

Case Study | Three Urgent AN-124-100

Air Charter Flights to Saudi Arabia





Industry
Petrochemical



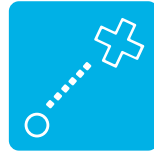
Cargo
811 CBM
of urgent
petrochemical
equipment



Total Weight
252 MT of
industrial cargo



Cargo Highlight
1,100 x 310 x
340 cm, 54.5 MT
convection
modules



**Origin and
Destination**
From Italy and
the Netherlands
to Saudi Arabia



Schedule
3 consecutive
AN-124-100 air
charter flights
within just
7 days



Loading operation at Malpensa Airport, Italy

Case Study: Three Urgent AN-124-100 Air Charter Flights to Saudi Arabia

To minimize extremely costly production downtime at a petrochemical plant due to a production line shutdown in Saudi Arabia, the deugro Netherlands team was approached by their client Lummus Technology. In close cooperation with the teams of deugro Italy, deugro Saudi Arabia and deugro Air Chartering, 13 plant components were successfully delivered by three consecutive AN-124-100 air charter flights from Italy and Belgium to Saudi Arabia within just seven days.



The extremely urgent and time-critical cargo units contained heat transfer equipment with a total volume of 811 cubic meters and a total weight of 252,216 kilograms, including convection modules with dimensions of 1,100 x 310 x 340 centimeters, weighing 54,500 kilograms.

» Despite scarce cargo space, deugro Air Chartering was able to lock in the required aircraft on short notice. «

While the heat exchanger modules, which were the main scope of the shipment, were picked up from a supplier in Italy near Milan, the plant operator requested on short notice another delivery of a fan casing from another supplier in the Netherlands as an additional scope, which was added during a stopover at Ostend-Bruges Airport in Belgium.

Initially, it was planned to ship the equipment by ocean freight. However, due to significant daily production downtime costs, the plant operator requested to expedite the manufacturing of the

equipment; and once it was ready, deliver it for installation at the site as early as possible.

Due to the critical schedule, an air charter solution was selected to provide the shortest transit time. This allowed for choosing the airports of origin and destination as close as possible to the supplier locations and the plant site, and the schedule of the flights could be planned in accordance with the manufacturing schedules.

Due to the dimensions of the heat exchanger modules, they could only be transported with an Antonov aircraft. In the planning stage, deugro's teams considered either two flights with the AN-225 Mriya aircraft with a maximum payload of up to 250 metric tons, or three flights with the AN-124 Ruslan with a maximum payload of up to 120 metric tons. However, after the start of the military conflict in the Ukraine, the one and only AN-225 aircraft was tragically destroyed, and the only choice left was the AN-124-100 aircraft solution.

The biggest challenge against the backdrop of this geopolitical situation, which has impacted the heavy lift market dramatically, was to secure the required aircraft in time. Thanks to its long-standing strategic relationship with the carriers, the deugro Air Chartering team was able to successfully lock in the aircraft for the required dates of transportation. The Air Chartering team was also present during the loading operations of each flight, which provided real added value due to the fact that the lines with the carrier were very short. This resulted in flawless operations at all times.

Pre-carriage

According to the strict schedule, deugro Italy, together with deugro Netherlands, arranged for timely cargo pick-up of the heat exchanger modules directly from the manufacturer's yard, near Milan. After the heat exchanger modules were loaded and safely secured on trailers, they started their approximately 26-kilometer trip to Milan Malpensa Airport under escort, which was organized by deugro.

The biggest challenge in meeting the tight schedule was the timely application for road permits, which required daily communication between the inland hauler and the authorities.

Thanks to deugro Italy's proactive and timely coordination, all required permits for road transport from the supplier's facility to Milan Malpensa Airport were obtained on time and all shipments were transported to the airport according to schedule.



On-time cargo arrival at Milan Malpensa Airport, Italy

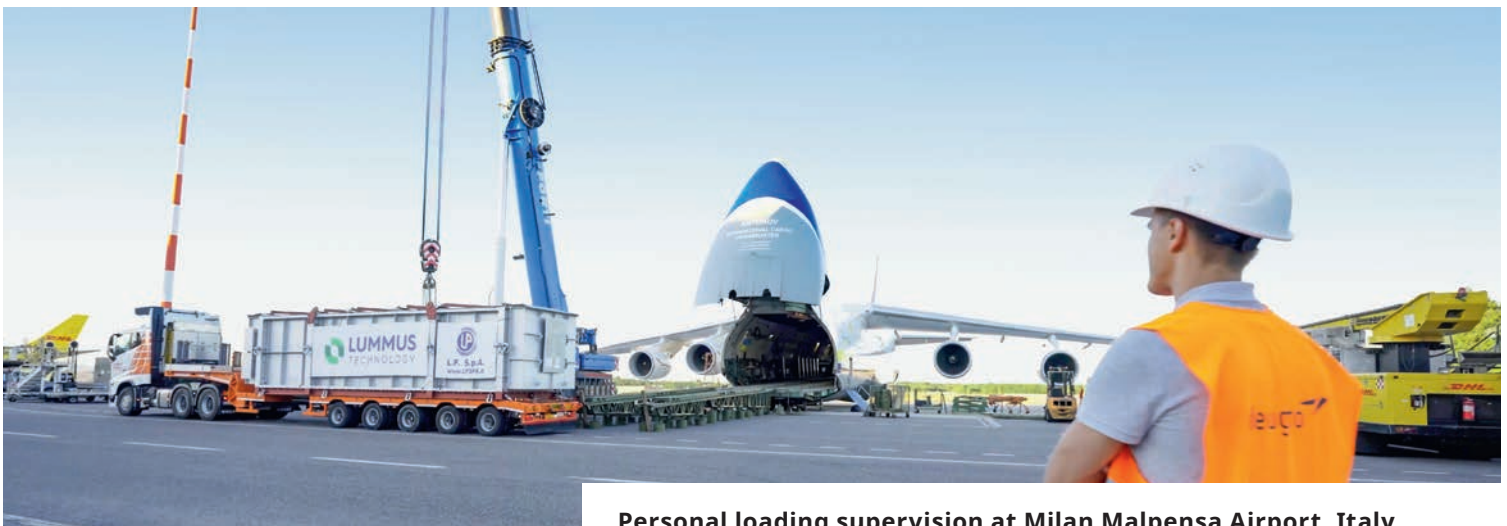
Loading operations

The loading operations of the three flights were executed according to a strict schedule and under the personal supervision of the local deugro team and deugro Air Chartering experts at the airport of Milan, Italy. The loading operations for each flight took seven to eight hours, including the time required for setting up the Antonov loading ramps.

The first two flights from Italy to Saudi Arabia each contained three packages with a total weight of 86.81 and 71.50 metric tons respectively. On the third flight, three packages with a total weight of 67.50 metric tons were loaded

in Milan and an additional four packages weighing 26.41 metric tons were added during a stopover at Ostend-Bruges Airport in Belgium.

Besides securing the aircraft on time, the deugro teams successfully handled several technical challenges to ensure a safe transport. Because the cargo hold of an AN-124-100 is not fully pressurized, the deugro team had to carefully check with the manufacturer's engineers if the in-flight conditions in the cargo hold, including temperature and pressure change rates, were suitable for the cargo.



Personal loading supervision at Milan Malpensa Airport, Italy



Loading operations at Ostend-Bruges Airport, Belgium

Furthermore, several modules were too heavy to be lifted with the on-board crane of the AN-124-100. This meant that the loading and offloading had to be executed using special loading ramps from the carrier and that external mobile cranes had to be arranged at the origin and destination airports.

To ensure that weight distribution on the platforms of the loading ramps met all safety requirements, deugro consulted with the manufacturer on a solution to prepare a suitable flat surface on the footprint of the large cargo components. Any unevenness was compensated by added wooden beams to fill the gaps.

As higher acceleration forces occur during flights, additional lashing points had to be added to meet the lashing requirements. In close coordination with the manufacturer's and the airline's engineers, deugro assisted in developing a solution for the design, number and location of the additional lashing points to allow the safe transport of the modules by air. For the equipment that was packed in wooden crates, deugro consulted with the supplier to add special metal corners in order to

avoid any slipping of the chains when lashing.

The additional cargo, a fan casing provided by another supplier in the Netherlands, was added to the loading plan of the third AN-124-100 flight from Milan on short notice. However, due to the dimensions of those additional items and the limited time frame, it was not possible to receive the permission for road transport from the Netherlands to Italy on time. Therefore, the decision was made to stop at Ostend-Bruges Airport, Belgium to load these items. Within a short time frame, deugro Netherlands was able to arrange an external crane and coordinated all procedures to prepare for the loading the additional cargo at Ostend-Bruges Airport.

Thanks to the excellent preparation, coordination and teamwork, all the loading operations were executed safely, successfully and according to the given schedule. All three flights could take off as planned.

i Project challenges

- The timely procurement of the required aircraft against the backdrop of a tense geopolitical situation, which has dramatically impacted the heavy lift market
- The arrangement and execution of three consecutive and urgent AN-124-100 air charter flights within an extremely tight schedule to ensure ongoing production processes, avoiding extremely costly production downtime

» The detailed preparation of the unloading processes by the local deugro team ensured a safe and swift onward transportation without any time losses. «

Unloading operations and on-carriage

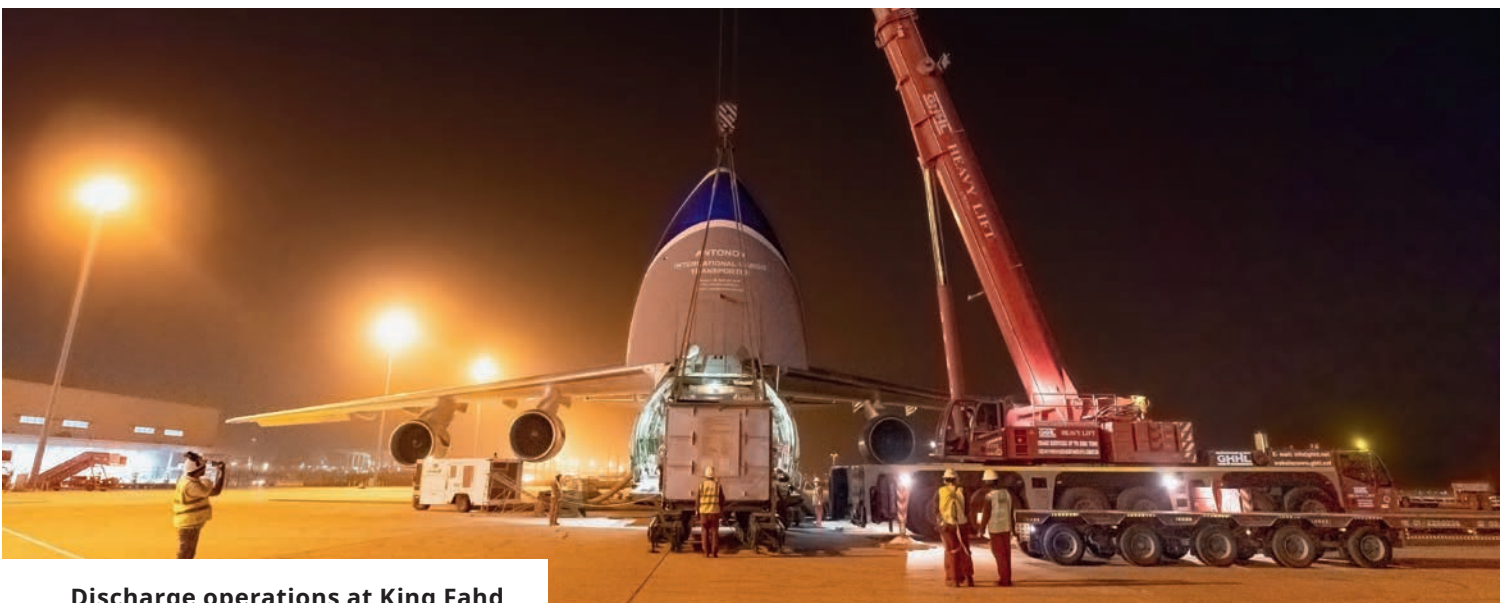
Upon arrival at Dammam Airport, Saudi Arabia, the individual flights were unloaded punctually, according to schedule, taking an average of three to five hours per flight.

During the bidding phase, all subcontractors offered a lifting solution based on two 150-metric-ton cranes. However, in close cooperation with the subcontractor and the transport engineers of dteq Transport Engineering Solutions, a deugro group company, deugro developed a solution where the lifting of the equipment from the ramp onto the trailer could be safely performed using a 250-metric-ton

crane, resulting in a reduction of the operational complexity and risks as well as a significant cost reduction for the client.

The biggest challenge was obtaining gate passes for the cranes in a timely manner so that they could enter the airport upon arrival of each flight, as well as obtaining the appropriate approvals in advance to ensure on-time unloading upon arrival of the aircraft. Since there are only a limited number of ground-handling agents that are preferred by the local authorities, working with the ground-handling company at Dammam Airport was also critical.

Through early and close coordination and cooperation with the plant operator, the airport authorities and the appointed ground-handling agent, the local team of deugro Saudi Arabia ensured a smooth and timely entry of the cranes and trailers into the airport upon arrival of all three charter lots. As a result, delays were avoided during the unloading process on arrival, and subsequent delivery to the site could take place according to the agreed schedule.



Discharge operations at King Fahd International Airport, Saudi Arabia

The approximately 100-kilometer-long transport of the components from the airport to the plant was performed using 5-axle lowbed, 6-line gooseneck and flatbed trailers.

To enable timely on-carriage, deugro proactively organized the appropriate Ministry of Transport (MOT) and Royal Commission (RC) permits required for all trailers, except the flatbed trailers, and arranged for the escorts. For the heavy lift units, the truck-trailer configurations had to traverse a special heavy-duty road.

Since the plant gate, approximately 10 kilometers from the final unloading location, was only opened once a day for five to ten minutes with traffic police present each afternoon at one o'clock, the timing and smooth processes were paramount. Thanks to the good project preparation and the excellent cooperation of the local deugro

team with all parties involved, all components were delivered safely and on time to the plant within the tight time frame.

All operations were seamlessly performed to the highest level of the client's satisfaction. After observing the loading operations of the third flight in Milan, Italy, the client's team was also able to enjoy the experience of flying as cargo attendants on board the AN-124 on the short leg from Milan to Ostend, which reinforced the feeling of accomplishment once the cargo had safely reached the destination.

Thanks to prompt and proactive planning and preparation, as well as deugro's outstanding cooperation with the client, dteq, the airlines and all partners involved, this project was executed successfully, safely and on time—reducing costly downtime to a minimum.



Safe and on-time delivery to the petrochemical plant facility