



# Designing the Industrial Internet

IxDA SF Design Doing  
August 8, 2013

**Dane Petersen**  
@thegreatsunra  
@GEDesign





GE is huge

GE is huge

121 years old

GE is huge

121 years old

300,000 employees

## GE is huge

121 years old

300,000 employees

14,000 developers

## GE is huge

121 years old

300,000 employees

14,000 developers

\$147 billion revenue



## GE is huge

121 years old

300,000 employees

14,000 developers

\$147 billion revenue

\$13 billion income



GE is huge



year

000

00

\$147 billion revenue

\$13 billion





PRECAUTION:  
NE PAS UTILISER  
SANS INSTALLER  
CORRECTEMENT  
RISQUE DE  
CHOC ÉLECTRIQUE  
ÉVITER LE CONTACT

GE HELICAL 26W  
120VAC 60Hz 390mA  
FLE26HT3/2/SW  
FC

PRECAUTION:  
NE PAS UTILISER  
SANS INSTALLER  
CORRECTEMENT  
RISQUE DE  
CHOC ÉLECTRIQUE  
ÉVITER LE CONTACT



1:23 PM

ADVANTIUM  
120

GE Profile













All these industrial things run on software

All these industrial things run on software

Connected to the internet

All these industrial things run on software

Connected to the internet

Generating gobs of data

All these industrial things run on software

Connected to the internet

Generating gobs of data

For their (benevolent) human operators

machines



machines



analytics

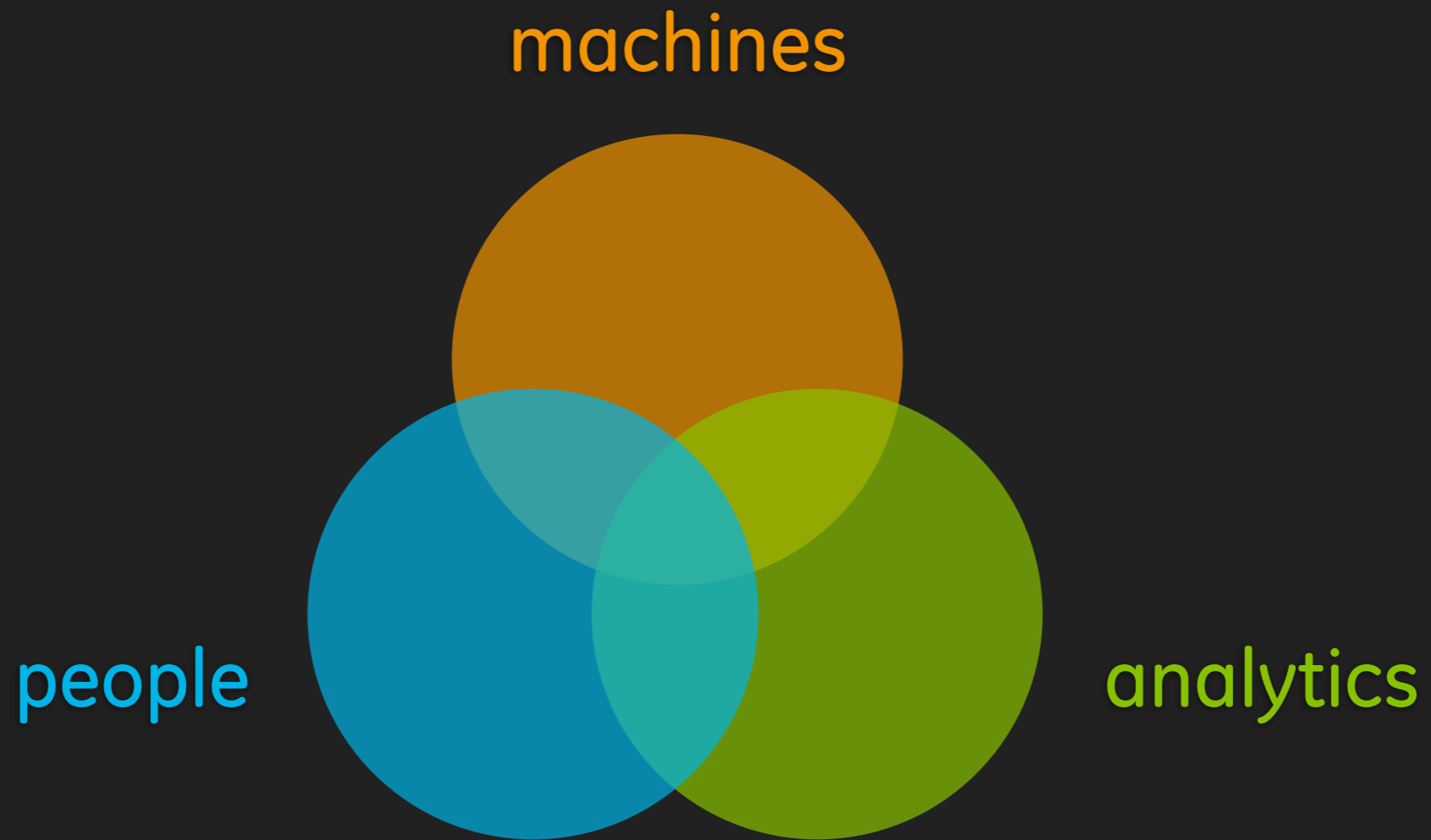
machines

people

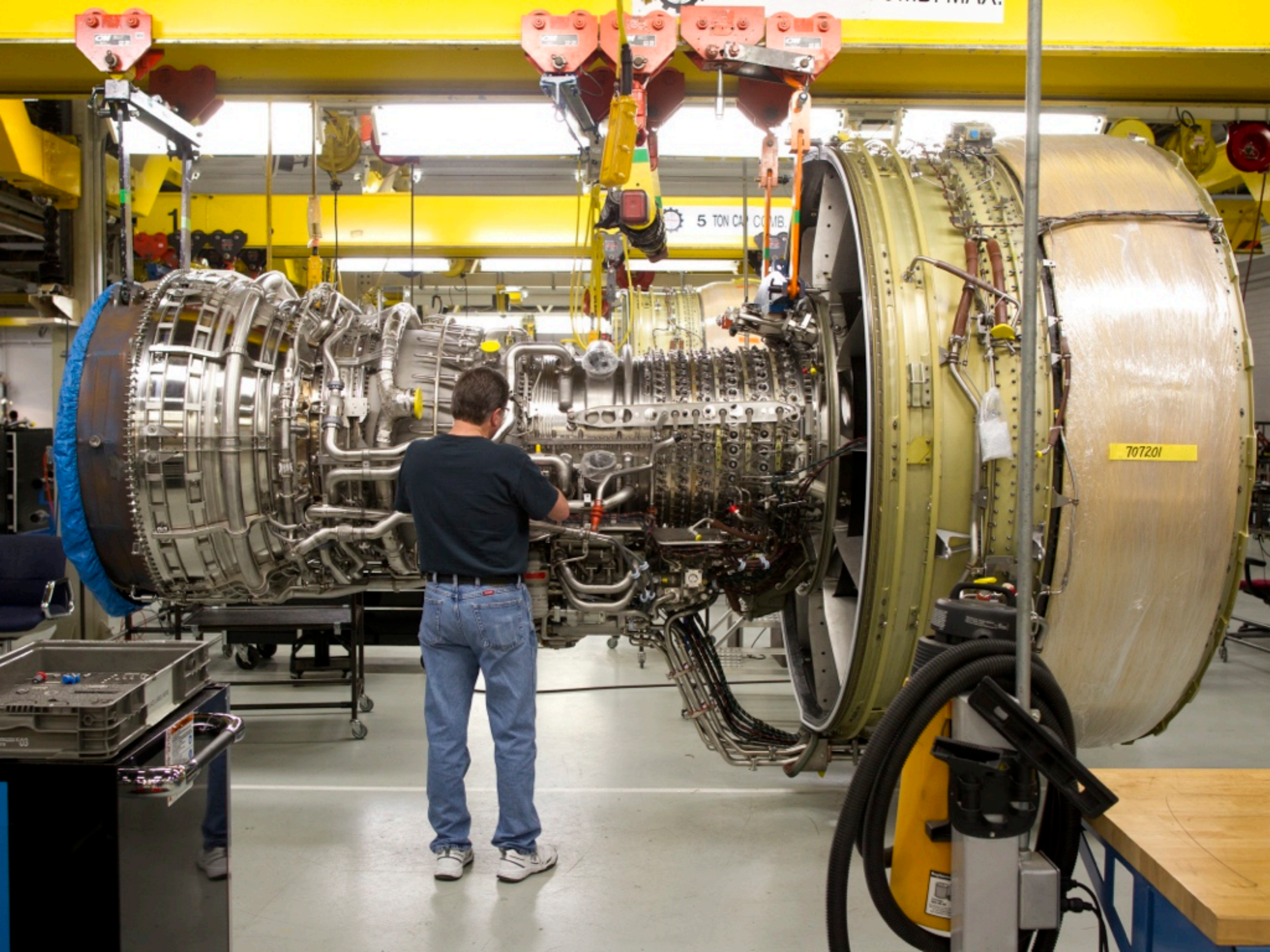
analytics







# The Industrial Internet



5 TON CAP COMB.

707201

```
function() {
```

```
};
```



# Design Systems

# Software Design Hub

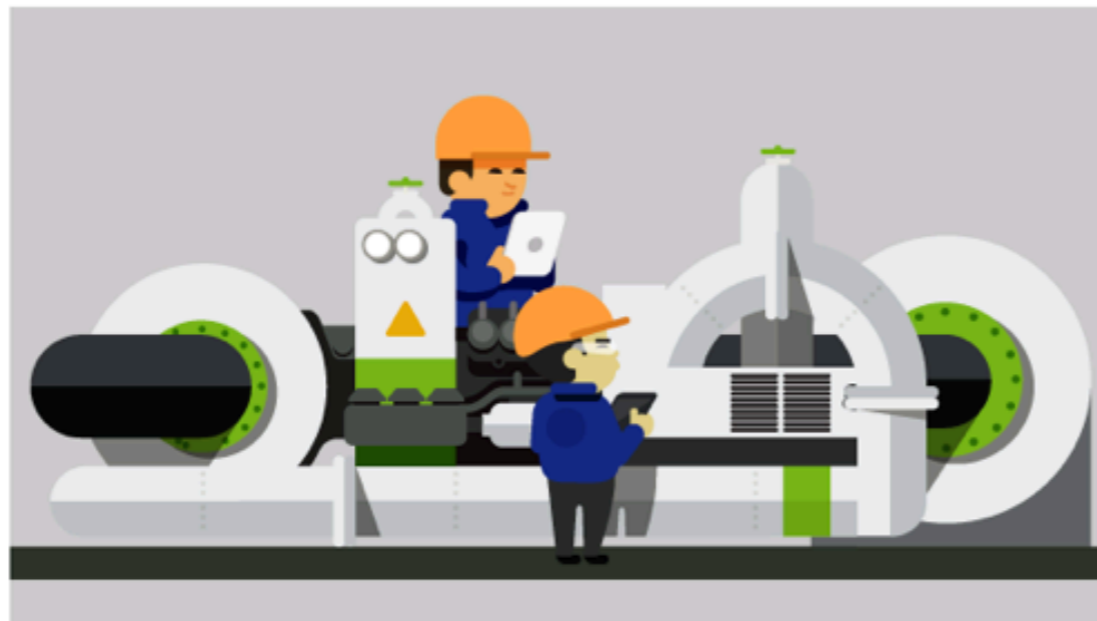
*Welcome to the home of GE's design system library. This is an ever-changing repository of application design guidelines for all of the GE businesses.*



Software Design Hub

Design Extensions: Industrial Marketing Healthcare

Community Contact Us



## Industrial Internet Design System

The Industrial Internet Design System (IIDS) is an extensible set of design and development assets to support the easy creation of GE's Industrial Internet software applications.

[Learn more about the IIDS.](#)

[Download IIDS v1.0.0](#)

- [Docs: Basic UI Elements](#)
- [Docs: Components](#)
- [Example Applications](#)
- [Design Guidelines](#)

# The Industrial Internet Design System (IIDS)

## The Industrial Internet Design System (IIDS)

A **code-based** design framework that establishes visual and interactive **patterns** for all of **GE's industrial internet** software.



When I prototype in IIDS, I am prototyping in **the same code used by our software engineers.**

When I prototype in IIDS, I am  
prototyping in **the same code**  
**used by our software engineers.**

It gets better.

```
<!DOCTYPE html>
```







**Bootstrap**



**jQuery**  
*write less, do more.*







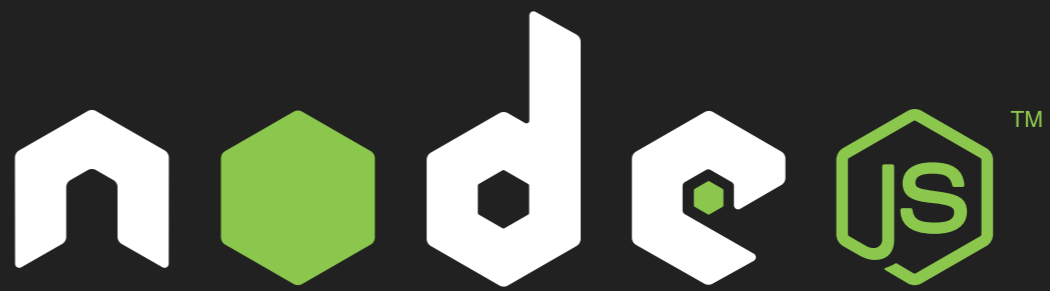
Highcharts JS



**D3.js**









Knockout.



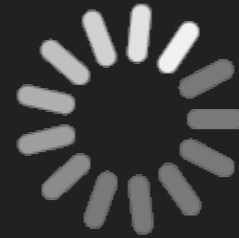
D3.js



jQuery  
user interface

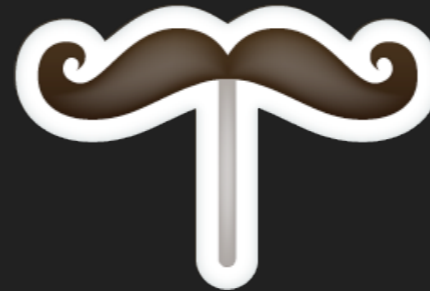


jQuery  
write less, do more.



express

handlebars



play ▶

{less}

Bootstrap

node JS

DataTables



Highcharts JS

Font Awesome



IIDS.zip

## Dashboard View







## Documentation / Examples

### Documentation

#### [Basic UI Elements](#)

Documentation for and examples of IIDS Basic UI Elements, including typography, buttons and forms.

#### [Components](#)

Documentation for and examples of IIDS Components, including complex buttons, navigation and charting.

### Examples

#### [Datagrids](#)

A comprehensive list of Datagrids examples.

**NOTE** These examples loads local JSON, and so might not work in Chrome or IE. To preview them, use Firefox or a web server.

---

## Common Patterns

### Layouts

#### [Dashboard View](#)

IIDS dashboard view pattern

#### [Mixed Module View](#)

IIDS mixed module view pattern

#### [Content View](#)

IIDS content view pattern

#### [Kitchen Sink](#)

IIDS template displaying functional demos of multiple IIDS application elements

#### [Two-pane View](#)

IIDS two-pane view pattern

# Labels, Badges & Alerts

Example	Description	Usage
<p><b>DEFAULT</b></p> <p><b>SUCCESS</b></p> <p><b>WARNING</b></p> <p><b>IMPORTANT</b></p> <p><b>INFO</b></p> <p><b>INVERSE</b></p>	Labels	<p>1. <code>&lt;span class="label"&gt;Default&lt;/span&gt;</code></p> <p>Add one of <code>.label-success</code>, <code>.label-warning</code>, <code>.label-important</code>, <code>.label-info</code> or <code>.label-inverse</code> to colorize the <code>.label</code> for the appropriate context.</p> <p>1. <code>&lt;span class="label label-success"&gt;Success&lt;/span&gt;</code></p> <p>Use the Bootstrap utility classes <code>.pull-left</code> or <code>.pull-right</code> to make <code>.label</code> float alongside headlines or other block elements.</p>
<p><b>1</b></p> <p><b>2</b></p> <p><b>4</b></p> <p><b>6</b></p> <p><b>8</b></p> <p><b>10</b></p>	Badges	<p>1. <code>&lt;span class="badge"&gt;1&lt;/span&gt;</code></p> <p>Add one of <code>.badge-success</code>, <code>.badge-warning</code>, <code>.badge-important</code>, <code>.badge-info</code> or <code>.badge-inverse</code> to colorize the <code>.badge</code> for the appropriate context.</p> <p>1. <code>&lt;span class="badge badge-success"&gt;2&lt;/span&gt;</code></p>

# Dashboard



## Net Plant Heat Rate

Lost Coast Energy Center



9,365 Btu/KWh  
Ideal Heat Rate: 7905

Great Land Municipal



5,433 Btu/KWh  
Ideal Heat Rate: 6200

Rolling Plains Energy



13,199 Btu/KWh  
Ideal Heat Rate: 10826

## Net MW Output

Megawatt Output for All Plants

3965.20



-18.2 MW  
Ideal MW Output: 3947

## Alerts

**URGENT** Alert Type and Title  
This is a brief description or summary of the associated event that occurred...  
MM/DD/YY 12:05

**MODERATE** Alert Type and Title  
This is a brief description or summary of the associated event that occurred...  
MM/DD/YY 12:05

**URGENT** Alert Type and Title

## Messages

**Michael McDougal** Subject Line  
Lorem ipsum dolor sit adipiscing consectetur comodo amet prota...  
MM/DD/YY 12:05

**Essie Longstreet** Subject Line  
Lorem ipsum dolor sit adipiscing consectetur comodo amet prota...  
MM/DD/YY 12:05

**Essie Longstreet** Subject Line

## Cost of Ownership

Total Fleet over Year-to-Date



- Capital Allocation 19.5%
- Operations & Maintenance 10.2%
- Fuel 70.3%

## Dashboard

### Net Plant Heat Rate

Lost Coast Energy Center



9,365 Btu/KWh  
Ideal Heat Rate: 7905

Great Land Municipal



5,433 Btu/KWh  
Ideal Heat Rate: 6200

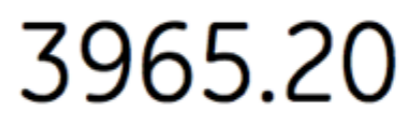
Rolling Plains Energy



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Lorem ipsum dolor sit adipiscing consectetur commodo amet prota...  
MM/DD/YY 12:05

**Essie Longstreet** Subject Line  
Lorem ipsum dolor sit adipiscing consectetur commodo amet prota...  
MM/DD/YY 12:05

**Essie Longstreet** Subject Line

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Total Fleet over Year-to-Date



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Analytics Dashboard

Search Google or enter an address

My Application

## Dashboard

Net Plant Heat Rate

Lost Coast Energy Center	Great Land Municipal	Rolling Plains Energy
9,365 Btu/KWh Ideal Heat Rate: 7905	5,433 Btu/KWh Ideal Heat Rate: 6200	13,199 Btu/KWh Ideal Heat Rate: 10826

Net MW Output

Megawatt Output for All Plants

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Cost of Ownership

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How I Work

How I Work

I don't start in code

## How I Work

I **don't start** in code

Code is **not always** the best place to design

## How I Work

I **don't start** in code

Code is **not always** the best place to design

It is **a single design medium** among many



# MY APP



TOM V

SEARCH

DASHBOARD

FLEET

ASSET 001

ASSET 002

## ASSET 001 EVENTS

ASSET EVENT

9-15-13

ASSET EVENT

9-13-13

ASSET EVENT

9-10-13

## STATUS:

ONLINE

INFO

- 
- 
- 

CONFIG

- 
-

IIDS-Layouts.graffle: Asset Monitoring: Asset Overview

Canvases

- Cover
- Dashboard View
- Mixed Module View
- Content View
- Core Template
- Asset Monitoring: Asset Overview
- Asset Monitoring: Asset Data

Asset 001

Events

- IMPORTANT Asset Performance Event**  
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...  
MMDDYY 12:05
- Asset 001 Bulletin Issued**  
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...  
MMDDYY 12:05
- MODERATE Asset Performance Event**  
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...  
MMDDYY 12:05
- IMPORTANT Asset Performance Event**  
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...  
MMDDYY 12:05
- MODERATE Asset Performance Event**  
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...  
MMDDYY 12:05
- Asset 001 Bulletin Issued**  
Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...  
MMDDYY 12:05

View all Events

Current Status

**ONLINE** Standard Operation  
Last Updated 15 minutes ago

Asset Information

Model	Model Type
Owner	Owner Name
Location	Asset Location
Year	1962

Configuration

Attribution A	Configuration Value A
Attribution B	Configuration Value B
Attribution C	Configuration Value C
Attribution D	Configuration Value D

Asset Utilization

Output Power (MW)

Jan '12 Feb '12 Mar '12 Apr '12 May '12 Jun '12 Jul '12 Aug '12 Sep '12 Oct '12 Nov '12 Dec '12

Jan 2012-Dec 2012

Canvas selected 50%

Stencils

STENCIL LIBRARY

RECENT STENCILS

- IIDS
- Software
- Shapes

FAVORITE STENCILS

Checkbox Button Groups

Left Middle Right

Icon Buttons

Share

Refresh Checkout Delete

Comment Settings More Info

Stateful

Loading State loading...

Toggle

Single Toggle Single Toggle

Filter Label Buttons

Asset 01 x Asset 02 x Asset 03 x

Asset 04 x Asset 05 x Asset 06 x

```
asset-monitoring-overview.html x
223     <div class="module-body span8">
224         <div class="row">
225     <div>
226         <ul class="message-list">
227             <li class="message-item">
228                 <a href="#">
229                     <span class="label label-important pull-left">Urgent</span>
230                     <h4 class="message-title">Asset Performance Event</h4>
231                     <p>
232                         Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
233                         totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae
234                         dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit,
235                         sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt&hellip;
236                     <br>
237                     <time datetime="MM:DD:YYYYTHH:MM:SS" class="message-time">MM/DD/YY 12:05</time>
238                 </p>
239             </a>
240         </li>
241         <li class="message-item">
242             <a href="#">
243                 <h4 class="message-title">Asset 001 Bulletin Issued</h4>
244                 <p>
245                     Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
246                     totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae
247                     dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit,
248                     sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt&hellip;
249                 <br>
250                 <time datetime="MM:DD:YYYYTHH:MM:SS" class="message-time">MM/DD/YY 12:05</time>
251             </p>
252         </a>
253     </li>
254     <li class="message-item">
255         <a href="#">
256             <span class="label label-warning pull-left">Moderate</span>
257             <h4 class="message-title">Asset Performance Event</h4>
258             <p>
259                 Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
260                 totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae
261                 dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit,
262                 sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt&hellip;
263             <br>
264             <time datetime="MM:DD:YYYYTHH:MM:SS" class="message-time">MM/DD/YY 12:05</time>
265         </p>
266     </a>
267 </li>
268 </ul>
269 </div>
270 </div>
271 </div>
```

```
223 <div class=
224 <div cla
225 <div>
226 <ul class="mes
227 <li class="m
228 <a href="#"
229 <span cl
230 <h4 clas
231 <p>
232 Sed ut
totam
dicta
sed qu
233 <br>
234 <time
235 </p>
236 </a>
237 </li>
238 <li class="m
239 <a href="#"
240 <h4 clas
241 <p>
242 Sed ut
totam
dicta
sed qu
243 <br>
244 <time
245 </p>
246 </a>
247 </li>
248 <li class="m
249 <a href="#"
250 <span cl
251 <h4 clas
252 <p>
253 Sed ut
totam
dicta
sed qu
254 <br>
255 <time
```

asset-monitoring-overview.html

Asset Monitoring Overview

Search Google or enter an address

My Application powered by GE Business

5

Tom Edison

Dashboard Fleet

Asset 001 Asset 002 Asset 003 Asset 004 Asset 005

Asset 001

Overview Events Data

**Events**

**URGENT Asset Performance Event**

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...

MM/DD/YY 12:05

**Asset 001 Bulletin Issued**

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...

MM/DD/YY 12:05

**MODERATE Asset Performance Event**

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...

MM/DD/YY 12:05

**URGENT Asset Performance Event**

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt...

MM/DD/YY 12:05

**Current Status**

**ONLINE Standard Operation**

Last Updated 16 minutes ago

**Asset Information**

Model	Model Type
Owner	Owner Name
Location	Asset Location
Year	1982

**Configuration**

**Attribute A**  
Configuration Value A

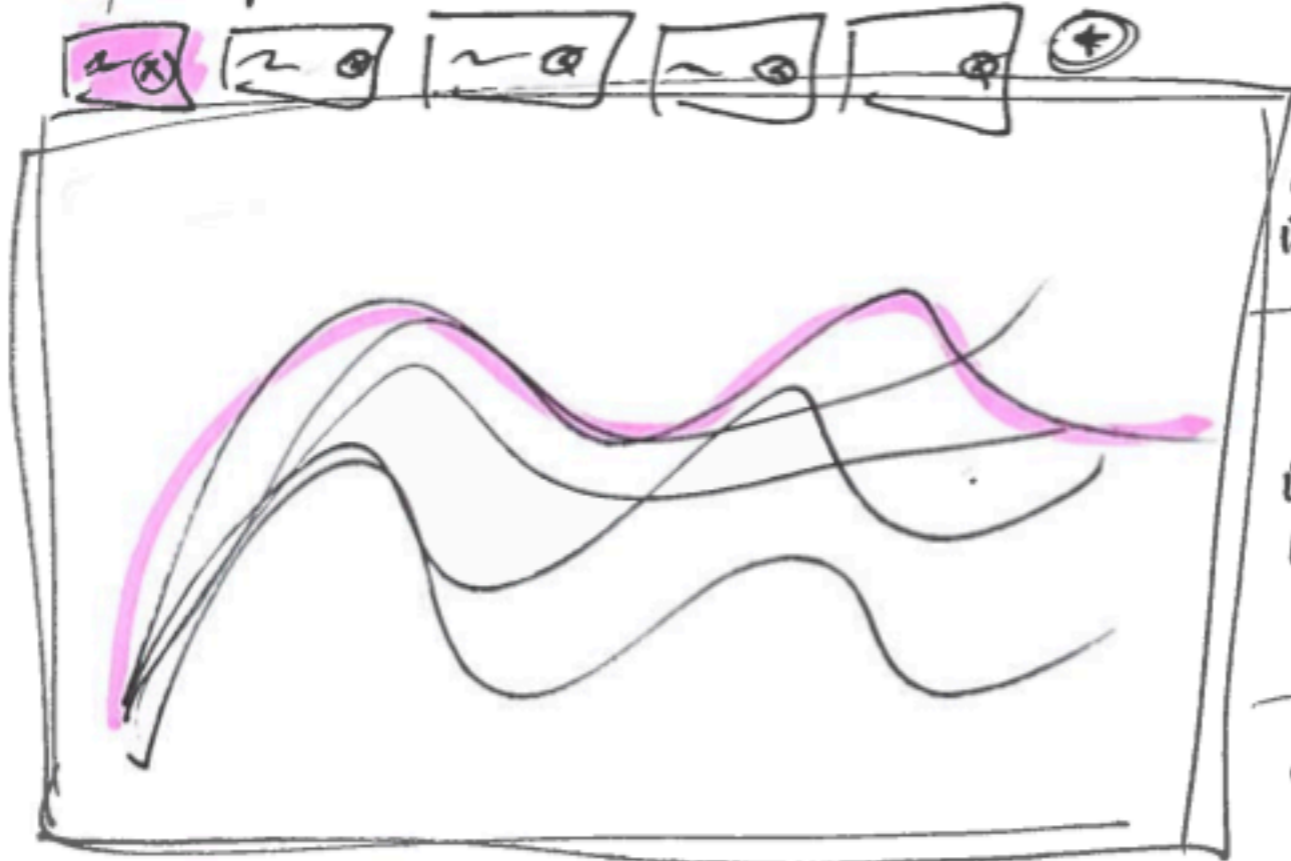
**Attribute B**  
Configuration Value B

**Attribute C**  
Configuration Value C

**Attribute D**  
Configuration Value D

# FLIGHT DETAIL

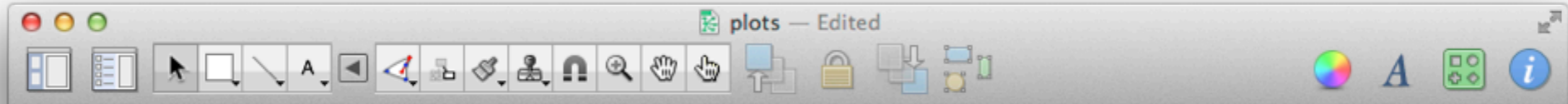
ENGINE# 12345



BRAN  
DLEN  
DMOOTH

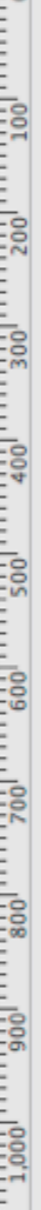
ENGINES  
D 1  
D 2  
D 3  
D 4

MODELS



**Canvases**

- Plots
  - Layer 2
  - Layer 1
  - Background



**Performance Plots for Engine**

Data Source

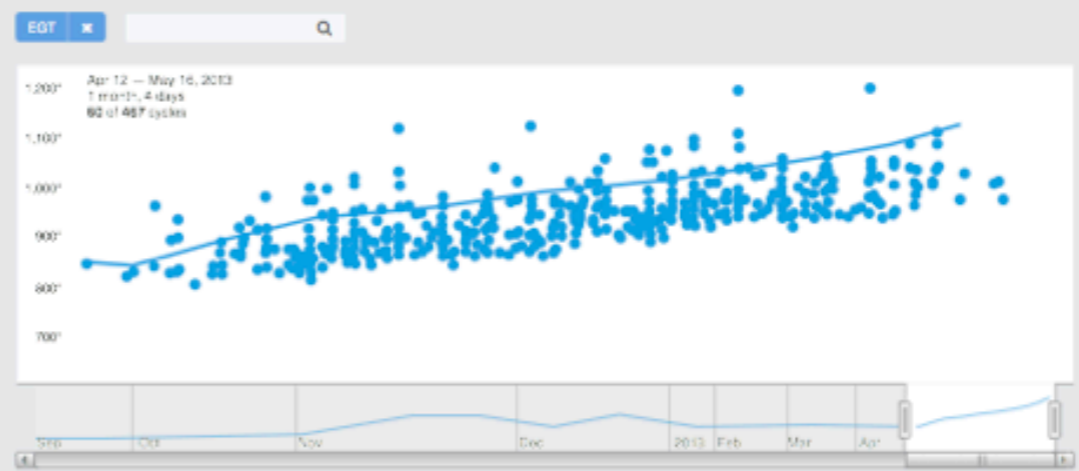
- Raw
- Smooth

Flight Phase

- Take-Off
- Climb
- Cruise

Comparison

- Sister Engine 1
- Sister Engine 3
- Sister Engine 4



**Performance Plots for Engine**

Data Source

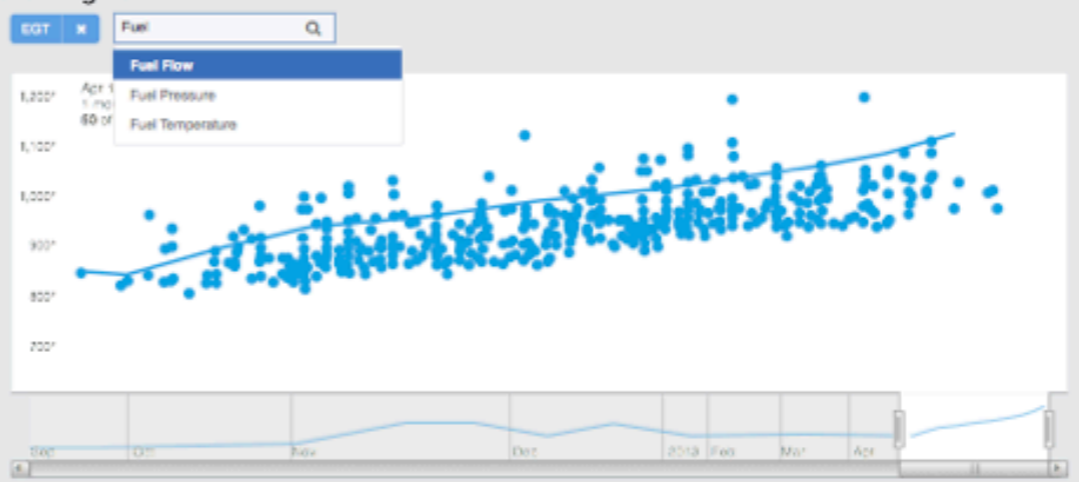
- Raw
- Smooth

Flight Phase

- Take-Off
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- Cruise

Comparison

- Sister Engine 1
- Sister Engine 3
- Sister Engine 4



**Stencils**

STENCIL LIBRARY

- Common
  - IIDS
- IIDS : Masthead & Navigation Bar
  - Masthead & Navigation Bar
- My Application
  - My Application
- IIDS : Navigation: Supplementary
  - Supplementary Navigation

Section 1 | Section 2 | Section 3

Canvas selected 50%



Search Google or enter an address



Reader

add a parameter

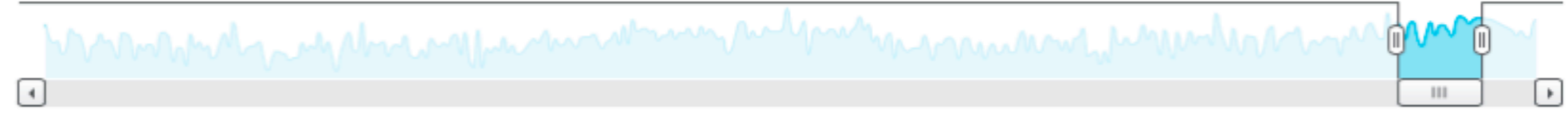
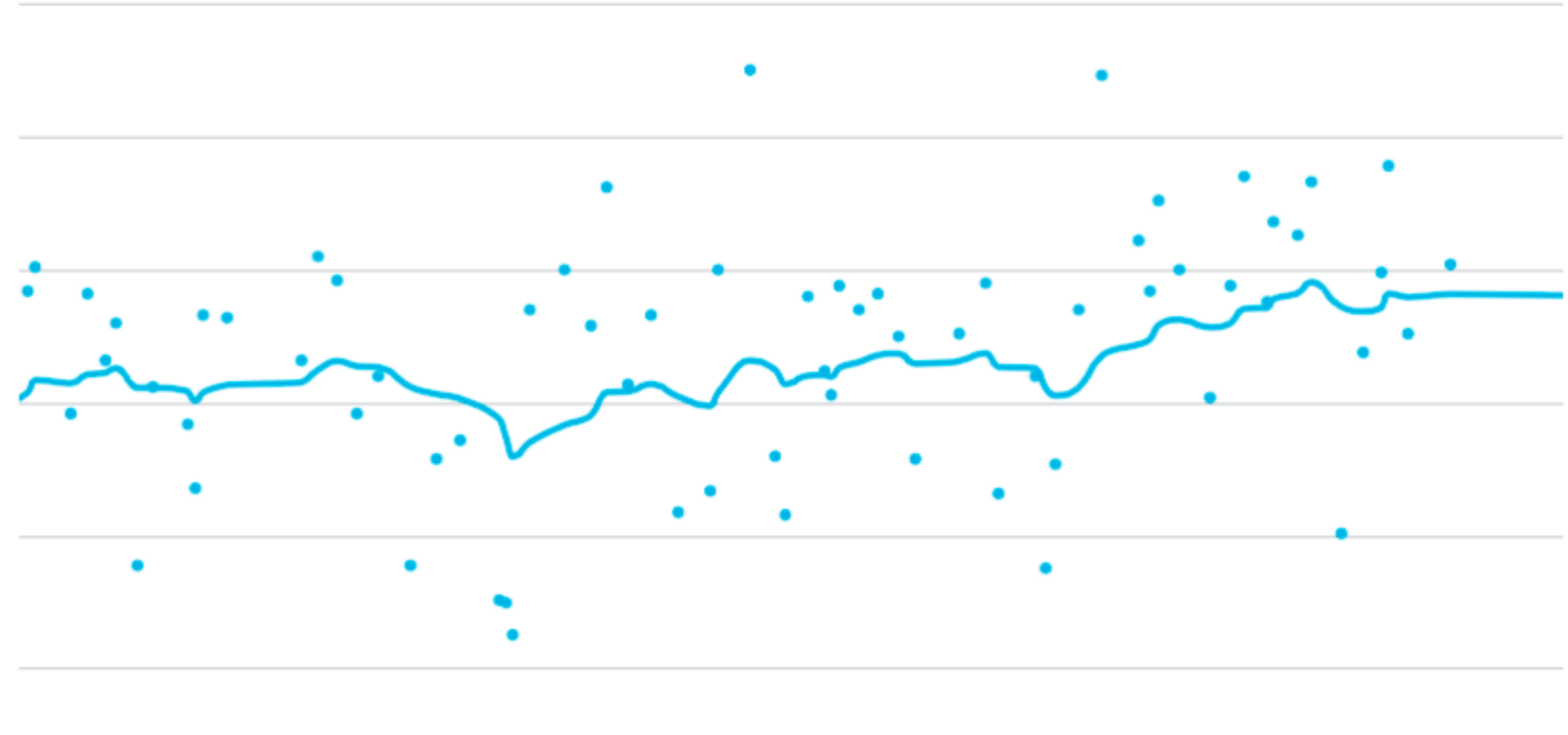


EGT Thermocouple Inner Lower x

Mar 24, 2013 — May 03, 2013

39 days

78 of 1120 flights







# Gotcha #1 — Production Code

## Gotcha #1 — Production Code

Writing it is **way harder** than you think

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Writing it is **way harder** than you think

Unless you set expectations, **your code will be implemented** as-is, and you will be asked to support it

## Gotcha #1 — Production Code

Writing it is **way harder** than you think

Unless you set expectations, **your code will be implemented** as-is, and you will be asked to support it

Are you the right person to code for **IE8?**

## Gotcha #2 — The Uncanny Valley

## Gotcha #2 — **The Uncanny Valley**

Code can make it **feel too real**

## Gotcha #2 — The Uncanny Valley

Code can make it feel too real

The worst that can happen is that your prototype gets implemented as you built it

## Gotcha #2 — The Uncanny Valley

Code can make it *feel too real*

The worst that can happen is that your prototype *gets implemented as you built it*

*Idiosyncrasies* and all



## Gotcha #3 — Whiplash

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As the designer, your job is to account for the **strategy** as well as the **execution**

## Gotcha #3 — Whiplash

As the designer, your job is to account for the **strategy** as well as the **execution**

You are responsible for the **10,000-foot** view and the **10-inch** view

## Gotcha #3 — Whiplash

As the designer, your job is to account for the **strategy** as well as the **execution**

You are responsible for the **10,000-foot** view and the **10-inch** view

**Switching** between these contexts **is hard**, and you need to get good at it

Set expectations

Set expectations

Establish clear boundaries

Set expectations

Establish clear boundaries

Communicate early and often

Remember



Remember

You are an advocate for the user



Questions? **Get in touch!**



@thegreatsunra

@GEDesign

dane@ge.com