NORTH ATLANTIC TREATY ORGANISATION

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RTO TECHNICAL REPORT **TR-AVT-036**

Performance Prediction and Simulation of Gas Turbine Engine Operation for Aircraft, Marine, Vehicular, and Power Generation

(Estimation et simulation des performances du fonctionnement des turbomoteurs pour avions, navires, véhicules et pour la production d'énergie)

Final Report of the RTO Applied Vehicle Technology Panel (AVT) Task Group AVT-036.

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RTO is the single focus in NATO for Defence Research and Technology activities. Its mission is to conduct and promote co-operative research and information exchange. The objective is to support the development and effective use of national defence research and technology and to meet the military needs of the Alliance, to maintain a technological lead, and to provide advice to NATO and national decision makers. The RTO performs its mission with the support of an extensive network of national experts. It also ensures effective co-ordination with other NATO bodies involved in R&T activities.

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- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS System Analysis and Studies Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

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14. Abstract

A Technical Team of the NATO RTO has created a report on gas turbine simulation, ranging from applications to latest methodology of modeling techniques for gas turbine propulsion applications. The report includes examples of how gas turbine numerical simulations have been utilized for aircraft, marine, and vehicular propulsion applications. The major numerical simulation presented in the report is the gas turbine engine cycle code which provides performance for both steady state and transient operation. In addition to examples of how cycle codes are used, an in-depth discussion of how cycle codes are constructed and what basic assumptions are involved is given in the report. Additional higher order and specific numerical simulations for component design and operation are presented in the appendices to this report. Present computer platforms in use for such models are reviewed, and an outlook on development is given. The report aims at increasing the use and the value of engine computer simulations in NATO Nations and NATO's design and use of engines.

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