TECHNOLOGY FOR THE SMART ROCKET LAUNCHER: THE SYSTEM ENABLER FOR THE 21ST CENTURY

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DISCLAIMERS

- WE WILL PRESENT TECHNOLOGY TRENDS:

  WE WILL NOT PRESENT PROGRAM PLANS!
- NOTHING SAID HERE IS TO BE TAKEN AS A FORMAL SOLICITATION

- I AM NEITHER A MISSILE MAN NOR A ROCKET SCIENTIST:

I AM A LAUNCHER ENGINEER WITH 30+ YEARS EXPERIENCE!

GOALS OF PRESENTATION

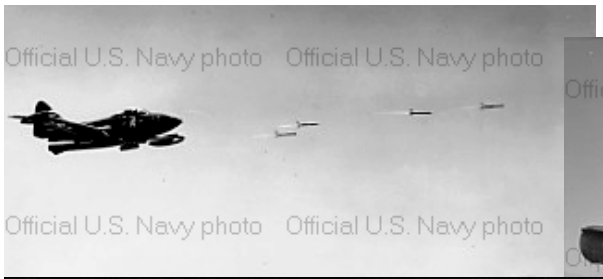
- **INFORM COMMUNITY**
  - CURRENT DESIGN DIRECTIONS
  - AREAS THAT NEED HELP
- **RAISE AWARNESS OF 2.75” ROCKETS**
- **INSPIRE THOUGHT**
  - WHAT CAN BE DONE ONCE SMART LAUNCHER IS AVAILABLE?

YOU TELL US!

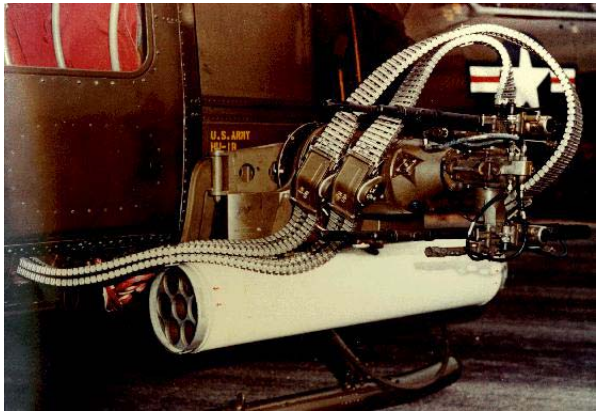
ROLES OF ROCKETS

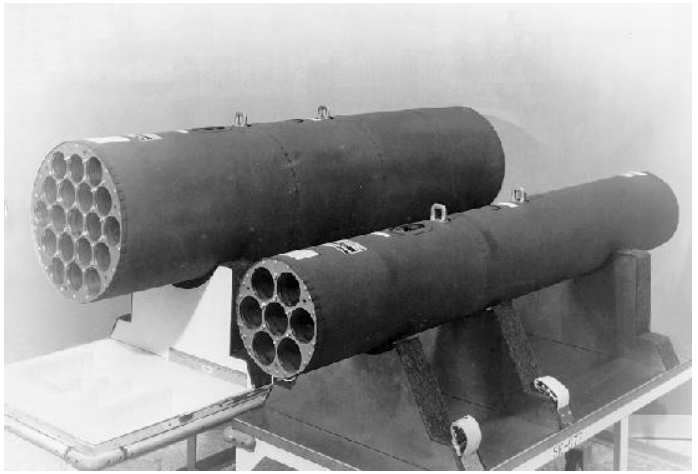
- **TRADITIONAL**
  - HIGH VOLUME FIRE POWER
  - AREA ENGAGEMENT
  - SUPRESSION OF ENEMY
- **EMERGING**
  - PRECISION ENGAGEMENT
  - SMALL MUNITIONS ON SPECIFIC TARGET
- **A VERY BRIEF HISTORY:**

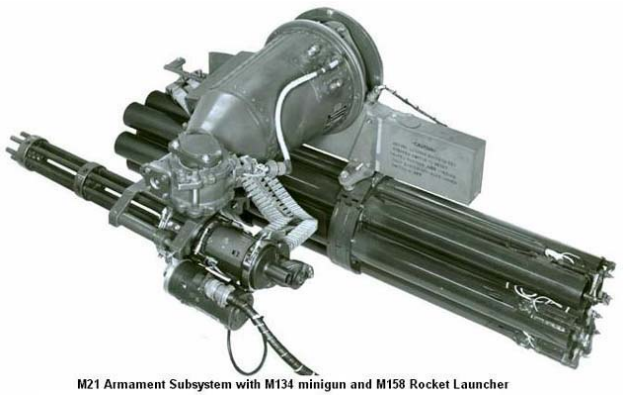
HISTORY OF 2.75” ROCKETS



HISTORY OF 2.75” LAUNCHERS







M21 Armament Subsystem with M134 minigun and M158 Rocket Launcher

WHY SMART LAUNCHERS?

NEW SMART ROCKETS REQUIRE SMART LAUNCHER SUPPORT!

- **APKWS, LASER GUIDED, BLOCK I**
  - TURNS-ON WITH ROCKET IGNITION & ACCELERATION
  - NO LASER CODE CHANGES
  - NO NAVAGATION INPUT
  - NO PRE-LAUNCH CHECK-OUT
- **APKWS, BLOCK III & FUTURE SMART ROCKETS**
  - PRE-FIRE GUIDANCE TURN-ON
  - REQUIRE COMPLETE COMMUNICATIONS
- **PROBLEM: LAUNCHERS TO SUPPORT BLOCKIII DOES NOT EXIST!**

WHY SMART LAUNCHERS?

NEED FOR STANDARDIZE PLATFORM ELECTRICAL INTERFACE

- CURRENT ARMY LAUNCHER HAS 2-PLUG RMS
- CURRENT AF/NAVY HAVE 5-PIN CONNECTOR
- AH-64D & FUTURE ROTARY WING AIRCRAFT WILL UTILIZE MIL-STD-1760 CONNECTION

GENERAL NEW LAUNCHER ISSUES

- **DROP MK40 ROCKET CAPABLITY**
  - THEY ARE OLD AND MOSTLY GONE
- **IMPROVE FIRING CIRCUIT DURABLITY**
  - LAUNCHERS ALMOST ALWAYS FAIL IN FIRING CIRCUIT
- **IMPROVE RIPPLE-FIRE DURABLITY**
- **RETAIN LOW COST, LIGHTWEIGHT, NON-REPAIRABLE APPROACH**
  - ALUMINUM BASIC STRUCTURE TECHNOLOGY
  - 4, 7, AND 19 TUBE VERSIONS

SMART LAUNCHER ENABLING FEATURES

- **MIL-STD-1760 PLATFORM INTERFACE**
  - MOVES RMS FUNCTIONS INTO LAUNCHER ELECTRONICS MODULE
- **TUBE TO ROCKET ELECTRICAL INTERFACES**
  - PORT TO PROVIDE POWER AND COMMUNICATION
  - MUST BE COMPATIBLE WITH CURRENT REMOTE SET FUZING
- **AUTOMATIC ROCKET IDENTIFICATION**
  - “INFINITE” OR “ZONELESS” LAUNCHER

MIL-STD-1760 INTERFACE LAUNCHER ELECTRONICS

- **NAVY DEMONSTRATED LAUNCHER IN 1999**
  - FIRED ROCKETS & SET FUZES
  - MAINTAINS MANUALLY INPUT ROCKET ON-BOARD INVENTORY
  - UPGRADED & IN FINAL DEVELOPMENT
- **ARMY & NAVY COOPERATED ON 4-TUBE, HURL, ELECTRONICS PACKAGE**
  - DEMONSTRATED ROCKET FIRING
  - SURVIVED TACTICAL VIBRATION TEST
  - INTERFACED THROUGH HELLFIRE SHOTGUN CONNETOR
- **PROJECTED LOW UNIT COST IN PRODUCTION**
  - BASED ON “COTS” AUTOMOTIVE CPU

POWER AND COMMUNICATIONS PORT

NAVY DEVELOPING THIS INTERFACE FOR OF LOGIR

- LOGIR PROVIDES INITIAL APPLICATION
- MECHANICAL INTERFACE & SOFTWARE PROTOCOLS WILL BE ESTABLISHED
- MUST PASS COMMUNICATION BOTH WAYS
- WILL LEAD TO A MORE STANDARD SMART ROCKET LENGTH

Navy Launcher Evolving to Support 2.75" Guided Rockets

An MH-60-borne launcher will help demonstrate LOGIR effectiveness

Extended length launcher (LAU-61 D/A) to incorporate a guidance interface unit (GIU) for Low-cost Guided Imaging Rocket (LOGIR) development, testing, and demonstration.
Will enable pre-launch seeker configuration, calibration, and protection.
The electrical portion of the GIU, building on existing Smart Launcher electronics, will provide power to, and robust, high speed digital communication with LOGIRs.

GIU at-a-glance

- Guidance section keyway
  - Positions LOGIR within .007" radially (roll axis)
  - Blind-mating electrical contacts
- Seeker window protection device
  - Rocket back blast shielding
  - Camera calibration
- Inertial measurement unit
  - Transfer alignment from platform to launcher to rocket
- MMSI-supportive interface
  - EBR-1553 10 Mbit/s network
  - CANbus for store configuration
  - High bandwidth analog line
  - 28 VDC power

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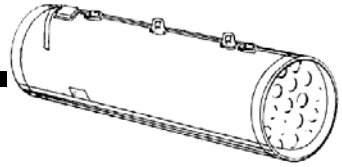

MIL-STD-1553 Bus Controller

Already exists
Adding for guidance interface
Existing external subsystem
Developmental external subsystem

MIL-STD-1553 Remote Terminal

In-Flight Data Acquisition Pod with IMU

Rocket Motor Ignition Switching Matrix

EBR-1553 Bus Controller

Launcher Processor

CANbus Controller

Rocket Guidance Section Power Switching Matrix

19 Port Hub

Rocket Motors

Guidance Sections

AUTOMATIC ROCKET IDENTIFICATION

- **GOAL: ANY ROCKET IN ANY TUBE AT ANY TIME**
  - LAUNCHER DETERMINES TYPE AND STORES LOCATION
  - CREW PROVIDED WITH TYPES AND COUNTS
  - PICK TYPE FOR ENGAGEMET
- **POTENTIAL TECHNOLOGIES**
  - SIGNAL THROUGH THE POWER AND COMMO PORT
  - BAR CODES
  - RF-ID TAGS
  - “OTHER”
- **GENERAL REQUIREMENTS**
  - NO ROCKET-SIDE POWER
  - ANY READER MUST FIT BETWEEN TUBES
  - ANY READER MUST BE ROBUST ENOUGH FOR **TACTICAL** LAUNCHER ENVIRONMENT
  - NEEDS TO BE RETROFITABLE TO EXISTING ROCKET STOCKS

KNOWN AUTOMATIC ROCKET IDENTIFICATION TECH PROBLEMS

- **ID THROUGH COMMO PORT**
  - NOT EASILY RETROFITABLE
  - WOULD REQUIRE UMBILICAL FOR ALL ROCKET/WARHEAD COMBINATIONS
- **BAR CODES**
  - REQUIRES CLEAR AND CLEAN OPTICAL TUBE WINDOW
    - USED LAUNCHERS CAN BE VERY DIRTY
  - "GROCERY STORE EXPERIENCE" SAYS POTENTIALY NOT RELIABLE ENOUGH FOR TACTICAL APPLICATION
- **RF-ID TAGS**
  - REQUIRE AN RF WINDOW IN TUBES
    - DIRTY TUBE NOT AN ISSUE FOR RF-ID
  - METAL BACKING (i.e. MOTOR TUBE) CAUSES READING
  - PROBLEMS
- **OTHER TECHNOLOGIES?**

SUMMARY

- ROCKET HAVE STRONG PAST AND POTENTIAL FUTURE
- WE'VE SHOW WHERE CURRENT DESIGNS & TECHNOLOGY ARE GOING
- WE HAVE SHOWN THAT AUTO-ID APPROACH IS STILL UNDEFINED

WHY IS ALL OF THIS IMPORTANT?

THIS GUY NEEDS OUR HELP!