

## Anti Aircraft Fire Control And The Development Of

During the Cold War, the Soviet Army was perhaps the deadliest fighting force the world had ever seen. Within its mechanized forces, the Soviets accomplished something that their American counterparts never could – the fielding of a self-propelled anti-aircraft gun (SPAAG) that could keep pace with its heavy armored formations. This volume examines the design, development and operational history of the Soviet Union's Cold War SPAAGs: the ZSU-37, ZSU-57-2, the infamous ZSU-23-4, and the 9K22 Tunguska (better known by its NATO reporting name: SA-19 'Grison'). These vehicles excelled in their air defense role, and many US Department of Defense publications were dedicated to examining how to defeat the ZSU and its radar tracking system. These formidable weapons equipped Russian forces in Afghanistan and were encountered again in Iraq during Operation Desert Storm and Iraqi Freedom, cementing their place in the landscape of modern warfare. This study explores the full history of the SPAAGs with revealing photographs, technical illustrations and detailed analysis.

An in-depth reference to the naval weapons used by Britain, Germany, the US, and the other combatants in the Great War, with photos: "Superb...invaluable."—History of War Although the Great War might be regarded as the heyday of the big-gun at sea, it also saw the maturing of underwater weapons, the mine and torpedo, as well as the first signs of the future potency of air power. Between 1914 and 1918 weapons development was both rapid and complex, so this book has two functions: on the one hand it details all the guns, torpedoes, mines, aerial bombs and anti-submarine systems employed during that period; but it also seeks to explain the background to their evolution: how the weapons were perceived at the time and how they were actually used. This involves a discussion of tactics and emphasizes the key enabling technology of fire control and gun mountings. In this respect, the book treats the war as a transition from naval weapons which were essentially experimental at its outbreak to a state where they pointed directly to what would be used in World War II. Based largely on original research, this sophisticated book is more than a catalogue of the weapons, offering insight into some of the most important technical and operational factors influencing the war at sea. For more than half a century the big gun was the arbiter of naval power, but it was useless if it could not hit the target fast and hard enough to prevent the enemy doing the same. Because the naval gun platform was itself in motion, finding a 'firing solution' was a significant problem made all the more difficult when gun sizes increased and fighting ranges lengthened and seemingly minor issues like wind velocity had to be factored in. To speed up the process and eliminate human error, navies sought a reliable mechanical calculation. This heavily illustrated book outlines for the first time in layman's terms the complex subject of fire-control, as it dominated battleship and cruiser design from before World War I to the end of the dreadnought era. Covering the directors, range-finders, and electro-mechanical computers invented to solve the problems, America's leading naval analyst explains not only how the technology shaped (and was shaped by) the tactics involved, but analyses their effectiveness in battle. His examination of the controversy surrounding Jutland and the relative merits of competing fire-control systems draws conclusions that will surprise many readers. He also reassesses many other major gun actions, such as the battles between the Royal Navy and the Bismarck and the US Navy actions in the Solomons and at Surigao Strait. All major navies are covered, and the story concludes at the end of World War II with the impact of radar. This is a book that everyone with a more than passing interest in twentieth-century warships will want to read, and nobody professionally involved with naval history can afford to miss.

During WWII, the U.S. Army's ranks of men and its arsenal of equipment grew mightily. From a mere 190,000 soldiers in 1939, the Army would reach 8.4 million

in 1945. That was a staggering achievement, and what is even more impressive is to consider how few guns, tanks, artillery and other essentials the military possessed prior to Pearl Harbor. Outfitting America's war machine, and assessing its needs and delivering the goods, was one of the War Department's most challenging tasks. To make it work, some weapons would be pressed into production even though they were obsolete, while others would be adopted as expedients in hopes that better replacements would soon be delivered. The full scope of what was produced in the handful of years between the military build-up that preceded December 7th and V-J Day is hard to comprehend. Fortunately, the War Department left behind this four volume "Catalogue of Standard Ordnance Items." A master catalogue that neatly lists most if not all of the vehicles, weapons, ammunition, and combat equipment that fought history's greatest war, it's an astonishing compendium. Volume 2 of the Catalogue details mobile artillery, railway and seacoast artillery, tank armament, anti-aircraft artillery, subcaliber guns, Army controlled submarine mines, fire control (including gun data computers and transmission systems, sights, telescopes and observation instruments, torque amplifiers, etc.) and aircraft armament. Companion books include Volume 1 which focuses on tanks, armored cars and vehicles, Volume 3 which examines small arms, and Volume 4 which is devoted to ammunition. This publication represents the first time in seventy years that Volume 2 has been presented in its entirety. Please note however, portions of this text were created from original versions that were sub-standard in quality. As a result, some areas of the text, photographs and diagrams may have quality or legibility issues.

Naval Anti-Aircraft Guns and Gunnery Naval Institute Press

The German 88 mm guns became the most famous and feared artillery pieces of the Second World War. They appeared in a whole series of forms ranging from anti-aircraft to anti-tank and tank-guns, including several self-propelled platforms. Although primarily anti-aircraft guns they gained an awesome reputation as anti-tank weapons, a reputation that remains to this day. Terry Gander, in this in-depth, highly illustrated study, tells the story of the 88 from its first manifestations during the Great War to its clandestine development in Sweden, its production in Germany, its first 'multi-role' initiation during the Spanish Civil War and its part in the campaigns of 1939-40. As well as a detailed technical description of the gun and its development, his book features vivid accounts of the 88 in action in many of the main theaters of the Second World War, in North Africa, Italy, France and Germany, and on the Eastern Front.

"Lambert was a drafter of no mean skill . . . his drawings are concise, clear, and invaluable to scratchbuilders and super-detailers. Very highly recommended!"  
—Nautical Research Journal John Lambert was a renowned naval draftsman whose plans were highly valued for their accuracy and detail by modelmakers and enthusiasts. By the time of his death in 2016 he had produced over 850 sheets of drawings, many of which had never been published. Now they have

become available in these remarkable collections, with expert commentary and captioning included. The initial volumes concentrate on British naval weaponry used in the Second World War, thus completing the project Lambert was working on when he died. His interest was always focused on smaller warships and his weapons drawings tend to be of open mountings—the kind that present a real challenge to modelmakers—rather than enclosed turret guns, but he also produced drawings of torpedo tubes, underwater weapons, fire-control directors, and even some specific armament-related deck fittings. Following the earlier volumes on destroyer and escort armament, this one covers the multitude of weapons carried by Coastal Forces, many of which were improvised, ad hoc, or obsolescent, but eventually led to powerful purpose-designed weaponry. An appendix covering the main deck guns carried by British submarines of this era is included, along with an introductory essay by naval ordnance authority Norman Friedman and a selection of photos.

Following his book on the origin of control engineering (1800-1930 (see separate entry), the author now traces development through the critical period 1930-1955, widely identified as the period of "classical" control theory. In the 1930s basic automatic control devices were developed and used in process industries, as were servos for the control of aircraft and ships and amplifiers for the telephone system and early computers etc. During the war many disparate ideas were brought together for the development of aircraft tracking and response systems -- leading to classical control theory which dominated the field through the 1950s. The foundations were also being laid for the introduction of what we now term "modern" control theory.

The eighty-eight was probably the best known artillery piece in the Second World War, and it must never be forgotten that it started life as an anti-aircraft weapon. It was so successful that every German division in 1939 was established with a number of these guns for defence against Allied aircraft. Then, during the battle of Arras in 1940, General Rommel used his anti-aircraft guns on tanks, and the rest is history. This official evaluation of the gun is complete in all the detail one could wish for. The illustrations back up the descriptions of the components of the Flak gun so that a picture of the weapon emerges which is not to be seen in any other publication of the period. The gun and its carriage are described, and the photographs are simply superb. There follows an operator's manual of how to set up, use, clean and service the weapon. Ammunition is also described (and readers may like to know that the 88mm ammunition is also described in full colour in the companion volume German Ammunition in the Handbooks of enemy ammunition series, Numbers 6 and 15. There are range tables included, as well as detailed sections on fire control and sighting equipment. There is no better book on the 88mm antiaircraft gun available.

Kalman filtering techniques using a rotated coordinate system were applied to tracking problems encountered in fire control systems. Two models of target motion were considered: a constant-velocity model and a model which assumes correlated random accelerations.

Estimators derived from these models were evaluated using Monte-Carlo simulations of constant-velocity and maneuvering targets. An algorithm developed to calculate prediction accuracy data for time intervals based on an approximation of the time of flight for a 5 inch/54 Caliber projectile was used to obtain prediction accuracy statistics for evaluating estimator performance.

This book does for naval anti-aircraft defence what the author's Naval Firepower did for surface gunnery – it makes a highly complex but historically crucial subject accessible to the layman. It chronicles the growing aerial threat from its inception in the First World War and the response of each of the major navies down to the end of the Second, highlighting in particular the widely underestimated danger from dive-bombing. Central to this discussion is an analysis of what effective AA fire-control required, and how well each navy's systems actually worked. It also takes in the weapons themselves, how they were placed on ships, and how this reflected the tactical concepts of naval AA defence. As would be expected from any Friedman book, it offers striking insights – he argues, for example, that the Royal Navy, so often criticised for lack of 'air-mindedness', was actually the most alert to the threat, but that its systems were inadequate not because they were too primitive but because they tried to achieve too much. The book summarises the experience of WW2, particularly in theatres where the aerial danger was greatest, and a concluding chapter looks at post-1945 developments that drew on wartime lessons. All important guns, directors and electronics are represented in close-up photos and drawings, and lengthy appendices detail their technical data. It is, simply, another superb contribution to naval technical history by its leading exponent.

This book presents the sound locators, fire control systems, and searchlights used by Germany in conjunction with anti-aircraft fire.

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Please note that the content of this book primarily consists of articles available from Wikipedia or other free sources online. Pages: 72. Chapters: ENIAC, UNIVAC 1101, Ship gun fire-control system, Torpedo Data Computer, Rangekeeper, Norden bombsight, HACS, Aegis Combat System, Arthur Pollen, Frederic Charles Dreyer, DATAR, Coincidence rangefinder, MOBIDIC, Kerrison Predictor, Dumaresq, Ferranti Argus, AN/FSQ-32, Director, MIL-STD-1750A, AN/FSQ-7, Gun data computer, AN/FSQ-31V, TRADIC, Mark I Fire Control Computer, Vickers range clock, Gyro Rate Unit, Barr and Stroud, UNIVAC 1103, Pom-Pom Director, Naval Tactical Data System, Tachymetric anti-aircraft fire control system, Battenberg Course Indicator, Operations room, Admiralty Fire Control Table, Advanced combat direction system, Command and Control Microcomputer Users Group, AN/USQ-17, Mark 8, Fire Control Computer, Fuze Keeping Clock, IBM AP-101, AN/UYK-7, Central Air Data Computer, AN/USQ-20, ATHENA computer, SSDS, AN/UYK-20, UNIVAC 1102, AN/UYK-8, Enhanced Tactical Computer, AN/UYK-43, MARQUISE, MANDRIL, UNIVAC 1104, AN/UYK-44, Project Genoa, RH1750.

The prediction problem for fire control of anti-aircraft missiles is considered. The relationship of the problem to the general fire control strategy is indicated, and two basic models are suggested for the solution: the deterministic model and the noisy model. Several approaches to the problem are proposed and preliminary investigations are conducted with use of differing approximations. (Author).

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