Safran Nacelles brings together the needs of engine and aircraft manufacturers into a unique and efficient product: the nacelle. It is a complex system, whose functions are managed in a severe environment, in particular extreme temperatures (down to -50°C outside and up to +500°C inside) and dimensional constraints (fluctuations in forces and pressures outside and inside). It is aero dynamic, and it optimises internal and external air flows. It protects the engine and the aircraft from any attack. It assists in braking during landing and contributes to the aircraft’s aesthetics. Safran Nacelles has unique expertise to design and integrate all nacelle components. As such, it offers after-sales solutions and services 24/7 to its customers world-wide.

O-duct, innovative thrust reverser
It is composed of a single “O”-shaped composite part (O-Duct), replacing the configuration of two “D”-shaped doors. Thus, it improves the aircraft’s aerodynamic performance and fuel consumption (by 0.5%, i.e. 300kg per flight), while increasing the efficiency of the thrust reverser.

Electrical thrust reverser actuation system
The deployment of the O-Duct is actuated by ETRAS (Electrical Thrust Reverser Actuation System), which replaces the heavier hydraulic central systems used on thrust reversers, and offers the following advantages: simplified design, weight reduction, simplified maintenance and elimination of corrosive hydraulic liquids.

Maintenance
C919 customers will benefit from responsive 24/7 customer support and a full range of custom services for their nacelles in operation. Thanks to the use of standard tools to open the O-Duct thrust reverser, access to engine equipment is optimised. Attached to the pylon, it may be directly replaced under the aircraft wing, just like any LRU (Line Replaceable Unit). Thus, it may be quickly recommissioned, without having to change the thrust reverser system (TRAS).

Customer support and services: tailor-made assistance
Because Safran Nacelles is the designer and manufacturer, airlines are ensured of obtaining top-quality services 24/7, throughout the life cycle of their nacelles. From the first day of the nacelle’s commissioning, the nacelle manufacturer establishes relationships with the airline to ensure the maximum availability of the aircraft, while preserving the value of the product over time. Spare part stocks and their locations are designed for optimal efficiency by offering flexibility and availability to airlines. Safran Nacelles relies on a global network of technical representatives and support managers on the five continents. They involve four distribution centres and five repair shops in the USA, Europe, the Middle East and Asia.

Tailor-made services
A service contract established with Safran Nacelles includes guarantees in terms of availability of spare parts, a commitment to the reliability of equipment in airline fleets, a monitoring of nacelle condition, full logistical management, and planned, controlled costs for the customer. Designed for the long term, Safran Nacelles service programs are flexible and may be specifically elaborated to meet unique needs of the customer’s fleet.
Safran Nacelles is responsible for A330neo nacelles, from design to the integration on engines. With its 3.65 meters, it is ranked in the same category as the A380, i.e. very large nacelles. It benefits from the best technologies developed by Safran Nacelles for its ever-growing product portfolio.

The A330neo nacelle contributes to improved performance for the propulsion system and the aircraft.

Safran Nacelles designs A320neo LEAP-1A nacelles and performs the integration on engines and the paint work.

Expertise in composites and in acoustic treatment
60% of the A320neo LEAP-1A nacelle is made of composite materials. Their use, combined with acoustic treatment, reduces engine noise by 50%.

The cascade-type thrust reverser: source of performance
The cascade-type thrust reverser of the A320neo is used during landing to reduce the braking distance, mainly on wet, icy or snowy landing strips. The only moving part of the nacelle, the thrust reverser is a complex component, which contributes to the improved performance of the integrated propulsion system and of the aircraft, while offering a high level of reliability.

Know-how in integration and painting
All nacelle components (air inlet, fan cowls, thrust reverser, exhaust and EBU*) are assembled on the engine at Safran Nacelles integration sites. The nacelle is also painted with the colours of the airlines before being delivered to the final assembly line at Airbus.

Tailor-made customer support and services
Safran Nacelles supports A320neo customers in operating their nacelles with responsive 24/7 customer service and a full range of custom services.

*Engine build-up

A320NEO LEAP-1A NACELLE

The A330neo Trent 7000 nacelle benefits from innovations for the factory of the future.

Virtual reality to get it right the first time
42 months: that is the development time expected for the A330neo nacelle, i.e. 18 months less than a standard programme. Safran Nacelles uses virtual reality to meet the time challenge, while remaining competitive and improving the working conditions of its teams. This technology has the advantages of immersion and interactivity, using dynamic 3D glasses, with the industrial environment in real scale, modeled in 3D. Virtual reality is used to quickly validate new manufacturing and assembly methods, to design ergonomic tools and to efficiently train operators. The validation time of industrial milestones is cut in half, and the tool budget reduced by 10%. This innovation won the Safran Innovation Grand Prize, in March 2017. Industrialisation of the A330neo nacelle benefits from other innovations aiming for efficiency, in particular in the automation of certain activities (drilling-riveting-countersinking for assembly, painting for integration, acoustic drilling of composite parts or even semi-automated handling equipment, etc.).

A330NEO TRENT 7000 NACELLE

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An efficient nacelle
More aerodynamic, lighter thanks to the use of composite materials, quieter thanks to better acoustic treatment, and equipped with cascade-type thrust reversers, the A330neo nacelle contributes to improved performance for the propulsion system and the aircraft.

Know-how in integration and painting
All nacelle components (air inlet, fan cowls, thrust reverser, exhaust and EBU*) are assembled on the engine at Safran Nacelles integration sites. The nacelle is also painted with the colours of the airlines, before being delivered to the final assembly line at Airbus.

Customer support and services close to customers
Safran Nacelles will enable its A330neo customers, around the world, to benefit from 24/7 customer support and from a full range of custom services for nacelles in operation.

*Engine build-up

INNOVATING FOR SUCCESSFUL RAMP-UPS
Safran Nacelles has developed a non-destructive automated inspection solution using infrared thermography (IRIS) combined with augmented reality for complex composite parts. The time spent on inspection is thus reduced by 50%.

A moving line, intended for the assembly of thrust reversers, is operational. It has mobile jigs, which move continuously and are designed in compliance with principles of work station ergonomics. Operators are equipped with smart rolling tools (with RFID chips) which enable them to work as the line advances. With its smart trolley, the integration of LEAP-1A engine into the nacelle components is done in 10 minutes 49 seconds; usually, this would take several hours. From now on, the engine only leaves its rolling trolley to be attached to the aircraft.

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