

ATCOSIMA PROJECT*

Integrated ATC Radar-Flight Deck Simulations for the Assessment of ATCo Trainees

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Abstract— Development of Common ATC Simulation Training Assessment Criteria Based on Future Pan European Single-Sky Targets (ATCOSIMA) proposes an integrated ATC radar-flight deck simulation approach to measure the performance of ATC trainees in order to develop radar approach simulation assessment and training. This study provides a brief description of the baseline integrated simulations and presents their selected results of the preliminary analysis.

Keywords—component; Air Traffic Control; Radar Control Simulation Training; Human-in-the Loop Simulations; Flight Cockpit Simulations; Assessment Criteria

I. INTRODUCTION

Development of Common ATC Simulation Training Assessment Criteria Based on Future Pan European Single-Sky Targets (ATCOSIMA) project primarily aims to develop common assessment criteria for radar control simulation training courses within ATCo basic training in order to improve their competencies regarding working effectively and in harmony within the Pan-European air traffic system; improve metrics and scorings for evaluation of their performance in parallel to SESAR's future targets and provide a reference for enhanced ATCO training across the Europe. The project has been conducted by a consortium of three higher education institutions including Faculty of Aeronautics and Astronautics at Eskisehir Technical University (ESTU), Faculty of Transport and Traffic Science at University of Zagreb (ZFOT) and Institute of Flight Guidance at Technische Universität Braunschweig (TUBS).

The project adopts an innovative approach to measure the performance of ATCo trainees in radar approach simulations using integrated ATC radar-flight deck simulations. These simulations will be performed to evaluate the impacts of ATCo trainees' instructions in terms of efficient use of airspace, aircraft fuel consumption, ATC and pilot task load during the radar approach exercises. The results will be used to support the development of common quantitative assessment criteria along with training guidelines. The project consists of two parts: a baseline analysis to evaluate performance of ATC

trainees using current assessment criteria and training techniques and development and testing of new assessment criteria. Baseline analysis part included two steps: ATC radar-only simulations done at ESTU and ZFOT and integrated ATC radar-flight deck simulations at TUBS. This poster provides a brief description of the baseline integrated simulations and presents their selected results for the preliminary analysis.

II. SIMULATIONS AND DATA COLLECTION

The previously developed airspace model based on Frankfurt TMA was used to run the integrated ATC radar-flight deck simulations. This TMA has generic characteristics provides quick and easy adaptation of ATCo trainees during basic training such as a convex airspace boundary with a moderate number of entry points (fixes) and absence of prohibited and restricted areas. Its relatively broad size also allows trainees have a longer planning and executing time to perform arrival and departure sequencing and implement radar vectoring techniques. These relatively relaxed time windows not only help trainees detect conflicts and develop appropriate resolutions but also allow instructors convey critical pedagogical information to trainees during the simulations. The previously developed exercise scenario, containing 9 arrivals and 4 departures, require advanced decision-making skills regarding effective and timely use of vectoring, airspeed adjustments and flight level change for conflict resolution and arrival sequencing. A single aircraft type (i.e. Airbus A320) has been simulated in all exercises. The simulation setup consists of one ATC workstation along with a fixed based A320 flight deck simulator flying one arriving aircraft and two pseudo-pilot workstations running the rest of the arrivals and departures in the exercise. The total 10 trainees (5 from ESTU and 5 from ZFOT) participated in the simulations. Simulation logs of flight deck and ATC/pseudo-pilot workstations, communication logs and ATC mouse/keyboard interactions were collected to estimate trajectory data (i.e. flight distances and durations and fuel consumption) and ATCo instructions and actions. After each simulation both the pilot and trainees were administered NASA Task Load Survey (NASA-TLX) in

* This project is funded by the Erasmus+ Program of the European Union under the contract of 2017-1-TR-KA203-046525.

