

# Overviews of the Python Script „MDopplerShift“ v.0.32

Wolfgang Kaufmann, 2019, on base of Thomson W.P. (1985). "Airborne Bistatic Radar Limitations and Sample Calculations". Air Force Institute of Technology, Ohio.

## Parameter Window (see next page)

MDopplerShift v0.32

### Dopplershift Simulation of a Bistatic Radar

This program uses the 3D cartesian coordinate system (x,y,z). It assumes the receiver is coincident with the coordinate origin (0,0,0). The transmitter is located on the x-axis in distance X to the receiver (X,0,0). The target can be anywhere in the space (x,y,z). Its bearing must be indicated as angle between its forward direction and the receiver>>transmitter direction. Its inclination must be specified towards the horizon.

Transmitter Distance [km]:	800
Transmitter Frequency [Hz]:	143050000
x - Start Position of the Target [km]:	400
y - Start Position of the Target, - = right side [km]:	25
z - Start Position of the Target [km]:	100
Velocity of the Target [km/s]:	10
Bearing of the Target, counterclockwise [°]:	270
Angle of Inclination of the Target, - = falling [°]:	0
Flight Time of the Target [s]:	10

----- Multiple Targets -----

Number of Targets in x-Direction:	1
Distance of the Targets in x-Direction [km]:	100
Number of Targets in y-Direction:	1
Distance of the Targets in y-Direction [km]:	50
Number of Targets with increasing Inclinations per Loc.:	3
Increase of the Angle of Inclination of the Targets [°]:	-30
Number of Targets with increasing Bearing per Loc.:	1
Increase of the Angle of Bearing of the Targets [°]:	30

----- Simulation Parameter -----

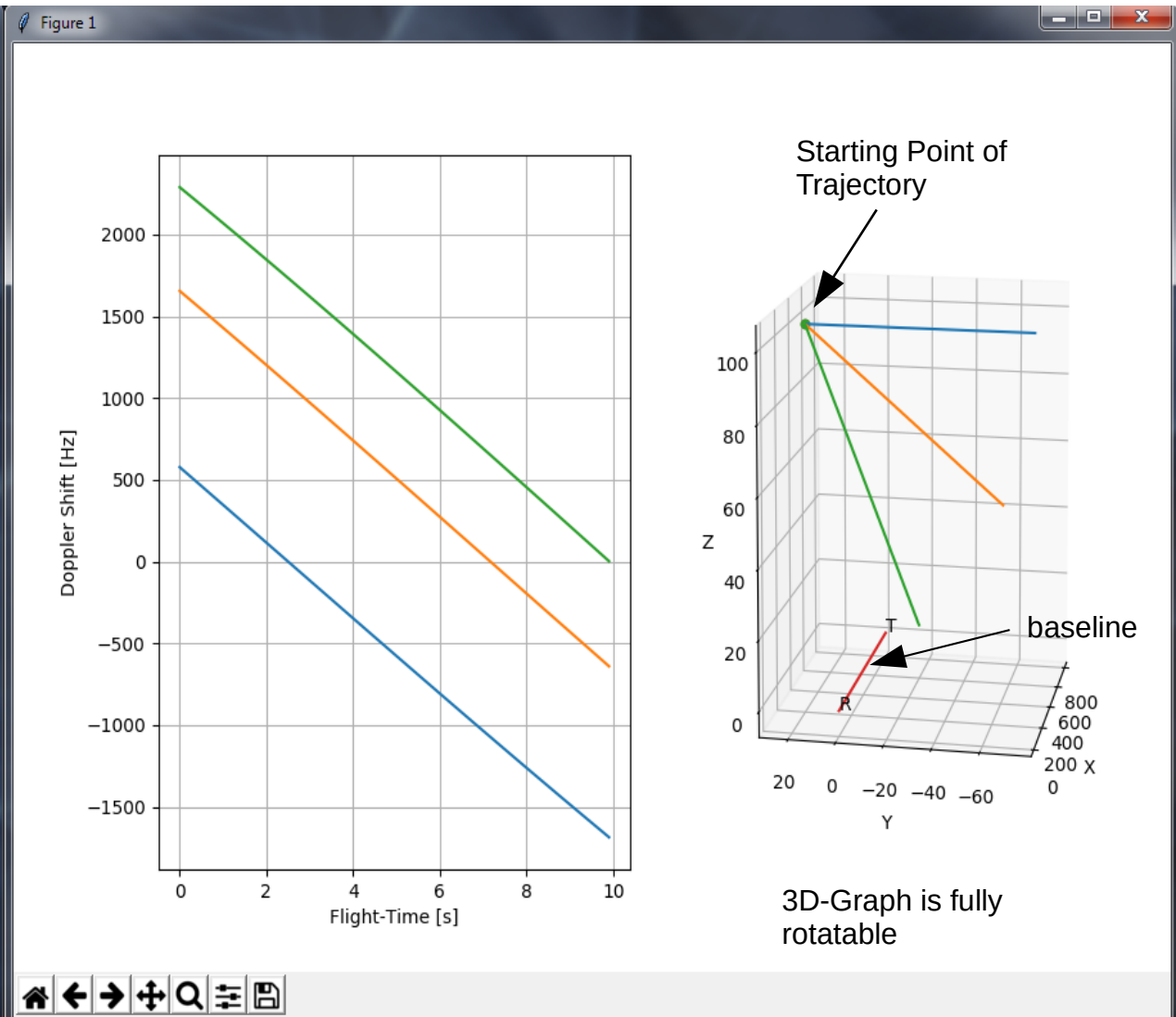
Lower Height Limit [km]:	0
Upper Doppler-Shift Limit [Hz]:	100000
Lower Doppler-Shift Limit [Hz]:	-100000

☐ Only Zero Crossing Doppler-Shifts

☐ Save Simulation

Run Simulation Quit

## Graphics-Window



MDopplerShift v0.32

### Dopplershift Simulation of a Bistatic Radar

This program uses the 3D cartesian coordinate system (x,y,z). It assumes the receiver is coincident with the coordinate origin (0,0,0). The transmitter is located on the x-axis in distance X to the receiver (X,0,0). The target can be anywhere in the space (x,y,z). Its bearing must be indicated as angle between its forward direction and the receiver>>transmitter direction. Its inclination must be specified towards the horizon.

Transmitter Distance [km]:	800
Transmitter Frequency [Hz]:	143050000
x - Start Position of the Target [km]:	400
y - Start Position of the Target, - = right side [km]:	0
z - Start Position of the Target [km]:	100
Velocity of the Target [km/s]:	10
Bearing of the Target, counterclockwise [°]:	0
Angle of Inclination of the Target, - = falling [°]:	0
Flight Time of the Target [s]:	10

----- Multiple Targets -----

Number of Targets in x-Direction:	1
Distance of the Targets in x-Direction [km]:	100
Number of Targets in y-Direction:	1
Distance of the Targets in y-Direction [km]:	50
Number of Targets with increasing Inclinations per Loc.:	1
Increase of the Angle of Inclination of the Targets [°]:	30
Number of Targets with increasing Bearing per Loc.:	1
Increase of the Angle of Bearing of the Targets [°]:	30

----- Simulation Parameter -----

Lower Height Limit [km]:	0
Upper Doppler-Shift Limit [Hz]:	100000
Lower Doppler-Shift Limit [Hz]:	-100000

☐ Only Zero Crossing Doppler-Shifts

☐ Save Simulation

How to use  
for a:

#### Single Target Simulation

Parameter  
to control  
the flight of  
a single  
target

#### Multiple Target Simulation

Start parameter of the  
first target

By entering integers > 1  
in the number fields the  
corresponding quantity  
of targets will be  
created with respect to  
the start parameter

General plot limitations

Save the calculated data of the simulation

Run the simulation and plot the result / Exit