Integrated engineering services

working together

reaching new heights

integrated engineering services

Your business technologists. **Powering progress**

Atos

Put Atos on your winning team

Successful engineering-led companies are challenged to integrate an ever growing range of skills and technologies across the IT and Engineering domains, and they are required to deliver them in a flexible and cost effective way. That task gets more difficult each day, which is why more and more companies are turning to Atos Integrated Engineering Services.

Engineering is a complex activity that has traditionally been at the center of the world's most innovative companies. But in recent years, it has become harder to fully satisfy the growing demand for engineering services using inhouse solutions because of talent shortages, cost pressures and ever changing demands.

Growing technological sophistication and the raised expectations of end-users for products that are easy to use further complicate the picture. Companies whose experience lies mainly in the predigital world risk underestimating the multidimensional design and integration challenges of today's smart products.

To succeed in today's ultra-competitive global marketplace you need to be able to harness the power of innovation to quickly and effectively meet new market demands. You want to drive more value from existing projects, resources and processes, yet you also need flexibility, responsiveness and access to new skillsets to embrace new opportunities.

This is where Atos Integrated Engineering Services can help. By teaming with Atos you can cost-effectively leverage the know-how and creativity of our engineers, and access our extensive range of engineering services and technologies covering mechanical engineering, software development, tooling and information technology.

We will work with you to develop a more integrated and strategic approach to engineering that adds real sustainable value to your business and allows you to:

- Support digitalization with software development & management for technical products
- Stay in control of critical processes & infrastructures
- Design, simulate and test physical structures
- Profit from the bundled domain knowledge of Global Competence Centers
- Optimize development cost with attractive delivery & business models

All-round capability

Atos has more than 20 years of experience helping leading engineering-led companies improve their innovation chain. We have captured and distilled this know-how into competence centers that cover aerospace, automotive, transportation and discrete manufacturing industries.

As product differentiation and innovation expands from simple physical attributes to complex systems and software, Atos can help you take a truly integrated approach to product development.

Our engineers have diverse backgrounds and skills but they share a common desire to work alongside your own people and, if required, carefully selected partners, as a single integrated team.

Serving as a foundation to our engineering services is our renowned range of business IT solutions. These harness your core skills and competences in engineering and translate them into competitive advantage on the commercial stage.

As fully-fledged supplier of integrated manufacturing solutions, Atos can also supply enabling information technologies in areas such as manufacturing execution systems (MES) and product lifecycle management (PLM).

Taken together, Atos offers an unusually diverse ecosystem of services and technologies and one that is ideally suited to today's complex engineering challenges.

Whatever your challenge, we have the solution

What are the main drivers that make companies decide to buy engineering services from external suppliers? Cost savings are important and other reasons include time-to-market pressures and the need to improve resource flexibility to better handle peaks during certain project phases.

You might need a partner to help optimize your global footprint, or to implement a new design-to-value methodology to improve a product's competitive positioning.

Sometimes the requirement is more tactical in nature. For example, you lack a specific technology or skillset needed for a particular project and judge it could be quicker or more cost effective to source it from outside.

Atos has identified three broad strategic areas where externalisation delivers value and competitive advantage for our clients:

1. Capability extension

We can help you devote more R&D resources to a fast-growing emerging market, so avoiding the risk that your own resources get over-stretched, or you may want help from us to innovate a product or process.

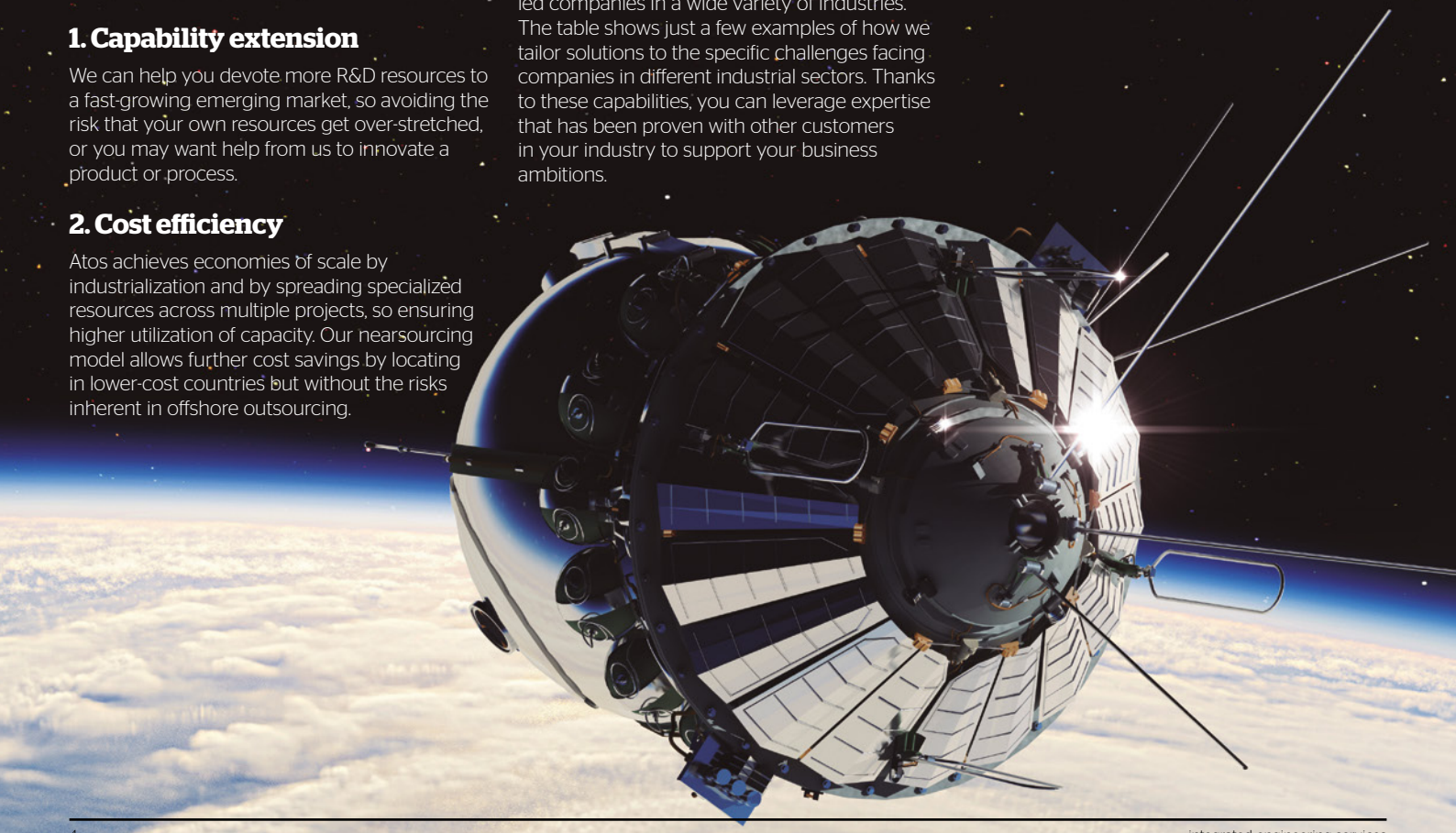
2. Cost efficiency

Atos achieves economies of scale by industrialization and by spreading specialized resources across multiple projects, so ensuring higher utilization of capacity. Our nearsourcing model allows further cost savings by locating in lower-cost countries but without the risks inherent in offshore outsourcing.

3. Flex resources

We can help you flexibly scale up and down your engineering effort to meet changing project requirements and market conditions. You can run development tasks in parallel, so shortening development cycles and achieving a time-to-market advantage. Offload the more routine tasks to us and let your engineers refocus on tasks that really add value, such as core competences and new product development.

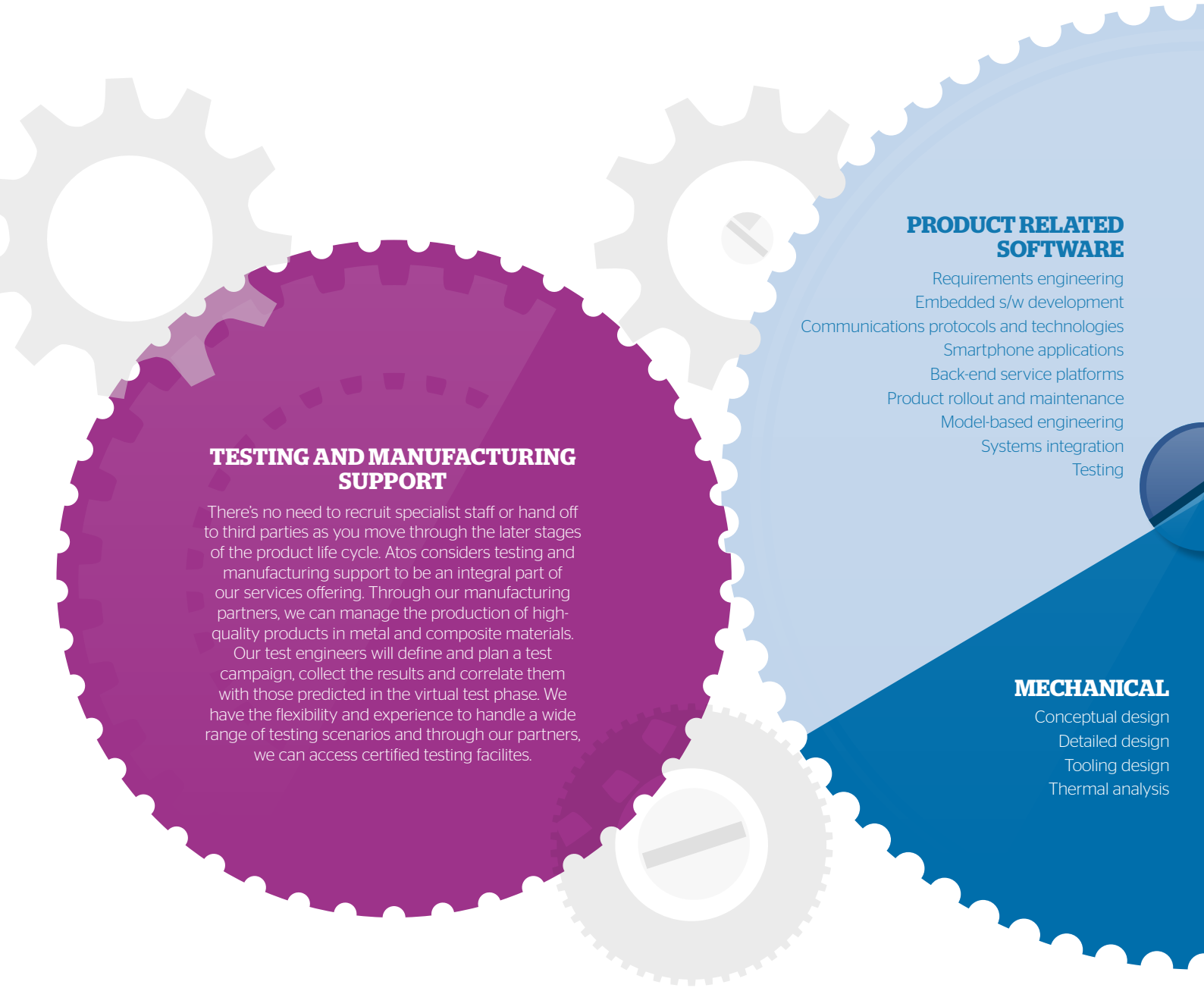
Atos knows the challenges facing engineering-led companies in a wide variety of industries. The table shows just a few examples of how we tailor solutions to the specific challenges facing companies in different industrial sectors. Thanks to these capabilities, you can leverage expertise that has been proven with other customers in your industry to support your business ambitions.



	Aeronautics	Automotive	Transportation	Discrete Manufacturing
Challenges	New airplane concepts, new technologies and materials, offset obligations, captive talent shortage, cost pressures	OEM overcapacity, make or buy trade-offs, Tight R&D budgets, Greater E/E product complexity e.g. connected car, regulatory & engineering challenges, e.g. hybrids	Smart Infrastructure, energy efficiency, local regulations and requirements, Designed globally, built locally	Intense cost pressures, maximise efficiency of global supply chains, design for mass customization, complexity of products and product-related software
ESP market characteristics	Mature, stable, increased focus on higher-value, skills intensive areas, growth of offshore providers, supplier consolidation	Less mature, OEMs cautious about outsourcing core product engineering, traditional focus on work packages for particular components	Less mature, traditional focus on capacity and capability bottlenecks,work packages for particular components	Less mature, primarily cost-driven, growth of task-focused offshore providers, e.g. 3D modelling in India
Why externalize?	Tap into scarce high-end talent, improve efficiency and productivity, reduce costs	Focus internal R&D, reduce fixed R&D capacity costs, externalize complexity, eg regional adaptations and derivatives	Focus internal R&D, reduce fixed R&D capacity costs, externalize complexity	Save costs, access skills and expertise not available inhouse, e.g. embedded software engineering, design for manufacturability
Differentiators	Extensive domain experience, proven process for industrialising operations, integrated service portfolio including software, Global delivery center "best of both worlds"	Fixed price work packages, integrated service portfolio including software and tooling, entrusted development partner, cooperation model, flexible delivery	Fixed price work packages, integrated service portfolio including software and tooling, entrusted development partner, cooperation model, flexible delivery	Fixed price work packages, integrated service portfolio including software and tooling, access to manufacturing partners, extensive skillset
Benefits	Cost savings, access to specialist talent and skills, eliminate inhouse capacity and capability bottlenecks, reduce time-to-market, reduce risks of going offshore			
Proof Points	Atos is a long-established supplier of engineering services to a major aerospace manufacturer	Atos is main supplier of CAE services to an automotive OEM in conjunction with ESI; Atos provides Infotainment and ECU development for Automotive OEMs	Atos designed a railway roof fairing within a fixed price work package that included physical manufacturing; Atos is SW partner for railway control systems of one of the industry leading railway manufacturers	Atos has performed legal certification of the solar tracker structures for solar power plants; Atos provides control systems for plants and SW for networked products

Atos makes the difference

Our mission is to support our customers during the whole product development cycle, from the initial conceptual design through the following stages of detailed analysis, design optimization, product testing, correlation, technical documentation, and certification. We can also develop tools and methodology for transversal engineering activities.



PRODUCT RELATED SOFTWARE

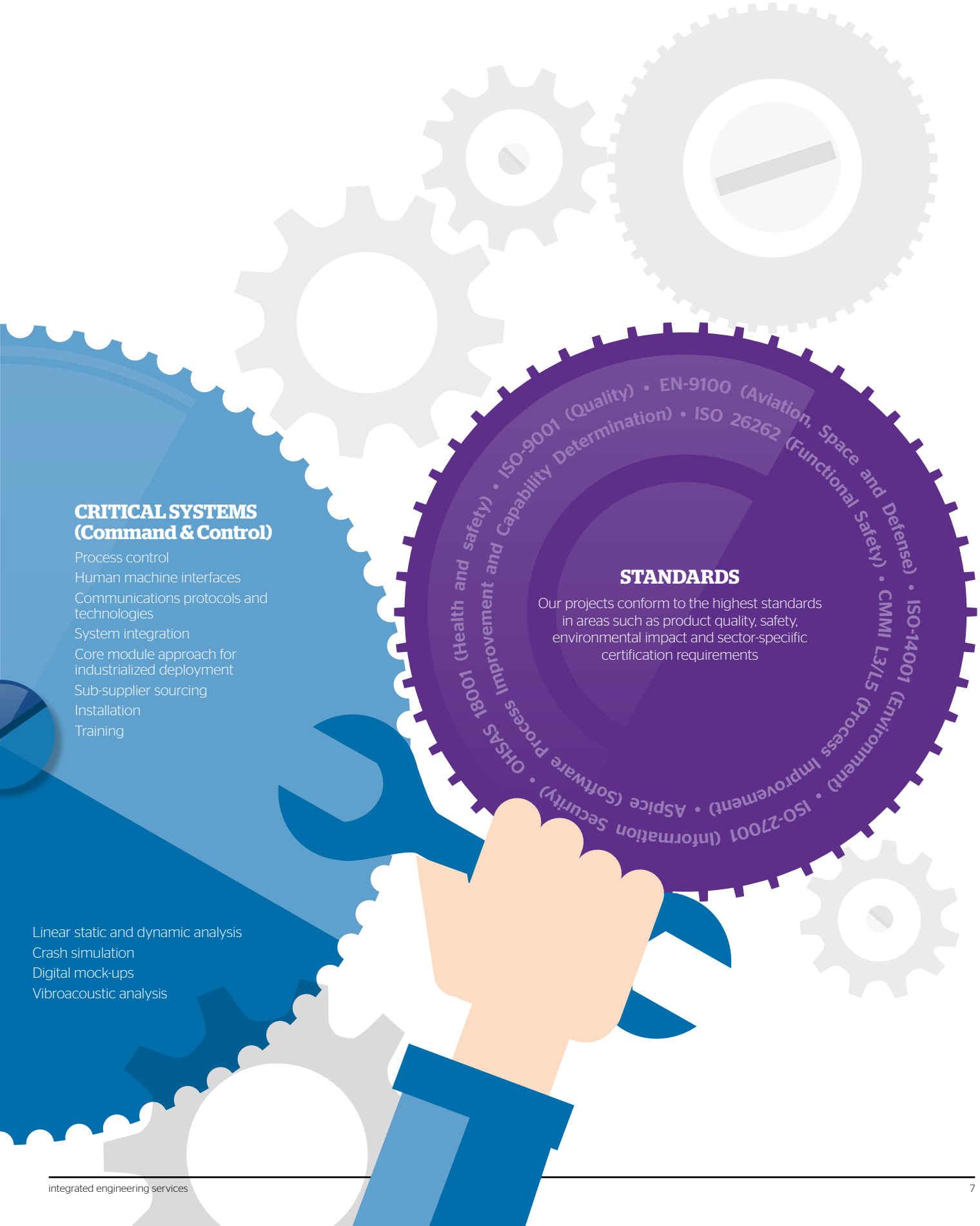
Requirements engineering
Embedded s/w development
Communications protocols and technologies
Smartphone applications
Back-end service platforms
Product rollout and maintenance
Model-based engineering
Systems integration
Testing

TESTING AND MANUFACTURING SUPPORT

There's no need to recruit specialist staff or hand off to third parties as you move through the later stages of the product life cycle. Atos considers testing and manufacturing support to be an integral part of our services offering. Through our manufacturing partners, we can manage the production of high-quality products in metal and composite materials. Our test engineers will define and plan a test campaign, collect the results and correlate them with those predicted in the virtual test phase. We have the flexibility and experience to handle a wide range of testing scenarios and through our partners, we can access certified testing facilites.

MECHANICAL

Conceptual design
Detailed design
Tooling design
Thermal analysis


CRITICAL SYSTEMS
(Command & Control)
Process control
Human machine interfaces
Communications protocols and technologies
System integration
Core module approach for industrialized deployment
Sub-supplier sourcing
Installation
Training
STANDARDS
Our projects conform to the highest standards in areas such as product quality, safety, environmental impact and sector-speciific certification requirements
ISO-9001 (Quality) • EN-9100 (Aviation, Space and Defense) • ISO-14001 (Environment) • ISO-27001 (Information Security) • Aspice (Software Process Improvement and Capability Determination) • ISO 26262 (Functional Safety) • CMMI L3/L5 (Process Improvement) • OHSAS 18001 (Health and safety)
Linear static and dynamic analysis
Crash simulation
Digital mock-ups
Vibroacoustic analysis

Working with you, for you

Thanks to our experience in multiple industry sectors and access to a wide range of partners, we can cover all your skill requirements, irrespective of project time-frame, location and size.

Our workforce of more than 1,500 FTE engineers constitutes a formidable base of skills and experience that allows us to undertake almost any task in the engineering services domain.

When it comes to design and analysis, our engineers are platform-agnostic so they not only can use the tools that you use, but they can also apply the methodologies and processes that you have defined.

Below are some of the specific mechanical engineering skillsets we offer.

CAD tools

- Catia v5/v4 (Dassault)
- NX, I-DEAS, Unigraphics(Siemens)
- Pro-engineer (PTC)
- Maya, 3DStudio (Autodesk)

PDM tools

- Windchill PDMLink (PTC)
- Optegra (PTC)
- Enovia VPM (Dassault)
- Teamcenter (Siemens)

CAE tools

- Nastran, Patran, Adams (MSC)
- Pamcrash, VA-One, Openfoam (ESI Group)
- Abaqus (Dassault)
- Isami, Caesam, Samcef (Siemens)
- Optistruct, Hypermesh (Altair)
- Ansys, Fluent (Ansys)
- NX Thermal (Siemens)
- Esatan (ESA)

Get connected

Atos has particular strengths in automotive software engineering and has worked for many leading OEMs and Tier One suppliers.

We have developed chassis & safety systems, infotainment & instrument clusters and implemented advanced driver assistance systems.

Atos is the European market leader in connected vehicle solutions, serving two large OEMs and a number of third-party fleet and mobility providers. We offer our own proprietary scalable software platforms for telematics, connected vehicles and service integration.

In addition, we offer a full line of end-to-end development service offerings including embedded software, back-end applications, content services provision and platform operation, data analytics, and end-to-end monitoring.

This rich combination of skills puts Atos in a unique position to work on today's technology-rich projects as we are equally at home working in the mechanical, software and IT solutions domains

Software takes the driving seat

Atos' expertise in the software engineering domain dates back to long before today's smart revolution. So if your business is struggling to cope with the challenges of engineering for a digital world, then talk to us about a better way to develop product-related software.

Today, it seems that just about every product contains digital technology. Cars, phones, even washing machines boast features that would have been unthinkable a decade ago.

But the price of this progress is growing system complexity that can cause real headaches for engineering firms, particularly if their experience lies mainly in the mechanical domain.

The new era of tech-enabled products requires a radically different set of processes and skill sets.

The IT architectures and software ecosytems required for digital products are far more complex than the specifications of traditionally engineered products.

Poor hardware and software design decisions upfront can have costly downstream consequences. If you lack the specialized software engineering skills then it is time to talk to Atos.

We can help you devise new hardware and software design strategies that are closely integrated into the product design from the start.

We can help you develop a complete ecosystem of soft assets, ranging from embedded software and web-based applications that interact with your end-users through to back-office applications to support remote configuration or to collect data on how well the product performs in the field.

Atos has long history of developing embedded and critical software for various industries, such as aerospace, avionics and automotive. These soft assets must meet very precise safety, reliability, regulatory and hardware requirements, which imposes particularly stringent design challenges.

The discipline and extensive experience we have built up developed software for these "mission-critical" applications can now be leveraged by a much wider range of customers requiring digital-enabled products.

Atos has four main strengths in engineering services for digital products:

1. Connectivity Solutions

Communication technologies and protocols, backend service platforms to enable smart products, international technical product rollout and maintenance;

2. Control & Command Systems

Turnkey solutions for monitoring plant and processes in industries such as power generation, transportation or aerospace;

3. Virtual Engineering

Consulting and solutions for distributed and complex development tasks. Including development tools support and application management services;

4. Industrialization of software development

Atos has its own global development process framework and tools and complies with industry standards like SIL, DO or SPICE as well as specific domains like Agile development.

A key differentiator for Atos in the embedded domain is that we manage engineering software development projects using the techniques and process excellence we have built in the classic IT domain. Atos is Europe's largest IT services company and so IT is part of our DNA.

Flying high together

Atos has an extensive track record in the aerospace sector that dates back to 1998, when our mechanical engineering teams began working for a major aeronautical manufacturer.

We have delivered a wide range of engineering services for the development and manufacture of a diverse range of aircraft and components, and Atos has also helped define methodologies for optimal airframe structure sizing.

Our expertise in aerospace engineering can easily be adapted to your needs, whether you're looking for a design partner to participate in a new transnational OEM aircraft program or simply require engineering support for an existing program.

Many of our engineers are skilled in flight physics and can perform analysis of engine performance and flight mechanics. We have carried out projects for a variety of aeronautical projects including military transport vehicles, fighter jets, maritime surveillance and unmanned aerial vehicles. Here's just a few examples of our skill areas in aeronautical applications:

- Aircraft powerplant safety
- Generation of motor maps
- Analysis of tests and adjustments of deployment models
- Design and validation of the flight control laws
- Generating and updating simulation models using computational fluid dynamics
- Analysis of aircraft stability and control using simulators
- Monitoring of flight test campaign for certification

Flexible delivery options

To meet engineering companies' increasingly complex and changing needs, Atos offers a range of delivery options for engineering services that can be adapted to use as much or as few of the client's own resources as they choose.

The Atos value proposition for Integrated Engineering Services leverages our leading onshore engineering capabilities, supported by a delivery network of Global Competence Centers with domain-specific expertise and resources.

As a result, we are able to provide bespoke engineering solutions that are tailored to each client's needs in terms of cost, quality and skills.

Our engineers, whether working alongside your own personnel or from a nearshore/offshore location, share the same vision and objectives as your engineers and work as part of the same team.

A key facet of ever Atos engagement is to foster collaboration, skills sharing and embrace technology transfer. In this way, we ensure that the client preserves and develops core engineering competences inhouse.

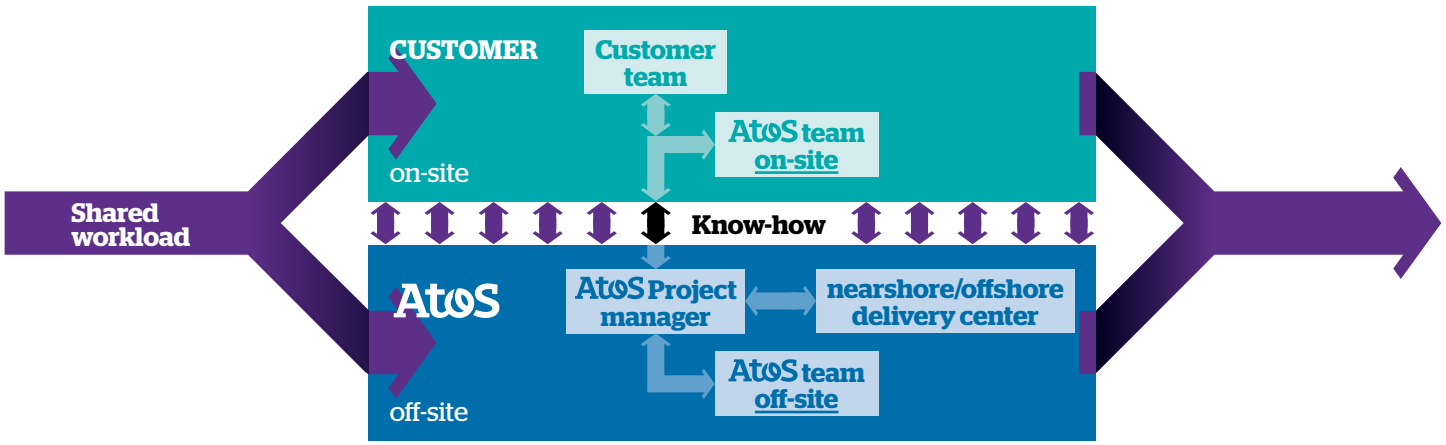
Atos has pioneered its nearsourcing delivery model for mechanical engineering services through a centralized Nearshore Development Center (NDC), located in Madrid, Spain, from which Atos engineers deliver multi-skill methodologies and processes to customers in diverse locations.

The customer benefits from greater resource flexibility, scalability and significant cost savings compared to the cost of recruiting engineers directly, particularly if the customer facilities are located in high-cost countries.

The Atos nearshore model was pioneered with a large aerospace manufacturer. The various projects require Atos engineers to have specialized knowledge of metallic and composite structures, and to work using state-of-the-art engineering software packages.

The Atos NDC has achieved critical mass and so its extensive range of engineering skills and services are now available to a wide range of customers and industries.

Example: Atos Nearshore Center Spain



Nearsourcing model fosters know-how transfer

Atos in Action

Many leading OEMs and suppliers have entrusted Atos to deliver solutions to their complex engineering challenges. Here are just a few of them.

Client: **Leading aeronautical manufacturer**

Task: **Airframe design and stress services**

Delivery location: **France, Germany, Spain and UK**

As part of its ongoing supplier rationalization, the customer chose Atos to be one of its preferred suppliers for engineering services. Atos demonstrated its ability to provide core engineering competences with direct benefits to the airframe development process, adding significant value to the aircraft programs.

Client: **International hi-tech group**

Task: **Embedded software**

Delivery location: **France**

Atos developed the board support packages and hardware abstraction layers for a data communications product, meeting all the client's requirements in terms of performance, footprint, functionality and cost.

Client: **Transportation manufacturer**

Task: **Design of train roof**

Delivery location: **Spain**

Atos was tasked to perform end-to-end design, analysis, tooling of very light roof fairing to specific manufacturing and cost constraints. The solution met all client's structural resistance, stiffness and weight requirements and the resulting CAD model could be directly integrated into client's global CAD model.

Client: **Automotive OEM**

Task: **Embedded system development**

Delivery location: **Germany**

Atos was responsible for HMI development, third-party software integration as well as developing and operating the internet services for a connected car platform. By awarding this complex project to Atos, the client obtained a solution that seamlessly integrates onboard software and backend sevices and offloads operational responsibility to its partner, Atos.

Why Atos?

Many leading manufacturers already trust Atos to solve their engineering challenges.
We offer the scale and breadth of resources to implement major turnkey projects while retaining the flexibility and cost-effectiveness to take on single projects that require a specific skill or technology.
We are experts in engineering-led innovation so by partnering with Atos you get access to a highly experienced workforce skilled in the latest technologies.
We offer a truly integrated approach to engineering services across multiple domains, which is particularly important today, and we have a proven track record for delivering projects that meet all our clients' time-to-market and cost objectives.
Working together with Atos, we can help you reach new heights.

About Atos

Atos SE (Societas Europaea) is an international information technology services company with 2013 annual revenue of €8.6 billion and over 76,000 employees in 52 countries. Serving a global client base, it delivers IT services in 3 domains, Consulting & Technology Services, Systems Integration and Managed Services & BPO, and transactional services through Worldline. With its deep technology expertise and industry knowledge, it works with clients across the following market sectors: Manufacturing, Retail & Services; Public sector, Healthcare & Transports; Financial Services; Telco, Media & Utilities.

Atos is focused on business technology that powers progress and helps organizations to create their firm of the future. It is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and is quoted on the NYSE Euronext Paris market. Atos operates under the brands Atos, Atos Consulting & Technology Services, Worldline and Atos Worldgrid.

For more information, visit: atos.net.

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