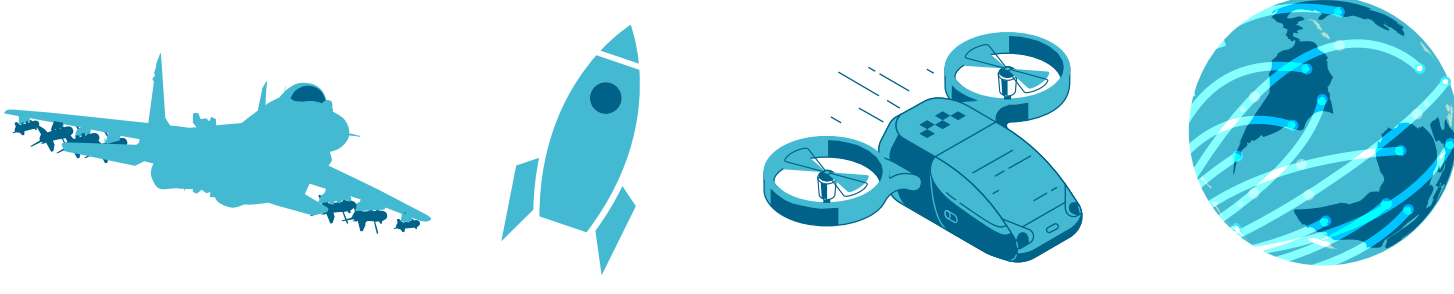# SIEMENS

Excel at agile engineering and program execution while minimizing risk with **Siemens Product Design and Engineering**

Trends

Pressure to Reduce Program Cost and Schedule
Companies are under pressure to reduce program cost and schedule while meeting requirements for new products.

Increasing Program Complexity and Integration
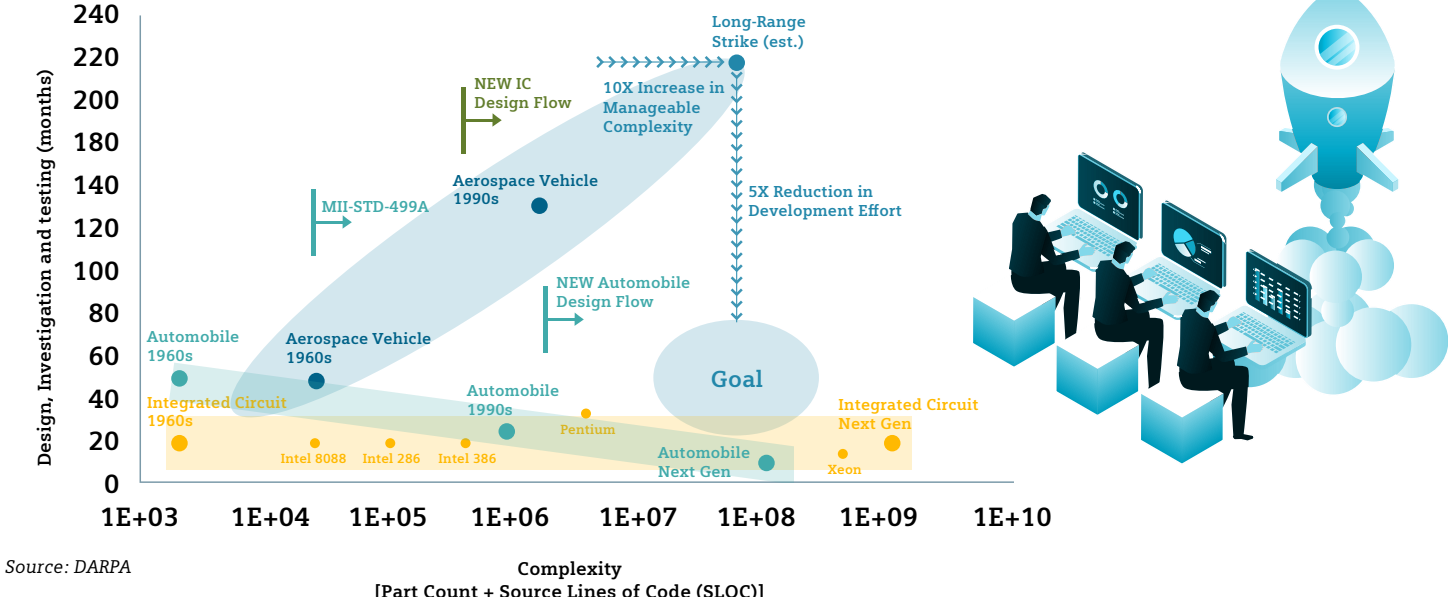Aerospace and defense products are becoming increasingly complex and highly integrated.

Increased Electrification of Products
Decarbonization, reliability, maintainability and performance of products are driving increased electrification.
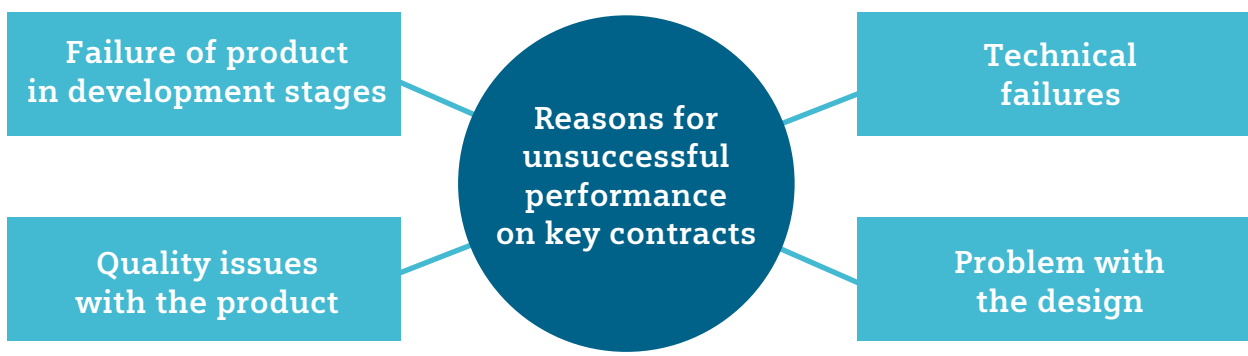
Globalization
Growing globalization in company supply chains, workforce and the competition is driving changes to how companies collaborate both internally and externally.
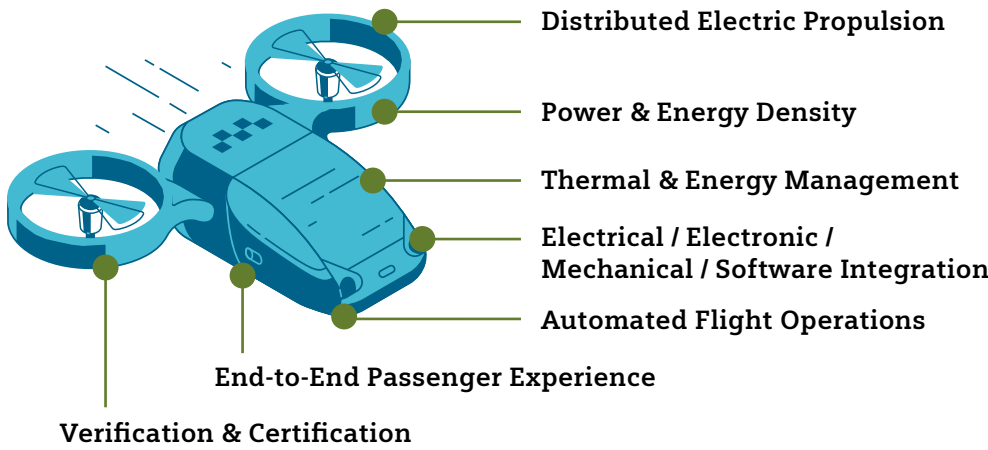
Complexity Growth in A&D

Design, Investigation and testing (months): 0, 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240

Complexity [Part Count + Source Lines of Code (SLOC)]: 1E+03, 1E+04, 1E+05, 1E+06, 1E+07, 1E+08, 1E+09, 1E+10

Long-Range Strike (est.)
10X Increase in Manageable Complexity
NEW IC Design Flow
5X Reduction in Development Effort
MIL-STD-499A 1990s
Aerospace Vehicle 1990s
NEW Automobile Design Flow
Automobile 1960s
Aerospace Vehicle 1960s
Customized Circuit
Automobile 1990s
Goal
Integrated Circuit Next Gen
Automobile Next Gen

Source: DARPA

Program Risk – Ability to Perform in key Contracts

Reasons for unsuccessful performance on key contracts
- Failure of product in development stages
- Technical failures
- Quality issues with the product
- Problem with the design
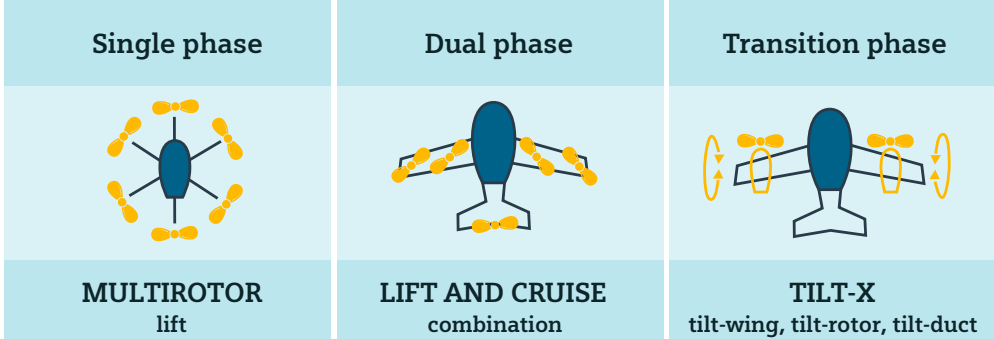
Source: EY Analysis

From Traditional Air Travel to Urban Air Mobility

Challenges and risks that impact development processes

- Distributed Electric Propulsion
- Power & Energy Density
- Thermal & Energy Management
- Electrical / Electronic / Mechanical / Software Integration
- Automated Flight Operations
- End-to-End Passenger Experience
- Verification & Certification

Simplified Aerodynamic Mobility Concepts

Single phase	Dual phase	Transition phase
MULTIROTOR lift	**LIFT AND CRUISE** combination	**TILT-X** tilt-wing, tilt-rotor, tilt-duct

So many choices. Which configuration to choose?

Source: Porsche Consulting

What's an OEM to do?"

CONTINUOUS INTEGRATION
VIRTUAL VERIFICATION
SPRINT
REQUIREMENT ANALYSIS
SPRINT DELIVERY

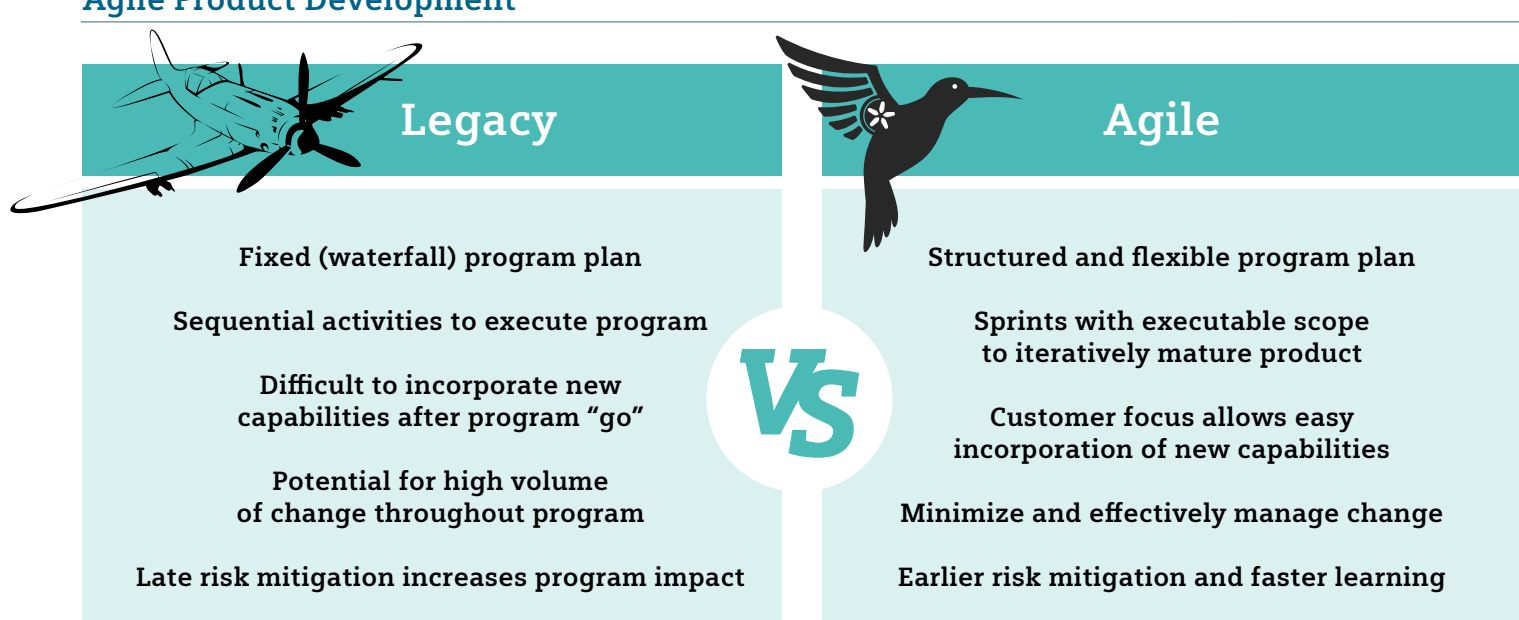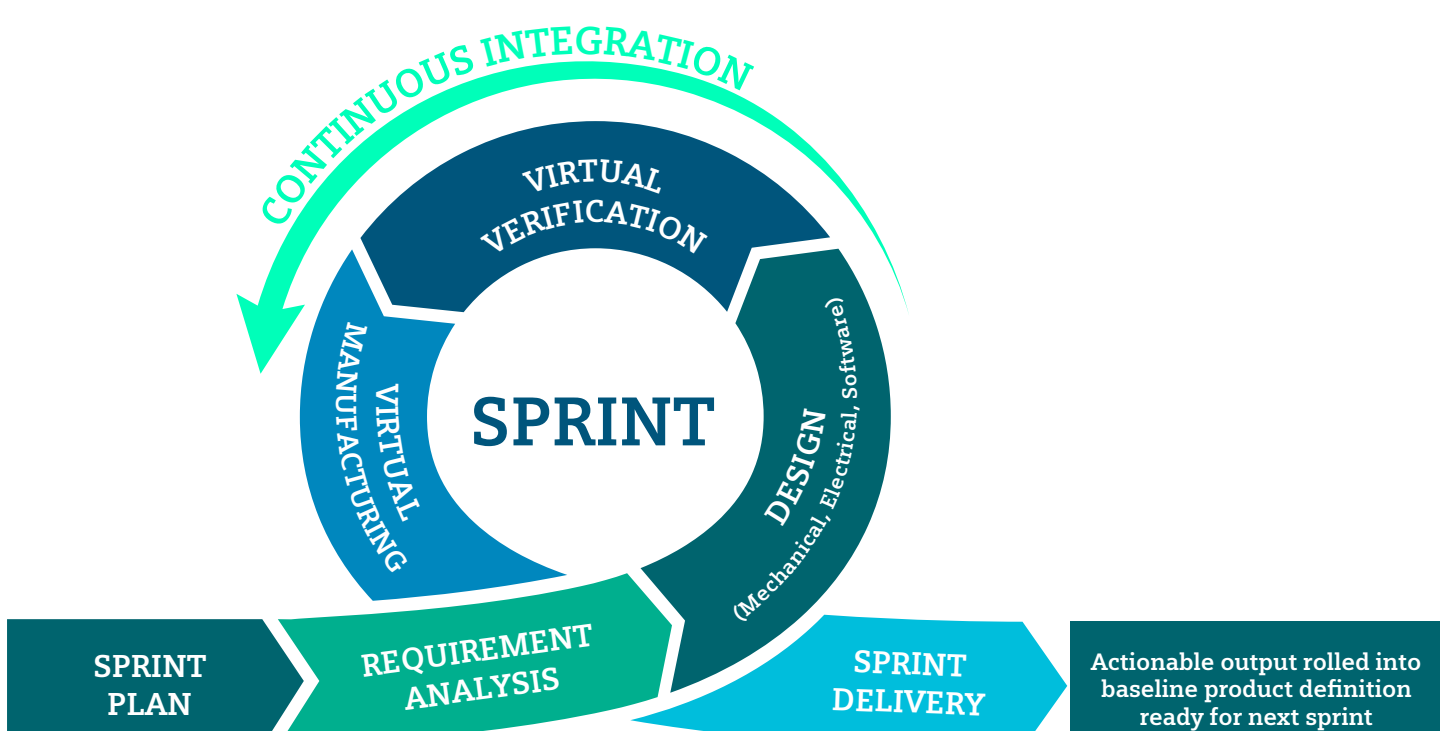## GO AGILE: Breakdown the Barriers and Accelerate your Innovation

- Become more flexible to evolving customer needs and market forces
- Use the full potential of your workforce talent and dissolve disruptive silos
- Transform program management to focus on delivering more mature content

Agile Product Development

Legacy	VS	Agile
Fixed (waterfall) program plan		Structured and flexible program plan
Sequential activities to execute program		Sprints with executable scope to iteratively mature product
Difficult to incorporate new capabilities after program "go"		Customer focus allows easy incorporation of new capabilities
Potential for high volume of change throughout program		Minimize and effectively manage change
Late risk mitigation increases program impact		Earlier risk mitigation and faster learning

Digitalization Enables Agile Product Development

CONTINUOUS INTEGRATION
VIRTUAL VERIFICATION
VIRTUAL MANUFACTURING
SPRINT
DESIGN (Mechanical, Electrical, Software)

SPRINT PLAN | REQUIREMENT ANALYSIS | SPRINT DELIVERY | Actionable output rolled into baseline product definition ready for next sprint

Accelerate your new product development and become more agile

- Go faster and Innovate more
- Be more flexible to evolving customer needs
- Minimize risk while building more complex products
- Be more collaborative with your supply chain

- Reduce Risk
- Accelerate Innovation
- Speed Time to Market
- Improve Collaboration

For more information, visit: