



DS-18 : Designing the Next Generation of C-UAS (Counter- Unmanned Aircraft System) Interfaces

By: John Grinthal, Nia Poor, David Kumar,
Juliet Meza, Nicholas Milonni



Agenda



Meet the Team



Problem Statement



Org Chart



Project Timeline



MMC



MVP



Final Deliverables



Gantt Chart

Meet the Team

John Grinthal



4th year B.S.
Management
Information Systems

Nia Poor



4th year B.S./M.S.
Cybersecurity

David Kumar



4th year B.S.
Cybersecurity

Juliet Meza



3rd year B.S.
Cybersecurity

Nicholas Milonni



4th year B.S.
Cybersecurity

Problem Statement - Original

Diplomatic Security's C-UAS operators in Post Alpha need a more centralized interface that autonomously gathers data from multiple C-UAS sensors and feeds the most relevant information into one single view. This single pane of glass approach needs to be optimized with UI/UX principles in mind in order to better monitor threats and make evidence-based decisions from Post Alpha and beyond.

Problem Statement - Revised (Final)

Diplomatic Security's C-UAS operators in Post Alpha need a more centralized interface that autonomously gathers data from multiple C-UAS sensors and feeds the **necessary** information into a **minimal number of views (ideally 1) while integrating components from various vendors**. This **interface** needs to be optimized, **simplified, and customizable** with UI/UX principles and **user feedback** in mind in order to better monitor threats and make evidence-based decisions from Post Alpha and beyond.

Project Timeline

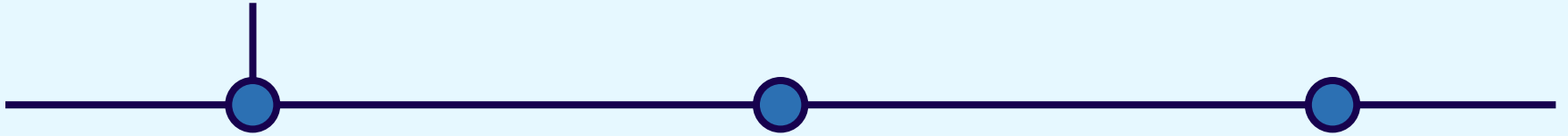


Project Timeline

Weeks 1 - 5: Getting Started

Total Interviews: 21

Unique Interviews: 20



Weeks 1-5: Getting Started

- Beginning to get a feel for the problem statement
- Interviews consisting mainly of RIT students and faculty
- Meetings with our problem sponsor being taken over by clarifying questions
- Beginning to talk about the logistics of an in-person site visit to the West Virginia C-UAS testing facility










The Mission Model Canvas

Mission/Problem Description:
DS-18

Designed by:
The whole group and ChatGPT

Date:
09/05/2023

Version: 1

<p>Key Partners </p> <ul style="list-style-type: none"> - Contractors - Other government agencies that deal with drones - Private industry partners - Outsource dashboard to third party (e.g. Microsoft) 	<p>Key Activities </p> <ul style="list-style-type: none"> - Dashboard with views - Conduct user research 	<p>Value Propositions </p> <p>This initiative will bring forth the following values:</p> <ul style="list-style-type: none"> - Speed and Efficiency - Increased Accuracy - Consolidate View - Easier Training - Heightened Security - Cost Savings/ROI 	<p>Buy-in & Support </p> <ul style="list-style-type: none"> - develop business case - explain the benefits - educate about the project - demonstrate ROI - address concerns - emphasize safety measures 	<p>Beneficiaries </p> <ul style="list-style-type: none"> - C-UAS Operators - Field Service Watchstanders (FSWs) - DS test engineers - Test analysts - Project managers - Regional Security Officers (RSOs)
<p>Key Resources </p> <ul style="list-style-type: none"> - Federal Aviation Administration - C-UAS Guidance - DeDrone C-UAS White Paper - C-UAS Hub 		<p>Deployment </p> <ul style="list-style-type: none"> - Begin testing at a few international posts / consulates <ul style="list-style-type: none"> - Area where there is less of a risk of drone attacks - Send out user feedback surveys and take into account the results 		
<p>Mission Budget/Cost </p> <p>\$25,000,000 program budget</p> <ul style="list-style-type: none"> - This project specifically would have a smaller budget 		<p>Mission Achievement/Impact Factors </p> <ul style="list-style-type: none"> - User satisfaction with UI - Overall increase in response times to possible threats - Quicker decision making from operators 		

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DESIGNED BY: Strategyzer AG & Steve Blank
The makers of Business Model Generation and Strategyzer

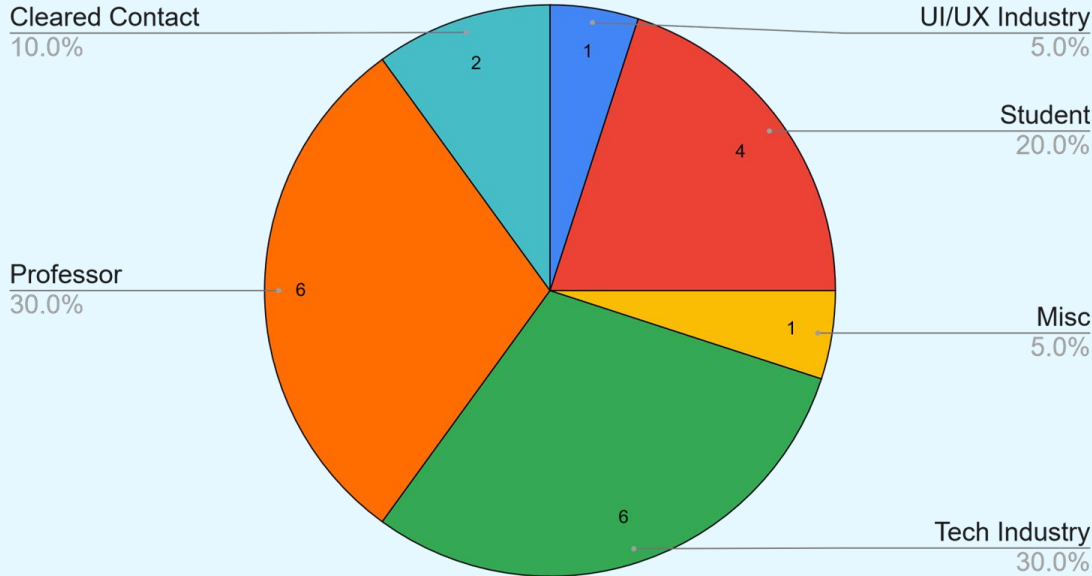
Strategyzer
strategyzer.com

Discovery

“If it seems easy, make it easier” - Drone Interface Training Professional

“A simple user interface would be better, as some folks in the state department might not be very technically inclined.” - Lieutenant General

Unique Interview Count By Field



Stats:

Total Interviews: 21

Unique Interviews: 20

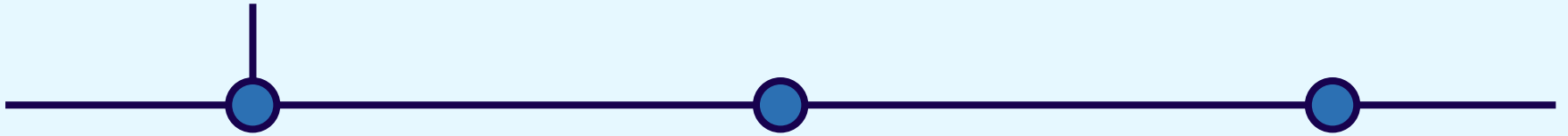
Discovery just getting started, not too many interviews yet

Project Timeline

Weeks 1 - 5: Getting Started

Total Interviews: 21

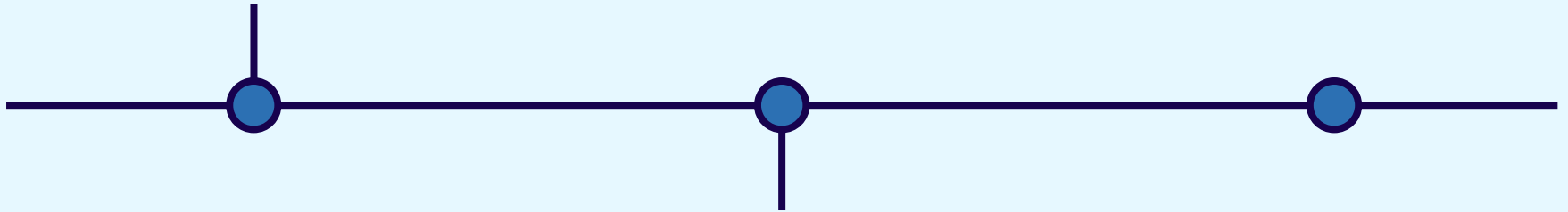
Unique Interviews: 20



Project Timeline

Weeks 1 - 5: Getting Started

Total Interviews: 21
Unique Interviews: 20



Weeks 6 - 10: Discovery and Site Visit

Total Interviews: 79
Unique Interviews: 51

Weeks 6 - 10: Discovery and Site Visit

- Put a focus on beneficiary discovery
- Went to an in-person site visit to the Summit Point Training Facility in West Virginia
- Began to make major pivots to our problem statement
- Started the creation of a Minimum Viable Product (MVP)
- Began discussing the Wizard of Oz MVP

Contingency
FSWs



Problem
Sponsor



This is an actual sensor that is used to help detect drones in the vicinity. The interfaces take in this data to give the FSWs the information they need to take proper action.



A DoS FSW (Field Service Watchstander setup)










The Mission Model Canvas

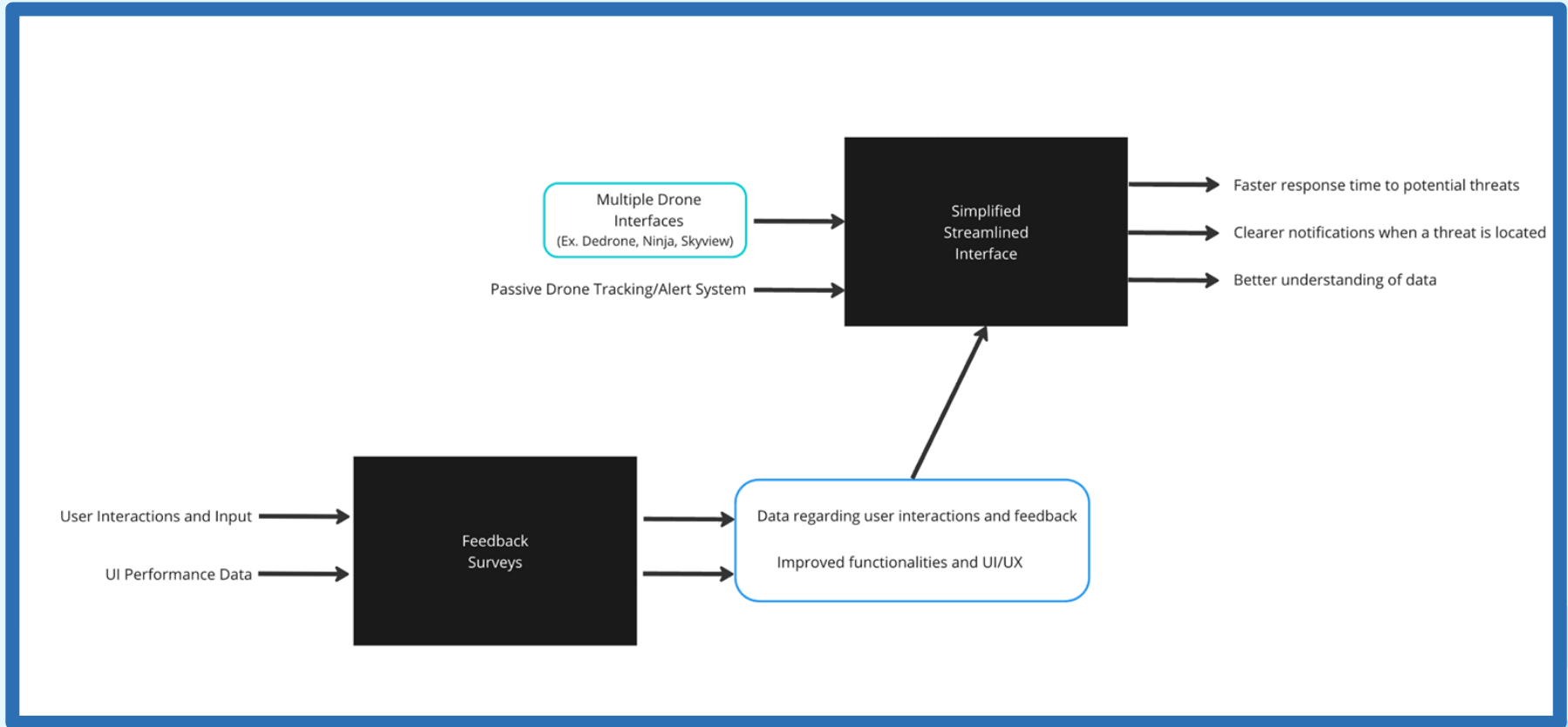
Mission / Problem Description: DS-18

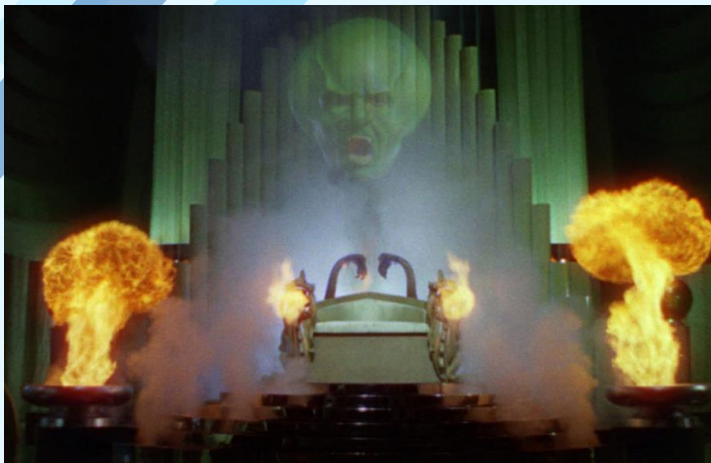
Designed by: The whole team and ChatGPT

Date: 10/17/2023

Version: 5

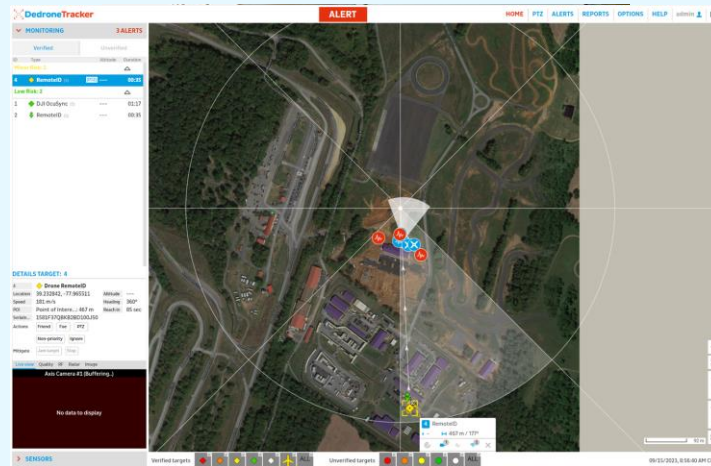
<p>Key Partners </p> <ul style="list-style-type: none"> DS Test Engineers Test Analysts CST Vendors <ul style="list-style-type: none"> Ninja (Black River), Corican (CACI), Dedrone, Blue Halo (SkyView DIV2, SkyView MPV2, Titan), Echodyne EchoGuard, Rada Radars, Axis Camera, Speed ER Contractors Other government agencies that deal with drones Private industry partners 	<p>Key Activities </p> <ul style="list-style-type: none"> Simplify UI mockup with easily understandable icons Conduct user research through feedback surveys Observe user interaction with current dashboard 	<p>Value Propositions </p> <ul style="list-style-type: none"> UI that is easier to use / navigate <ul style="list-style-type: none"> Easier to flag noise and other data issues Faster response time to drone attacks User feedback taken into account Improved threat monitoring for evidence based decision making Increase security in locations where implemented Interface widely applicable throughout the agency and beyond (e.g., Airports) 	<p>Buy-in and Support </p> <ul style="list-style-type: none"> Develop business case Explain the benefits Educate about the project Demonstrate ROI Address concerns Emphasize safety measures 	<p>Beneficiaries </p> <ul style="list-style-type: none"> C-UAS Leads <ul style="list-style-type: none"> Senior Lead Program Advisor Projects Lead Field Service <ul style="list-style-type: none"> Watchstanders <ul style="list-style-type: none"> 4 leads, each has ~3 non-leads Contingency FSWs Regional Security Officers (RSOs) Deputy Project Managers Country Manager
<p>Mission Budget / Cost </p> <p>\$25,000,000 program budget This project specifically would have a smaller budget</p>		<p>Mission Achievement / Impact Factors </p> <ul style="list-style-type: none"> Feedback survey (Qualitative) Interface that is applicable to a much wider range of posts Interface is intuitive and requires minimal training to use 		





Single-Pane-Of-Glass Mockup That Is / Contains:

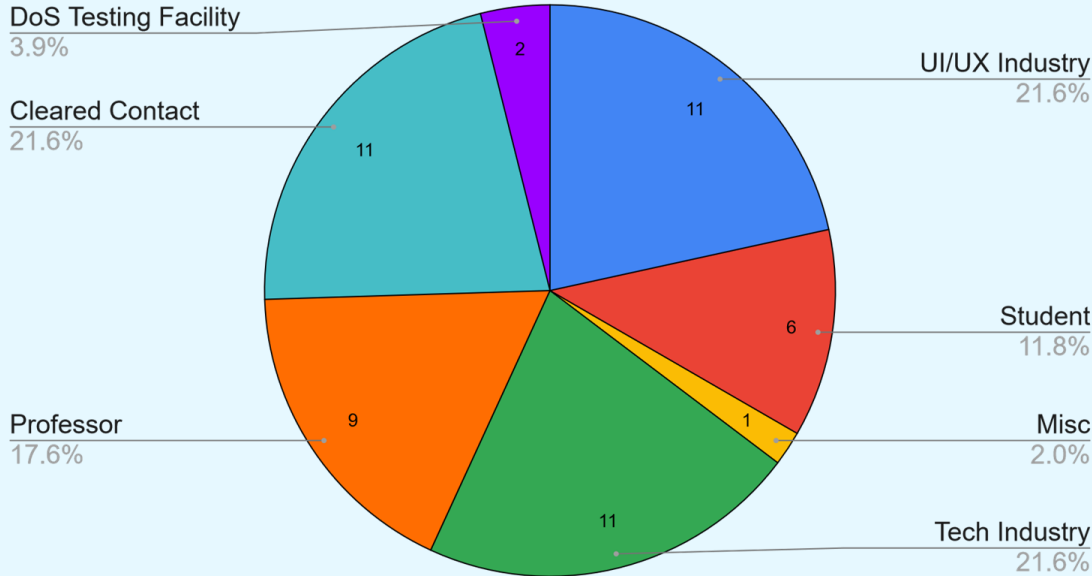
- Dark mode
- Less information overload
- Alerts with differing sounds
- Ability to minimize camera views
- Wider use of icons
 - Buttons / easier storyboarding
- Single person use
- Clear wording
- "iPhone Easy"
 - Mobile on a tablet
- Adaptable to "human on the loop"
- Corresponding written instructions / guidance



Discovery

“The point of the Wizard of Oz MVP is to gauge initial interest before investing so much into development and production” – Innovation Consultant

Unique Interview Count By Field



Stats:

Total Interviews: 79

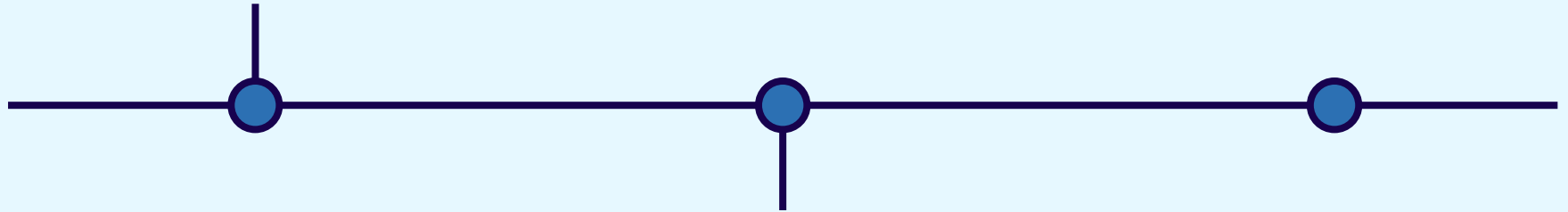
Unique Interviews: 51

Conducted the most interviews of any 5-week period

Project Timeline

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Weeks 6 - 10: Discovery and Site Visit

Total Interviews: 79
Unique Interviews: 51

Project Timeline

Weeks 1 - 5: Getting Started

Total Interviews: 21
Unique Interviews: 20

Weeks 11 - 15:
Confirmations
and Conclusions
Total Interviews: 110
Unique Interviews: 81

Weeks 6 - 10: Discovery and Site Visit

Total Interviews: 79
Unique Interviews: 51

Weeks 11 - 15: Confirmations and Conclusions

- Problem sponsor meetings became updates on our final plans
- Beneficiary discovery began to confirm our findings
- The problem statement and MMC began to pivot less
- Created a Wizard of Oz MVP
- Drew final conclusions and created final deliverables








The Final Mission Model Canvas

Mission / Problem Description: DS-18

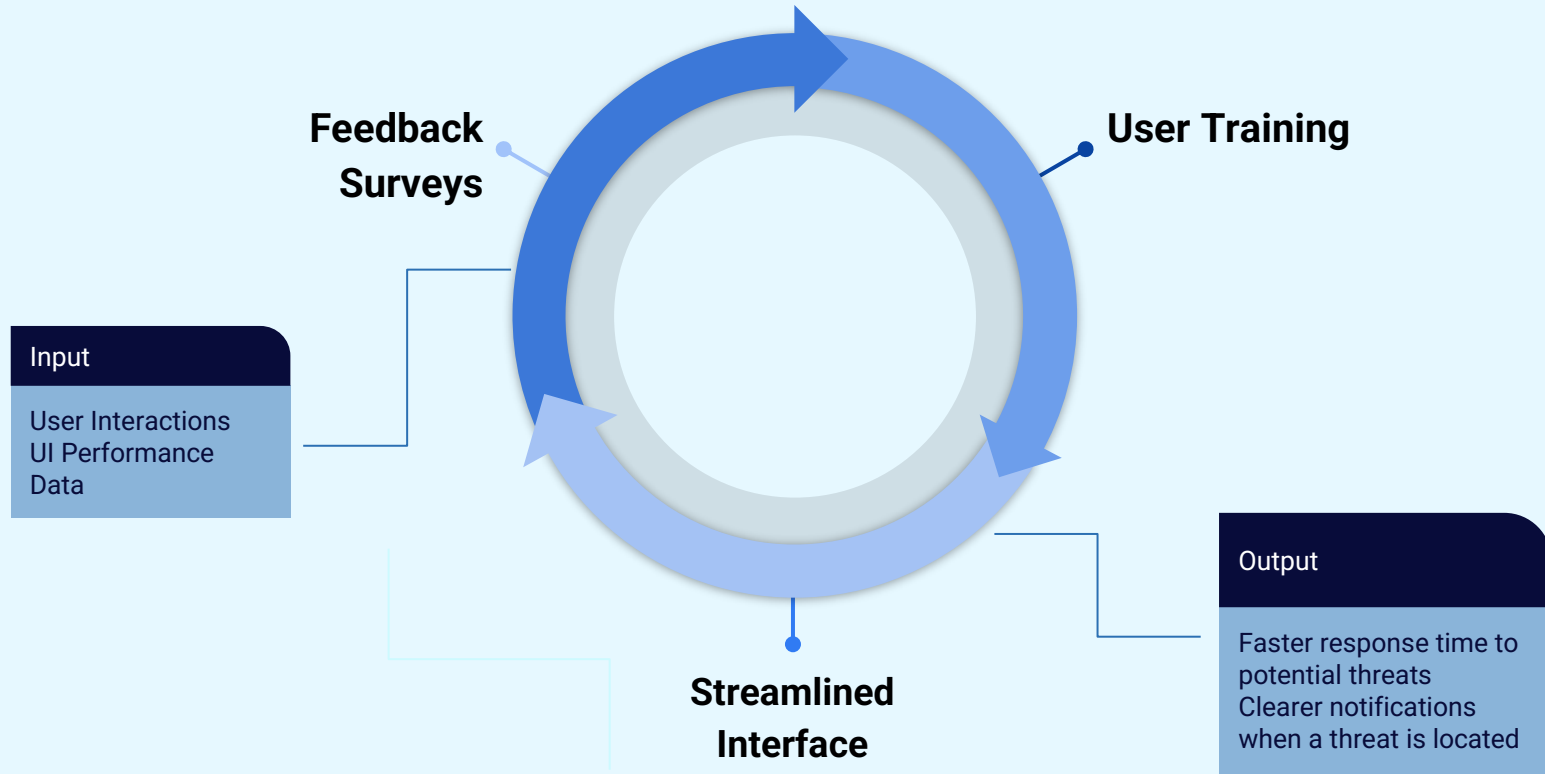
Designed by: The whole team and ChatGPT

Date: 12/05/2023

Version: 10

<p>Key Partners </p> <ul style="list-style-type: none"> DS Test Engineers Test Analysts CST Vendors <ul style="list-style-type: none"> Ninja (Black River), Corican (CACI), Dedrone, Blue Halo (SkyView DIV2, SkyView MPV2, Titan), Echodyne EchoGuard, Rada Radars, Axis Camera, Speed ER Other government agencies that deal with drones Private industry partners 	<p>Key Activities </p> <ul style="list-style-type: none"> Simplify UI mockup with easily understandable icons Conduct user research through feedback surveys Observe user interaction with current dashboard 	<p>Value Propositions </p> <ul style="list-style-type: none"> UI that is easier to use / navigate <ul style="list-style-type: none"> Easier to flag noise and other data issues Faster response time to drone attacks User feedback taken into account Improved threat monitoring for evidence based decision making Increase security in locations where implemented Interface widely applicable throughout the agency and beyond (e.g., Airports) 	<p>Buy-in and Support </p> <ul style="list-style-type: none"> Develop business case Explain the benefits Educate about the project Demonstrate ROI Address concerns Emphasize safety measures 	<p>Beneficiaries </p> <ul style="list-style-type: none"> Field Service Watchstanders <ul style="list-style-type: none"> 4 leads, each has ~3 non-leads Contingency FSWs C-UAS Leads <ul style="list-style-type: none"> Senior Lead Program Advisor Projects Lead
<p>Mission Budget / Cost </p> <p>\$25,000,000 program budget:</p> <p>OMA: The allocation of time for system maintenance costs.</p> <p>OPA: Cost implementation of a new or updated system.</p> <p>Ongoing hosting and maintenance.</p> <p>User Training Solution: \$20,000+</p>		<p>Mission Achievement / Impact Factors </p> <ul style="list-style-type: none"> Feedback survey (Qualitative) Interface that is applicable to a much wider range of posts Interface is intuitive and requires no formal training to use 		

Final Minimum Viable Product



Final Streamlined Interface GUI Process

Current Dashboard

Using Dedrone as our base interface.



Operator Recommendations

With the missions and people (FSWs) in mind.



Improved CUAS System

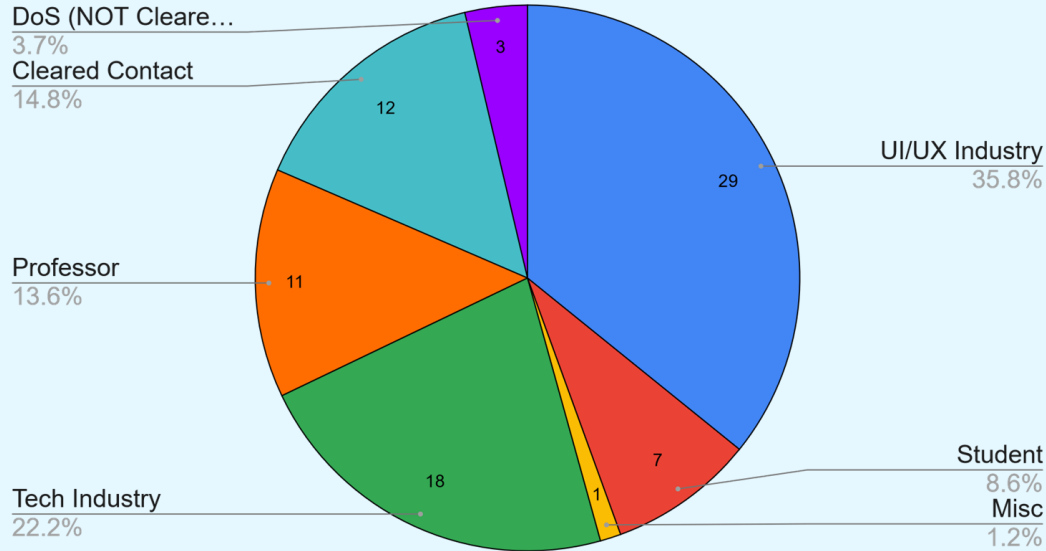
Combining the needs and preferences of the operators to a modular system that fits for testing and field needs

Discovery

“The segregation of different alert types could help them feel like they don’t have to watch the map like a hawk” - UI/UX Designer

“Using hotkeys could help to speed up the FSWs’ repeated tasks” – Ui/UX Designer

Unique Interview Count By Field



Stats:

Total Interviews: 110

Unique Interviews: 81

Focused on conducting more UI/UX industry interviews

Over 15 weeks
we conducted
many
interviews...

Final Deliverables

1. A **Wizard of Oz MVP DeDrone Mockup** to be presented to DeDrone to request changes be implemented
1. An **FSW feedback survey** to be distributed at a time where the FSWs have a lower workload
1. **Interface recommendations** to be widely implemented across all posts where FSWs are currently deployed

FSW Feedback Survey

- Created a leave-behind document of questions based on interview feedback and UX heuristics
- Questions divided into five categories
 1. Introduction / Context: 5
 2. Sponsor Recommendation: 1
 3. Likes: 6
 4. Dislikes: 5
 5. Wrapping-Up: 2

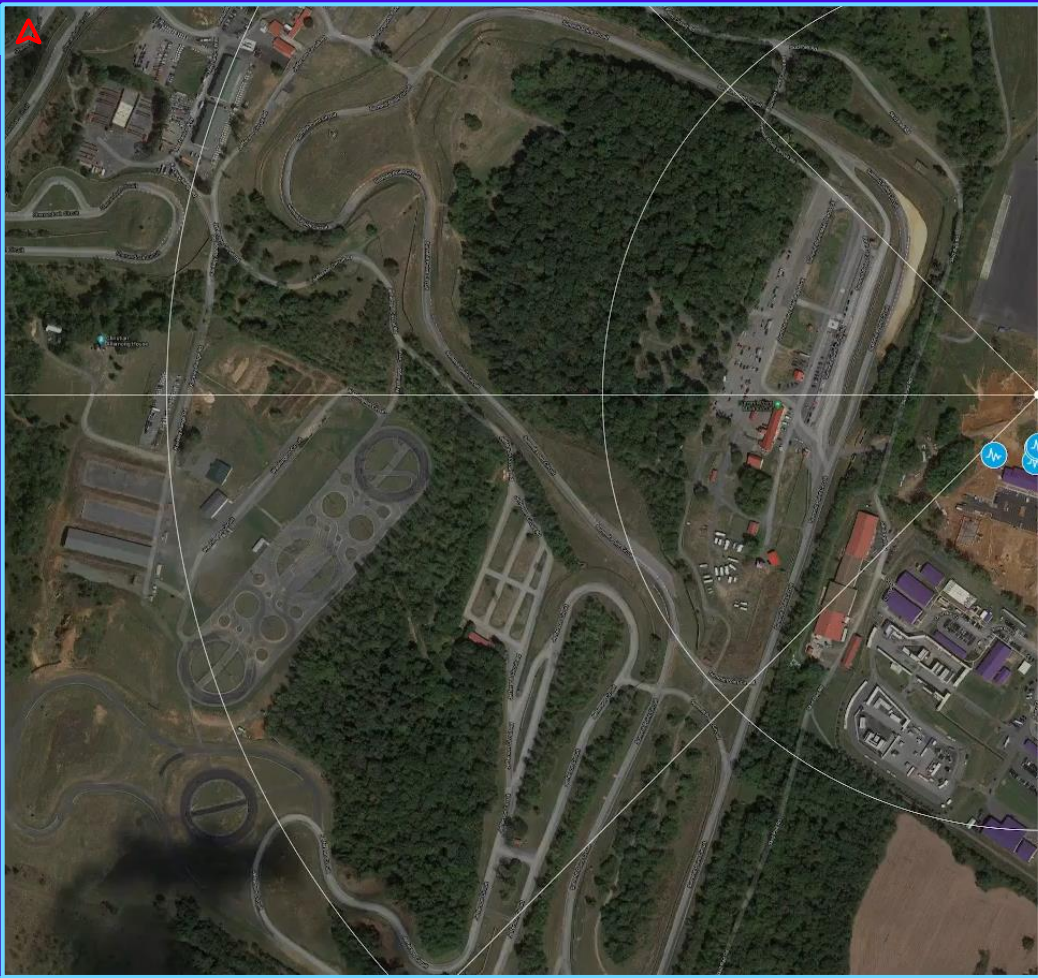
Interface Recommendations

1. An optional **dark mode**
1. **Alerts with differing sounds** based on severity
1. Wider use of **icons**
 - For easier storyboarding
1. Implement optional **hotkeys** to speed up common tasks
1. Add corresponding **written instructions / guidance**

Wizard of Oz MVP Live Demo!

> Monitoring

SAFE



- < PTZ
- < Alerts
- < Reports
- < Options
- < Help
- < admin
- < Mail

Latest Alerts

- 8 minutes ago
- 14 minutes ago
- 16 minutes ago



> Sensors

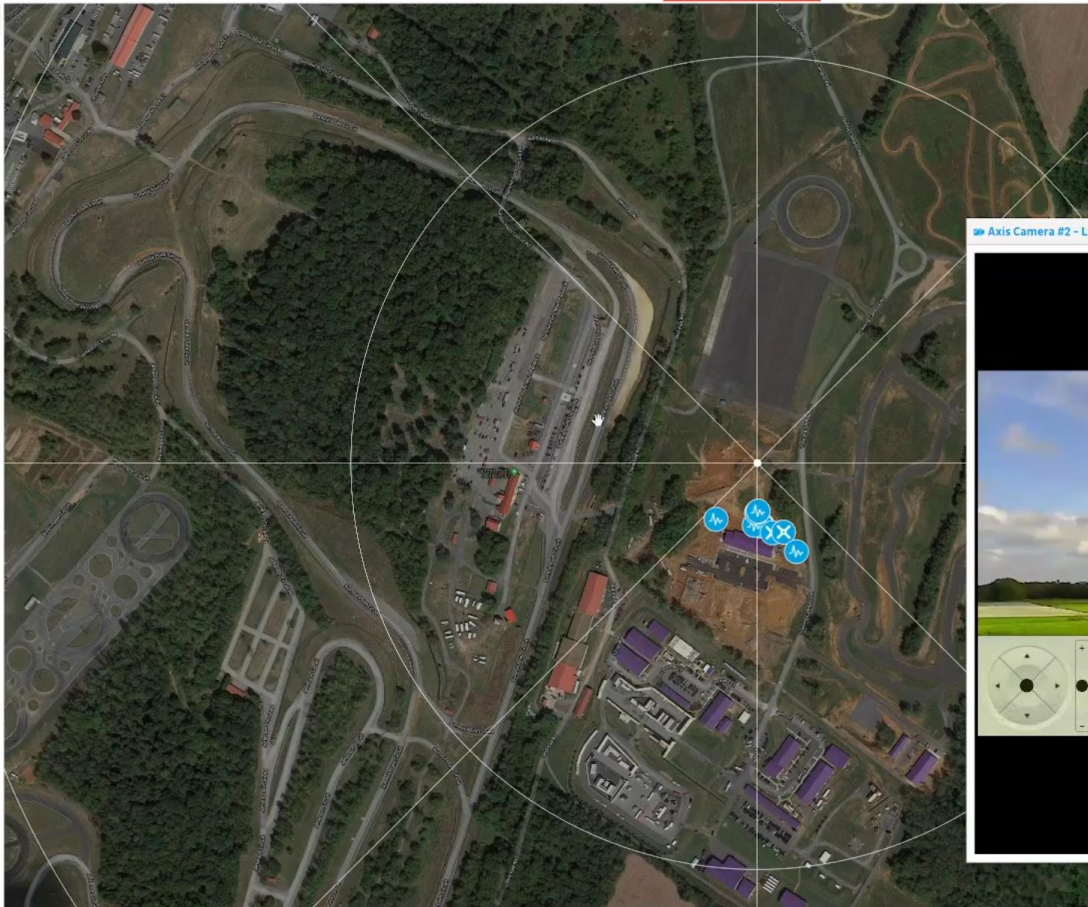
Verified Targets

Unverified Targets



MONITORING

SAFE



Axis Camera #2 - Live view

Wipe Track Lock target 91° Verify Ignore Non-priority

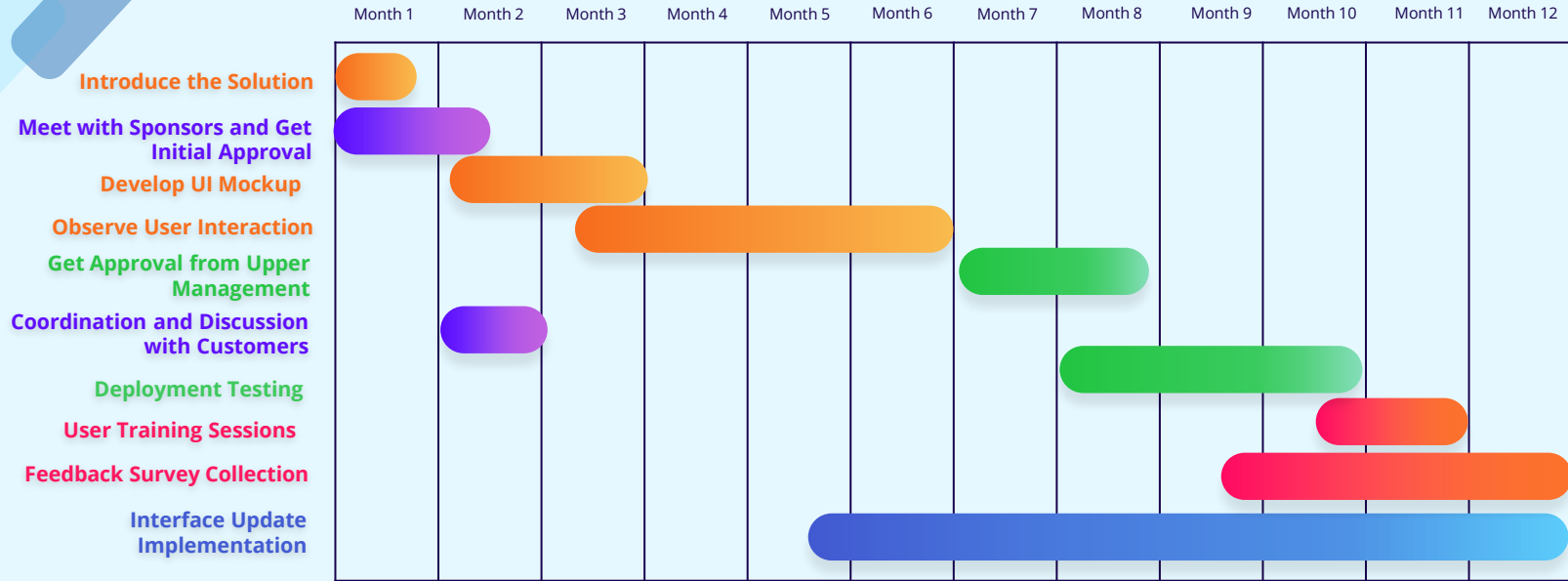
Latest alerts

- 15 minutes ago
- 15 minutes ago
- 15 minutes ago
- 14 minutes ago
- 15 minutes ago

> SENSORS

Verified targets ALL Unverified targets ALL

Gantt Chart



Phase 1: Research and Funding

Phase 2: Development

Phase 3: Approval and Testing

Phase 4: Implementation and User Interaction

Phase 5: Feedback and Update

Thank You!



Roshan Daniel
Problem Sponsor



Eitan Danon
Problem Mentor



Jim Santa
H4Dip Professor



Suvam Barui
Teaching Assistant

Thanks!

Do you have any questions?

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