Chapter 1
Introduction

Part I: Aerodynamic Modeling

RQ #1: key aerodynamic phenomena driving S&C of leading-edge distributed propulsion aircraft

Chapter 2
Aerodynamic Modeling of Leading-Edge Distributed Propulsion Aircraft
- Airframe aerodynamics
- Propeller aerodynamics
- Propeller-airframe interactions

Chapter 3
Model Order Reduction
- Decrease simulation time
- Generation of an aerodynamic model suitable for control design

Part II: Open-Loop Stability

RQ #2: Effect of typical leading-edge distributed propulsion layouts on the open-loop S&C of aircraft

Chapter 4
Distributed Propulsion Components Modeling
- Mass and inertia estimation
- Models for electrical machinery
- Definition of the architectures for the study cases

Chapter 5
Open-Loop Stability in Leading-Edge Distributed Propulsion Aircraft
- Effects of distributed propulsion on open-loop stability of aircraft
- Handling qualities of several study cases (X57, ?)

Part III: Flight Control Design

RQ #3: flight control system architecture and control laws for distributed propulsion aircraft

Chapter 6
Flight Control Design for Distributed Propulsion Aircraft
- Review of FCS architectures
- Control allocation
- Conventional controller design
- Modern controller design

Part IV: Experimental Validation

Chapter 7
Experimental Validation Studies
- Aerodynamic Model Identification from flight test data
- Comparison with simulated data
- Controller validation

Chapter 8
Conclusions