Head Up Display Visteon Corporation

Automotive Engineering International
Improvement of Head-Up Display Standards. Volume 1. Head-Up Display Design Guide. Appendix
Optical Measurement Procedures for Airborne Head Up Display (HUD)
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Automotive Display Systems and IVHS.
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Forbes
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Head-Up Display 48 Success Secrets - 48 Most Asked Questions on Head-Up Display - What You Need to Know
Nuts & Volts
Automotive News
Final Program
Head-Up Displays and Attention Capture
Road & Track
Collaborative Internet of Things (C-IoT)
Ward's Auto World
Information Display
Human Factors Issues in Head-up Display Design
Head-Up Display Study
Minimum Performance Standard for Airborne Head Up Display (HUD).
Head-up Displays for Automotive Applications
Annales des télécommunications

PETERSEN RAMOS

Automotive Engineering International
McGraw-Hill Professional Publishing
A low-cost wearable Commercial-off-The-Shelf (COTS) Augmented Reality (AR) Head-Up Display (HUD) system is designed, successfully reduced to practice, and flight tested. The system is developed based on the need for a technology that improves loss-of-control (LOC) safety in the General Aviation (GA) sector. The accuracy of the flight-path based system is determined to be within a degree of the truth source. The repeatability of the data from the COTS system is excellent. A complementary filter is proposed for air data flow angles and successfully flight tested for straight and level flight, dynamic maneuvering, and atmospheric turbulence, provided that a reasonably accurate lift curve is determined. A novel accelerometer method is proposed for estimating the relative pitch attitude estimation of the pilot's head. The method is evaluated on the ground and in flight, and is shown to be superior to other commercially available solutions. The HUD system is shown, through various test points, to make flying more intuitive and efficient, thereby affecting the GA LOC. In all performed tasks, experienced and inexperienced pilots are used to fly the aircraft and evaluate the technology.
Improvement of Head-Up Display Standards. Volume 1. Head-Up Display Design Guide. Appendix Artech House Publishers
The material provided in this document consists of recommendations related to

the design, analysis, testing, and intended functions of head up displays (HUDs) for transport category airplanes. The content of the document is limited to statements of general design and installation considerations, including display function criticality and compliance considerations; symbology, coding, clutter, dimensionality, and attention getting requirements; equipment installation; display visual characteristics; failure modes; information display and formatting; specific integrated display and mode; and system verification.
Optical Measurement Procedures for Airborne Head Up Display (HUD) SAE International
Popular Mechanics inspires, instructs and influences readers to help them master the modern world. Whether it's practical DIY home-improvement tips, gadgets and digital technology, information on the newest cars or the latest breakthroughs in science -- PM is the ultimate guide to our high-tech lifestyle.
Design and Construction of a Commercial Aftermarket Automotive Head-Up Display Routledge
This report reviews the literature on automotive head-up displays (HUDs) from a human-factors point of view. Four major topics are covered in this reivew: HUD display parameters, the designs of available HUDs, popular appraisals of HUDs, and human performance with HUDs. The most important display parameters are HUD location and HUD contrast with respect to the roadway. Several assessments of optimal HUD location have been made, and there is a consensus that HUDs should be located in the region where drivers make the majority of their eye fixations. Appropriate HUD image contrast levels with respect oth the roadway have also been assessed, and it has been recommended that the HUD image be between 15 percent and 50 percent as bright as the background for daylight luminance conditions, and about 300 percent as bright as the background during nighttime luminance conditions. The second section of the review is dedicated to the description of HUD hardware and available HUD systems. It is the evident that technology is available to produce a HUD that meets all of the display criteria discussed in the first section, with the exception of optimal HUD image contrast with the brightest backgrounds. Popular perceptions of automotive HUDs are discussed in the third section of the review. People believe that HUDs would be beneficial for performing the driving task, but will require more experience with HUDs before being comfortable with them in their automobiles. Human performance with automotive HUDs is discussed in the final section of this review. Most assessments have investigated the effects of displaying speedometer information head-up. It has been found that people can monitor and extract information from a HUD speedometer ore rapidly and frequently than from a conventional speedometer, but that HUD speedometers do not affect speeding behavior. The most significant benefit of HUD speedometers is that they allow for quicker and more accurate reactions to roadway...
Automotive Display Systems and IVHS. John Wiley & Sons
This book provides a simplified visionary approach about the future direction of IoT, addressing its wide-scale adoption in many markets, its interception with advanced technology, the explosive growth in data, and the emergence of data

analytics. IoT business applications span multiple vertical markets. The objective is to inspire creative thinking and collaboration among startups and entrepreneurs which will breed innovation and deliver IoT solutions that will positively impact us by making business processes more efficient, and improving our quality of life. With increasing proliferation of smart-phones and social media, data generated by user wearable/mobile devices continue to be key sources of information about us and the markets around us. Better insights will be gained through cognitive computation coupled with business intelligence and visual analytics that are GIS-based.

Intelligent Vehicle Technology and Trends Createspace Independent Publishing Platform

This title examines head-up display technology (HUD) and its application in the automotive industry. With the recent trend toward higher-speed mobility, as typified by the plan in Japan to build a second Tomei expressway linking Tokyo, Nagoya and Osaka, there is a need for more complex and accurate navigation or route guidance systems. In addition, older drivers, whose vision may be declining, must be able to obtain the necessary information for safe vehicle operation. The author demonstrates that HUD, originally developed for weapons targeting in fighter planes, is ideal for meeting these future automotive navigational and social needs. As HUDs become a standard automotive feature this work will be an important reference to this rapidly developing technology.

Collection de tableaux de 1er ordre, surtout primitifs Taylor & Francis

A design guide for Head-Up Displays (HUDs) has been prepared to assist the HUD engineer by providing in one source a list of design criteria for HUDs. The criteria are based on a review of existing HUD specifications and HUD research. Contents: Definitions; System Characteristics; Operational System Criteria; Display Criteria; Symbology Criteria; Primary Flight Reference Criteria.

Forbes LAP Lambert Academic Publishing

This SAE Aerospace Standard (AS) specifies minimum performance standards for airborne binocular Head-Up Displays (HUDs) in fixed wing (14 CFR part 23, 25) aircraft; while this document is also applicable to rotorcraft (14 CFR part 27, 29) additional performance standards may be required for rotorcraft. This aerospace standard covers basic display standards, but does not include specific application requirements. Specific applications can include flight instrumentation, navigation, engine and system status, alerting, surveillance, communication, terrain awareness, weather, enhanced vision, synthetic vision and other displays.This document covers criteria for conformal and non-conformal HUD systems that are intended for use in the flight deck by the pilot or copilot. Display minimum performance characteristics are specified for standard and other environmental conditions for the purpose of product qualification.This document does not address sensor imaging systems, displays worn by the pilot (goggles, helmet mounted displays) or specific symbology to be displayed.This document is intended to be used in combination with other guidance material contained in current system specific, Technical Standard Orders (TSOs), Advisory Circulars (ACs), and other Federal Aviation Administration (FAA)-approved guidance material. This

SAE Aerospace Standard can be applicable to HUDs used across multiple aircraft types. This SAE Aerospace Standard provides the Minimum Performance Standard for Airborne Head-Up Display (HUD) for use by the aerospace industry and may also be used by the FAA and other regulatory agencies in a technical standard order. The original version focused on CRT-HUD technology and Revision A updates the CRT requirements and extends the requirements to cover digital HUDs. This document was developed by the SAE A-4 HUD subcommittee and supersedes AS8055.
Transport Category Airplane Head Up Display (HUD) Systems Emereo Publishing
A head-up display either Heads-Up display-also familiar like a HUD-is whatever see-through display that gives information short of needing consumers to look off as of their conventional viewpoints. The cradle of the designation branches as of a pilot being capable to view data with the lead located 'up' and sensing ahead, in lieu of angled down sensing at lesser tools. There has never been a Head-up display Guide like this. It contains 48 answers, much more than you can imagine; comprehensive answers and extensive details and references, with insights that have never before been offered in print. Get the information you need--fast! This all-embracing guide offers a thorough view of key knowledge and detailed insight. This Guide introduces what you want to know about Head-up display. A quick look inside of some of the subjects covered: Head-up display - History, Instrument Landing System - Special CAT II and CAT III operations, Contact lens - Current research, The Elder Scrolls V: Skyrim - Gameplay, Wearable computers - 1989-1999, Wearable Computer - 1990s, Avionics Electro-Optics, Toyota FCHV-adv - Motor Triathlon Race Car, Airbus A320 family - Flight deck and avionics, Optical head-mounted display - Lumus, Fighter aircraft - Fourth generation jet fighters (circa 1970 to mid-1990s), Google Glass - Development, BMW E60 - Equipment, Optical head-mounted display - Optinvent, Organic light-emitting diode - Structure, Unity (user interface) - User interface, Acronyms and abbreviations in avionics - H, Disclosure (novel) - Underlying themes, Head-up display - Developmental / experimental uses, Heads-Up Display - Civil aircraft specific applications, OLED - Structure, Halo 4 - Gameplay, Dashboard - Fashion in instrumentation, HUD (video gaming), Automotive night vision - Honda, Machinima - Limitations and solutions, Heads-Up Display - Automobiles, Prius - 2011 facelift, Instrumentation - Aircraft, Head-up display - Automobiles, and much more...
Minimum Performance Standard for Airborne Head Up Display (HUD)
The contents of this report provides a comprehensive look at the details involved in the design and development of an automotive head-up display (HUD). By examining the product's complete assembly, including its optics, mechanical assembly, and embedded system, a portable aftermarket automotive HUD was successfully constructed. The resulting product addresses issues and criticisms present in commercially available HUDs, such as display clutter, placement, price, and versatility, giving it a strong competitive advantage within its target market. A brief overview on some performance improvements is also included, followed by recommendations for future actions to advance the

developed product closer to commercialization.

Newsweek

A review of the safety aspects of head-up displays (HUDs) is presented. Because of the widespread concern about the use of HUDs during unusual attitudes, particular attention was paid to spatial disorientation and the implications of flying by reference to the HUD during unusual attitude recoveries. It is concluded tha the HUD is not inherently unsafe during instrument meteorological conditions and is quite suitable for use as a primary flight display. It is clear, however, that current military training for pilots in the use of the HUD is inadequate both in terms of initial pilot training and recurrent training. Any problem with head-up displays is exacerbated by the lack of adequate training. The use of a generic HUD procedures trainer is highly recommended. Keywords: Orientation(Direction), Symbols, Flight instruments, Flight control, Flight instrument standardization, Instrument flight training, Aviation safety. (EDC).

Improvement of Head-Up Display Standards. Volume 3. An Evaluation of Head-Up Display Safety

This groundbreaking resource offers you a comprehensive overview of cutting-edge intelligent vehicle (IV) systems aimed at providing enhanced safety, greater productivity, and less stress for drivers. Rather than bogging you down with difficult technical discourse, this easy-to-understand book presents a conceptual and realistic view of how IV systems work and the issues involved with their introduction into road vehicles. Helping you apply your skills to this emerging field, this practical reference offers you a thorough understanding of how electronics and electronic systems must work within automobiles, heavy trucks, and buses.

Official Gazette of the United States Patent and Trademark Office

This is a thorough description of this increasingly important technology, starting from the development of head-up displays (HUDs), particularly specifications and standards and operational problems associated with HUD use. HUD involvement in spatial disorientation and its use in recognizing and recovering from unusual attitudes is discussed. The book summarizes the design criteria including hardware, software, interface and display criteria. It goes on to outline flight tasks to be used for evaluating HUDs and discusses the impact of HUDs on flight training. Recent work indicates that a HUD may allow a significant reduction in the time required to train a pilot on a particular aircraft, even considering non-HUD-related tasks. The author concludes with a review of unresolved HUD issues and recommendations for further research and provides an impressive bibliography, glossary and index. Within the military aviation sector the book will be of use to industry, research agencies, test pilot schools and air force training establishments. In the civil area regulatory authorities, airlines and industry will also have an increasing interest.

Visual Optics of Head-up Displays (HUDs) in Automotive Applications

A study of the requirements for and the design of an advanced head-up display (HUD) was conducted. The requirements, based on use in an advanced close air support fighter, included wide field of view (60-x 45-degree), and high brightness (approximately 8,000 fL). The requirements analysis was supported by

interviews with pilot users of head up displays in the field. It was concluded that conventional HUD techniques (cathode ray tubes, thick lenses, etc.) could not be practically used to meet these requirements. Accordingly, an advanced design utilizing holographic optics and liquid crystal display techniques was conceived and evaluated. The holographic lens provides the combiner and collimator functions. The liquid crystal matrix display provides modulation of the light from a collimated arc light source to provide either sensor or symbol video. Using these components, several alternate configurations capable of meeting the requirements were derived. The A-10 aircraft was selected as a candidate for the installation due to its large canopy and over the nose visibility. As part of the study program, a demonstrator was developed to indicate how the holographic lens/combiner and reflective liquid crystal can be used together as a see through display. Also a half size mockup of the baseline cockpit configuration was fabricated.

Head-Up Displays: Designing the Way Ahead

Over last 50 years, there have been innumerable article and scientific papers which address the design and performance of Head mounted Display systems and Head up Display system. With the fielding of the various military and civilian system, research within this area has accelerated greatly since the mid of 1980's. This project intends to the design of Head up Display system. First we focus that what is HUD and its requirement in army and civilian aviation. HUD device including a display element arranged to be mounted in front of the user instantaneous field of view and display controlling unit disposed remotely from the display element and coupled thereto by a signal transmission apparatus.

The First Head Up Display Introduced by General Motors

You have found the first guide to head-mounted displays (HMDs) that places the emphasis where it belongs - on the end-user. This volume addresses key disciplines for future head-mounted virtual reality (VR), industrial and military display systems. It gives you a solid understanding of factors critical to end-user acceptance: user-centered design, imaging and optics, anthropometry, safety, human factors, visual perception, and system testing. HMD visual displays, image alignment, head and neck strain, and brain-actuated control are explored in depth. You also have access to a superb categorization of HMD optical designs, and a state-of-the-art model for stereoscopic viewing. From basic optical parameters to supporting HMDs with head-tracking data, this guide covers the important aspects of designing cutting-edge HMDs for the designer, user, and buyer of next-generation devices and systems.

Report from Head Up Display (HUD) Workshop

The primary role of head-up displays (HUDs) is to provide primary flight, navigation, and guidance information to the pilot in a forward field-of-view on a head-up transparent screen. Therefore, this theoretically allows for optimal control of an aircraft through the simultaneous scanning of both instrument data and the out-the-window scene. However, despite significant aviation safety benefits afforded by HUDs, a number of accidents have shown that their use does not come

without costs. The human factors community has identified significant issues related to the pilot distribution of near and far domain attentional resources because of the compellingness of symbology elements on the HUD; a concern termed, attention or cognitive capture. The paper describes the phenomena of attention capture and presents a selected survey of the literature on the etiology and potential prescriptions.Prinzel, Lawrence J., III and Risser, MatthewLangley Research CenterHUMAN FACTORS ENGINEERING; AIRCRAFT SAFETY; HEAD-UP DISPLAYS; ETIOLOGY; INFORMATION; OPTIMAL CONTROL; FIELD OF VIEW

Head-mounted Displays

Optical Design of Head Up Display

Popular Mechanics