HP2: High Performance Hybrid Partition

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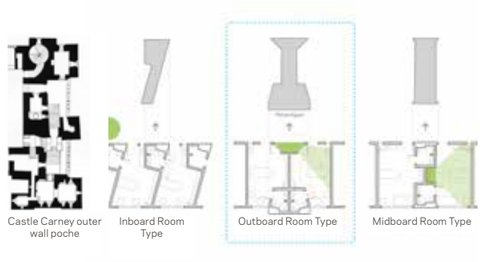
"This is architecture of extreme integration, of nuanced transgressions of the extensive and intensive, of dipping in and out of poché space, pushing up against architectural surfaces, and reconstituting them in a more complex way. Poché becomes vivid, active space rather than blackened solids of classical architectural representation. Moreover, a rethinking of the problem of standardized fixtures in ceilings and walls is long overdue, in the sense that the interface between systems and surfaces can be more productive." — Tom Wiscombe, from *Extreme Integration*[1]

HP2 was a design research project into the potential of a fully digitally fabricated, high performance interior partition placed within the healthcare environment. Working within charges established through Kieran and Timberlake's *Refabricating Architecture* as well as Tom Wiscombe's *Extreme Integration*, this designer saw potential in a refocusing of the design lens to the assembly, a part to whole approach integrating techniques of mass customization and complete systems integration. Research indicated areas which design could assist in better delivery of healthcare, specifically in the patients' exposure to air and surface contaminants. Altering the ways healthcare providers enter and exit the room, as well as the way air is moved through the room to could better protect patients in these facilities. Additionally, research aimed to integrate the inclusion of digital form generation and fabrication techniques to consider a partition that allows synergy between the various building systems.

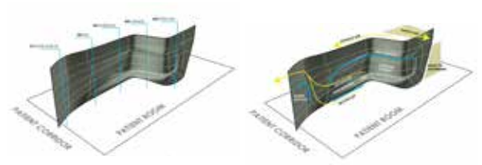
The design process investigated areas of acute care patient rooms, monocoque construction, architectural poche, narrow spectrum sanitary lighting, adjustable and variable perforation, interstitial building space, and patient room air ventilation. The aim of the research was to reconceive the conventional construction techniques of the light gauge partition in high performance, technology-specific locations. These partitions often exhibit an incredible amount of inefficiency in systems integration where poche space becomes quite convoluted. The design process, beginning with research into various internal and external influences, culminated in the manifestation of a 3d-printed scale mockup with all systems represented. The inclusion of these systems in the monocoque print allowed for parametrically controlled modification and skin adjustments responding to criteria such as structural stresses, bypassing/bifurcating systems, and curtain air distribution. As well, this technique analyzed surface geometry and varied the monocoque structural skin in ways that added material and strength where necessary, and lightened the skin where not needed. Variable perforations into the surface eliminated the need for diffusers, allowing for appropriate air and light to be delivered to point of need.

HP2 features include integrally 3D-printed building systems, monocoque sink, healthcare vitals data readout, and ventilation, hand, as well as surface sanitation through narrow spectrum lighting aimed to decrease the quantity of contaminates entering the patient rooms. Critical anthropometric sections were established to address program requirements through pushing and pulling the poche space, accommodating various technical conditions. This in turn generated a dynamic interior partition that, with the right parametric definition, could be mass customizable for integration into both new and existing construction.

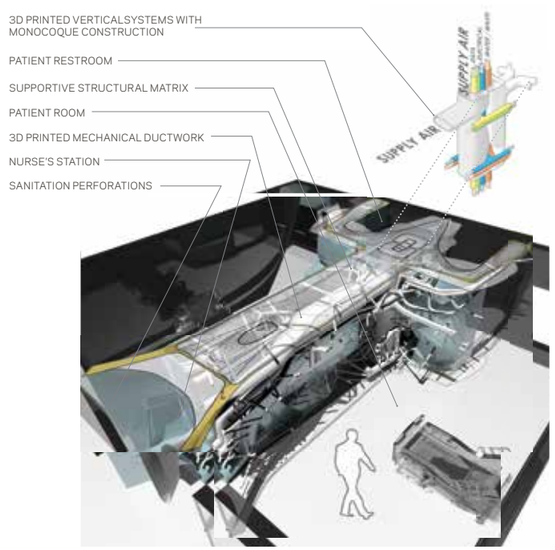
1. Tom Wiscombe, "Extreme Integration" *Architectural Design* Vol. 80, Issue 2 (2010): 79.

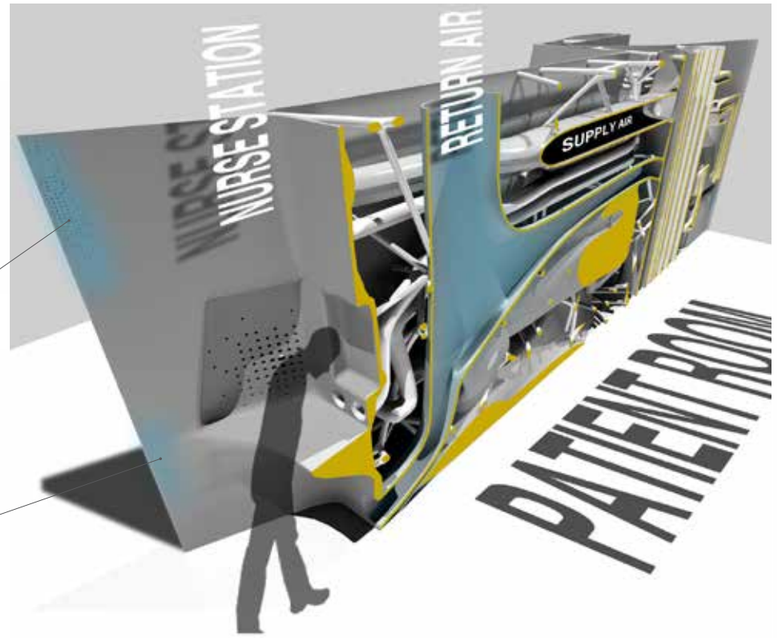


01 HISTORICAL POCHE AND PATIENT ROOM TYPOLOGY



02 CRITICAL ANTHROPOMETRIC SECTIONS AND THE PROGRAMMED SURFACE





03 PROGRAMMED PERFORATIONS FOR AIR AND LIGHT SANITATION

04 FABRICATION AND PROTOTYPE DEVELOPMENT