

Beginning of document

Hyun Seo

Profile overview

2023

linkedin.com/in/hyunseo
+1.856.630.4086
hi@hyun.io

—

Sept 18, 2023

Hello, I'm Hyun.
I hope you're having
a fantastic day.

I started out as a designer, then I started defining product via design. So now, I am doing both product work and design work at Kayhan Space as Head of Product & Design.

For a little context about this document, it is meant to show “breadth” than “depth”.

Finally, I also code a bit. Please check out <https://www.github.com/hyundotio> if you're interested in code.

| | | |
|-----------------|---------------------|---------------|
| YoE | Location | Education |
| 12 (2011 – Now) | Philadelphia region | B.A., Rutgers |

Industry experience

Cybersecurity, Robotics, Quantum Computing, Geospatial Defense Intelligence, and Space

10 YoE Breakdown

- 2013.07 – 2017.09 IBM Security (Product) In a team of 4-6 Designers (30+ team)
- 2017.09 – 2019.12 IBM Research (Sciences) In a team of 4-6 Designers (20+ team)
- 2020.01 – 2022.11 HawkEye 360 (Defense) First designer, Managed 2 Designers (15+ team)
- 2021.11 – Current Kayhan Space (Space) First designer, Will manage 1 PM, 1 Designer (15+ team)

Kayhan Space

2021.Nov-Current

What is Kayhan Space?

Kayhan Space is a company that is focused on space traffic management. Imagine air traffic control but for satellites. We create software solutions that auto-mitigate potential collisions between satellites versus debris as well as satellites versus satellites. We also host a network of satellite operators so everyone has visibility and can work together to mitigate high-risk space collision events.

About the company

- 13 engineers (Software & Astrodynamics)
- Me (First PM & Designer / Head of Product & Design)

Common users

- Software engineers in space industry
- Guidance, navigation, control (GNC) engineers
- Government aerospace analysts

Things I do/have done at Kayhan Space on a regular basis

- Understand market, identify users & create personas
- Create first design system for product & brand
- Complete corporate rebrand
- Napkin sketch to full product execution (graphical + API interfaces)
- Enact new product development processes
- Create product requirements
- Act as Creative Director to agency for product marketing work
- Facilitate design thinking exercises with entire company
- Balance and prioritize engineering deliverables
- Production front-end development (React, TypeScript, SCSS)

I joined as the first design (and product) hire at day 1 of the company receiving seed money. Working at Kayhan Space has been an exercise of testing everything I've learned during my career; defining ideas to executing and marketing complex technologies and products.

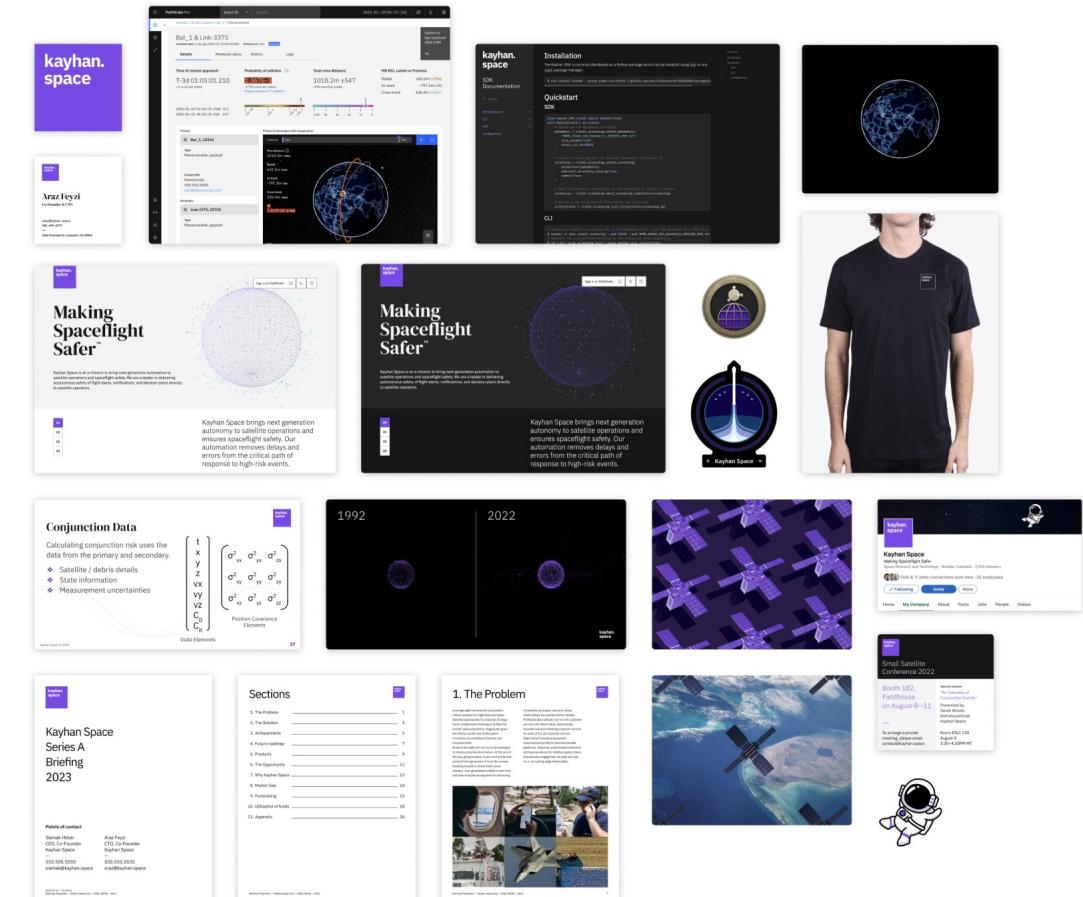
So far, I've led product and design efforts to release two first-to-market products, rebrand the entire company, grow 50% in managed space assets, and write the company's story to raise \$7MM for Series A.

Kayhan Space

Branding

At Kayhan Space, I am currently utilizing IBM Carbon (an open-source design component system) for all products as the timeline for delivery is very short. The corporate branding I've established for Kayhan Space is also a distant variant of IBM Carbon as I wanted the brand and product to look and feel the same.

To keep a symbiotic relationship with IBM Carbon, I keep in contact with the Carbon design and development team to discuss potential contributions to the open-source library.



A small slice of different visual artifacts created at Kayhan Space. Including product, documentation, presentations, print assets, 3D + 2D visualizations, and swag.

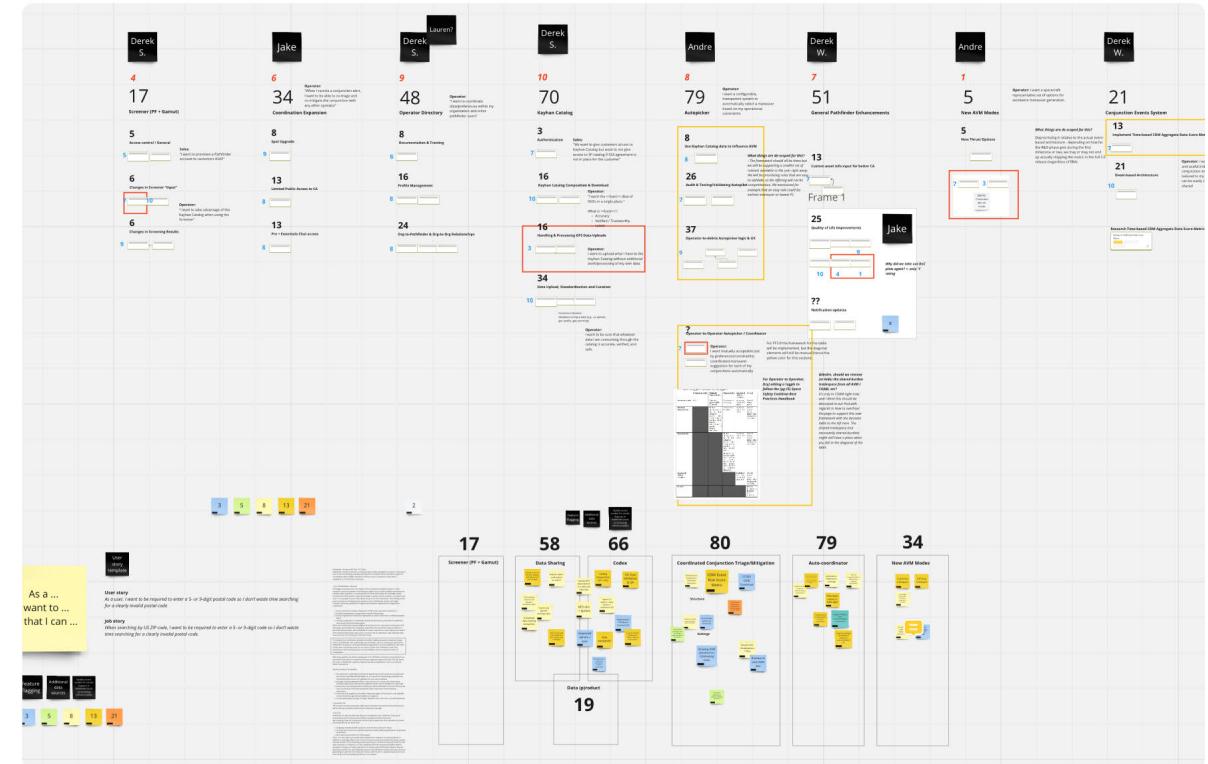
Kayhan Space

Product process

At HawkEye 360, I found myself creating and communicating product requirements via UI design because the company lacked a product development process. As I became Head of Product and Design at Kayhan Space, I decided to adopt Amazon's PRFAQ process to avoid inefficiencies encountered at HawkEye 360.

The PRFAQ process centers around the Mock Press Release (MPR), a document (that is written by Chief of Sales and myself) that describes “what” the product is along with a delivery time.* Using the MPR as a guide, the engineering staff and myself have more freedom to creatively find a solution rather than following a list of requirements that's been trickle down from management. This process opened up significant amount of time for the Founders to fundraise and engage with potential customers. Another big bonus is that the engineering and product staff gained significant amount of autonomy and creative freedom.

*Before the PRFAQ process even begins, I run DT exercises to create a foundational source of information.

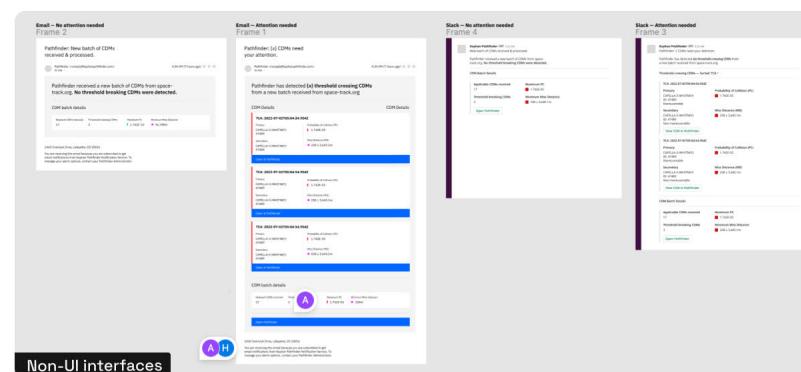
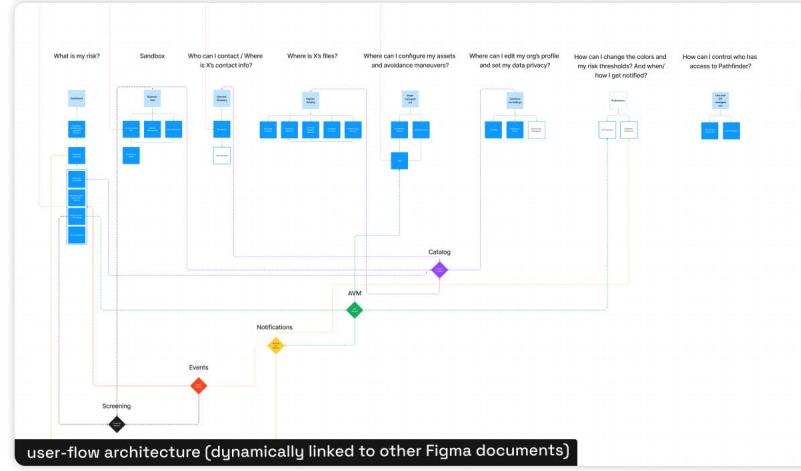


At Kayhan Space, I run product exercises with the engineering team where we deconstruct the MPR into Epics and assign each epic with “Resource Points”. Then the results are handed off to the Founders, Chief of Sales, and myself where we assign each epic with “Prioritization Points”; influenced by the market, product & engineering pipeline and other strategic factors.

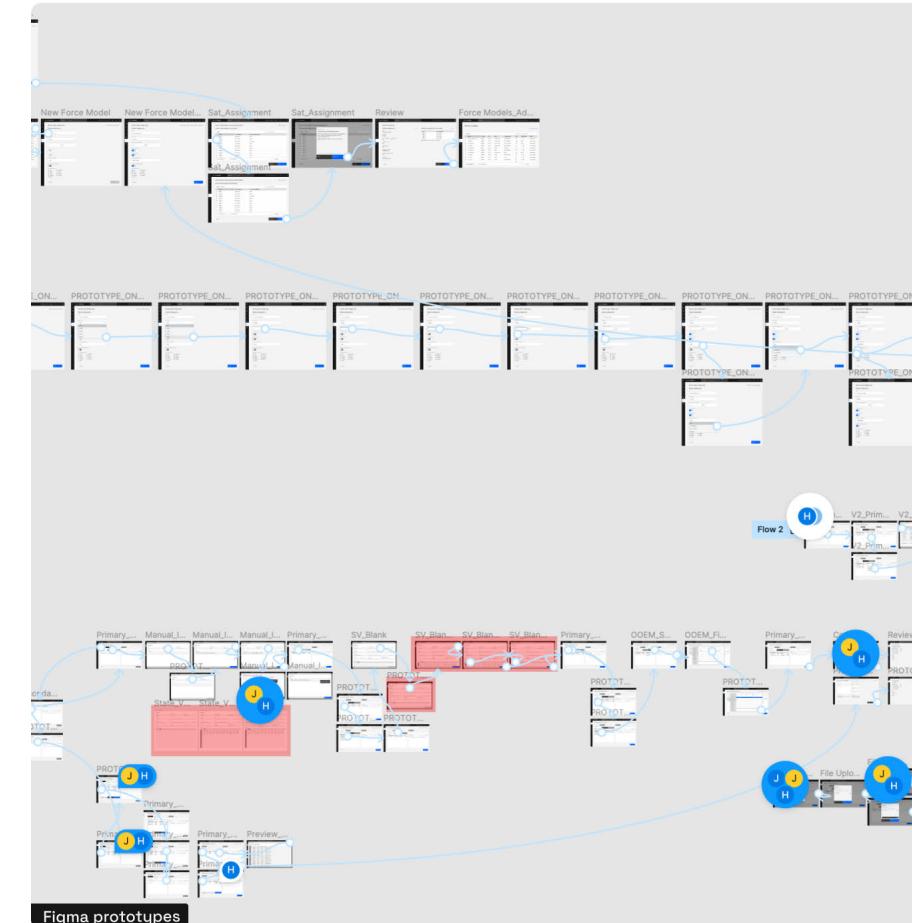
With these results, I create a product release plan which usually include multiple phases (with each phase having a time and a set of experiences; all collaboratively created with engineering input) then kick the whole thing off with the entire company.

Kayhan Space

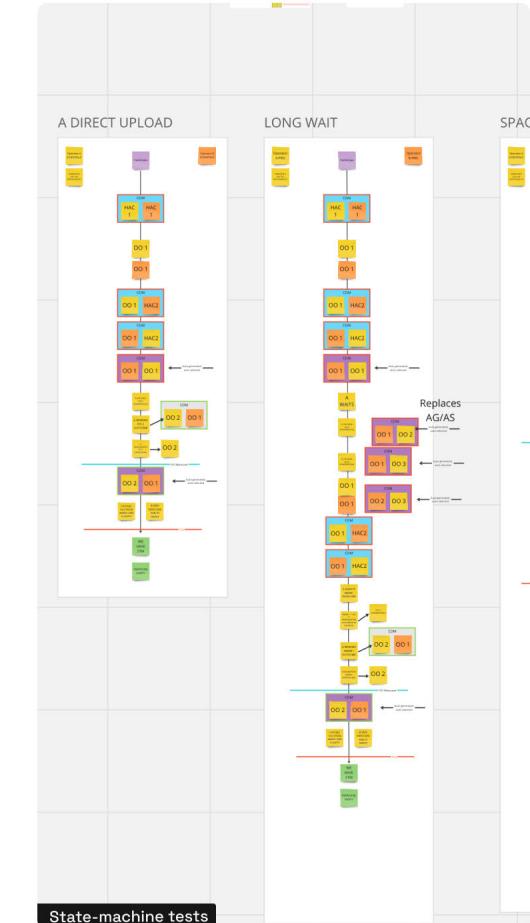
Snippet: Design process artifacts



General: Some snapshots of my design process at Kayhan Space. Including user-flow architecture (which links to other Figma documents), Figma prototypes, state machines, and non-UI interfaces.



Above: At Kayhan Space, the time opportunity for me to create Figma prototypes are rare, but when I do get a chance, I do create them to test assumptions with potential clients and users.



Above: It is very common for me to create and test logic flows (ie make state machines) for edge cases with engineers.

Kayhan Space

Snippet: Product, Pathfinder (1/2)

The screenshot shows the Kayhan Space Pathfinder Pro interface. At the top, it displays the date and time: 2023-09-14 15:13:32 UTC. The main header reads "Pathfinder Pro" and "XELNAGA-A, 55555 & PROTOSS-1, 44444 Conjunction". Below this, there's a message: "High-interest event Active (Coordinated) Last update: 4 hours ago". A red box highlights a "High-interest event": "There is at least one Operational CDM with P_c above $>1E-4$, SSC recommends mitigating action to 1E-5". The interface includes sections for "SSC Responsible" (Primary 55555, Secondary 44444), "Auto-generated maneuver status" (Ready), and "CelesteCraft mitigation status" (Not intending to mitigate). It also shows "Operational ephemeris availability" for Tundra and CelesteCraft. The "Operational CDM" section provides details about the closest approach (T-2d 08h), probability of collision ($1.72E-3$), total miss distance (54.1 ± 139.1 m), and relative speed (13.1 km/s).

Screencap of Pathfinder, flagship product of Kayhan Space that is aimed to make safe flight of on-orbit spacecraft. This interface is designed for satellite operators to triage and mitigate potential collisions with other satellites and debris.

The screenshot continues from the previous one, showing the "Operational CDM" section with "Available Operational CDMs" (Kayhan CDM-1EA7E3F (Newest)). It details the time of closest approach (T-2d 08h), probability of collision ($1.72E-3$), total miss distance (54.1 ± 139.1 m), and relative speed (13.1 km/s). Below this, the "Mitigation" section shows "Auto-generated maneuvers (Pro)" and "Import custom scenario". It lists tradespace (55555 Auto (AVM Profile 1)), display type (Plot), Y-axis (MD), and PC. The "Available Impulsive maneuver plans" section shows a plot with a red line labeled "No maneuver PC: 1.72E-3" and a vertical red line labeled "TCA". The plot has logarithmic scales for Probability (1E-3 to 1E-2) and Time (1E-3 to 1E-2).

This may look like a lot but the key UX for users at Kayhan Space is data transparency and navigability as space data always contain uncertainties and almost always more than a single source of truth. Typography plays a huge role in graphical interfaces at Kayhan Space.

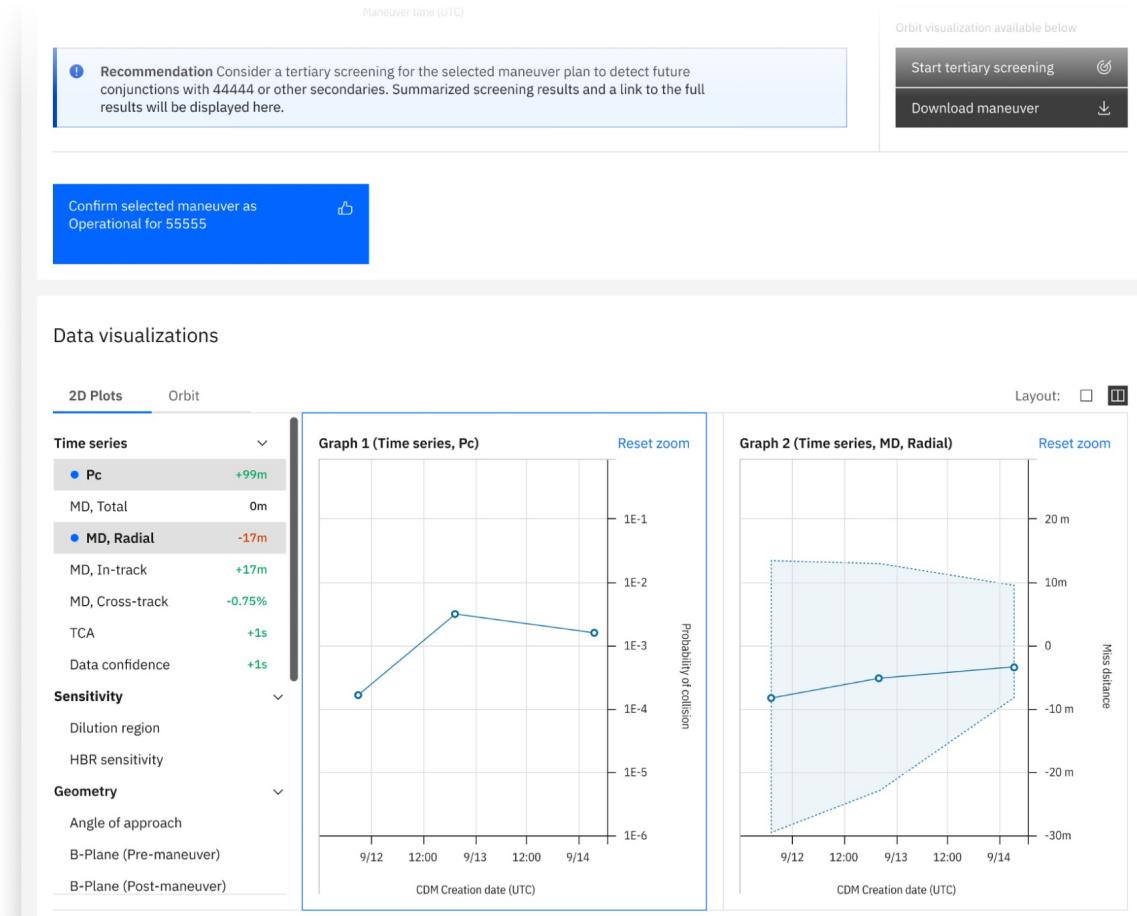
Kayhan Space

Snippet: Product, Pathfinder (2/2)



IBM Carbon is utilized as the primary design component library. However a significant amount of custom components that extend the Carbon design language have been created to accomodate our needs.

Awarded by Fast Company
Innovation by Design 2023 (3 times!)



Before Pathfinder, our users had to filter through bunch of emails to create their own trend analysis. Because the graphs weren't standardized, it took a lot of research to find out what data the users like to correlate and how they render uncertainties. TL;DR stock apps got it right.

Kayhan Space

Snippet: Product, Gamut

Welcome to Gamut, Derek

SP Cat. Solution time: 2021-12-14 13:33:17 UTC
SP Cat. full coverage time span: 2021-12-14 13:35:17 UTC - 2021-12-19 13:39:17 UTC

Objects tracked:
LEO 21,000 (19,500 DEB)
MEO 3,000 (1,950 DEB)
GEO 1,400 (1,200 DEB)

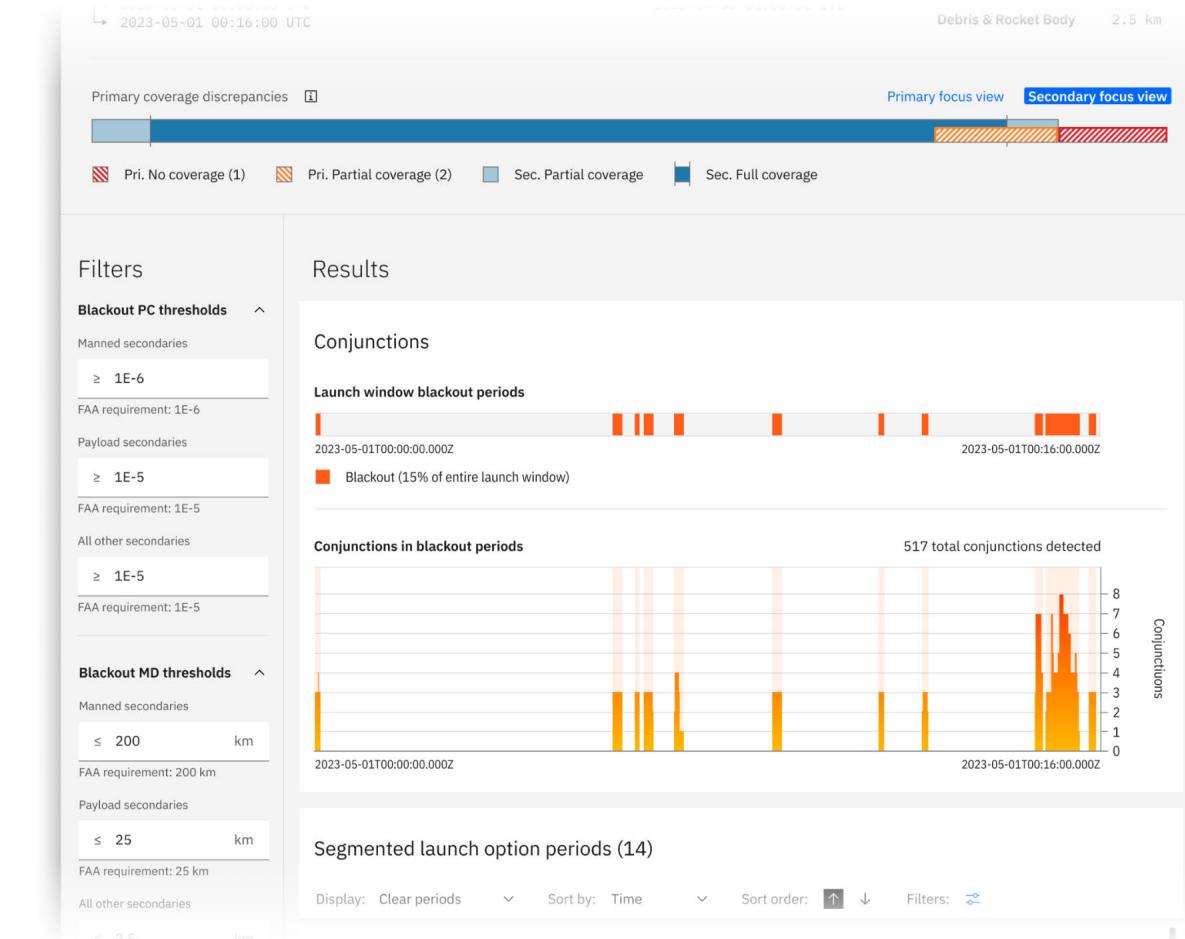
{C}% increase since last month

Jobs: Screening jobs

Sort by: Created Sort order: ↑ ↓ Filters: Search: Screening jobs list New screening job +

| Screening job name | Launch window duration | Blackout | Coverage | Conjunction # | Primaries # | Secondary source |
|----------------------|------------------------|---------------|----------|---------------|-------------|------------------|
| Screening_job_name_1 | {X} hrs | Blackout {Y}% | Full | {A} | {B} | SP Catalog |
| Screening_job_name_2 | {X} hrs | Blackout {Y}% | Full | {A} | {B} | Custom |
| Screening_job_name3 | {X} hrs | Blackout {Y}% | Full | {A} | {B} | SP Catalog |

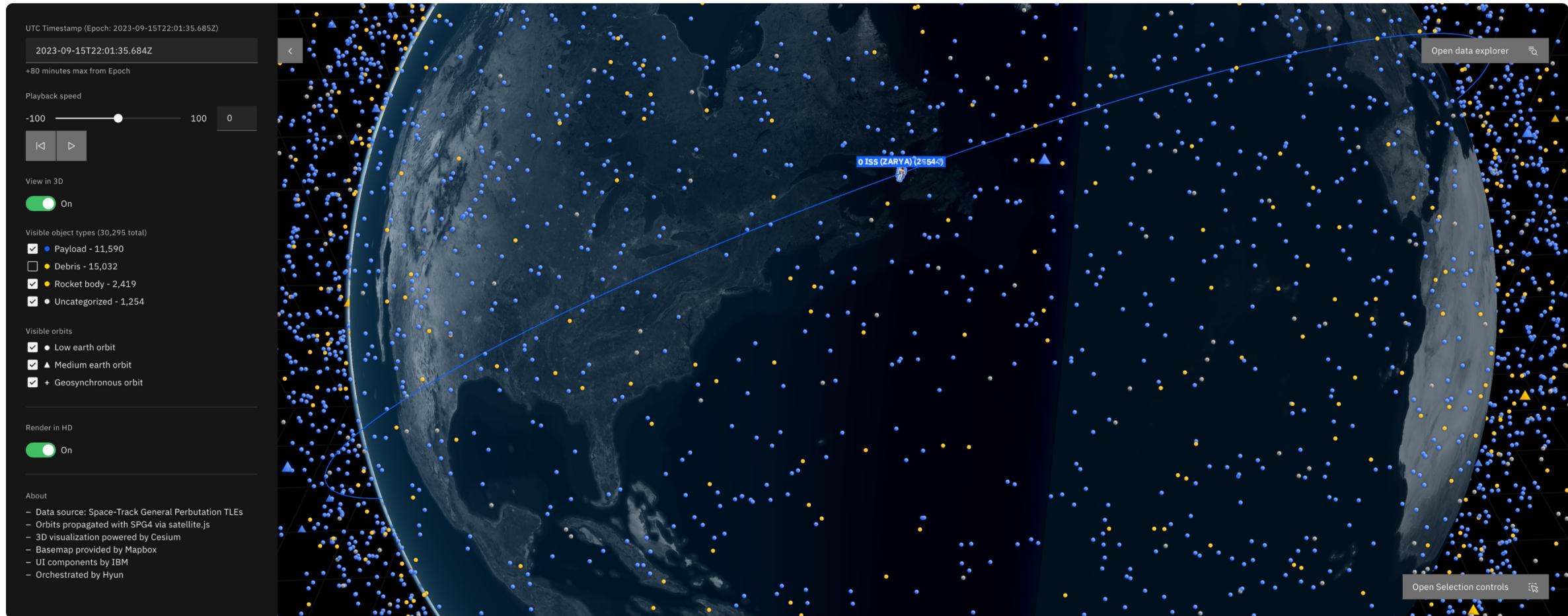
Dashboard screencap of Gamut, a rocket-launch safety tool where a rocket launch provider can simulate launches and scan for potential collisions with space debris or satellites. Gamut is used as a sandbox tool unlike Pathfinder which is a real-time operational tool.



Screencap of a finished scanning in Gamut. This screen shows the user a time-range of when they can launch or cannot launch (with breakdowns of how many potential collisions they may encounter at a certain time).

Kayhan Space

Snippet: Marketing, Space Visualizer



A public facing application that tracks space objects I've designed for investors & space-enthusiasts (not my primary user-base, satellite operators). This design is more visualization-centric as the primary utility of the app is more of a technology demonstration.

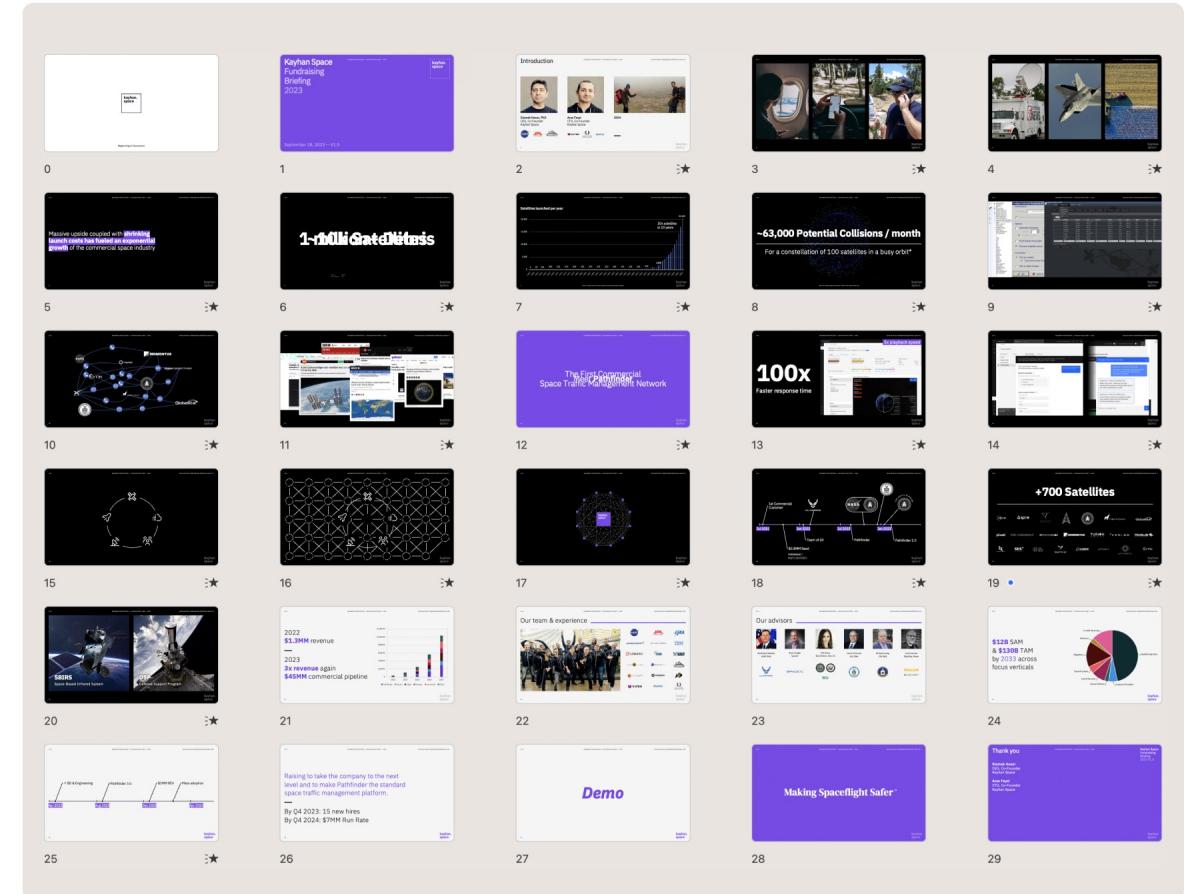
Try out the lab environment at <https://another-sat-viz.vercel.app>

Kayhan Space

Storytelling

Along with product requirements, UIs in Figma, coding, and animations in After Effects, another thing I constantly do is write and tell stories for a variety of audiences: Users, stakeholders (managers & Founders), and investors.

Although not directly a success-story of design artifact communication, significant successes in my storytelling contributions are related to Kayhan Space Series A fundraising and HawkEye 360 Series D fundraising as I have designed and created the entire pitch decks.



Screencap of the Kayhan Space Series A presentation. My first experience with creating fundraising presentations was at HawkEye 360, however the biggest difference with this one was that I was part of the story most of the time, not just in the end. The logo, the brand, the product, the story, all of it. ~\$7MM Fundraising achieved.

HawkEye 360

2020.01-2021.Nov

What is HawkEye 360?

HawkEye 360 is an aerospace defense company that has a constellation of custom satellites that geolocates radio transmissions. Meaning it can geolocate anything that transmits a radio frequency (within a frequency range and a margin of error). This capability in many shapes and forms; such as downloadable data or SaaS Products are offered to the market.

About the company

- ~15 engineers (Software, Signals Processing, Flight Dynamics)
- 1x VP of Product, 1x Product Manager, 1x Product Associate
- Me (First Designer / Principal Designer)

Common users

- Intelligence analysts (U.S. Gov & U.S. Allies)
- Environmental scientists
- Internal team (sales)

Things I've done at HawkEye 360 on a regular basis

- Identify users & create personas
- Create first design system for product
- Napkin sketch to full product execution (graphical + API interfaces)
- Negotiate product requirements with Engineering team
- Act as Creative Director to agency for product marketing work
- Facilitate design thinking exercises with entire company
- Balance and prioritize engineering deliverables
- Production front-end development (React, TypeScript, SCSS, WebGL)
- Customer shadowing
- Satellite data analysis and orbital resource management

As the first design hire, I was able to define the first user-centric design processes and products at HawkEye 360. The company at first offered data in .zip files as products. By the time I left, the company had products with graphical and API interfaces made for targeted users and a design practice & team to maintain and grow the product portfolio.

On top of product & design, I was part of the core team that crafted the company's story that was told to investors for the Series D fundraiser which netted \$145MM.

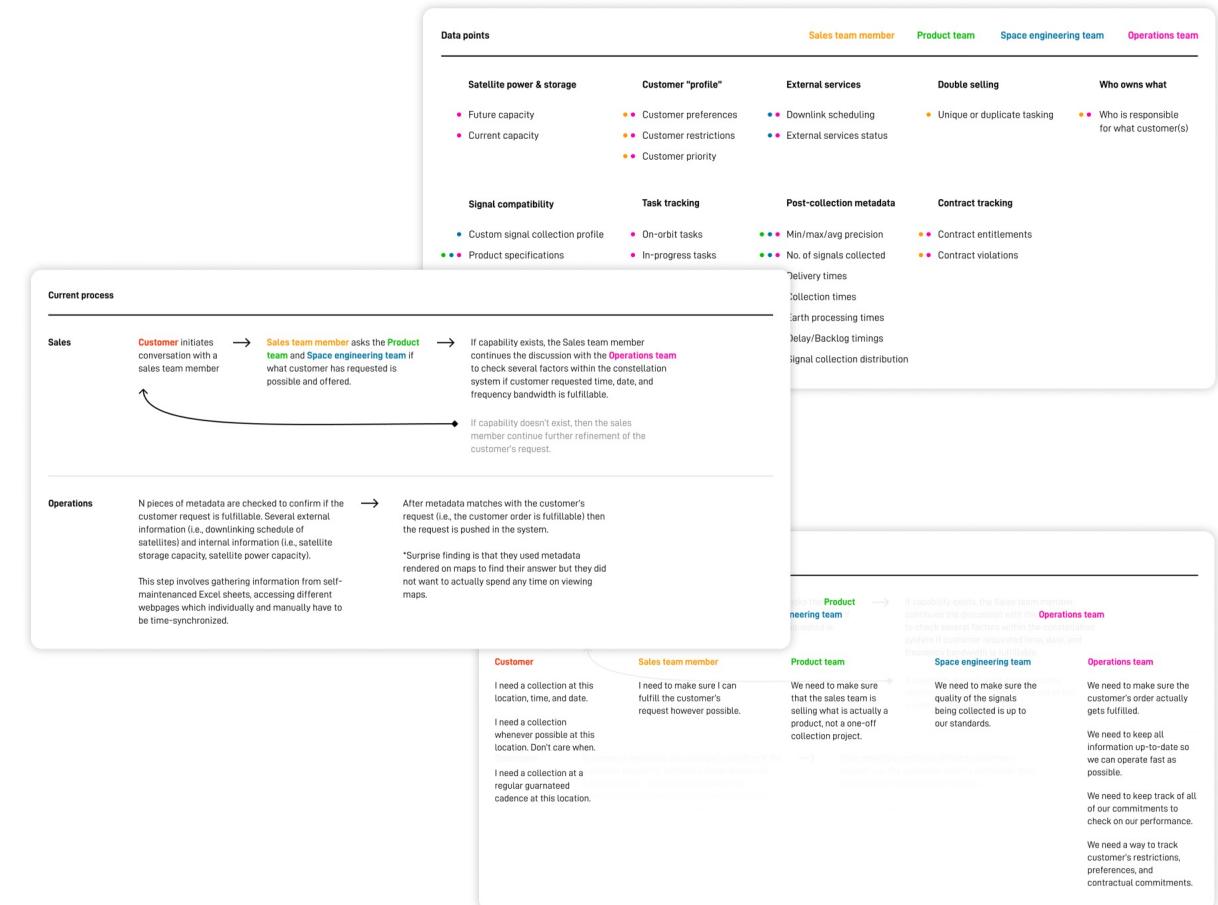
HawkEye 360

Product discovery & Design Thinking (1/2)

After participating and learning how to run Design Thinking (DT) exercises at IBM, I've been able to facilitate them myself at HawkEye 360 to primarily gather information about users and their pain-points by running the exercise with product, sales, and engineering staff. It also has been a great tool to update and align everyone on product expectations.

As there wasn't a formal product & design process at HawkEye 360, I have used DT exercises to fulfill not just design but product discovery and product requirements.

To give you some context, when I ran the very first DT exercise at HawkEye 360, there wasn't a concept of "users" or "personas".



Some sequential screencaps of a presentation I've created for the VP of Product and COO at HawkEye 360 (synthesized from Design thinking exercises and interviews) to justify resources I am allocating to create an internal business process tool to optimize satellite resource usage.

HawkEye 360

Product discovery & Design Thinking (2/2)

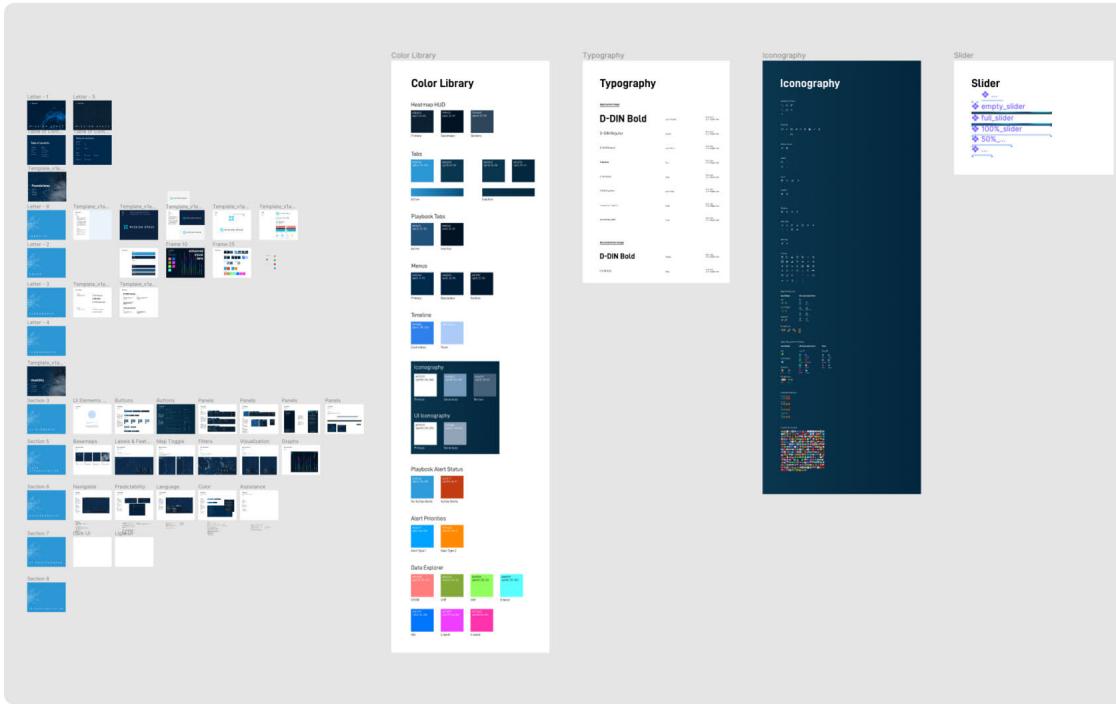


Screencap of a DT exercise that I ran at HawkEye 360. Engineering, product, and sales teams were involved to identify weak-points in the product portfolio, expose capabilities unknown to the sales team, ideate and analyze risk of new product capabilities, and having the engineering team dynamically assign “Resource points” to any new suggested capabilities.

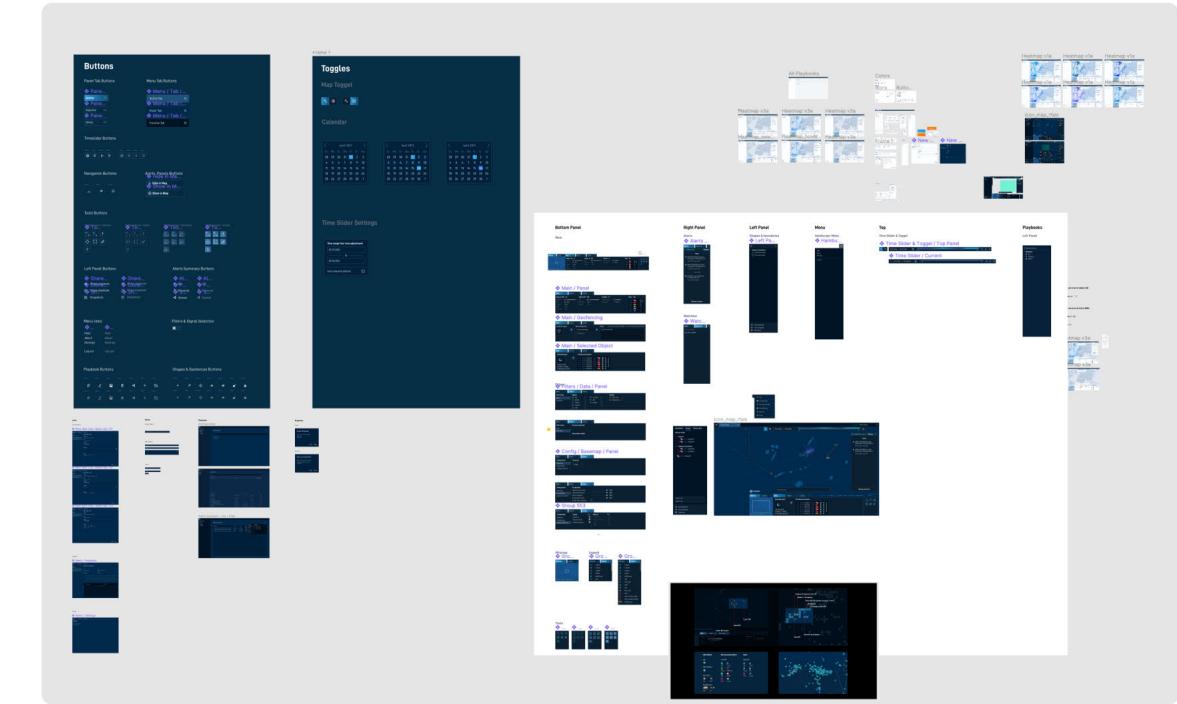
If time allows, I typically set the context of DT exercises under “User Experience” OR “Product” and run them multiple times. The “Product” context ignore business concerns and is purely focused on solving user pain-points which may lead to new products or product capabilities. On the other hand, “User Experience” context confines the exercise with business constraints set by the product, which filter discussions to user-flows & interfaces.

HawkEye 360

Snippet: Design system



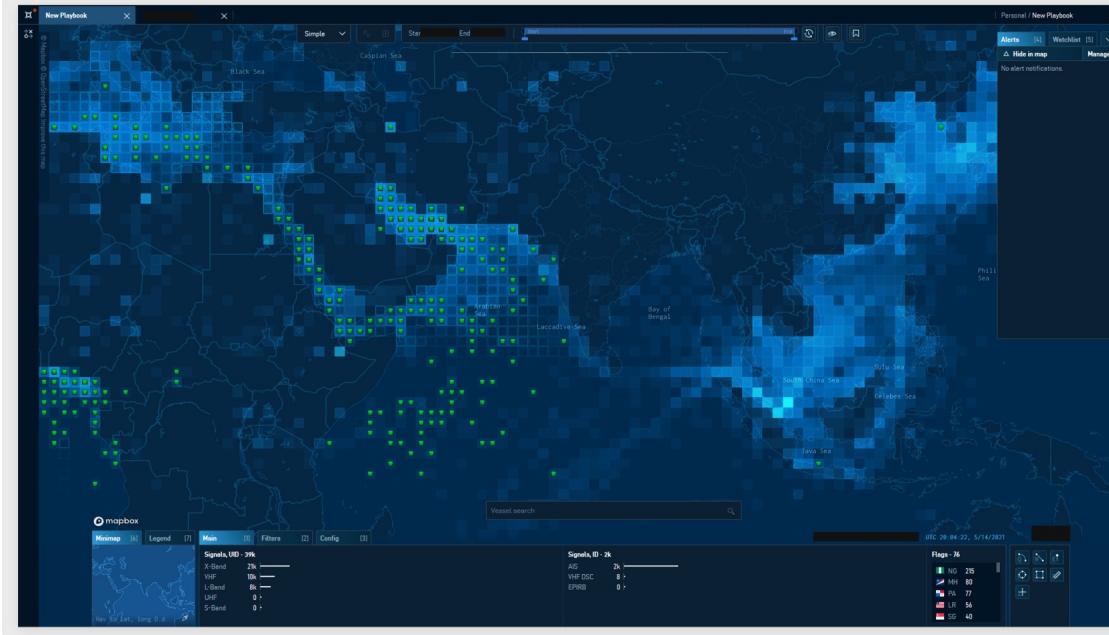
Screencap of design system I created at HawkEye 360. Initial UI components used in HawkEye 360 products were dispersed and unorganized as I did not organize them as they were created) and used. The designers I managed were tasked to audit, tidy up, and organize all UI components into a single document and maintain the document for constant updates. They did a phenomenal job and created a living document that is available for all parts of the company.



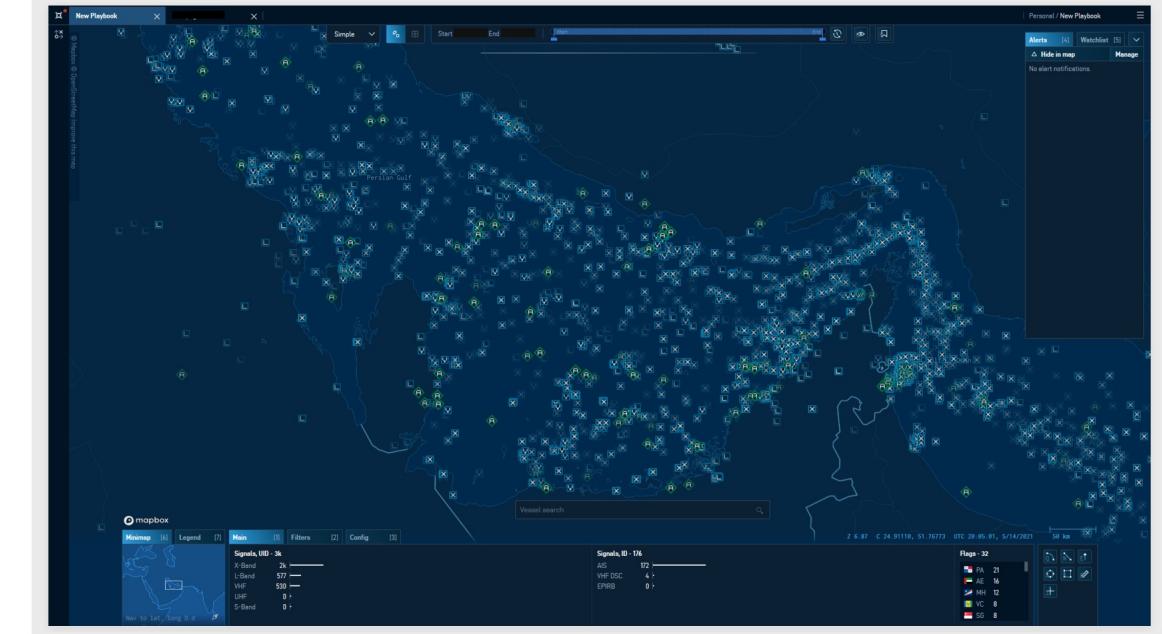
The design system included (but not limited to) map styling, map iconography, color schemes, type sizes, and usage of colors. Along with the Figma documents, I've created a SASS stylesheet with variables as well as a "Example usage" React web-app which was made available to front-end engineers for low-resistance adoption.

HawkEye 360

Snippet: Product, Mission Space



Real product image of Mission Space. Mission Space is a geospatial intelligence tool for government and commercial users to visually consume, analyze, and organize data gathered by HawkEye 360's satellites in a mission format. At the time of when this screenshot was captured, what you see; the iconography, UI components, and map styling were all designed by myself. I was guided by feedback from early-access customers, sales teams, and intelligence analysts (SMEs).



One of the most common user feedback was: “Is there anyway to get some kind of identifiable behavior from unidentifiable signals?”. FYI, the blue icons on the screenshot are geolocated but unidentifiable signals (i.e., we know something is there, but we don’t know who). Since the map always rendered a time range, a simple solution I came up with was to assign a transparency value to icons: A more transparent icon means it’s older, opaque means it’s newer. This method reveals translucent to opaque trails which the analyst then can use to discern certain groups of unidentifiable signals from another. Although simple, it was one of the most praised capabilities of the platform.

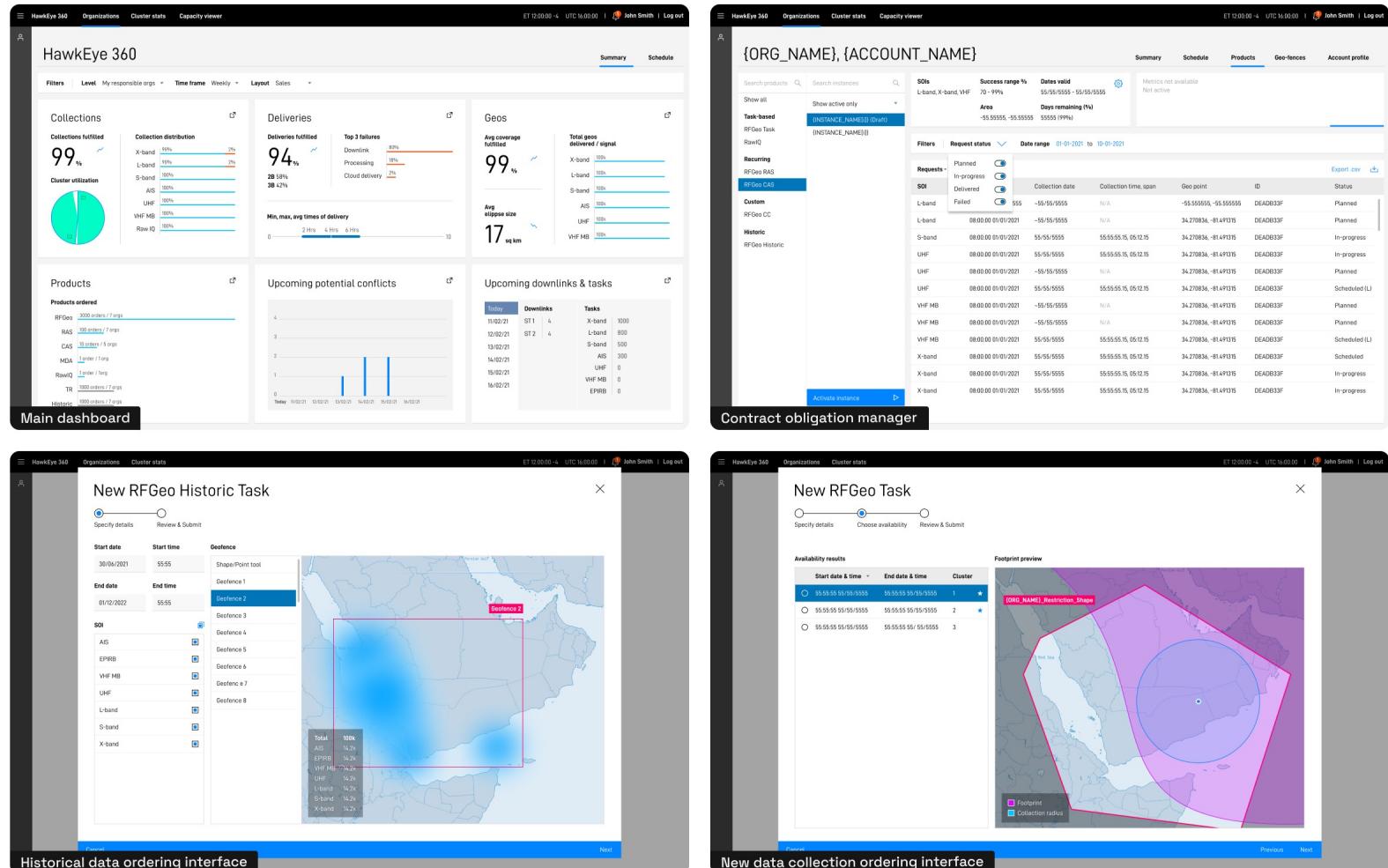
HawkEye 360

Snippet: Internal tooling, Talon

Another significant project I led and worked on at HawkEye 360 is an internal tool that allowed the sales team and customers to utilize satellite resources efficiently.

Unlike the cloud, satellites have limited power and storage, sensors have limited field of view and finally, HawkEye 360 satellites orbited the earth every 80 minutes or so. All of these combined means there is a huge need for prioritization (for example, how important is the customer's request?) and optimization: Can the data being collected in an area at a certain time be sold more than once?

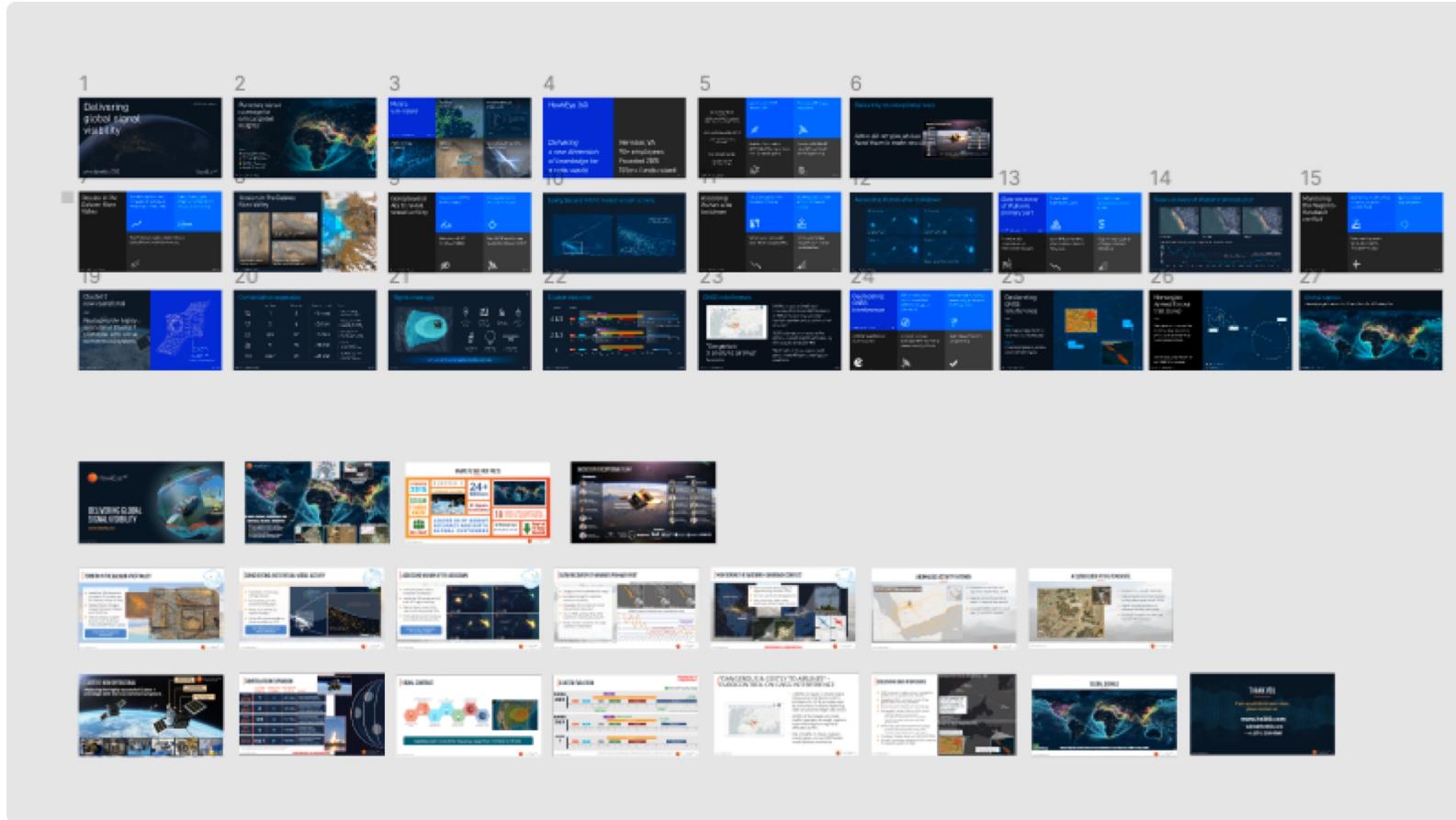
Before Talon, data collection requests had to be “okayed” by the Satellite Operations team, with Talon, all collection requests are scheduled automatically according to contract obligations, customer priority assignments, and available satellite resources.



Screencaps of Talon

HawkEye 360

Snippet: Storytelling



Screencap of the HawkEye 360 Series D presentation. This presentation included overall company progress, product progress, real-world examples of the company contributing to defense successes, financials, and future growth. I have gotten a chance to work with the executive team and Board of Advisors to create the presentation story, flow, and design. \$145MM Fundraising achieved.



2013.07-2019.12

What projects did I work on at IBM?

- Cybersecurity products
- Interactive robotics for large-data consumption
- Creating interfaces for a quantum processor
- Creating interfaces for an AI that can debate
- Creating intellectual property

Average team composition

- ~20 to 30 engineers (Software, SMEs / Research staff)
- 1x General Manager, 1x Product Manager, 1x Design Executive
- Me (2013-2014 Visual UI, 2014-2016 UX & Design Technologist)

Common users

- Application vulnerability security analysts
- Cloud application security analysts
- AI researchers
- AI developers

Things I've done at IBM on a regular basis

- Extend IBM Design Language
- Understand user pain-points gathered by Researchers
- Identify pain-points
- Understand & negotiate product requirements
- Create high-fidelity designs for developers
- Create clickable prototypes
- Create internal tooling
- Create animations
- Front-end development for prototyping

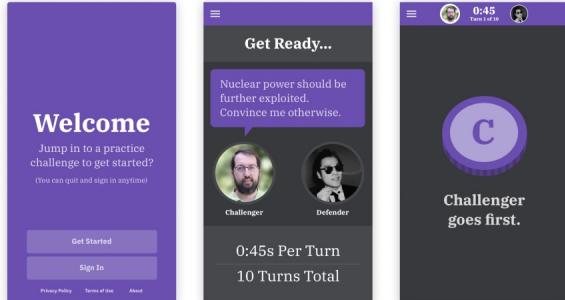
I started at IBM as part of the first 60 hires for “IBM Design” in 2013. IBM is where I learned Design Thinking, how to work in large teams, designing for complex data structures, and my overall love for the craft.

During my time, I’ve contributed to the Security Product business unit and Research business unit.

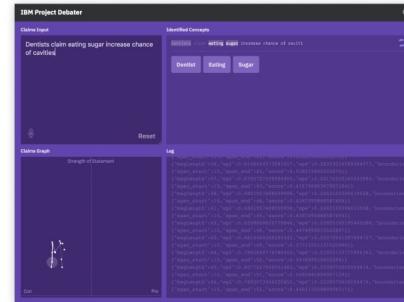
This particular section will mostly be a high-level overview of the most interesting bits I’ve worked on at IBM Research.

IBM Research (2016-2019)

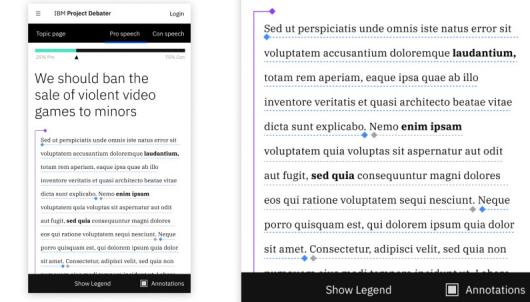
Snippet: Design process artifacts



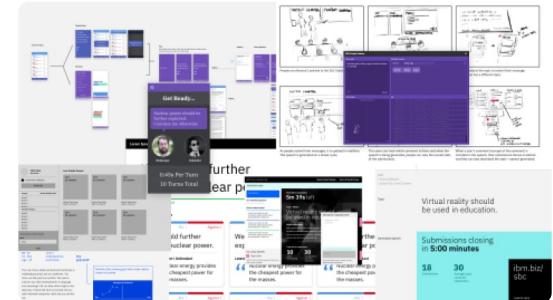
First iteration of a general-audience Project Debater experience where the AI moderates a Player vs Player blitz-debate in a game format



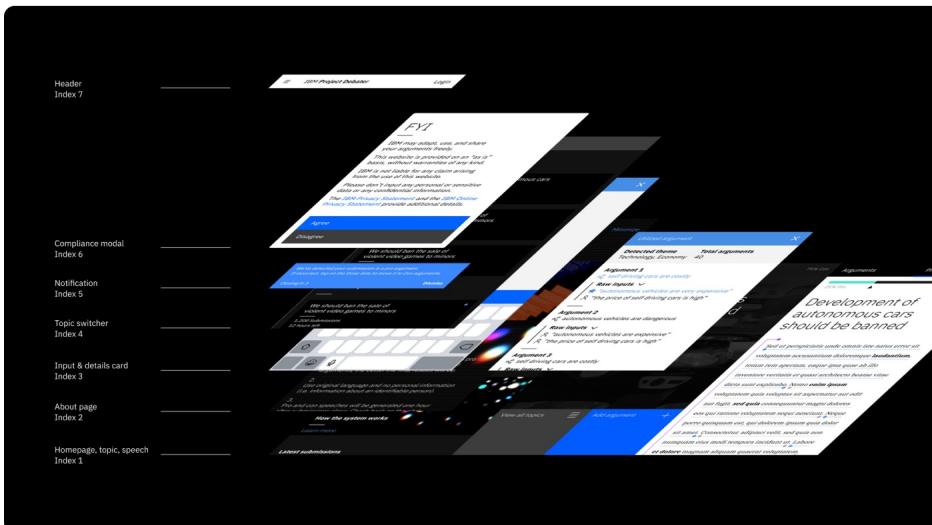
Second iteration where I proposed to target only developers with an API console displaying telemetry



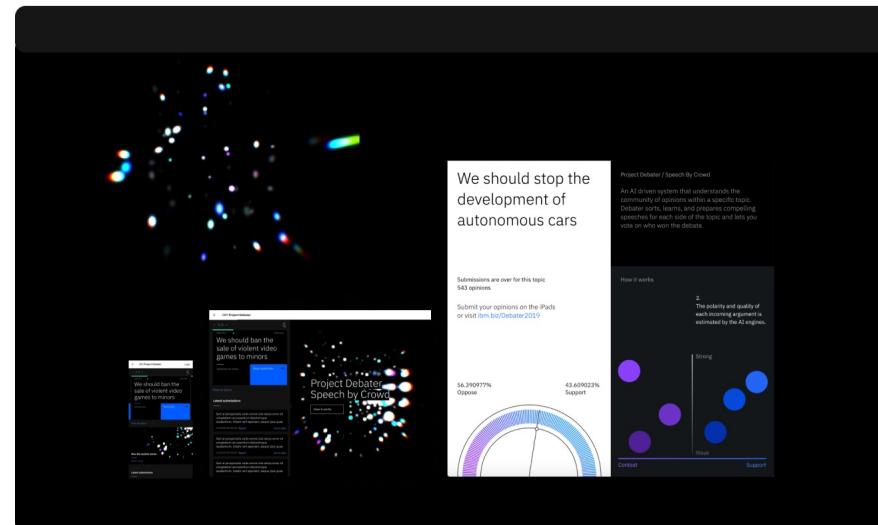
Final idea (designed mobile-first) where the AI create speeches from crowd-sourced pro/con comments of provided topics.



Mashup of iterations. Final iteration was chosen as it provided benefits of both the first and second iteration.



A screencap of a presentation explaining the different layers of the mobile UI



Theme set of mobile & tablet/desktop UIs, event-installation, and AI avatar

IBM Research (2016-2019)

Snippet: Product, Project Debater



Project Debater in the flesh. These design artifacts were used for local debate clubs throughout the US and Israel as well as different technology conferences such as CES and IBM Think.



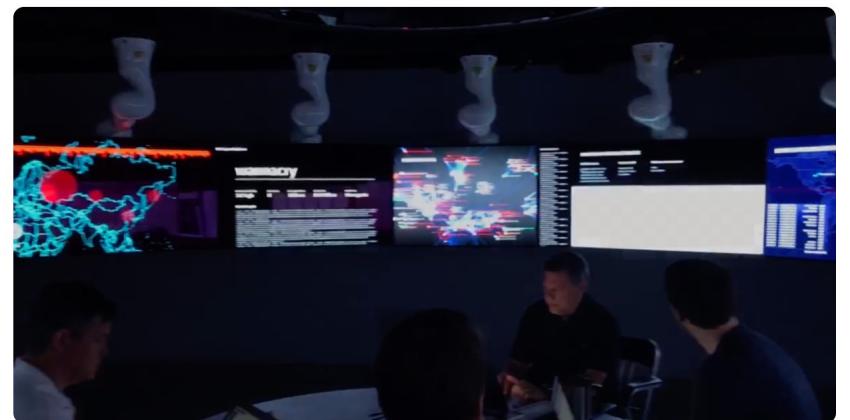
The right half portion of the event display and the three dot avatar were made by a creative agency under the direction of the Creative Director of IBM Research and myself while the left half; the live tracker and the iPad application were designed and developed by me.

IBM Research (2016-2019)

Snippet: Research project, Dataspaces



Photograph of a robotics project I worked on. I was tasked to create interaction and visual designs for a set of displays mounted on robot arms which acted as anti-gravity assistants. The photo above is a push/pull interaction with haptic feedback where a user can physically sift through a third-dimension of data (i.e., physical 3d or time).



IBM

Intellectual property

As I have gained industry knowledge during my time at IBM, I have been able to file design & purely technical inventions. I was also part of the “Invention Disclosure Board” a group that help IBM employees write inventions and file them as patents.

Patents that I've contributed to are currently cited over 110+ times by companies like Intel, Oracle, Accenture, Hitachi, Microsoft, Amazon, PayPal, Dell, F5 Networks, Bank of America, AT&T, USAA, American Megatrends, and CapitalOne.

US 20210342437 A1
User-tailored password strength indicator
Issued Nov 4, 2021 (Principal investigator)

US 20210279321 A1
Wheel-based UI authentication
Issued Sep 9, 2021

US 11110608 B2
Robotic physical movement adjustment based on user emotional state
Issued Sep 7, 2021 (Cited 4 times by other patents)

US 11029759 B2
Movable display for spatial correlation with haptic feedback
Issued Jun 8, 2021 (Principal investigator)

US 10845913 B1
Touch sensitivity for robotically operated displays
Issued Nov 26, 2020

US 10623724 B2
Adaptive Display Environment For Dynamic Applications
Issued Apr 14, 2020 (Cited 3 times by other patents)

US 10592626 B1
Visualizing or interacting with a quantum processor
Issued Apr 9, 2020 (Cited 8 times by other patents)

US 10613707 B2
Auditing icons by AI to synchronize assets
Issued Apr 7, 2020 (Cited 5 times by other patents)

US 10268825 B2
Amalgamating Code Vulnerabilities Across Projects
Issued Apr 23, 2019

US 10223535 B2
Ranking Security Scans Based on Vulnerability Data from External Sources
Issued Mar 5, 2019

US 10171054 B1
Automatic adjustment of audio based on dynamic and static rules
Issued Jan 1, 2019

US 10089452 B2
Three Dimensional Fingerprint Scanner
Issued Oct 2, 2018 (Principal investigator, Cited 18 times by other patents),

US 10089452 B2
Three Dimensional Fingerprint Scanner
Issued Oct 2, 2018 (Principal investigator, Cited 18 times by other patents)

US 9,987,559
Aggregating and utilizing meta game data for artificial intelligence in video games
Issued Jun 5, 2018 (Principal investigator, Cited 6 times by other patents)

US 9941719 B2
Wireless Charging Surface
Issued May 30, 2018 (Principal investigator, Cited 8 times by other patents),

US 9471778 B1
Automatic baselining of anomalous event activity in time series data
Issued Oct 18, 2016 (Principal investigator)

Something fun...

Ask me about Chernobyl

I got to visit Chernobyl in 2018 and took pictures.
Eventually I published a photobook called “Tak...”

“Tak...” got top seller in Amazon under “Photo Essay - Former Soviet Union” (hey... it’s still a category). It is exhibited in the National Museum of Chernobyl and in the library of the nearest town to Chernobyl.



Thank you,
Hyun

linkedin.com/in/hyunseo
+1.856.630.4086
hi@hyun.io

—

Sept 18, 2023

End of document