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DESIGING THE FUTURE

Inspired user experience design

Industrial Controls UI Case Study

OVERVIEW

Boston UX designs an intuitive, attractive UI for induction heater.
Delivers on accelerated schedule and tight budget.

A manufacturer of arc welding products was developing an innovative system for preheating weld joints using electrical induction, the same technology used in induction stove tops. Their engineering team created the user interface (UI) in-house. The feedback from the company's beta release to a limited group of customers was unequivocal: the interface was difficult for actual users (welders) to understand and operate.

Despite the advanced stage of the product's development, the company called on Boston UX, Integrated Computer Solutions' user experience (UX) design studio, to re-imagine the heater's UI. Why choose Boston UX? The manufacturer had decided to build the device using Qt but their engineers had limited experience with it. So they opened a competitive process to identify vendors who could help with both UX design and UI development. They selected Boston UX/ICS for our proven capacity in both UX design and Qt development, as well as our successful track record and responsiveness.

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OVERVIEW

MAJOR CHALLENGES

- Very aggressive timeline
- Tight budgetary constraints
- Highly specialized domain
- Existing software had a convoluted information architecture
- Some of the nomenclature was confusing
- Existing software had inefficient workflows
- Existing software lacked visual appeal
- Existing hardware controls could not be changed

RESULTS-AT-A-GLANCE

- Streamlined workflow that resulted in more than 50% in efficiency gains
- Rationalized and simplified information architecture
- Rationalized nomenclature
- Created a simple context-sensitive help system and wrote all help content
- Wrote more-usable error messages that are easier to understand and include specific guidance
- Delivered professional-level visual design
- Designed low-light and high-light modes for easier viewing in various contrast environments
- Created a highly intuitive, efficient and attractive user interface

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PROJECT STEPS

Here's how Boston UX improved the user experience of the heater controls (physical buttons with an LED display screen), creating a more intuitive, usable and visually appealing UI and streamlined workflow:

1

Visited the client for fast domain learning, and had existing device control panel shipped to our office for more in-depth study

2

Set a daily meeting schedule for close collaboration with the client

3

Analyzed and rationalized information architecture and nomenclature

4

Created a prototype "sandbox" for demonstrating possible solutions

5

Streamlined virtually all workflows

6

Executed a complete visual redesign

7

Wrote a detailed interaction specification for hand-off to the ICS development team

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THE DETAILS

The UX team started with a deep dive into the operation of the heating system. After reading draft product manuals, we visited the facility where the device was being developed. There we spent time speaking with engineers, welders, product managers, and marketing executives to get a comprehensive picture of the device.

We also watched demonstrations of all system hardware and conducted a task analysis of the primary use cases. The site visit was the beginning of a highly collaborative and focused design process.

Next, we reviewed beta release feedback for usability issues. This gave us insight into a variety of users.

We conducted a heuristic analysis to identify specific violations of UX design best practices. This analysis revealed a number of issues that would require significant design modification. It quickly became apparent that the structural organization of the controls did not make sense to most users.
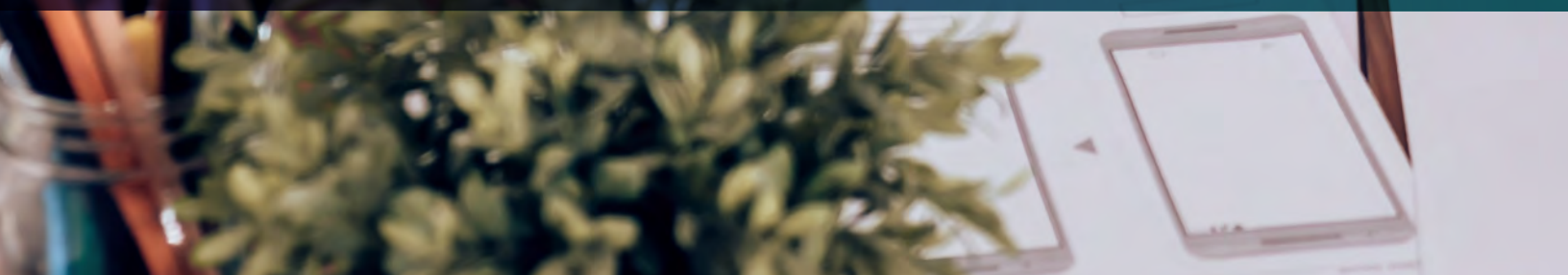
We conducted an affinity mapping exercise with stakeholders to identify groupings of similar functions and tasks. This led the way to a new, more intuitive information architecture and extensively revised nomenclature.

With this process complete, we mapped workflows to provide a clear overview of task pathways through the newly organized system. This visual representation helped us communicate efficiently with the client and revealed possibilities for greater streamlining.

The workflows provided the basis for interactive prototyping, which involved creating layouts and controls for all screens. Using our cloud-based prototyping software, we were able to design and share a highly realistic interactive experience with the client. We worked closely together through several iterations to refine the prototype. The client took responsibility for user testing with their customers, and shared the resulting feedback.

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We developed a prototype that addressed some of the device's greatest usability challenges, and then created several visual design concepts, which we refined based on client feedback. Then we applied the refined concept to all screens and provided pixel-perfect mockups for development.

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SOLVING PROBLEMS THROUGH THOUGHTFUL DESIGN

TASKFLOWS

PROBLEM
Far too many steps were required to complete a desired action. Users had to wade through many layers of confusing screens to find the correct spot to execute their chosen action.

SOLUTION
We simplified complexity so users could complete tasks more quickly. How? By reconfiguring the workflow to vastly reduce the number of steps. For instance, we reduced the steps required to clear a fault by 60% without losing the integrity of the data.

Menu
Content Screen
Task Path

*Steps to clear a fault **BEFORE***

Menu
Content Screen
Task Path

*Steps to clear a fault **AFTER***

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VISUAL IMPROVEMENTS

PROBLEM
The beta screen proved hard to use due to harsh color contrast and the inability to discern where one number ended and another began. Each panel was also indistinguishable in terms of function.

SOLUTION
We designed a simple, clean, consistent look and feel, including a color palette, icons, and font styles. All elements are compliant with best practices for visual usability and accessibility standards. The client can use our code to build future enhancements.
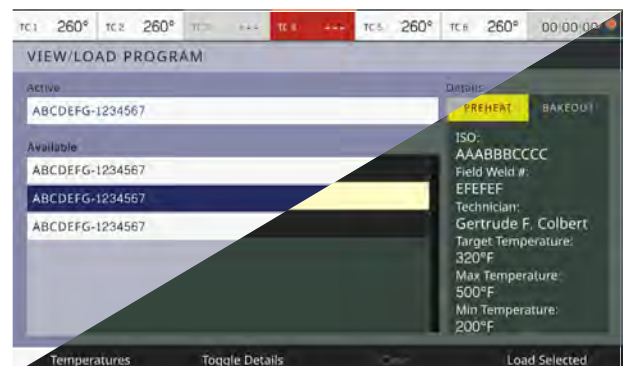

*Temperature Screen **BEFORE***

*Temperature Screen **AFTER***

THEMES

PROBLEM
Beta customers complained that the screen was very difficult to read in high-light outdoor environments.

SOLUTION
We created two themes: one for low-light uses, the other for bright-light situations like outdoor use.

*Original Load Configuration Screen **BEFORE***

*Re-designed High/Low Light Themes **AFTER***

ABOUT BOSTON UX

At Boston UX (www.bostonux.com), we pair user interface (UI) and user experience (UX) design with engineering best practices to create appealing, easy-to-use connected and embedded devices, and web and mobile applications. Whether you're building lifesaving medical devices, smart industrial controls, automotive IVI systems or anything else, our UX First approach helps you create better products that lead to stronger business outcomes.

Specialists in intuitive interface design for touch, voice and gesture-powered smart devices, our team has deep knowledge of the engineering and business complexities that impact software-product development. Companies like MilliporeSigma, Intel and Boston Engineering rely on Boston UX for powerful user experiences.

Boston UX is part of the Integrated Computer Solutions (ICS) family. Founded in 1987, ICS is a product-driven software company that provides development, project management and related consulting services. Learn more at www.ics.com.

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