

## BatModel– Readme

1. Extract the winrar folder to your computer.
2. Open MATLAB®:



3. Set the path on MATLAB command window to ‘**BatModel**’ (the folder thee code files were extracted to):

```

MATLAB R2018b - academic use
HOME PLOTS APPS EDITOR PUSH VIEW
New Open Save Print Go To Comment Insert Run Section
C:\Users\YousifN\Documents\OneDrive\BatSimulation\All Directories 210918\Bat Simulation_xlife_050320\BatGUI1.m
Current Folder
Name
BatDATA_output
DATA
Experiments Code
BatModel
BatGUIL
AnalyzCrossInterference.m
AnalyzCrossInterferenceFromOnLine.m
AnalyzFlightStages.m
AnalyzStageLearning.m
BuildEnvironment.m
BuildFindEnvironment.m
BuildFindObstacles.m
BuildFindObstacle.m
BuildTargets.m
BuildTargets.m
BuildFlight1.m
BuildFlight2.m
BuildFlightForGul.m
BuildGul.m
BuildMove.m
BuildMoveDecision.m
BuildMove.m
BuildSonarDecision.m
BeamDirectivity.m
BuildEnvironment.m
BuildEnvironment.m
BuildInterferenceProgram.m
BuildInterferenceProgramFromOn...
BuildInterferenceProgramFromOn...
calc_fb_come_resp.m

```

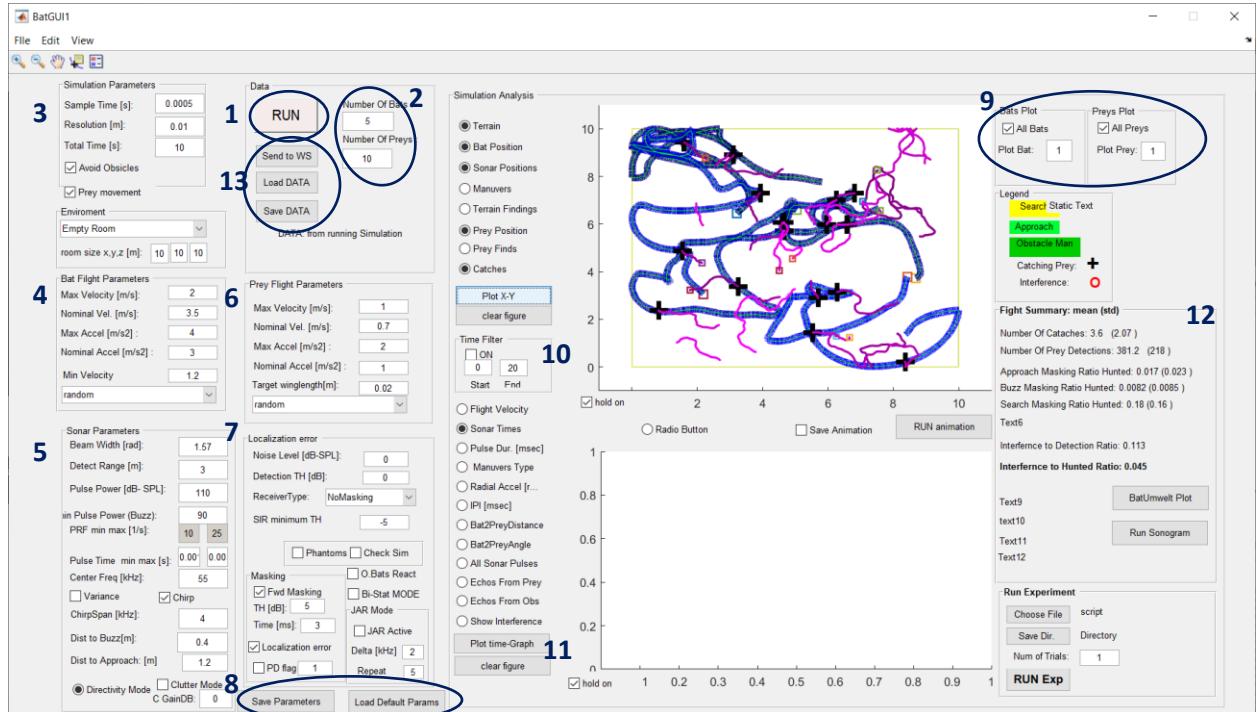
```

32 ~     gui_State = struct('gui_Name', ...
33 ~         'gui_Singleton', ...
34 ~         'gui_OpeningFcn', @BatGUIL_OpeningFcn, ...
35 ~         'gui_OutputFcn', @BatGUIL_OutputFcn, ...
36 ~         'gui_LayoutFcn', [], ...
37 ~         'gui_Callback', []);
38 ~
39 ~ if nargin <> ischar(varargin{1})
40 ~ end
41 ~
42 ~ if nargout
43 ~     [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
44 ~ else
45 ~     gui_mainfcn(gui_State, varargin{:});
46 ~ end
47 ~ % End initialization code - DO NOT EDIT
48 ~
49 ~ % --- Executes just before BatGUIL is made visible.
50 ~ function BatGUIL_OpeningFcn(hObject, ~, handles, varargin)
51 ~ % hObject handle to figure
52 ~ % varargin function handles and other args, see OutputFcn.
53 ~ % handles handle to figure
54 ~ % eventdata reserved - to be defined in a future version of MATLAB
55 ~ % handles structure reserved - to be defined in a future version of MATLAB
56 ~ % varargin command line arguments to BatGUIL (see VARARGIN)

```

4. Type **BatGUI1** on the Command window.

This will open the Graphical User Interface that controls and executes the simulation:



5. Run the Simulation:

- 5.1. (2) Set how many bats and prey items participate the simulation.
- 5.2. (3-7) Change the parameters of the simulation.

5.3. **(8)** Load or save the parameters of the simulation.

**Important: Saving the parameters will change the default parameters.**

5.4. **(1)** Press 'Run' to execute the simulation.

6. Analyze the data:

6.1. **(9)** After executing the simulation, decide which bats and prey items to plot.

6.2. **(10)** Decide which parameter to plot in the x-y figure, and press 'Plot X-Y'.

6.3. **(11)** Decide which parameters to plot in the time graph, and press 'Plot time graph'. Use the hold on check button.

6.4. **(12)** Main statistics of the trial: mean values and standard deviations (in brackets).

7. Further Analysis:

7.1. **(13)** The output data of the simulation is stored at structure called '**BatDATA**'. Press 'send to WS' to send the output to the MATLAB work-space. It is possible to load and save the output data as files.

7.2. BatDATA consists of the following fields:

**BatDATA** = struct with fields:

**PREY**: [1×(number\_of\_prey\_items) struct]

**BAT**: [1×( number\_of\_bats) struct]

**AllParams**: [1×1 struct]

**FlightInterferenceSummary**: [1×1 struct]

**FilterBank**: [1×1 struct]

7.3. Main data to analyze:

7.3.1. **BatDATA.AllParams** – the parameters used in the simulation run (i.e. a flight)

7.3.2. **BatDATA.FlightInterferenceSummary** – main statistics regarding masking and jamming.

7.3.3. **BatDATA.BAT(x).InterReportStrctOnLine** – detailed data for each bat.

7.4. Main Functions and files:

7.4.1. **BatGUI1.m** – runs the Graphical User Interfaces

7.4.2. **BatFlightForGui.m** – The main function that executes the simulation and calls other functions to calculate all the required data.

7.4.3. ...\\DATA\\DefaultParameters.mat – a MATLAB file with the required parameters

7.4.4. ...\\BatDATA\_output\\BatData\_04-Mar-2020\_224159.mat – an example of an output struct after running the simulation

7.4.5. ...\\Experiments Code\\\*.m - some examples of code for running the model numerous times with different parameters.

Good Luck,

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