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Abstract

TRAQUA is an innovative smart reusable water bottle developed during the European Project Semester (EPS) at ISEP in 2026. The project aims to tackle health and environmental problems by combining automated hydration tracking with integrated water purification to reduce single-use plastic waste. TRAQUA consists of a smart device providing safe filtration, real-time mineral sensing, and ultraviolet C (UV-C) self-cleaning, complemented by a user-friendly cross-platform application for tracking intake and personalizing hydration goals. The design was heavily guided by ethical, sustainability, market, and technical considerations, prioritizing user safety through physical radiation barriers and a modular architecture for long-term repairability. The paper describes the theoretical background of the project, the technical design, and the prototype development and testing. The results show the feasibility of TRAQUA as a practical, reliable, and environmentally friendly solution for daily hydration management, and its impact on sustainable consumption habits and single-use plastic reduction.