Team 3 Patent Search

#	Patent#	Holder	Title	Summary
1	CN102384702 A	北京理工大学	Method for intercepting aircrafts without collateral damage in unmanned way.	Uses curtain to capture the projectile. Describes method of lining up an aircraft carrier and the UAV.
2	US7328644 B2	Samuel C. Vickroy	System and method for intercepting a projectile.	Deployment of containment blanket.
3	US9085362 B1	Lockheed Martin Corporation	Counter-unmanned aerial vehicle system and method.	Deployable net to capture and disable a UAV.
4	WO2015127178 A1	Lockheed Martin Corporation	Payload launcher and autonomous underwater vehicle.	Having to do with the launching of fragile UAVs.
5	US 9039547 B2	Michael Yeager	Personal sports simulation robot	This sports simulation robot contains an autonomous reload system
6	US 5583311 A	Daimler-Benz Aerospace Ag	Intercept device for flying objects	An interception device for flying objects that acts as a net to reduce the velocity of the flying object. Uses activatable parachutes at the end of the net to act as resistance bodies.
7	US 6626077 B1	Mark David Gilbert	Intercept vehicle for airborne nuclear, chemical and biological weapons of mass destruction	This is the same as #6, but uses contractible sections of the net, acting as a drawstring, causing the net to close around the flying object upon impact.
8	US 4433608 A	Westinghouse Electric Corp.	Electromagnetic projectile launcher with an augmented breech	An electromagnetic launcher using conductive rails, a sliding conductive armature (or projectile), and means for commutating a large direct current into the rails and through the armature. Current flow transfers force onto the armature, propelling it outward.
9	US 5357841 A	The Secretary Of State For Defence In Her Britannic Majesty's Government Of The United Kingdom Of Great Britain And Northern Ireland	Recoilless projectile launcher	A projectile launcher which exhibits no recoil whatsoever.
10	US 7946207 B1	Raytheon Company	Methods and apparatus for countering a projectile	A three part system: detection system, tracking system, and countering system, in that order.
11	US 8173946 B1	Raytheon Company	Method of intercepting	A method of intercepting an

			incoming projectile	incoming missile via an interception missile. Utilizes the motors of the interceptor missile to alter course of the missile.
12	US 8718921 B2	Mbda France	Method and system for avoiding an intercepting vehicle by an airborne moving body	Describes a method in which an interception device can be avoided. Takes into account the velocity and trajectory and autonomously avoids the interception device.
13	US 20100181424 A1	Honeywell International Inc.	Catch and snare system for an unmanned aerial vehicle	The current invention provides a catch and snare system for an unmanned aerial vehicle (Goes in depth about how to bring the object down to the ground etc).
14	US 20120211595 A1	Johnson Michael R, Hall Garrett L	Weapon interceptor projectile with deployable frame and net	A weapon interceptor projectile with a deployable frame for maintaining the shape of the net.
15	US 5467682 A	Hughes Missile Systems Company	Action calibration for firing upon a fast target	Having to do with the proper aiming process to shoot a fast moving target. First a spotting shot is fired in order to get extra data on the object, then a shot is made to intercept the object. Multiple spotting shots can be fired in order to reduce the possibility for error when firing the interception shot.
16	US 7264204 B1	The United States Of America As Represented By The Secretary Of The Navy	Unmanned aerial vehicle catcher	System for catching an aerial vehicle using a land based vehicle. Using a special tow mechanism the aerial vehicle is caught and lowered down. This uses a winch to hook onto the UAV.
17	US 20120210851 A1	Richard Glasson	System and Method for Rapid Aiming and Firing of Defensive Countermeasures	System for rapid firing of weapons. The concept is that a semicircle of launcher extensions which allows for multiple angle prevention, which means less aiming time.
18	US 5452640 A	Fmc Corporation	Multipurpose launcher and controls	A modular structure and control system allow for launch of different types of projectiles.
19	US 7895931 B2	Lockheed Martin Corporation	Electromagnetic countermeasure launcher	the system uses an electromagnetic catapult to throw a countermeasure payload, wherein the azimuth, elevation, and propulsive force of the electromagnetic catapult are

				controllable.
20	US H357 H	The United States Of America As Represented By The Secretary Of The Army	Electromagnetic projectile launchers	Essentially a rail gun patent. The foundation of patent #8

Categorization

Net Projectile:

- Uses curtain to capture the projectile. Describes method of lining up an aircraft carrier and the UAV. **1**
- Deployment of containment blanket.**2**
- Deployable net to capture and disable a UAV. **3**
- An interception device for flying objects that acts as a net to reduce the velocity of the flying object. Uses activatable parachutes at the end of the net to act as resistance bodies. **6**
- Same as above, but uses contractible sections of the net, acting as a drawstring, causing the net to close around the flying object upon impact. **7**
- The current invention provides a catch and snare system for an unmanned aerial vehicle (Goes in depth about how to bring the object down to the ground etc). 13
- A weapon interceptor projectile has a deployable frame for maintaining the shape of the net. **14**

Launcher Systems:

- Having to do with the launching of fragile UAVs.**4**
- This sports simulation robot contains an autonomous reload system **5**
- A projectile launcher which exhibits no recoil whatsoever.**9**
- System for catching an aerial vehicle using a land based vehicle. Using a special tow mechanism the aerial vehicle is caught and lowered down. This uses a winch to hook onto the UAV. **16**
- A modular structure and control system allow for launch of different types of projectiles.**18**

Electromagnetic Launchers:

- Essentially a rail gun patent. The foundation of patent #8 **20**
- An electromagnetic launcher using conductive rails, a sliding conductive armature (or projectile), and means for commutating a large direct current into the rails and through the armature. Current flow transfers force onto the armature, propelling it outward. **8**
- the system uses an electromagnetic catapult to throw a countermeasure payload, wherein the azimuth, elevation, and propulsive force of the electromagnetic catapult are controllable. **19**

Takedown Methods:

- A three part system: detection system, tracking system, and countering system, in that order. **10**
- A method of intercepting an incoming missile via an interception missile. Utilizes the motors of the interceptor missile to alter course of the missile.**11**
- Describes a method in which an interception device can be avoided. Takes into account the velocity and trajectory and autonomously avoids the interception device.**12**
- Having to do with the proper aiming process to shoot a fast moving target. First a spotting shot is fired in order to get extra data on the object, then a shot is made to intercept the object. Multiple spotting shots can be fired in order to reduce the possibility for error when firing the interception shot. **15**
- System for rapid firing of weapons. The concept is that a semicircle of launcher extensions which allows for multiple angle prevention, which means less aiming time. **17**

Possible Areas for Innovation:

- Based on our patent search, it seems clear to us that the area for innovation is essentially a full, multipurpose, automated system. A perfect system would be able to detect a drone from great range, identify its model (size/shape), track it, and perform preventative measures; this system would also be able to determine which projectile or

launcher method would best suit the current conditions (weather, the type of drone, etc.) and then have no problem taking out the drone.