Design Development And Fabrication Of Sugarcane Bud

This report reviews and summarizes the activities and significant events in the design, development, and fabrication of an experimental safety vehicle (family sedan). It consists mainly of how the final design of the major vehicle subsystems was attained. Only data and analyses developed subsequent to that submitted in the preliminary design report of March 1971 is contained herein.

This report documents a program to design, develop and fabricate a composite roadwheel for the M1A1 tank. The roadwheel incorporates composite materials to reduce net weight when compared to the aluminum counterpart. The original design weight for the M1 tank was 58 tons. Additional capabilities, such as improvements introduced in the Block I program, have led to significant weight growth of the vehicle. The current M1A1 vehicle being manufactured by GDLS weighs 65 tons. Planned improvements in survivability, track and Block II will lead to a 70 ton vehicle if weight growth is not offset by weight reduction in the base vehicle platform. A 70-ton tank will lead to severe transportability problems and may impact some key automotive performance parameters.

Fabrication capabilities at the Iowa State University's Microelectronics Research Center have recently been expanded significantly to include CMOS processing. Intended for academic lab use as well as to provide the flexibility of fabrication using more modern processing, the CMOS-70 process will be a significant boon to researchers looking for ways to design and test circuits with quick turn-around time and greater control over processing parameters. The development and proof of this new capability has been the work of several people, and the research described herin both builds upon and expands this work. This research provides additional design capability, process characterization and demonstration of the process' viability for building multi-transistor functioning circuits.

All phases of a complete development program for this fuze were carried out with a goal of developing a safe and reliable long delay fuze that is compatible with available subsonic and supersonic delivery systems. The final result of this development program was a long delay (1.0 hour to 199 hour) bomb fuze compatible with retarded or nonretarded bomb systems in either nose or tail fuze well installations.

This report describes the design, development, and fabrication of projectile metal parts for the Cartridge, He, 152-mm, XM657E1. All projectiles were fabricated from AISI 4340 steel by hot forge-cold draw forming methods. Major problems in forming the projectile nose were solved by external contour machining and annealing of the drawn cans, then nosing the parts while cold in one operation. Annealing of the projectile immediately after nosing was found necessary to avoid cracking. Weight control problems were solved by close control of the ogive wall thickness and relaxing the tolerance on the bourrelet relief diameter. (Author).

The aim of this book is to design a High Altitude and Long Endurance (HALE) UAV after comparing and analyse the existing solar powered UAVs that has to be used in variety of applications as for military as well as commercial purposes. The aircraft design developed is a light and

low drag flying wing configuration with solar cells as major power source.The Book includes the conceptual and detail design of the aircraft with stability, propulsion, performance, structural and fluid analysis, and also the fabrication of a prototype flying model for the demonstration and verification of the concept.

Under Contract AF 08(635)-3745, initiated on 17 June 1963, an electronic, long-delay bomb fuze, the FMU-35/B, was to be designed, developed, fabricated, and evaluated. By its development, the inherent disadvantages of the mechanical fuze, viz., unsuitability for supersonic flights and deliveries, low reliability, and potential safety problems were to be overcome. In the design and development of the fuze, those subassemblies of the existent FMU-26/B Bomb Fuze generically common to the FMU-35/B Bomb Fuze were modified, where necessary, for adaptation in the latter configuration. Through comprehensive programs of development, qualification, and Air Force engineering evaluation tests and through a comprehensive failure-analysis program, it has been possible to fabricate a long-delay fuze possessing a reliability in excess of 0.9 at a 90-percent confidence level. Concomitant with the engineering-evaluation program (Phase III), an E-Cell concept for adaptation to the FMU-35/B fuze was designed and developed. The innate simplicity of the E-Cell timer as a substitute for the electronic-timer subassembly in the FMU-35/B, and its initial evaluative successes justify further consideration of the E-Cell concept. (Author).

Continued research is presented on the XM-11 baroswitch. It was felt that the problem of vibration isolation in the switch was nearly resolved. The investigation of the setting curve characteristics is near completion. Hinge material for the XM-11 device was changed to type 303 stainless steel to make compensation easier and to reduce the temperature error to less than 5 mbs over the range. Results indicated stability of the XM-11 when placed on drift test. The baro set lamp operating voltages were established and incorporated into setters. All of the panel and case details were defined for the XT-4126A. (Author).

The work described in this document was performed in compliance with the scope of work as specified in Contract AF 08(635)-2850 tendered Honeywell Ordnance Division on 13 June 1962. All phases of a complete development program were carried out in order to achieve the goal of developing a safe, highly reliable fuze compatible with available subsonic and supersonic delivery systems. The final result of this development program was a multi-purpose fuze operable in three different modes: impact short-delay, impact medium-delay, and airburst. Fuzes were subjected to every environmental, functional, and safety test for development of fuzes required by the Air Force and by the contract. A program for the development of fuzes incorporating a retard-mode capability into the fuze was conducted, but the mode could not be included without extensive fuze redesign. Several recommendations were made by the contractor to expend additional efforts under the production program to effect the following: loading simplification, battery firing device simplification or integration, safing and arming mechanism simplification, and general safety improvements. (Author).

This effort resulted in the design and construction of a crash sensing system for military helicopters to be used to electrically detonate the squibs of an inflatable body and head restraint system (IBAHRS) during a crash. Calibration sensitivity levels were established through computer simulations using acceleration data collected in previous helicopter

crash tests. The sensor system is sensitive enough to deploy the IBAHRS in time for it to be effective but not so sensitive that inadvertent firings occur due to expected acceleration levels of flight maneuvers, vibrations, and landings.
A machine was evolved during the program which accepts fuzeed on a conveyer belt, auto matically subjects them to arm, noarm tests, and emits the units through "accepted" and "rejected" chutes. (Author).
Research concerns the development of handling equipment for the nose cone and the warhead of the NIKE ZEUS missile. The equipment was to consist of two slings and a dolly; one sling for removing the nose cone from its packing box and for replacing it after the warhead had been installed. The dolly was required for intermediate handling and assembly work. A design was agreed upon which appeared to meet the needs for handling the NIKE ZEUS warhead nose cone. (Author).
A program concerned with the design, development and fabrication of the XM-10 remote baroswitch, the XM-11 present baroswitch and the XT-4126 baroswitch setting control is described. Manufacturing techniques, testing procedures and test results are included.
This report describes progress on the development of a 7-in. and 9-in.-diameter ultra-high-resolution flying-spot-scanner tubes. A proportional control circuit for reducing cathode-current flow in FRM devices during modulation is described. Test data on three narrow-beam-angle FRM microgun experiments are presented. An experimental tube has been constructed that demonstrates 3000 lines-per-in. resolution in the 7-in. configuration. (Author).