Design of Man Machine Interface for Stabilized Electro-Optical Surveillance and Tracking System Using MATLAB

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Introduction

Stabilized EO System

- Electro-Optical Sensors- Contains a CCD Camera, a Thermal Imaging (TI) Camera and an Eye-safe Laser Range Finder (ELRF)
- To Maintain the Orientation of Sensors Toward a Target on Harsh Mobile Platform Like a Tank
- Electro-Optical Sensors Mounted On a 2-axis Gimballed Structure to Provide Freedom in Azimuth (Yaw) and Elevation (Pitch)
- Stabilized Electro-Optical Systems to Control the Gimbal’ Line-of-sight (LOS)
  - Gyro Based Stabilization
  - To Isolate the Platform Disturbances to Achieve Accurate Pointing and Tracking
- Automatic Video Tracker (AVT) - Key Component of Target Engagement Process
  - Used for Automatic Detection and Tracking of Targets
Problem Statement

- Design of Man-Machine Interface (MMI)- In Such Type of Complex Systems
  - Involves Thoughtful Consideration of Ergonomics, Real-Time Performance and Usability Engineering

- Graphical-User Interface (GUI) Based MMI
  - Command and Control of Gimbal
  - Command and Control of CCD Camera
  - Command and Control of TI Camera
  - Command and Control of ELRF
  - Command and Control of AVT
  - Gyro Drift Calibration
  - Electro-Optical Sensors Calibration
  - Firmware Update facilities
  - High Speed Data Logging
  - Health Monitoring of Multiple Critical Parameters

Tools/Components: MATLAB GUIDE and Instruments Control Toolbox
- Event Drive Programming
- Serial Communication (RS-232)
Experimental/Operation Setup

Man-Machine Interface

Electronics Unit

Stabilized EO System

RS-232
Results

Drift Calibration Page

![Drift Calibration Page](image-url)
Results

Data Logger Page

[Image of a data logger software interface showing settings for data logging, including options for GYRO-INT DATA, ENC DATA, and TRACK ERROR, with LOGGING OFF button.]
Results

Firmware Update Page