NS
18
NIAGARA
SUMMIT
CONNECTING
THE WORLD

Understanding User Experience

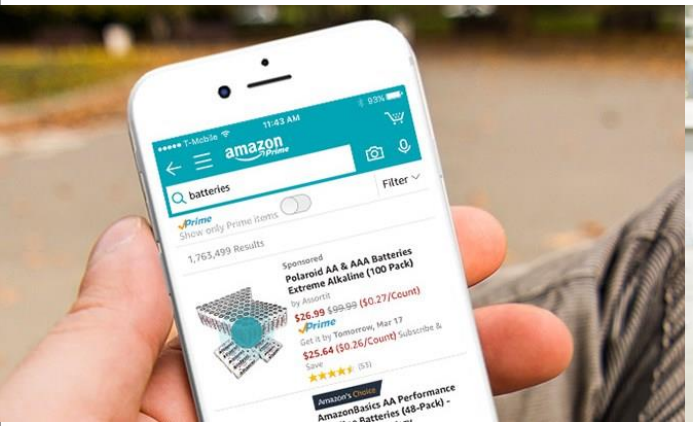
Kristofer Layon

Principal UX Researcher & Designer

What is user experience?

End-to-End User Experience

Buy



Deliver

Unpack

End-to-End User Experience

Buy

Deliver

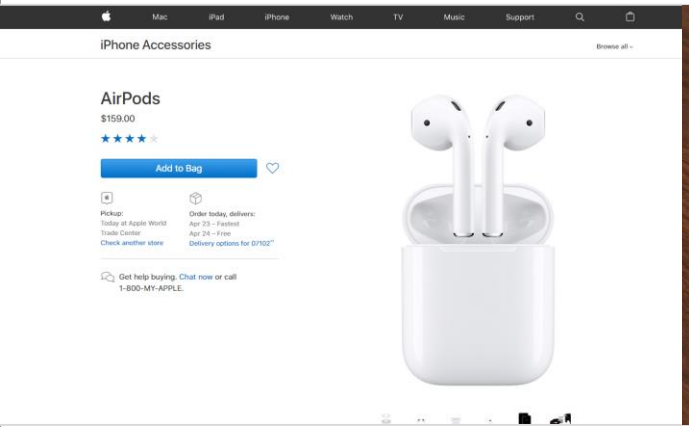
drive up

drive up

Unpack

End-to-End User Experience

Buy



Unpack

Use

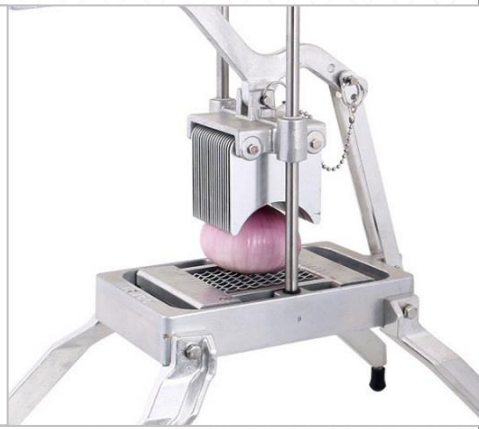
User Experience Options

Slice

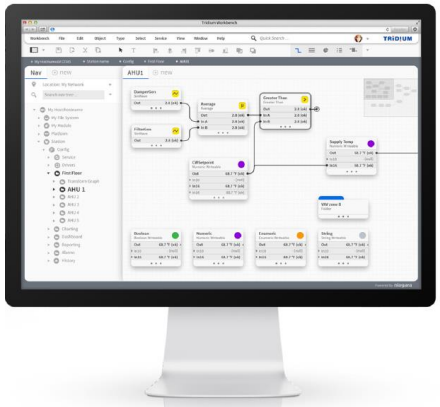
Slice

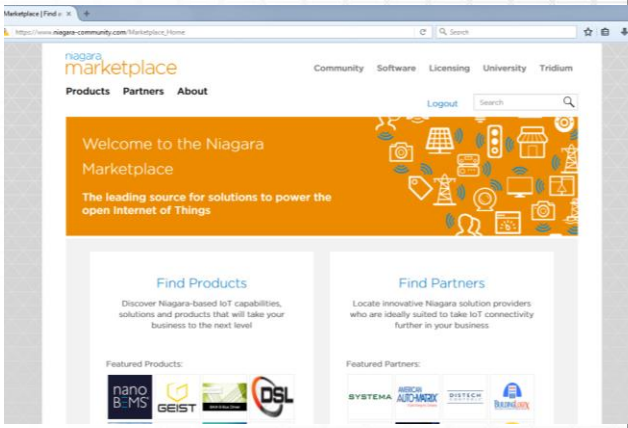
Slice

Slice



Niagara End-to-End User Experience





Engage

- tridium.com
- Tridium Talks
- Email
- Social Media
- Niagara Forum
- Niagara Summit
- AHR Expo

Specify & Buy

- JACE 8000
- JACE I/O
- Edge 10
- Niagara AX
- Niagara 4
- Community (licensing)

Train

- Tridium University
  - Classroom
  - Online
- Forum and Summit

Install

- Hardware packaging
- Hardware guide
- Commissioning workflows
- Wiresheets

Use

- Dashboards
- Graphics
- HX / PX pages
- Analytics

Maintain

- Cloud backup
- Community
- License renewal
- Tridium University

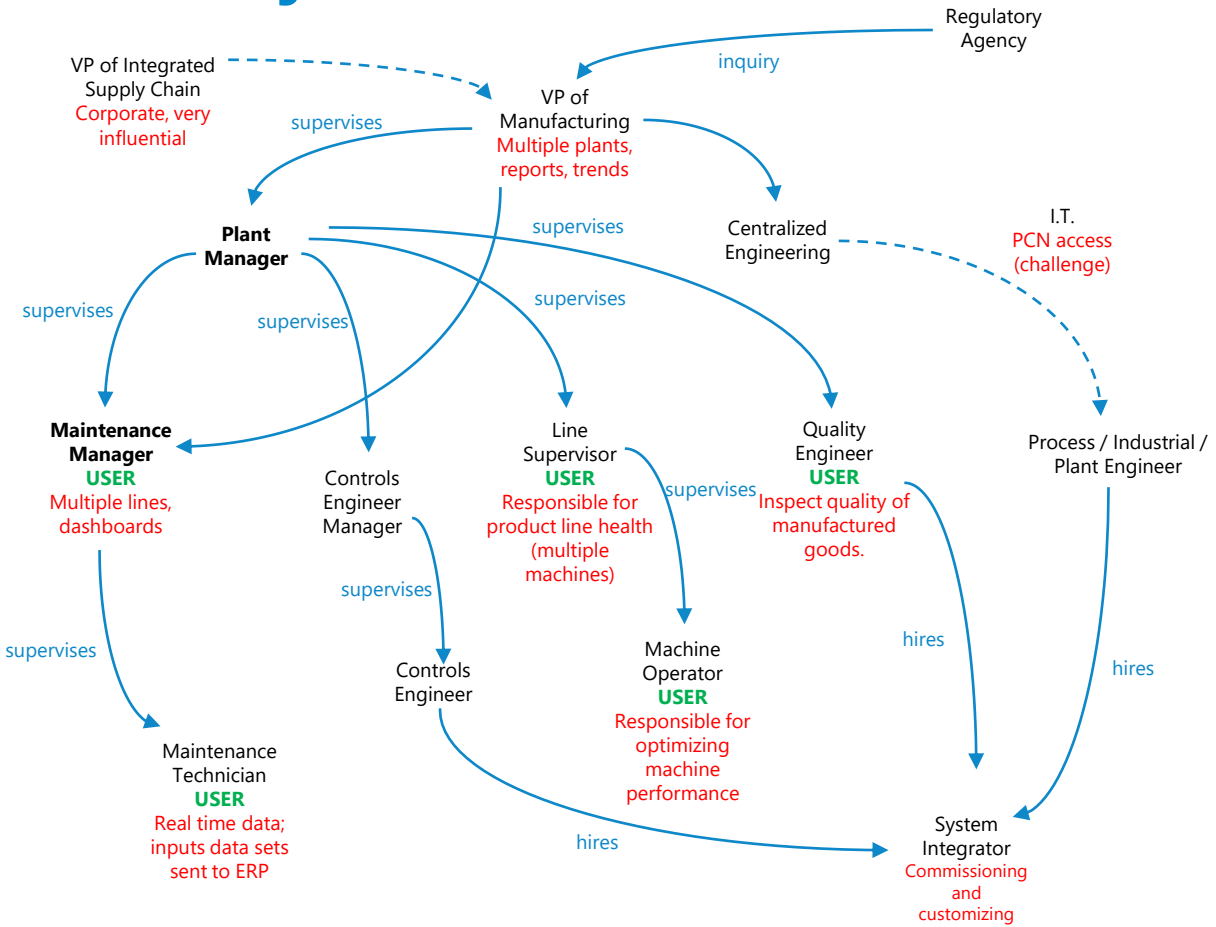
Upgrade

- Marketplace
- Customer service
- Sales
- OEM and SI channels

Understanding users (that is, people)

Stakeholder Analysis

The **Plant Manager** is the main decision maker, followed by the **Maintenance Manager**.



Persona

Larry, Line Supervisor

“Everyone relies on me to keep production capacity at 100%, all of the time. So I’m interested in finding problems immediately and solving them quickly.”

Description
Responsible for production line effectiveness. Various KPIs: velocity of production, bottleneck identification, production line health.

Heavy user of Tridium offering.

Use cases
I need to know if there is a problem in the production line. If there is a problem, where is it?

If there are multiple problems, which one should I address first?

I would like to see the severity of problems, and then drill into the details of the problem.

Environment
Plant floor of a manufacturing facility. Mobile part of time, also may be supervising from an office. Noisy, distracting, can be hard to focus and concentrate.

Most accessed content + features
tbd

Pain points
If production line is not performing well, goals are not met and I am answerable for not meeting those expectations.

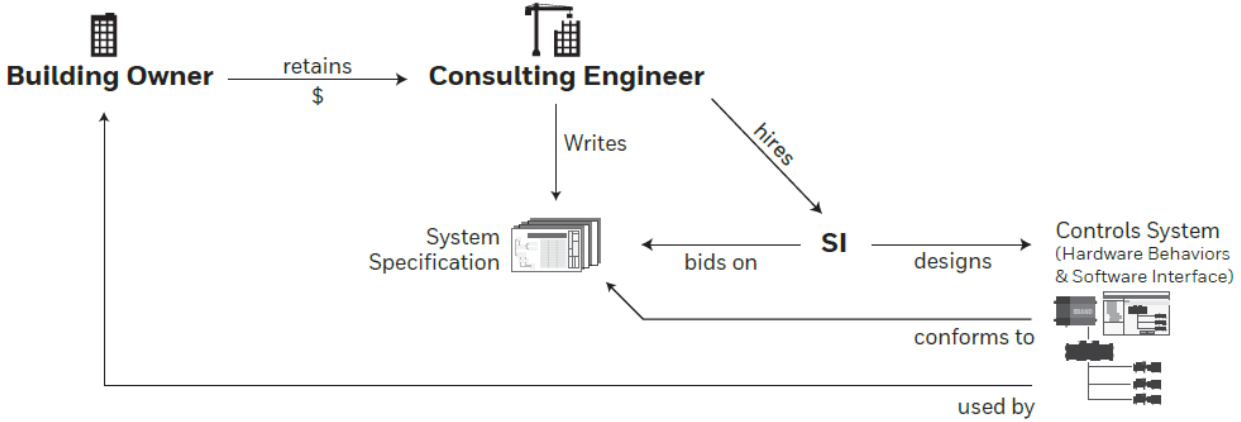
No scheduled downtime to inspect the system and address concerns – it’s real-time and ongoing.

When I am not aware of something immediately, there is a cost to that inefficiency during that period of being unaware.

Experience outcomes & evidence of success

- Velocity of production stays consistent or improves.
- Downtime duration is minimized when the problem is not an anomaly.
- Time to assign is reduced.
- Evidence of the most critical problems being addressed first and most quickly.
- OEE: Overall Equipment Efficiency

Journey Map

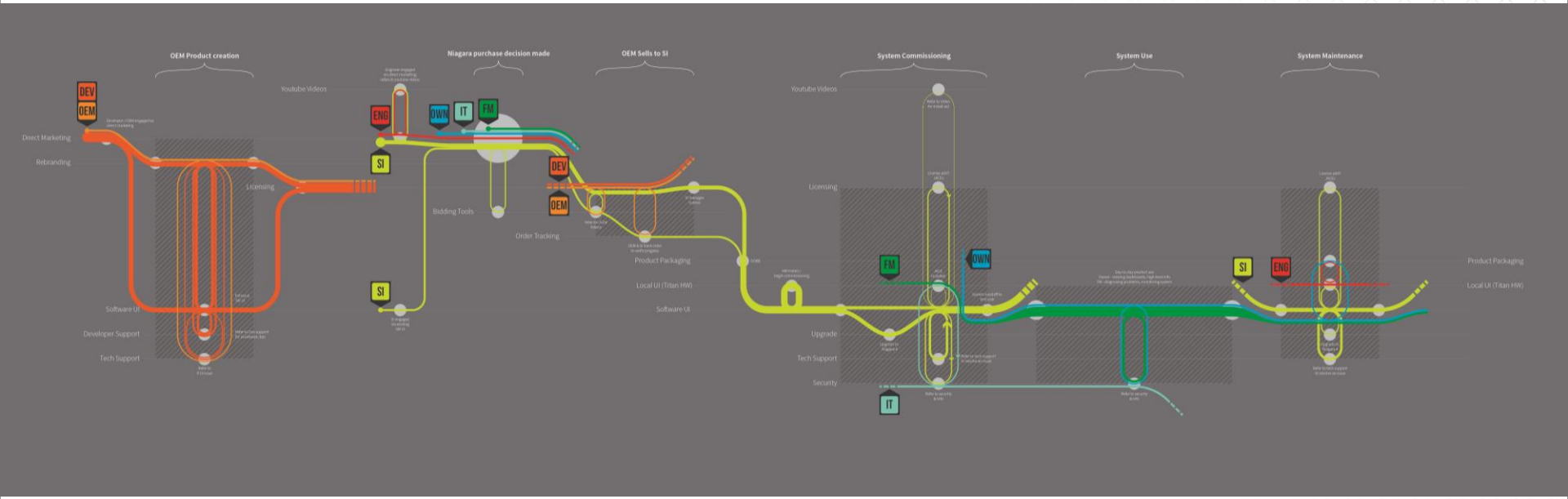


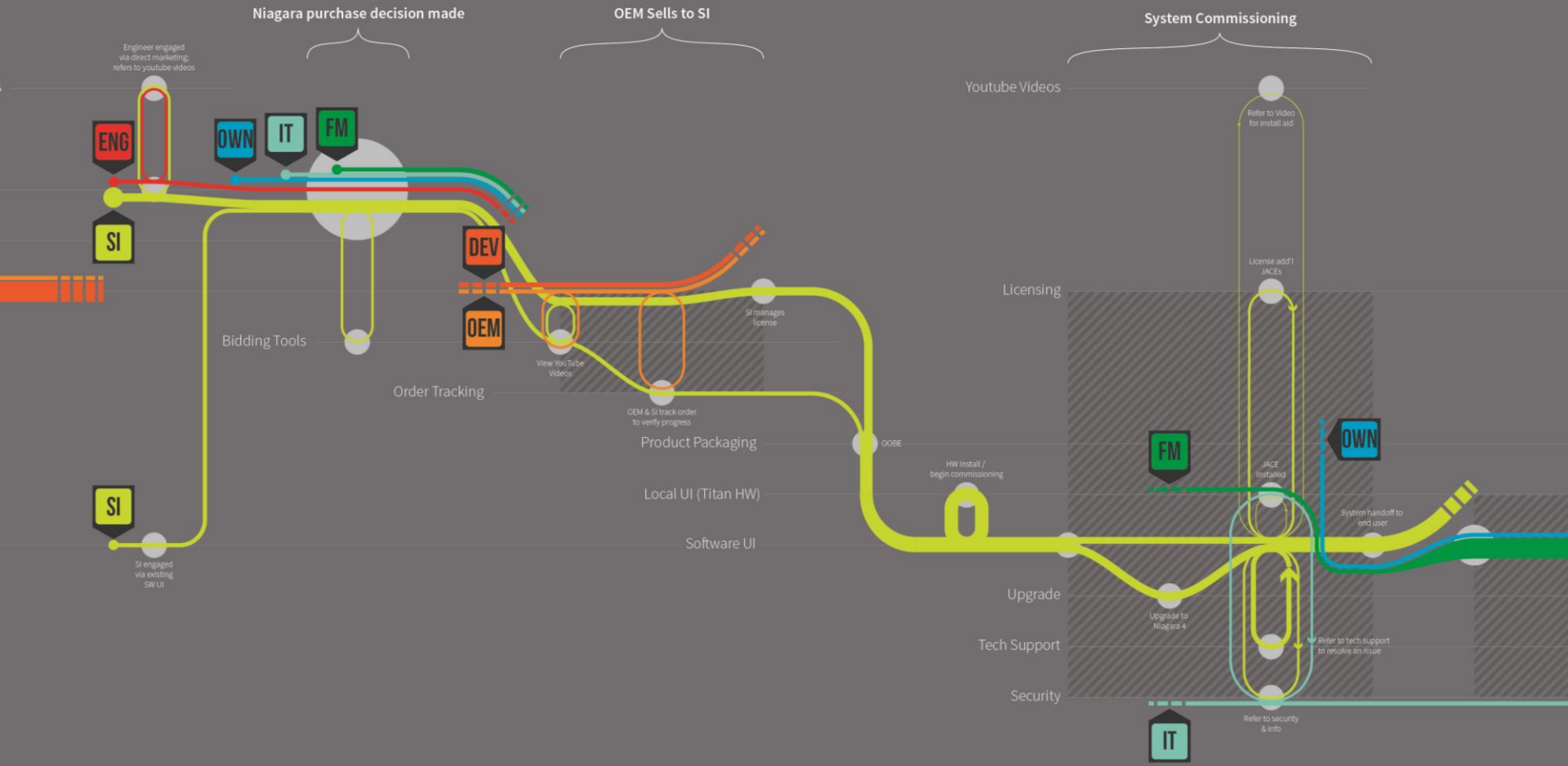
Building owners (whether new constructions or retrofits), generally work through Consulting Engineers to design and document new systems of building hardware (HVAC, Lighting, Electrical, etc.). The specification developed in this way is bid on by Systems Integrators, who submit a design/cost estimate in order to get the job.

Once awarded a bid, the SI uses the Engineer's specification to design the building automation system (controls). These controls are typically managed through a Niagara-derived UI and work with one or more Niagara stations/supervisors commissioned by the SI for that job.

Once the controls system and interface are built, the SI then trains the building owner in its use and provides ongoing support for the life of the system.

Journey Map


OEM Product creation
Niagara purchase decision made
OEM Sells to SI
System Commissioning
System Use
System Maintenance
DEV
OEM
ENG
SI
OWN
IT
FM
Youtube Videos
Direct Marketing
Rebranding
Licensing
Bidding Tools
Order Tracking
Product Packaging
Local UI (Titan HW)
Software UI
Developer Support
Tech Support
Upgrade
Security


Niagara purchase decision made
OEM Sells to SI
System Commissioning
Engineer engaged via direct marketing; refers to youtube videos
ENG
OWN
IT
FM
SI
DEV
OEM
Bidding Tools
Order Tracking
Product Packaging
Local UI (Titan HW)
Software UI
SI engaged via existing SW UI
View YouTube Videos
OEM & SI track order to verify progress
SI manages license
OOBE
HW Install / begin commissioning
Youtube Videos
Refer to Video for install aid
Licensing
License add'l JACEs
JACE Installed
System handoff to end user
Upgrade
Upgrade to Niagara 4
Tech Support
Refer to tech support to resolve an issue
Security
Refer to security & info

User Story

PERSONA | NEED | OUTCOME | VALUE

"As Larry the Line Supervisor, I want to see all schedules that are tied to a device so I can understand how changes to one schedule might impact others, helping me reduce support calls."

User Stories

1. As an S.I., I have just one version of Scheduler to manage in Work Bench, Mobile, and HX so I can save time and avoid confusion.
2. As an S.I., I can use Scheduler on my smartphone and tablet so I can work in the field and not need a laptop.
3. As an S.I., I can use Scheduler offline so I do not need an internet connection to use it.
4. As an S.I., I can view schedules in both list or calendar views so I can switch to one format or the other depending on context and viewing preferences.
5. As an S.I., I can quickly view details of an event so that I can save time.
6. As an S.I., I can visually identify holidays so that I can quickly differentiate them from regular events.
7. As an S.I., I can easily create and interact with (select, move, etc.) short duration events so that they are more accessible and quick to use.
8. As an S.I., I can export a schedule to PDF so that I can print it.
9. As an S.I., I can see all schedules that are tied to a device, or see all devices that are tied to a schedule, so that I can understand how changes to a schedule will impact devices.
10. As an S.I., I have a view of the Scheduler that is easy to see and read so that it is pleasant and efficient to use.
11. As an S.I., I can set the beginning of the week to be on a Sunday or a Monday for localization purposes.
12. As an S.I., I can set view and edit permissions for my schedules so I can control access to them.
13. As an S.I., I can import and export schedules so add other events to Niagara, and use my schedule outside of Niagara.

Human Centered Design

1 **Control costs**
Monitor energy usage so you can be aware of costs, and then make informed decisions to control them.

2 **Save energy**
Get meaningful information and practical notifications that help you optimize energy performance.

3 **Benchmark your buildings**
View data across all of your buildings, and leverage analysis that can help you set performance standards.

Smart Phones

They’re really cool!

The latest technology!

They look fantastic!

But do we actually like them for other reasons?

Cell Phones

They’re really cool!

The latest technology!

They look fantastic!

We used to say this things about these phones, too.

BlackBerrys

They’re really cool!

The latest technology!

They look fantastic!

And PDAs.

10 Usability Heuristics for User Interface Design

Jacob Nielsen – Principal, Nielsen Norman Group

Source: tfa.stanford.edu/download/TenUsabilityHeuristics.pdf

1. Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

2. Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing.

5. Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

6. Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

7. Flexibility and efficiency of use

Accelerators — unseen by the novice user — may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

8. Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Heuristic Evaluation

Visibility: information is black and white, uniform in size, on a very small screen

Ease of use / minimalist design: bulky form

Flexibility: physical buttons

Heuristic Evaluation

Visibility: information is black and white

Ease of use / minimalist design:
bulky form, complex icons

Flexibility: physical buttons

Heuristic Evaluation

Visibility: information is color and with different sizes that convey hierarchy

Ease of use / minimalist design: thin form

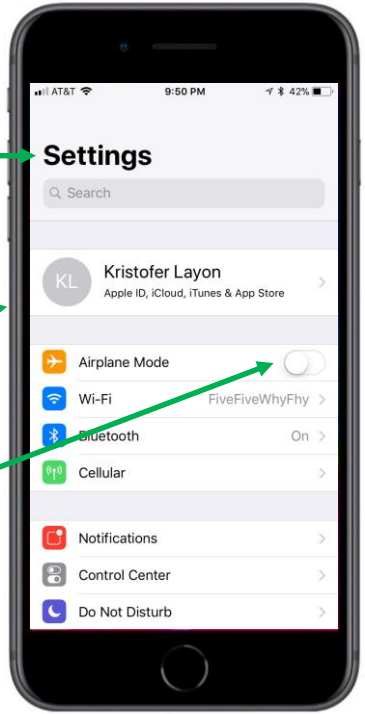
Flexibility: touchscreen enables infinite configuration options

Heuristic Evaluation

Visibility: information is color and with different sizes that convey hierarchy

Ease of use / minimalist design: simple icons

Flexibility: touchscreen enables infinite configuration options

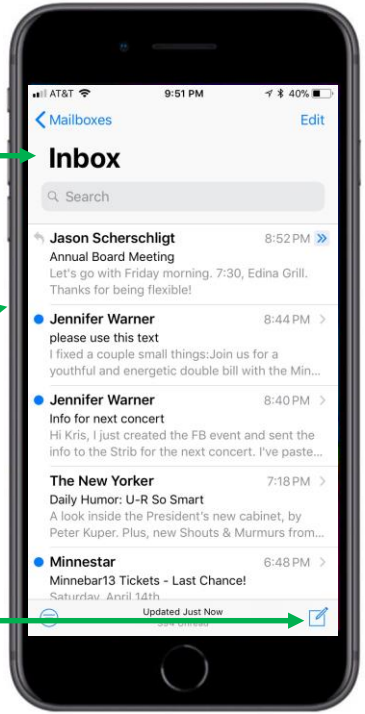


Heuristic Evaluation

Visibility: information is color and with different sizes that convey hierarchy

Ease of use / minimalist design: simple indicators, limited use of color

Flexibility: touchscreen enables infinite configuration options



What can we learn from the evolution of cellular phones?

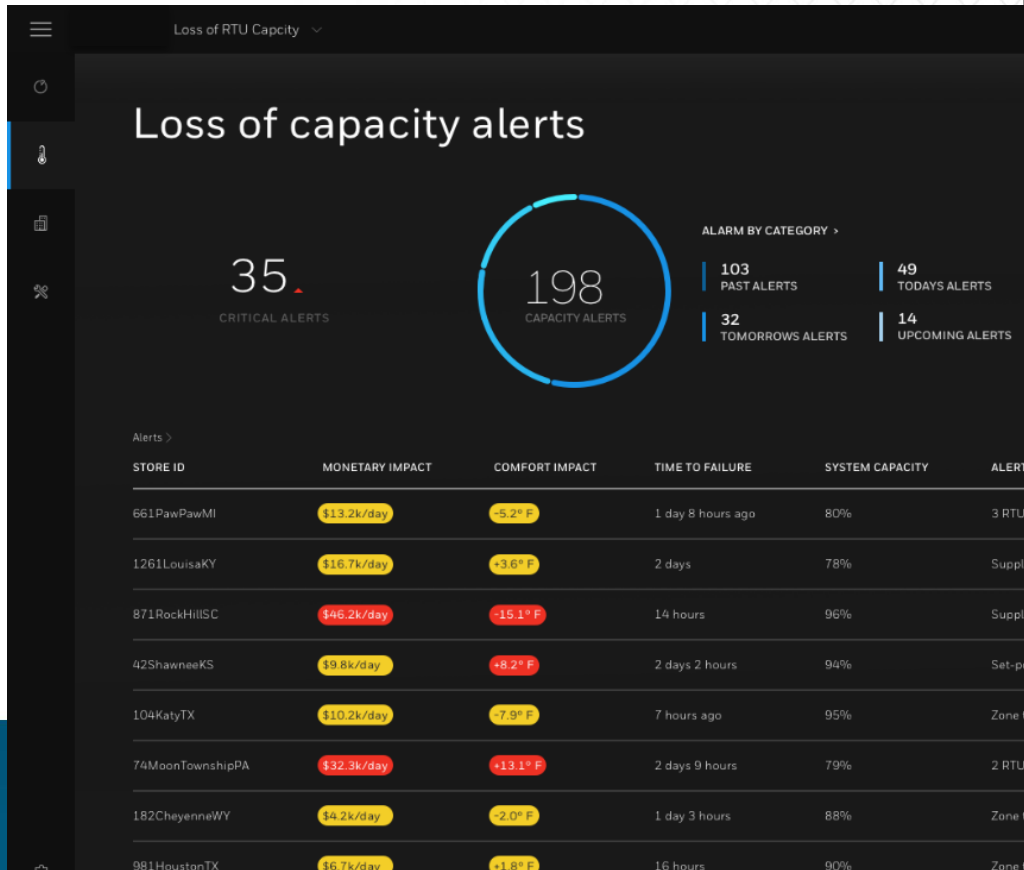
1. Visibility of status
2. Information hierarchy
3. Aesthetic and minimalist design
4. Flexibility and ease of use

Visibility of Status

- Use color if it communicates meaning or adds clarity
- Make a symbol easy to see
  - Don’t make it too small
  - Don’t hide it in clutter
- Use only as much color as necessary

Information Hierarchy

- Use a common font and color to unify presentation
- Use type sizes to differentiate levels of importance
- Use color sparingly and in ways that communicate vs. decorate



Information Hierarchy

Last game to define season for Wolves
SPORTS

MUMMY WAS IN STOCK
A monkey never left Dayton's
MINNESOTA

Wild embrace role of playoff underdog
SPORTS

WEDNESDAY
April 11, 2018

StarTribune

43° 36°
Rainy; likely to turn to snow this weekend. B6

TOP NEWS

ANDERSON QUITS TWO BOARDS
Ex-CEO of Best Buy resigns from General Mills, MPR panels over donation to group. D1

No threats to EPA chief found
Files undercut Scott Pruitt's claims he needed first-class travel, guards. A4

Wells Fargo may face fine
Consumer finance agency may penalize bank millions over abuses. D9

Thousands flee Ghouta
Damascus suburb targeted by government. A5

China's Xi open to talks
President says trade dialogue better than confrontation with U.S. A3

LOCAL NEWS

School cuts draw protest
Parents, students, staff ask Mpls. board to save jobs, programs. B1

Chaos at forum on city policing
Scuffles and shouting matches upend agenda in Minneapolis. B9

SPORTS

Twins rebound to beat Astros
Starter Jake Odorizzi got his first win with his new team. C1

Payoffs were focus of FBI raid

Cohen's office searched for files on two women who've accused Trump.

By MICHAEL D. SHEAR and MATT APUZZO • New York Times

WASHINGTON – The FBI agents who raided the office of President Donald Trump's personal lawyer Monday were looking for records about payments to two women who claim they had affairs with Trump, and information related to the publisher of the National Enquirer's role in silencing one of the women, several people briefed on the investigation said.

The search warrant carried out by the public corruption unit of the New York City federal attorney's office seeks information about Karen McDougal, a former Playboy model who claims she carried on a nearly yearlong affair with Trump shortly after the birth of his son in 2006. McDougal was paid $150,000 by American Media Inc., the Enquirer's parent company, whose chief executive is a friend of Trump's.

Agents were also searching the office and hotel room of the lawyer, Michael Cohen, for information related to Stormy Daniels, whose real name is Stephanie Clifford, who says she also had sex with Trump while he was married. Cohen has acknowledged that he paid Clifford $130,000 as part of a nondisclosure agreement to secure her silence just days before the 2016 presidential election.

Cohen's lawyer, Stephen Ryan, on Monday called the raids "inappropriate and unnecessary." In an e-mail on Tuesday, he referred back to that statement.

American Media released a statement saying that the

See TRUMP on A4 »

Related: Trump wanted to fire the special counsel in December over subpoena reports. A4

Zuckerberg to Congress: 'We didn't do enough'

CAROLYN KASTER • Associated Press

Facebook CEO Mark Zuckerberg faced two Senate committees Tuesday, admitting the company's missteps and vowing reforms.

Judge to be state's new U.S. attorney

Erica MacDonald chosen to fill vacant federal post.

By STEPHEN MONTEMAYOR • smontemayor@startribune.com

President Donald Trump on Tuesday nominated Dakota County District Judge Erica H. MacDonald to be the next U.S. attorney for Minnesota, elevating a former federal prosecutor for the important law enforcement post.

The Star Tribune first reported in February that MacDonald had emerged as the likely pick after a murky process saw multiple candidates rise and fall over the past year. The White House announced MacDonald's nomination as part of its 12th "wave" of U.S. attorney nominations.

If confirmed by the U.S. Senate, MacDonald would return to an office at which she spent eight years as a federal prosecutor; she also worked as a federal prosecutor in Illinois earlier in her career. MacDonald spent the last three years of

See ATTORNEY on A2 »

Judge Erica MacDonald has support from both sides of the aisle.

Bills target officers who abuse

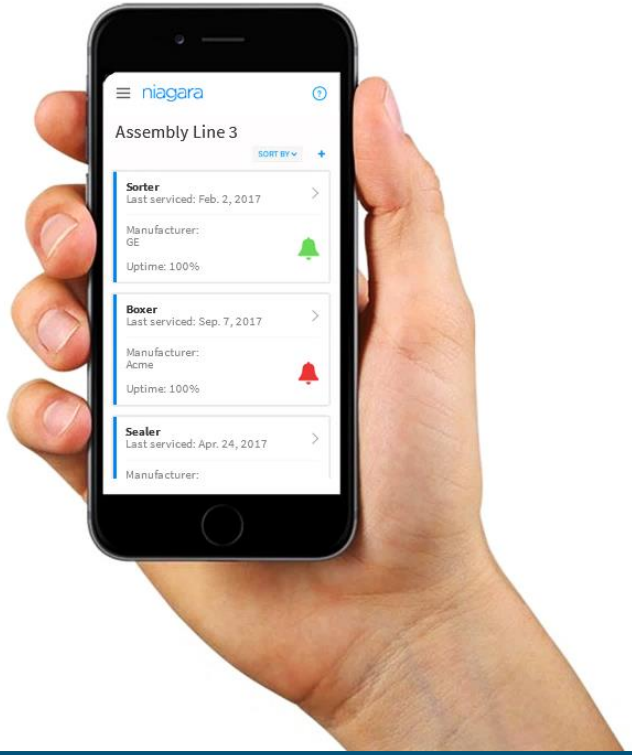
Police depts. would be required to establish rules.

By JENNIFER BJORHUS • jennifer.bjorhus@startribune.com

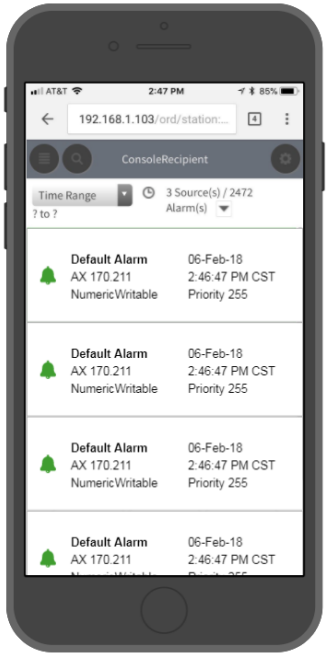
Police have set procedures for responding to domestic violence, but when one of

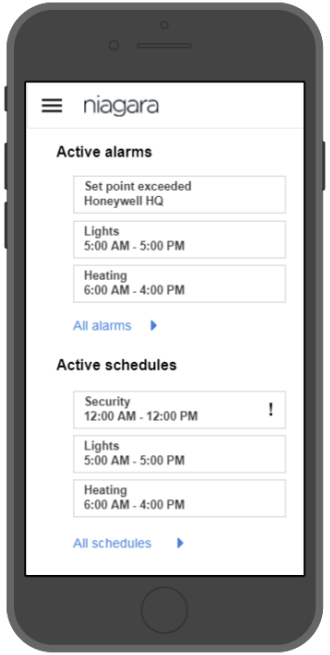
Aesthetic and Minimalist Design

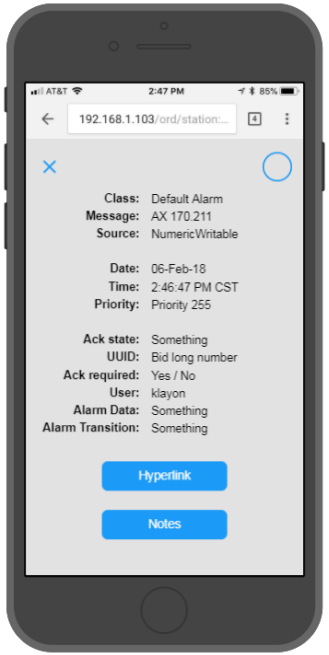
- Too much information at once is hard to process and leads to error, fatigue, frustration.
- Unnecessary ornamentation and styling adds visual clutter.
- The fewer the fonts, text sizes, and visual treatments used, the better.



Aesthetic and Minimalist Design

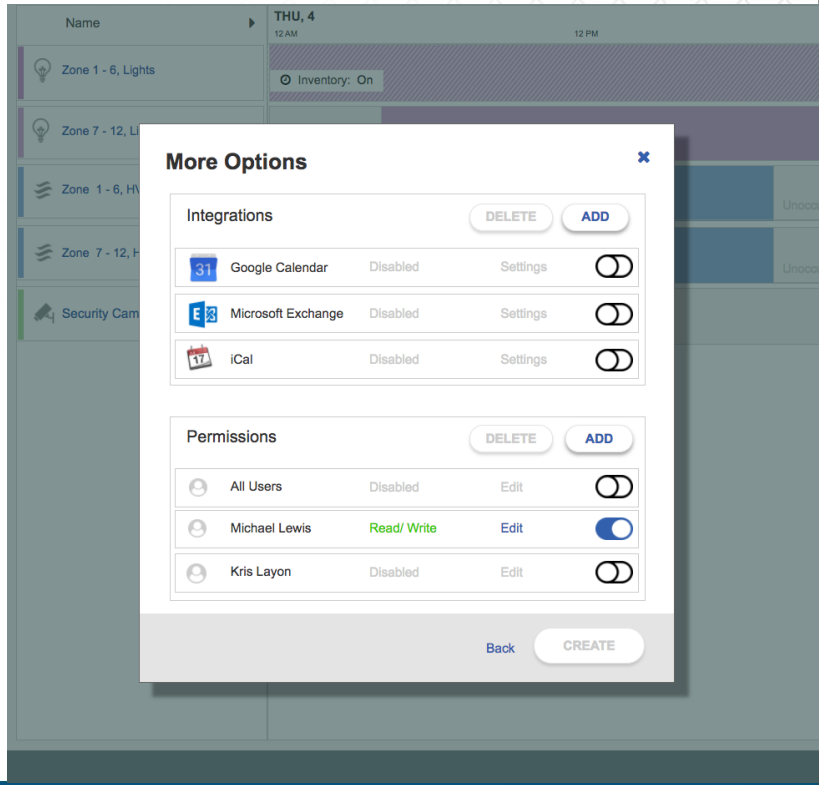




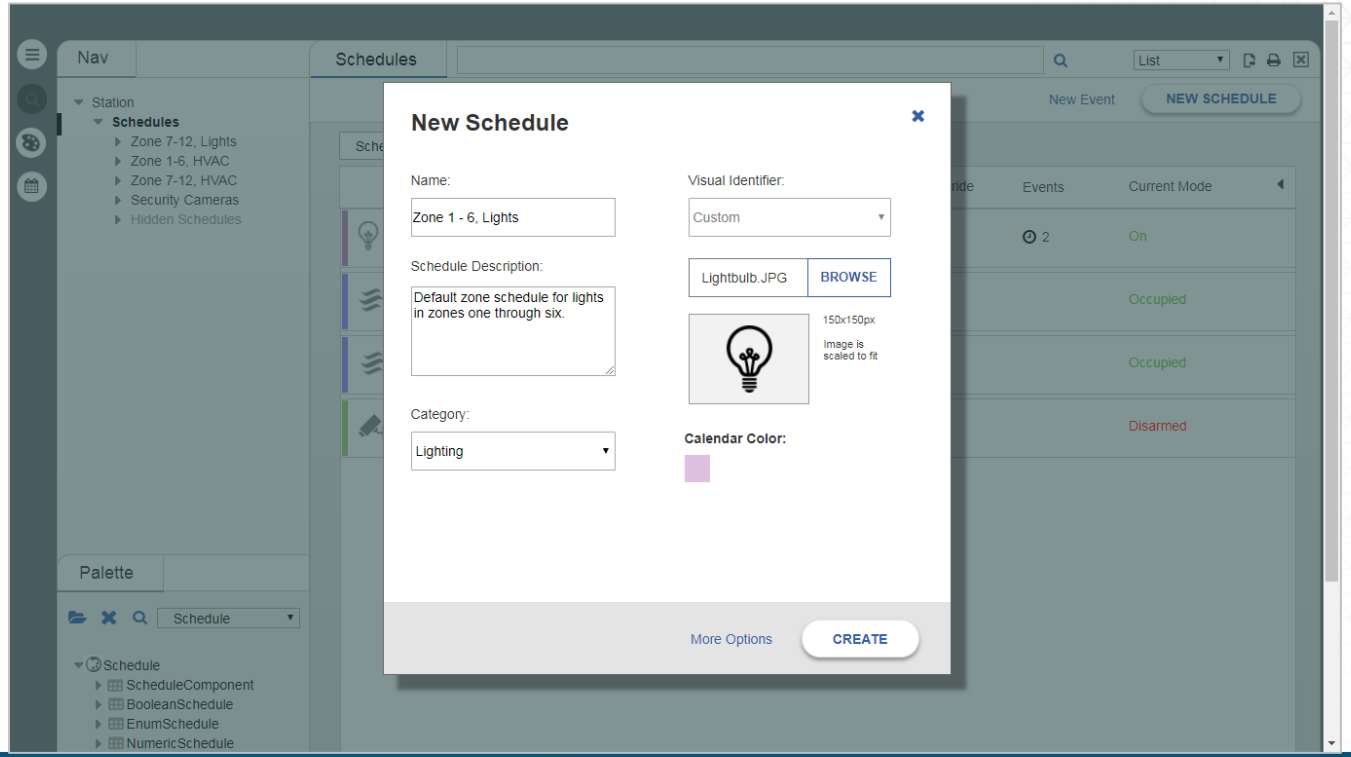


Flexibility and Ease of Use

- If customers manage tasks and information in more than one way, can we be flexible and accommodate that?
- Can we integrate with other tools to reduce labor?
- Can we make options easy?

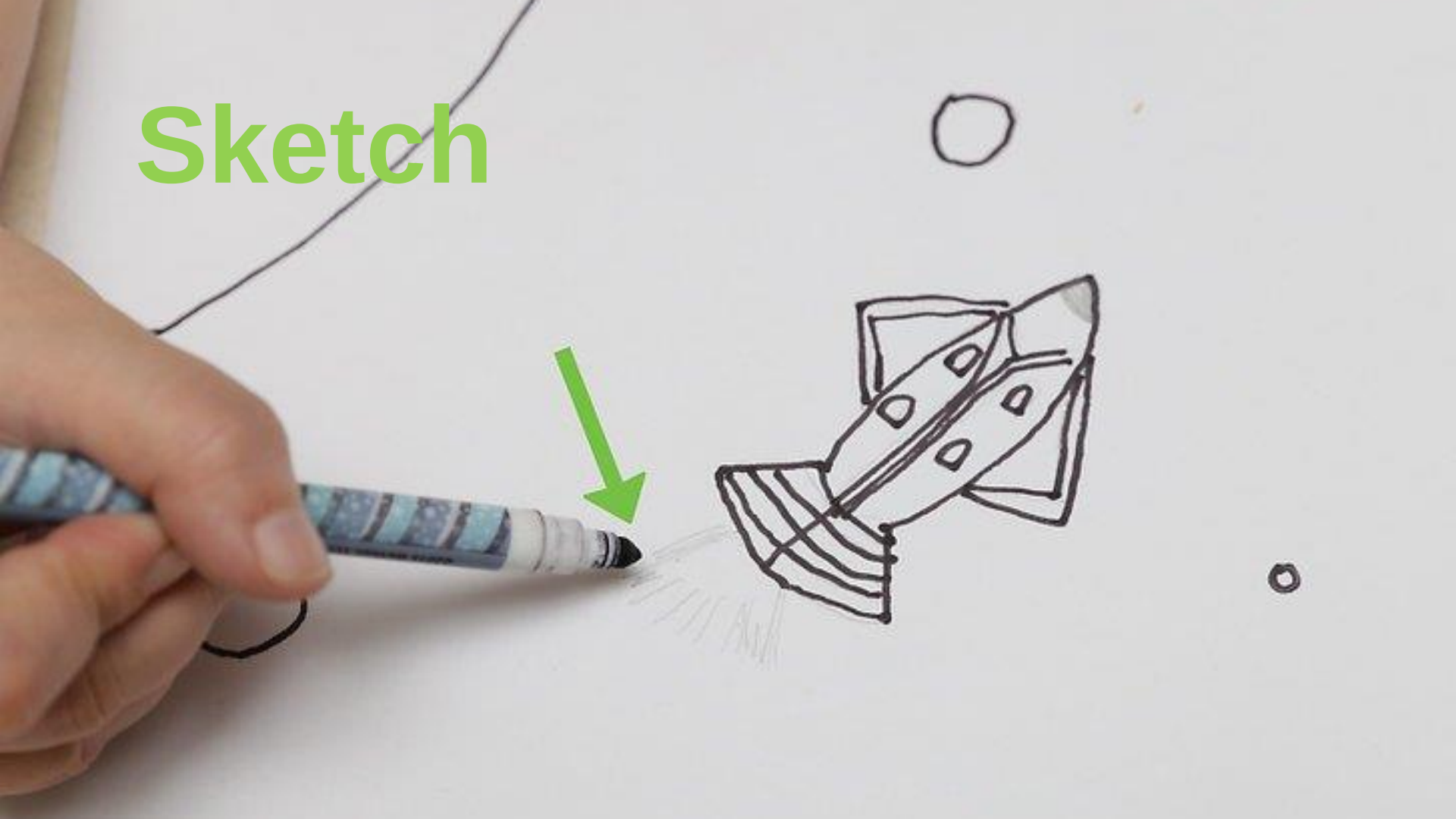


Flexibility and Ease of Use



“What can I do to support good UX design?”

Sketch



niagara Alarms Buildings Schedules Permissions Settings Anders Anderson

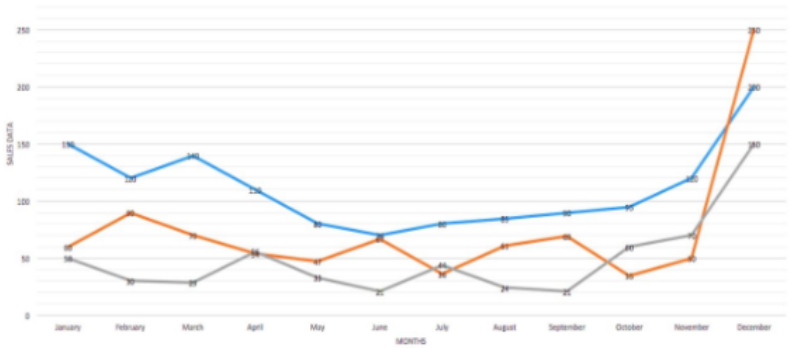
Prototype

Active alarms

Tridium Building 1 AC failure	Feb. 22, 2018 5:12 AM
Walmart Refrigeration leak	Feb. 22, 2018 6:45 AM
Chapel Hill - Chemistry Building Lighting failure	Feb. 22, 2018 1:08 PM

All alarms

History



Today's weather: Raleigh, NC

Air Sensor 1	Air Sensor 2
44° F	45° F

Active schedules

Security
IBM Building 1
12:00 AM - 12:00 PM
Occupied
2

Security
IBM Building 2
12:00 AM - 12:00 PM
Occupied
2

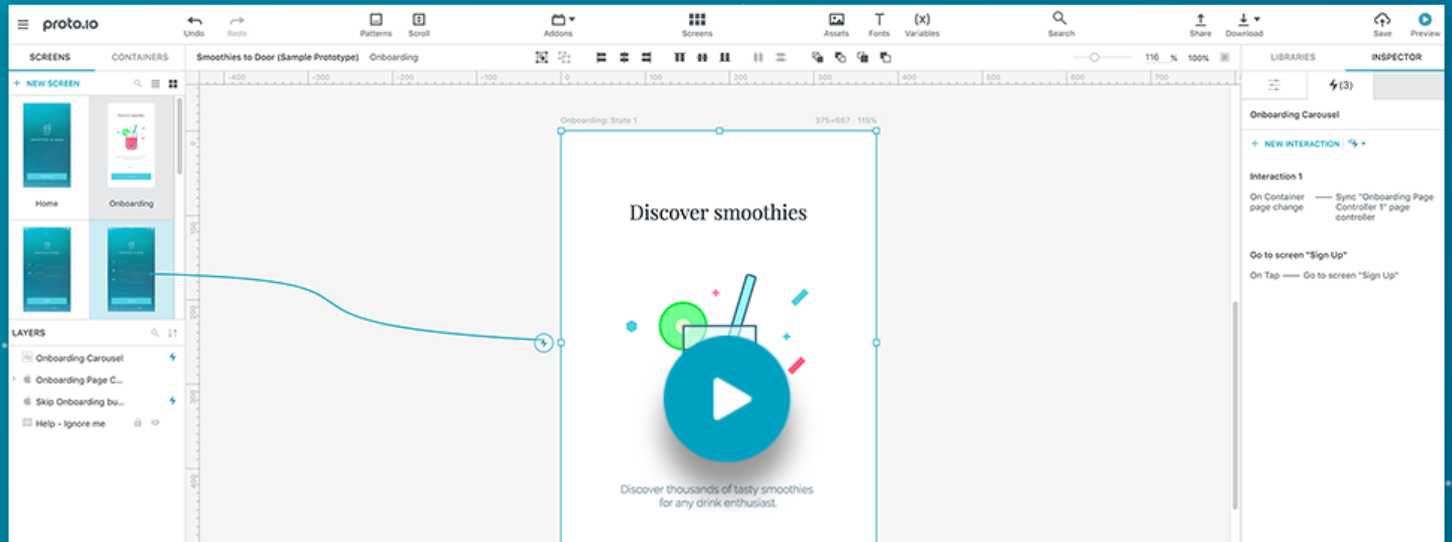
Lighting
Duke Student Union
12:00 AM - 12:00 PM
Occupied
2

All schedules

100%

Prototypes that feel real.

Create fully-interactive high-fidelity prototypes that look and work exactly like your app should.
No coding required.



Learn Design Basics

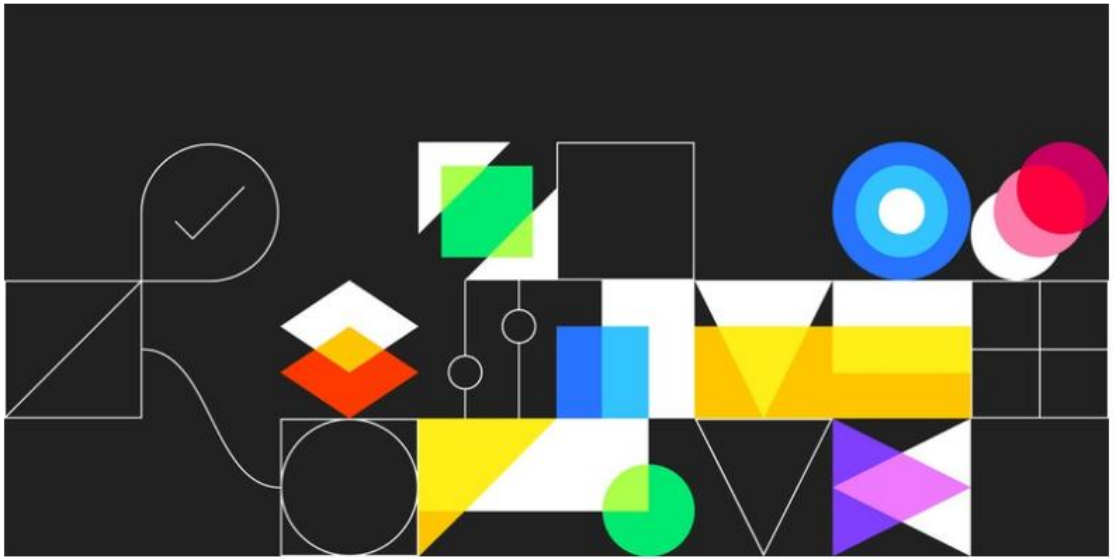
- General principles
  - Composition / page layout / screen layout
  - Information hierarchy
  - “White space” / reducing clutter and confinement
  - Legibility and readability
- Typography (fonts)
- Color

A directory of essential design tools and resources to keep your projects moving forward

Material Design

Find the latest Material Design tools, resources, and theory all in one place.

- Guidelines
- Components
- Color Tool
- Icons
- Gallery



Principles

Material is the metaphor

A material metaphor is the unifying theory of a rationalized space and a system of motion. The material is grounded in tactile reality, inspired by the study of paper and ink, yet technologically advanced and open to imagination and magic.

Bold, graphic, intentional

The foundational elements of print-based design – typography, grids, space, scale, color, and use of imagery – guide visual treatments. These elements do far more than please the eye. They create hierarchy, meaning, and focus. Deliberate color choices, edge-to-edge imagery, large-scale

Motion provides meaning

Motion respects and reinforces the user as the prime mover. Primary user actions are inflection points that initiate motion, transforming the whole design.

All action takes place in a single environment. Objects are

Type & Typography

Explore typographic culture and discover fonts for your next project, with this collection of case studies, technical updates, and editorial features curated by the Google Fonts team

Open Sans
Steve Matteson (10 styles)

Almost before we knew it, we had left the ground.

Lato
Łukasz Dziedzic (10 styles)

A shining crescent far beneath the flying vessel.

Montserrat
Julieta Ulanovsky, Sol Matas, Juan Pablo del Peral, Jacques Le Bailly (18 styles)

It was going to be a lonely trip back.

Tajawal
Boutros Fonts, Mourad Boutros, Soulaf Khalifeh (7 styles)

Mist enveloped the ship three hours out from port.

Roboto Condensed
Christian Robertson (6 styles)

My two natures had memory in common.

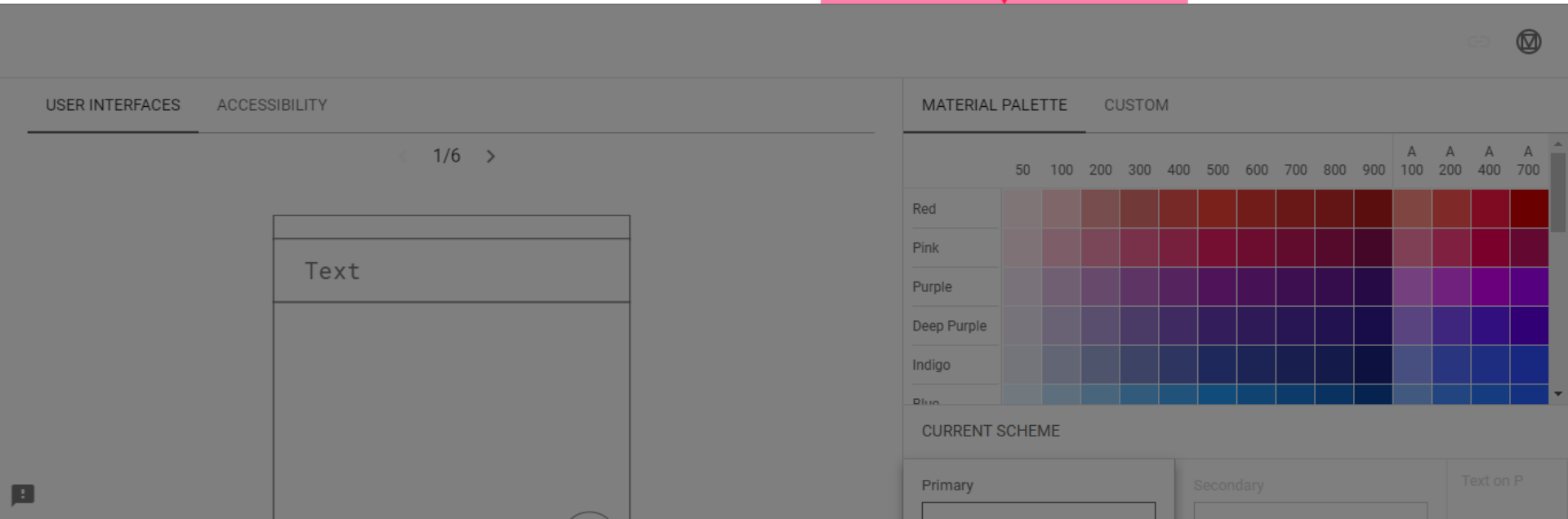
Oswald
Vernon Adams, Kalapi Gajjar, Cyreal (6 styles)

Silver mist suffused the deck of the ship.

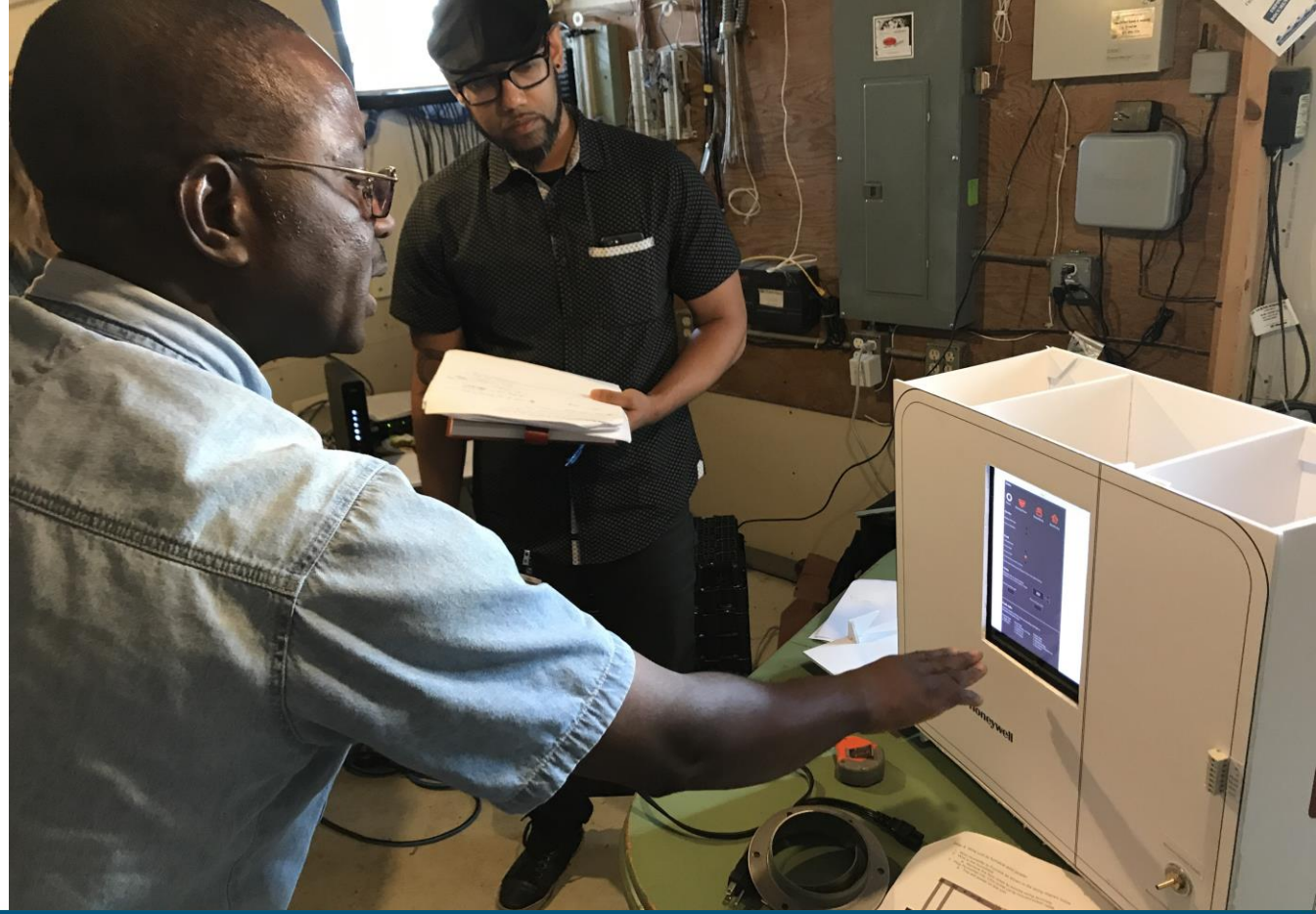
MATERIAL DESIGN

COLOR TOOL

Create, share, and apply color palettes to your UI, as well as measure the accessibility level of any color combination.



Test



Build Relationships

Thank you!

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And please visit our Niagara Design Lab!