

**Embry-Riddle Aeronautical University**  
**Application for IRB Approval**  
**EXEMPT Determination Form**

**Principal Investigator:** \_\_\_\_\_

**Other Investigators:** \_\_\_\_\_

**Role:** \_\_\_\_\_ **Campus:** \_\_\_\_\_ **College:** \_\_\_\_\_

**Project Title:**

**Review Board Use Only**

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**Initial Reviewer:** Teri Gabriel **Date:** \_\_\_\_\_ **Approval #:**

**Determination:**

Dr. Beth Blickensderfer

IRB Chair Signature: \_\_\_\_\_

**Brief Description:**

This research falls under the **EXEMPT** category as per 45 CFR 46.104:

(3)(i) Research involving benign behavioral interventions in conjunction with the collection of information from an adult subject through verbal or written responses (including data entry) or audiovisual recording if the subject prospectively agrees to the intervention and information collection and at least one of the following criteria is met: (Applies to Subpart B [Pregnant Women, Human Fetuses and Neonates] and does not apply for Subpart C [Prisoners] except for research aimed at involving a broader subject population that only incidentally includes prisoners.) (Does not apply to Subpart D [Children])

(A) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;

(B) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or

(C) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a **Limited IRB review** (use the Limited or Expedited Review form) to make the determination.

## Human Subject Protocol Application

Campus: Daytona Beach College: COE  
Applicant: Richard Stansbury Degree Level: Doctorate  
ERAU ID: 1394357 ERAU Affiliation: Faculty  
Project Title: A36 11L.UAS.76 Urban Air Mobility Studies - Working Package 3  
Principal Investigator: Richard S. Stansbury  
Other Investigators: William Coyne, Clyde Rinkinen  
  
Submission Date: 02/02/2022  
Beginning Date: 02/28/2022  
Type of Project: Simulation  
Type of Funding Support: FAA (ASSURE Center of Excellence)

### Questions

1. **Background and Purpose:** Briefly describe the background and purpose of the research. Include how the study contributes to existing knowledge; spell out acronyms the first time they are used; and use consistent terminology.

The main purpose of this study is to investigate the impact of Urban Air Mobility (UAM) on air traffic controllers' workload. The study also explores minimum system, operational, and procedural requirements for UAM integration into National Airspace System, minimum Communication, Navigation, and Surveillance requirements, infrastructural requirements, strategies for coordination of non-segregated operations between UAM and non-UAM air traffic, as well as factors that influence vertiport design and planning. The aim of this study is to explore each of the mentioned elements and provide substantial support to answer the research questions via literature review, subject matter expertise, experiments, or a combination of thereof. The research will use the Air Traffic Control (ATC) Tower Simulation Laboratory to conduct the experiment, where participants will undergo a series of simulations created by the research team. The participants will be observed and evaluated by the research personnel, as well as they will be asked to fill out a survey questionnaire after each of the simulations for workload evaluations. ATC operational environment and simulation components will be also evaluated by the research personnel.

2. **Time:** Include how much time will be asked of each participant. Include the amount of time it takes for each activity and the total time. The total amount of time must match what is written on the Informed Consent Form (ICF), but the ICF only need include the total amount of time. (Do NOT include the amount of time needed to read the ICF.)

Each simulation is anticipated to last around 50 minutes. The participants shall be given breaks between simulations (if more than one is planned to occur) that last around 20 minutes. After each simulation is conducted, the participants shall complete the NASA-TLX questionnaire that will take around 5-10 minutes per questionnaire. The demographic survey shall take no longer than 5 minutes to complete.

Time to complete the entire study. Each simulation shall take approximately 50 minutes to complete, and each participant shall go through the simulation three times in the Local Control position and three times in the Ground Control position. It totals approximately 7 hours of time per participant. The entire experiment shall not require more than two days or approximately 7 hours of time commitment per participant.

3. **Design, Procedures and Methods:** Describe the details of the procedure(s) to be used; how the data will be collected and/or what will be done to collect the needed data and when the data will be destroyed. \*Stating that the data will be destroyed when the Capstone project is completed is NOT acceptable. A specific time period must be indicated. Example: Data will be destroyed three years after completion of the research.

a. This study is conducted using a set of six ATC Tower simulations and six post-simulation surveys of approximately 20 ERAU ATC program trained students and approximately four ERAU associated ATC faculty with respective experience in ATC Tower environment. A simulation is marked "complete" when each participant finishes all of the following: non-UAM ATC Tower simulation, non-UAM simulation NASA-TLX post-survey, UAM ATC Tower simulation, and UAM simulation NASA-TLX post-survey. The experiment will be complete once all participants complete six simulations each. The total time for simulation shall take approximately 270 minutes. The experiments will be completed at ERAU's ATC Tower Simulation Laboratory in the College of Aviation. The post-simulation surveys will be administered individually using Apple iPads and NASA-TLX software in the same environment where the simulations were conducted. The time to complete is estimated to be around 50 minutes total. Eligible participants will be presented with the Informed Consent Form. Upon receiving consent, a participant will answer basic demographic questions (age, ethnicity, etc.) and indicate their ATC training level to date. The survey shall not take longer than 5 minutes. Post-simulation survey is a pre-set NASA-TLX questionnaire that rates various human demands in a pursuit to evaluate human workload. The questionnaires will be submitted online and accessible only by the research personnel. The sequence of events for the first day shall be the following:

- Pre-experiment briefing (15 minutes).
- Demographic survey (5 minutes).
- 1st simulation (45 minutes).
- Post-simulation survey (10 minutes).
- Break (20 minutes).
- 2nd simulation (45 minutes).
- Post-simulation survey (10 minutes).
- Break (20 minutes).
- 3rd simulation (45 minutes).
- Post-simulation survey (10 minutes).

This sequence shall remain true for one day of time asked per participant and take a little over three hours per day. The second day shall hold the same sequence of events except the demographic survey, which is as follows:

- 4th simulation (45 minutes).
- Post-simulation survey (10 minutes).
- Break (20 minutes).
- 5th simulation (45 minutes).
- Post-simulation survey (10 minutes).
- Break (20 minutes).
- 6th simulation (45 minutes).
- Post-simulation survey (10 minutes).
- Post-completion briefing (10 minutes).

Total is estimated to be 440 minutes or around 7 hours.

b. Data collected within this study shall be destroyed two years after the project's official end-date (i.e., date of project close-out by the sponsor, FAA).

a. Will the activity be RECORDED?

No

b. LOCATION: Indicate where the activity will take place –

**Embry-Riddle:**

Campus

Daytona Beach

Specify where the project will take place by including the building name and office/lab number:

ATC Tower Simulation Lab

4. **Measures and Data to be Collected:** What measures and data will be collected in the study? How will the measures and/or data be collected?

- a. Basic demographic information shall be collected from the participants to assess the demographics of the participating group, as well as previous air traffic control experience (ERAU training or real-world experience).
- b. The NASA TLX Questionnaire is used to assess the perceived workload of the participants during the simulations.
- c. Assessment based upon assigned duty within simulation (Local Control or Ground Control)

5. **Participant Population and Recruitment Procedures:**

a. Who will be recruited to be participants? Check ALL that apply:

Embry-Riddle Faculty, Embry-Riddle Students

b. Approximately how many participants do you hope to recruit?

20

c. Explain how and where recruitment will be conducted? (Emails, mailings, sign-up sheets, social media, flyers, etc.)

- a. Participants must be at least 18 years old to participate. They will be recruited using emails sent to students participating in Bachelor Studies in Air Traffic Management and Master Studies in Aeronautics. The faculty members will be recruited based on willingness to participate and prior experience in ATC Tower.
- b. Must be majoring/minoring in Air Traffic Management or a faculty member with ATC experience having completed AT 315 or possess previous tower experience.

**6. Risks or Discomforts:** Describe any potential risks to the dignity, rights, health or welfare of the human subjects and how the risks will be mitigated. Risks may be physical, psychological, social, legal, economic, to reputation, or others. All other possible options should be examined to minimize any risks to the participants.

- a. The risks of participating in this study are no greater than in daily life or during regular ATC Tower training class, but some stress or fatigue might be experienced due to the simulation environment and its elements. Simulator sickness may occur if the participant is not used to simulation environment, which may include dizziness, discomfort, disorientation, nausea, etc.
- b. Considering the ongoing spread of COVID-19, safety measures will be set in place to protect participants during the experiments. All researchers, research assistants, and participants will follow ERAU's COVID-19 policy, expecting everyone to wear a face mask over their nose and mouth regardless of their vaccination status. Hand sanitizer and other disinfectant products shall be available for use at any time during the study. After each simulation is conducted, the disinfectant products will be used to clean shared equipment used during the simulations to prevent the potential spread of COVID-19. In the event of either participant, researcher, or research assistant testing positive for COVID-19, they must stay home and follow the necessary procedures to prevent the spread of COVID-19. Anyone who has been in contact with the infected person, shall comply with standard quarantine practices for 14 days.

**7. Benefits:** Assess the potential benefits to be gained by the participants as well as to others in general as a result of this project. If there are no benefits to the participants, state that 'While there are no benefits to the participants...' The benefits here must match what is written on the consent form; here they are written to the IRB reviewer on the consent form they are written directly to the participant.

While there are no benefits to the participant, the study carries many benefits to the aviation community and its future growth:

- i. Methodology for set-up and utilization of UAM corridor structures, corridor dimensions based on the performance characteristics, and separation rules within the corridors.
- ii. Recommendations on dimensions and placements of vertistops and vertihubs, as well as investigation into the feasibility and throughput of UAM ground operations within those structures.
- iii. Evaluation of ATC workload with an addition of UAM operations for on-airport arrivals and departures, operations in the vicinity of the airport, and conventional aircraft arrival/departure path crossing.
- iv. Recommendations on the standards, rules, and needs for setting up the UAM operational environments, to include performance infrastructure requirements.

**8. Informed Consent:** Describe the procedure you will use to obtain informed consent of the subjects. How and where will you obtain consent? The first page of an electronic survey must be the consent document. See [Obtaining Participant Consent](#) for more information on Informed Consent requirements.

The informed consent form will be presented to all candidates before the beginning of the experiment. All candidates must read and sign the form on the consent form page to begin the experiment. If the candidate refuses to sign or doesn't consent, they will not be able to participate in the experiment and will be removed from the study.

**9. Confidentiality of Records/Data and Privacy:** Will participant information be:

Confidential

- a. Justify the classification and describe the safeguards you will employ to protect participant privacy in securing, sharing, and maintaining data during the study.

All data will remain confidential and will be only accessible to the research team. The data will be stored online using OneDrive account dedicated to this research study and destroyed two years after the project's official end-date (presently, July 2022, but to extend to October 2022 under No Cost Extension).

- b. Indicate what will happen to data collected from participants that choose to "opt out" during the research process.

If a participant decides to withdraw, no data will be collected, and any collected data pertaining to that participant will be destroyed promptly.

- c. Where and how long will participant data be kept? Include the plan for storage or destruction of data upon study completion.

Individual information will be protected in all results of this study. No personal information will be collected except the basic demographic information and prior ATC experience. The online questionnaire will not collect any identifying information and will store the results within the application. The results will be transferred to the OneDrive account accessible only by the team and destroyed two years after the project's official end-date.

10. **Economic Considerations/Incentives:** Are participants going to be paid for their participation or are you providing any other type of incentive; including extra credit?

Yes

What will be the compensation or incentive –

**Payment** – How much?

\$50 each,

Each student shall be required to complete and sign the "Human Subjects Stipend Request Form" attached to be compensated (as per OSRA).

Describe your policy for dealing with participants who start but fail to complete the research.

If a participant decides to withdraw from the study before experiment completion, they will not be awarded the incentive.

**Letter template to be sent out to student participants by Dr. Coyne or Rinkinen**

Greetings,

My name is [name], and I'm one of the faculty members on the lead of A36 11L.UAS.76 Urban Air Mobility Studies - Work Package 3 Project. We are looking to recruit candidates with Air Traffic Control knowledge to participate in our experiment, where you will undergo a set of different simulations in ERAU's ATC Tower Lab.

Please, read the following list for the eligibility requirements in order for you to take part in the experiments:

- Be at least 18 years old.
- Be an active student participating in Air Traffic Management degree/minor or a faculty member with previous Air Traffic Control experience.
- Have completed at least AT 315 (Introduction to Air Traffic Control Tower) or have previous experience in the ATCT.

If you choose to participate in our study, you will be asked to complete six simulations, a demographics survey, and NASA TLX Workload Assessment survey after each simulation is completed. All questions presented to you will only be based on your perceptions at the moment of participation and will not require any previous knowledge.

As an incentive to take part in our project, you will receive compensation of \$50 upon completion of the experiment. If you have any questions, concerns, or comments, please do not hesitate to contact me [contact info].

If you wish to participate, please contact [info] and use the following link for a demographic survey: [link]

[signature]

# ASSURE A36 WVP3 INTRODUCTION BRIEFING

RICHARD S. STANSBURY,  
WILLIAM COYNE,  
CLYDE RINKINEN,  
MYKYTA ZHYLA,  
MAALIYAH BOWDEN,  
AND RANDON SENN



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# OUTLINE

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- UAM/AAM Overview
  - Project Outcomes
  - Your Role
  - Course of the Experiment
  - ATC Tower Positions
  - Data Collection
  - Informed Consent Form



# UAM OVERVIEW

UAM is a transportation system that will help transition from the current ATM to autonomous aircraft serving low-level altitudes within the urban environments.

- sets transportation connectivity between urban centers, suburban hubs, regional and major airports.
- operates alongside traditional manned traffic, UAS under UTM, and other UAM traffic.
- Advanced Air Mobility (AAM)





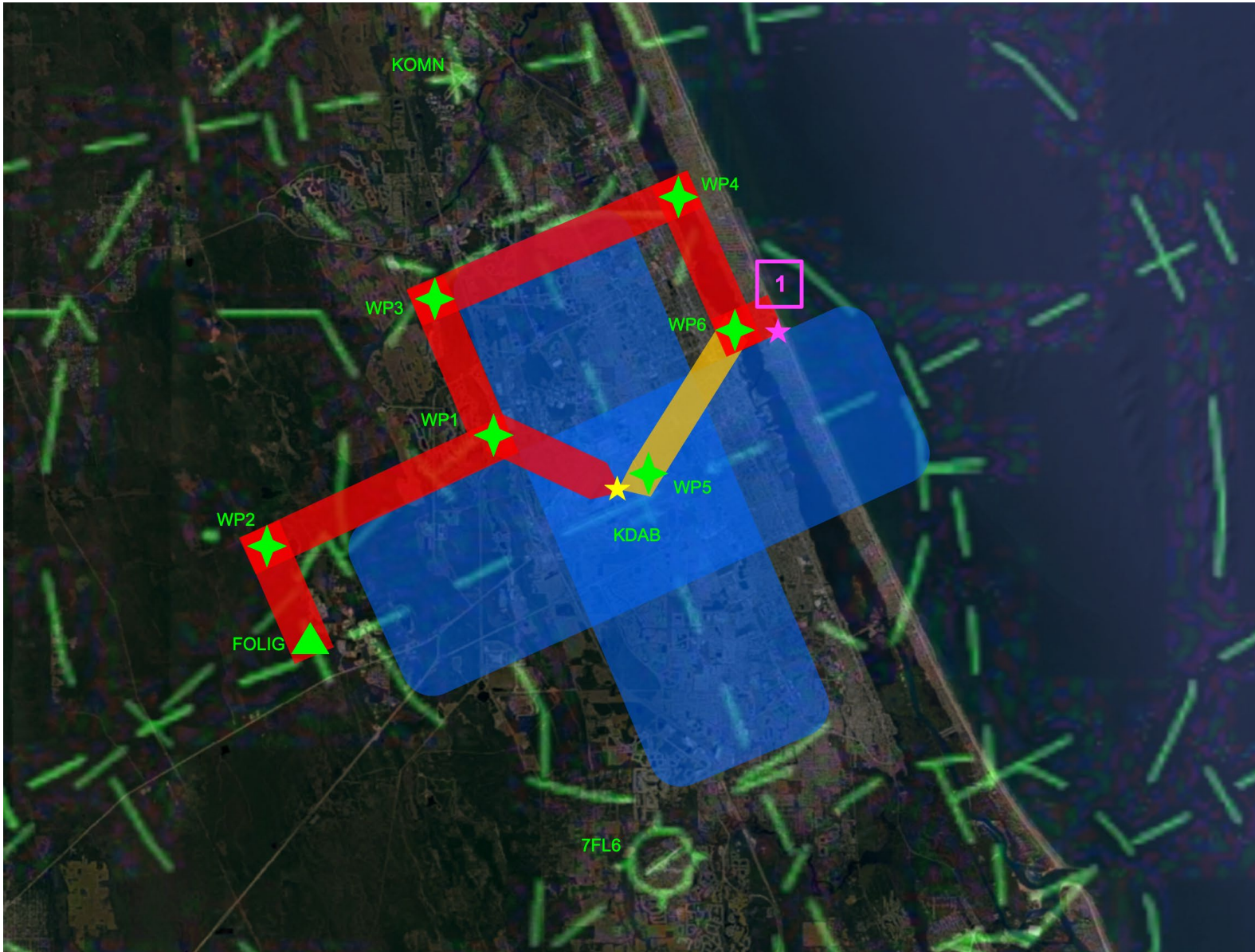
# PROJECT OUTCOMES

- Methodology for set-up and utilization of UAM corridor structures based on the performance characteristics and separation rules.
- Recommendations on dimensions and placements of vertistops and vertihubs, as well as the feasibility and throughput of UAM ground operations.
- Evaluation of ATC workload with an addition of UAM for on-airport arrivals and departures, operations in the vicinity of the airport, and arrival/departure path crossing.
- Recommendations on the standards, rules, and needs for setting up the UAM operational environments.
- Additional research areas that need to be explored for further understanding of issues and discrepancies in the effects of UAM operations on conventional air traffic.

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# YOUR ROLE

- 
- Help the team to evaluate the impact of UAM aircraft on the ATC environment, operations, and workload.
  - The simulations do not require you applying any extra knowledge outside of your ATC training
  - The input we receive from you is critical to the outcomes of this study.



# UAM CORRIDORS

# YOUR EVALUATION

VFR and Other Traffic Sequence

Phraseology

Loss of Situational Awareness

Stripmarking and Strip Management

Ensuring Separation between Aircraft

Communication with PSU

Protection of the UAM Corridors

Procedures

# COURSE OF THE EXPERIMENT

- Set of air traffic simulations of KDAB airspace with true to life ATC tower equipment and environment.
  - 6 simulations total (3 in GC and 3 in LC).
- Same as the prior ATC training you have received from ERAU.
  - **At least one** training simulation is **mandatory** prior the experiment.
- A scenario will have three simulations to complete – no UAM, with UAM, and with UAM off-nominal case.
- After each simulation is finished, you will complete the NASA TLX survey used to estimate the workload .
- If more than one scenario is tested over one day, you will be given appropriate breaks in between.
- You will be observed by the support personnel to add additional information onto your workload surveys and help the team evaluate the impact of UAM aircraft on controllers.

# ATCT POSITIONS

- **Local Control** - issuing take-off and landing clearances, runway crossings, and any other aircraft movement instructions within the airside/runway environment.
- **Ground Control** - issuing taxi and aircraft movement instructions on the airport movement areas.
- **Cab Coordinator** – coordination of UAM corridor configurations and off-nominal scenarios with PSU.
- **PSU** - oversight of UAM traffic flow and coordination of any off-nominal operations with ATCT supervisor.



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# DATA COLLECTION

- 
- All collected data will remain anonymous and will be only accessible by the research team.
  - The data will be stored online using OneDrive account dedicated to this research study.
  - Individual information will be protected in all results of this study.
  - **Note:** If you decide to withdraw, no data will be collected, and any collected data pertaining to your participation will be destroyed promptly.

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# INFORMED CONSENT FORM

- The informed consent form will now be presented to you.
- You must read the form and select “**AGREE**” on the consent form page in order to begin the experiment.
  
- **Note:** if you refuse to do so or don’t consent, you will not be able to participate in the experiment and will be removed from the study.

QUESTIONS?



## INFORMED CONSENT FORM

### *A36 11L.UAS.76 Urban Air Mobility Studies - Working Package 3*

**Purpose of this Research:** I am asking you to participate in this research study for the purpose of investigating the impact of Urban Air Mobility (UAM) on air traffic controllers' workload. The aim of this study is to explore a variety of elements for efficient integration of UAM aircraft into the National Airspace System. In the course of this study, you will undergo a series of simulations created by the research team at the Air Traffic Control (ATC) Tower Simulation Laboratory. You will be observed and evaluated by the research personnel during the simulations. After each simulation, you will be asked to fill out a survey questionnaire for workload evaluations. Each simulation shall take approximately 50 minutes to complete, and each participant shall go through the simulation three times in the Local Control position and three times in the Ground Control position. The entire study should not require more than two days or approximately 7 hours to complete.

**Risks or discomforts:** The risks of participating in this study are no greater than in daily life or during regular ATC Tower training class, but some stress or fatigue might be experienced due to the changes in simulation environment and its elements. Simulator sickness may occur if you are not used to simulation environment, which may include dizziness, discomfort, disorientation, nausea, etc.

Considering the ongoing spread of COVID-19, safety measures will be set in place to protect you during the experiments. You will follow ERAU's COVID-19 policy by wearing a face mask over your nose and mouth regardless of your vaccination status. Hand sanitizer and other disinfectant products shall be available for use at any time during the study. After each simulation is conducted, the disinfectant products will be used to clean shared equipment used during the simulations to prevent the potential spread of COVID-19. In the event of either you, researcher, or research assistant test positive for COVID-19, the infected person must stay home and follow the necessary procedures to prevent the spread of COVID-19.

**Benefits:** While this study does not have any benefits to you as a student, it has a great impact on the future development of aviation community and growth of Urban Air Mobility as part of it.

**Confidentiality of records:** All collected data will remain confidential and will be only accessible to the research team. The data will be stored online using OneDrive account dedicated to this research study and destroyed (two years after the project ends). If you decide to withdraw, no data will be collected, and any collected data pertaining to your participation will be destroyed promptly.

Your individual information will be protected in all data resulting from this study. While the members of the research team will have access to your personal information, publication of the data will not include any identifying information. You will be assigned a number; the key code will be stored separately from the data. Information collected as part of this research will not be used or distributed for future research studies. Any collected data will be destroyed two years after the project's official end-date.

**Compensation:** You will be asked to complete the “Human Subjects Stipend Request Form.” A stipend of \$50 will be issued to you via check once you complete all the experiment activities. If you fail to complete the study, you will not receive the \$50 stipend.

**Contact:** If you have any questions or concerns about this study, please contact Dr. Richard Stansbury, [stansbur@erau.edu](mailto:stansbur@erau.edu), or other faculty members overseeing this study Dr. Bill Coyne, [coynea7e@erau.edu](mailto:coynea7e@erau.edu), or Professor Clyde Rinkinen, [rinki613@erau.edu](mailto:rinki613@erau.edu). For any concerns or questions as a participant in this research, contact the Institutional Review Board (IRB) at 386-226-7179 or via email [teri.gabriel@erau.edu](mailto:teri.gabriel@erau.edu).

**Voluntary Participation:** Your participation in this study is completely voluntary. You may discontinue your participation at any time without any penalty. Should you wish to discontinue the research at any time, no information collected will be used.

**CONSENT.** By signing the form below, I certify that I am a resident of the U.S., I am majoring/minoring in Air Traffic Management or am a faculty member with ATC experience, have completed at least AT 315 or possess previous ATCT experience, and understand the information on this form, and voluntarily agree to participate in the study.

If you do **not** wish to participate in the study, simply close the browser or discard this form, unsigned, which will direct you out of the study.

Please print a copy of this form for your records. A copy of this form can also be requested from Dr. Richard Stansbury, [stansbur@erau.edu](mailto:stansbur@erau.edu).

Signature of Participant \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name of Participant \_\_\_\_\_

# A36 Project WP3 Demographic Survey

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\* Required

Please, answer the following three questions in order to confirm your eligibility to participate in this experiment.

## Eligibility Question #1

1. Are you at least 18 years old? \*

*Mark only one oval.*

Yes    *Skip to question 2*

No    *Skip to section 5 (We are sorry, but you are not eligible to participate.)*

## Eligibility Question #2

2. Are you an active student participating in Air Traffic Management degree/minor or a faculty member with previous Air Traffic Control experience? \*

*Mark only one oval.*

Yes    *Skip to question 3*

No    *Skip to section 5 (We are sorry, but you are not eligible to participate.)*

## Eligibility Question #3

3. Have you passed at least AT 315 (Introduction to Air Traffic Control Tower) or do you have previous experience in the ATCT? \*

*Mark only one oval.*

- Yes    *Skip to question 4*
- No    *Skip to section 5 (We are sorry, but you are not eligible to participate. )*

We are sorry, but you are not eligible to participate.

Thank you so much for your interest in our project!

### A36 Project WP3 Demographic Survey

4. What is your gender? \*

*Mark only one oval.*

- Male
- Female
- Prefer not to say
- Other: \_\_\_\_\_

5. What is your age? \*

*Mark only one oval.*

- 18-24
- 25-34
- 35-44
- 45+
- Prefer not to say

6. What is your ethnic background? \*

*Mark only one oval.*

- White/Caucasian
- Asian - Eastern
- Asian - Indian
- Hispanic
- African - American
- Native - American
- Mixed
- Prefer not to say
- Other: \_\_\_\_\_

7. Are you a student? \*

*Mark only one oval.*

- Yes     *Skip to question 8*
- No     *Skip to question 11*

### Additional Student Demographics

8. What is your major? \*

*Mark only one oval.*

- Air Traffic Management
- Aeronautical Science
- Other: \_\_\_\_\_



9. What is your current education level? \*

*Mark only one oval.*

- Freshman
- Sophomore
- Junior
- Senior
- Graduate

10. What is your current ATC experience? \*

*Check all that apply.*

- No experience
- AT 315 - Introduction to Air Traffic Control Tower
- AT 401 - Advanced Terminal Radar Operations
- AT 405 - En route Radar Operations
- AT 406 - En route Non-Radar Operations
- AT 415 - Advanced Air Traffic Control Tower

*Skip to section 9 (Submit the Demographic Survey)*

### Additional Faculty Demographics

11. What is your ATC experience? \*

*Check all that apply.*

- ATC Tower
- TRACON
- En-Route

*Skip to section 9 (Submit the Demographic Survey)*

**Submit the Demographic Survey**

Thank you so much for your participation!

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**Google Forms**

**A36 WP3**

**GC Experience level** \_\_\_\_\_ **TOWER #** \_\_\_\_\_

**Ground Control**

	Points of Errors	Total
<input type="checkbox"/> Did not protect DAB UAM Vertiport	-10	
<input type="checkbox"/> Did not use established <u>procedures</u> or <u>phraseology when coordinating with UAM/PSU</u> (Did not protect the UAM Transition or Beech VSTAR Riddle Transition)	-10	
<input type="checkbox"/> Runway Incursion (allow an aircraft to cross or get on a runway without coordination)	10	
<input type="checkbox"/> Did not APREQ runway 16 departure, when not active	5	
<input type="checkbox"/> Scanning is not performed / Situational Awareness is not maintained	5	
<input type="checkbox"/> Did not use effective techniques for taxiing to, from or crossing runways (nose to nose)	3	
<input type="checkbox"/> Did not maintain positive control – failure to give hold point along taxi route /	3	
<input type="checkbox"/> Aircraft / delayed in crossing runway (Number of minutes from when it could have crossed)	2	
<input type="checkbox"/> Did not maintain positive identity of aircraft/vehicle (had to ask aircraft who they were)	1	
<input type="checkbox"/> Did not identify position on initial contact / or use type aircraft	1	
<input type="checkbox"/> Did not use prescribed phraseology (i.e., approved procedures, words, phrases, or formats)	1	
<input type="checkbox"/> Told acft to “TAXI TO RWY...”	1	
<input type="checkbox"/> Did not tell an acft to cross RWY 16 using the work “TAXIWAY”	1	
<input type="checkbox"/> Did not indicate runway assignment on strip	1	
<input type="checkbox"/> Strip Board / Scratch Pad Mgt : Did not get rid of unneeded strips or information / info not organized	1	

Comments:

Other issues

**Final Score**

LC Experience level \_\_\_\_\_ TOWER # \_\_\_\_\_

**LOCAL CONTROL**

	Points of Errors	Total
<input type="checkbox"/> Runway Separation not ensured (aircraft landed or took off over another or lost separation with UAM aircraft)	10	
<input type="checkbox"/> Did not use established <u>procedures</u> or <u>phraseology when coordinating with UAM/PSU</u>	5	
<input type="checkbox"/> Did not inform PSU of runway configuration changes	3	
<input type="checkbox"/> Did not protect the UAM Corridors	3	
<input type="checkbox"/> Did not issue an alternative clearance to NAS aircraft when UAM exited the UAM corridor	2	
<input type="checkbox"/> Did not issue a pattern entry point or did not use proper phraseology to VFR aircraft	2	
<input type="checkbox"/> Did not properly sequence traffic or issue: #2 Traffic .....		
<input type="checkbox"/> LUAW – Did not inform aircraft of closest traffic / cleared aircraft to land with traffic holding in position	2	
<input type="checkbox"/> LUAW – Did not inform 16 dept. of traffic		
<input type="checkbox"/> Did not use LUAW memory aid / Did not turn off LUAW memory aid	1	
<input type="checkbox"/> Did not turn on/off runway crossing memory aid		
<input type="checkbox"/> Did not identify position on initial contact	1	
<input type="checkbox"/> Did not use type aircraft		
<input type="checkbox"/> Did not use prescribed Take-off / Landing clearance phraseology – NOT: Cleared to Land Rwy... Cleared for T/O Rwy	1	
<input type="checkbox"/> Did not say “FULL LENGTH” or intersection “C” when needed	1	
<input type="checkbox"/> Did not use prescribed runway crossing phraseology – Did NOT say <u>taxiway</u>	1	
<input type="checkbox"/> Did not use prescribed runway exiting phraseology: Did NOT tell acft where to turn or to contact GC	1	
<input type="checkbox"/> Did not maintain positive identity of aircraft / Had to keep asking acft who or where they were	1	
<input type="checkbox"/> Did not use proper strip marking (no runway, checkmark)	1	
<input type="checkbox"/> Strip Board / Scratch Pad Mgt : Did not get rid of unneeded strips or information / info not organized	1	
<input type="checkbox"/> Working Speed: Did not get acft across rwy in a timely manner / Did not get departures out in a timely manner	1	

Comments:

Other issues

**Final Score**

## NASA TLX Questionnaire

The evaluation you are about to perform is a technique that has been developed by NASA to assess the relative importance of six factors in determining how much workload you experienced while performing a task that you recently completed. The procedure is simple: You will be presented with a series of pairs of rating scale titles (for example, Effort vs. Mental Demands) and asked to choose which of the items was more important to your experience of workload in the tasks) that you just performed. Each pair of scale titles will appear separately.

These six factors are defined on the following page. Read through them to make sure you understand what each factor means. If you have any questions, please ask your administrator.

Title	Endpoints	Descriptions
MENTAL DEMAND	Low/High	How much mental and perceptual activity, was required (e.g., thinking, deciding, calculating, remembering, looking, searching etc.)? Was the task easy or demanding, Simple or complex, exacting or forgiving?
PHYSICAL DEMAND	Low/High	How much physical activity was required (e.g., pushing, pulling, turning, controlling, activating, etc.)? Was the task easy or demanding, slow or brisk, slack or strenuous, restful or laborious?
TEMPORAL DEMAND	Low/High	How much time pressure did you feel due to the rate or pace at which the tasks or task elements occurred? Was the pace slow and leisurely or rapid and frantic?
PERFORMANCE	Good/Poor	How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your performance in accomplishing these goals?
EFFORT	Low/High	How hard did you have to work (mentally and physically) to accomplish your level of performance?
FRUSTRATION LEVEL	Low/High	How insecure, discouraged, irritated, stressed and annoyed versus secure, gratified, content, relaxed and complacent did you feel during the task?

## Pairwise Comparison

You'll now be presented with a series of pairs of rating scale factors; each pair will appear on a separate screen. For each pair, choose the factor that was more important to your experience of the workload in the task that you recently performed.

Effort or Performance	Temporal Demand or Frustration
Temporal Demand or Effort	Physical Demand or Frustration
Performance or Frustration	Physical Demand or Temporal Demand
Physical Demand or Performance	Temporal Demand or Mental Demand

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Frustration or Effort	Performance or Mental Demand
Performance or Temporal Demand	Mental Demand or Effort
Mental Demand or Physical Demand	Effort or Physical Demand
Frustration or Mental Demand	

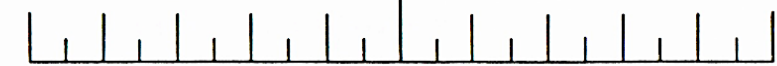
16

## Rating Scales

You'll now be presented with a series of rating scales. For each of the six scales, evaluate the task you recently performed by tapping on the scale's location that matches your experience. Each line has two endpoint descriptors that describe the scale. Consider your responses carefully in distinguishing among the different task conditions and consider each scale individually.

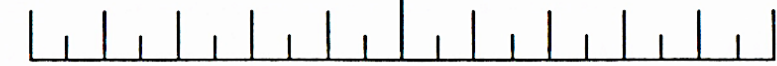
**RATING SHEET**

**MENTAL DEMAND**



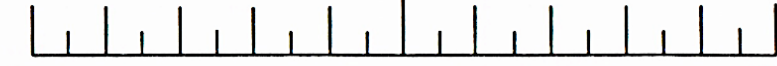
Low High

**PHYSICAL DEMAND**



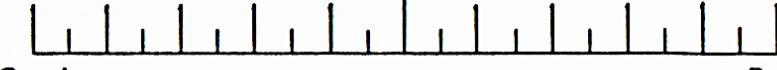
Low High

**TEMPORAL DEMAND**



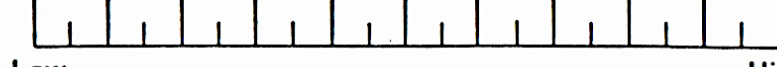
Low High

**PERFORMANCE**



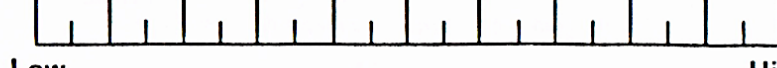
Good Poor

**EFFORT**



Low High

**FRUSTRATION**



Low High

You've successfully completed the simulation we have set up. Thank you so much for your participation in our experiment.

To reiterate, all collected data will remain anonymous and will be only accessible by the research team. The data will be stored online using OneDrive account dedicated to this research study. If you decide to withdraw even after the experiment is completed, any collected data pertaining to your participation will be destroyed promptly. Individual information will be protected in all results of this study.

Now, you are invited to complete the last NASA TLX survey where you will answer a couple questions that will help us evaluate your experienced workload.

After you are done with the survey, you may leave the lab.

Thank you for participation!



## Human Subjects Stipend Request Form

Instructions: Use this form to request payments to non-employees for their participation in a University research study. It may also be used to request payments to employees for their participation in a University research study when the participation is non-employment related.

Hint: Use the keyboard Tab to maneuver between fields

Payee:

Address:

Amount:

Cost Center to be Charged:

- 7164

Request Date:

Check if Payee is a US Citizen or US resident alien.

An IRS Form W-9 must be provided by the Payee and accompany this request. ERAU students may provide their Student ID in lieu of Form W-9.  
Student ID:

Check if Payee is a non-resident alien.

An IRS Form W-8BEN must be provided by the Payee and accompany this request.

Note: The income tax consequences of this payment is the responsibility of the payee and reported by ERAU to the IRS annually as follows: **Non-Resident Alien Participants:** Reported on Form 1042-S. May be subject to up to 30% income tax withholding based upon tax treaty. **All Other Participants:** Reported on Form 1099-MISC if cumulative payments in a calendar year exceed \$600. Not subject to income tax withholding.

Reason for Request:

Requested by:

Ext.#

Budget Manager or Authorized Signer:

(signature)

Budget Manager or Authorized Signer:

(printed/typed)

Office of Sponsored Research Admin:

(signature)