# Uavs as Means to Provide First Aid Kits to Lost at Sea Victims


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# Presenter:


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In 2017, Anastasiia Rozhok received a bachelor's degree in industrial safety from Bauman Moscow State Technical University in Moscow, Russia.

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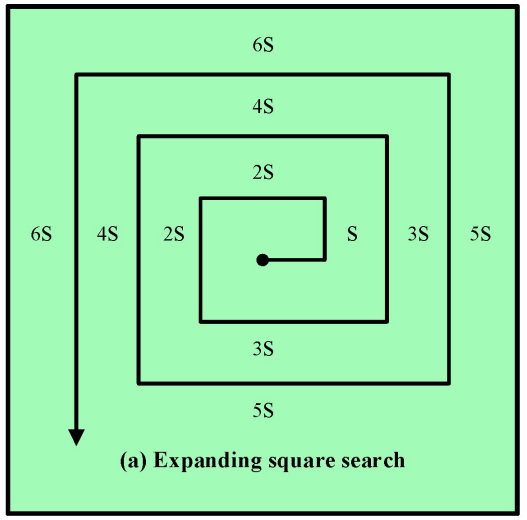
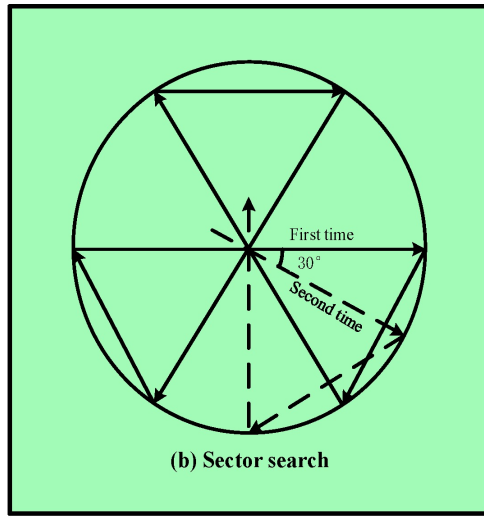
She is a Ph.D. student of the Department of Mechanical, Energy, Logistics Engineering and Engineering Management, University of Genoa, Genoa, Italy, and the Department of International Education and Scientific Collaboration, Bauman Moscow State Technical University, Moscow, Russia.

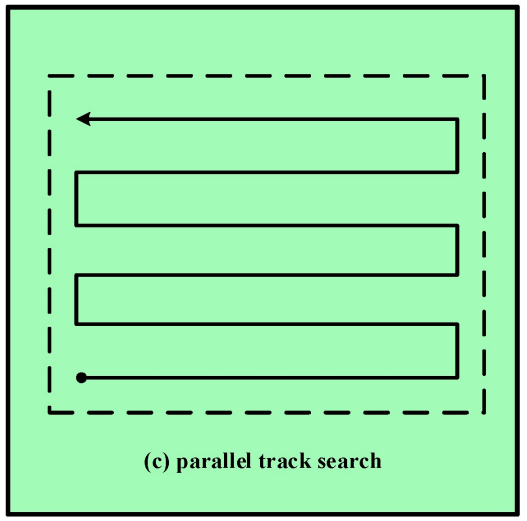
Her research interests include autonomous security, risks, complex modelling and simulation systems, environmental safety, Industry 4.0.

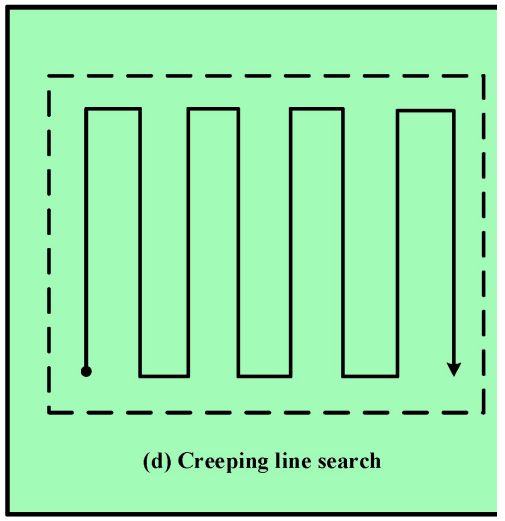
# Means of rescue

- By boat people are able to
  - search for victims by following paths established by international organisations;
  - Delivery the necessary equipment by taking the shortest path



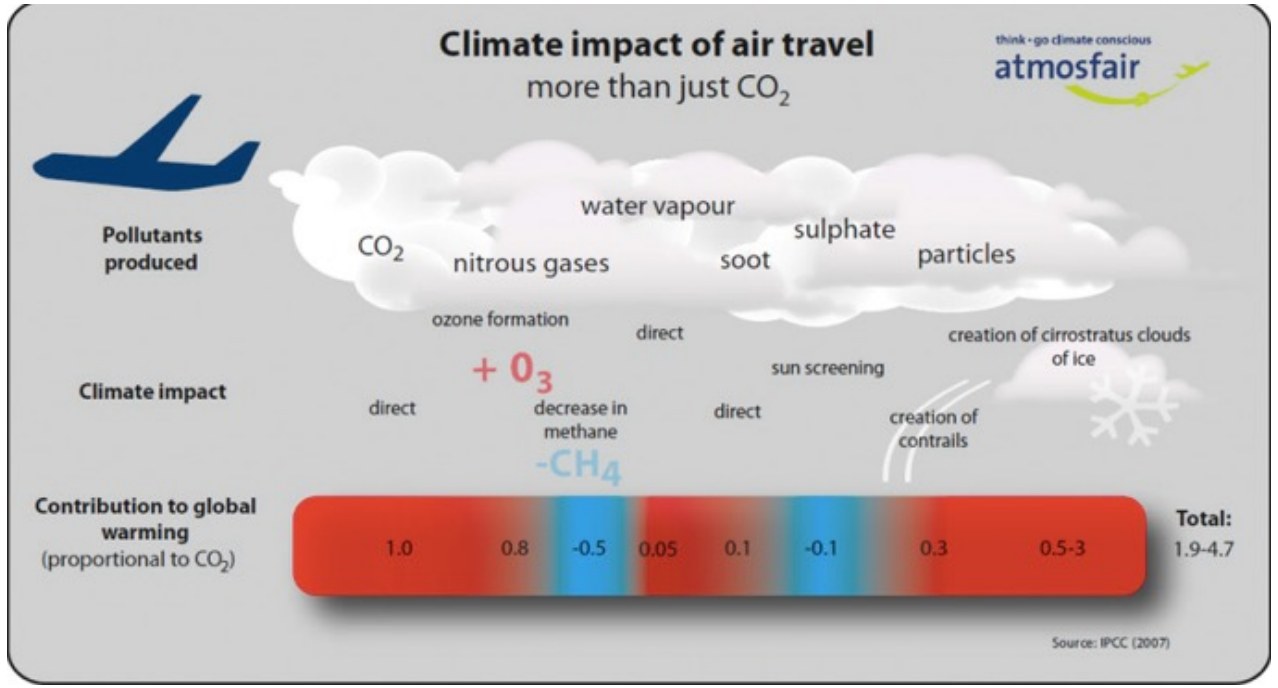



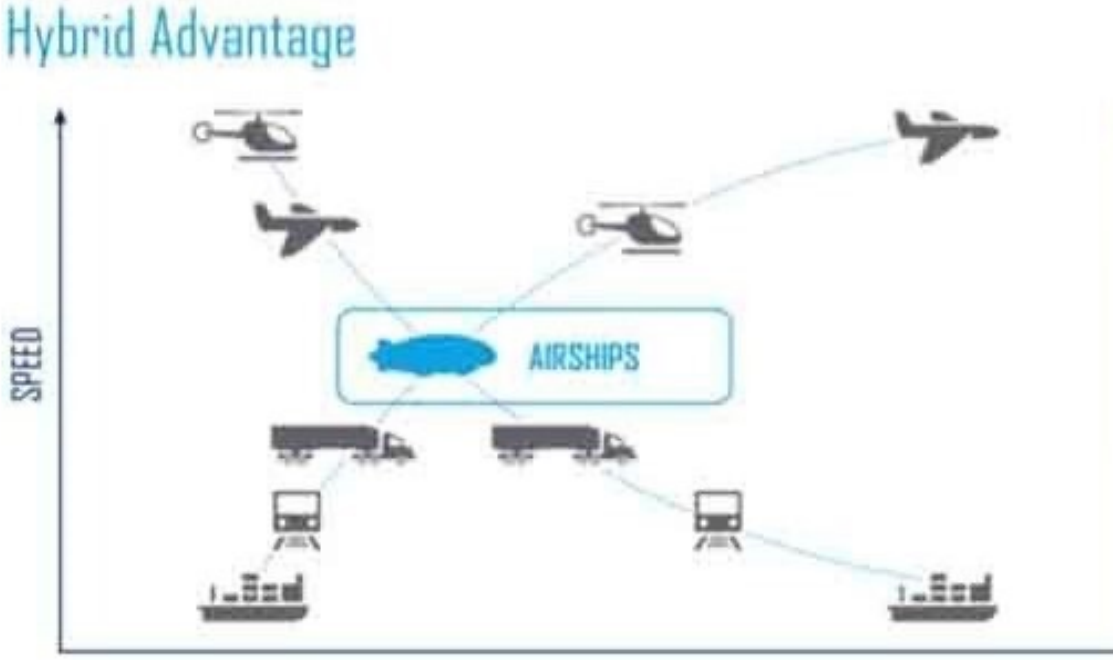
# Means of rescue

- Airplanes and helicopters
  - Require complex facilities, especially for delivery operations
  - Give off high emissions of pollutant agents
  - Wings create lift
  - Present critical issues both for rescue and delivery operations



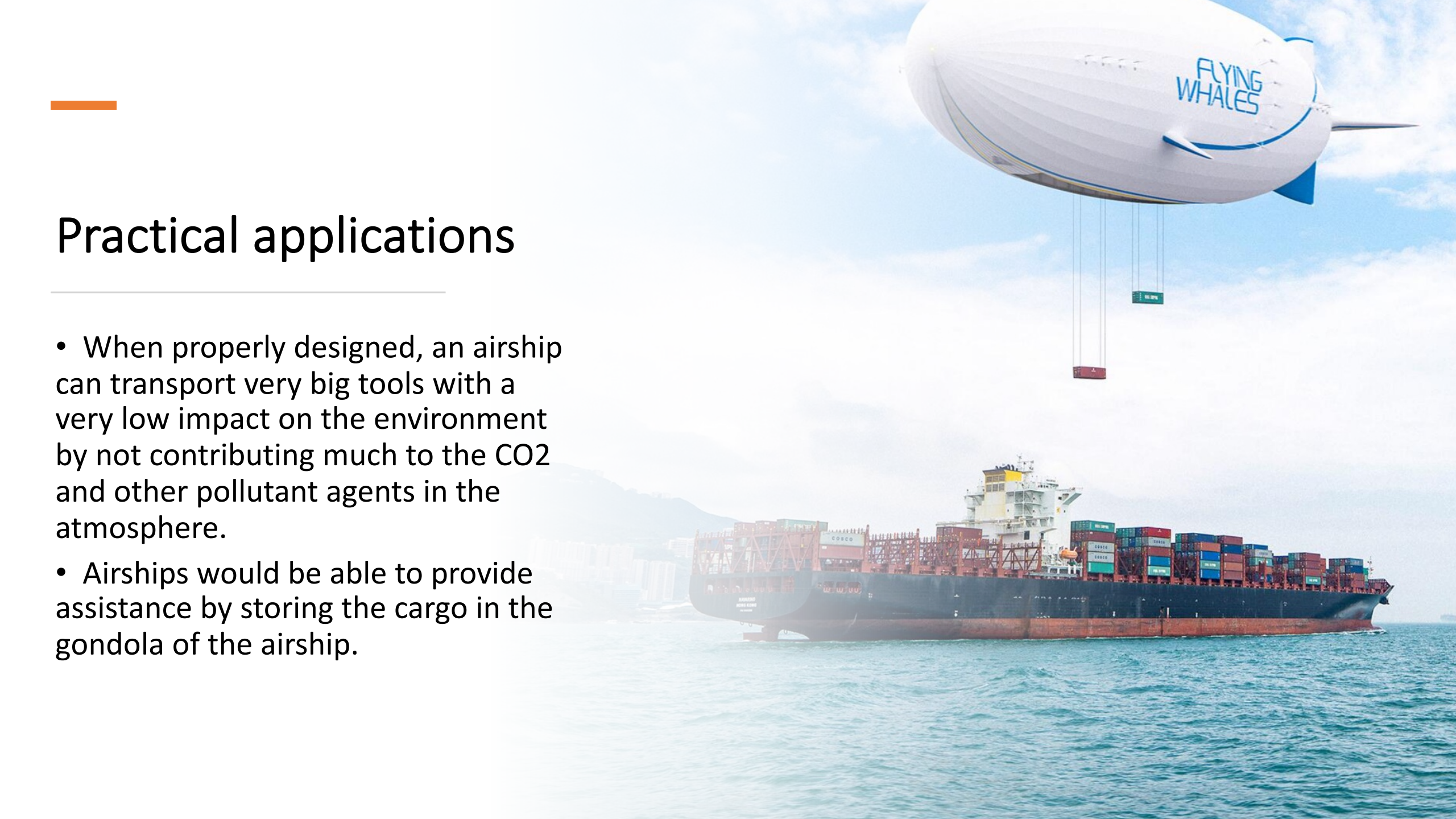
# Airships

- As sustainable means of transport given the possibility to emlpoy hybrid or completely solar powered systems
- Do not require big facilities for deployment
- Do not require a big amount of personnel
- Can comply with a big variety of tasks with a minimal environmntal impact
- Can be equipped with AI softwares for a smart and autonomous response to distress signals



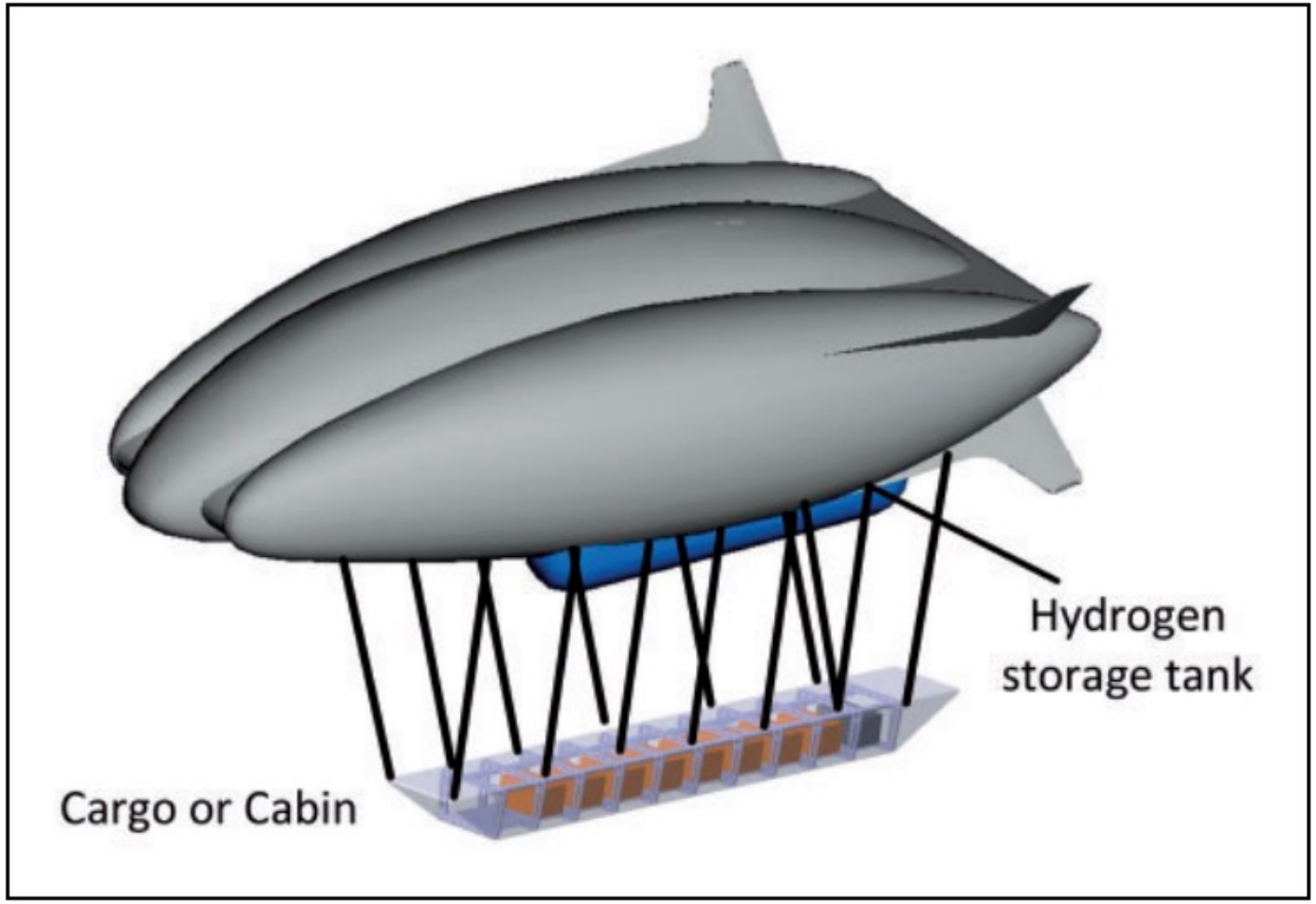
# Practical applications

- When properly designed, an airship can transport very big tools with a very low impact on the environment by not contributing much to the CO2 and other pollutant agents in the atmosphere.
- Airships would be able to provide assistance by storing the cargo in the gondola of the airship.



# Scenario

- For people lost at sea, we are suggesting that airships would be able to deliver supply kits to the survivors. The supply kit would be designed to provide everything to the people for first aid and to be used also as a mean of localization for further support by the personnel on the mainland.

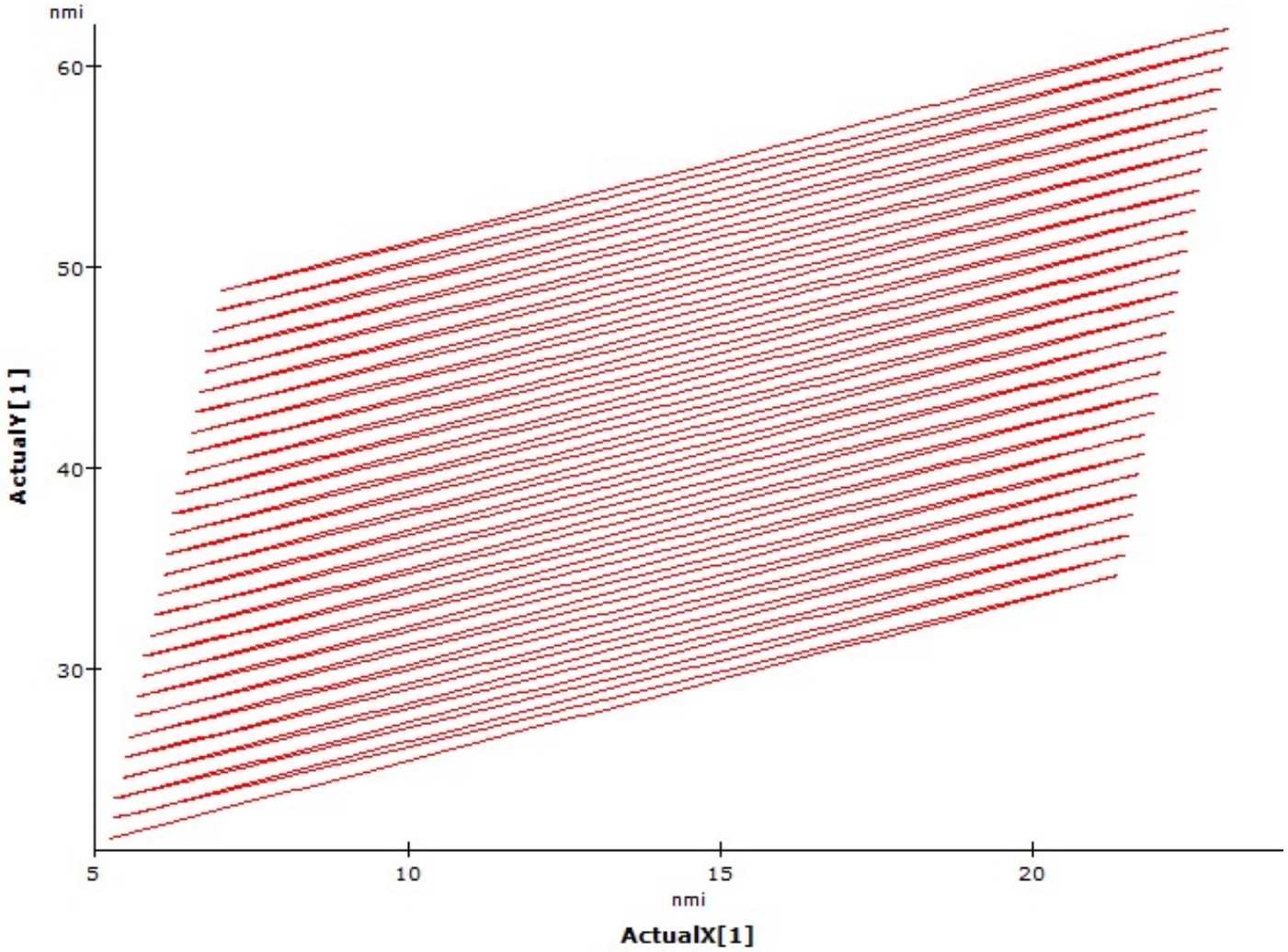


- The airship should gently deliver the supply kit by deploying it with nylon cables (not dangerous for the victim in case of wind) until the touchdown on the sea surface. The basic supply kit provides the victims with what we studied to be the fundamental needs for a distress situation. Comparing different ideas on what the first aid kit should contain we decide the basic elements that in the proposed scenario of people lost in the Ligurian coast.

| Equipment | Weight |
|---|---|
| **Life raft + manual (on specialized vehicles)** | 30.0 kg |
| **Water supply + drinkable water device** | 4.50 kg |
| **Food supplies** | 0.50 kg |
| **Waterproof torch + batteries** | 0.60 kg |
| **Marine First Aid Kit** | 1.00 kg |
| **Emergency Marine Whistle** | 0.05 kg |
| **Floating knife** | 0.10 kg |
| **FFP3 2505 masks x2** | 0.05 kg |
| **Personal sanitation kit** | 0.30 kg |
| **Additional repairing tools** | 0.40 kg |
| **Nautical charts** | 0.10 kg |
| **RED hand flares x3** | 0.68 kg |
| **Rescue quoit** | 0.90 kg |
| **TOTAL** | 9.18 kg (+ 30.0 kg on specialized vehicles) |

# Simulation model

- Airship, as part of a fleet, will start the search for the victim by following a sprint-and-drift strategy to save energy
- The idea behind this concept states that the vehicle will sprint in a direction for a designated time and then drift with the wind employing only minimal energy for correction actions.



# Future works

- Delivering other goods to hard-to-reach places (oil platforms, mountains cottages)

- Simulation of recovery of victims lost at sea

# Conclusion

- The relevant studies we described showed that this problem is urgent and will soon become an integral part of smart cities.
- During the patrolling operations, the airship would detect the victims, send the signal to the port authorities with the coordinates of the event and deliver them the disaster supply kit. The airship will then go back to its mission.
- Given the weight of the payload, consisting of the disaster supply kit and the instrumentation, we were able to develop a preliminary calculation on how to determine the dimensions of the semi- axes of the needed airship.
- The presented simulation showed the hypothetical pattern of search for victims lost at sea.

# Thank YOU

- “The Earth will not continue to offer its harvest, except with faithful stewardship. We cannot say we love the land and then take steps to destroy it for use by future generations.” —John Paul II