risk Management and Mitigation Programmes**
- **Introduce Lessons Learnt Training Programmes to cultivate good Ethics and Human Factors Behaviour (e.g. Culture, Norms and Leadership)**
- **Introduce Mitigation Mechanism within processes to minimize and eliminate risks and potential errors with Digitalization initiatives (e.g. E-Router, Process Data Analysis, Dissimilarity, Robotics etc..)**

**The QUALITY
in You
Makes a Difference!**