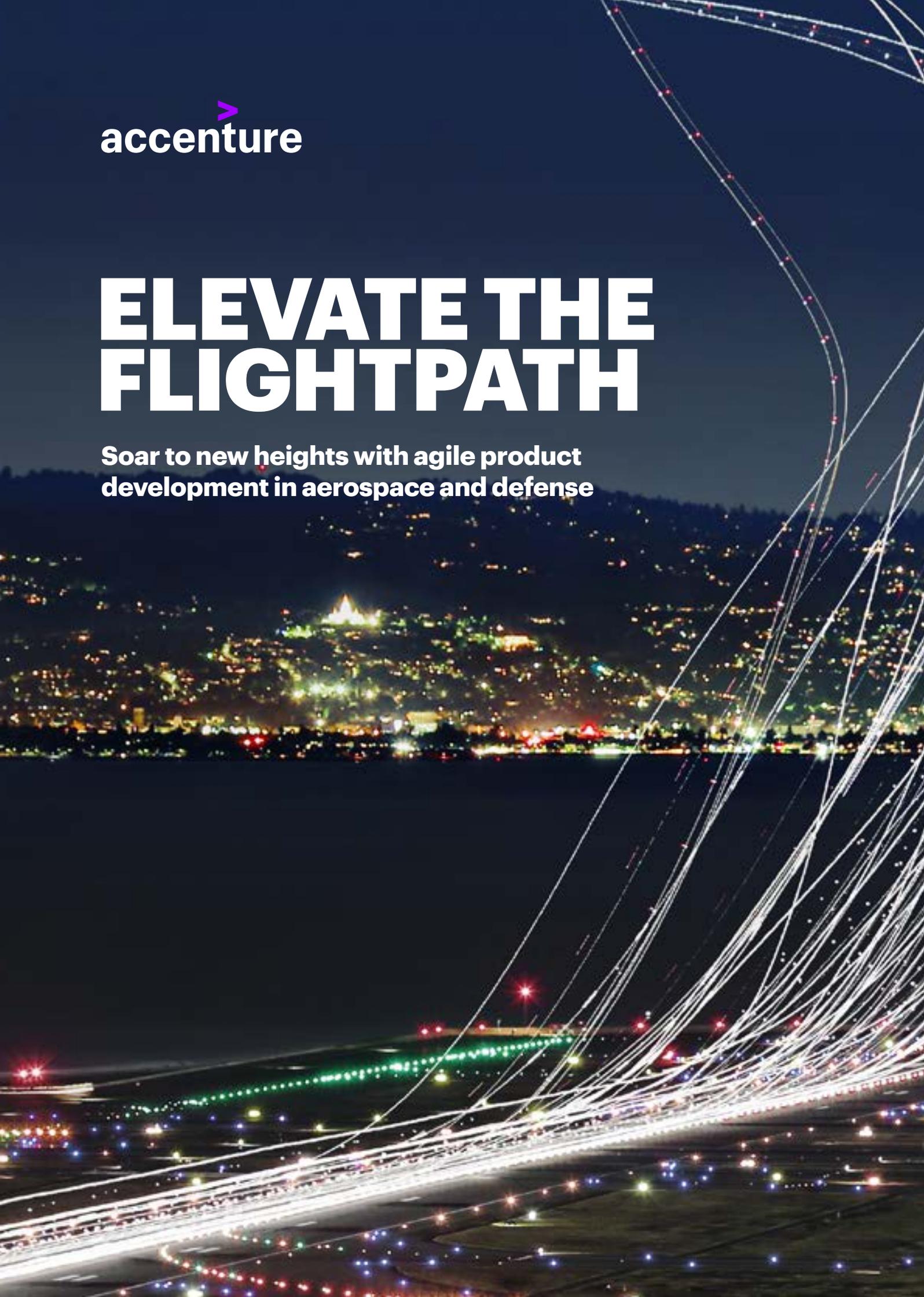




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# ELEVATE THE FLIGHTPATH

Soar to new heights with agile product  
development in aerospace and defense



# Agile approaches are critical in helping aerospace and defense companies address increased volatility and pressures on profitability, while adopting new business models.

The Aerospace and Defense industry faces significant change. Supply chains face increasing volatility due to rapidly evolving market conditions and changing customer needs. Global defense spending is rising, reaching \$1.8 trillion in 2018.<sup>1</sup> Nimble, new entrants are competing with established players, especially in the resurgent space industry, and changing the economics of the sector. And crucially, the industry is seeing a pivot to services as customers' demands change.

Technology is transforming how products are designed and manufactured. Harnessing data more effectively is an imperative. With 93% of aerospace and defense executives reporting that the pace of innovation in their organizations has accelerated over the past three years due to emerging technologies,<sup>2</sup> deploying digital technologies like artificial intelligence (AI) is essential for delivering improved business outcomes.

Aerospace and defense companies must explore new business models that will deliver growth and profitability. That means a new approach to delivering value across the entire product lifecycle.

Agile approaches support the demands of service-based business models, facilitating rapid upgrades and the creation of new features delivered directly to customers.

Some areas of the Aerospace and Defense industry, such as new 'earth observation' companies launching smaller satellites into low-earth orbit, already deploy agile methods. Yet many players remain unsure about whether agile is applicable to the industry's unique context: complex products, with long lifecycles, that must comply with multiple regulatory regimes.

These concerns, however, should not prevent aerospace and defense companies from adopting an agile approach. High-frequency, cross-functional, model-based and feature-driven principles can work in the Aerospace and Defense industry; they just need to be adapted to its specific challenges.

# WHY AGILE MATTERS

**To drive success with services, aerospace and defense companies need to understand their customers better and respond faster to their needs.**

Accenture research shows that 81% of aerospace and defense executives<sup>3</sup> agree that the integration of customization and real-time delivery will be key to gaining a competitive advantage in the future. Agile business models help organizations meet these needs by encouraging frequent releases of new features directly to customers.

In some areas of the Aerospace and Defense industry, the agile business mentality is already in evidence. Boeing Defense and Space took an agile approach in their pursuit of contracts for the advanced jet trainer, T-7A Red Haw, and unmanned aerial tanker, MQ-25 Stingray. Their low bid was essential to their success, but their agile approach to the development process was equally important.

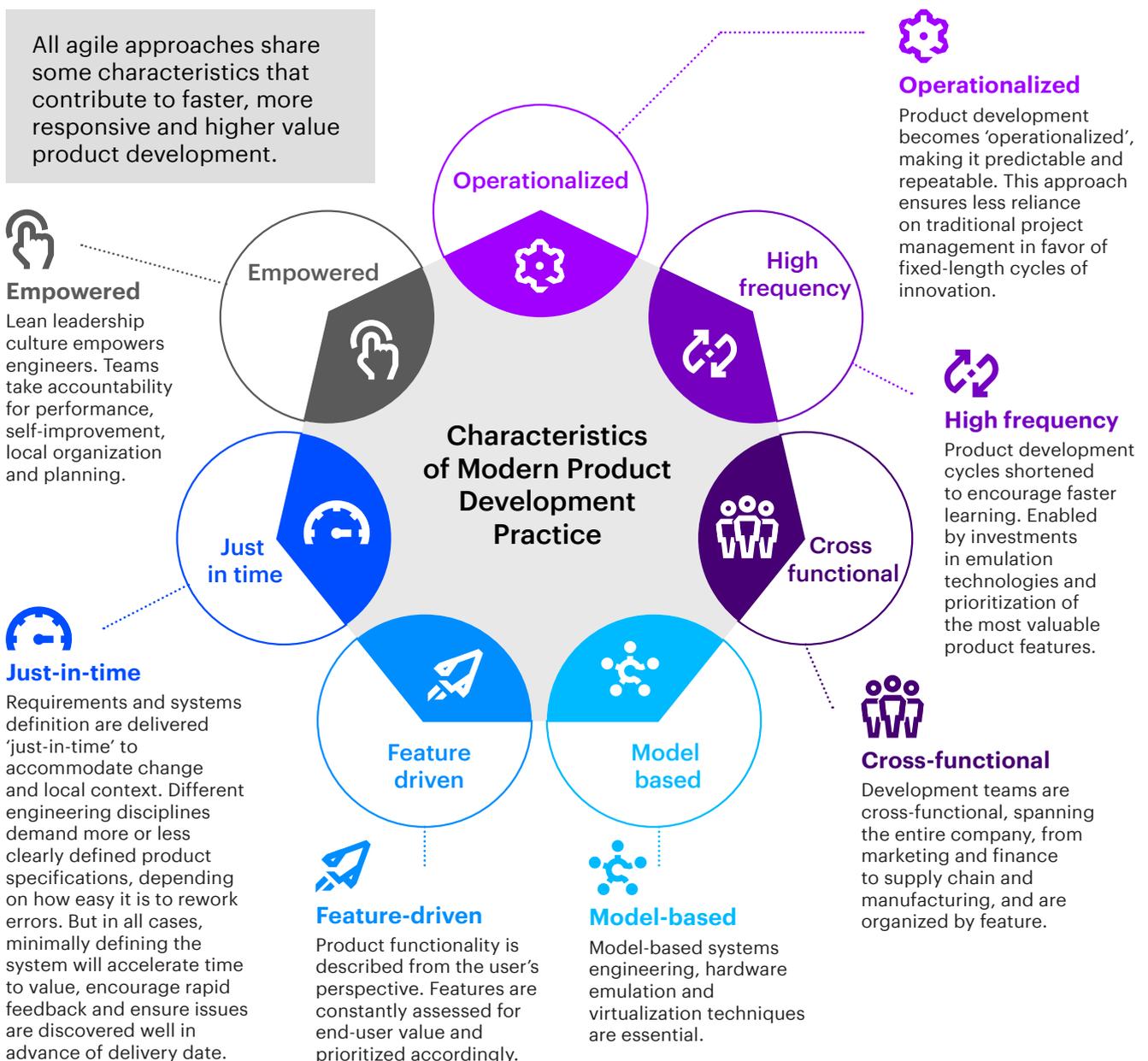
Their software developers chose an agile path, reducing the lines of code by 50% compared with traditional development, while model-based engineering reduced the duration of the assembly process by 80%. 3D digital models replaced paper documentation, allowing engineers to analyze aerodynamic flows, develop manufacturing plans and distribute design outlines throughout the supply chain.<sup>4</sup>

BAE Systems, leader of Team Tempest, which is responsible for developing the UK's next-generation fighter, is also pioneering agile methods, testing the use of multitask robots, digital twins and innovative materials to make production faster and cheaper.<sup>5</sup>

# CHARACTERISTICS OF AN AGILE APPROACH

An agile approach is high frequency, cross-functional, model-based and feature-driven. Product development is 'operationalized', engineers are empowered to do their work and goods are delivered just-in-time.

Figure 1: Modern product development practices based on agile principles



# HOW AGILE PRODUCT DEVELOPMENT CAN ACHIEVE TAKE-OFF

**Aerospace and defense companies can harness agile methods and reap the benefits of doing so. But they need to adapt agile to the industry's specific needs.**

The principal barriers to the adoption of agile in the Aerospace and Defense industry are concerns about their applicability to the industry. Our experience suggests that these objections can be grouped into requirements management, program management, and product and service development.

Looking at some of the most common reasons for these objections, it's possible to see how agile principles can overcome them.

## **Requirements management**

Traditionally, the Aerospace and Defense industry has determined all of a product's specifications before beginning development. Agile development methods encourage a more flexible and iterative approach. To begin with, only a product's essential specifications need to be established. The rest are subject to ongoing assessment. By adopting this approach, product designers can test the assumptions underlying their product earlier and faster.

## **Program management**

Aerospace and defense companies cite the complexity of regulation and program management as barriers to adopting an agile approach. The reality is that program management is made easier with agile

method, with for example, cross-functional teams working more closely together and simplifying the management of dependencies. Regulatory activities can also be built into the agile development cadence rather than deferred to the end. Agile offers other advantages in this context too. The velocity that a team establishes can be used for forecasting and agile contracting principles build trust with clients and help to avoid late delivery penalties.

## **Product and service development**

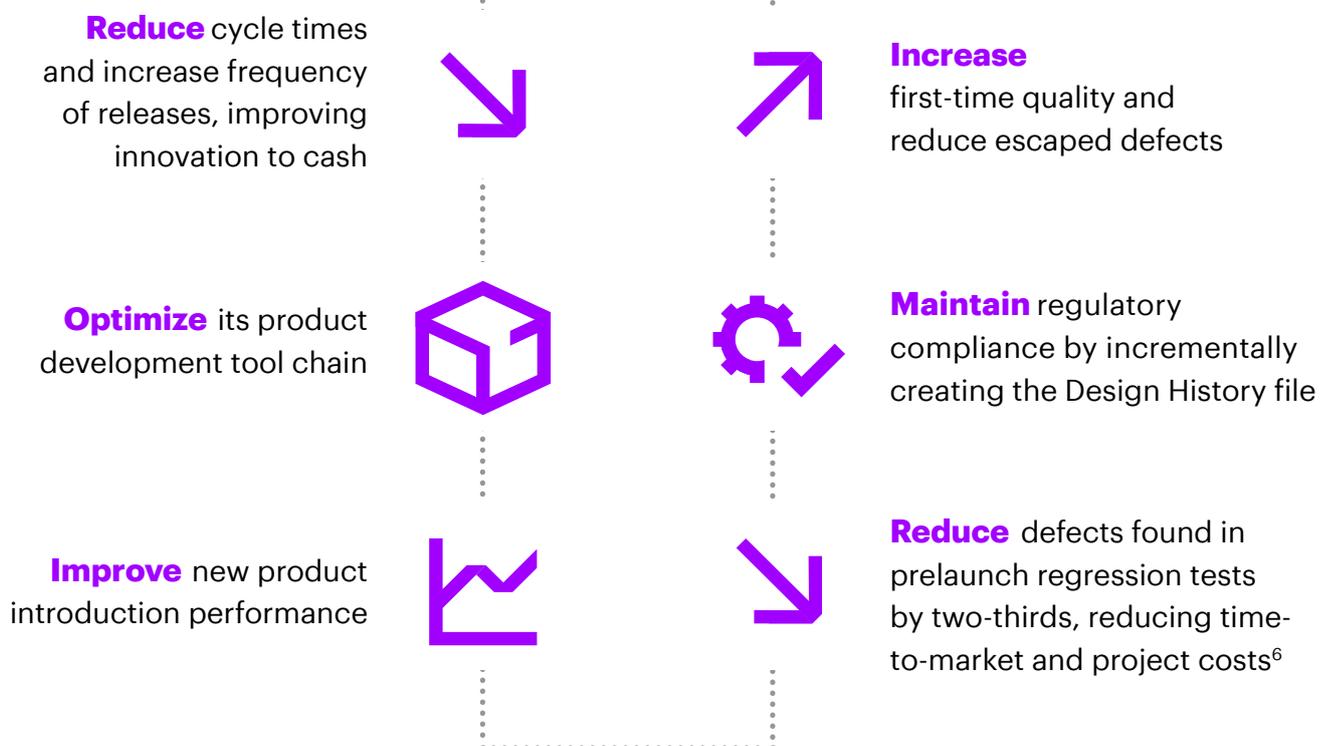
Unlike a web developer, aerospace and defense companies cannot release products and services incrementally or share beta versions with customers. But that doesn't mean agile approaches are unsuitable. Feedback from trusted stakeholders on an early version of a product can still be valuable, even if the delivery is into a test harness or virtual environment.

Agile can also benefit developers of reusable components, or platforms who struggle to prioritize the competing needs of their internal customers. Clearly defined priorities, combined with synchronized development of the platform and product, can simplify interlock and optimize return on investments in research and development.

# AGILE IN ACTION

**Industries facing similar challenges to the Aerospace and Defense industry have successfully adopted agile, and are now seeing the benefits, with faster times to market and accelerated innovation.**

**A medical devices business** operating in a highly regulated, complex product and services lifecycle environment, wanted to accelerate their processes, from idea to market, and from order to cash. With the help of agile ways of working and Scaled Agile Framework (SAFe) for large distributed development, the business was able to:



# GET AIRBORNE WITH AGILE

**Aerospace and defense companies can overcome the principal barriers to adopting agile. But they also need a culture that encourages change. Starting small and building on success is the way forward.**

The largest barrier to change is a risk-averse industry culture and this can be addressed through an incremental approach to agile adoption through a series of pilots.

- 1 Build a coalition of change agents and supporters**  
Select those in your company that recognize the need for change.
- 2 Identify candidates that are suited to an agile pilot**  
Good pilot candidates may already have some local agile initiatives or be in a business division more open to experimentation
- 3 Design your Agile Engineering Operating Model**  
The characteristics of Modern Product Development Practice provide the foundations for getting started and underpin many of the publicly available frameworks such as SAFe or Accenture's AutoSCRUM.<sup>7</sup>
- 4 Plan, Do, Check, Act**  
Execute a couple of development cycles, review progress and be prepared to make small adjustments to your approach before promoting it beyond the pilot team. Above all, prioritize learning.
- 5 Seek to propagate your refined framework**  
Extend to a broader group as performance improves and interest in the new method spreads.
- 6 Publicly acknowledge the progress of the new agile teams**  
Understand that culture only starts to change when benefits are widely acknowledged.

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