

## Implosion Fabrication Memo

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### Press Release

Amazon introduces Nanobots adopting shrinking technology for a greater good of the Society

April 11, 2019 at 11:00 AM EST

*With the raising concerns on environment conservation, Amazon has introduced a Nanobots that will adopt implosion fabrication to address the problem of oceanic waste*

SEATTLE--(BUSINESS WIRE) --May 6, 2019-- Today, Amazon (NASDAQ:AMZN), announced the launch of Nanobots using the technology invented by Massachusetts Institute of Technology, where in they shrink the object to nanoscale where it's almost invisible to the naked eye. Simple structure can be reduced to 1000th of its original size. Amazon proposes to use this miniaturizing technology called "implosion fabrication" to create nanobots that will be used to clear the toxic waste that pollutes the oceans.

An estimate of eight million metric tons (more than 17.6 billion pounds) of plastic enters the ocean from land every year. Waste Management Systems haven't really kept up with the growing economies. Lot of the land waste is often dump into the oceans. This not only destroys the Flora and Fauna of the ocean, but it also spreads diseases among human life near by the Ocean. Marine debris decreases the economic value and productivity of coastal regions, particularly in the tourism, recreation, and seafood industries, and creates additional costs. In the United States, 85% of tourism revenue comes from coastal ocean states.

This is wherein our implosion fabrication nanobots come in the picture. With the Technology invent by the MIT, our nanobots can enter the Ocean and detect waste, toxic materials and destroy the garbage without harming the ocean. These Nanobots will explore to the deepest parts of the Ocean and can target huge 3D Object as big as a ship. This Technology is developed by simple lab equipment's like Laser and absorbent gel. These tiny but still powerful Bots will help to solve this grave problem and enable us to have cleaner and beautiful Oceans.

"There are all kinds of things you can do with this technology, democratizing nanofabrication could open up frontiers we can't yet imagine." Said Edward Boyden, the Y. Eva Tan Professor in Neurotechnology and an associate professor of biological engineering and of brain and cognitive sciences at MIT. With this amazon came up with a small solution to big problems.

Although these nanobots are available to government authorized organizations that fight to save and preserve oceans, interested organizations or NGO's can get themselves approved for the use of this technology to contribute to the same reason. They can get started by signing into [www.amazon.com](http://www.amazon.com)

"Nanobots using implosion technology has helped many organizations contribute to the goal of sustaining the oceans which made a huge impact worldwide." said Andrew R. Wheller, Administrator of EPA (Environmental Protection Agency)

These nanobots are now in use by authorized organizations but will soon be available for NGOS, educational committees who work towards the same goal.

### **About Massachusetts Institute of Technology**

The Massachusetts Institute of Technology (MIT) is a private research university in Cambridge, Massachusetts. Founded in 1861, the soul of MIT is research. For more than 150 years, the Institute has married teaching with engineering and scientific studies—and produced an unending stream of advancements. Research flourishes in our 30 departments across five schools, as well as in dozens of centers, labs, and programs that convene experts across disciplines to explore new intellectual frontiers and attack important societal problems. Research at MIT aims to develop innovative solutions to the world's most daunting challenges. From addressing the energy needs of tomorrow to improving cancer therapies, MIT's research efforts are enhanced through creative collaborations with leading research institutes and consortia around the world.

For more information visit [www.mit.edu](http://www.mit.edu)

### **About Amazon**

Amazon is guided by four principles: customer obsession rather than competitor focus, passion for invention, commitment to operational excellence, and long-term thinking. Customer reviews, 1-Click shopping, personalized recommendations, Prime, Fulfillment by Amazon, AWS, Kindle Direct Publishing, Kindle, Fire tablets, Fire TV, Amazon Echo, and Alexa are some of the products and services pioneered by Amazon. For more information, visit [amazon.com/about](http://amazon.com/about) and follow @AmazonNews.

## **FAQ**

### **What is Implosion fabrication?**

Implosion Fabrication is a miniaturizing technology that could be applied to anything to shrink 3D objects to nanoscale. It can be from developing smaller microscope and cell phone lenses to nanobots. This is invented by MIT, by simply using existing lab Equipment like Laser and absorbent gel.

### **How will the Nanobots operate?**

Nanobots are created by using Implosion fabrication which are programmed in a manner that they target non-degradable waste under water and break them down into degradable components.

### **Is it safe for the Ocean Flora and Fauna?**

Yes definitely, the nanobots will be programmed in such a way that they will only target toxic wastes. The flora and fauna won't be harmed. Nanobots will be programmed in the way where they will target plastics, wood, metals and any other toxic chemicals.

**Will these Nanobots be at the surface or in the depths of the ocean?**

These bots will be sited at the bottom of the ocean where majority of the waste accumulates from sources like Industries, Ships, Constructions etc.

**Will it be safe to swim or surf in the Ocean if the Nanobots are activated?**

Yes, it will be safe to use the Ocean even when the nanobots are activated. As their major activity will be at the bottom to clear the debris and waste materials. One can easily use the Ocean to swim and surf.

**Will there be any side effect of these nanobots?**

Yes, if the nanobots are hacked there will be malfunction which might end up affecting the biota under water

**Will this technology affect the quality of water?**

No, this will not affect or hamper the quality of water. Our natural resource will not be damaged we will have pure and cleaner oceans.

**Can this technology be used for clearing land waste as well?**

As of now this product focuses solely on helping clear the waste in the ocean. However, with positive results we will definitely look into expanding the product to help clear land waste.

**Can we buy these nanobots to clean fish tanks?**

No, this is not available to common man since this product specifically targets dump of waste and not small particles which can be cleaned by easily available machines on amazon

**What advantage does nanobot give over regular-size bot?**

Being such a tiny sized bot, it can access small crevices without interrupting marine life. They can reach the depths of the oceans to clear the waste

## **Appendix**

**Key Assumptions**

Nanobots can be called back by magnetic interference for maintenance and reusability

They are programmed to only target non-degradable waste

This product is only available for government authorized organizations

**Customer Segment**

We have devised a product that will help us conserve our environment and help preserve the oceanic life. Our initial customer are organizations with government grant to preserve oceans like Ocean conservancy, Oceana, Natural Conservancy, Natural resource defense council. Every organization will sign a contract to ensure the right use of the nanobots. There will be oceanographers that will test the technology and approve of the product.

In future, beach authorities NGOs who are closely working on energy conservation and clean resource promotion, Educational institutions who focuses on Marine sciences will be our

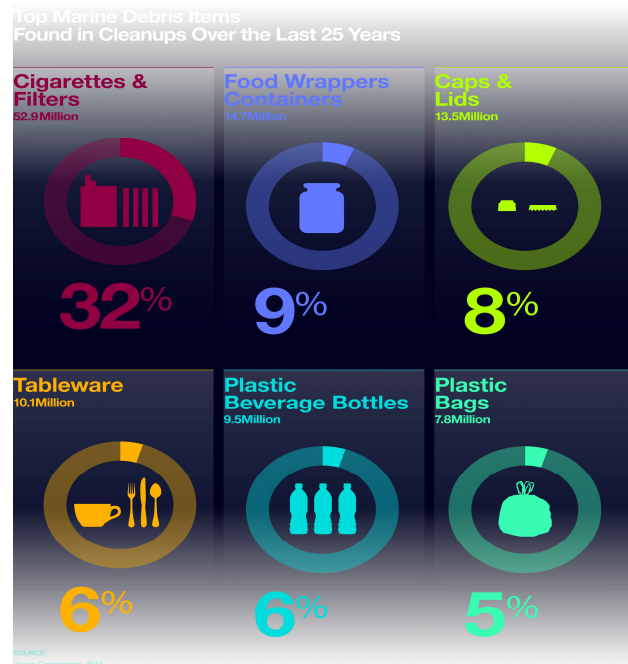
potential customers. Pitching the idea to these high-level authorities and then promoting them to utilize the product will be challenging but once they see the benefits, it will enable us to expand the target and try focusing locally.

Long term customers would also include industries which want to opt eco-friendly waste management practices.

### Unmet Needs

As the community is becoming aware of the increasing danger organizing ocean clean-ups, Local volunteers walk beaches to collect trash, SCUBA divers collect debris from the ocean floor, and volunteers in boats collect floating debris, yielding staggering amounts of trash, there is still toxic waste in the deeper areas hence molecular scale robots will help take care of this issue

With the ever-growing concern over environmental issues, waste management has become one of the key highlights where in there is a need to find a way to efficiently dispose of the waste without causing any side effects. Pollution in the oceans are increasing at an alarming rate, where there is a severe need to address this issue. As shown in the image these different pollutants affect the marine life and cause problem to the population residing nearby. With the Nanobots using the new technology it will reduce the magnitude of the pollutants in the ocean without affecting the marine life.



### Pricing

Developing implosion technology is by using simple lab equipment's however the cost increases once nanobots are created and deployed. Operational cost is a major factor of increase cost Our major focus lies on cleaning the ocean hence we need to create batch of nanobots a minimum of 1000 nanobots per batch

To start with one major big-time investment is base photon Microscope which is- 125000\$  
Microscope equipped with laser costs approximate- 225000\$

Polyacrylate- 1 pound is 7.35\$ (Amazon)-used in the lab for implosion fabrication

Solution of fluorescein 100 grams is 33.9\$ (Sigmaadrich)- used in the lab for implosion fabrication

Research and development-2million \$

Manufacturing bots-3 million \$

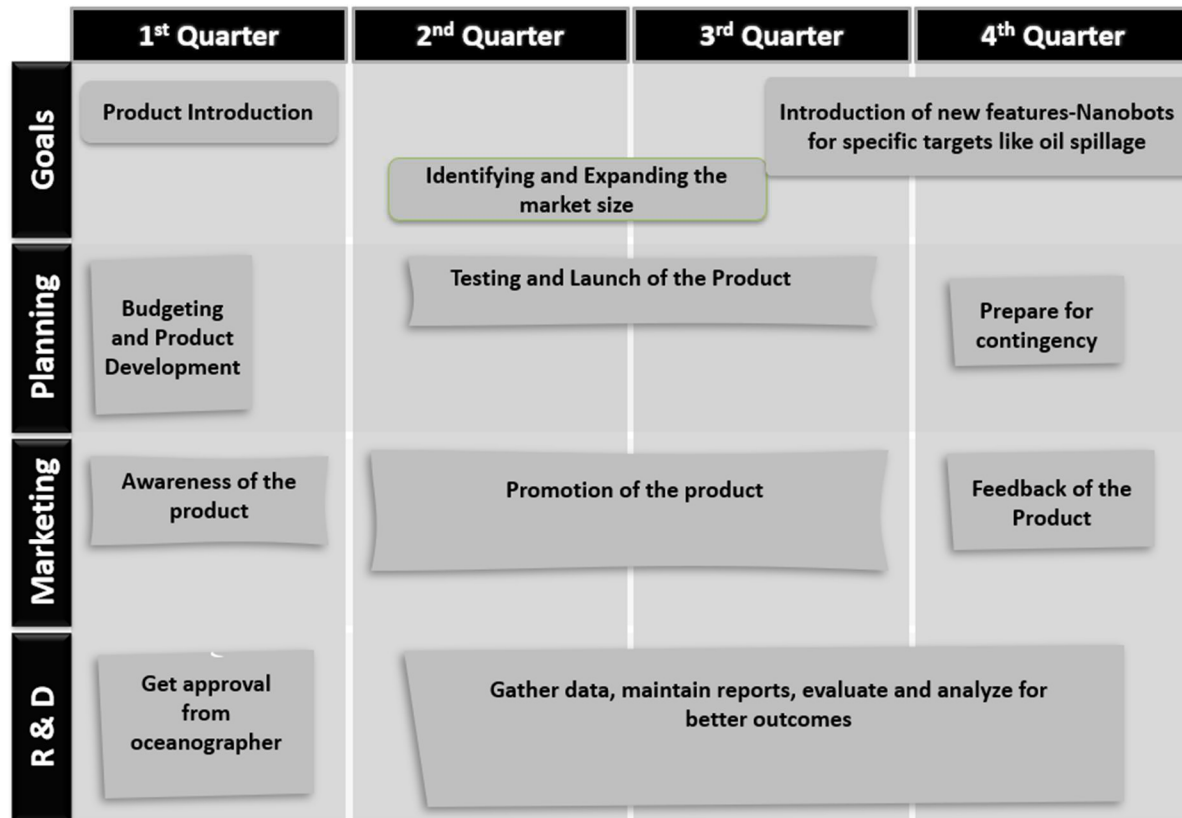
Maintenance per year-2 million \$

Total approximate cost of the project for the manufacturing of the batch is 7-8 million \$

Price for the 1000 nanobots batch estimate 4-5 million dollars for organizations who sign the contract of 5 years, else it would be 8-9 million dollars for one time dealing

Also, an important cost will be royalty to MIT 15% of every new contract only for the 1st year

## Roadmap



### Key Metrics

Quantitative Metrics	Qualitative Metrics
Area to be covered by the Nanobots (in miles)	Quality of Water and marine life
Toxic waste in the selected area (in pounds)	Operations on the Nanobots
Number of Nanobots required for cleaning the selected the area	Temperature of the Ocean
Time require for clearing the toxic waste (in days)	Data Analyzing on the before and after scenario

### Operational Needs

**Engineering Team:** This is crucial Team and will work hands on with the R&D Team. They will help in engineering Nanobots and design their functioning.

**Operations Team:** They will manage the Operational activity and monitor the work done and maintain data and records of the Activities and use of technology to clear a particular segment of the ocean.

**Marketing Team:** They will promote the Product and help gain attention and awareness in the society. Focusing on protecting the social cause and endorsing the product.

**Research and Development Team:** They will be responsible to keep track of the technology used and the innovate the process. Also look into if there is any adverse effects or pitfalls in the product. This team will also include oceanographers that will help us understand marine life and ocean structure

**Finance Team:** To maintain and ensure budget for the product

**Legal Team:** To Sign the terms and condition and adhere to the Law of the country. Also responsible for policy making

**Copyrights & Patent Team:** To ensure there is no misuse of the product

### **Addressing Risks/Caveats**

Risks are part of any new technology invention. It's necessary to make necessary provisions for the same

Potential risk for implosion technology are:

**Technical risk:** Nanobots are operated on technology advancement as it is machine after all there is always a risk of malfunction leading to breakdown of the nanobots.

**Funding risk:** Being a multidimensional project funding is a major challenge. Investors are also looking for profit in return, however major focus of this technology is environmental benefit resulting in the returns to be slow in the initially quarter.

**Usage risk:** This is a major risk addressing where in an skilled professional is the one to operate and monitor the nanobots. Human error may result in grave danger to the marine species and the ocean structure.

### **References:**

- [https://oceanconservancy.org/blog/2018/11/09/people-places-behind-waste-management-solutions/?ea.tracking.id=19HPXGJAXX&gclid=EAlaQobChMI1\\_r1-ofF4QIVRFcNCh2Q3wEWEAAAYASAAEgLysvD\\_BwE](https://oceanconservancy.org/blog/2018/11/09/people-places-behind-waste-management-solutions/?ea.tracking.id=19HPXGJAXX&gclid=EAlaQobChMI1_r1-ofF4QIVRFcNCh2Q3wEWEAAAYASAAEgLysvD_BwE)
- <https://www.media.mit.edu/articles/team-invents-method-to-shrink-objects-to-the-nanoscale/>
- <http://www.oceanhealthindex.org/methodology/components/trash-pollution>
- <https://www.mit.edu/research/>
- <https://www.epa.gov/international-cooperation/protecting-marine-environment>
- <https://www.youtube.com/watch?v=Dc5wINoPvNQ>
- <https://www.biocompare.com/Editorial-Articles/168367-Look-Beneath-the-Surface-with-Two-Photon-Microscopy/>
- <https://www.sigmaaldrich.com/catalog/product/aldrich/f2456?lang=en&region=US>
- <https://www.amazon.com/>