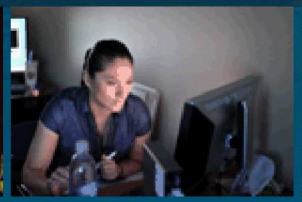
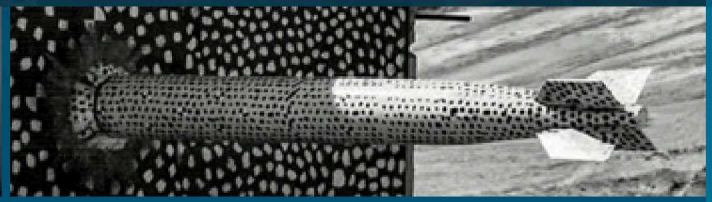
This paper describes objective technical results and analysis. Any subjective views or opinions that might be expressed in the paper do not necessarily represent the views of the U.S. Department of Energy or the United States Government.

SAND2019-11220C

Urgently Needed! Interaction and User Experience Design in Sensor Command and Control





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A GOOD QUESTION

"My kid can figure out a phone!

Why can't the [Sensor X] interface be as easy to learn?"

"Anna with her two G1 phones" by viralbus is licensed under CC BY-SA 2.0

TOPICS

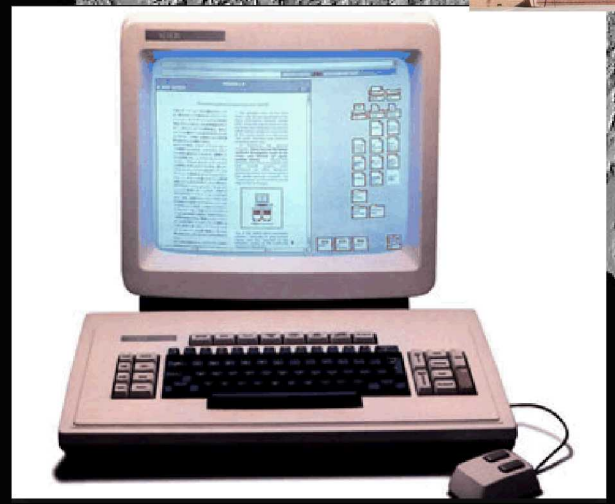
- Why are so many of our interfaces so awful?
- The UI is more than cosmetic.
- What are the most common interface issues we encounter?
- How to fix this problem.

BAD INTERFACES CAN UNDERMINE GOOD TECHNOLOGY

- Poorly implemented command and control systems introduce *extraneous cognitive load.*
- The more time and effort we put into navigating a bad interface, the fewer resources we can invest in learning the sensor.

A well-designed interface enables users to focus attention on the *sensor.*

1980: Personal/Consumer Computing
Software Psychology
Human-Computer Interaction



1948: World War II
Aviation Psychology
Engineering Psychology
Human Factors

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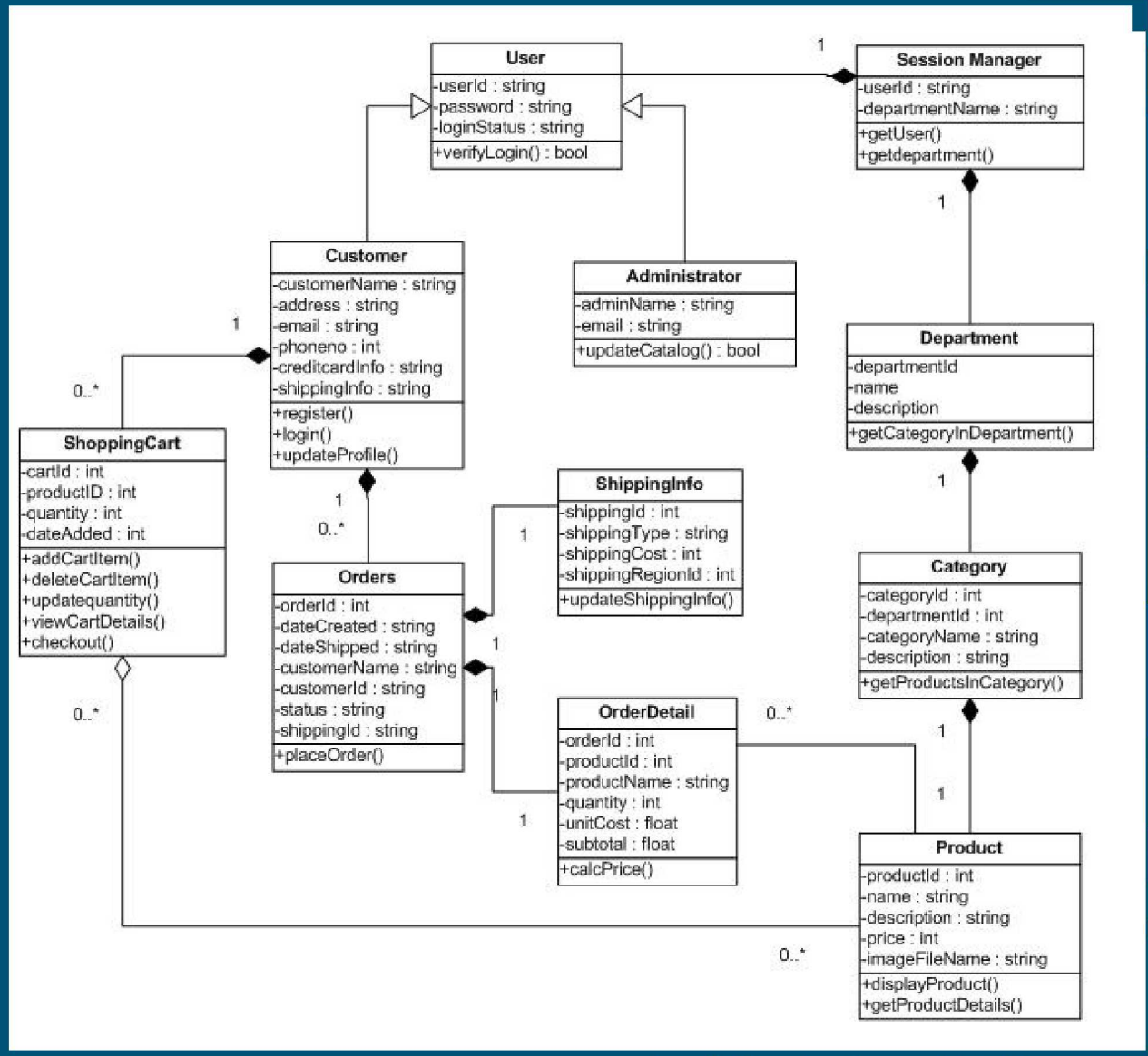
INTERFACES AREN'T THE STUFF YOU DO LAST



Jesus M. Almendros-Jimenez & Luis Iribarne
Group of Information Systems
University of Almeria, SPAIN
http://indalog.ual.es/mdd/udbi/

COMMON ISSUES WE ENCOUNTER

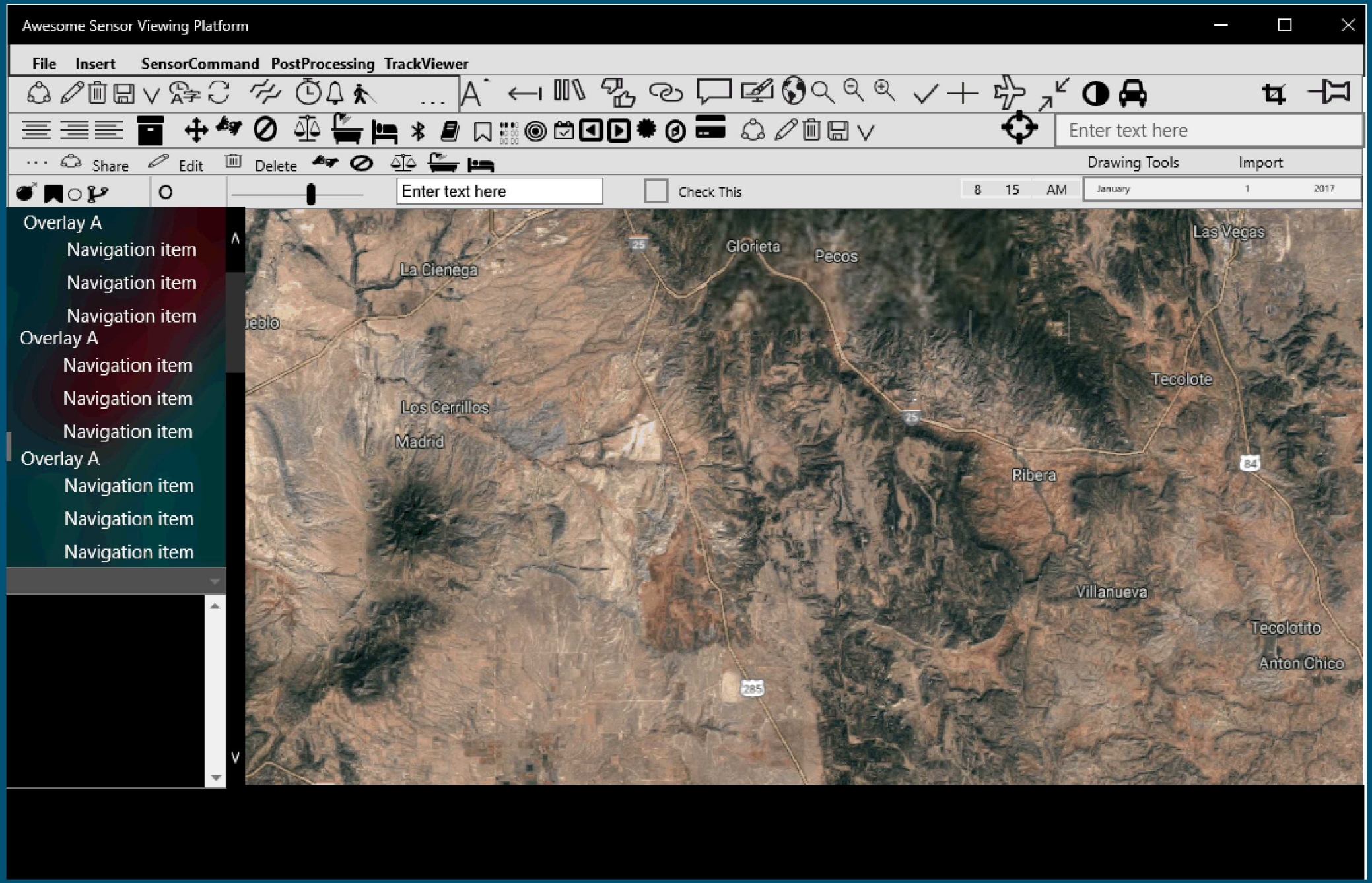
1. Lack of *External Consistency*
2. Lack of *Internal Consistency*
3. Too Much Stuff
4. Too Many Steps

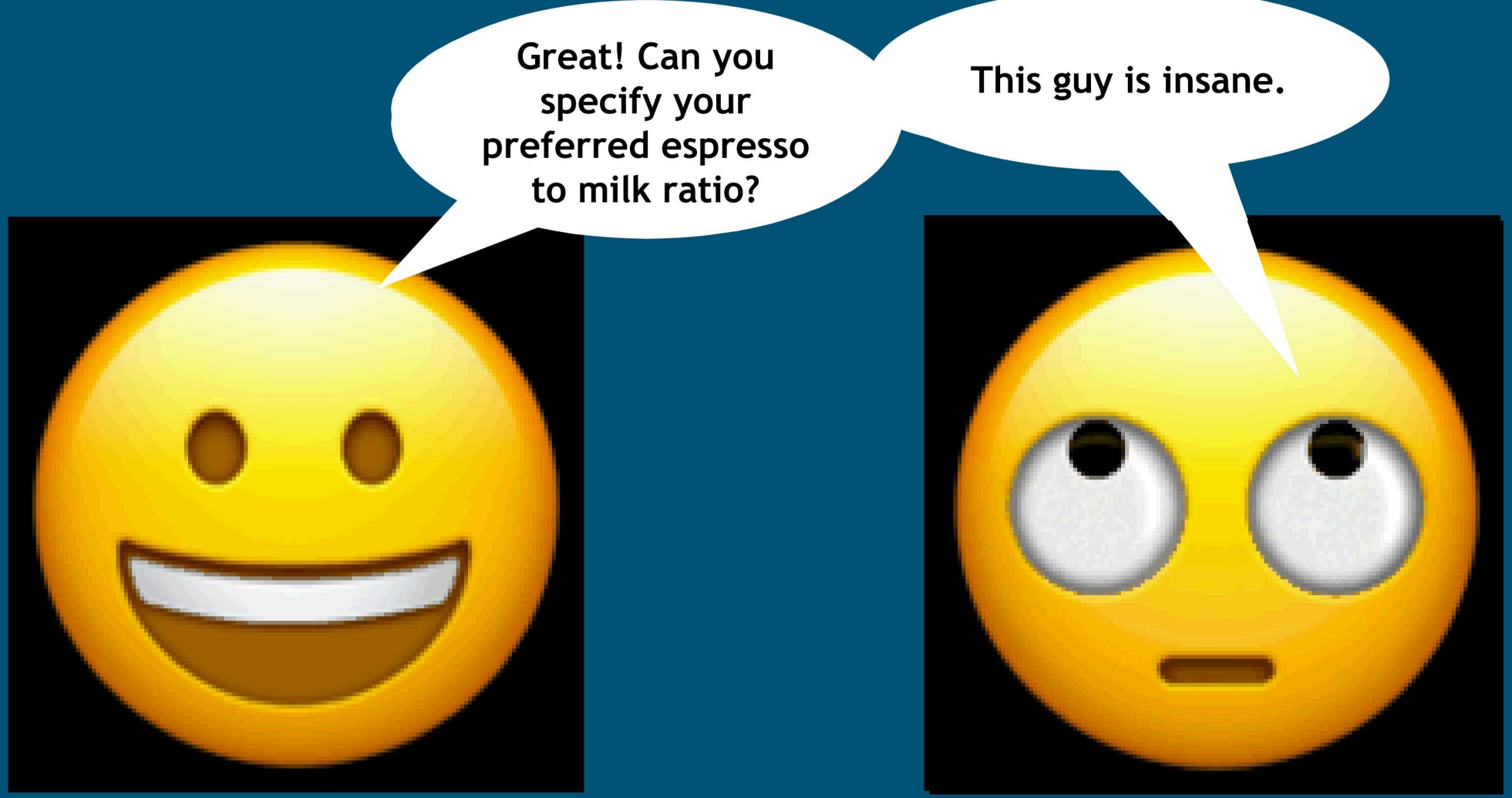
EXAMPLE: EXTERNAL CONSISTENCY

Let's say this is a button on a toolbar. How do you interpret the arrow?

A *Toggle Switch* is a much better way to communicate turning something 'on' or 'off.'

ALL THE THINGS. ALL THE THINGS





When interactions don’t make sense, we get frustrated.

FROM INTERFACES TO INTERACTIONS

1) A user action (clicking a button) that leads to a *perceptible* change in the system's state (a dialog appears or closes);

OR

2) A *perceptible* change in system state (I see a warning indicator) that prompts a user to take action (I click on the indicator to get information).

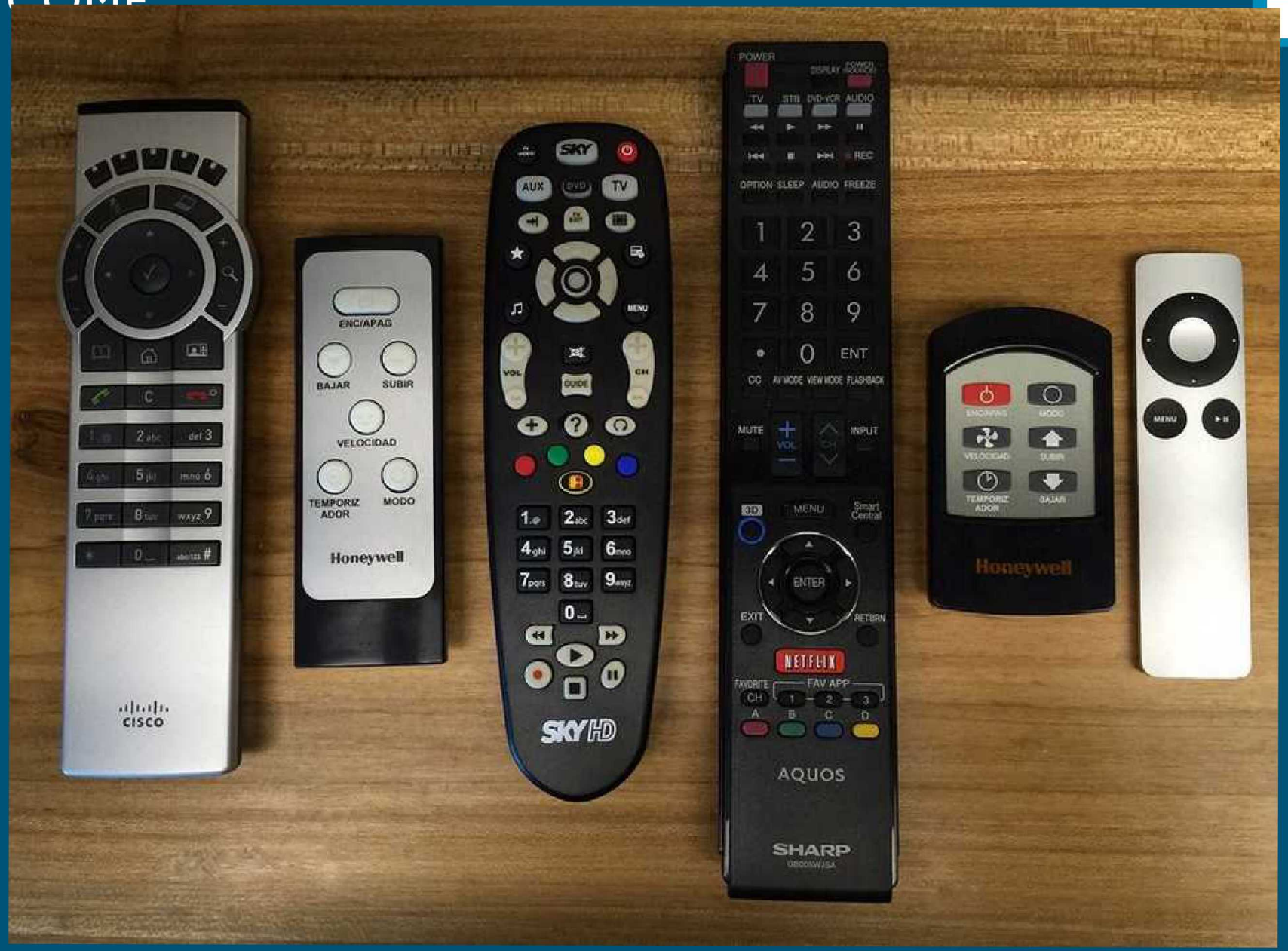
Saffer, D. 2014. Microinteractions. *Sebastopol, CA: O'Reilly.*

FIVE GOOD PRACTICES FOR BETTER COMMAND AND CONTROL INTERFACES

1. Get user experience experts involved as early as possible.
2. Design the interface. Like, really DESIGN it.
3. Get input and feedback from the user community, early and often.
4. Work in quick spiral iterations – design, implement, test, fix, wash, repeat.
5. Incorporate robust, valid usability criteria into your acceptance testing.

THE OPTIMAL OUTCOME

"Why can't our TV be as easy as our LIDAR?"



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