deugro

Case Study | Air Charter Solution for an Urgent Facility Start-up

Industry
Oil and gas

Cargo
1,628 CBM of urgent pipe spools

Total weight
213 MT of industrial cargo

Air chartering
Nine charter flights

Origin and destination
From Thailand to the USA

Highlights
A variety of customized loading concepts

Spools successfully loaded, secured and lashed in the AN-124-100 at U-Tapao Airport, Thailand

Case Study: Air Charter Solution for an Urgent Facility Start-up

On behalf of its client, deugro USA, in close cooperation with the teams of deugro Air Chartering and deugro Thailand, successfully delivered 37 pipe spools of different designs and dimensions—a total volume of 213 metric tons and 1,628 cubic meters. All in all, nine charter flights were performed for the transportation of components urgently needed to minimize extremely costly downtime at a facility in the USA.

deugro's scope of work encompassed the complete multi-modal, door-to-door transportation by various types of aircraft and truck–trailer configurations from a production plant in Rayong Province, Thailand to the facility in the USA.

Due to the critical schedule, deugro designed a complex and sophisticated air charter solution to ensure the shortest transit time. It allowed for choosing the airports of origin and destination as close as possible to the plant and the facility, while the flight schedules could be

closely and flexibly coordinated in accordance with the manufacturing schedules.

To meet all the requirements of this critical project, deugro deployed a well-rehearsed international team of experienced air charter, project and transport engineering experts. They were in daily communication with the production plant, client, carriers, transport engineers, and all institutions and service providers involved—working closely together across the project supply chain to ensure safe operations and delivery.

» Several challenges had to be overcome simultaneously. «

To ensure the personal safety of all involved, detailed Toolbox Talks and risk assessments were conducted prior to each operation.

The challenges

Since facility downtimes cause immense hourly costs, the quick organization, preparation, fastest-possible and safe delivery of the urgently needed components were paramount. Against this backdrop, several challenges had to be overcome simultaneously.

With scarce capacities on the heavy lift air charter market caused by the war in the Ukraine, the biggest challenge was locating and securing aircraft that could not only be available at the right place at the right time, but which also allowed for loading the oversized equipment with extremely odd dimensions: complex shapes, lengths of up to 36.6 meters, widths of up to 5.5 and heights of up to 4.4 meters.

At the same time, the individual requirements of the sensitive cargo components, with their extraordinary specifications, had to be matched with the available aircraft types, loading and lifting equipment, and airport capacities, all of which varied greatly. For this purpose, deugro's teams provided customized packaging solutions, designed a variety of customized safe and efficient loading concepts, and sourced additional loading equipment.

Since the oversized cargo units included lengths of over 36 meters, a variety of mobile cranes and truck–trailer configurations, as well as the special permits and police escorts required for road transportation, had to be arranged for in advance to ensure a timely and smooth delivery of the replacement components from the Rayong plant to U-Tapao Airport and then, upon arrival, from the airport in Houston, Texas, to the facility.

Challenges

- An extremely tight schedule, since facility downtimes cause immense hourly costs
- Locating and securing nine aircraft, at a time when capacity was tight in the heavy lift charter market
- Extremely odd cargo dimensions that had to be matched with the greatly varying aircraft types, loading and lifting equipment, and airport capacities available

Critical air freight operations

The first step that had to be executed for the project was the urgent transportation of a critical piece of piping from the USA to the original manufacturer in Rayong Province, Thailand. This critical piece would be incorporated into a full-length pipe spool, saving several weeks of costly fabrication time. To have this piece moved from the USA to Thailand in the shortest-possible transit time, the deugro team secured an AN-12 aircraft within just 24 hours, which was immediately available for departure from Houston Airport and quickly reached the destination.

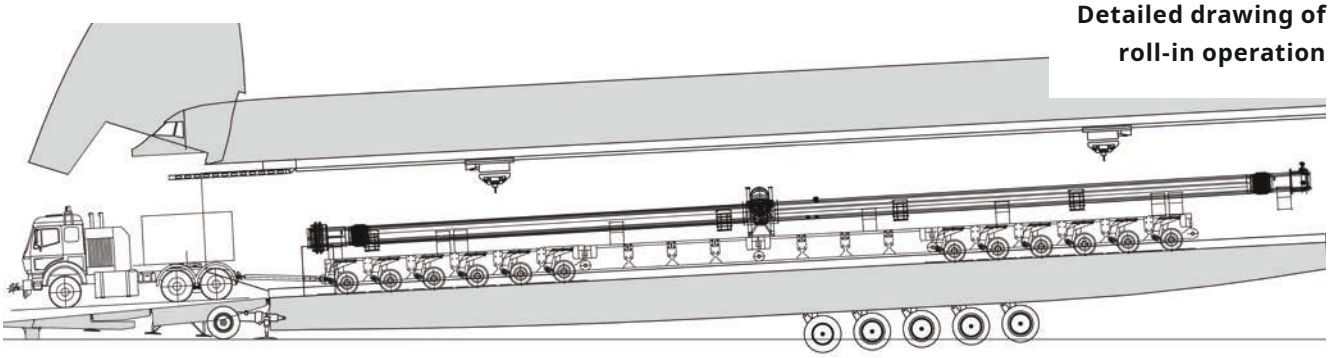
The next step, and actual main scope of the project, was delivering the pipe spools to the facility as quickly as possible from the production plant in Thailand. Due to the extraordinary length of many cargo units of up to more than 36 meters, the choice of aircraft for most of the components was limited to large aircraft with nose-loading capability.

While the destination, George Bush Intercontinental Airport in Houston, was well equipped and ready to handle any incoming aircraft types, the situation with possible origin airports in Thailand was more challenging. Loading such long pieces requires blocking a lot of ramp space at the airport of loading, which was not possible at busy Bangkok Suvarnabhumi Airport due to limited space. Therefore, U-Tapao Airport was chosen.

» To match the cargo with the available aircraft types, a variety of customized and efficient loading concepts had to be designed. «

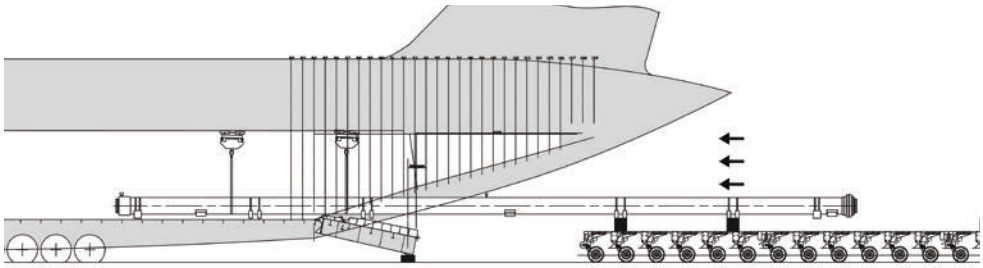
To load the spools through the nose door of a Boeing 747 freighter, a minimum of three cargo main-deck loaders was required, and U-Tapao Airport had only a limited number of such units, which made operation with the B-747 impossible at that time. Therefore, while deugro was working closely with airport handling agents and the carriers to source additional main-deck loaders, an AN-124-100 aircraft that allowed loading independently from airport ground support equipment was chosen for the first three flights with the most urgent cargo required.

The cargo was too long to be loaded into the AN-124-100 in a traditional way—the reach of the onboard cranes did not allow



Detailed drawing of roll-in operation

Cargo loading through the rear cargo door at U-Tapao Airport, Thailand



loading through the rear door. Therefore, in close collaboration with the carrier's loadmasters and with engineers from dteq Transport Engineering Solutions (dteq), deugro worked out a technical solution to overcome that challenge.

On the first AN-124-100 flight, a 34.7-meter-long pipe spool was loaded into the cargo hold on a hydraulic trailer completely driven into the aircraft using an extension ramp from the ground up to the nose door of the aircraft.

Once positioned inside the aircraft, the spool was easily lifted using the onboard cranes. The fit of the spool on the trailer inside the aircraft's cargo hold and the spool orientation were carefully checked by dteq engineers and the carrier's loadmasters. Based on that, the spool was packed on wooden blocks in a certain position that enabled the best fit.

On the second AN-124-100 flight, an even more efficient solution was applied. The spools were loaded through the rear cargo door, whereby one end of the spool was lifted by the onboard crane and the other end was slowly fed into the aircraft with a hydraulic trailer that was moving in sync with the onboard crane. This allowed four big spools to be loaded side by side, fully utilizing the aircraft hold's capacity.

To ensure smooth and safe, step-by-step execution, this multi-stage method was first carefully simulated virtually. Together with dteq engineers and the airline's load planning team, potential risks and challenges were analyzed, and then the technology was approved by all parties. Attending deugro experts ensured that each step of the operation was precisely and safely executed.

The third AN-124-100 flight had to transport 12 spools. Ten of them were smaller in diameter and length, so to utilize the full capacity of the aircraft and reduce costs, deugro arranged for the packing to be in stackable metal frame bundles, which were designed

Packing in stackable metal frame bundles to utilize the full capacity of the aircraft

by dteq and manufactured in Thailand on deugro's behalf. The components were loaded inside the aircraft using the carrier's extension ramp system

» ... one of the longest pieces of cargo ever moved on a B-747 freighter. «

and external cranes, which were arranged by deugro after two big spools were loaded outboard alongside the main bundles.

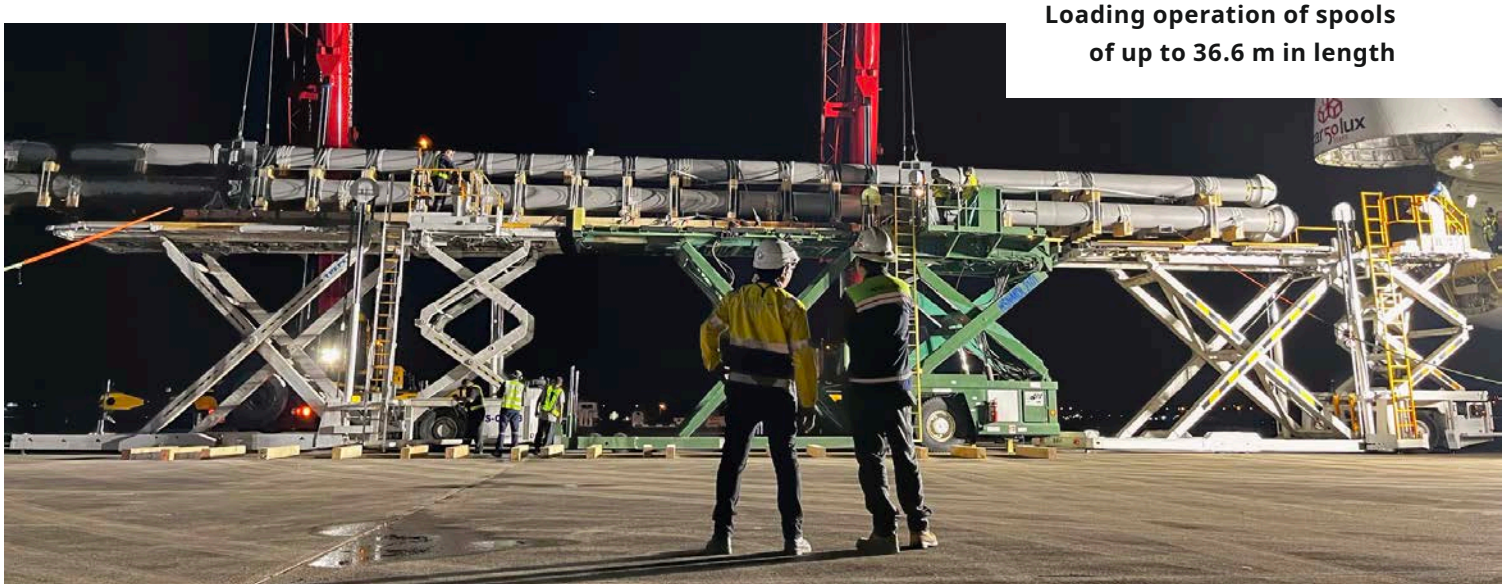
Once the first three flights with the AN-124-100 were completed, and after an extensive search, an additional high loader was sourced and brought into operation at U-Tapao Airport, allowing for the use of the more cost-efficient Boeing 747 freighter to deliver most of the remaining spools.

Altogether, four flights with the B-747 aircraft were performed to transport the next 14 spools of different shapes and dimensions. These included 36.6-meter-long spools—one of the longest pieces of cargo ever moved on a B-747 freighter.

For the B-747 flights, deugro, in collaboration with dteq and the carrier's engineers, designed special packing that allowed for the optimization of the aircraft's capacity and the reduction of costs for the client, while at the same time guaranteeing the safe lifting, stowage and lashing of the cargo.

Among the remaining six spools, there were several that could not be loaded into the B-747 due to their odd shape and dimensions. The most challenging spool had dimensions of over 7.3 x 5.5 x 4.4 meters and could not

Loading operation of spools of up to 36.6 m in length



even fit in the AN-124-100 because it exceeded the height of the aircraft's cargo hold.

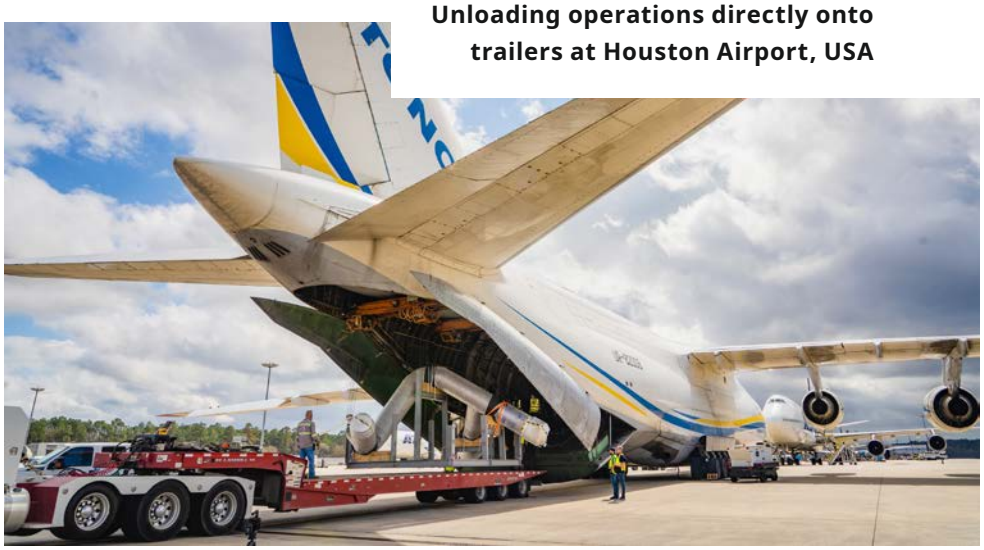
After extensive technical studies and collaboration between deugro and the aircraft carrier, a solution was found to fit those challenging components in the AN-124-100.

To make this work, several spools had to be fixed at a specific angle in metal frames. For safe lashing inside the aircraft cargo hold, the frames were also equipped with a sufficient number of D-rings. The design was carefully prepared by dteq and the manufacturer and then arranged by the teams of deugro Thailand.

After thorough planning and preparation, the last six spools were safely loaded into the AN-124-100 aircraft and then flown from U-Tapao Airport to Houston Airport, where they were carefully offloaded onto trailers and safely transported to the facility.

» Due to their odd shape and dimensions, some spools did not even fit in the AN-124-100. «

Unloading operations directly onto trailers at Houston Airport, USA



Pre- and on-carriage preparations to and from the airports

Besides the critical transportation of the cargo by aircraft, a variety of further preparations was essential to ensure the timely and smooth deliveries of the replacement components from the factory in Rayong Province to U-Tapao Airport and then from George Bush Intercontinental Airport in Houston, Texas, USA to the facility after arrival.

This applied in particular to the extra-long spools with lengths of more than 36 meters, which together with the truck–trailer configurations used for pre-carriage in Thailand, resulted in total lengths of up to over 45 meters. To safely move and load these oversized components, appropriate loading and transport equipment had to be sourced and mobilized. This included 80-metric-ton mobile cranes, main-deck loaders and various truck–trailer configurations.

For the pre-carriage from the factory to U-Tapao Airport, the local deugro Thailand teams furthermore prepared detailed road surveys and timely organized all necessary permits, including gate passes and appropriate approvals for a smooth entry of the cranes and trailers into the airport, ensuring on-time loading upon arrival of each of the individual aircraft and avoiding delays. Thus, under the personal coordination and supervision of the deugro teams, the individual cargo units were picked up and loaded on time at the plant according to the strict schedule. They were then safely delivered to U-Tapao Airport, 50 kilometers away, under the escort of the police and security escorts arranged by deugro—ready for take-off.

Cargo pickup at the original manufacturer in Rayong Province, Thailand

Unloading operations at Houston Airport, USA

Upon arrival at Houston Airport, the individual components were punctually unloaded directly onto trailers under deugro USA's supervision and according to the method statements.

To ensure all equipment and resources were available at the airport on time, close coordination with the ground handling agent, truck driver and crane company was paramount, including special gate entry and exit permissions required due to the extreme cargo dimensions.

As the majority of the flights arrived outside of normal business hours, either in the late evening or early morning, the teams of deugro USA organized special concession in advance from the Texas Department of Transportation for the road transport of the components with overlengths of up to more than 36 meters, which is normally only allowed during daylight hours.

For transports to the job site, and due to the extreme cargo lengths and the support requirements of the spools, deugro deployed special Scheuerle and Goldhofer trailers with 30-meter decks.

Personal supervision of the unloading operations at Houston Airport, USA

» Success for this project can be measured by the fact that the cargo arrived on or before the site requirements and did so without any damage or safety incidents. «

Client in the USA

Since the transports had to exit Houston at rush hour, police escorts were required to provide additional safety during transit in the metro area.

Conclusion

Thanks to deugro's many years of experience and its long-standing strategic relationships with the airlines, as well as the excellent cooperation with the client, dteq, the airlines and all partners involved, all urgently needed components were delivered safely, as quickly as possible and on budget, reducing costly downtime to an absolute minimum.