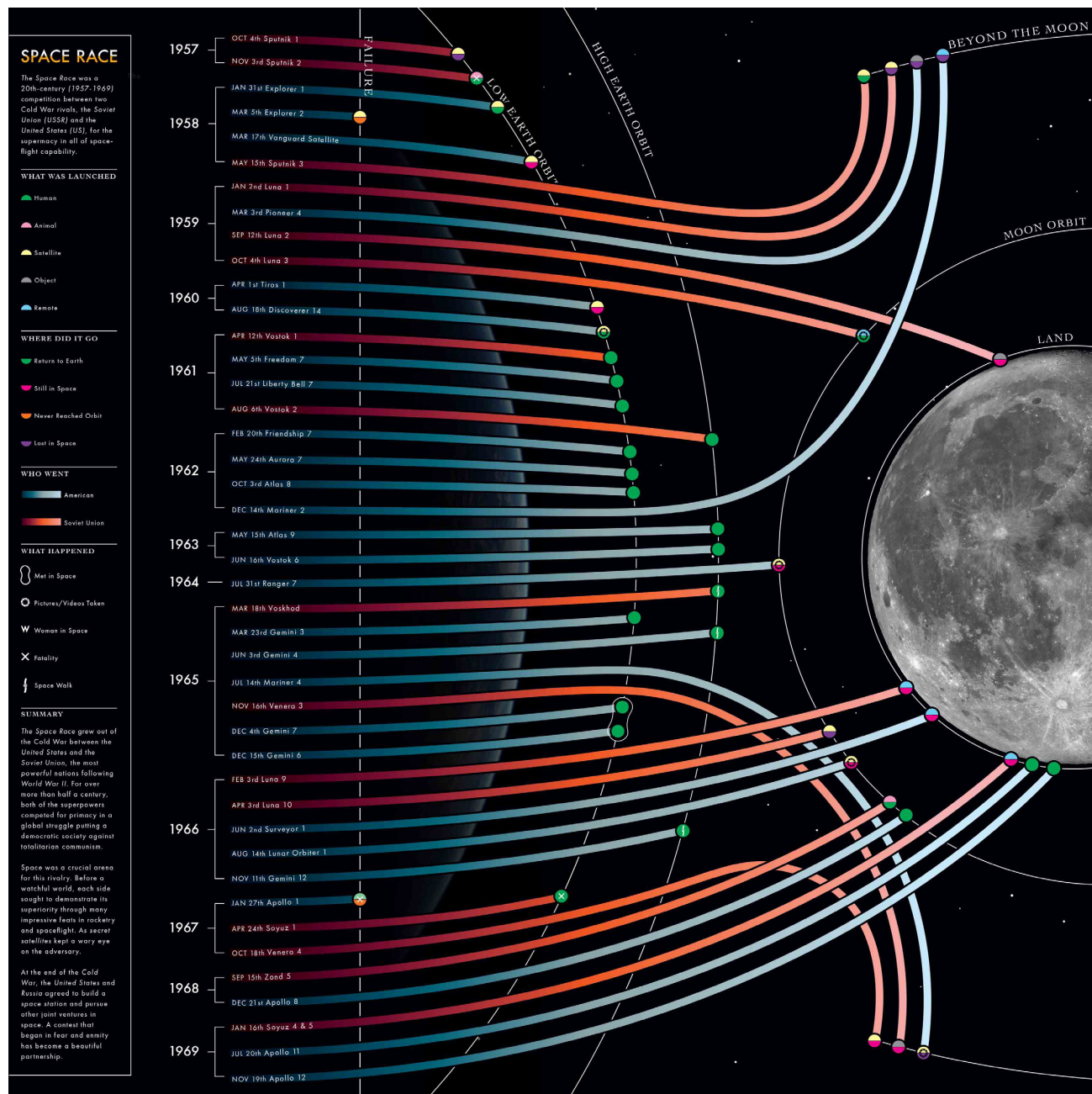


Mapping the Space Race: Form and Function for Non-Linear Storytelling

ROBERT CAPALDO

KEYWORDS Design practice, design process, grid-pattern, information design, information graphics, (the) space race

ABSTRACT Information graphics are now part of the everyday visual landscape, becoming nearly as common as pictures and text. The central new ingredient is the diagram or schematic. Whereas classic journalism was textual, or text supported by photographs and captions, today's journalistic practice is often supplemented diagrammatically. This means that the pure linear narrative is becoming "distributed" in chunks of text, image, and visual elements. The pure aesthetic of typographic practice must be supplemented



by an aesthetic that deals with content that is no longer in story form. Instead, content is arranged (and rearranged) through a logic that builds from all aspects of context and relationships. Design and aesthetic play a significant role in this process; rules and standards for such diagram-making are rooted, perhaps, in map making, yet remain quite flexible. Where accuracy is not a primary driver, other aspects of clarity, simplicity, and good communication practice supplement the notion of “accuracy.” The process proceeds through content and design development. This paper shows how content and design logic were applied, stage-by-stage, to display content that deals with the Cold War “Space Race” between the Soviet Union (USSR) and the United States (USA) from 1957 until 1969. The examples provide insight into design for non-linear storytelling.

WHAT IS THE SPACE RACE ABOUT?

The development of the example depicted here maps the famed “Space Race,” a Cold-War era conflict between the Soviet Union (USSR) and the United States (USA) that lasted from 1957 until 1969. Growing out of the cold war between the USSR and the USA, this “race” was to prove who had supremacy in all space flight capability between the two most powerful nations following World

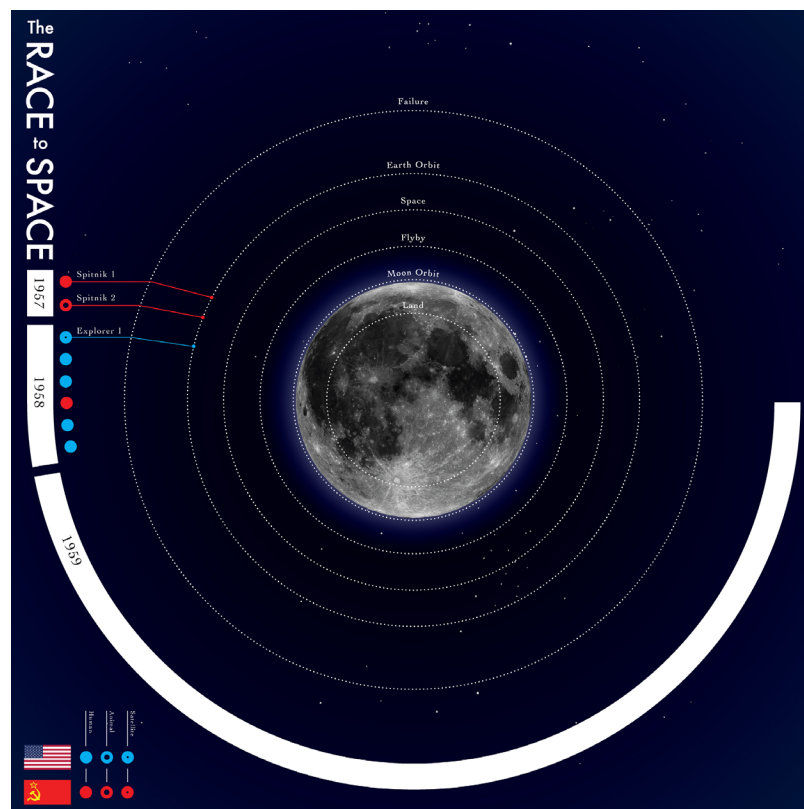
War II. For over half a century both of the superpowers competed for primacy in a global struggle putting a democratic society against totalitarian communism.

APPROACHING THE DESIGN

DESIGNING THE INFORMATION

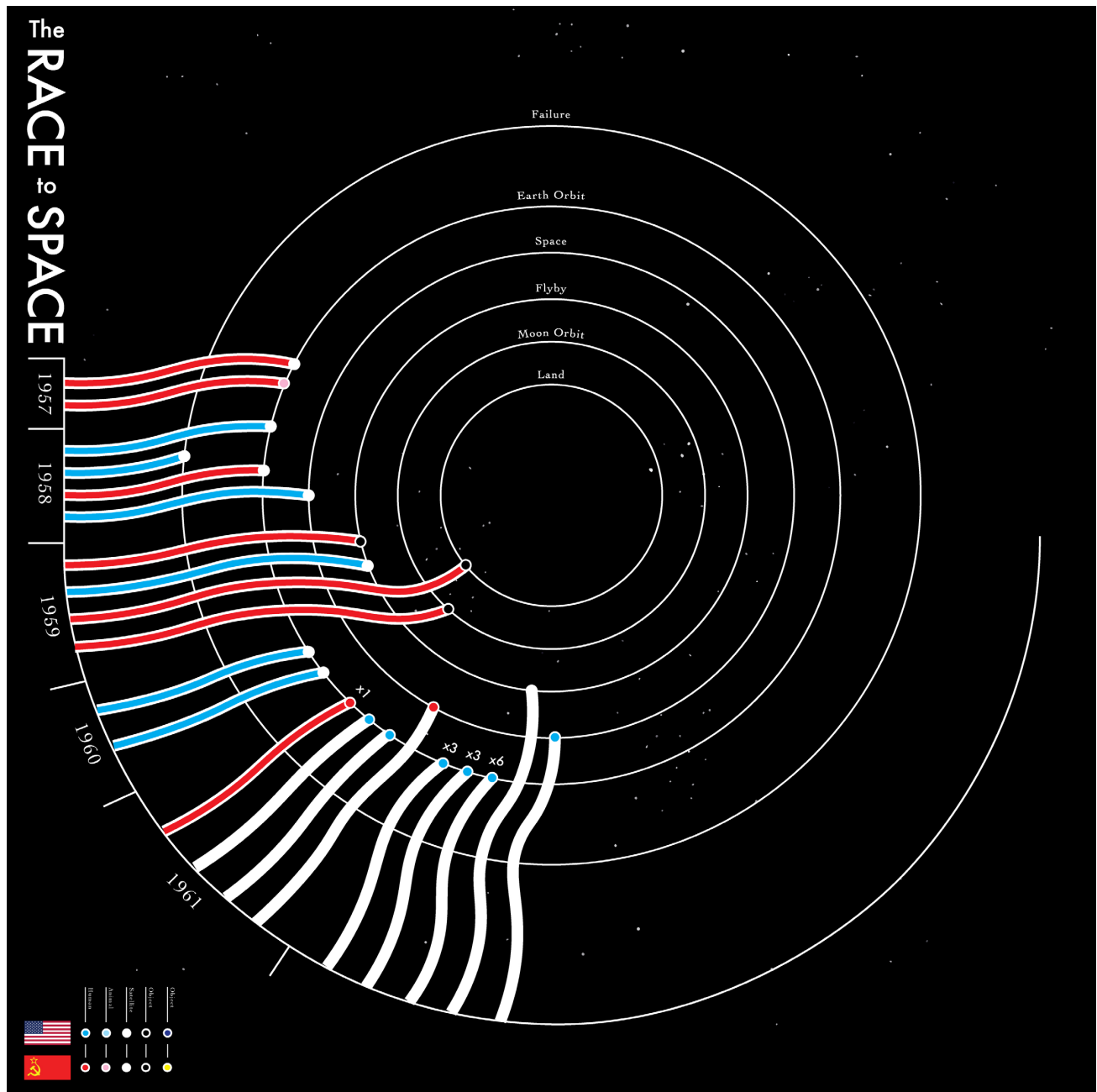
After developing an interest in the topic of the space race I began the rudimentary visualization. Originally the information I gathered was quite minimal, consisting only of the expeditions, the years that they were launched, and the destination points for the mission.

After gathering this information I started to plan and sketch out my ideas on paper. From the sketches I determined that the information could be displayed across four different layers: who (USSR/US), what (expeditions), where (destination), and when (year). Following standard information design practice, it was important to make each of these layers as clear and as easy to understand as possible, while also making the composition clear and coherent. I sketched out a wide variety of designs and looked for those sketches that had the best rhythm and understanding. Eventually I found and chose the design that was best suited for the information.



INITIAL PRESENTATION

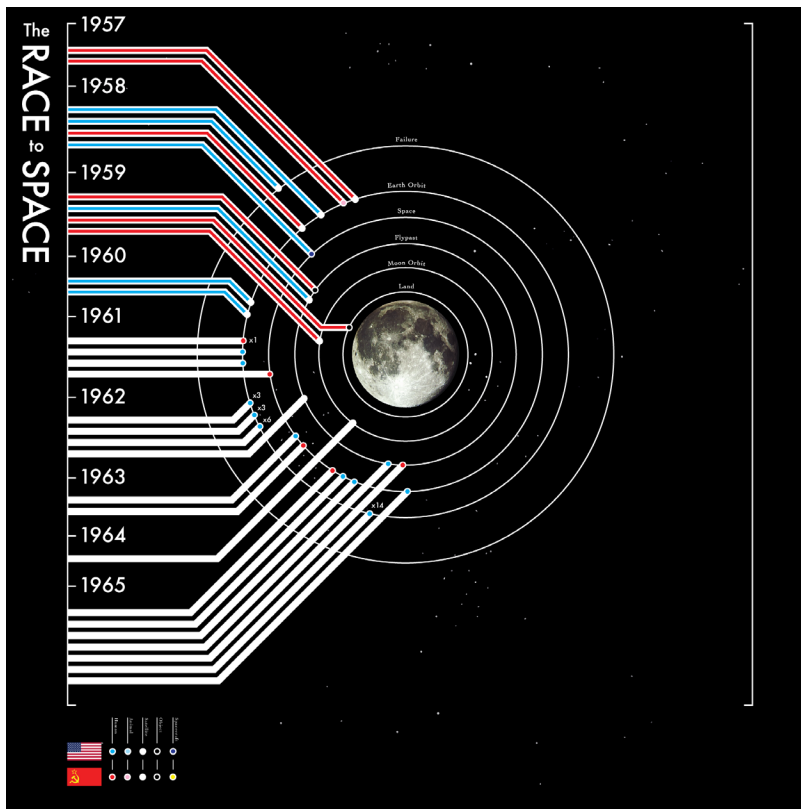
After selecting the most effective sketch it was time to push the design forward via the computer and digitalization. While building out the diagram I came across several problems. This first attempt is lacking in both balance and hierarchy—it was not cohesive. For example, the years are too bold, which distracts the viewer from the rest of the information being shown, as well as creating a false sense that the years are more important than the rest of the data. The information needed to be presented in a much more organic and fluid manner. When working with limited collections of data the designer must be careful not to create a false hierarchy between the types of data presented. So, the initial effort was to minimize these divisions if I felt they were too pronounced.



ACCENTUATING THE FLIGHT PATHS

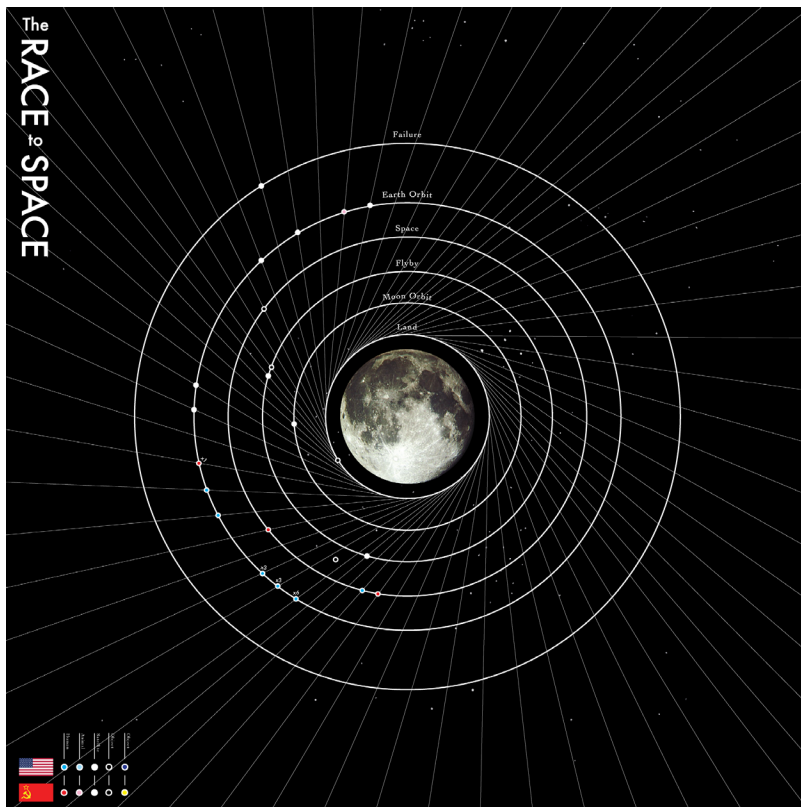
As I gathered more information I was able to focus on the number of orbits that each expedition required. I also focused on trying to “bring down” the boldness of the design. I deleted the huge strip of white demanding too much attention. Although improved, it remained hard to differentiate between the colors of the circles that delineate the expeditions. There was a set of different colors between both the USA and USSR when there should only be one set of colors that tell the viewer what

is happening. This was an unnecessary complexity that confused the viewer and made it more difficult to understand. The number of orbits was not clear enough. (Also, I needed to inform viewers what each depiction represented). The white was still very bold and the layers began to morph into one jumbled mess. As for the expeditions, I began to feel that the curviness of the lines going to their destination point was increasingly awkward and unnecessary.



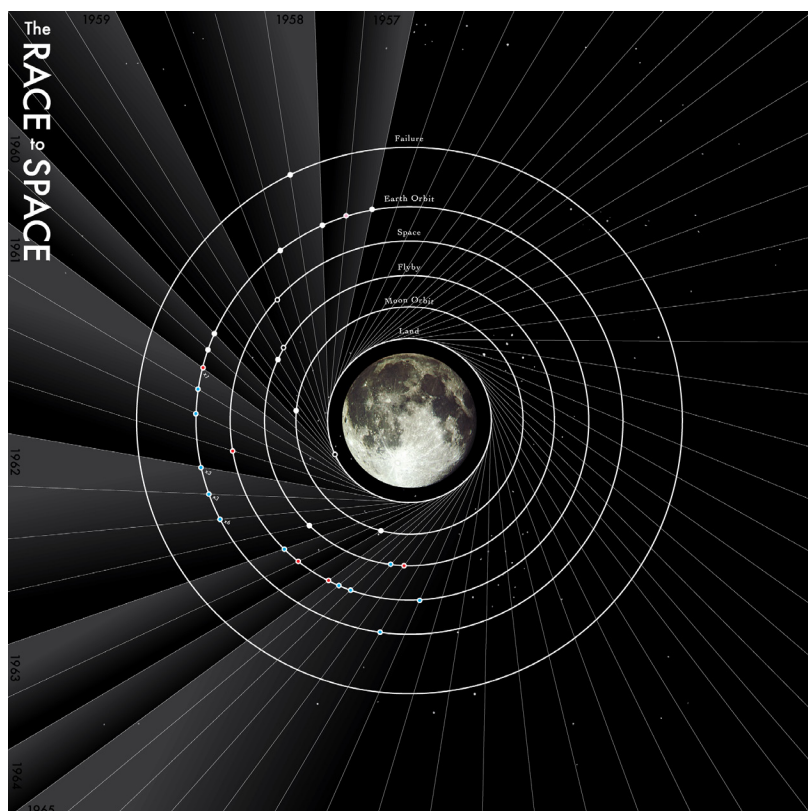
FROM WAVES TO SCHEMATIC

I straightened all of the curved expedition lines, however, many of the same problems still remained. The previous piece had curvy lines while this one had straight lines that bent at a 45-degree angle. I felt this was a better approach, yet, still not fully successful. The white still morphed into aspects of non-clarity, and they are too aggressive. I was beginning to more carefully address the colors, although at this point in the process my concern was more focused on form. The way that the years are set up on this attempt was a little bit easier on the eye but still a bit confusing. The years are also starting to fight with one another because it is hard to tell which years pertain to which expeditions.



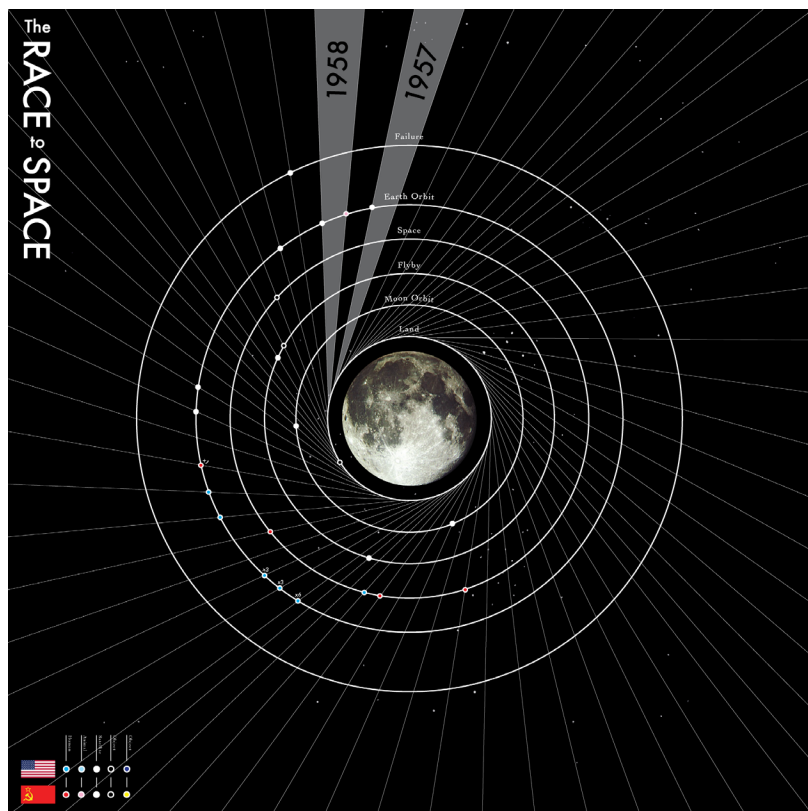
RETHINKING THE BASE PATTERN

In order to create a new “baseline” pattern, I did this experimental design in which I disregarded all of the information, coming up with shapes and connections that looked visually appealing, without any actual data in place. The lines spiraled in toward the moon (from the border of the piece.) After creating this outline I started to plug in the information. At the time I thought it was brilliant, but clearly I was completely wrong; the piece had lost all connections it had to the information, and was becoming less informative. The expeditions are extremely hard to comprehend and the years are awkwardly set up and barely visible. The lines of the expeditions became a bit misleading. Overall this whole attempt was extremely hard to understand, and I should have abandoned the form; instead I tried to evolve it over the next few attempts.



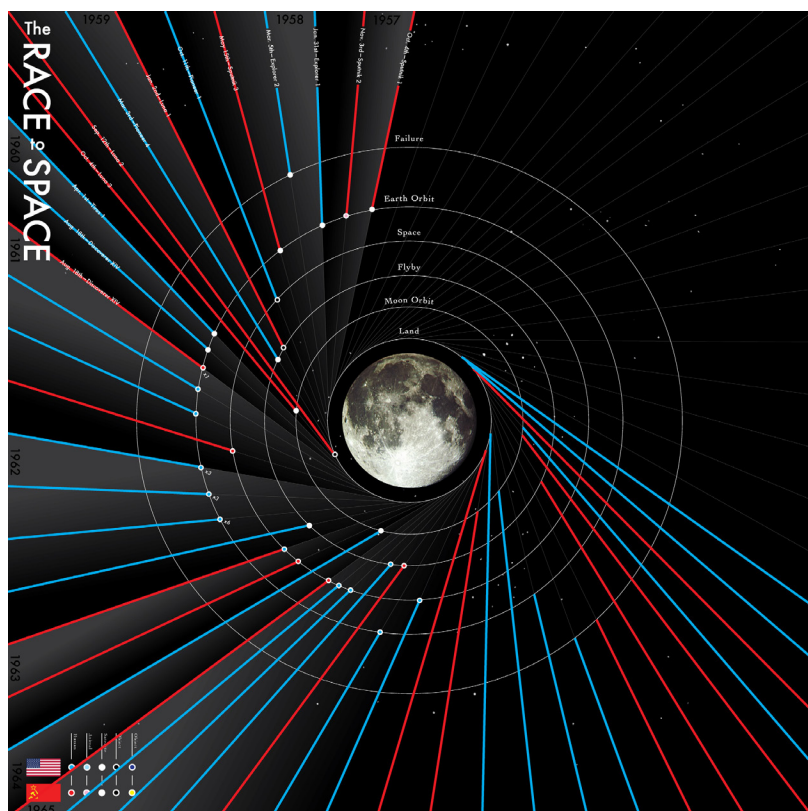
LIPSTICK ON THE PIG

The goal was to take a base pattern that I admired and, through value and highlighting, reintroduce the information in a strong, decisive way. However, the pattern, was beginning to overwhelm the data.



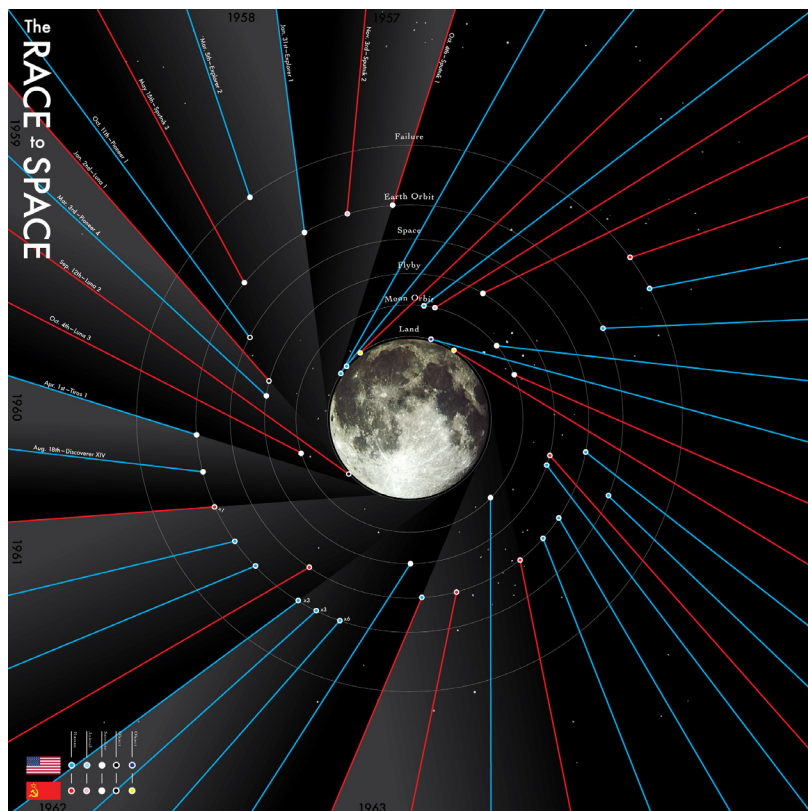
VALUE AND SHAPE AS INDICATORS

On this attempt I added a bolder blue and red that worked better than the 0.25 point sized line I was previously working with. (Although, the 0.25 line still runs past the destination to the moon.) The problem was that, although calm and in context, the system was beginning to convey as kind of “false information.” This is not the case if one studies the patterns one-by-one, but conveys it in context. The name of the expedition awkwardly breaks the line that it’s actually associated with. I was still focused on the aesthetics of the original outline, and was hesitant to break away from that structure even though I had created a structure that completely disregarded the information.



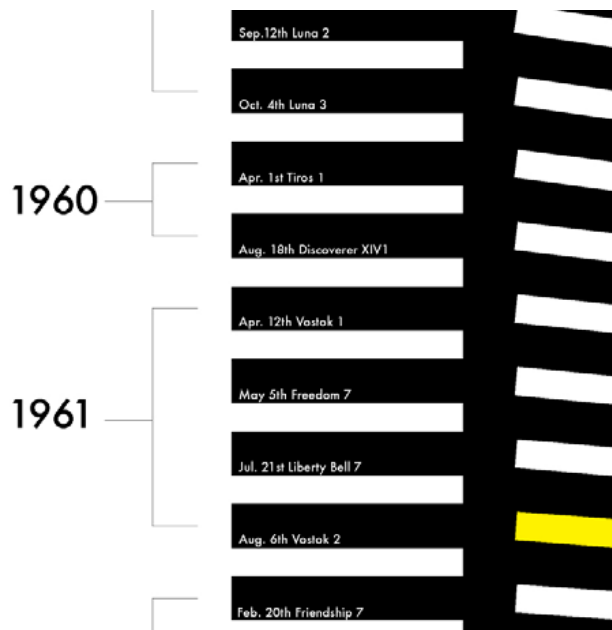
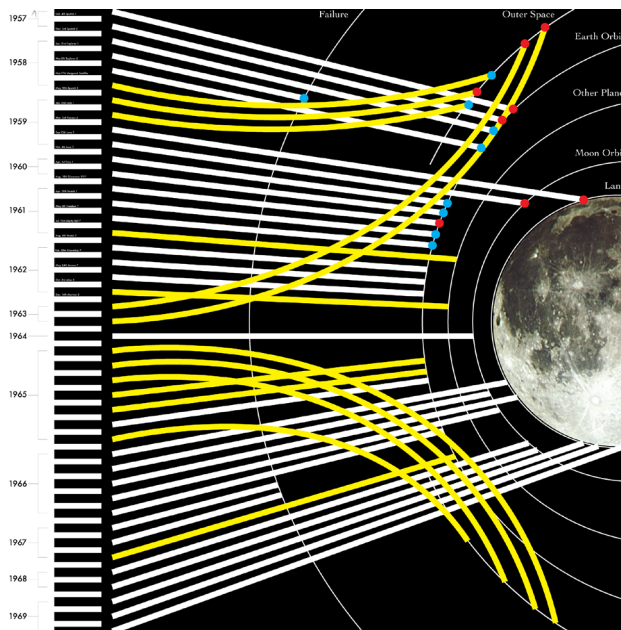
AGGRESSIVE HIGHLIGHTING

I repaired the awkward break in the line and the expeditions, and placed the name of the expeditions within the line. This was a good improvement in relational clarity—but the destinations surrounding the moon have been dimmed back way too much, causing a disconnect for the viewer as to where the expedition's destination actually is. I also began to elevate the importance of the key. A new challenge was that the lines began to compete for space when they converged near the moon. This is due to the awkward spiral that the lines created, again making it hard to differentiate between expeditions. The aesthetic was too strong and becoming increasingly counter-productive.



LATERAL DESIGN SHIFTS

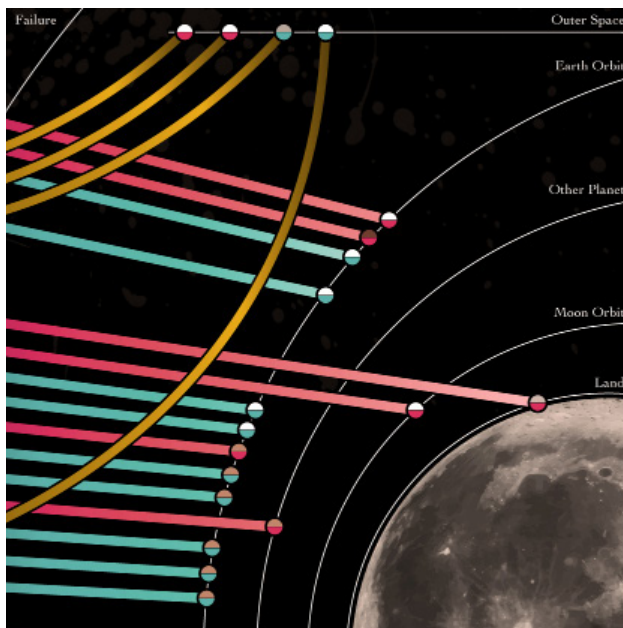
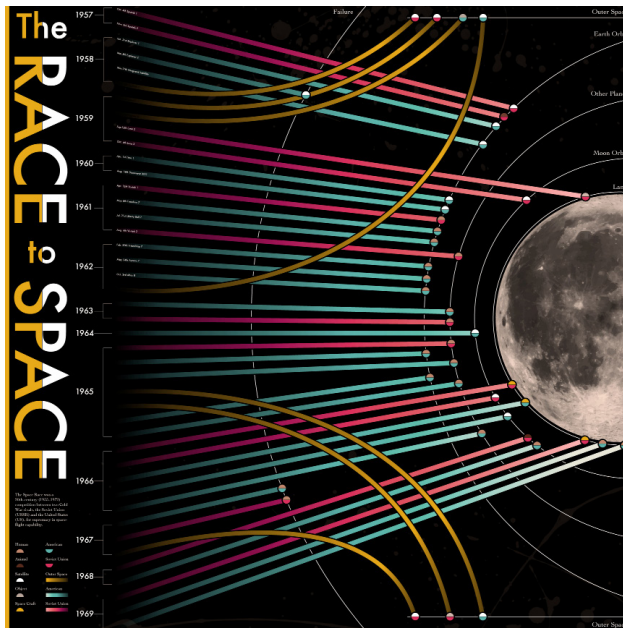
Although the structure was beginning to work, I began to realize that the spiraling lines were ultimately too limiting. Clarity was beginning to emerge; yet there was also the realization that the design was ultimately limiting. Even though the layers of information were integrated, the overall presentation was too non-hierarchical.



MOON SHIFTS AND DYNAMIC DESIGN

The piece started to visually tighten, but it still had to be pushed much further from this point. I moved the moon to the right side of the poster and the title of the poster has been changed. The title was also blown up in scale tremendously, filling in the negative space that would be there. But by blowing up the title, I created a distraction from the actual information. The most important part of an information-design piece is the information itself. There were also many flaws within this iteration. The yellow lines that have been added in were meant to show that the destination was outer space and not towards the moon. This gets quite confusing though, as it creates an unawareness of which country the expedition is associated with. It was also unnecessary because it is traveling to a line that says outer space, thus making it pointless to be a different color.

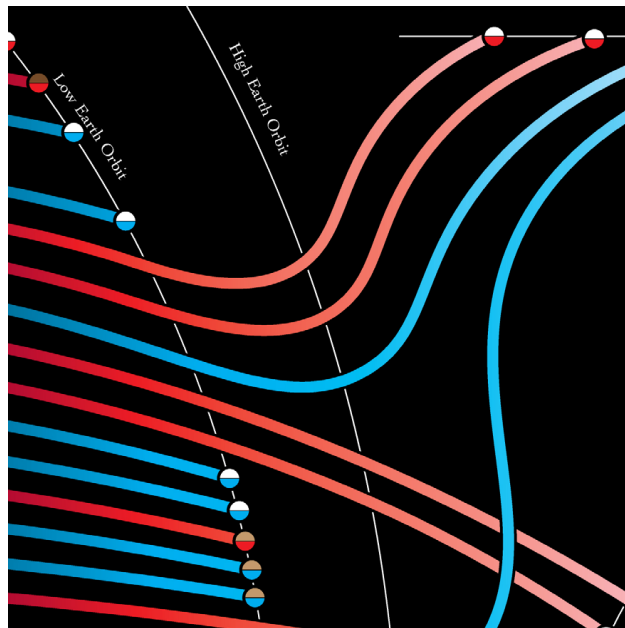
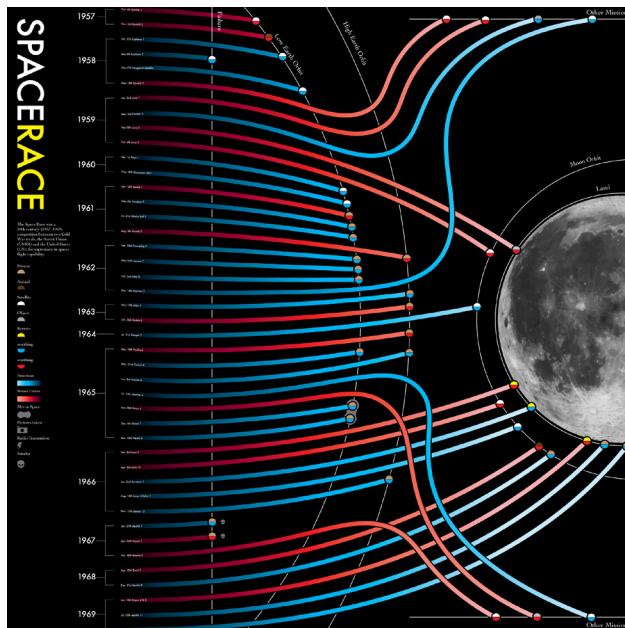
In this iteration there are now exact dates of when the expedition was launched. There is now more within the circle of the destination points. It is now split up into two parts. The top color being what the expedition was carrying or what it was in itself. For instance, it now tells you if it was a human, animal, satellite, object, or remote controlled spacecraft that was launched. The bottom half of the circle shows who the expedition was associated with, the USSR or the US. There was a problem with this because it became repetitive and in this case its repetitive nature caused a bit of confusion for the viewer. Also, at this point in the process, my type wasn't quite where it needed to be. The straightness of the lines shooting to the destination was unappealing; it started to create a bit of stiffness to the piece and moved away from the organic feeling that I wanted the piece to take on. Also the destination lines surrounding the moon were awkward and could be changed to make the piece feel cleaner.



CLEANING UP AND CLARIFYING

I changed the straightness of the lines and turned them into something more fluid, although it was still slightly clunky in its appearance. This shows how some of my earliest ideas returned. The design now allows for a good amount of information to be added and with this new information the key on the left started to slowly change. It now shows which expeditions met in space, which were meant to take pictures/video, which sent radio transmissions back to earth, and which resulted in a fatality.

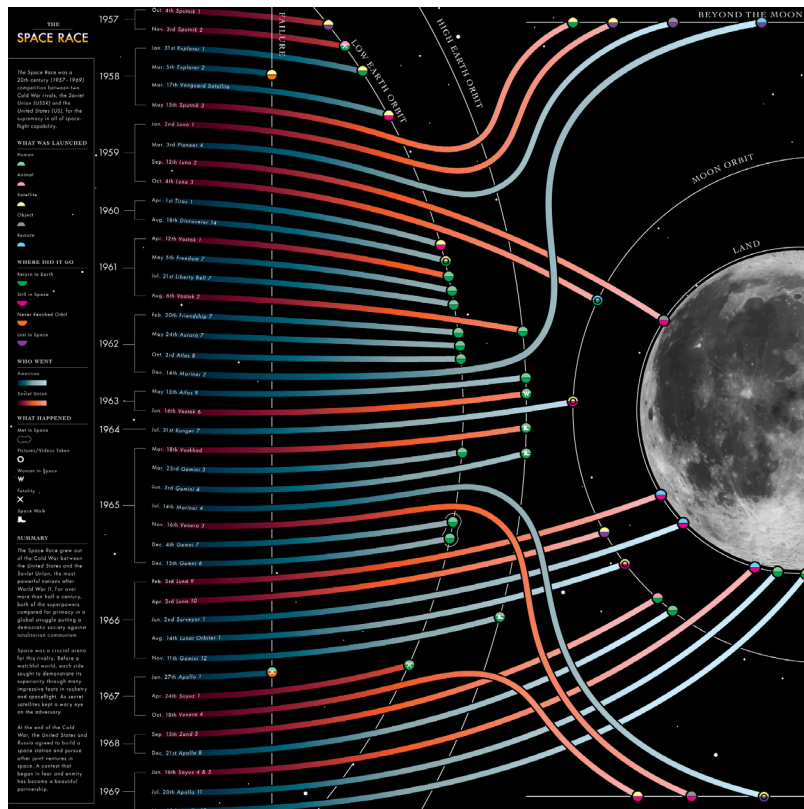
I decided once again to change the title's appearance. The title has decreased in size creating less of a distraction. Another thing that I decided to change was the destination lines surrounding the moon. They are now laid out more effectively than before. Now the lines give a sense of not only the moon, but the earth and beyond. The failure line is straight up and down on the left hand side symbolizing that it never reached orbit. The right of the failure line is both the low earth orbit line and the high earth orbit line. This time they are reflecting the moon's orbit, thus giving a greater understanding of where in space the expedition's destination actually was. The lines relating to the missions beyond the moon also created a disconnect between the moon and the earth and differentiates itself and tells the viewer that it is in fact beyond the moon. The type in this piece slowly started to become more effective. The way that the type is curved with the shape of the line creates a relationship between the two objects and makes it faster and easier for the viewer to comprehend.



INTEGRATING MORE INTELLIGENCE

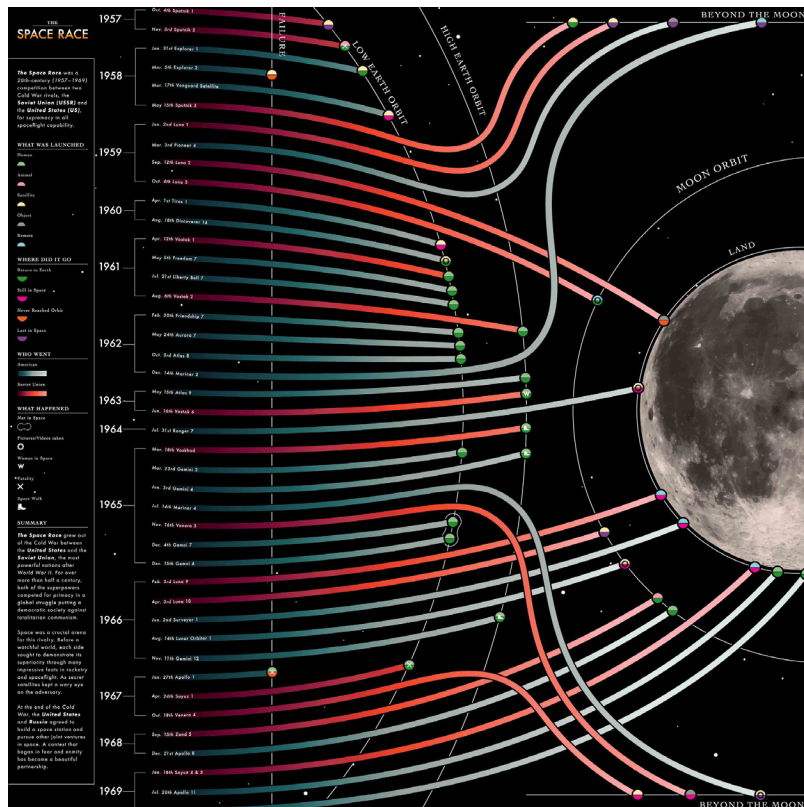
As the design tightened and became clearer it was possible to add more information; this was an exciting development. Now there is actually an introduction and explanation of what the space race is actually about. The title has changed back to its original look but is now much smaller. Now there is a much greater focus on the information. At this point in my process I finally found all the information needed. The information now consists of what was launched: human, animal, satellite, object, or remote. This information is supplemented by where the mission specifically went: return to earth, still in space, never reached orbit, still in space; who went: America, Soviet Union; what happened: met in space, pictures, videos taken, woman in space, fatality, space walk.

It also maps out if the expedition was a failure, if it reached low Earth orbit or high Earth orbit, if it went beyond the moon, if it reached the Moon's orbit, and if it landed on the moon. At this point in the design I started to get rid of any repetitiveness that it may have had previously. Now the top halves of the destination point circles relate to "what was launched" and the bottom halves relate to "where did it go." The icons have also changed and are now much cleaner than before. The colors in the piece have changed as well. The way I approached the colors had aspects that mimic how society views colors. For example: red is bad, green is good, orange means something is wrong, etc. I looked at what the biggest accomplishment could be in these expeditions and I came up with the idea that a manned mission that returns to earth is definitely the biggest achievement in space flight, so the halves that relate to that will be together when it is achieved, i.e. both the top and bottom halves for Human and Return to Earth are green. Also at this point in my process I started to really clean and tighten things up. I also spaced out the destination lines on the piece so that there was a better balance between them.



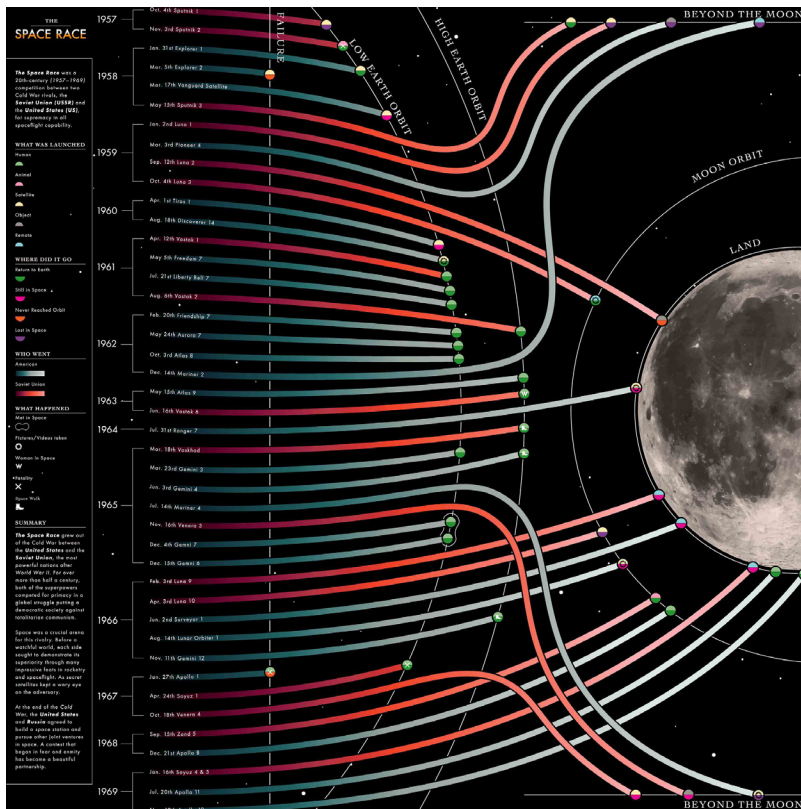
TYPOGRAPHIC REFINEMENT

At this point in my process I was able to concentrate on typographic refinement. I considered how the eye moves about the piece to gather the content and derive the knowledge. I assigned the type, varying hierarchy through both the Futura and Cochin typefaces—often using all caps which works well in short information design elements (as opposed to text). I also start to brighten up the key on the left side of the piece. The typographic refinement began to allow the presentation to truly coalesce.



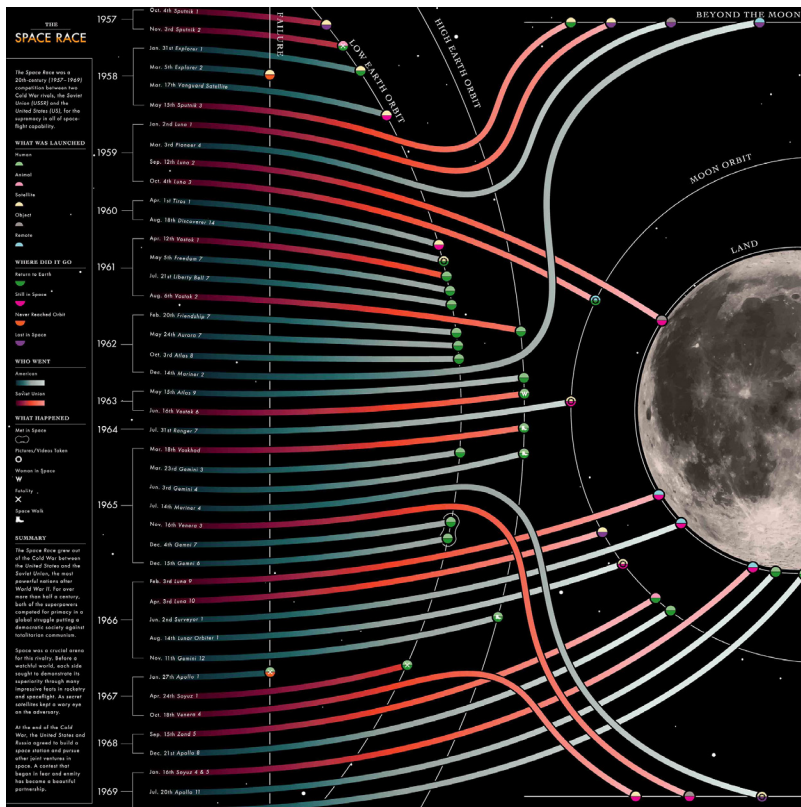
TYPE REFINEMENT THROUGH VALUE

Typography in information-design pieces has a great deal of flexibility through size, as well as through value. As I continued through the refinement process I considered the “brightness” of the typographic treatment and refined the point size, line spacing, word spacing, and kerning of the textual content.



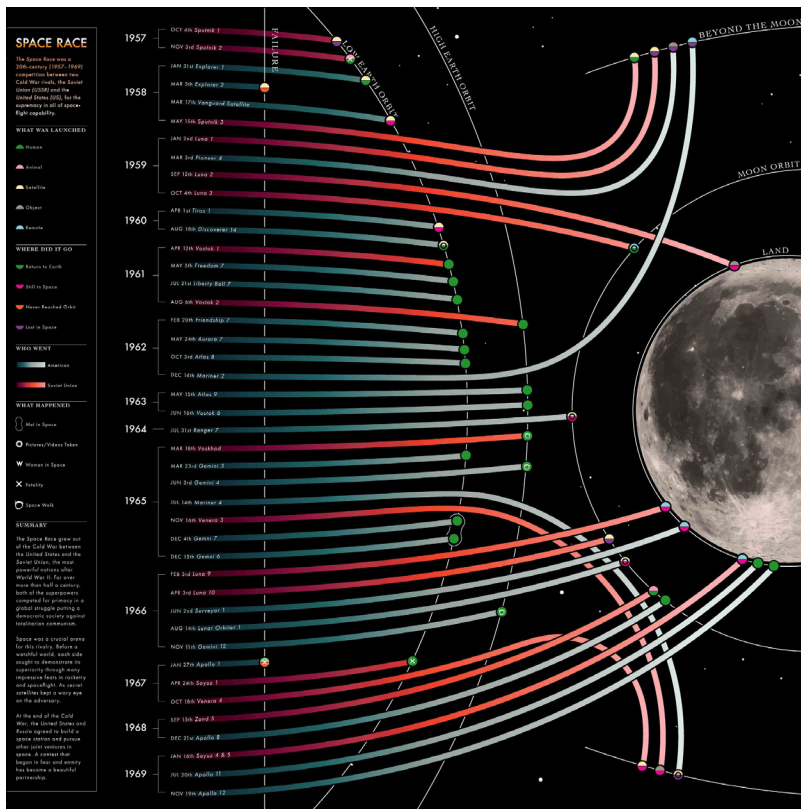
ADDRESSING REDUNDANCIES

Here I modified some bold type use, which created unnecessary sparkle—and calmed distractions. I worked to delete repetitiveness from both editorial and visual aspects. An interesting result of doing this was that titles and support information became much “calmer” as key data is elevated. In the beginning of the process titles are often major visual objects, however, as information begins to logically occupy the totality of the piece, these elements of “eye candy” can be minimized.



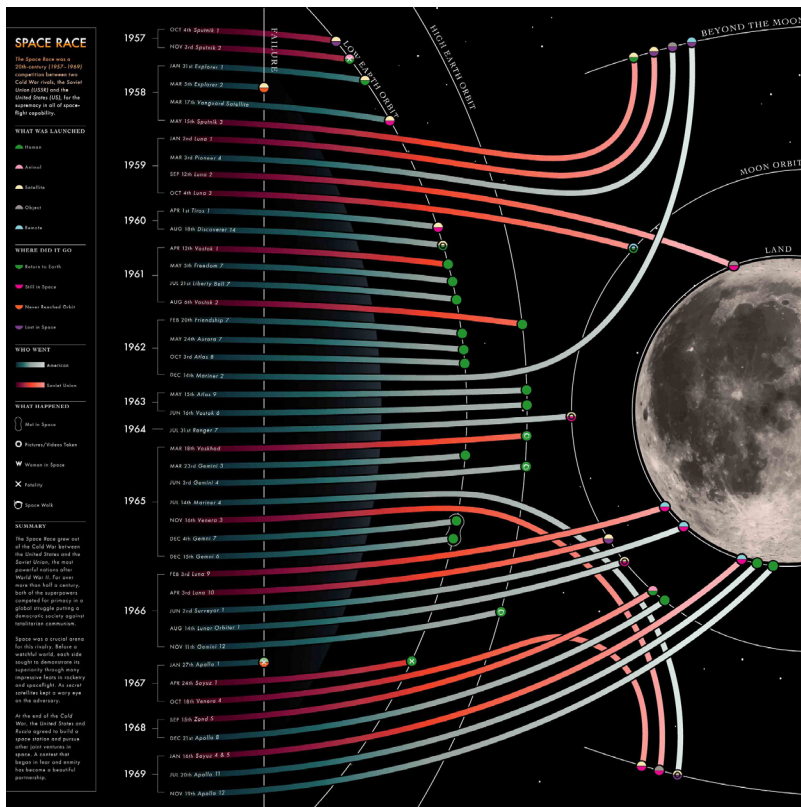
QUALITY REFINEMENT: SHAPING

The expedition lines have been greatly cleaned up much more than before. Now the lines run alongside each other in a much smoother way. The destination lines for beyond the moon have changed from being straight to being curved. This created more of a balance throughout the piece. Towards the bottom you can see that the lines shooting off toward “beyond the moon” are placed behind the lines ahead of them. Doing this helps give a better understanding of time. The highest achievement circles that were once two split green circles have now become one full green circle. (The title has changed too, being labeled as just “Space Race”) The icon for “space walk” was also changed because it was a little misleading. I also removed any of the stars on the left hand side of the screen so that they did not interfere with any of the type.



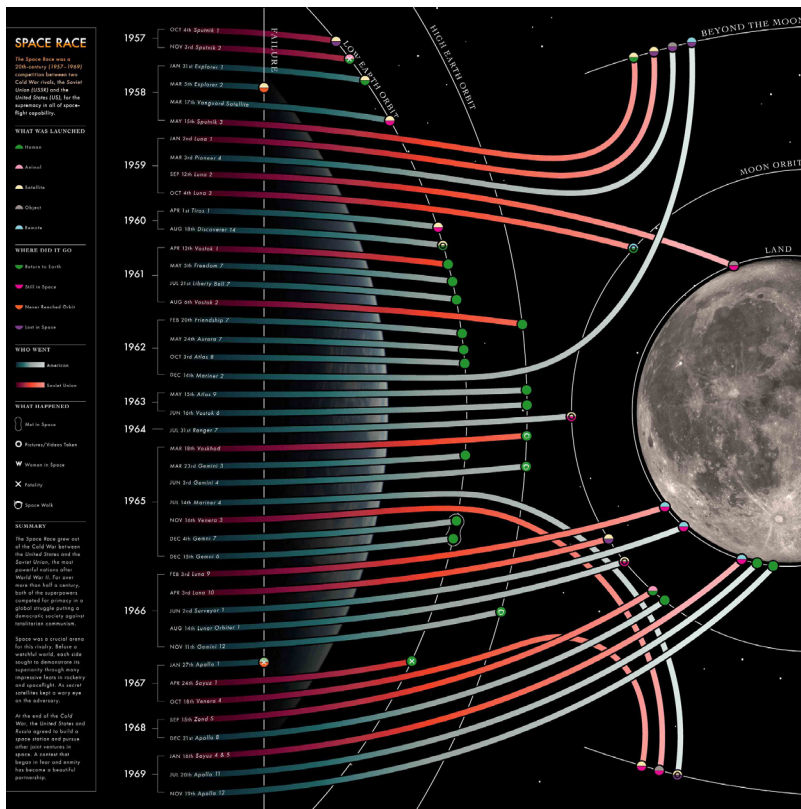
CONTRAST OF SMALL ELEMENTS

I reduced the intensity of some stars to minimize distraction. I didn't want to get rid of the stars entirely because there is a beautiful, emotive quality that I felt they added to the piece. An exciting development was the addition of the Earth—a dark blue circle representing the home planet.



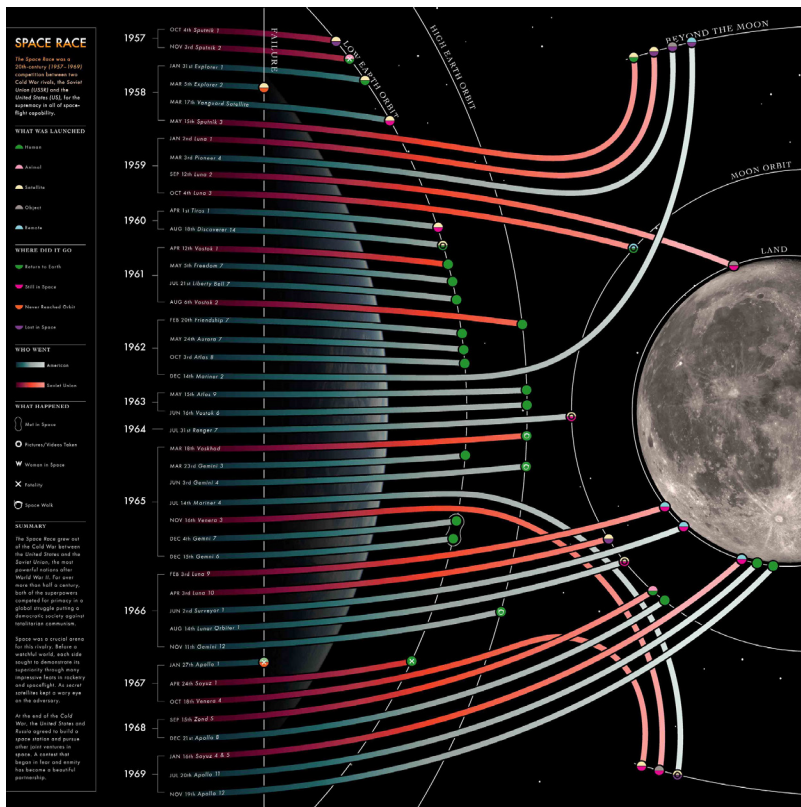
ANOTHER STEP

Here I ended up changing the blue circle representing Earth, to an actual image. It is fascinating how shape plays such a major role in all information design, and how that shape can then be visually manipulated through color and texture for even greater levels of communication.



MINOR MODELING ONE

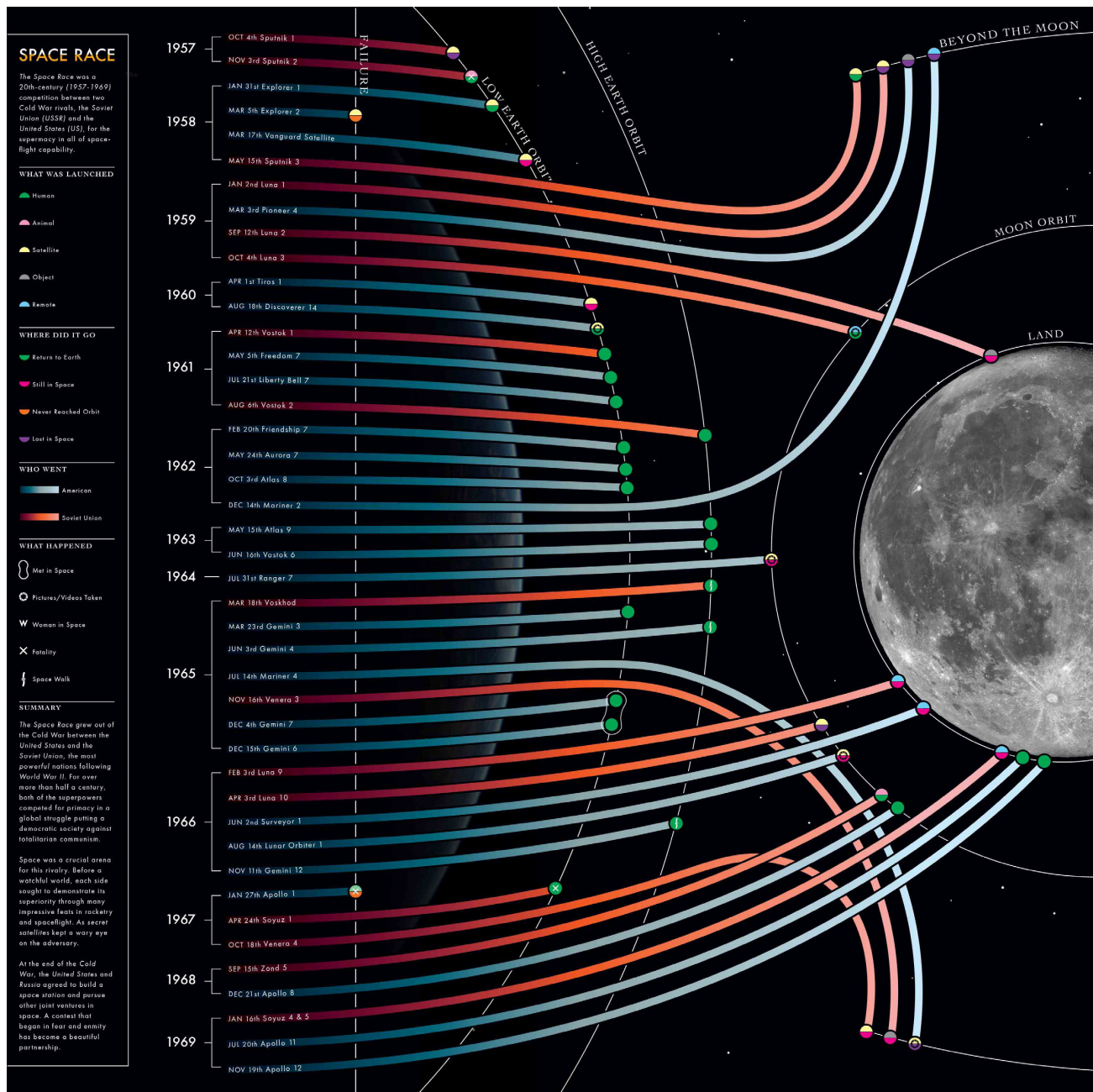
Once one brings new elements into a piece they must be carefully balanced to all the went previously...



MINOR MODELING TWO

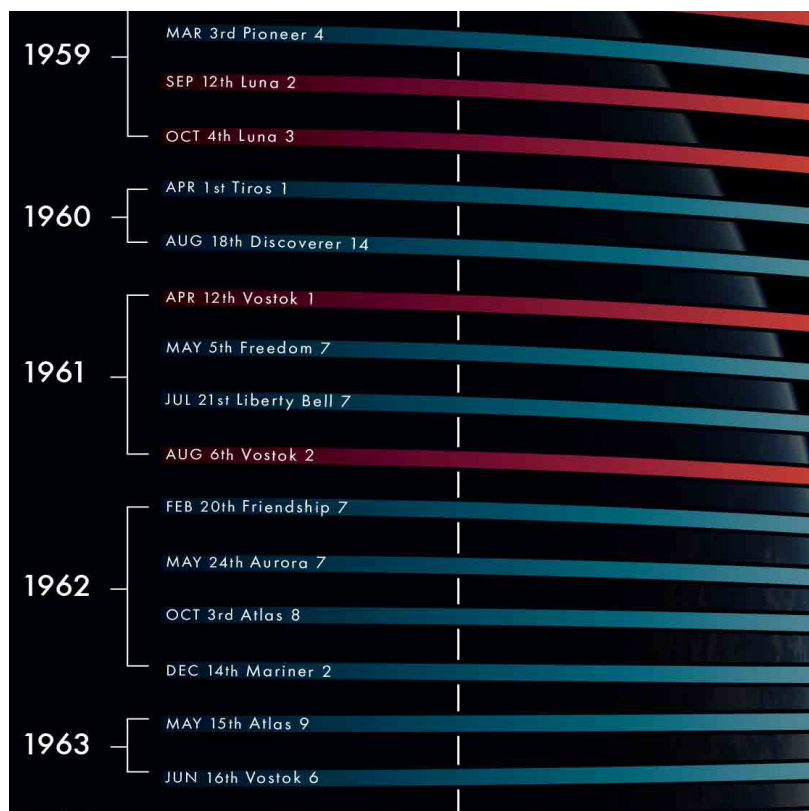
...so the images for the earth are carefully articulated to provide emotive value and not interfere with any data and diagrammatic information.

At this point I was modifying typefaces to test for clarity; I replaced some italicized type with Futura Roman.



THE FINISHED PIECE

For the final iteration, I tightened up every expedition line so that it felt as spaced out and balanced as possible. I changed the orange fade in the intro back to white. I gave the key on the left side bolder lines so that it created a better balance throughout the piece. I cleaned up all spelling errors and changed the space walk icon once again. Now it matches the style of the other icons better than it did before.



WHAT I LEARNED FROM THIS INFOGRAPHIC

After going through this process of creating this infographic, I gained a whole new perspective on design that I now apply to all of my work. Going through various critiques helped build this piece to what it has become. It has not only helped my infographic but it has also helped me as a designer. Many of the problems I came across I will never have to deal with again. Now I have the knowledge of how to and how not to approach certain aspects of design based off of issues I ran into during this process. One of the most important things I got out of this process was that you have to let the information design itself. And once you have made that happen, that's when you know you have created something successful.

ACKNOWLEDGEMENT

Thanks to William Bevington who provided valuable input on this paper.

BIOGRAPHY

Robert Capaldo is a senior enrolled in the Communication Design Program at Parsons School of Design. Since the summer of 2015 he has been an Information Design intern at Donovan/Green. At Donovan/Green he has been working to create infographics that deal with topics related to science and science fiction. For Robert, this project was a process of exploration in learning how to create complex visual narratives on a more structured level. As of 2015 Robert is working on his thesis to help non-verbal children with autism communicate with the general public.

