

Direct Operating Costs, Fuel Consumption, and Cabin Layout of the Airbus A321LR

Task for a *Bachelor Thesis*

Background

The long range Airbus A321LR (launched in 2018) is based on the A321neo. Both aircraft belong to the popular Airbus A320 family. Although, the A321LR is a rather new aircraft, it has attracted already many operators, because of its versatility and long range capabilities achieved with additional center tanks (ACT). Airlines are offered many new and attractive operating scenarios with this right-sized aircraft. Furthermore, an extended range variant, the XLR, is scheduled to be introduced in 2022, offering even more range. Inevitably, range capabilities are limited by flight physics. The A321neo makes already use of winglets for improved aerodynamics and new engines for reduced specific fuel consumption. An increased tank volume on its own improves range only in exchange of payload. On 29 April 2021 Jet Blue took delivery of its first A321LR. The aircraft "has 24 lie-flat seats. The economy section is outfitted with 114 seats. The Airbus Airspace cabin - offering more comfort, mood lighting and larger luggage bins - is the first of its kind on a single-aisle aircraft" reported FlightGlobal (<https://perma.cc/F3R6-YH82>). 138 seats is not much for an A321. With reduced payload i.e. reduced number of seats, the fuel consumption per seat and the Direct Operating Costs (DOC) per seat would go up. On the other hand, the aircraft would not be so successful, if its economy would not be right. For this reason, a closer look seemed necessary.

Task

Task of this thesis is to look at fuel consumption, DOC, and cabin layout of the Airbus A321LR and A321XLR compared to the A321neo and the A330neo and/or the A350. It is important to look at the routes flown by airlines that operate the aircraft. The aircraft's cabin should be addressed particularly with a focus on its number of seats. Visualize your findings with the "bath tub curve" as explained by [Burzlaff 2017](#). You may need to build on what is given. Use the [AEA Method \(1989\)](#) and/or the [TU Berlin Method \(2013\)](#) to calculate DOCs. Compare the A321LR with competing types based on our [Ecolabel for Aircraft](#). Make use of Airbus' document "[A321 – Aircraft Characteristics Airport and Maintenance Planning](#)". The subtasks are:

- Give a brief introduction to the calculation of fuel consumption and DOC.
- Review the use or planned use of the A321LR and A321XLR with various airlines focused on long range operations. In each case, investigate the cabin layout applied.
- Calculate and compare the fuel consumption.
- Calculate and compare the DOC.
- Calculate Ecolabels based on selected seat layouts from the OEM and typical airlines.
- Discuss the cabin design and layout of the A321LR and A321XLR in view of comfort, economy, and ecology.

The report has to be written in English based on German or international standards on report writing.