AEROSPACE INFORMATION REPORT

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Statistical Stability Assessment

RATIONALE

Engine stability analysis and assessment, and the allocation of stability margins, form integral parts of the design and development of every gas turbine engine program. The existing guidelines for stability assessments are documented in ARP1420 and AIR1419, which have been widely utilized throughout industry. However, the existing guidelines do not recognize the statistics of operational demands and can therefore potentially over emphasize low probability events. Applying statistical techniques allow an assessment of the probability of encountering a destabilizing event and thus enable a risk assessment to be made for inlet/engine compatibility. The application of such techniques form the basis of the methodology discussed in this Aerospace Information Report.

This document contains information that is fundamental to the discipline of inlet-engine compatibility and is expected to remain stable for the foreseeable future.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE S-16 Turbine Engine Inlet Flow Distortion Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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FOREWORD

Engine stability analysis and assessment, and the allocation of stability margins form integral parts of the design and development of every gas turbine engine program. The existing guidelines for stability assessments are documented in ARP1420 and AIR1419, which have been widely utilized throughout industry. A key aspect of the stability assessment process involves assessing the statistical aspects of stability and the probabilistic nature of stability limits. As a result, there has been significant progress in developing and applying Monte Carlo techniques to the stability assessment process. A discussion of such techniques forms the basis of the methodology discussed in this Aerospace Information Report.

The overall approach outlined in the document is referred to as the Statistical Stability Assessment or SSA. Information is provided on the various models and methods that make up the SSA process. The validity and application of the approach is examined.

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