

ARCHITECTURES OF HYPER MOBILITY

ARCH 7104/7211 Diploma Design Research Studio | SP 2022 | Dr. Dimitris Papanikolaou | dpapanik@uncc.edu | <https://urbansynergeticslab.net>



Image by BIG-Bjarke Ingels Group



Pegasus Hyperloop Pod. Image by Virgin Hyperloop

ARGUMENT

Cities are in constant flux. Every second, thousands of people, products, materials, and food are transported between origins and destinations. The architecture of these logistical networks, consisting of terminals, pipeline links, and hubs, is shaping not only the structure, function, and image of a city but also the way we experience the city and understanding its identity.

Hyperloop – a concept for a new in-vacuum, ultra-fast, mode of transport, originally developed by Elon Musk in a white paper in 2013 and currently developed by numerous companies across the globe in a race, is considered by many the most important breakthrough in transport technology for more than a century. While the concepts of pneumatic tube transportation and magnetic levitation are not new, it is only with the latest advances in technology and control systems that it can happen in affordable ways. Hyperloop's breakthrough is not just its in-vacuum, frictionless, ultra-high speed but also the contactless magnetic connection between its pods allowing platoons of individual pods to organically assemble and disassemble on the fly, its small-radius turns allowing maneuvers in dense cities, its low-power consumption in combination with solar energy (to name a few), eliminating therefore the planning complexities of century-old railways. With a capacity to link the East to West Coast in less than 45 minutes, Hyperloop has potential not only to revolutionize travel but also to dramatically alter urbanization process. Despite its technological progress, until today, there have been no compelling ideas about how Hyperloop stations, tubes, and links, might be implemented in cities and ports neither about what new service/business models and architectural typologies may emerge as a result of hyper-mobility.

This research studio will seek to invent and develop novel typologies for personal rapid transit (PRT) networks in combination with autonomous vehicle technologies, and explore novel scenarios for shared mobility for people and goods in 21st century cities. Students will conceive systems building up on Hyperloop technology to expand its functionality and they will conceive new service models and user experiences. These explorations will be conducted through the lens of two ongoing technological breakthroughs. On one hand, automation, robotization and artificial intelligence turn the “system” into an intelligent agency capable of making its own decisions. On the other hand, connective technologies, the internet, and the shared economy turn the system into a participatory platform which users can individually and collectively influence. These technological breakthroughs open the potential for flexible, adaptable, nearly real-time responsive systems to human needs but they also pose challenging design questions.

Ultimately, the studio asks: How might we give form to a mobility ecosystem of pods and portals where the waiting hall has vanished together with the waiting itself? What new models of services can emerge from new models of mobility and what form can they have? How might we merge top-down and bottom-up approaches in system design and how might such decisions affect system's performance?

METHOD

The studio will combine March and MSc Arch/IT students. The studio will be organized in three phases: research, conceptualization, and design. In research, the studio will work collectively as a think tank and identify key research areas through both rigorous literature review and case studies both from a critical/theoretical and applied standpoint. In conceptualization and design, each student will work individually on a research area and develop a design proposal. The design process in the studio will take a **systems-thinking approach** operating in two levels: at the system level students will design the structure and behavior of the system. At the component level they will detail the interactions and architectural typology of it. In doing so, novel representation techniques must be developed. All design proposals and research background will collectively construct a holistic studio vision on the topic that may lead towards a publication.

OBJECTIVES

- Engage with one of the most contemporary, novel and unexplored research design problems of global impact
- Develop and defend a strong design thesis and position it critically within the architecture/technology discourse
- Learn how to implement a system thinking approach in design
- Design not only in space but also in time, and how to diagrammatically represent time and space through states
- Work both independently and collectively through a learning-by-making approach, and become comfortable working within unknown fields of knowledge
- Think out of the box and challenge pre-established notions about design and technology

SITE

A regional-scale site and context will be given. Students are responsible of choosing their project's specific sites, data, defining the program and type of building, and positioning them through the lens of the studio's premise.