# Outline

1. UAM and RAM Missions
2. Vehicle Configurations
3. Vehicle Sizing
4. SUAVE
5. Battery life prediction over time (done)
6. Performance charts (scitech)
7. Aeroacoustics Medium fidelity approach
8. Acoustic footprint over urban canyon using multi-fidelity analysis techniques (aviation)
9. Optimum trajectories
   1. considering batteries
   2. considering noise
   3. considering batteries and noise
10. Title
11. Overview
12. Agenda Presentation Outline
13. Part 1- Introduction
    1. Background
    2. Research Goals
    3. Aircraft Design/SUAVE
    4. Contributions to SUAVE
14. Part 2 - Mid Fidelity Aeroacoustics in Aircraft Design
    1. Sub Agenda
    2. Survey of Literature
    3. Contributions
    4. Approach
    5. Additions to Existing Theory
    6. Verification and Validation of Model
    7. Comparison with Other Fidelities
    8. Simulations of Flight Profile
    9. Multi Fildeity Approach
    10. Optimization Set Up
    11. Preliminary Results
    12. Conclusion
15. Part 3 - Battery Modeling
    1. Sub Agenda
    2. Literature Survey and Issues
    3. Contributions
    4. Understanding Batteries
    5. Approach/Modelling
    6. Model Validation
    7. Benchmark Test
    8. Aircraft Models
    9. Results
    10. Optimization
    11. Results
    12. Conclusion
16. Future Research
    1. Aero/Acoustics
    2. Battery
    3. System Modeling
    4. Optimization
17. Conclusions

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## Noise Theory - Papers

* An efficient and robust method for predicting helicopter high-speed impulsive noise
* Frequency-Domain Method for Rotor Self-Noise Prediction
* Sound from a propeller at angle of attack: a new theoretical viewpoint
* Influence of Propeller Design Parameters on Far-Field Harmonic Noise in Forward Flight
* Applicability of Early Acoustic Theory for Modern Propeller Design
* Rotor broadband noise prediction with comparison to model data
* Airfoil self-noise and prediction
* An acoustic analogy formulation for moving sources in uniformly moving media
* Derivation of Formulations 1 and 1A of Farassat
* Maneuvering rotorcraft noise prediction

## Isolated Propeller Validation (Performace and Acoustics) - Papers

* Modeling Multirotor Aerodynamic Interactions Through the Vortex Particle Method (performance validation) (APC 10x 7)
* Applicability of Early Acoustic Theory for Modern Propeller Design (acoustic validation)
* Propeller Wing Aerodynamic Interference (performance validation)
* A summary of NASA research exploring the acoustics of small unmanned aerial systems (acoustic validation) APC - SF (Dia 11.9 x 4.7 ) , DJI -CF (Dia 9.4 in)
* Acoustic characterization of a multi-rotor UAS as a first step towards noise reduction (acoustic validation)
* Acoustic Characterization and Prediction of Representative, Small-Scale Rotary-Wing Unmanned Aircraft System Components (acoustic validation)

## Propeller Wing Interaction Validation - Papers

* Wingtip-mounted propellers: Aerodynamic analysis of interaction effects and comparison with a conventional layout
* Wing Pitching and Loading with Propeller Interference
* Relaxed-wake vortex-lattice method using distributed vorticity elements
* A Higher-Order Vortex-Lattice Method with a Force-Free Wake
* Propeller Wing Aerodynamic Interference (performance validation)
* Aerodynamic interaction between propellers and wings (performance validation)
* Propeller-Wing Interaction Prediction for Early Design
* Hybrid numerical technique for evaluating wing aerodynamic loading with propeller interference
* Higher-order free-wake method for propeller-wing systems
* Quasi-Steady Aerodynamics Steady Aerodynamics Analysis of Propeller-Wing Interaction
* Wingtip-mounted propellers: Aerodynamic analysis of interaction effects and comparison with a conventional layout

## Frequency Based Implementation - Papers

1. Frequency-Domain Method for Rotor Self-Noise Prediction
2. Applicability of Early Acoustic Theory for Modern Propeller Design (acoustic validation)
3. Rotor broadband noise prediction with comparison to model data
4. Sound from a propeller at angle of attack: a new theoretical viewpoint
5. influence of Propeller Design Parameters on Far-Field Harmonic Noise in Forward Flight

## Time Domain (CFD) Implementation - Papers

* An efficient and robust method for predicting helicopter high-speed impulsive noise
* An acoustic analogy formulation for moving sources in uniformly moving media
* Derivation of Formulations 1 and 1A of Farassat
* Maneuvering rotorcraft noise prediction

## Broadband Noise - Paper

* Rotor broadband noise prediction with comparison to model data

## Airfoil self-noise and prediction

## System Validation - Paper

* Influence of Propeller Design Parameters on Far-Field Harmonic Noise in Forward Flight

## Multifidelity Optimization - Papers

* Gradient-Based Propeller Optimization with Acoustic Constraints