# A study of Knowledge Exchange in the Single pilot operations

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The number of pilots has been steadily decreasing for the last seventy years in commercial flights. At least, this is what is being considered by many airlines and aircraft manufacturers (Bilimoria et al., 2014). A new type of crew is currently being certified: single pilot operations (SPO). However, some flight safety experts are sounding the alarm that this reduction in crew would subject an increase in accident risk (Graham et al., 2014). One of the major risks for the pilot of the Single Pilot Operations, is his temporary or permanent incapacity to manage the situation. To try to solve this issue, it is possible to integrate an autonomous system that acts as a mediator in the sharing of representation.

In the interest of making the future virtual assistant useful, it is important that it has a contextual retrieval capability in order to support the pilot's decision. This paper aims at understanding the necessary composition of useful and necessary information for a pilot in a context of Single Pilot Operations during a landing phase. We believe that it is possible to examine situation awareness requirements (Endsley, 1995; Endsley & Jones, 2001) at a given moment of a pilot's mission.

To reach this objective, we have defined our study on a use case involving eighteen pilots from different companies. For this purpose, we put those pilots in a flight simulation during a complex scenario engaging an aircraft failure at a German airport with bad weather. At the end of the scenario, the pilots participated in a semi-directed interview (Boyer & Savoie Zajc, 1997; De Ketele & Roegiers, 1996) combined with a hybrid card sorting methodology (Conrad, 2019; Aarts et al., 2020) to classify and prioritize situation awareness requirements. The objective of these methods was to have the different pilots explain the useful information to share with a pilot of the same qualification as them, if they had to leave the cockpit for incapacitating reasons.

As exploratory results, content analysis methods were applied on the results of global interviews. In the context of our study, the following results were obtained: around 47% of situation awareness requirements identified during pilots' speech match the theoretical speech of our pilot reference; while 29% meet the theoretical speech of our aeronautical expert who designed the scenario. These results show the existence of variability within the pilots.

This study is an upstream analysis to show the importance of the variability of information that each pilot considers salient for the management of his flight mission. Moreover, these preliminary results show that there is a possible strategy of information sharing; which is undoubtedly related to the context in which the operator is located. Further work is currently being carried out to analyze the different strategies of information sharing. In this way, it is envisaged highlighting a generic methodology of selection of the useful and necessary information to share with an operator in a complex situation.