TFM-AID

CRITICAL
DESIGN REVIEW

Interaction Design and Interactive Arts Program
California State University, East Bay

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QUAD CHART

Cal State University, East Bay — The AVA Dashboard

Federal Aviation Administration

TFM-AID
TRAFFIC FLOW MANAGEMENT -
APPLICATION INTEGRATION DESIGN CHALLENGE

CSU East Bay – The AVA Dashboard

Project Description / Requirements

- AVA is an UI dashboard that integrates various applications to simulate the process of creating and implementing an Air Flow Program in Figma.

- AVA allows traffic managers to organize the position of applications and functions to assist them in the execution of particular tasks.

- AVA is a prototype which simulates the process of creating and implementing an Air Flow Program in Figma.

Image/Graphic:

Flow Management Data and Services

Sign in to FMDS Online
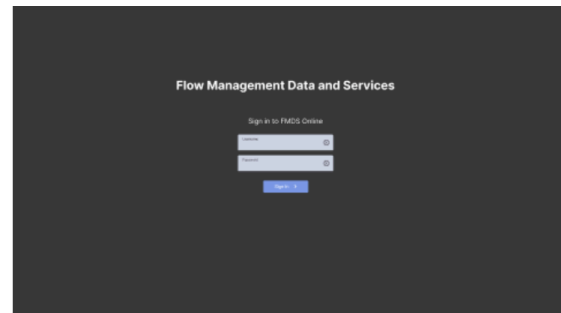
Risks / Issues

- The modernized, streamlined flow might require training for new and experienced users.

- Unable to test prototype on traffic managers, lack of authentic user testing.

- Unable to access the different applications and information shared between apps.

- Lack of specifications of computers used by air traffic managers and controllers such as the computer rendering speed and pixel density.

Next Steps

1. Design, develop and practice presentation for FAA Design Committee.

2. Retool, color, and contrast design elements in the Figma Prototype to ensure visibility and readability during the presentation.

3. Develop multimedia content to show the capabilities of the proposed design that cannot be developed in the Figma Prototype.

4. Perform a test of the presentation to ensure multimedia and design elements that meet specification.

PROBLEM SCOPE

System

1. TFSM is no longer able to meet the required availability and reliability for effective TFM operations. Additionally, it is difficult to maintain and update.

2. Current system lacks integrated capabilities that prevent users from having a consistent view of the system, making it difficult to make operational decisions and use the system effectively.

3. TFM decision-making process is inefficient and can lead to errors because users need to manually collect data from a variety of sources, and the information they need is often scattered across different systems and databases.

4. The user interfaces are inconsistent and complex in terms of both their graphical and functional design.

Death by a Thousand Windows

Traffic managers' major frustration stems from constant interaction with unconnected applications developed and designed around system control rather than activity-controlled systems. In other words, traffic managers face a "death by a thousand windows" as they try to accomplish the task needed to perform their job daily. Creating FEA/FCAs in the current design leads to a cluster of pop-up windows cluttered across the Traffic Situation Display. The AVA Dashboard aims to make this information orderly and intuitively accessible while preventing information blocking. Therefore, our primary approach to the interface centers on the action and demands of the traffic manager by considering their interaction across many applications. Most importantly, the AVA Dashboard allows traffic managers to prioritize, identify and act.

DESIGN SOLUTION

Mobile-First Generation-Inspired Design

Inspired by the pervasive experience of customizing the many smartphone apps, our design approach to the dashboard maintains a simple layout that is flexible to the needs and actions of traffic managers. Traffic managers need to organize data and applications in a structure, starting with the most relevant information they need to pay attention to and then the actions they need to perform. Implementing an AFP requires managers to venture across several applications, often performing duplicate actions, to achieve one complete task.

Spatial Mapping

Spatial mapping allows users to visualize and understand the spatial relationships between different elements of a design. It can be used to create more efficient and user-friendly designs. As an integrated system, FDSM will have a complex and massive architecture. Using spatial mapping in the design system, the left side is used for navigation, the right side is used for displaying data, and the bottom part is used for analytics and calculations.
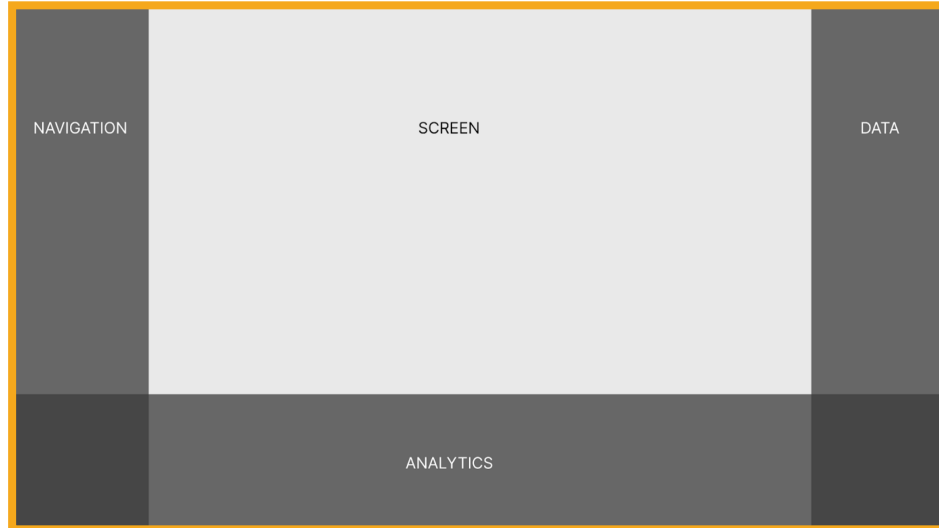
Task-Centered Interaction Design

Therefore, our goal is to allow traffic managers to customize the organization of applications within that structure, helping reduce the actions and time they need to perform. In addition, the integrated dashboard uses three panel structure to demonstrate how information can be ordered and understood while reducing the number of windows. Moreover, the AVA dashboard leverages visualization of data to reduce confusion and mistakes for experienced and new traffic managers.

Scope

Our prototype focuses on three main areas of redesign: the FCA/FEA creator, the Traffic Situation Display, and the Flight Schedule Monitor. It addresses how these three applications are integrated into the AVA dashboard and organized on the screen to enable traffic managers to create and implement an Air Flow Protocol. We emphasize customization in two fundamental ways; organization and display to meet the user's needs. We also restrict some customization and privilege consistent design, recognition over recall and readability.

For example, we allow traffic managers to organize the Favorites and Applications sections in the Navigation Panel yet restrict the panel's placement to the left side, creating an expectation that specific tools and information be consistently displayed and accessed in dedicated areas of the screen. In this example, we leverage spatial mapping to connect the organization of information to the human tendency to recognize the object's location quicker than recalling information 1. In the same way, a person remembers the spatial map of a number lock on a door or their phone more so than the number combination itself.

Assumptions and Limitations

As a starting point, we assumed that most information viewed in the example programs is always displayed, and using a drop down or drill-down menu is not a current capability.

The AVA dashboard allows the FAA to look at what interactions or tools traffic managers use and begin to integrate them. If traffic managers only use fifty percent of the functions in the Flight Schedule Monitor, then the opportune question becomes what we can leave out and what we need to put in.

However, our design could not make this discernment within specific applications. As non-experts and based on our limited research, we could not determine a good deal of functionality within each application.

Moreover, we recommend below that the Support & Learn function within the settings panel provides a tutorial mode for new users. Due to limited functionality in the Figma system, we did not add this to the prototype but will present an example of this functionality during the presentation.

PROJECT DESCRIPTION

Constraints and Capabilities

In terms of the design, we focused primarily on designing the UI of the AVA dashboard on one monitor, 24.0 inches viewable area, and 1920 x 1080 resolution. Since the dashboard organizes clusters of information, we designed the AVA Dashboard with the idea that app windows can be moved to a second monitor; this helps ensure that information is still viewable from four feet away.

A major concern is the capabilities of web browsers versus desktop applications. In designing the AVA Dashboard various functionalities that stem from CSS are compatible with desktop applications by using Javascript frameworks, such as Electron. In pursuing a different design approach, the dashboard can utilize JavaFX which allows CSS to be applied to Java based applications.

The most important aspect of utilizing these newer UI elements, as the AVA Dashboard shows, deals with how all types of interactions can be integrated, so that the user does not have to click everything. Simplifying incorporating a hover function allows menus to slide in and out when the mouse comes into contact with them. Interactions should follow the mouse rather than interaction being enacted by the click of a mouse.

New Controls: Shortcut Keys and Voice Assistant

As mentioned before, the FMDS provides a new opportunity to create a new universal standard of controls. Most importantly, this allows the FMDS to leverage the power of shortcut keys and voice -assistance. In modeling the AVA Dashboard, our team envisions that specific keys and combinations, as well as ,voice control will allow traffic managers to access specific applications and functionalities.

For example, the voice assistant or shortcut keys can select an application, minimize a screen, access the slide-out menus, etc. In the case of FSMS, traffic managers could use voice assistance or keys to navigate to pre-designated regions on the TSD rather than using the mouse to scroll there. In the deployment of either tool, the commands should be intuitive and perform simple actions to minimize any technical problems.

Under these circumstances, built-in voice recognition and shortcut keys can be utilized effectively in the ways most beneficial to traffic managers by saving them time otherwise spent clicking.

The Old and The New

One of the significant changes to the previous design is the introduction and refinement of the tool-bar. The taskbar now allows access to various applications, such as the Flight Schedule Monitor, and does not require traffic managers to slide out the entire navigation bar to perform this action. This grants more screen space to the TSD for the traffic manager as well as provides a shortcut.

Another change moves the "Analytics" section, which hosts simulated FCA(s), to a slide-up menu displayed at the bottom of the screen. As a result, this provides a dedicated space that traffic managers can access while at the same time giving more screen space to display the relevant information of the simulated evaluations before publishing them in the system.

Moreover, the new design has the Traffic Situation Display constantly shown on the screen with the menus overlaid over it. The AVA Dashboard ensures that traffic managers always have this information from TSD displayed to them and can adjust the viewable map space to their needs.

The Navbar and Toolbar

The left side of the bar hosts the navigation bar and toolbar This remains fixed in place and uses icons to allow managers to access the applications and functions they need quickly. In this case, the design emphasizes recognition over recall, saving users the trouble of navigating through a series of submenus using icons. Moreover, these functions can be accessed with shortcut keys, like a user presses a key to use the "selection tool" in Photoshop. The entire menu slides out when the user clicks the icon menu button.

In the full menu, the profile of the user is displayed at the top, indicating who is logged into the system. Underneath is the Favorites section, sequentially encompassing the user's most frequently used applications, though these can be edited to meet a traffic manager's preferences. By default, the two applications placed at the top are the Webinar and Share functions. Since planning with stakeholders is at the core of a traffic manager's everyday duties, this feature allows users to join a meeting quickly. The Share function allows a traffic manager to share their screen with others as well as share analyses of airspace.

PROJECT DESCRIPTION

Below Favorites is the Applications section, housing all the various applications traffic managers utilize and are clicked to be open within the dashboard. Traffic managers can organize these applications in the order and location they find most useful by simply dragging and dropping them. This follows a mobile design strategy where users locate applications on their phones based on the spatial location applications are placed within a display. On top of that, the added search function allows traffic managers to quickly find an application that they may not use frequently and saves them the effort of having to scan through an organizational list of numerous applications.
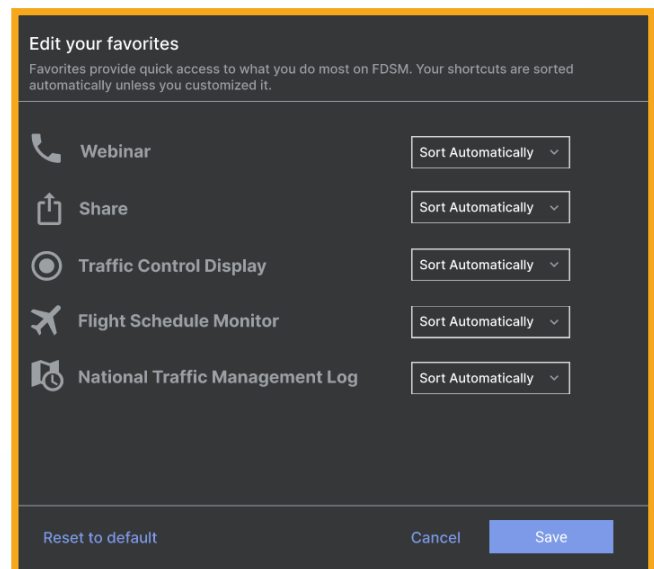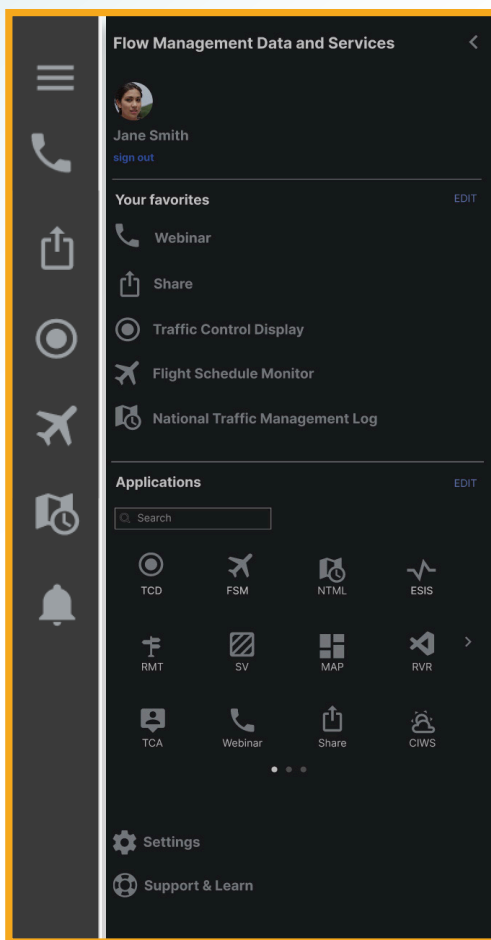
At the bottom of the navigation bar are two significant additions, the *Settings and the Support & Learn* functions. In the *Settings* function, the user can adjust three essential effects: *display settings, user functions, and format & units*. In the display settings, users can easily adjust brightness, contrast, and font size. These are important to the users as their environment might change throughout the day depending on the ambient light and make the system more accessible to individuals with differences in eyesight.
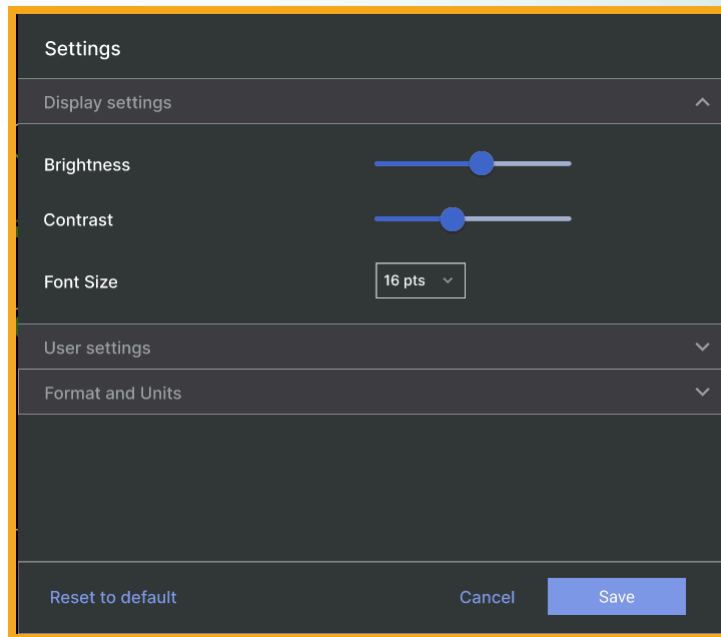
The *user function* provides the user with a list of standardized presets that differently organize their workspace or organizational structure of the app menu system, providing them with pre-programed organization of applications that better assist in the execution of a particular task. For one, this provides traffic managers with a base to customize a specific workspace while at the same time providing a series of default workspaces, so traffic managers do not have to customize the organization of their applications. The AVA Dashboard addresses the committee's concerns that traffic managers may want or have little time to spend on customization.

In the case of *Support & Learn*, this function provides the user with a base of instructional material. The search function allows traffic managers to research any particular tool or topic, providing them with written instructional material covering everything from using a specific application to adjusting their display settings.

At the same time, we propose that the system, once activated, provides a series of prompts while the user is utilizing the system. This is akin to video game tutorials and utilized in Adobe applications, providing the user with information within pop-up prompts explaining particular functionality and the use of a tool or function as they select that item.

PROJECT DESCRIPTION

Traffic Situation Display: A New Movement

As a primary part of the traffic manager's duties, much of the design went into the Display. Here the traffic manager keeps a constant eye on the weather (the primary reason for flight re-routes and delays) as they see it in relation to the air traffic traveling through that space. Due to this fact, the Display is always present on the screen.

Our main change is how the traffic manager navigates this space and updating the TSD to reflect more intuitive uses of map navigation introduced by Google and Apple Maps and 3D program navigation. In other words, traffic managers can constantly scroll through the map space. Using the scroll wheel on a mouse, the user zooms in and out of the map of TSD. Depending upon the distance, certain information is displayed with the idea that as traffic managers zoom in on a space, more detailed information becomes present. To navigate directionally, the user left clicks and holds, which grabs the map space and moves the inverse direction of how the mouse is slid.

When a traffic manager creates a FCA/FEA this creates a pop-up, adjustable window overlaid over the TSD. The manager can position the FEA/FCA(s) window(s) and adjust the map space to ensure no relevant information is blocked or covered. In addition, snap functionality allows traffic managers to click on an FEA/FCA, and the map space is automatically centered to where that FEA/FCA is placed on the TSD and map space.

Another minor change is making the FCA(s) clickable on the TSD, immediately displaying on the right side. This directs traffic managers to the particular FCA they are looking at and enables them to retrieve information as well as edit the FCA quickly.

FEA/FCA: Creation and Simulation

Before creating the FCA, traffic managers spend a great deal of time modeling constraints in the airspace. The AVA Dashboard handles this by creating a slide/drag-up menu from the bottom of the screen in a newly created Analytics section.

In creating an FEA/FCA, traffic managers set the parameters by clicking "add to analytics" at the bottom of the window on the opposite side of the "publish" button. Consequently, a menu bar displays a queue of FCA(s), housing the most relevant information, such as the number of flights, average delay, and maximum delay times. Traffic managers can quickly adjust the parameters in the open FCA creator and submit another FCA, which is then added to the list below

The purpose of this design serves the traffic manager's task of creating a list of evaluations without having to start a new FCA from scratch. At the same time the user sees the FCA being instantly and recognizably added to the queue within the same visual space.

After this, the traffic manager can navigate to the left toolbar and share these analytics as a part of their upcoming webinar. After their meeting, the manager returns to the Analytics section and selects "publish," pushing the FCA into the dashboard right-side menu.

Since traffic managers constantly monitor and reevaluate constraints to air traffic, the FEA/FCA application list is incorporated into the dashboard to slide out on the right-hand side on the Data Bar. Here, traffic managers can see all the previous FCA(s), both active and inactive, they have created or shared.

PROJECT DESCRIPTION

This more significant real estate on-screen allows the most relevant information for the FCA to be displayed to the user. Most importantly, it does away with the cluster of too many windows being scattered over the TSD. On top of that, the search function allows managers to navigate directly to a particular FCA or see a list of FCA(s). For example, a traffic manager may want to see the FCA(s) implemented in a particular area over that day as a frame of reference.

The list also provides a secondary view, where traffic managers can quickly transition the data visualization of the FEA., As seen in the screenshot, the design visualizes the data making the informa-

Code	Status	Altitude	Time	Alert
FCAJX7	Active	200/500	29/10:00 AM - 29/10:59 PM EDT	⚠
FCAJX6	Active	200/500	29/10:00 AM - 29/10:59 PM EDT	⚠
FCAJX5	Active	300/700	29/10:00 AM - 29/10:59 PM EDT	
FCAJX4	Inactive	200/700	29/10:00 AM - 29/10:59 PM EDT	
FEAJX9	Active	200/700	29/10:00 AM - 29/10:59 PM EDT	
FEAJX2	Active	200/700	29/10:00 AM - 29/10:59 PM EDT	

tion instantly understood by the user.

The FEA(s) are organized by code, status, altitudes, time, and alert status. Traffic managers can manage the list by any of these categories, but by default, it will likely be sorted by alert status.

Additionally, the AVA dashboard ascribes color and shape to the FEA/FCA(s) to prevent users from identifying the wrong information due to mistakes in recognition or memory slips. The color coding matches the listed FCA to its corresponding FCA shape in the TSD (along with aircraft traveling through that airspace). Also, the selected FCA slides down to reveal additional information and actions, reinforcing the user's selection and system status. Moreover, users can easily edit and adjust

the FCA and access the Advisory or the EDCT pertaining to that FCA. This is essential to managers as they monitor changing environmental conditions and adjust traffic flows.
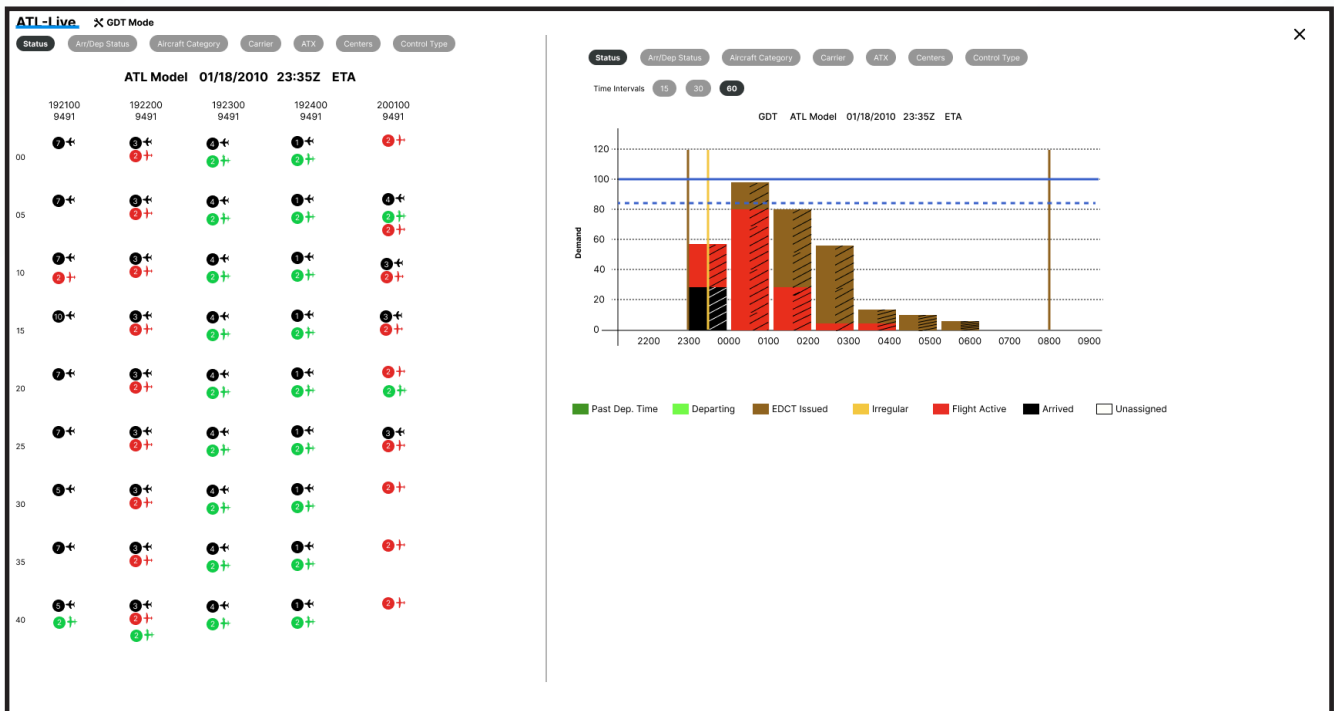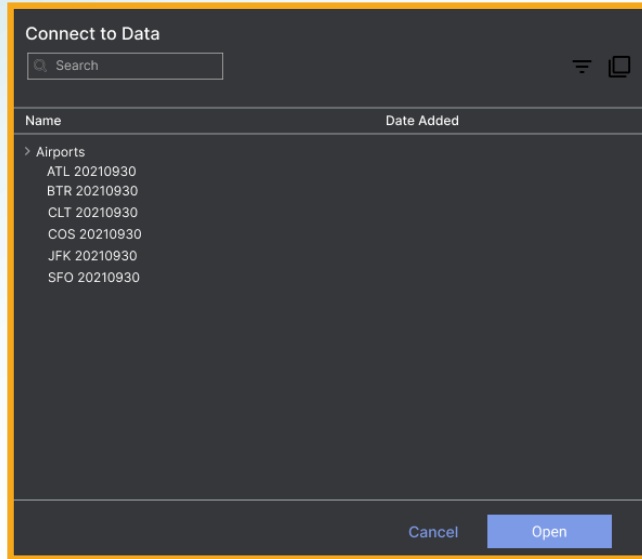
Flight Schedule Monitor

Our major redesign to the Flight Schedule Monitor deals with its integration into the Data panel, which slides up from the bottom. The AVA Dashboard provides a list of airports which traffic managers can select from based on their previous evaluations as well as a search function to add additional airports if need be.

One of the changes in the GDT Setup is the introduction of dropdown menus and these can assist both new and experienced users. For example, in selecting exemptions for Centers and Airport Origins users manually type in the three-letter code for an airport, which is certainly faster for touch typers and experienced traffic managers. The new functionality integrates a search function and a drop-down menu, so when traffic managers begin to type, the list of letter codes appear, providing them with assistance as they perform this task.

Additionally, the dropdown menu also provides a list that users can simply select. This helps newer traffic managers while assisting when even experienced managers may undergo momentary memory slips or lapses.

PROJECT DESCRIPTION

In addition to the GDT, the redesign uses drill-down menus, for example, in the General Options segment. Information remains hidden to prevent cognitive overload on the user. However, users access these options either by choice or when a particular predecessor action has been selected.

Advisory

PROJECT DESCRIPTION

We have redesigned the advisory to enhance its readability and organization. The existing advisory is challenging to read and comprehend due to the dense clustering of information in the message section. Users are required to navigate through the message line to locate pertinent information. The redesigned version segregates the information into separate sections, ensuring improved readability.

Monitor Demand and Capacity

During the implementation of the AFP, the traffic manager continues utilizing FSM to assess the effectiveness of delivering flight demand to the program's capacity. This evaluation is performed using a bar graph. It is customary for traffic managers to display such bar graphs simultaneously for multiple FCAs, FEAs, and/or airports. The bar graph illustrates the arrival demand at the monitored airport or FCA in relation to the presently published capacity.

Our design aims to assist traffic managers in efficiently monitoring various FCAs, FEAs, and/or airports by providing them with the ability to selectively display the most relevant bars. While it is typical for traffic managers to examine multiple bar charts to track demand and capacity, our new interaction feature helps alleviate overwhelming information and cognitive load.

Post Analysis

Traffic managers have the responsibility to ensure that all their actions, alerts received, and operational events are logged for future analysis and discussions within the current system. The NTML application supports these functionalities. Additionally, traffic managers utilize NTML for sharing operational information and coordinating specific TMIs. Our redesign largely preserves the design elements of the current system. However, we have introduced a new feature—a summary section
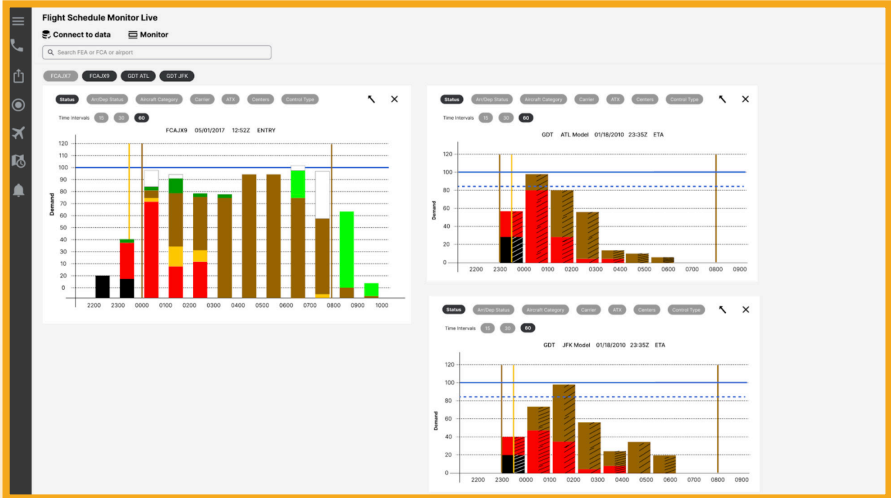
at the top of the page—which displays the number of tasks, notifications, and reports completed by the managers during their shifts. This addition enables them to swiftly quantify and reflect on their activities at the end of their shift.

SUMMARY

Integration and Scalability

As one person loudly repeated over and over in the Q&A video, we need "integration, integration, integration." While the TFMS applications have graphically and functionally inconsistent interfaces, the AVA dashboard creates cohesion by enabling congruent functional interaction across various applications. Not only does AVA standardize action and menu controls, but it also matches those to the user's current understanding. This reduces cognitive load and confusion for users, as they recognize rather than recall all menu navigations, shortcuts, and sequential actions in a program. Instead, this gives the user a unified set of intelligible interactions, linking their efforts and effects.

The AVA Dashboard demonstrates how a 3-panel design structure applies to incorporating various applications, being both scalable and flexible for integrating new tools and functions. The AVA dashboard's design strongly emphasizes data visualization, allowing users to quickly comprehend and extract insights from complex information. Users can easily call out the most relevant and essential information according to their specific needs by providing customizable filtering capabilities. Overall, the Dashboard aims to assist users in comprehending intricate and detailed data and gaining a deeper understanding of the information presented.

Data Complexity and Filtering Tools

The design of the AVA dashboard places a strong emphasis on data visualization, allowing users to easily comprehend and extract insights from complex information. We have extensively integrated data visualization as a powerful tool in our project. We acknowledge that this project represents just the tip of the iceberg in the daily operations of the NAS. Our commitment to employing effective data visualization techniques aims to assist users in comprehending intricate data and gaining a deeper understanding of the information presented.

In conjunction with data visualization, we have incorporated filtering options to enable users to focus on the specific data they require at any given moment. This feature enhances flexibility, catering to the preferences of different users who may have specific ways they prefer to view the data. By providing customizable filtering capabilities, users can easily call out the most relevant and important information according to their specific needs.

In creating the FMDS, the FAA has a unique opportunity to not only update the old architecture but design it in a modern way that leverages the capabilities of new coding platforms, making the system more accessible to new users and less cognitively taxing to experienced traffic managers.

Moreover, the AVA dashboard is designed to continually incorporate the development and integration of new tools and functions. The dashboard provides the skeletal structure, where new graphical displays of information and data can be changed, modified, and represented, as the back-end infrastructure (i.e., FMDS) is updated over time. In other words, the AVA Dashboard, though limited, shows how this design structure is applicable to the incorporation of various applications into its 3-panel structure. The design is most importantly scalable .

The FMDS has a unique opportunity to not only update the architecture but design in a modern way that leverages the capabilities of new coding platforms and utilizes the growing skill sets of programmers in these fields.

VIDEO LINK

https://tinyurl.com/AvaVideo2023

FIGMA PROTOTYPE

https://tinyurl.com/AvaPrototype2023

PERSONAS

Alice

Age: 23
Location: ATCSCC
Occupation: Traffic Manager

"Focus on being productive instead of busy."

PERSONAL CHARACTERISTICS

- Focused
- Driven
- Independent

HOBBIES AND INTERESTS

- Playing Video Games
- Competing in Triathalons

GOALS

- To quickly and efficiently learn the new FTM software
- To customize the new FTM software desktop

CHALLENGES

- Traffic Management Initiatives (TMIs) that Affect Airspace Flow Programs (AFPs)
  - Grounds Delay Programs (GDPs)
  - Reroutes
  - Capping

NEEDS

- A streamlized, modernized way to balancie air traffic demand with system capacity
- To ensure a safe, orderly, and expeditious flow of traffic while minimizing delays.

Stephen

Age: 45
Location: ATCSCC
Occupation: Traffic Manager

"Efficiency is doing things right. Effectiveness is doing the right things."

PERSONAL CHARACTERISTICS

- Determined
- Motivated
- Inspired

HOBBIES AND INTERESTS

- Restoring Classic Cars
- Through-Hiking

GOALS

- To proactively manage the NAS without over control.
- To maximize throughput, and balance capacity with deman
- To ensure a safe enroute environment.

CHALLENGES

- Traffic Management Initiatives (TMIs) that Affect Airspace Flow Programs (AFPs)
  - Severe Weather Events (SWE)
  - Tunneling
  - Military Airspace

NEEDS

- A way to easily collaborate AFP needs with other Traffic Managers
- A new GUI that that supports traffic managers but minimalizes user training requirents

COMMENTS/RESPONSES

1. Your grid in your left hand toolbar is unclear. What did you mean by this; what's its purpose?
   Response: Our major redesign to the left toolbar increases clarity and gives managers quick access to tools while reserving the option for them to slide out the full menu.

2. Do not get into a rabbit hole with the 3D stuff. Only a very small subset of what you proposed is relevant to TFM. Most of it is more relevant to operators (such as airlines) flight planning systems or ATC systems. Your suggested uses of 3D appear to be out of scope for this project.
   Response: We took inspiration from Apple Maps and other 3D programs in design mouse scrolling over the TSD.

3. Would like to see more about how user manages screen use, workflow through the application, and making sure screens space is still available for other use.
   Response: The addition of a third menu at the bottom ensures that a certain amount of space on the screen is always reserved for the TSD.
   .

4. Please discuss browser based vs application based implementation feasibility.
   Response: Various intermediates now have the capabilities to implement many of the new browser-based features and functionalities. More information is below.

5. General concerns for the time it would take users to customize to their liking. When considering the range of scenarios, the range of possible configurations might be daunting, as is the visual of checker boxes. From a HF standpoint, a TM might have anxiety that they have to be filled in.
   Response: In terms of customization, we limited this to the placement and ordering of applications and functions in the Favorites and Applications sections. The rest of the UI remains relatively fixed in position.

6. I really would like to see more of that innovative approach, but I didn't see that consistently done in your project.
   Response: In terms of an innovative approach, our prototype shows how the composition space of the dashboard creates clean organizational elements. For example, FCA(s) are placed in a listed format eliminating the need for so many windows.

7. I am missing a detailed project schedule that lays out what activities will take place and when.
   Response: We had several redesigns in our process as our understanding of the workflow and design objectives became more evident over time. This made it very difficult for us to understand, at the time, the next steps to plan for.

8. The proposal should have been proof-read. An entire paragraph was repeated. Many grammatical errors. Proposed design is missing the collaboration piece. Why have two user personas if they are almost identical?
   Response: We have proofread and spellchecked our report. Our personas have been revised.
   Concerned still with death by a thousand clicks, still have to perform actions on multiple screens.
   Response: The FEA/FCA(s) list format consolidates all of these into one window.
   Moreover, the dashboard design segments applications into three windows on a single monitor.

9. I would like to see a more formal plan for the project by each phase with dates/estimates. I would like to see more integration between the different apps--the boundaries between the legacy systems should disappear as much as possible. That applies to the UI, the workflow, etc.
    Response: The prototype shows how different applications can be accessed and organized within the dashboard.We originally thought that the goal of the challenge was to create an organizational interface for the apps. In our new prototype, we redesigned the User Interface of the legacy apps to be better incorporated into the dashboard.

10. Timing of the video was a bit off when explaining the tools.
    Response: The timing of the new video is correct.

11. Strongly recommend collecting information/feedback from ATC users, if feasible. Understanding a user's perspective could help better inform your design or, at minimum, give the team bet-ter insight into traffic flow management operations. User acceptance and understanding stakeholder needs is a major part of the aviation domain and system modernization. This could also help better inform the personas as the facilities represented (ORD, JFK) are air traffic control towers. These types of users would likely not be involved in AFP planning/execution, rather ARTCC and ATCSCC TMs would be.
    Response: One of the critical things our group learned is the flow of traffic managers' duties and the time they spend analyzing and discussing proposed interventions to manage airflow. We have updated our personas accordingly.

12. A clearer, lower level project plan, especially for your path forward, would have been useful.
    Response: The major challenge we found was understanding the workflow of traffic managers correctly. We spent additional time mapping out the flow and performing further research.

13. Report has a lot of grammatical errors, typos, and repeated text. Generally, it feels incomplete.
    Response: We have proofread and spell-checked this CDR. Unfortunately, our report was incomplete due to misunderstandings around the objectives and the tasks managers must act on and off the computer. We believe we have correctly addressed this in the prototype

14. Detail on the project plan is very limited. The generic discussion of user testing is good, as is the described approach, but a schedule and detail would give more confidence around the plan.
    Response: No user testing was performed on traffic managers, as the committee did not allow this. We performed functionality testing with fellow team members and students.

15. Include team name and text and photos of members in video.
    Response: We have included all the team information.

16. The idea of 3D capability is innovative, but practically not useful for this system, largely because it would increase cost due to higher system requirements.
    Response: We did not pursue any line of 3D capability.

OUR TEAM

Ian Pollock, an Associate Professor of Art and Director of the Graduate Interaction Design Program at California State University, East Bay

Ian holds a Master of Fine Art in New Media Art from UC Berkeley. He has taught fine and applied media art in the US, Europe, Egypt, and UAE, and has extensive experience in television, web production. He collaborates on transdisciplinary research, including game jams, neuroscience, and afro-futurism, and reviews academic articles for conferences and journals.

Ferdi Agusta, Graduate Student in Interaction Design

Ferdi focuses on UX research and information design. Ferdi pursued his passion for design by enrolling in a Bachelor's degree in Fashion Design at ESMOD Paris. He worked in the fashion industry for several years before transitioning into computational design. In his free time, he spends much time at Crossfit Gym and hunting for good pastries in San Francisco.

Tessa Board, Graduate Student in Interaction Design

Tessa is a graduate student studying Interaction Design and Interactive Art in California. Tessa is an alumnus of Washington State University, where she obtained a Bachelor's degree in Digital Technology and Culture. She owns a women's boutique with her mom and sisters in their hometown. You will find Tessa walking around with her yellow labs and an iced coffee nearly every morning.

Jon Crescenzo Graduate Student in Interaction Design

Jon has been a multimedia specialist and researcher for more than a decade. He has worked as a multimedia specialist for over seven years at the University of Pennsylvania, managing multimedia projects to support educational research. Currently, he is a graduate student in the Interaction Design Program at Cal State East Bay, where he also works as a graduate assistant in developing multimedia for University Communications.

Patrice Reynolds, Graduate Student in Interaction Design

Patrice holds a double Bachelor of Arts Degree in Broadcast Journalism and German from Cal Poly Humboldt. Professional experience encompasses graphic design, photo retouching and digital asset management for major retailers, large software companies and established advertising agencies for over 30 years.