

# Analysis on Future Automation Scenarios in the framework of 2050 ATC

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**Abstract** — The proposed research activity has been developed in the context of AUTOPACE (Automation Pace) project, funded within the SESAR Joint Undertaking (grant agreement No 699238) Horizon 2020 research and innovation programme. AUTOPACE objectives are related to the definition of a psychological model to assess the effects on ATCo performances and workload in a highly automated scenario, with the final aim to define new training strategies and procedures for future AT controllers and to evaluate the effects on the safety. AUTOPACE starts from the definition of a 2050 ConOps (Concept of Operations) and automation scenarios as are the pillars for project research. Such AUTOPACE ConOps has been built upon a selected literature review and provides the framework for the further development of research on automation.

**Keywords** - Automation in ATM; Concept of Operations; Future Automation Scenarios

## I. INTRODUCTION

The AUTOPACE ConOps describes the automation features to be further analyzed according to automation needs and scenarios expected in 2050. Such scenarios will be an input for the research of an ATCo Psychological Model, competences and training definition and safety and performance requirements. Nominal and non-nominal (e.g. automation failures) conditions are identified and described.

Starting from specific requirements of the study, that are the focus on the automation aspects and on the 2050 time horizon, in relation to ATC perspective, we have defined the three phases that have been followed to gather the AUTOPACE Scenarios:

1. 2035 AUTOPACE ConOps definition;
2. 2050 AUTOPACE ConOps definition;
3. AUTOPACE Scenarios identification.

The AUTOPACE ConOps definition has been performed on the basis of a literature research. Several documents were considered as relevant to achieve a common understanding on the state of the art on future automation developments in Air Traffic Control. A reference list was identified considering two different time horizons (2035 and 2050):

- 2035 AUTOPACE ConOps has been defined based on SESAR Step 2 deliveries, as a good picture of what will be in place by this time. It constitutes a robust, well-structured baseline upon which 2050 environment can be developed [1], [2].
- 2050 AUTOPACE ConOps has been then developed upon 2035 AUTOPACE ConOps [3], [4], [5], [6].

AUTOPACE ConOps description is presented in three main sections that analyze changes in operations and procedures, systems and personnel. Future Automation Scenarios are then defined according to improvements in automation features and consequently changes in personnel roles and responsibilities. Non-nominal situations have been identified and described. System failures are considered as relevant for affecting controller's performances and causing the lack of functionalities.

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