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ADVANCED GUI FOR PLOTTING TRAJECTORY DATA

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ABSTRACT: A Matlab program has been developed to generate an advanced GUI (GRAPHIC USER INTERFACE) to plot and display the data for ballistic missile, aircraft, and Interceptor-Target Trajectories

I. INTRODUCTION

Most of the programs utilize a GUI which simplifies parameter changes and allows quick repeated use of the program. In Reference (1) cited A GUI for plotting Ambiguity function was developed. In which the GUI has 4 buttons such as

1) AMBIGUITY FUNCTION
2) CAL&PLOT SIGNAL
3) ACF&SPEC
4) PERIODIC

AMBIGUITY. Suppose if we click on cal &plot button the plots will be displayed.

II. DESCRIPTION

A) DESCRIPTION OF PROGRAMS UTILIZING GUI:

FIGURE1) shows the GUI FOR TRAJECTORY FUNCTION PLOTS. This is a GUI version of 1) BM or BT TRAJECTORY,2)AIRCRAFT TRAJECTORY,3)SATELLITE TRAJECTORY,4)INTERCEPTOR-TARGET TRAJECTORY.

Running the plotting program requires 8 matlab files. i.e. Each trajectory function plotting requires 2-m files. The first m-file is a GUI PROGRAM and the second m-file has the corresponding tracked data loaded into m-file defined by certain functions. In the MAIN PROGRAM there is a create calculate and draw trajectory functions Push buttons.
i.e. PUSH TO CALCULATE 1,PUSHTOCALCULATE2,PUSHTOCALCULATE3,PUSHTO CALCULATE4.

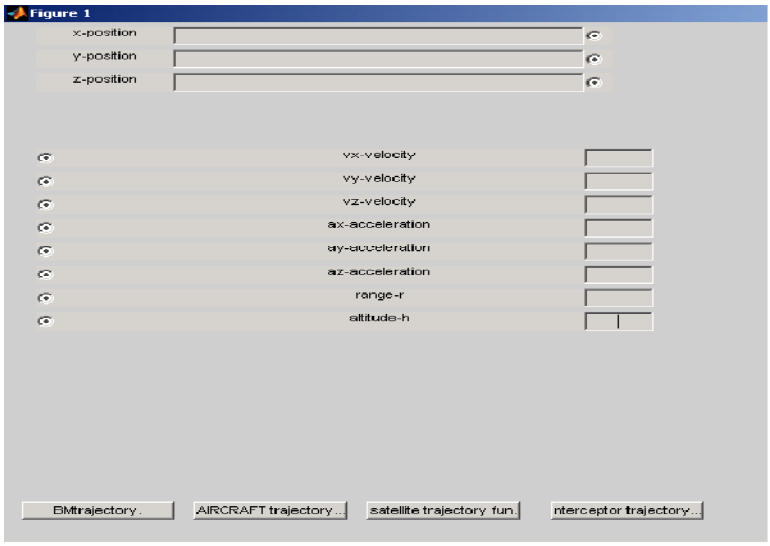


FIGURE1).ADVANCED GUI FOR TRAJECTORY PLOTS

In each push button two programs are being defined i.e. 2-m files
1) MAIN PROGRAM
2) BM OR BT TRAJECTORY

-AIRCRAFT TRAJECTORY
-SATELLITE TRAJECTORY
-INTERCEPTOR-TARGET TRAJECTORY.

Suppose when the MAIN GUI PROGRAM is executed Figure1) appears on the screen. Then by clicking BM TRAJECTORY push button 2 figures gets appeared on the screen The first figure is BM TRAJECTORY PLOT of RANGE, ALTITUDE, Z-POSITION

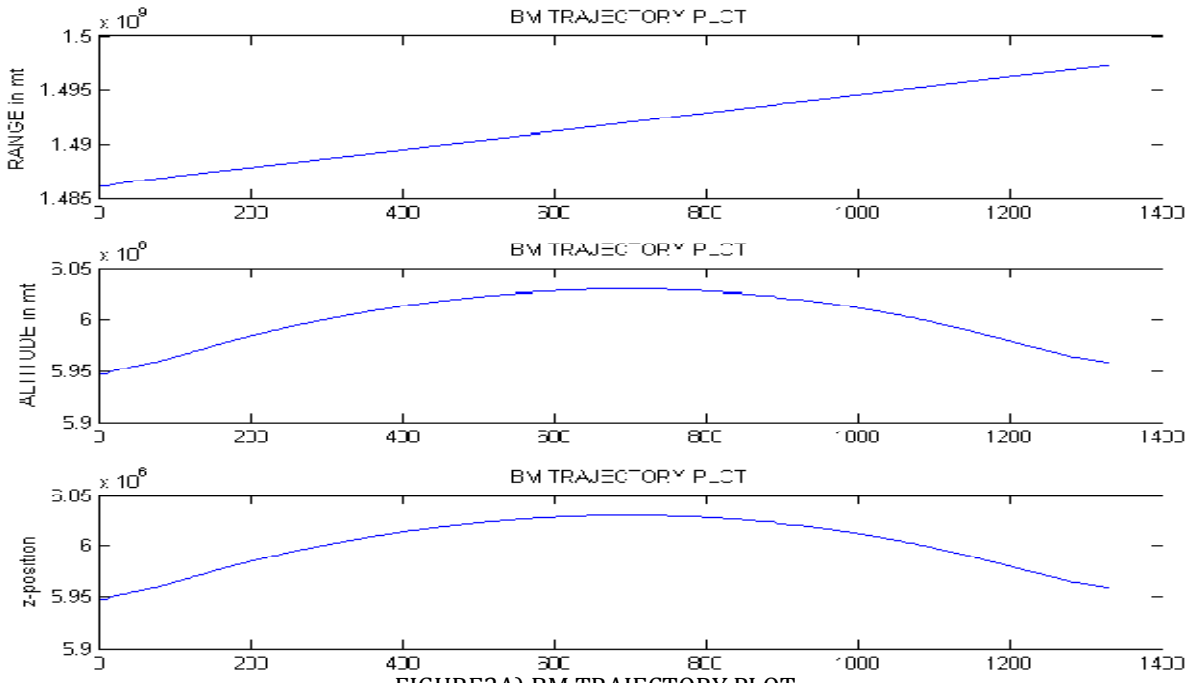


FIGURE2A) BM TRAJECTORY PLOT

The second figure 2B) is BM-POSITIONS, VELOCITIES and ACCELERATIONS PLOTS

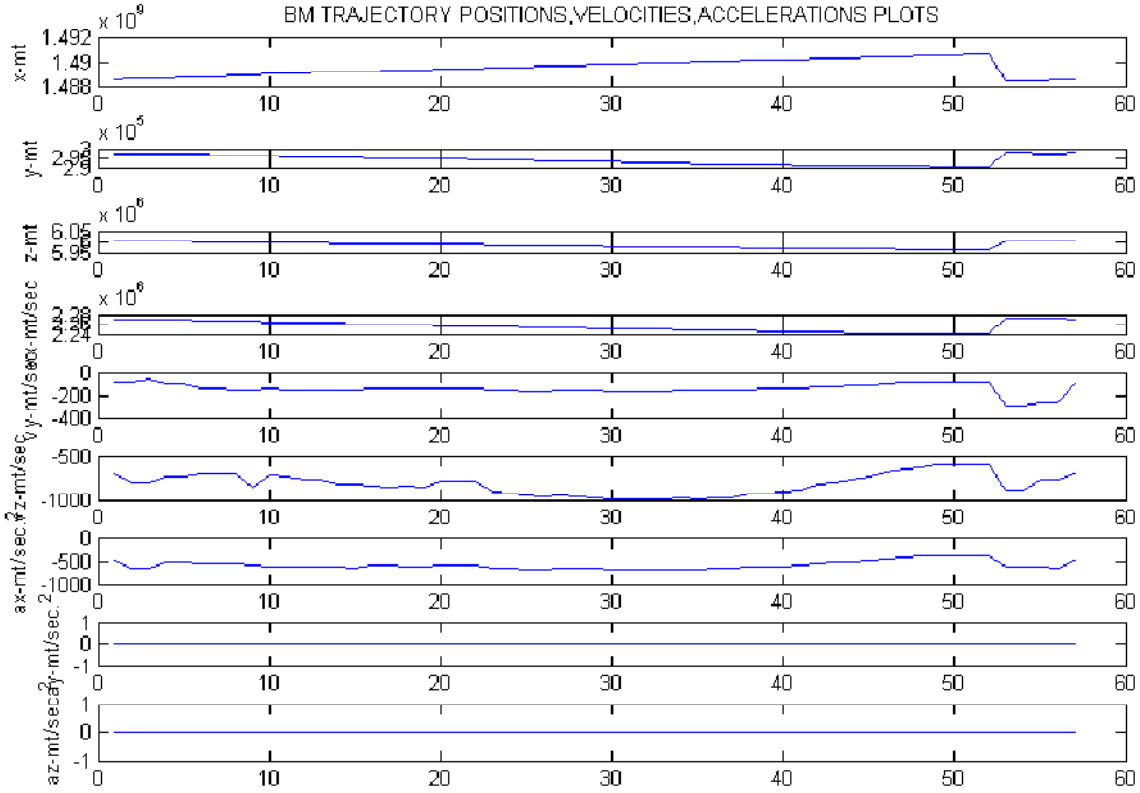


FIGURE2B) BM-POSITIONS,VELOCITIES ,ACCELERATIONS PLOTS

This is similar for AIRCRAFT and SATELLITE push buttons.Figure3A) shows the AIRCRAFT TRAJECTORY PLOT.

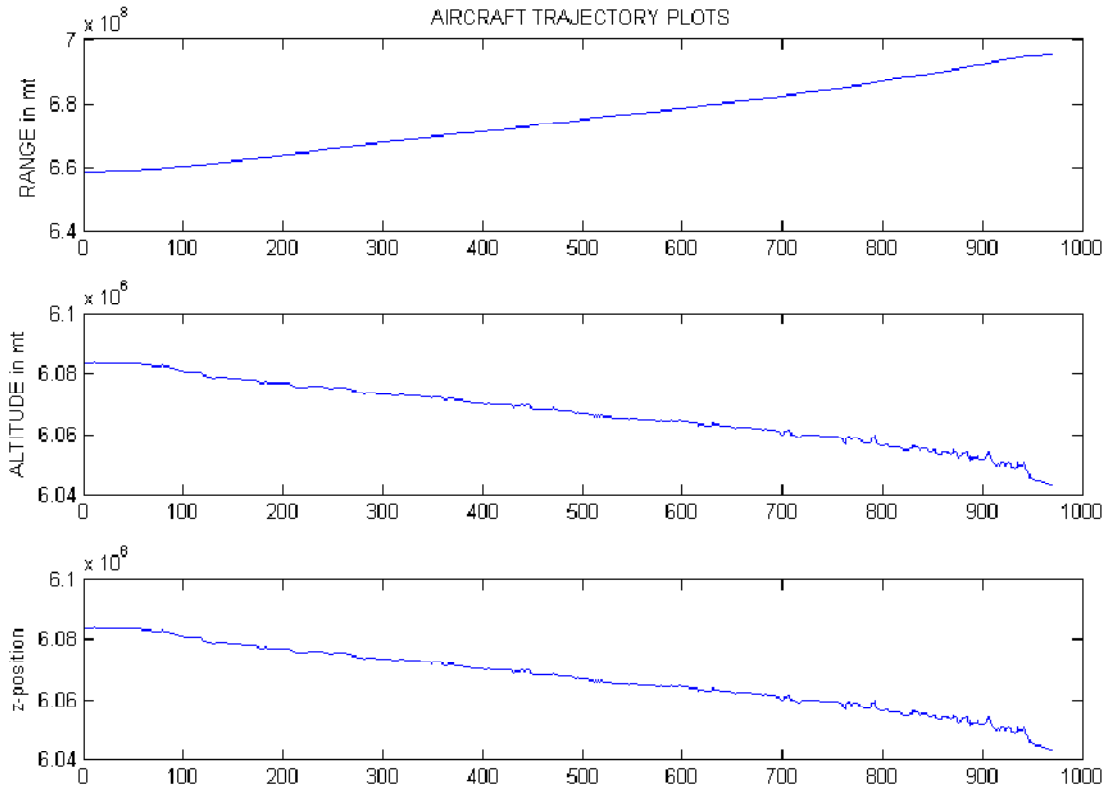


FIGURE 3A) AIRCRAFT TRAJECTORY PLOTS

FIGURE3B) shows AIRCRAFT POSITIONS, VELOCITIES, and ACCELERATIONS PLOTS. Since there was no satellite track data was available the plots have not been included in this paper.

FIGURE4A) shows the INTERCEPTOR-TARGET TRAJECTORY
FIGURE4B) shows the ACCELERATIONS OF TARGET AND INTERCEPTOR PLOTS.
Also if any of the push button in MAIN GUI is clicked in the command window by typing Any data variable the corresponding data will be displayed i.e. RANGE etc

FIGURE4A) INTERCEPTOR-TARGET TRAJECTORY

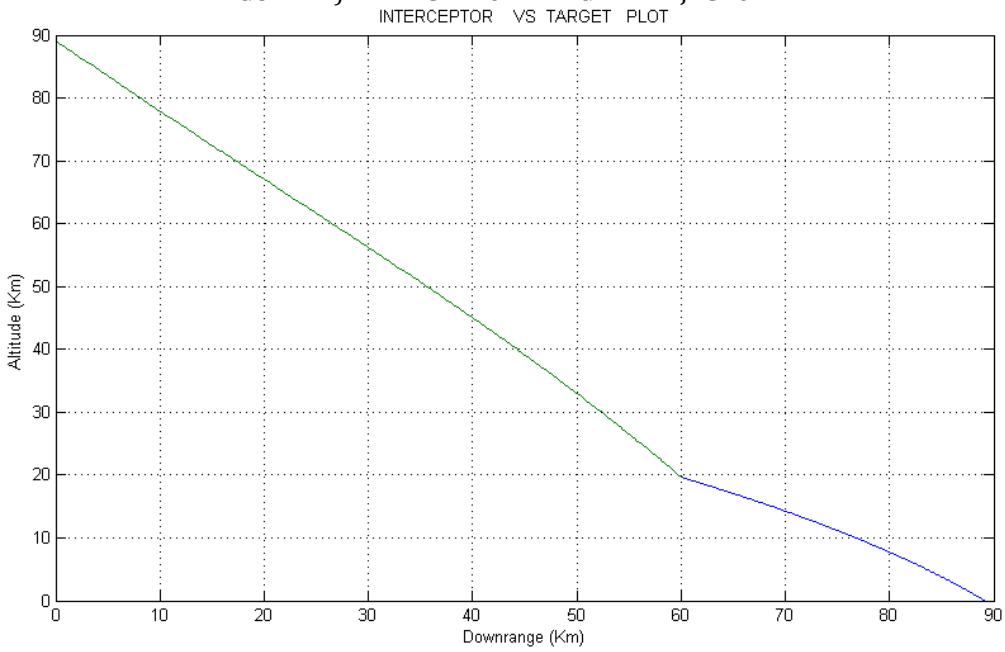
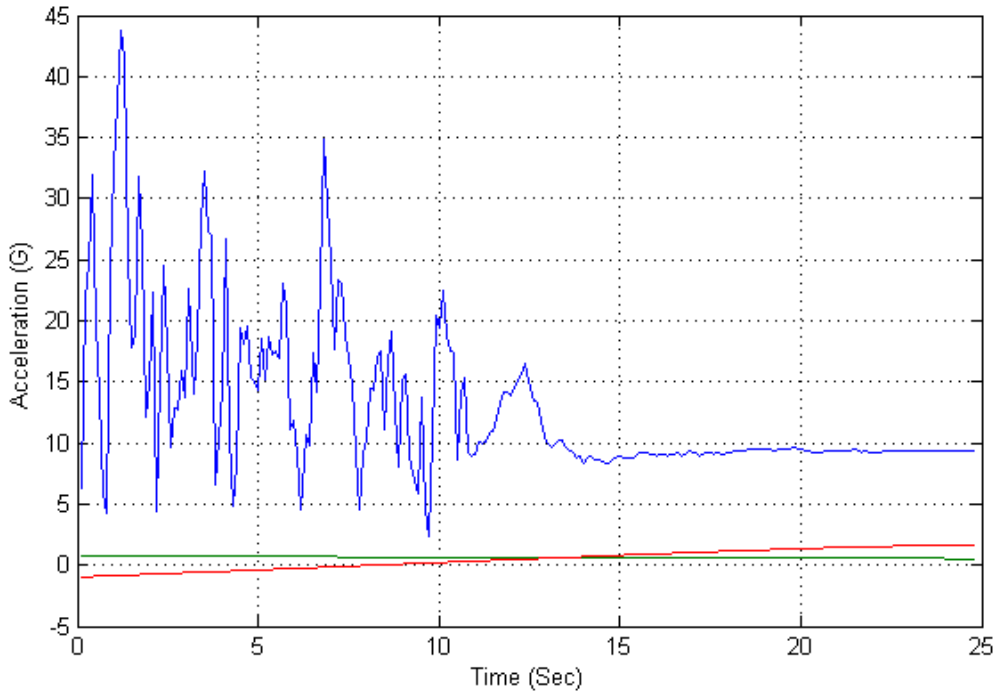


FIGURE 4 B
INTERCEPTOR&TARGET ACCELERATIONS PLOTS



B) HINTS ON USING GUI:

1) The signal is defined by vectors in 11 slots in the GUI.
2) X-POSITION,Y-POSITION,Z-POSITION,VX-VELOCITY,VY-VELOCITY,VZVELOCITY, AX-ACCELERATION,AY-ACCELERATION,AZACCELERATION, RANGE-R,ALTITUDE-H.

III. CONCLUSION

This Advanced GUI can be used for post flight analysis of tracked data of radars mission Control Center for different targets such as Ballistic Missile, Aircraft, Satellite and the most important INTERCEPTOR-TARGET. One more advantage is that the GUI can be used as radar environment simulator (RES) by modification of some data.

REFERENCES:

1. A text book titled "RADAR SIGNALS BY NADAV LEVANON AND ELI MOZOSON-IEEE PRESS".

