PhD THESIS SUMMARY

"CONTRIBUTIONS TO THE STUDY OF AIR INTAKE IN GAS TURBINE ENGINES MOUNTED ON SHIPS, IN ORDER TO AVOID SURGING IN TRANSIENT REGIMES"

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PhD thesis "**Contributions to the study of air intake in gas turbine engines mounted on ships, in order to avoid surging in transient regimes**", structured on 9 chapters, followed by bibliography. Each chapter concludes with conclusions on the content of that chapter. The chapters are ordered according to the practical activity of doctoral research, as follows.

The main objective of the study is to find a solution to avoid the surging phenomenon that occurs in gas turbine engines in transient acceleration regimes, by ensuring sufficient air flow.

The **original** solution chosen is to gas-dynamically profile a portion of the intake section and inject periphery air before starting a gas turbine acceleration regime in order to increase the kinetic energy of the air in the intake manifold. The air flow produced by this secondary air injection is added to the manifold flow, but the expectation is that the total flow rate will be greater than the sum of the two, due to the ejection effect produced by injecting secondary air in the direction of air flow from the intake manifold.

The main objective is supported by a series of milestones, including:

- realization of an analytical calculation model regarding hydrodynamic pressure losses on the air intake manifold;
- realization of numerical analysis models of air flow through the air intake manifold;
- analysis of the influence of some values of the constructive parameters of the proposed original solution;
- conducting an experimental investigation on a scale model, both for the original solution (existing) and for the modified solution (proposed by the author);
- analysis of the proposed technical solution, through experimental determinations;
- validation of numerical results by comparative analysis with the results of experimental determinations.

The organization of the doctoral thesis, as specified above, allowed **the achievement** of the assumed objectives and an analysis of the parameters that influence the air flow in the intake manifold of the ST40M gas turbine engine, so that the solution adopted leads to improved performance in transient acceleration regimes.

The proposed solution and the study model, numerical and experimental, have a high degree of generalization, and can be used for other models of gas turbine engines, both for the naval and land domain.