

Then at 9:36 pm (13 minutes after the second signal), the fateful and most criticized “Most Immediate” signal for the convoy to scatter! “Scattering” and “dispersing” were not synonymous!

With that signal, most escorts turned about and abandoned the near-defenseless freighters. The latter headed in all directions – those that headed more or less directly to Russia were picked off by U-boats and aircraft, while those that headed north into the icefield fared better. The armed trawler *Ayrshire* and three ships (*Troubadour*, *Ironclad*, and *Silver Sword*) painted themselves white and became ghosts (hence the title of the book), practically invisible in the icefield. The story line of the book, as seen through the eyes of their sailors, tells of their exploits in the ice and along the coast of Novaya Zemlya, a dash to Archangel with a few other ships which had found their way to that island, and then their experiences in the Russian port.

I recommend this book because, not only does it tell the full story of PQ-17, but also provides the human element of wartime experiences and of life on board ships and in Russia. The “Notes on Sources” is not just “end notes” but a much fuller rendering of information and *obiter dicta*. The book concludes with a chapter called “The Reckoning.” Need I say more?

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Henri-Pierre Grolleau. *French Naval Aviation*. Stamford, Lincs: Key Books www.keypublishing.com, 2022. Modern Military Aircraft Series Vol. 7. 96 pp., photographs. UK £15.99, paper; ISBN 978-1-80282-195-6.

France’s Marine nationale is the largest and most capable navy in the European Union post-Brexit that by default has assumed a clear leadership role in common defence and naval matters, minus the Royal Navy. It operates a modern naval force comprised of nuclear submarines, the nuclear aircraft carrier *Charles de Gaulle*, state-of-the-art surface combatant ships, support ships and auxiliaries, and significant naval aviation assets, deployed close to home and abroad. French defence industries and companies produce amongst the most technologically advanced military and defence wares in the world, marketed for domestic usage as well as export to other countries that brings considerable prestige, foreign business, and self-sufficiency to the French state. In its existing structure and organization, the Marine nationale also has a longstanding track record of operationalizing platforms and weapons systems as a contemporary navy with outstanding training, tactical doctrine, and operational command. Henri-Pierre Grolleau is a photojournalist specializing in naval and military aviation subjects, with insider access authorized by the

French Ministry of Defence. An author of some twenty French-language picture books (including one on US naval aviation and carriers), he turns his attention again to the French Navy's naval aviation arm, the *Aéronavale* or *Aéronautique navale*, for the first time in English.

This lavishly coloured photograph book is divided into six chapters, covering the basic purpose and organization of French naval aviation, aircrew selection and training, carrier-borne aviation, helicopters put into naval roles, maritime patrol and surveillance performed by mostly land-based aircraft under naval direction and control, and search and rescue missions in the maritime environment. Procurement of new aircraft types reflects the *Marine nationale*'s adjustment from a highly specialized but aging Cold War navy capable of delivering conventional and nuclear effects, to one more agile and suited to the complex world in which France finds itself, both nationally and with her allies. In recent decades, French pilots and aircrews have accrued considerable combat experience in Libya, Syria, Afghanistan, and other places, the older F-8P Crusader and Super Étendard giving way to the navalized Rafale "omnirole" fighter and the Super Frelon and Lynx helicopters replaced by the newer NFH90 Caïman, interim SA365 Dauphin, and eventually, the planned H160M Guépard. The E-2C Hawkeye, a carrier-borne surveillance and early warning plane, will also be replaced one-for-one by the E-2-D Advanced Hawkeye from production in the United States within the next decade.

The French Navy has existing training relationships with the US Navy and standardizes in many areas of equipment and communications. Only the United States, Great Britain, and France operate nuclear submarines in the western alliance at the present time, and operational nuclear aircraft carriers compose an even smaller group of two. The *Marine nationale* also boasts several unique public-private partnerships in the provision of fixed-wing and rotary aircraft operated and maintained by civilian contractors, available for military use in training and day-to-day operations. The Dauphin helicopter, for example, is a civilian commercial airframe, customized for naval usage, painted in military patterns, and flown by regular naval personnel. The versatile Falcon 50 used for surveillance and other general duties derives from a business jet, and is set to be replaced by the Albatros, another bigger commercial business jet type. In contrast, the Br. 1150 Atlantique 2, considerably improved in sensors, weapons, and display interfaces since entering service some thirty years ago, is a proven dedicated maritime patrol aircraft used over the sea and land. Its traditional anti-submarine warfare role has expanded into wide area surveillance and strike roles, the bay accommodating sonobuoys, the latest MU90 torpedoes, anti-ship Exocet missiles, and precision-guided munitions like the GBU-12. Twenty-two aircraft produced by Dassault Aviation are in service in Flotille 21F and 23F near Lorient in Brittany, scheduled to remain operational until

at least 2035. The commercial-sourced fixed-wing aircraft and helicopters provide the backbone to the Marine nationale's contribution in the field of search and rescue along the coasts of the Atlantic and the Mediterranean, important to the fishing fleets, commercial shipping, and civilian recreation.

The real focus of the book is the stunning close-up photographs, taken from chase planes and on the ground. The main objects of attention are the varieties of fixed-wing and rotary aircraft serving in the Marine nationale. Other photographs highlight the payloads carried on the aircraft, aircrew, and engineering and maintenance spaces aboard ships and on land. A great deal of detailed relevant information is conveyed in the captions of the photographs, as well as the main text that includes large block quotes of commentary from interviews with serving French personnel, both identified and anonymous, translated into English. The book has neither references nor index, so the sources of information must be taken on trust. Since the obvious focus is on the aircraft and developments in the recent and near-term future, little is learned about any debates over the policy and costs related to the French navy's procurement programs in the naval aviation field, especially in the context of other priorities within the larger armed forces, though the common basic flight training arrangements with the army and air force are mentioned. France's coming replacement of the Le Triomphant-class strategic ballistic missile submarines by a third-generation boat design and *Charles de Gaulle* with a nearly twice as large next-generation nuclear-powered aircraft carrier in the 82,000-tonne range, each requiring new-design ship-size reactors, entails considerable investment for the Marine nationale and French government. Inevitably, cost-savings will be sought in the rest of the fleet which may affect or delay procurement of more helicopters and another next-generation maritime patrol aircraft, no doubt the largest ask after newer generation fighter jets once the Atlantique 2 ages out.

The publisher of *French Naval Aviation* has produced a high-quality book at a modest price point, drawing upon its long experience with aviation-related magazines in Europe, including *Flypast*, focused on heritage war-era aircraft. Grolleau captures a snapshot in time inside a present-day modern navy, some of the description written six months before publication and already overtaken by events in the field and decisions on procurement. But the photographs are still spectacular. The book is recommended for readers interested in contemporary naval aviation and naval matters in the European context, maritime uses of fighting aircraft and their ordnance, and the technical equipment aspects of search and rescue over the sea from a French perspective.

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