بسم الله الرحمن الرحيم

AECENAR
Association for Economical and Technological Cooperation in the Euro-Asian and North-African Region

GCS PFD

of TEMOLeb-Mintad

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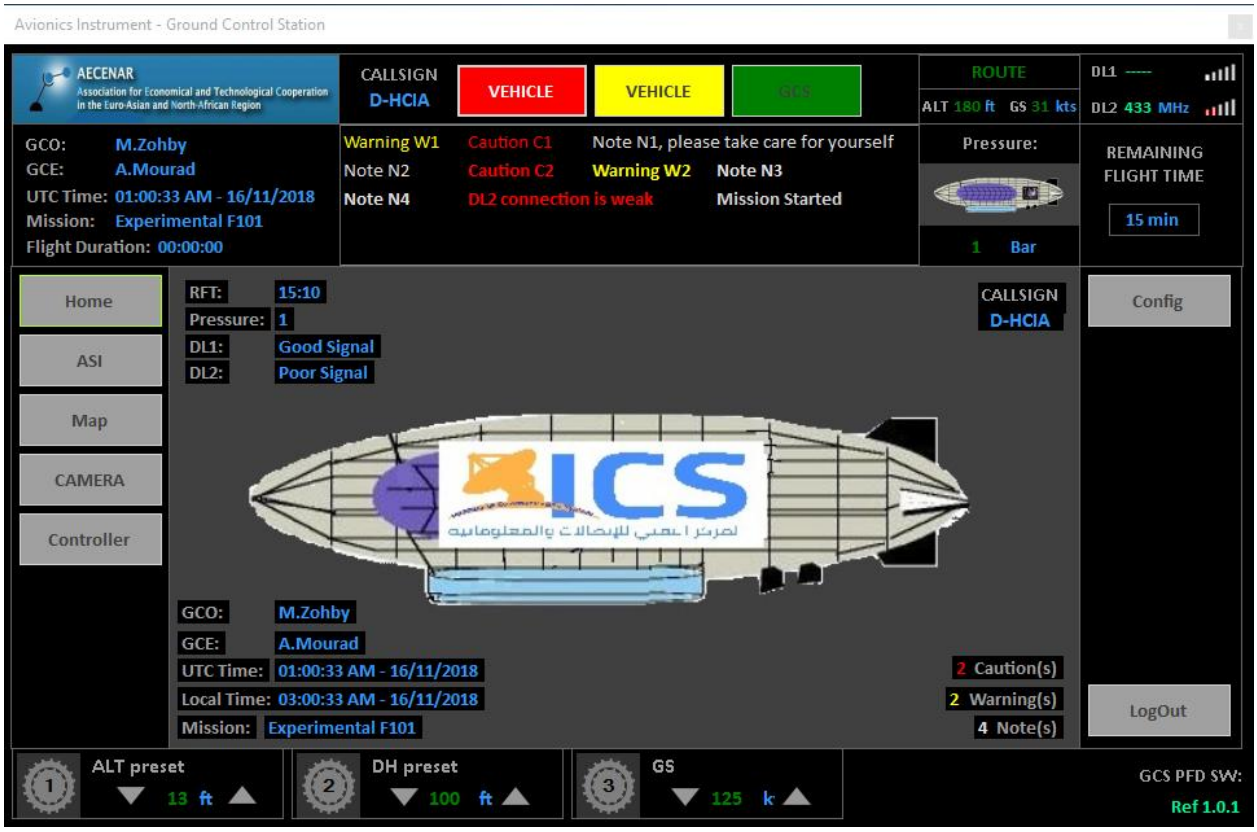
Designed on: **Windows form** application and programed using: **C#** coding language by: **MMJZ**

Contents

1 App Structure:

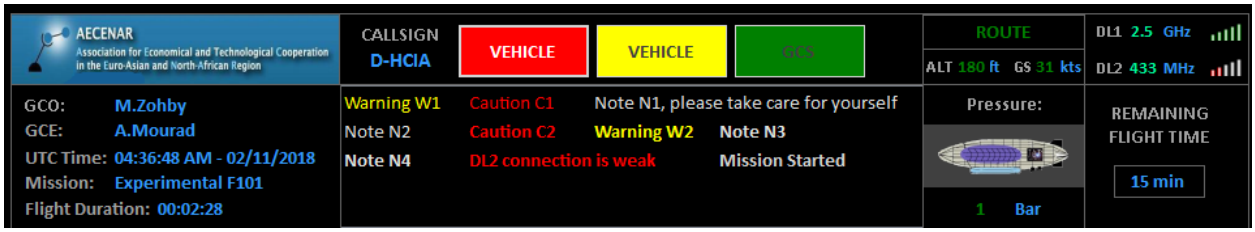


App structure consist of one main page, divided to 5 panels

- Headline Widget
- Main area
- Right navigation panel
- Left navigation panel
- Footer widget

Each panel contain the following:

1.1 Headline Widget contain:



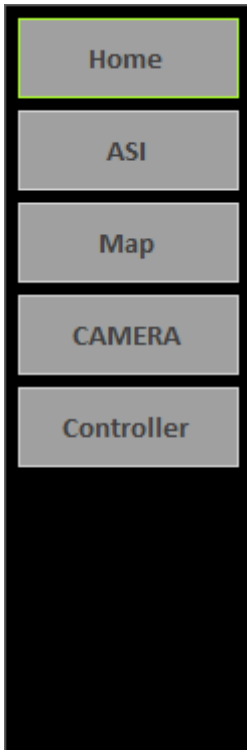
- LOGO
- General info
- Caution-Warning indicator
- Caution\Warning\Notes main list
  Caution shall be shown in Red, Warning shall be shown in Yellow, Notes shall be shown in White
- Route Altitude\Speed info
- Data Link 1&2 signal strength indicator
- Gas Pressure Info
- Remaining flight time Count down

Show the remaining Time of the lotto battery in Minutes than in Seconds, it shall be colored Red when it decrease to seconds

1.2 Main Area:

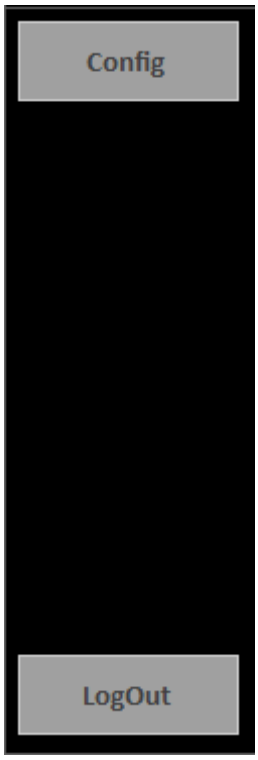
The area where the widget will be shown after selection and navigation from the Left and right navigation panels

1.3 Left navigation panel contain:



- Button to navigate to Home page
- Button to navigate to ASI widget
- Button to navigate to Map widget
- Button to navigate to Camera widget
- Button to navigate to Controller widget

1.4 Right navigation Panel Contain:



- Button to access the App configuration
- Button to Log-Out and close the App

1.5 Footer Widget Contain:

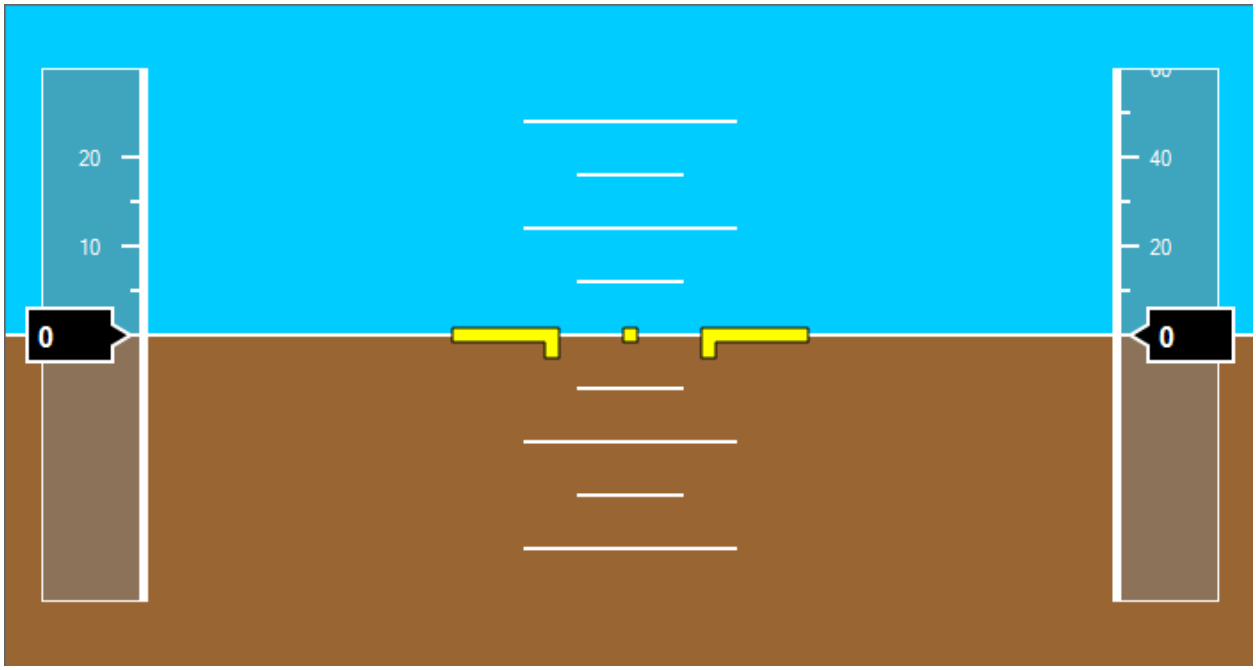
- 4 Quick access knobs to access important entrance
  Knobs can be enabled or disabled from app configuration
- App sign and version

2 Widget:

2.1 Home Widget:

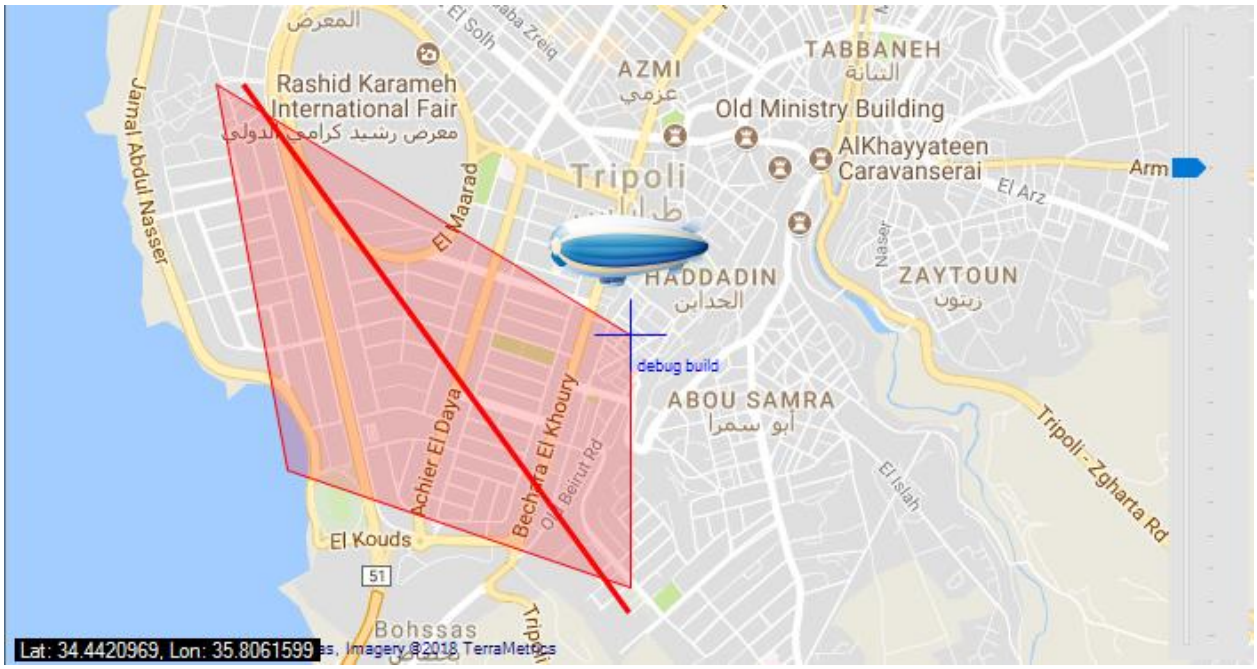
Show the general info and states of the vehicle, and the flight mission

2.2 ASI Widget:



Show the Altitude and the speed of the lotto, with the orientation.

2.3 Map Widget:

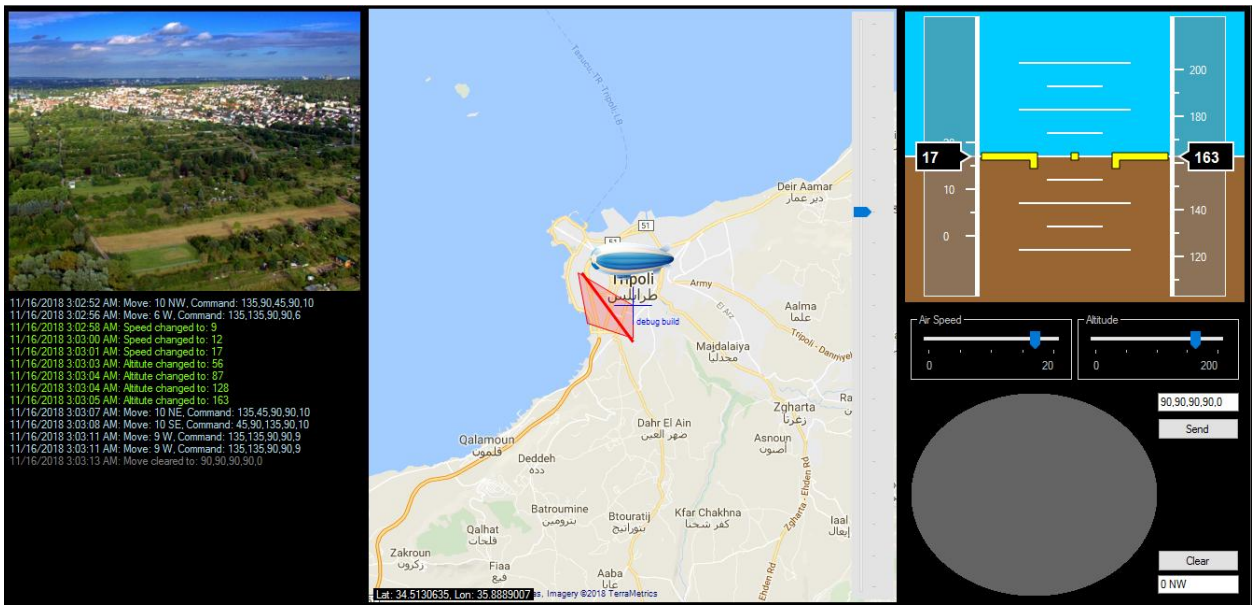


Map Widget is a GMap controller to show map with the lotto on it with the route and zone it should be pass, the route and zone set from the Route Configuration page

2.4 Camera Widget:

Show view of the lotto camera

2.5 Controller Widget:



Contain the three monitoring widget with the controller of the lotto to fully access, log file of each flight mission will be saved as a txt file in “My Documents\AvionicsMissions”

3 Configuration Page:

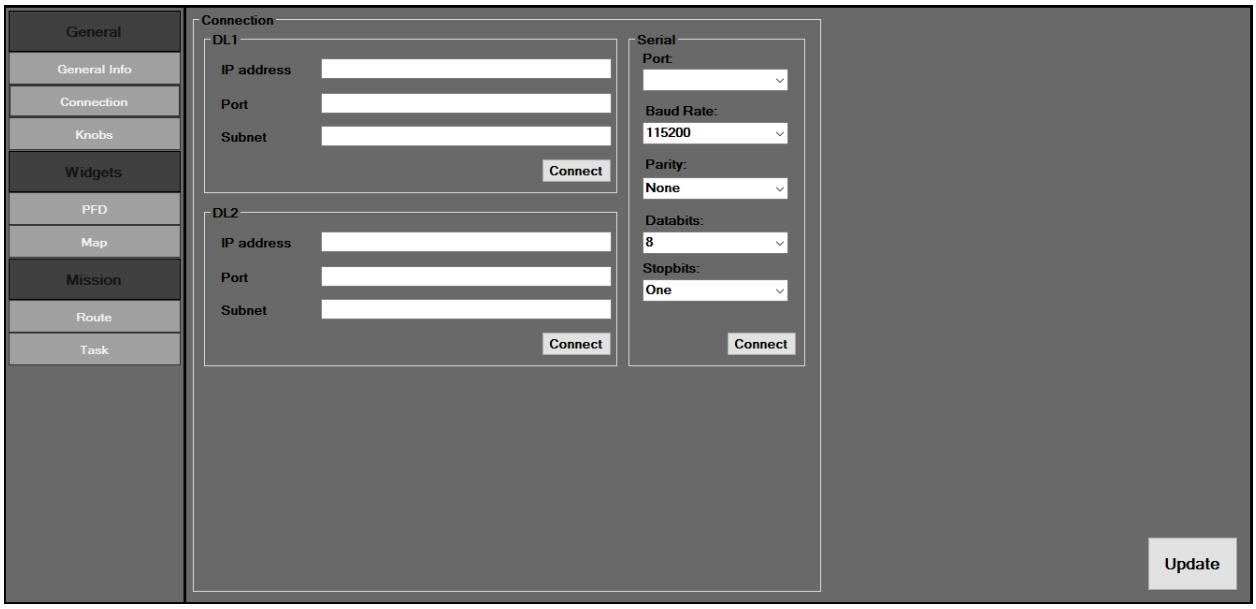
Configuration page divided to tabs as follows:

- General
  - General Info
  - Connection
  - Knobs
- Widgets
  - PFD (ASI)
  - Map
- Mission
  - Route
  - Task

3.1 General Info Configuration:

Press Update to save the update or it will be ignored

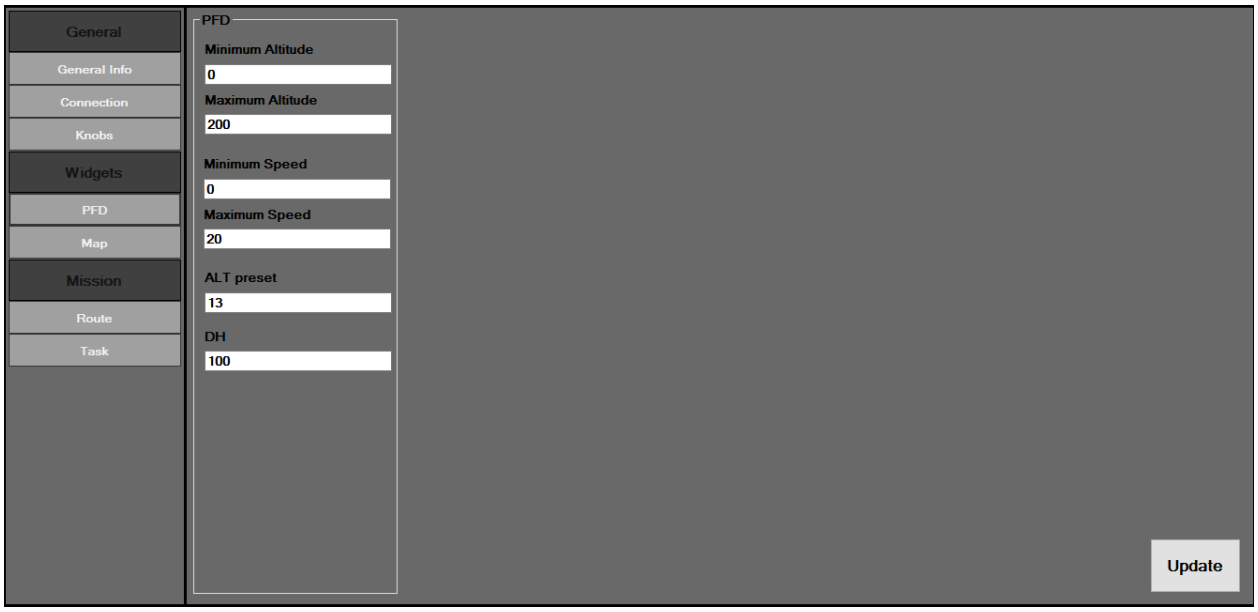
3.2 Connection Configuration:



3.3 Knobs Configuration:

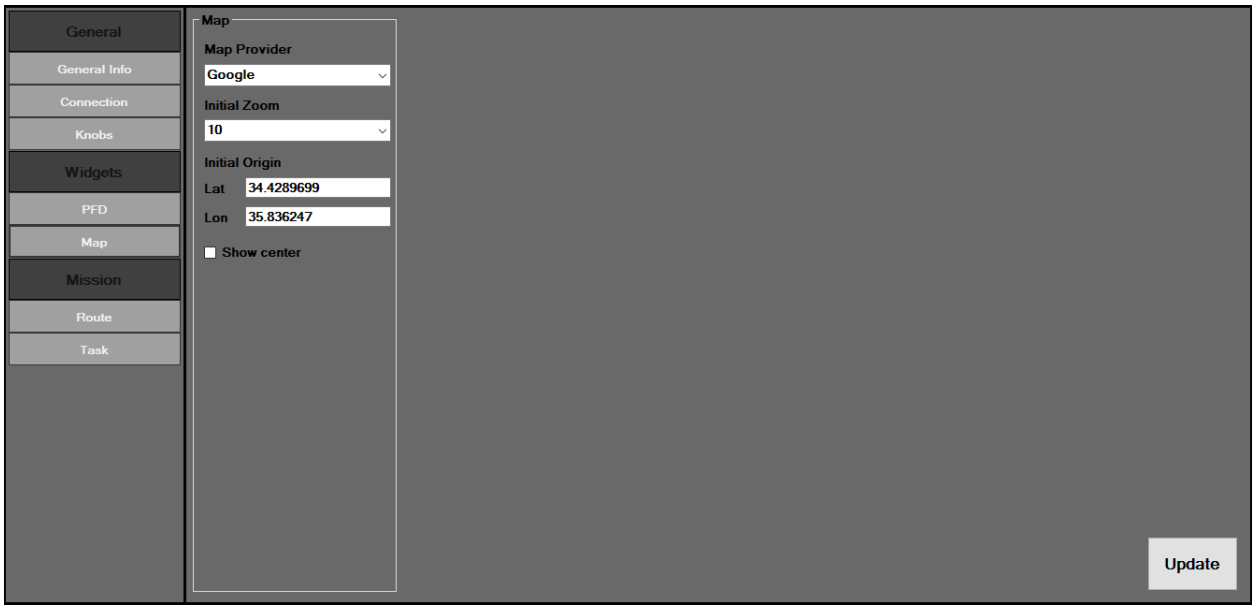
None disable the knobs

3.4 PFD Configuration:



This values will be configure the PFD view of the ASI widget

3.5 Map Configuration:



Map Widget view can be configure from here, map provider can be google or bing, knowing that the bing map is faster, while the google contain more info. Map is work online and offline if it already loaded before to the cache.

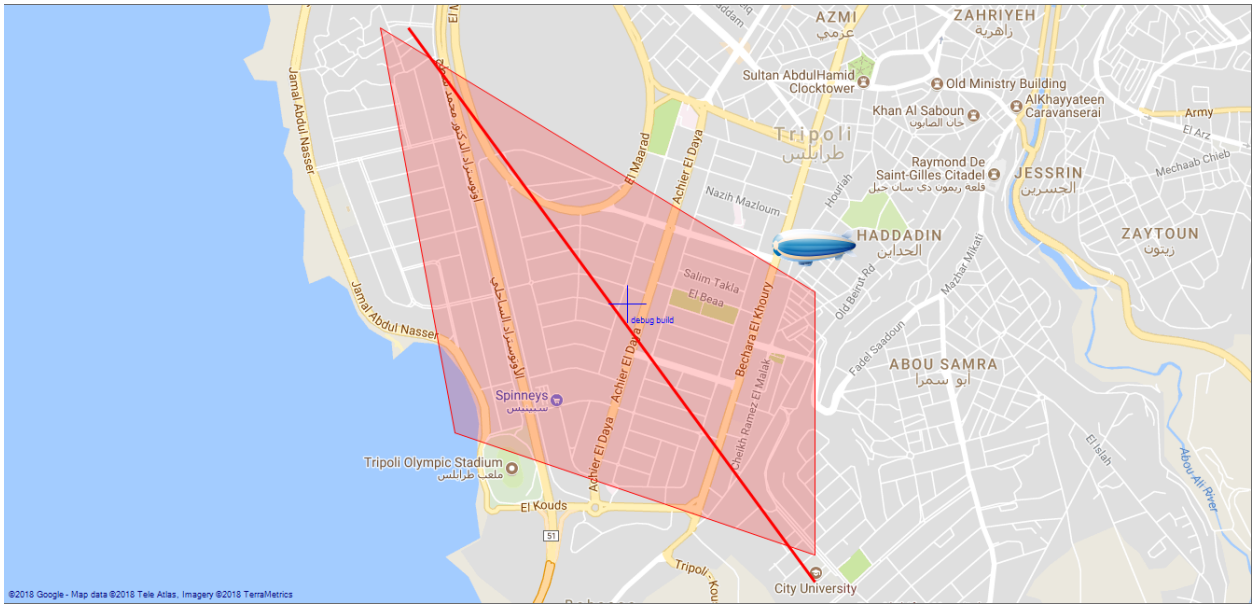
3.6 Route Configuration:

Zone: is the safe zone of the flight mission, a caution will be pop-up when the lotto get out from its safe zone, zone shall be shown as a red zone on the map.

Route: Is the route which the lotto should trace, a warning it will be pop-up in each time the lotto go away from the route, Route shall be shown as a red trace on the map

Each point in the zone or route list shall be consist of a Lat. and Long. separate by coma ',' and each line while represent a point.

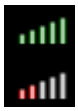
Map with Zone and route routed:



3.7 Task Configuration:

4 Controllers

4.1 Signal Strength



Use levels and colors to indicate signal strength, color and level will be change as follows:

- Till 10%: one Light Gray level
- Till 30%: 2 Red levels
- Till 40%: 3 Red levels
- Till 50%: 3 Yellow levels
- Till 70%: 4 Yellow levels
- Then, 5 Green levels

4.2 Knobs controller

Using this controller, user can quick access the field of the knobs without leaving widgets, each controller contain an up and a down arrow to increase and decrease value of the knobs.

5 User Control Code Summary:

5.1 Configuration:

LoadSettings	Load all settings from AppConfig to the user control fields
btn_Menu_Click	Callback for the Configuration menu tab choosing
btn_Connect_Serial_Click	Prepare the parameters for the connect to serial function
serialport_connect	Make a connection to a serial port
btn_Update_Click	Update the settings from the user control fields to the AppConfig
Sport	Public static element of the serial port

5.2 Controller:

Controller_Load	Load Controller widget settings from the AppConfig
btn_Send_Click	Send Command via serial port
trackAltitudeValue_Scroll	Callback to change the altitude value
trackAirSpeedValue_Scroll	Callback to change the speed value
UpdateAltitudeGaugeParams	Update the PFD view
MouseStick_MouseStickMoved	Callback on move to set the move speed and direction
MouseStick_MouseDoubleClick	Callback on double click to specify the move and set command
InsertLogLine	Function to write log line on log display and file
ParseMoveInfo	Parse move info to move command
trackAirSpeedValue_MouseUp	Callback on Mouse up to write log for the new speed value
trackAltitudeValue_MouseUp	Callback on Mouse up to write log for the new altitude
btn_Clear_Click	Callback to clear move command

5.3 FooterWidget:

FooterWidget_Load	Call UpdateKnobs function to load Footer knobs
UpdateKnobs	Load Knobs into footer
pb_Down_Click	Move one step down from the knobs value
pb_Up_Click	Move one step up to the knobs value

5.4 HeadlineWidget:

HeadlineWidget_Load	Load Headline info and settings, and start the clock and stopwatch timer
LoadGeneralInfo	Load General info from the AppConfig to the Headline widget
AddWarningCautionNote	Public function used to add warning\Caution\Note to the list
AnimateItem	Used to animate the new item add to the list
The headline widget use the SignalStrength control from the Libraries folder to indicate the Datalink signel strength	

5.5 HomeWidget:

LoadGeneralInfo	Load general info to the home screen

5.6 MapWidget:

LoadMap	Load widget map under the settings set in the AppConfig
trackBar1_Scroll	Callback to change map zoom on track bar scroll
Addmarker	Add the Airship icon to the map
gmap_OnMarkerClick	Event called when the airship marker click
AddPolygon	Add the Zone polygon set in the AppConfig
gmap_OnPolygonClick	Event called when the zone polygon click
AddRoute	Add the route of the flight set in the AppConfig mission to the map
gmap_MouseMove	Callback on mouse move to display the coordinate on the mouse point
GetMouseCoordinate	Public function return the mouse coordinate

5.7 PFDWidget:

InitializeGauges	Initialize the gauges of the PFD widget, and set the callback of the sport receiver
sport_DataReceived	Callback of the sport receiver
SetValue	Update PFD values under the data received from the sport receiver

SetText	Update the value of the PFD info label
Redraw	Redraw the user control
GraphicUserControl_Resize	Callback to redraw the PFD widget when the user control resized
GraphicUserControl_Paint	Callback to paint the Widget
The PFD Widget use the classes and interfaces and controllers in the Libraries\PFDLib folder	

5.8 MainMenu:

MainWindow_Load	Callback on page load to load the home widget
ResetButtons	Function to reset buttons selection and update headline content
btn_Home_Click	Callback on Home button click to load Home Widget
btn_ASI_Click	Callback on ASI button click to load PFD Widget
btn_Map_Click	Callback on Map button click to load Map Widget
btn_Camera_Click	Callback on Camera button click to load Camera Widget
btn_Controller_Click	Callback on Controller button click to load Controller Widget
btn_Config_Click	Callback on Config button click to load Config Widget
btn_LogOut_Click	Callback on logout button click to logout and close the app

5.9 AppConfig:

Setting	Type	Description	Default Value
GCO	String		
GCE	String		
Mission	String		
MinAlt	Int	Minimum value of the altitude roller	0
MaxAlt	Int	Maximum value of the altitude roller	200
MinSpeed	Int	Minimum value of the speed roller	0
MaxSpeed	Int	Maximum value of the speed roller	20
Knob1	String	Parameter of the footer quick access knob 1 (choose from: ALT Preset, DH Preset, GS, none)	ALT Preset
Knob2	String	Parameter of the footer quick access knob 2 (choose from: ALT Preset, DH Preset, GS, none)	DH preset
Knob3	String	Parameter of the footer quick access knob 3 (choose from: ALT Preset, DH Preset, GS, none)	GS
Knob4	String	Parameter of the footer quick access knob 4 (choose from: ALT Preset, DH Preset, GS, none)	None
AltPreset	Int	The altitude preset value	13
DHPreset	Int	The DH preset value	100
GS	Int	The ground speed value	125
MapProvider	String	The Map provider	Google
InitialMapZoom	Int	The initial map zoom value (choose value from 0 to 16)	10
OrigLat	String	The map origin initial latitude	34.4289699
OrigLon	String	The map origin Initial Longitude	35.836247
Zone	String	The safe zone of the flight mission	
Route	String	The route of the flight mission	
Task	String	The task of the mission	
ShowMapCenter	Bool	Add map center cross to the map or not	False
LogFilePath	String	Path of the log file on the local computer	

MissionStart	Bool	Mission is start or not	False

5.10 Libraries:

GMap library (DLL)	Used in Map widget
PrimayFligthDisplay (DLL)	Used with its PFDLib file contents as it is in the PFD widget
MouseStick1 (DLL)	Used on the mouse stick in the controller widget
SignalStrength (user Control)	Used on the Headline widget to show signal strength

6 References:

Setup zip file: