

# Data Visualisation

## Assignment 1

### Document Submission Cover Sheet

*Please ensure that you complete all relevant sections below and that you make this the **first page** of your assignment submission.*

*For submission, you are required to put all aspects of the assignment into one document, including the cover sheer below and then to submit the assignment on Moodle in the relevant module location.*

*The assignment must be completed on or before the designated submission date and time. Students are recommended to keep a copy of the assignment, as submitted.*

*Please complete the following, in advance of submission.*

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<b>Student Number</b>	<b>Programme Title:</b>
<b>Programme Year:</b>	<b>Module Title:</b>
<b>Lecturer Name:</b>	
<b>Visualisation Title:</b>  <div style="text-align: center;"><b>The GE (General Electric) Apollo Flight Plan Poster from 1969</b></div>	
<b>Declaration of Authenticity: (Please Sign)</b> <i>By uploading this document, I confirm that I have read and understood the assignment instructions and that the attached assignment is original (save for the visualisation being analysed) and represents all my own work.</i>	

## **Introduction:**

As a child born in the late 1960s, the NASA Apollo Program to land astronauts safely on the moon (and return them safely to Earth afterwards) had a significant influence on my early years. The euphoria and continued interest that my parents and mentors had for this led, inevitably, to an interest in space exploration, astronomy, physics, and mathematics that has lasted my entire life.

In the early 1970s, my late father bought a Time Life jigsaw of a photo of the moon taken from one of the Apollo missions. In the jigsaw box was an added bonus, a genuine 1969 General Electric poster of the Apollo Flight Plan as created by NASA with some extra embellishments about the Saturn V rocket, the astronauts' spacesuits, etc. This poster hung on the wall of my childhood and teenage bedroom for years until, in order to preserve it, it was rolled up and stored away.

I never thought of it again for many years until, after my father's passing (my mother having pre-deceased him), we were clearing out the family home in order to sell it. Hidden in a cardboard roll in the attic was the poster; fragile but intact. To see it again after so many years was emotional, touching, and exciting.

I have the poster now and it has gone to a paper restorer to conserve it and mount it in a frame so it may be hung in my office in my current home. It will eventually be passed on to future generations to, hopefully, cherish as I have and maybe inspire a new generation to look to the future with the optimism I had as a child.

## The Visualisation:

Further on in this document is an image of the poster as sourced from the web; the original is now at the restorers.

### Layout:

The poster itself is split into three distinct horizontal regions; the uppermost contains the flight plan and lunar orbital stages, the middle contains some visuals but is devoted to quantitative information in tables, while the bottom is cut-aways of the various modules and the astronauts suits. This banded layout is very effective in sectioning the various types of information being presented, i.e., visual, quantitative, and visual in that order. The colours scheme, while typical of the time, is nevertheless appropriate and effective.

### Flight Plan region:

The heart of the poster (though placed not in the centre but in the top left) is the actual course the astronauts took on their way to the Moon and back.

It starts on the left with the Earth and the stages of the Saturn V rocket in going from launch, through the jettison of stages I to III, to the point where the Lunar Module (LM) is extracted from the third stage (stage III) by the combined Command/Service Module (CSM) to then begin the trans lunar injection to take the astronauts to the Moon, their lunar orbits and the lunar descent. This trajectory is shown in yellow with the Moon occupying the lower right in this section.

The return journey is shown in blue (to distinguish itself from the outward journey) with the Moon now occupying the upper right of this section. This is an important visual trick for a number of reasons:

- The outward and return journeys are clearly separated so there's no obscuration.
- The drawings of the CSM+LM on the outward journey and the CSM on the return journey are clearly separated and easier to examine.
- The temporal aspect of the moon mission can also have been said to be addressed (not only with a counter on each image of the rockets staging) but also with the displaced position of the Moon.

The flight plan region is further embellished with a drawing of the astronaut on the moon performing experiments and how the information is sent back through the LM antennae through the CSM orbiting the Moon.

Actual photographs of the Earth (including the famous "Earth Rise" image of Apollo 8) and the Lunar surface fill in the gap between the outward and return journeys.

Finally, as a cherry on top, the stages of the parachute deployment complete the flight plan section.

As a visualisation, they don't come better than this. It's compact, clear, detailed, and instructive.

### Lunar Orbits region:

Placed on the top right, this takes its cue from the flight plan in using two images of the moon with the outward trajectory and lunar descent stages clearly shown and important stages annotated. These stages are then linked to images surrounding the Moon showing what is happening in terms of the LM and CSM.

Above this is the Lunar Ascent stage, the orbits to dock the LM with the CSM, the jettisoning of the LM, and the return to earth. The images surrounding this image of the Moon show these various activities.

Similar to the flight plan, the orbits are coloured yellow (outward journey and Lunar Descent) and blue (Lunar Ascent and return journey) to be consistent.

Similar to the Flight plan region, this is an exemplary example of efficient use of visuals to create a narrative for, what is certainly, a very complicated set of manoeuvres.

### **The Quantitative region:**

This middle region devotes much of its real estate to tabular data and actual facts and figures about the Saturn V rocket, the various listening stations on Earth, and the Moon itself.

To the left we have two cut-aways of the Saturn V rocket straddling a table with information about the rocket itself. This is for the Geeks who want facts and figures to quote and nauseam to anyone who'll listen.

Next to this is the orbital plot relative to Earth with tabular information about listening stations, time stamps for various activities, dockings, jettisons, etc.

On the extreme right is a section with the facts about the Moon, the landing sites chosen and images of what these look like from Lunar orbit.

From a visualisation viewpoint, it doesn't offer much in the way of visuals but it does provide the precise information (in tabular form) that the other visuals would lack.

### **The Cut-away region**

Finally, the cut-aways. These are intended to show the viewer what the various parts of the rocket look like and where the components are located, where the fuel and rocket motors are housed, where the crew sleeps, sits, and performs duties. They also give information to the viewer as to the different acronyms used to describe the various modules; LM, CM, SM, CSM, etc.

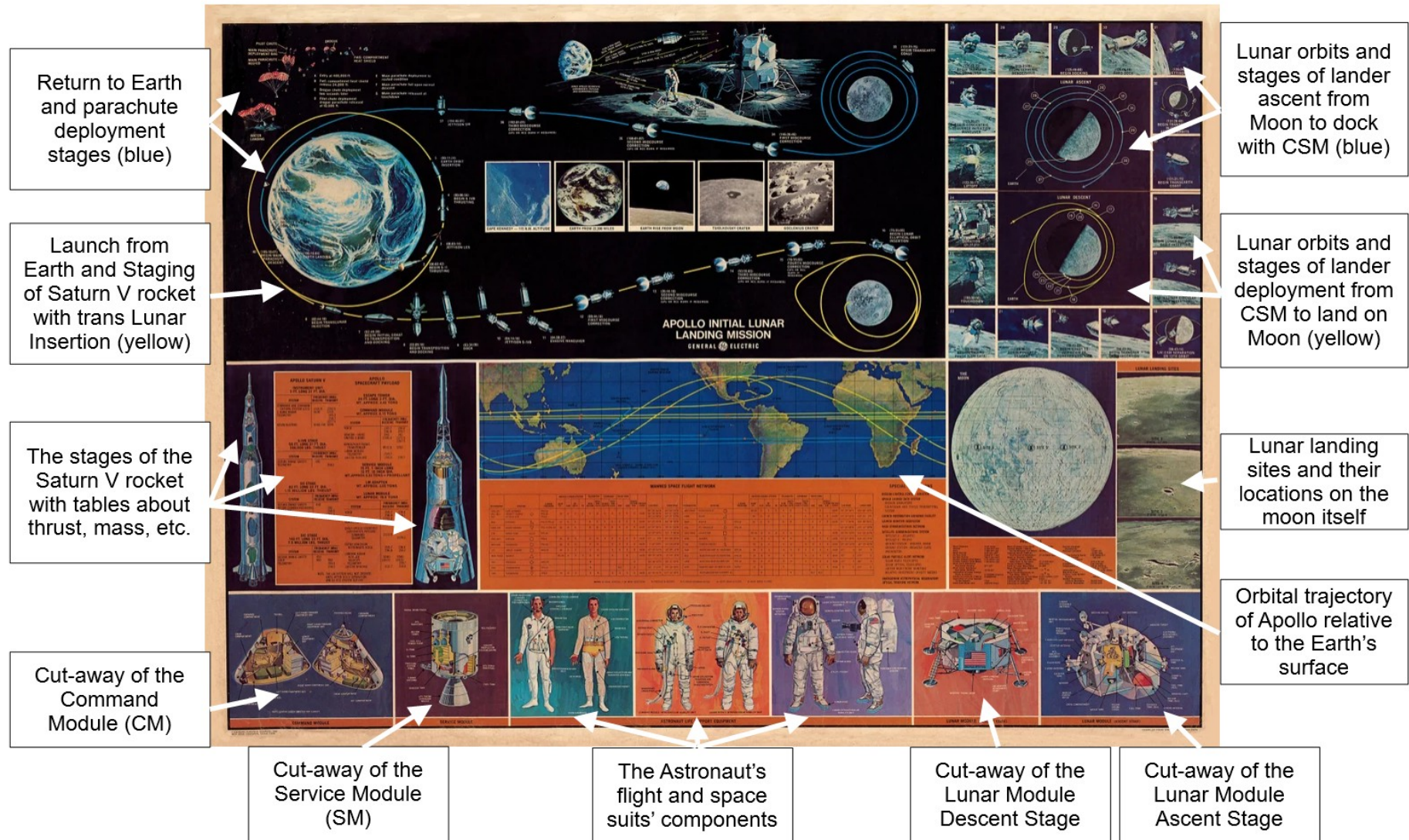
From a visual standpoint, in an era of no readily available interactive computer graphics, these visuals are an excellent tool to educate and inform the viewer of both the complexity and efficiency of the designs used in these modules.

The last section of this region contains images showing the various layers of clothing the astronauts wear in order to survive in the hostile environment of space. These images serve as a temporal visual (the inner most layers must go on first, etc.) as well as an instructive visual. The different suits (flight suits and EV suits) are clearly shown as is the plethora of sensors necessary to monitor the astronaut's vitals.

### **Overall**

An impressive and highly detailed, efficient, and informative poster showing the significant complexities involved in sending an astronaut to the Moon in the late 1960s.

# GE Apollo Flight Plan Poster 1969



## **Conclusion:**

So, in conclusion, what we have in this poster is primarily a geospatial and temporal visualisation of the journey each Apollo mission from Apollo 11 onwards took to land on the Moon and return safely to Earth. Given the complexities in the processes involved it was necessary to subdivide the poster in many sections, each devoted to a different aspect of the mission and Apollo Program with the intention of informing and educating the viewer on the immense effort it took to accomplish the mission.

In my opinion, I believe this poster accomplishes its goal brilliantly. It is a seminal example of efficiency, visualisation, organisation, and information dissemination.

It also holds a special place in my heart for the hours spent studying its visual components as a child while sparking an interest that has remained with me personally and professionally.