INTERACTION (INnovative TEchnologies and Researches for a new Airport Concept towards Turnaround coordinatION) is a Research & Development (R&D) project co-funded by the EC through the FP7 aiming to improve turnaround processes time- and cost-efficiently, airport environmentally friendliness and processes coordination. The consortium is composed of ALG, Indra, Aegean Airlines, Airbus, Athens International Airport (AIA), Aviapartner, Ineco, PildoLabs, Thyssenkrupp Elevator Innovation Center, TLD and Universitat Autònoma de Barcelona.

INTERACTION started evaluating the current turnaround processes, roles and activities of each process and overall coordination and interrelations among them, including information management tools used. The main conclusion was that current turnaround is composed of several uncoordinated processes that have strong temporal and physical interrelations that lead to inefficient management of time and resources. Current lack of information sharing and individual activity-centered optimization lead to overall non-optimum operations.

Considering the above starting point, INTERACTION envisaged turnaround as a whole integrated process with common situation awareness and collaborative decision making. To solve those issues and the points of improvement detected in each individual process INTERACTION developed 20 solutions grouped in 5 lines of action: passenger & baggage process, freight process, ramp operations, green concepts and information management. The solutions developed came out of different design thinking workshops were many more ideas were identified. Ideas are developed at different maturity levels, from more disrupting ideas that stay at a conceptual level to state-of-the-art technology prototypes developed and tested in real operations.

The passenger and baggage process line of action aims to improve passenger experience while reducing turnaround time, increasing punctuality and predictability. The concept of unifying passenger and baggage process was explored and the implementation of high-speed moving walks was studied to improve passenger experience. A slot assignment for passenger screening process was developed to balance capacity with demand and tested in real-live in AIA, resulting in good passenger acceptability. A causal boarding model was also developed as a decision support tool to obtain a hint about which boarding strategies could provide the best total boarding time for each particular mix of passengers. To improve turnaround time-efficiency gates were redesigned to consider standard gates for medium haul narrow body aircraft families and also rear-door boarding bridges over the wing for narrow body aircraft, reducing docking time and (de)boarding times for both designs.

The freight process was tackled aiming at improving its time-efficiency and fostering air cargo transportation in scheduled passenger flights at European level. Two solutions were developed to increase information management and planning of resources which are the cargo portal, dealing with information sharing on real time and ULD management system which supports an optimum planning of ULD. To enhance real time shipments supervision, the track & trace smart labels was design implementing RFID infrastructure at the airport and on-board, which was validated on a real exercise in Germany providing positive outcomes.

Ideas on ramp operations were focused on improving fleet, mobile vehicles and equipment management, on the one hand rationalizing the number of GSE at the ramp and improving therefore safety by the implementation of pooling of equipment and/or the centralisation of services and on the other hand automating the docking of Passenger Boarding Brides and cargo loaders which improved safety and predictability. Finally, aircraft-GSE and aircraft-airport communication was developed and validated.

Solutions in the green concept line work towards environmentally friendly airport operations. To that aim, electrical towing vehicles were design and different charging stations scenarios were studied to tackle full electrical GSE fleet. Algorithms were designed to predict potable on-board water usage so that its loading can be done more fuel-efficiently. Finally in this line, the powering of aircraft navigation lights through towbarless tractors was validated with positive results of fuel saving.

Information management tackled on the one hand the improved prediction of landing times using ADS-B data and on the other hand the enhancement of information sharing fostering the extension of collaboration decision making to turnaround, through the development of an information and decision support platform integrating information from the different processes. Validations on real operations environment in Athens International Airport were conducted providing good results in terms of improvement of predictability and punctuality as well as good acceptability from stakeholders.

Finally, a business case and cost-benefit analysis of all solutions was developed detecting the most promising improvements of each solution as well as the scenario in which its potential is maximized. The main impact of the overall project is the improvement of turnaround predictability and punctuality and the reduction of the environmental impact of airport operations.