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ABSTRACT
PRESENTATION
PAPER

Aude Lecardonnel obtained an engineering master degree in mechanics and energy engineering from the ENSIAME in Valenciennes, France in 2013. During her study she spent a five months internship at the University of Itajuba, Brazil, as well as one year at the TU Delft in the 3ME Department. After the study, she worked as a piping coordinator at the Drever company for two and a half years and spent the following two years at Safran Aero Booster (SAB), where she worked as an aerothermal engineer in the R&D Department. After that she was enrolled in one year research master programme at the Von Karman Institute for Fluid Dynamics (VKI) in Belgium. After that, she worked for one year at the VKI as an assistant research engineer on the experimental characterization of the experimental performances of heat exchanger samples additively manufactured. In September 2020 she started her PhD at the VKI. This research is part of a EU funded project PANTTHER.

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QUANTIFICATION OF REFRIGERANT FLOW MALDISTRIBUTION IN EVAPORATORS WITH IR IMAGES

Vapor cycle systems are closed loop that can be used for equipment cooling and environmental control purposes such as air conditioning. They are composed of several key components: compressor, evaporator, condenser, expansion valve. Among them, the evaporators are continuously subjects of research to improve their efficiency by reducing their volume and increasing their overall aerothermal performances. One straightforward way to improve the heat exchange is to improve the flow distribution among the different channels of the evaporator. Indeed, flow misditribution of the inlet two- phase fluid can cause up to 30% of thermal losses.

Commonly, high Global Warming Potential (GWP) refrigerants like R134a are still used as fluids. Thus, it means that their behaviour, when it comes to flow distribution in the header and channels, is well characterized and rather predictable. However, their use is already strictly regulated for domestic use or other industrial applications. Even though it does not yet apply for the aeronautical field, research is currently undergoing in this industry to explore the low GWP refrigerants to reduce the environmental impact of aircrafts.

The present work is part of the exPerimental And Numerical mulTiscale mulTiphasic Heat ExchangeR (PANTTHER) Clean Sky 2 project, which will aim at studying and characterizing the behaviour of the low GWP refrigerants like R 1234ze for which research works focused mainly so far on simpler geometries, as well as improving the flow distribution in the header of the evaporator.