

To cite this article: Yeuncheol Jeong (2024). THE OPERATION DESERT STORM AND THE PATRIOT MISSILE DEFENSE SYSTEM [5]-SUMMARY, International Journal of Applied Science and Engineering Review (IJASER) 5 (3): 27-29
Article No. 196 Sub Id 294

THE OPERATION DESERT STORM AND THE PATRIOT MISSILE DEFENSE SYSTEM [5] -SUMMARY

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DOI: <https://doi.org/10.52267/IJASER.2024.5306>

ABSTRACT

Postol claimed that the Patriot could not effectively handle the incoming Scud at its short range of defense. Some criteria suggested by the Patriot's side on its success were not easy to establish. Eventually, the Patriot system was claimed to have some political success, limiting Israel's actions to directly counter-attack Iraq. Therefore, the Patriot system had some political success regardless of its military effectiveness against the Scud.

KEYWORDS: projectile, trajectory, air friction; non-linear effects, butterfly effects, Patriot, Scud, ballistic missiles, multi-warheads, operation desert storm

INTRODUCTION

Although a college physics text book describes a motion of an object under gravitation as a parabolic motion, an actual motion of an object is far from the parabolic one. Nonetheless, people simply believe in the text book description because they never fully understand the trajectories of a moving object under air frictions.

Understanding the actual trajectory of a moving object is far beyond the realm of any engineering simulation projects which barely sketch the effects of air frictions. A high speed moving objects in the air generates a lower air pressure behind, dragging the object and creating quasi vacuum behind. Then, it starts to rotate in a circle or a spiral pattern perpendicular to its motion, vibrating and swing sideways. On top of these, some additional non-linear "butterfly effects" will further complicate its actual trajectory (Shapiro, 1961). Even the best computers in the world may not be able to simulate a realistic trajectory.

The Scud and the Patriot Missiles

After the operation desert storm in which the US led allied forces invaded Iraq occupied Kuwait in January, 1991, Iraq launched Scud missiles toward Saudi Arabia and Israel. However, the US already provided the Patriot missile defense system to them to counteract the missile threat. Then, the Patriot system was announced to be 100% successful by its manufacturer, Raytheon, raising no question about its effectiveness against the Scud. However, Theodore Postol at MIT questioned its effectiveness, suggesting that no single Scud missile was ever effectively counter measured by the Patriot. He claimed that the Patriot is not fully equipped to handle all those non-linear butterfly effects of the incoming Scud under air frictions. On top of these, the Scud starts to break into pieces, showing some effects of multi-warheads once it re-enters the atmosphere. In other words, the Scud's breaking pieces show some features of advanced modern ballistic missiles. According to Professor Postol, the Patriot cannot possibly handle these features of the Scud at its short range of defense.

This eventually led to the US congressional hearing between Professor Theodore Postol and Mr. Robert Stein, manager at Raytheon. In April, 1992, they had a public discussion on the effectiveness of the Patriot system. They debated on what is the criteria on success of the Patriot. The Raytheon's criteria included 1." duded": the Scud reached the ground with no explosion. 2." damaged": the Scud's strength has been reduced. 3." diverted: the Scud was led to the region of no people. 4." intercepted": the approaching Patriot exploded itself as planned, However, all of them are not very clear on the Patriot's success. In fact, what is considered to be the success of the Patriot is not easy to establish even from Raytheon's own point of view, raising further questions on the Patriot's fundamental effectiveness. Eventually, Raytheon tried to suggest some possibility of political success. Due to the Patriot, Israel did not counter-attack Iraq. Because of this, Saudi Arabia could remain with the allied forces. From Saudi Arabia's point of view, Iraqi was still an Islamic neighbor. In this respect, the Patriot made the allied forces to remain together throughout the operation desert storm. Also, the public morale was boosted while the sale of the Patriot system became even higher. Consequently, the US could sustain her policy of the middle east. Therefore, the Patriot system had some political success regardless of its military effectiveness (Collins, 2012).

CONCLUSION

The actual trajectory of an object with high speed shows various non-linear effects. Professor Postol claimed that the Iraqi Scud missile behave unexpectedly in the air due to air frictions, and the Patriot could not effectively handle the incoming Scud at its short range of defense. Some criteria suggested by the Patriot's side on its success turned out to be not easy to establish. Eventually, the Patriot system was claimed to have some political success, limiting Israel's actions to directly counter-attack Iraq. Thus, the US could keep the allied forces, sustaining her policy in the middle east. Therefore, the Patriot system had some political success regardless of its military effectiveness.

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