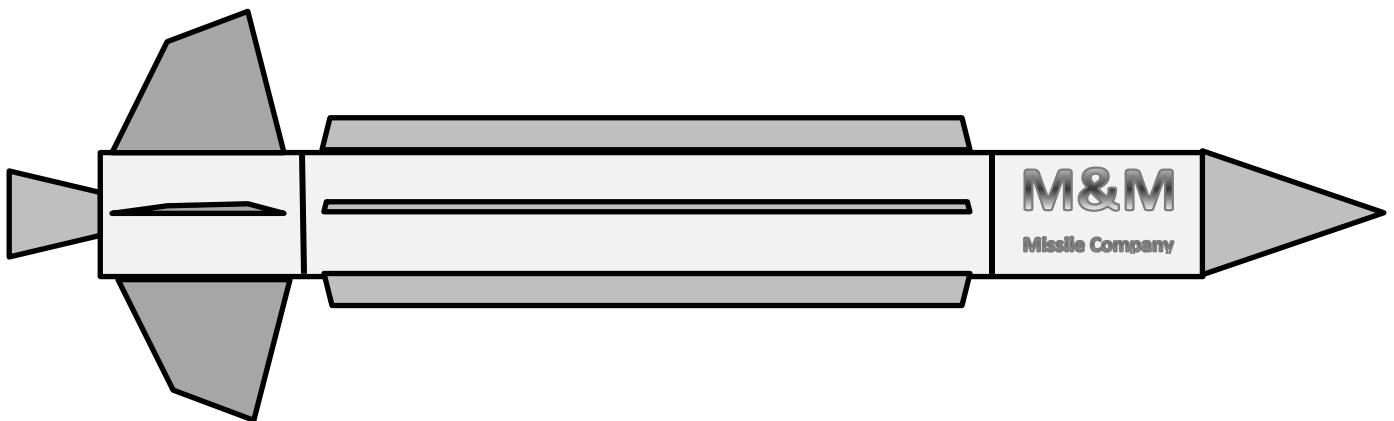


ROBIN HOOD

MISSILE SYSTEM



RHMS is a purely fictitious missile system conceived solely to serve as an example for use during a tutorial about software systems safety engineering. Any resemblance to any past, present or future actual missile system is entirely coincidental.

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Robin Hood Missile System (RHMS)

The RHMS is a software intensive system: all functions related to the pointing and firing of missiles are under the control of software. The RHMS consists of three major subsystems: the Bow Launcher, the Arrow missile, and the Archer Fire Control System (AFCS). The RHMS consist of the following sub-systems:

Arrow Missile:

Fletching Guidance System – with GSP aided Inertial Navigation System.

Bull's Eye Fuze – Proximity/point detonating fuze.

Warhead Section-High-Explosive Fragmenting.

Propulsion Section-Twenty inch diameter, single stage, HTPB based propellant.

Bow Launcher:

Two variants: Surface ship or ground.

Archer Fire Control System:

Provides precise target location and can provide in-flight updates to the missile via the data link.

Arrow Missile

Arrow Missile

The Arrow Missile consists of a Guidance Section, a Warhead Section, and a Propulsion Section.

Fletching Guidance System

The Fletching Guidance System includes the Bull's Eye Fuzing Subsystem, the Navigation System, the Autopilot, and the Fletching Guidance and Control Unit.

Bull's Eye Fuzing Subsystem

The Fuzing Subsystem consists of the proximity fuze, fuze contact device and the fuze processor. Arrow uses two methods of fuzing: a radio-frequency (RF) proximity fuze and a back-up fuze contact device. The proximity fuze processor uses the velocity of the missile to determine the exact time to issue the fire command at the optimal distance above target. The fuze processor is a digital signal processor that receives data from the proximity fuze RF receiver and velocity data from the Guidance Computer to compute the time to issue the fire command. The fuze contact device will issue the fire command on target contact should the proximity fuze fail to issue the fire command. The fire command is processed through the Guidance and Control Unit to initiate the warhead.

Navigation System

The Navigation System is a Global Positioning System (GPS) Aided Inertial Measurement Unit (IMU). The GPS determine precise missile location while the IMU uses Ring-Laser Gyroscopes to detect the pitch, roll, and yaw of the missile, and provides that information to the Autopilot.

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Autopilot

The Autopilot maintains missile stability during flight using data from the Navigation System and guides the missile toward the target using information provided by the Guidance and Control Unit.

Fletching Guidance and Control Unit

The Fletching Guidance and Control Unit is the brains of the Arrow missile. It receives position data from the Navigation System and determines course correction data to guide the missile toward the target. It provides the course correction data to the Autopilot. It also monitors signals from the aft receiver in the propulsion section and processes commands received from the launching platform, such as target position updates and command destruct orders.

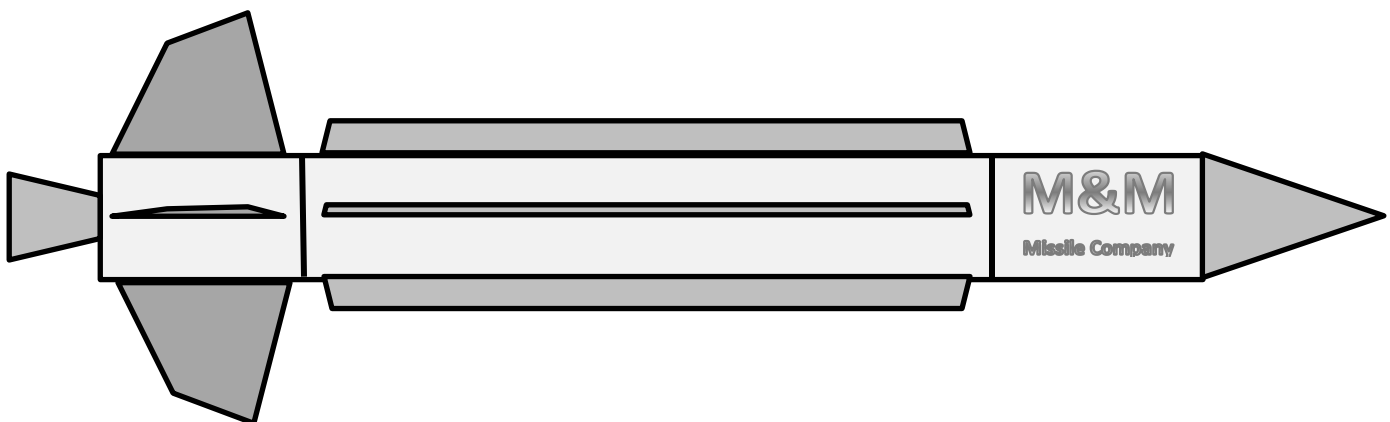
The Fletching Guidance and Control Unit provides two signals to the Electronic Safety and Arming Device: Good Guidance and a Warhead Detonate Command. The Electronic Safety and Arming Device uses the Good Guidance signal as an indication that the missile is on an appropriate trajectory. The signal is one of the signals required to allow the device to charge the firing capacitor. The Warhead Detonate Command causes the Electronic Safety and Arming Device to dump the firing capacitor charge to the Exploding Foil Initiator thus initiating the warhead explosive fill.

Warhead Section

The Warhead Section consists of a warhead shroud, the main charge explosive fill, and an Electronic Safety and Arming Device. The Electronic Safety and Arming Device contains two Field Programmable Gate Arrays that control the arming of the device and the firing of the warhead. It uses an Exploding Foil Initiator to initiate the warhead explosive fill. The two Field Programmable Gate Arrays control the charging of a high-voltage capacitor that fires the Exploding Foil Initiator.

Propulsion Section

The Propulsion Section consists of the Rocket Motor with its Ignition Safety Device, the control fins, and a aft antenna and receiver for communications with the launch platform. The control fins respond to commands from the Autopilot and maintain missile flight as well as steer the missile toward the target.



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