



# Exploratory Essay Story Map

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# The City College of New York(CCNY)

- The City College of New York(CCNY) was established in 1847 as a Free Academy. Located in Harlem, New York, it is composed of 8 different schools and divisions. Although CCNY is no longer free to attend, the tuition is among the lowest in the country while providing excellent education. With many alumni's going on to win big awards and reaching high statuses, CCNY is one of the best colleges when it comes to cheap education with amazing outcomes.





# The Grove School of Engineering

- The Grove School of Engineering (GSoE) is the engineering department of CCNY.
- Previously known as the The City College School of Technology established in 1919 and became the school of engineering in 1962 when Andrew Grove (CCNY alumni and co-founder of the Intel Corporation) made the largest single donation that the CCNY has ever received.
- Grove's donation of \$26 million brought the school to the cutting edge in research and equipment.



# Makerspace

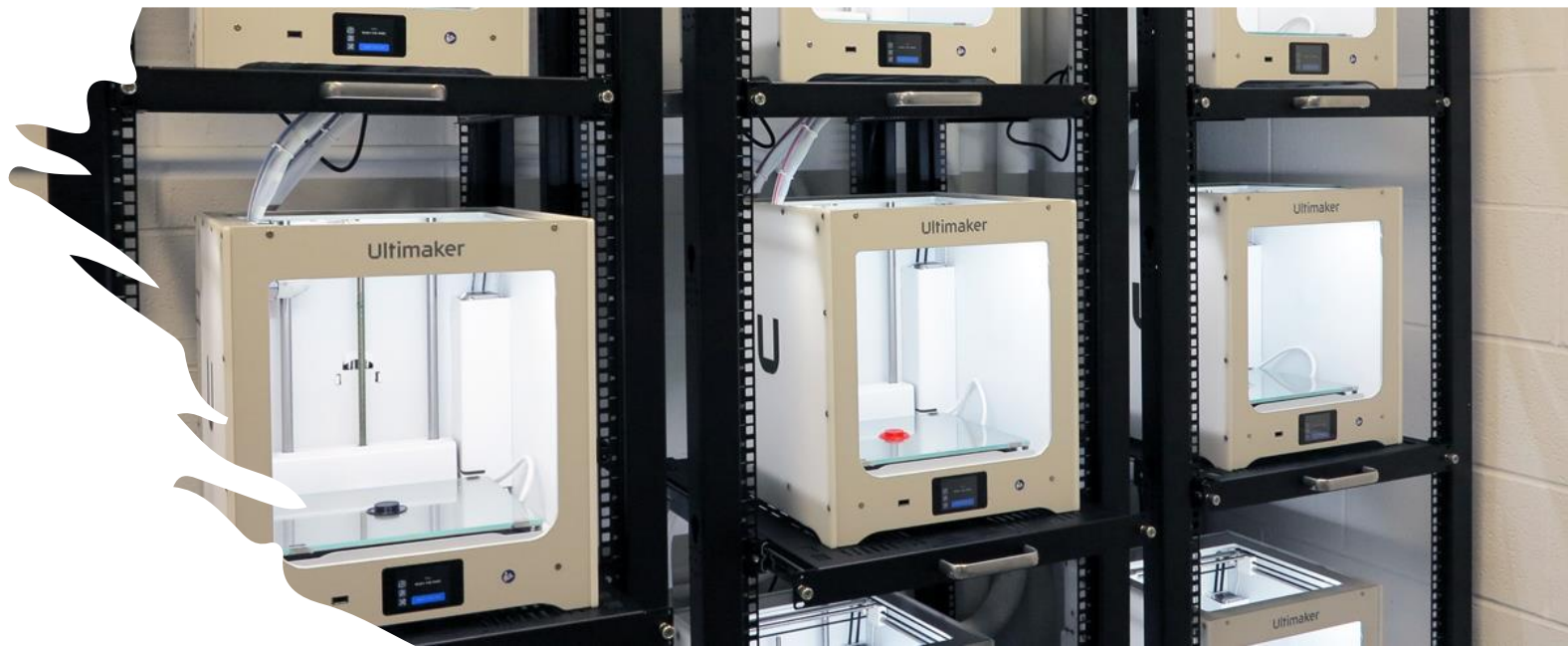
- CCNY's makerspace is located within the Grove building and is available to all student and staff. The makerspace was a part of a \$5million grant from the DOE to CCNY order to increase the amount of stem majors at the school. The makerspace is used by students as a place to work, study, create, and relax. It is filled with many modern machines and instruments to create whatever you can imagine. With 3D printers, soldering stations, laser engravers and more, whatever you can think of, the makerspace has the tools for you to bring it to life.





# Makerspace tools and equipment.

- The makerspace is filled with many tools and equipment to get the job done. With a wide array of 3D printers, laser engravers, laser cutters, vinyl cutters, soldering stations, test instruments, sewing machines and more. Whatever you can imagine you'll find the tools to make it a reality in the makerspace. The makerspace allows students to express their creativity to a level that isn't available to the average person.



# 3D Printers



- The maker space has many 3d printers. Both regular and metal 3d printers are available. 3d printers are used to turn 3d drawings from a computer into a physical 3d object. The printer's layers materials on top of each other slowly creating the object. 3d printers can use many materials such as plastic, ceramic, and metal.

# Laser Cutters and Engravers

- Laser cutters and engravers use powerful laser to cut and engrave designs and patterns onto materials. Those materials are usefully either wood or metal.





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## Soldering stations

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- Soldering is the act of combining two or more metals together. In the makerspace there are many soldering stations which allow students to solder, and desolder wires unto motherboards, allowing the to create electronic components for their projects.



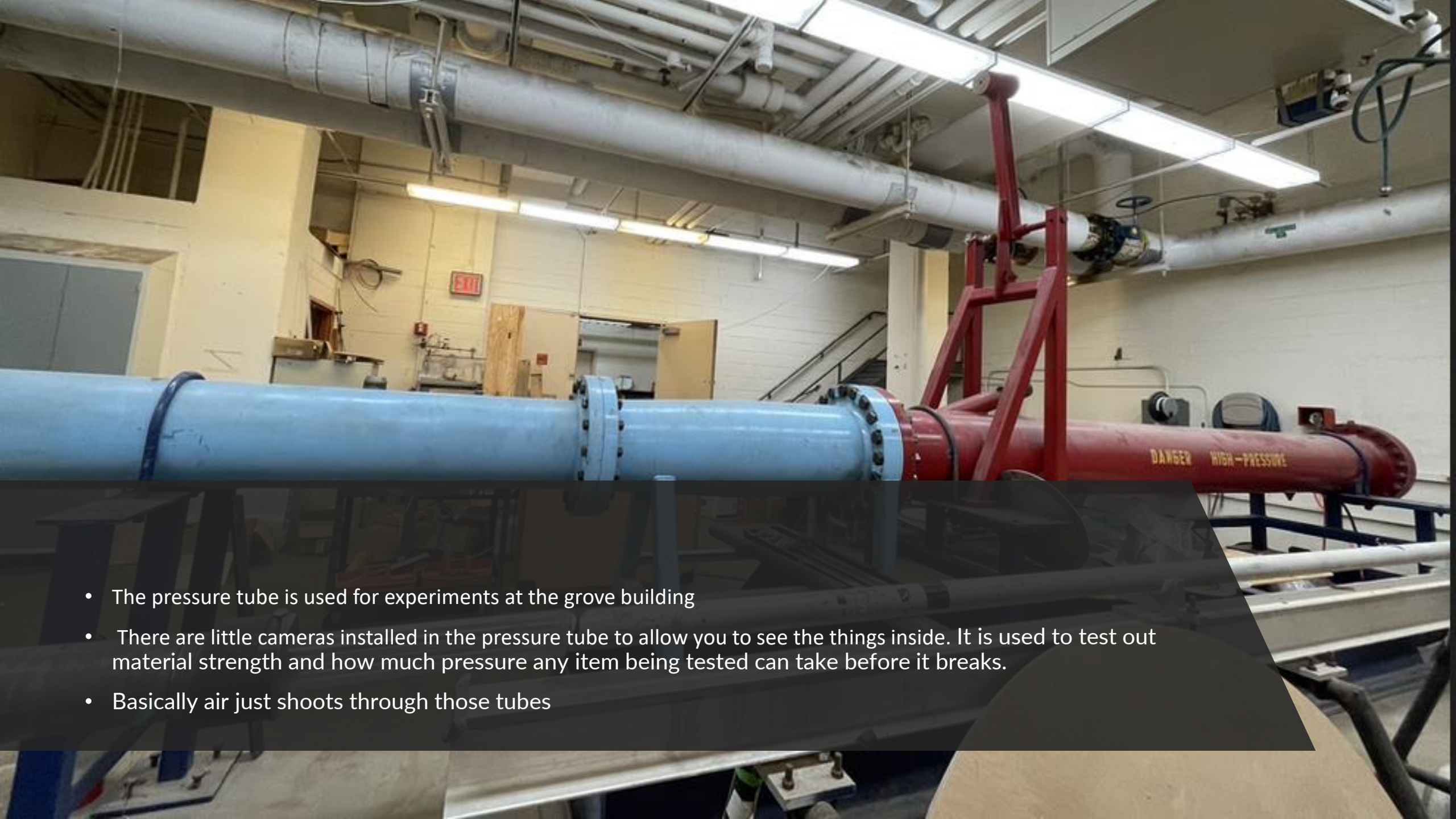
**C27-C32**

**CCNY**

**AERO-DYNAMICS LABORATORY**

**Mechanical Engineering**

- The Aero- Dynamics Laboratory is located inside the Grove building all the way down to the bottom floor. The same floor as where the Makerspace is at
- It is one of the many labs the mechanical engineering has
- Well what is aerodynamics? The definition that NASA say is the way objects move through air
- Two things that you will see in there is the wind tunnel and air pipe flow units( pressure tubes)
- These equipment are used for dynamic balancing, vibration testing, and various feedback control units for rectilinear mechanical systems, level and flow, pressure systems



- The pressure tube is used for experiments at the grove building
- There are little cameras installed in the pressure tube to allow you to see the things inside. It is used to test out material strength and how much pressure any item being tested can take before it breaks.
- Basically air just shoots through those tubes

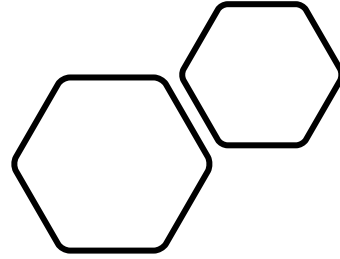




- As you see some of these metals have been tested
- Think of it as the wing of an airplane they have to test how much pressure that piece can hold while flying through the air
- Many students/professors from other colleges come here to use these items to experiment



# Historical Significance of Wind Tunnel in Aviation



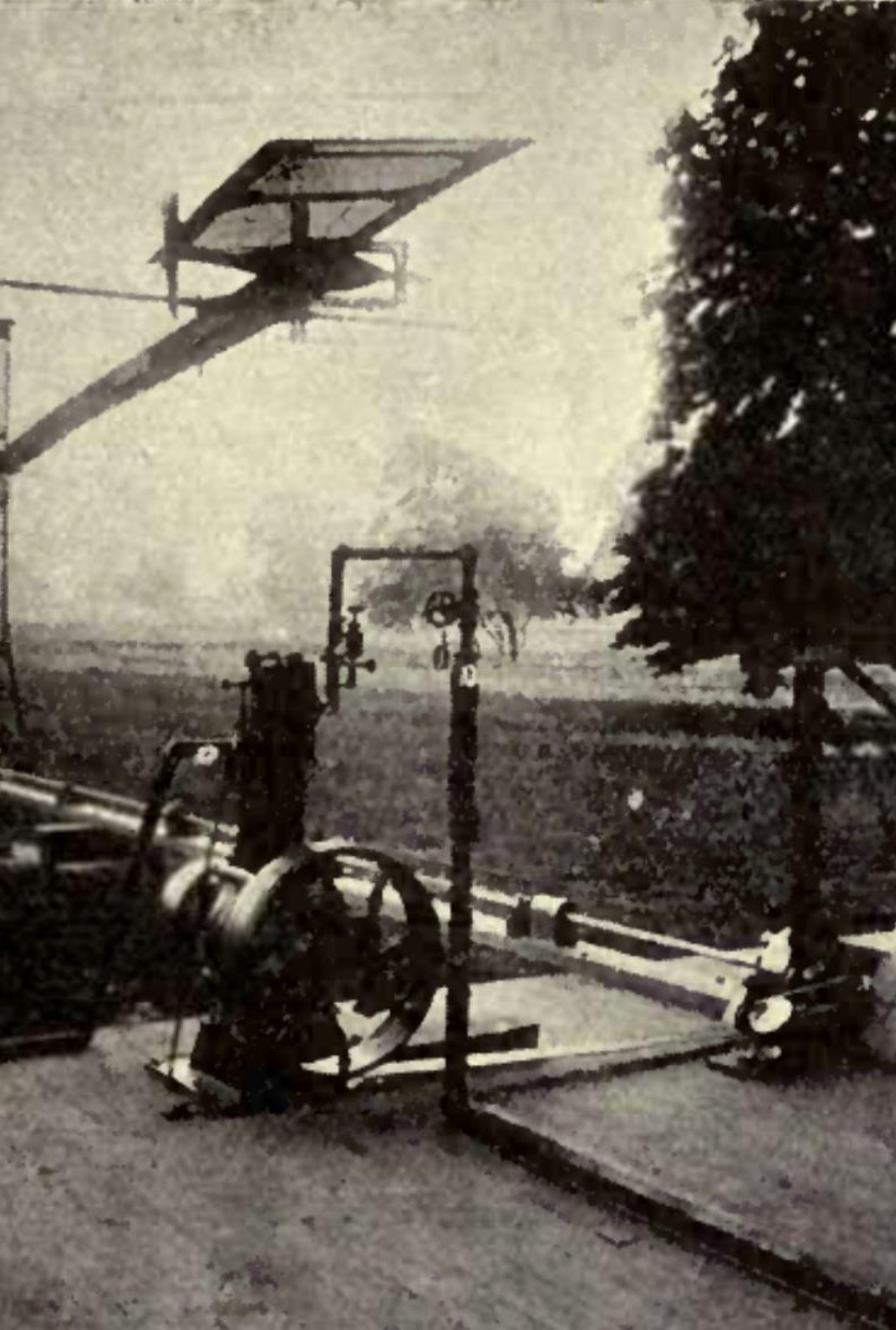
# The need for Wind Tunnel arises

The would-be aeronauts of the ninth century and later on closely studied the flight of birds and began building flying machines patterned after avian structures.

Their birdlike craft failed miserably.

They quickly realized that in reality they knew nothing about the lift and drag forces acting on surfaces cutting through the atmosphere.



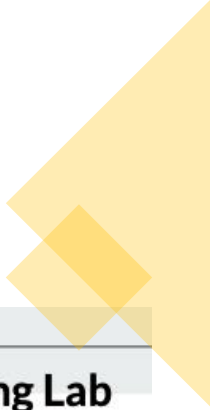


# Whirling arm

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- first aerodynamic test device.
- Early experimenters realized that they needed a machine to replace nature's capricious winds with a steady, controllable flow of air. They realized that they could either move their test model through the air at the required velocity or they could blow the air past a stationary model. Both approaches were employed in the early days of aeronautics.
- provided most of the systematic aerodynamic data gathered up to the end of the nineteenth century.
- Flaws: Test results were adversely influenced as the arm's eggbeater action set all the air in the surrounding in rotary motion. Aircraft models on the end of an arm in effect flew into their own wakes. With so much turbulence, experimenters could not determine the true relative velocity between the model and air. Furthermore, it was extremely difficult to mount instruments and measure the small forces exerted on the model when it was spinning at high speeds. Something better was needed.





utterly simple device consists of an enclosed passage through which air is driven by a fan or any appropriate drive system.

The heart of the wind tunnel is the test section, in which a scale model is supported in a carefully controlled airstream, which produces a flow of air about the model, duplicating that of the full-scale aircraft.

The aerodynamic characteristics of the model and its flow field are directly measured by appropriate balances and test instrumentation.

The wind tunnel's great capacity for controlled, systematic testing quickly replaced the inaccurate whirling arm.

capabilities of a wind tunnel can best be appreciated by recognizing the aerodynamic forces acting on an aircraft in flight.

The three basic forces are lift, drag, and side force as measured in an axis system referenced to the direction of flight of the aircraft. The drag force is along (but reversed to) the flight path; the lift and side forces are at right angles to it.

In a wind tunnel, the axial centerline of the test section defines the direction of the oncoming wind-the aerodynamic equivalent of the flight path.

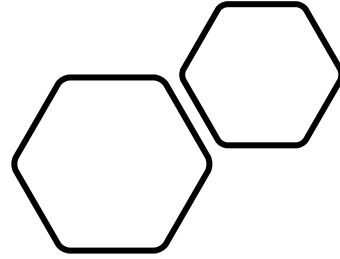
The ease of measuring aerodynamic forces relative to the tunnel axis on a model held stationary in the airstream opened a new era in aerodynamic experimentation.

Frank H. Wenham designed and built the first wind tunnel

**The Wind Tunnel at the Mechanical Engineering Lab**



# Historical Significance of Wind Tunnel in Aviation

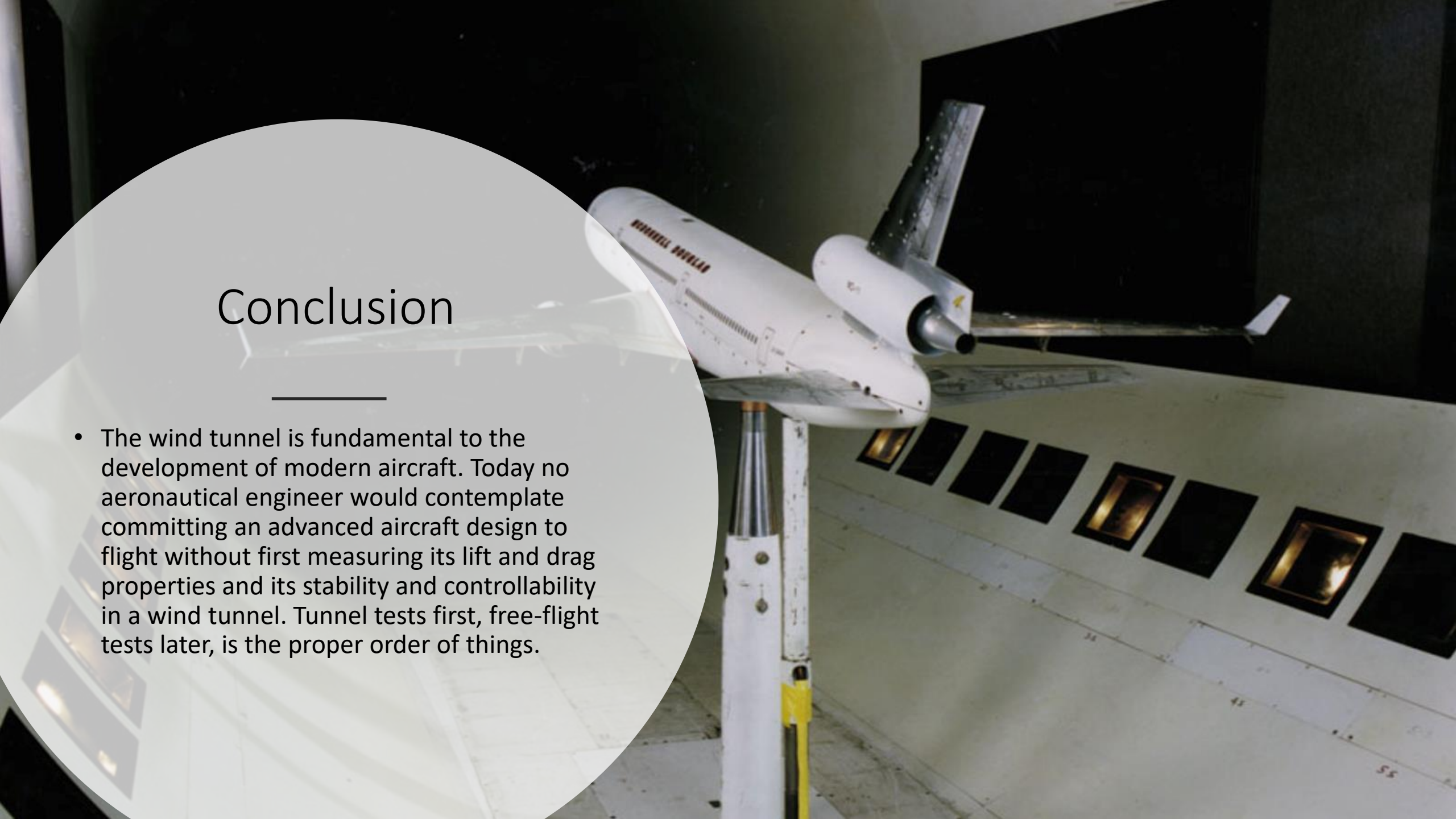


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# Conclusion

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- The wind tunnel is fundamental to the development of modern aircraft. Today no aeronautical engineer would contemplate committing an advanced aircraft design to flight without first measuring its lift and drag properties and its stability and controllability in a wind tunnel. Tunnel tests first, free-flight tests later, is the proper order of things.





# Citations

- *Design. build. learn : Makerspace - CCNY*. Makerspace. (n.d.). Retrieved December 5, 2022, from <https://makerspace.ccny.cuny.edu/>
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