

Contents

| | | |
|----------|---|-----------|
| 1 | Introduction | 1 |
| 1.1 | Objective und Outline of this Work | 1 |
| 1.2 | State of the Art - Flight Test Array Measurements | 3 |
| 1.3 | State of the Art - Boundary Layer Phase Velocity Characteristics from Noisy Wind Tunnel Measurements | 6 |
| 1.4 | Restrictions on Using Flight Test Data | 9 |
| 2 | Coherence of Surface Pressure: Flight Test Evaluation | 11 |
| 2.1 | Models for Comparison: Coherence Length | 11 |
| 2.2 | Experimental Setup | 18 |
| 2.3 | Data Processing | 28 |
| 2.4 | Data Quality | 34 |
| 2.5 | Results | 42 |
| 3 | Phase Velocity of Surface Pressure: Wind Tunnel Test Evaluation | 51 |
| 3.1 | Experimental Setup | 51 |
| 3.2 | Data Processing and Methods | 55 |
| 3.3 | Existing phase velocity prediction models | 58 |
| 3.4 | Results | 60 |
| 4 | Discussion | 75 |
| 4.1 | Coherence Evaluation | 75 |
| 4.2 | Phase Evaluation | 78 |
| 5 | Summary | 85 |
| 5.1 | Coherence Evaluation | 85 |
| 5.2 | Phase Evaluation | 86 |
| 5.3 | Conclusion | 88 |

| | |
|---|------------|
| 6 Outlook | 89 |
| Nomenclature | 91 |
| Bibliography | 97 |
| A Appendix | 105 |
| A.1 Deriving the flow angle from the coherence over the array | 105 |
| A.2 Generation of Numerical Data | 110 |