

## SCIENCE, TECHNOLOGY AND INNOVATION IN THE STRATEGIC PROGRAMS OF THE BRAZILIAN NAVY

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In order to fulfill National Defense objectives, Brazil must have Armed Forces that are properly trained, prepared and equipped to act. However, training, preparation and equipping go beyond the simple acquisition of new equipment and systems. Today, for the country's strategic interests, the capacity to design and develop them endogenously is vital. This capacity, in turn, only becomes possible through a robust science, technology and innovation (ST&I) structure that includes considerable research and development (R&D) efforts in areas of Defense interest.

In this context, the adoption of a model that foresees close cooperation between government, academia and industry – known as Triple Helix – in the scientific-technological activities of the Armed Forces deserves special mention. Developed by Etzkowitz and Leydesdorff, this model is guided by the recent transformation in the performance of these three actors in ST&I activities and by the collaborative practices between them in the innovation ecosystem, directly contributing to the effectiveness of the results achieved, as will be discussed throughout the sections of this paper.

Each of the three Forces currently has strategic programs that aim to guarantee the necessary material capabilities for the fulfillment of their respective missions. In the specific case of the Brazilian Navy, this means not only the demand for vessels that guarantee the Naval Force an effective performance in the

protection of Brazilian Jurisdictional Waters (AJB), but also the need to develop modern surveillance systems that ensure the capacity to monitor and control these areas. Both the development and the acquisition of such instruments necessarily go through scientific research and the incorporation of technologies in the domestic sphere, in order to enable the military to use these means.

The objective of this work is to analyze the importance of ST&I activities in the achievement of the Brazilian Navy's main strategic programs, demonstrating how R&D efforts are important to provide the Naval Force with appropriate means for the fulfillment of its mission. The text is divided into five sections, the first being the introduction. In section 2, the importance of ST&I activities in the context of National Defense will be presented, with emphasis on public policies aimed at the ST&I-Defense interconnection and on the national scientific-technological infrastructure related to the theme. In section 3, the main strategic programs of the Brazilian Navy will be presented, in general terms. In section 4, an analysis of the importance of ST&I activities for the achievement of these programs will be conducted. Section 5 finally concludes the text emphasizing the importance of technological progress in Brazilian Navy programs for the achievement of public policy objectives in the field of defense in Brazil.

# SUMEX

Ensuring that the Armed Forces are adequately prepared and equipped is as important as providing them with the necessary means for their actions. To this end, it is vital to continue and strengthen National Defense ST&I actions, especially R&D activities that enable the endogenous development of new defense equipment and systems, with the purpose of achieving autonomy. In this context, it is observed that the approach of the Armed Forces to the state of the art in ST&I enables the increase of efficiency and effectiveness in the fulfillment of their missions.

The analysis of the strategic programs of the Brazilian Navy presented in this work attests to the importance mentioned above. Furthermore, besides strengthening ST&I actions, it is essential to enhance the necessary infrastructure for their development. It is recommended, in this sense, to increase interoperability among the Armed Forces and to privilege the Triple Helix model in the execution of these programs. Thus, it will be possible to expand the positive externalities and technological spillover deriving from their development, benefiting not only the defense industry, but also different production chains in the civilian sphere.

In the specific case of the strategic programs of the Brazilian Navy reviewed in this study, the need for reallocation and prioritization of investments causes direct effects on its planning, demanding adjustments and changes during the course of the program, sometimes jeopardizing stages already accomplished. The guarantee of resources for the continuity of the programs, as well as the stability regarding the budgets destined to its execution, constitutes a fundamental element to achieve greater predictability throughout its different stages, an indispensable component in projects of high scientific and technological complexity. In this sense, treating public policies and investments in the scope of National Defense and ST&I as long-term issues is essential in the scope of federal planning, justified by the benefits that reach the economic, industrial and social spheres.