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Nota di contenuto	Chapter 1. Introduction -- Chapter 2. Hydrogen Storage Technology – Options and Outlook -- Chapter 3. Cryogenic liquid hydrogen tank design aspects – General Overview -- Chapter 4. Cryotankage – Structural thoughts -- Chapter 5. Cryotankage – Tank shapes and Airframe integration -- Chapter 6. Hydrogen tank – Cryocircuit, Integration of components, instrumentation -- Chapter 7. Liquid hydrogen pump overview -- Chapter 8. Leak Detection on Hydrogen Aircraft -- Chapter 9. Cooling System Technologies on Superconducting Rotating Machines -- Chapter 10. Excursion: Rotating heat transfer for motors -- Chapter 11. Airport Infrastructure Requirements for Liquid Hydrogen Supply and Distribution -- Chapter

12. Summary and Outlook.

Sommario/riassunto

This book gives a step-by-step approach to the design of a cryogenic infrastructure required for superconducting, all-electric aircraft systems which is also partially applicable to liquid hydrogen fueled subsonic and hypersonic aircraft, as well as hybrids. While there is no shortage of publications on hydrogen fueled aircraft, this book puts the past journal literature through a magnifying glass and condenses it into an engineering strategy for the next steps to enable liquid hydrogen storage and distribution in aircraft. Emphasis is placed on tank design, manufacturability, safety features, and minimum tank weight, providing a holistic focus on the logistics of hydrogen management for all major components within the aircraft as well as on future superconducting motor architecture. The intention is to fully exploit the benefits of a liquid hydrogen reservoir without any need for additional cryogenic fluids, with relevance to cooling of various superconducting components e.g., motors and superconducting cables, as well as the heat sinking of power electronics and for fueling the fuel cell stack system. A liquid hydrogen tank hold-time analysis reveals the main governing factors and describes the required efforts for minimizing onboard boil off for aircraft designs with different flight mission duration. This is followed by an outlook showing where cryotankage technology and cryogenic aircraft architecture may move within the next 20 years embedded in a green hydrogen-based economy and how basic research will need to play a major role to help us realizing these future designs by consequently eliminating whitespace within today's technology landscape. This book is also an aircraft engineering resource on composites, hydrogen properties, general aircraft materials and safety.