

Perceptual Design: Current Status and Future Needs

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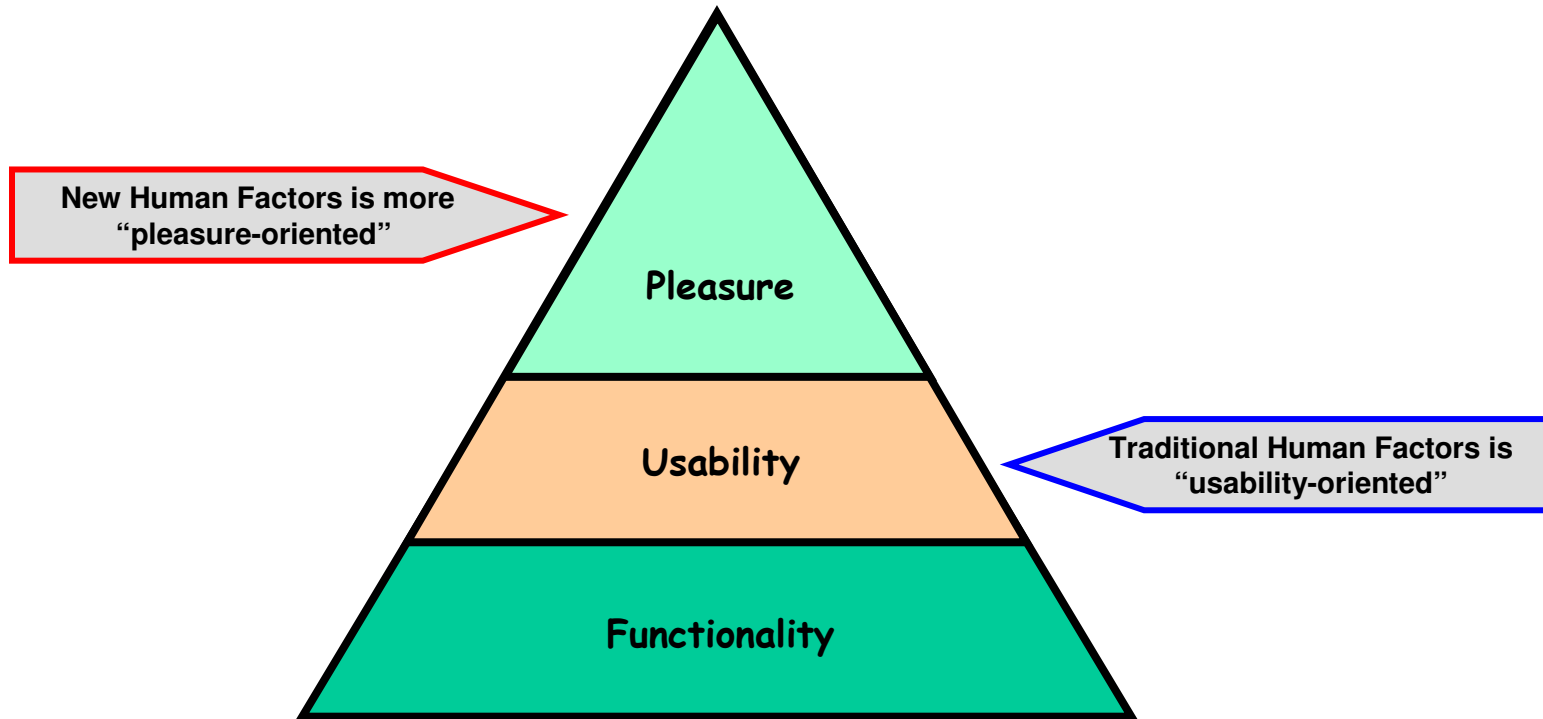
September 12, 2006

Contributors to this work

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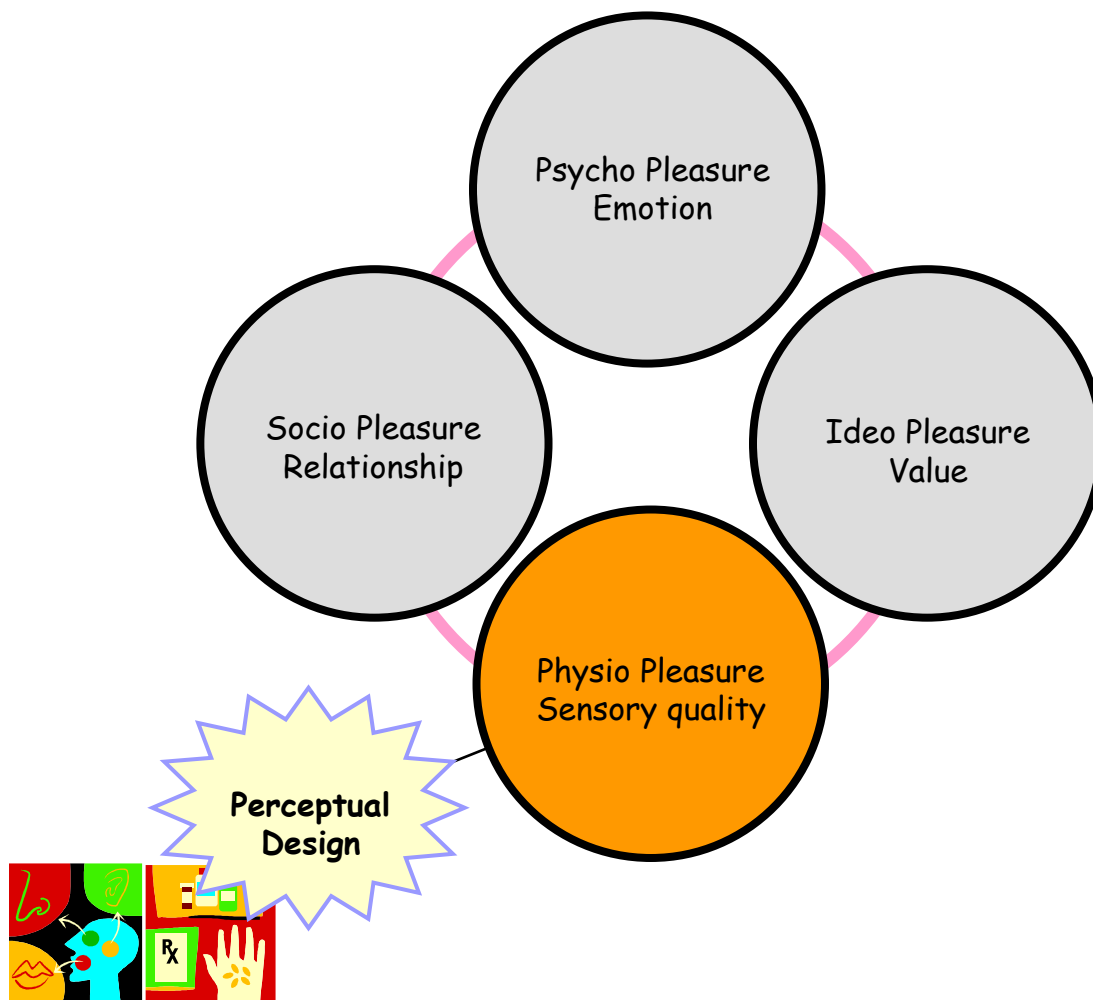
“Design may be our top unexploited competitive edge.”
-Tom Peters

HIERARCHY OF CONSUMER NEEDS



Maslow Triangle (Maslow, 1970), [Jordan, P W, 2000, "Designing Pleasurable Products."]

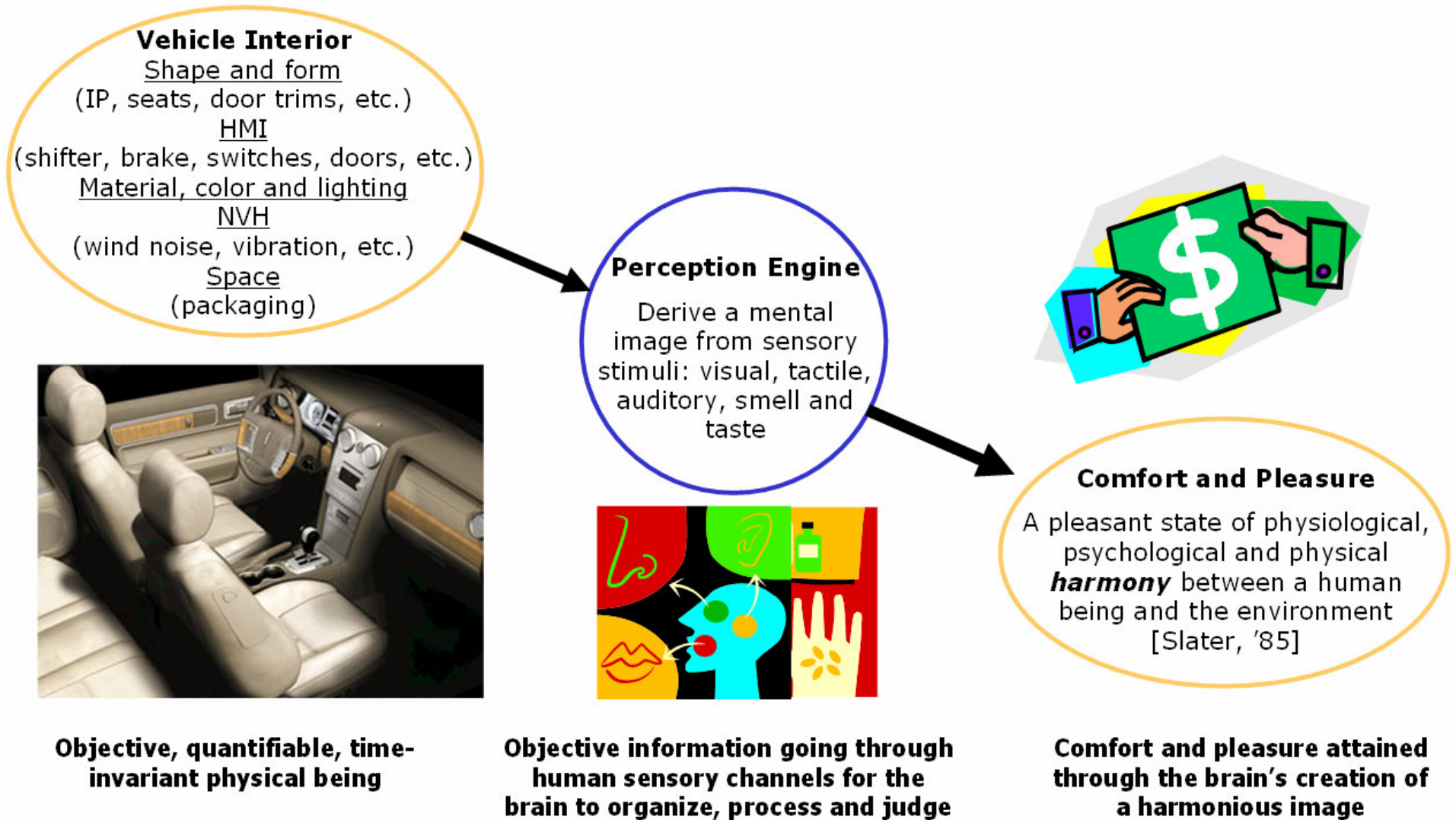
DESIGN FOR PLEASURE



PERCEPTUAL DESIGN

- Perception
 - “Process of acquiring, interpreting, selecting and organizing sensory information” Wikipedia.
- Perceptual Quality
 - Perceived quality based on brained-processed sensory information
- Perceptual Design (Narrow-Sense)
 - design engineering discipline aimed at creating products that are pleasurable to interact as perceived based on sensory information.
- Objective
 - Push for perceptual quality as a forefront design objective

AUTOMOTIVE INTERIOR

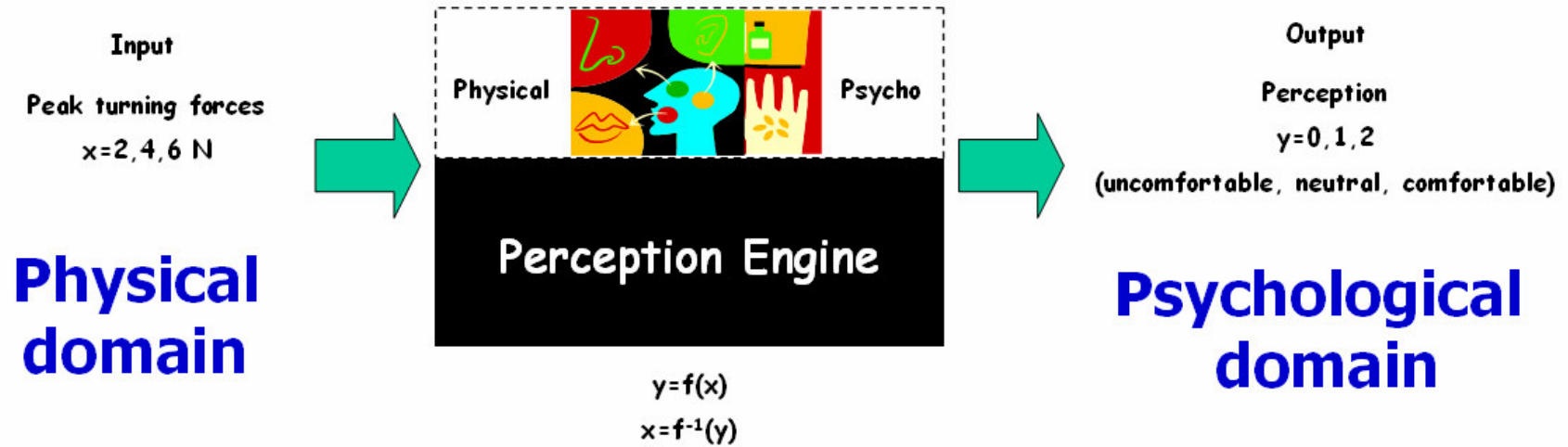


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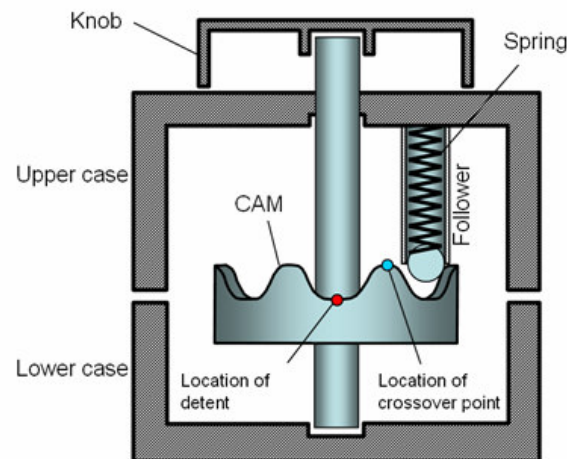
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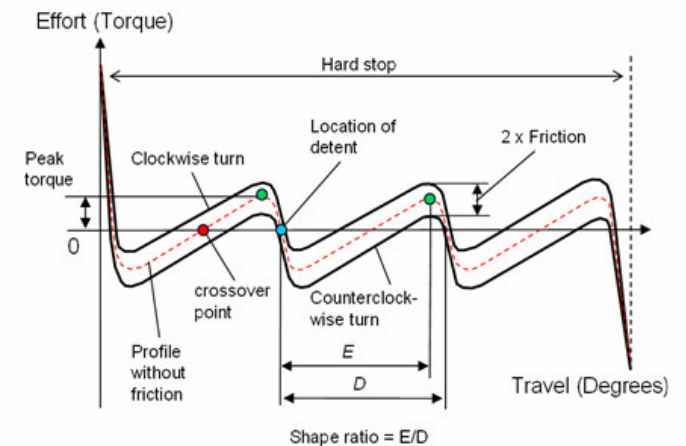
PERCEPTUAL DESIGN



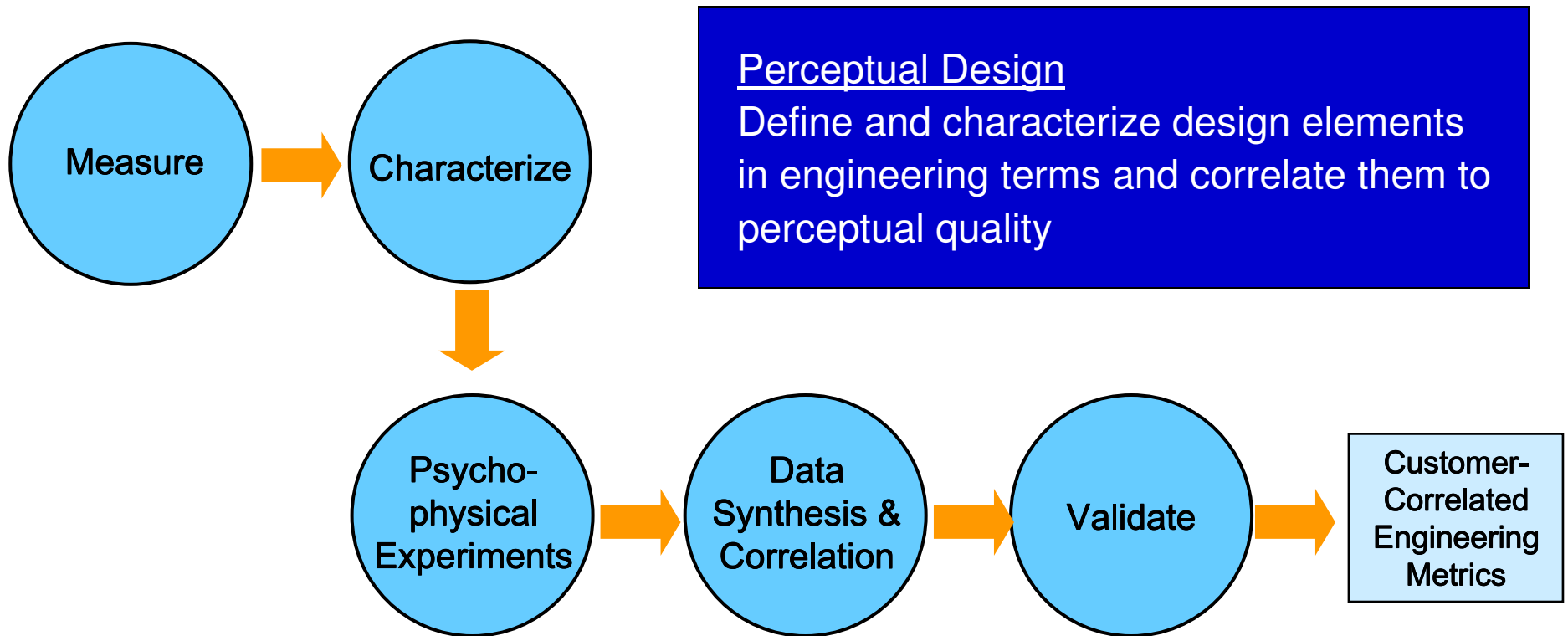
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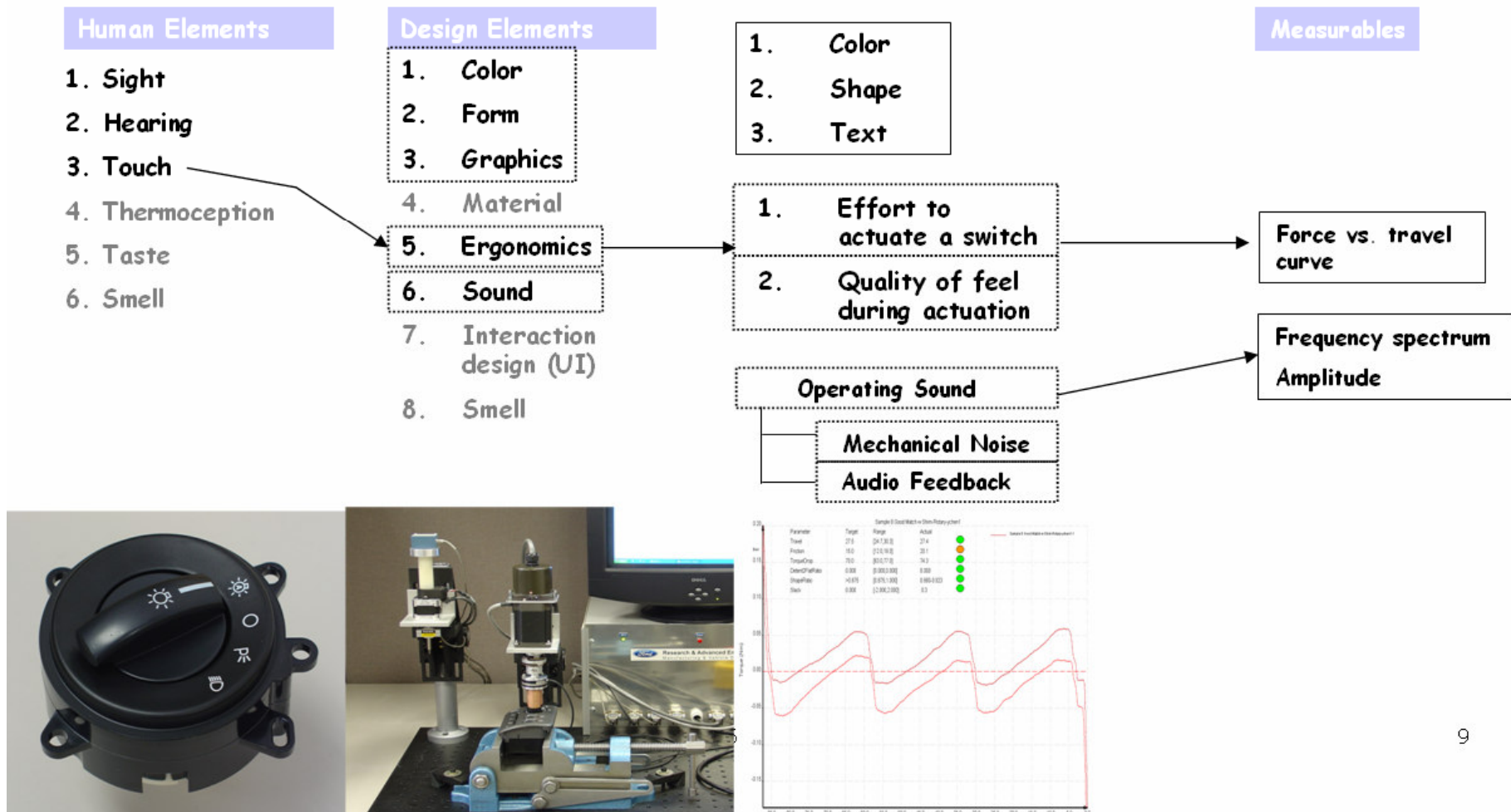


KEY STEPS OF PERCEPTUAL DESIGN



MEASURE

- Identify Measurable Aspects of Design Elements
 - Cascading-breaking down from subjective attributes to all the way to measurable attributes

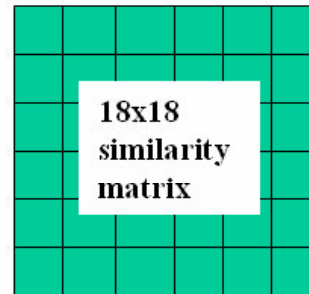


CHARACTERIZE

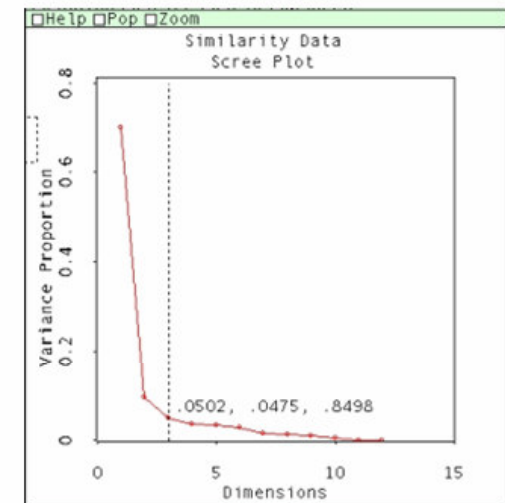
- Identify Minimum Dimensions Required to Effectively Describe Perceptual Domain



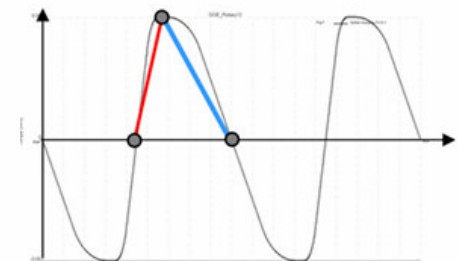
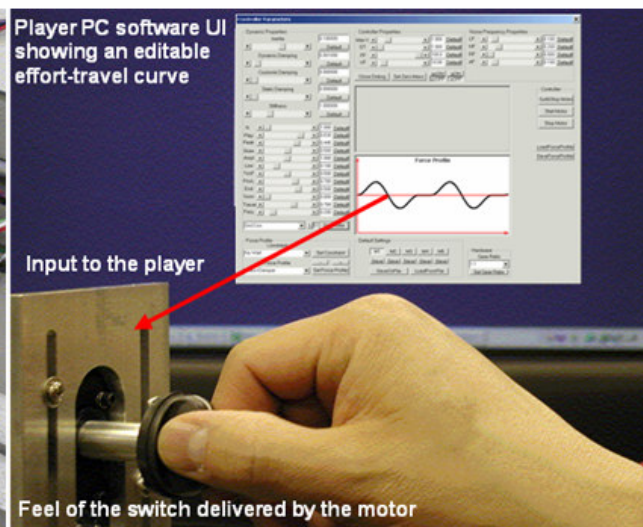
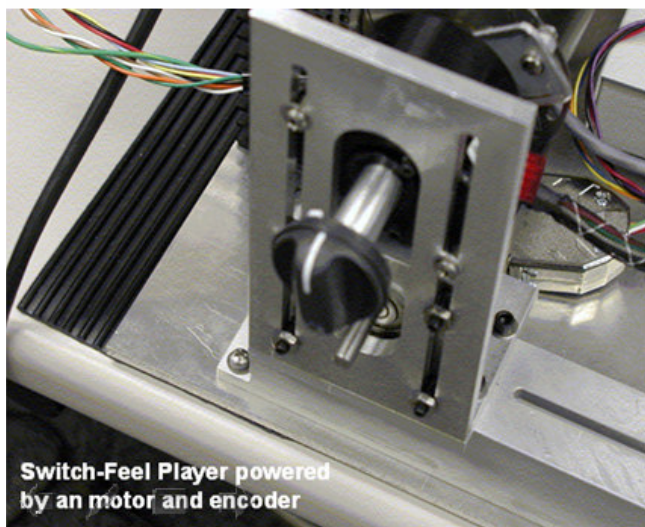
MDS



12 of the 18 switches used for customer clinics.
They are off the same friction, detent to detent travel, and peak force (three distinct factors)



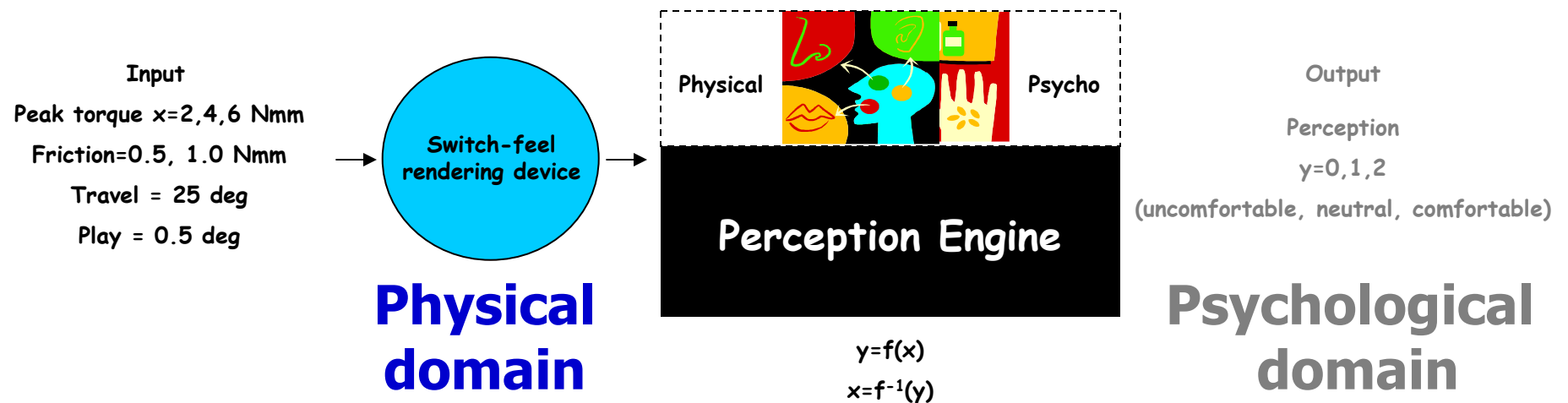
Scree-plot identifies the number of dimensions needed to accurately represent the perception of rotary switch-feel



RENDER

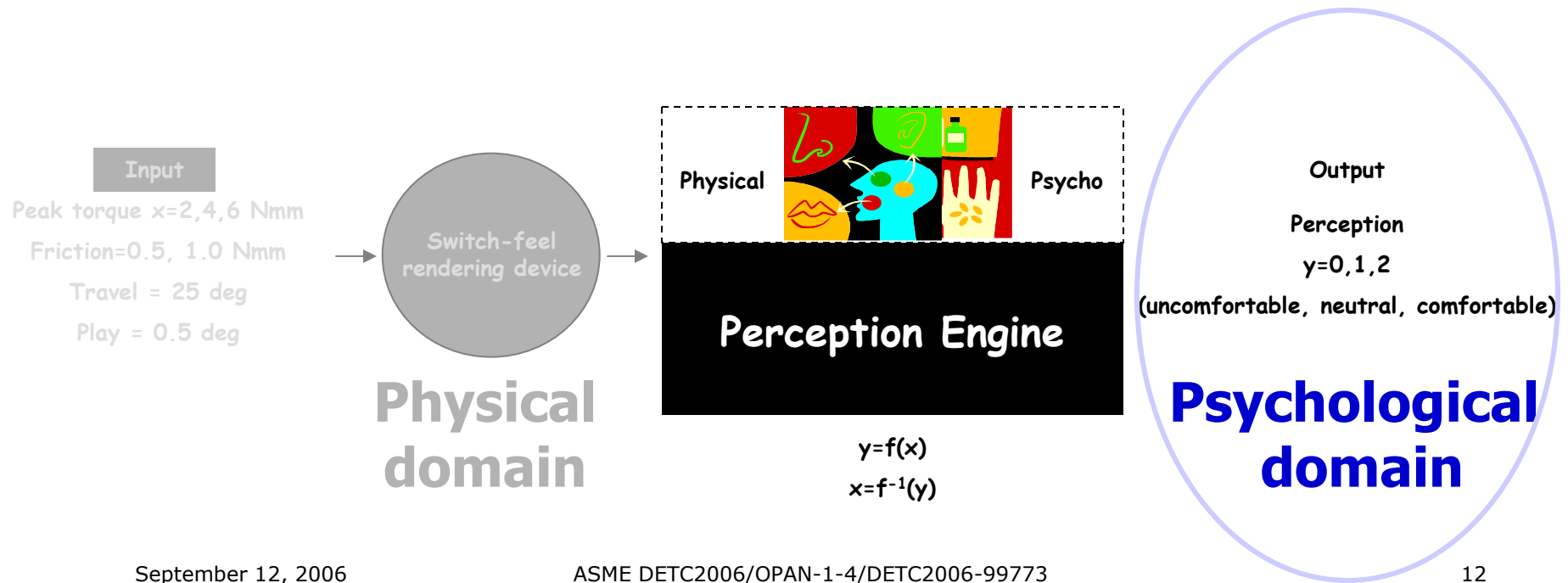
■ Purpose

- Provide a fast, reliable and affordable way to generate target system responses based on a given set of sensory input parameters
- Simulation is a viable alternative then building physical prototypes



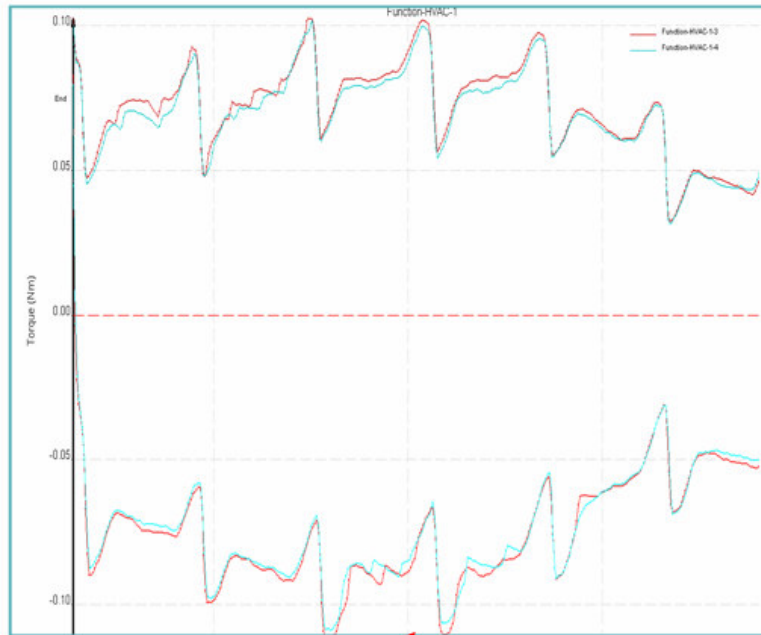
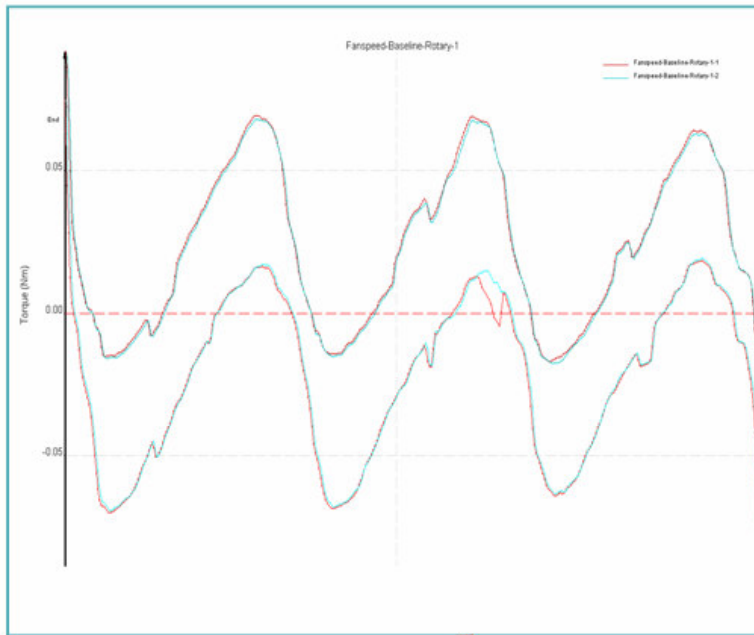
PSYCHOPHYSICAL STUDIES

- Purpose
 - Collect perceptual output data in response to sensory input data so that data correlation is possible



IMPLEMENTATION SUCCESS

2006 Ford Fusion Climate Control Switches

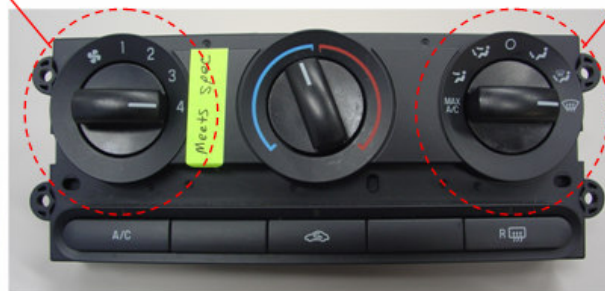
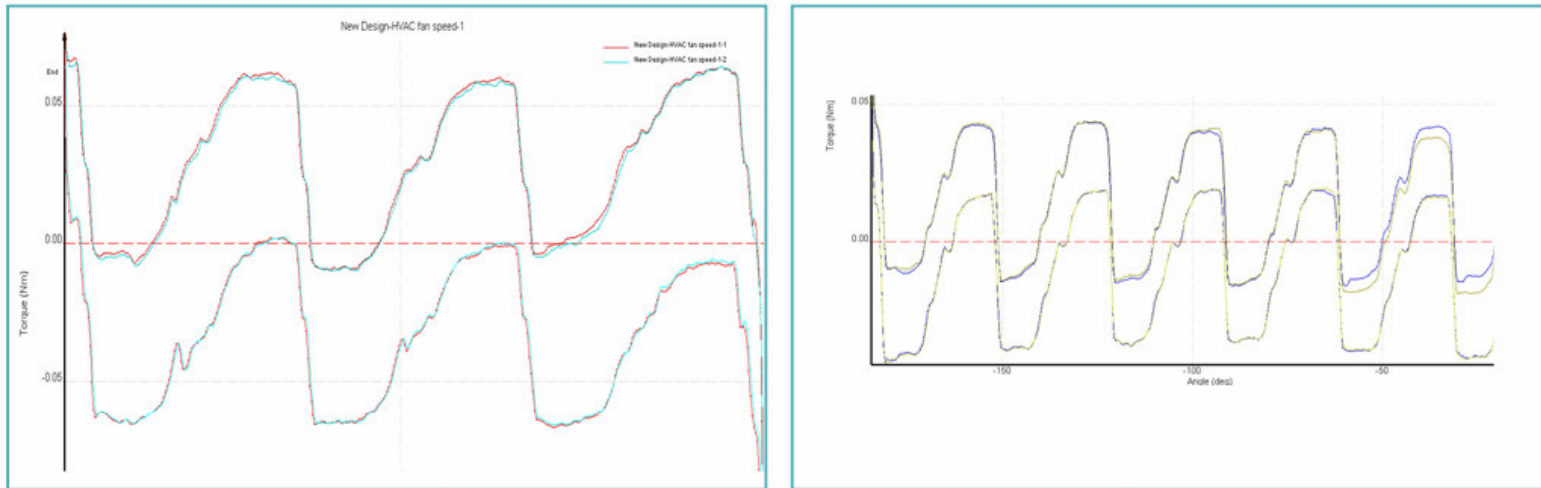


Carry-over parts

DET2006/OPAN-1-4/DET2006-99773

IMPLEMENTATION SUCCESS

2006 Ford Fusion Climate Control Switches – Production Version



This is what is in today's Fusions!

ASME DETC2006/OPAN-1-4/DETC2006-99773

CURRENT STATUS

- Work has been focused primarily on touch-and-feel
- Completed Switch-Feel Quality SDS
- Work is being extended to Other HMIs

FUTURE NEEDS

- Include other sensory information
 - Tactile (material texture)
 - Audio
 - Visual
- Challenges
 - Need subject matter knowledge to understand and describe information mathematically
 - Need tools that can be used to measure and characterize the sensory stimuli of interest
 - Need tools that can simulate or “render” the sensory experience
 - Better and more efficient methods