Investigation of AFDS Conversion for Range Extension

Author: Evangelos Georgiou
ID: 1056661

Diploma Thesis 2021-2022

Supervisor:
Prof. Vaios Lappas

Laboratory of Technical Engineering and Oscillations

1. Introduction

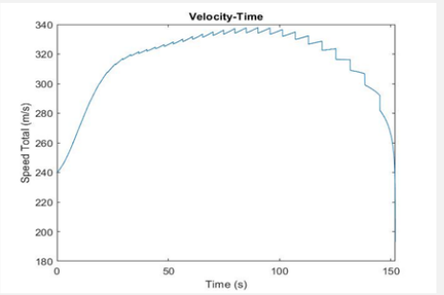
An Autonomous Free-flight Dispenser System is a bomblet carrier system that does not rely on a propulsion system but is rather released from an aircraft and is let to glide to its ground target where it dispenses its package. Most often guided by a global positioning system, inertial navigation system as well as infra-red seeker for the final targeting guidance, it is a fire and forget system that can operate in various and adverse conditions.
Since it has no propulsion, its range is determined by the altitude it is dropped from, its release velocity and it can shift and correct its course with small tail fins.

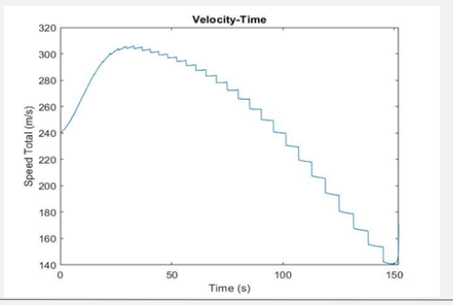
2. Methodology

i. Investigation of similar platforms and their propulsion
ii. Study of the fundamentals of Standoff System Trajectory
iii. Design Aspects and Modifications
iv. 3D Design plans

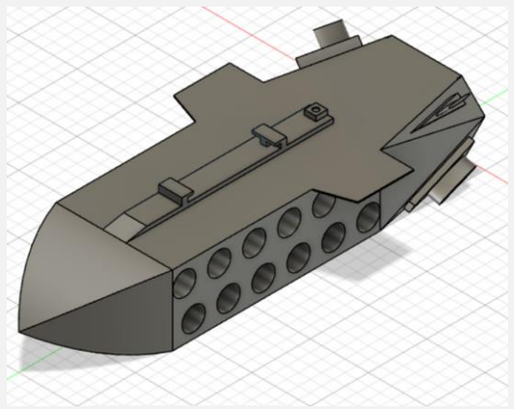
3. Results

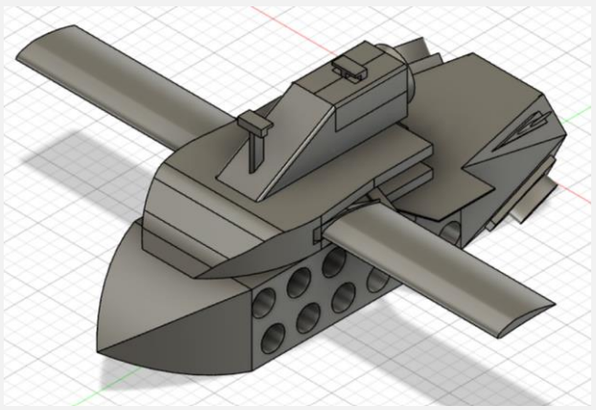
	MATLAB Model	
Wind	+	-
Time to Target(s)	152.056	152.055
X travelled(m)	44746.897	33409.156
Y travelled(m)	-15000	-15000
Z travelled(m)	5668.774	-5668.696
Maximum Velocity(m/s)	337	306



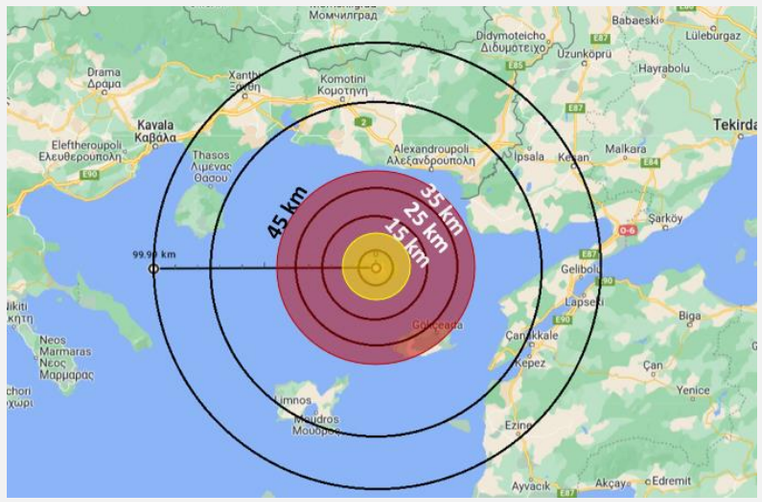


4. 3D Plans





5. Result Interpretation



Our new extended range of 45 km we can release our weapon outside the effective range of even medium range AA missiles and short air to air missiles.

6. Conclusion

The main objective of this dissertation that we were assigned to was investigate whether a range extension was possible to be achieved for an AFDS in active service with the Hellenic Airforce.

Through some preliminary research on closely related platforms and similar platforms that fall in the cruise missile category, we determined that this is indeed possible and in turn, created models that followed all the different forces exerted on a flying object.

Based on our models we investigated the different possible combinations between the introduction of a foldable wings module and the installation of a propulsion system to reach the conclusion that a hybrid system combining the two would be ideal.