

## **“Fashion and Space”**

### **Or what will we wear as tourists, technicians and workers in space**

#### **Introduction:**

By the beginning of the second decade of the 21<sup>st</sup> century, we will have had our first commercial tourists in space. Admittedly this will only just be in space but weightlessness will be achieved and at this juncture people will want to interact with this new sensation. This weightlessness is the reason for paying £200,000, so do you want to be wearing something normal or do you want to be clad in a garment that comes alive in these precious minutes and reacts in a completely new way to the weightless environment.

Fashion has always explored new concepts and in the context of space, we can look back to amazing 30's characters including Flash Gordon, 50's science fiction films including “Forbidden Planet”, “Barbarella” and “Star Trek” in the 60's, as well as fashion designers Courreges and Cardin, who in the excitement of the explosion of 60s space fever, explored new materials and silhouettes, to translate gravity laden mortals with some of the cachets and sparkles of space exploration.

The space fever died off and although space exploration continued throughout the 70s, 80s, 90s we never again hit that fertile, febrile excitement until now.

Space fever is about to hit the world again and what do we wear? Not just on Virgin Galaxy but on the inflatable space hotel being assembled as we speak that will orbit the earth by “Bigelow airspace” of Las Vegas and the Hilton hotel chain are looking at the design of a hotel on the moon as well as an orbiting space hotel called the galactic suite space hotel.

So what will the staff wear in a super expensive luxury hotel that is literally out of this world and what will the super rich wear when on holiday?

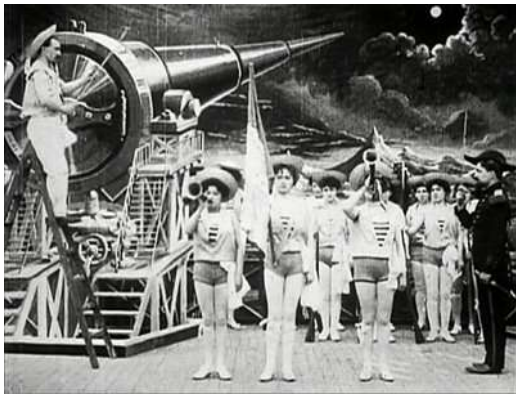
The answer lies in the hands of fashion designers who will create fashion garments that react to zero and microgravity in a new and completely different way to clothes that currently exist in a full gravity environment....

This may involve jets of air, magnets, shape memory alloys, nano fibres and fabrics, infra red data streams, light, radiation, etc, to allow garments to work with the human body and the environment in a new and unique manner.

## Chapter 1: A brief history of fashion and space in popular culture

The history of fashion in space has been around in popular culture since at least the beginning of the 20<sup>th</sup> century with the classic science fiction film *Metropolis* leading the way into visions of an ever more mechanised, automated urban culture with accompanying fashion statements. I think it is important that we look back to these fashion pointers as we have very little reality to look at. As with all historical lists I am sure that the viewer/reader will disagree with my choice and I am happy to accept that with a different set of films a different fashion aesthetic could be arrived at... But this is mine and I hope that you enjoy the ride and feel inspired to go off and find your own aesthetic, as I am sure that at some stage in the near future, we will all know of someone who has holidayed or worked in space.

There now follows a collection of seminal films, television shows and fashion images from these films and shows, starting back in 1902 and coming close to the present day:



**A Trip to the Moon**, directed by Georges Melies 1902



**Metropolis**, directed by Fritz Lang 1927



**Mysterious Island**, directed by Lucien Hubbard 1929

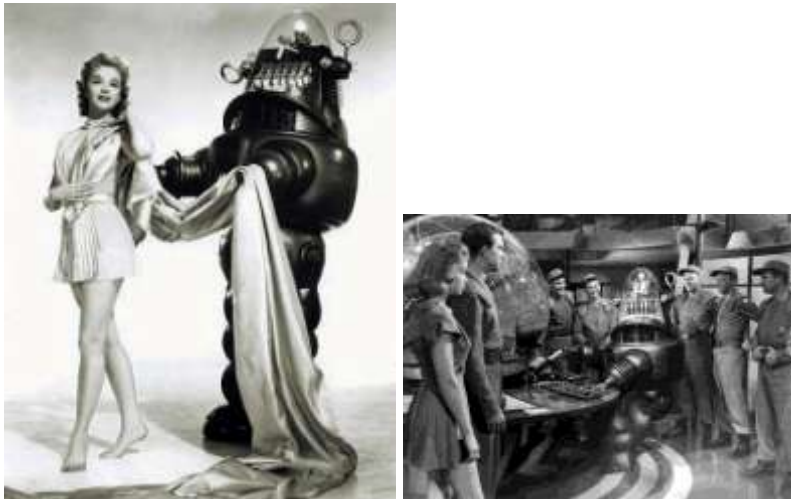


**Flash Gordon**, 1936



**The Day The Earth Stood Still**, directed by Robert Wise 1951

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**Forbidden Planet**, directed by Fred M Wilcox 1956



**Terronauts**, 1967



**2001 A Space Odyssey**, directed by Stanley Kubrick 1969



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**Barbarella**, directed by Robert Vadim 1968, fashion by Paco Rabanne



**Logans Run**, directed by Michael Anderson 1976

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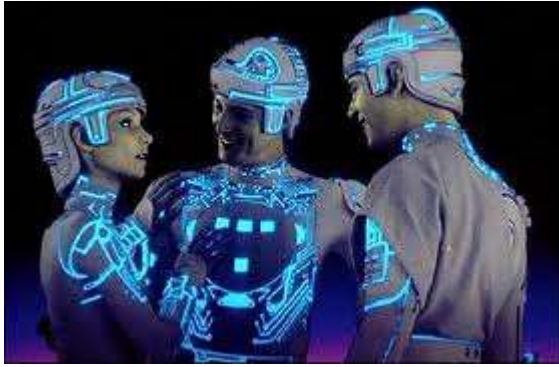


**Blakes 7**, BBC1 1978-1981



**Star wars**, directed by George Lucas 1977-2005

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**Tron**, directed by Steven Lisberger 1982



**The Fifth Element**, directed by Luc Besson 1997, Fashion by Jean Paul Gaultier





And finally **Wall E** directed by John Lassiter in 2008

The fashions portrayed in these films are all attempts by designers known and unknown to explore what we will wear in space. The interesting thing that comes out of this whistle-stop tour of the selection of space films is that space is militarised as far as the men's fashion is concerned and that women are happy to wear and explore fashion related to the period of when the film was made. So although the fashion designers are thinking ahead, on reflection they cannot see further than the current moods and movements in fashion.

The same fashion conundrum is graphically realised in the pulp science fiction of the 40s and 50s as is evidenced by the following images:



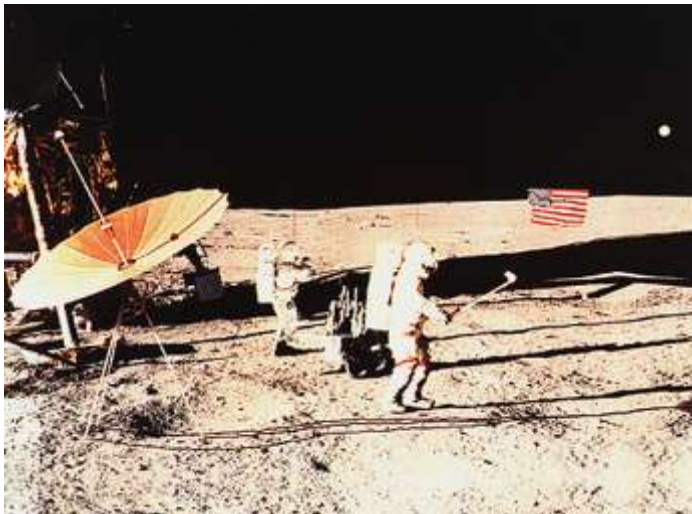




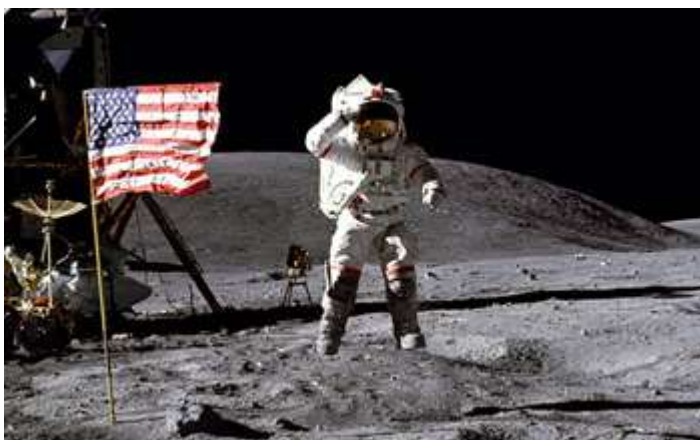
## Chapter 2: Astronaut

We have seen in the last chapter the fictional representation of what we wear in space as viewed through the eyes of film, television and print. However the reality of fashion (or should we call it clothing?) is much more mundane. We must also distinguish between what the astronaut wears in the space vessel/rocket/international space station and what goes on in the hard vacuum of outer space.

So initially let us look at what the astronauts wear outside the relative safety of the vessel. The space suit has to stop basically the astronauts' body exploding due to the surrounding vacuum and also to retain heat in the uber cold. Aside from these two vital safety functions the suit has also to allow a modicum of movement to allow tasks to be undertaken (including playing golf, taking pictures and repairing punctures and failed machinery)

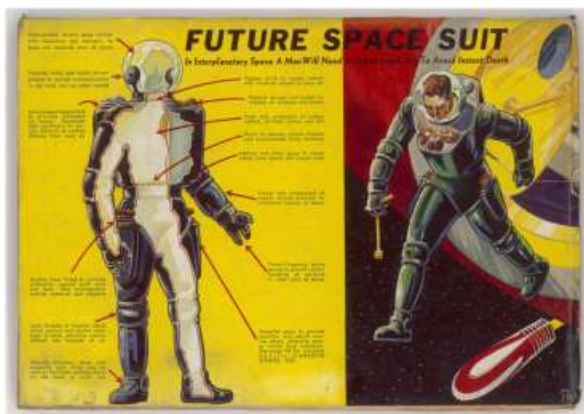


Alan Shepard in 1971, playing golf on the moon.



Jumping astronaut (this in the wildest flights of fancy could be the basis for the Olympics on the moon, just think how high the record for a high jump could be and how far could a javelin fly?)

We can look back in time to the following images to see some of the concepts that designers and engineers have come up with to solve some of these issues.









Still the search goes on, with a NASA (North America Space Agency) funded project with MIT (Massachusetts Institute of Technology) and Professor Dava Newman and her modern take on the solution. (The suit explores materials including Lycra, Velcro (designed in the 1960s by NASA to allow movement in a determined direction as opposed to just floating aimlessly in space ships and as an aid to safely anchoring objects) as well as very traditional corsetry)



Inside of the ship however is a very different story, with lightweight, very conventional clothing



JAXAオープンラボ近未来暮らしユニット  
宇宙船内用日常服(船内被服)

<p><b>上衣</b></p> <p>運動着</p>  <p>A 運動用半袖Tシャツ    B 半袖ポロシャツ    C 長袖ポロシャツ</p> <p>1) 無縫製技術: ABC 2) 吸水・抗菌・防臭機能: A    3) 吸水・消臭機能: BC 4) 透気性(背中・脇下にメッシュ): A</p>	<p><b>靴下</b></p>  <p>G 靴下(運動用)</p> <p>1) 無縫製技術 2) 吸水・消臭機能 3) 保温性</p>
<p><b>下衣</b></p>  <p>D 運動用ハーフパンツ    E 半ズボン    F 長ズボン</p> <p>1) 無縫製技術: DF    2) ナノマトリックス加工<sup>®</sup>: EF 3) 吸水・抗菌・防臭機能: D    4) 抗菌・消臭機能: EF 5) 使い勝手の良さ(ポケット/両ファスナー(PSテープ)<sup>®</sup>位置): EF</p> <p><sup>®</sup>ナノマトリックス加工 【効果】抗菌・消臭・耐臭・防汚</p> <p><sup>®</sup>両ファスナー(PSテープ) 【効果】ソフトな着心地、耐熱・耐燃</p>	<p><b>下着</b></p>  <p>H トランクス型下着</p> <p>1) 宇宙仕様のカッティング技術 2) 抗菌・消臭・制電・保温・保湿・肌触りの良さ(低刺激)</p>

The images above cover the standard kit for Russia, America and Japan in this order.

The Japanese trunks are interesting as they have been designed to be worn, without being replaced for over two weeks, with carbon and antibacterial agents in the fabric.

In the following images we can see the clothing previously described, being worn on the International Space Station.



A most uninspiring set of clothes to have to live in for three months at a time! Or is that scientists have never shopped and expressed their own fashion identity?

There are admittedly issues surrounding being in space for extended periods of time including the eye watering costs of transporting things into space and in the thoughts of the transport manager, clothing has to be functional and lightweight. Notwithstanding these issues, some design effort could be easily put into this clothing range.

Individuality as we can see from the above images, does try to bubble up and become more evident (the off orange T shirt, being an example of this) and in the last two years the European space Agency ESA put out a competition to primary schools across Europe to design a T shirt logo for one of its astronauts; Frank De Winne. The three finalists can be seen below:





There is also an element of corporate individuality with each mission having its own embroidered badge ( an interesting connection back to the military who have traditionally had medals and badges identifying campaigns undertaken)



However beyond this, there has been very little design input into expressions of individuality which when evidenced on earth seems to be a vital part of an individuals identity.

So we can see here that there is an opportunity for fashion designers, clothing and mechanical engineers to look at comfort, materials, finishes and extended wear which without being too outlandish, could allow more individual expression.

This expression of individuality may become even more important with the American desire to go to Mars with a human crew. This is a journey of epic proportions ( it is estimated that the entire trip will comprise of a nine month journey to Mars, nine months on the surface of



Mars and a nine month journey back to Earth) not dissimilar to the first voyages in tiny ships by Columbus and Vasco de Gama.

This journey could be amazingly boring and the idea of recreation and personal identity and space is a vital and critical one for the health and well being of the Astronauts. Research is going on in terms of long term isolation on earth, with the Mars 500 long term experiment, as well as design of the environment of the space craft.



Conceptual space craft interior Mars 500 ESA/Russian long term experiment

There again seems to be a great opportunity for fashion designers and technologists to come together to work on more conceptual garments which possibly change over time or respond to environments or remote messages (possibly giving the wearer a hug or warming up, so that although the two people are physically distant, some semblance of contact can be maintained)



conceptual Philips emotions garment



HaptiHeart



HaptiHug

Hapti hug garment/accessory which also explores the use of sound ( I am not sure that this is the design of the future but I am sure the technology will improve and become less visible)

We can see from these garments that serious research is being undertaken and in the future the technologies will form the basis for long distance communication.

### Chapter 3: low earth geo-synchronous orbit hotels

In previous chapters we have discussed some cultural history and the current and historical state of play for clothing for astronauts. In this part of the document we will be discussing

The venue for our tourist forays into space and the people who may be working there

And this article from the Guardian newspaper August 27<sup>th</sup> 2011 is a good place to start:



Up to seven space enthusiasts at a time would be housed in the Hotel in the Heavens, which is planned by Russian company Orbital Technologies

Russian engineers have announced the ultimate get-away-from-it-all holiday, revealing plans to put a hotel into orbit 200 miles above Earth by 2016. The four-room Hotel in the Heavens would house up to seven guests who would be able to cavort in zero-gravity while watching as our planet turns.

The out-of-this-world experience will not come cheaply, however. **Space** tourists will have to pay £500,000 to travel on a Soyuz rocket to get to the hotel before stumping up a further £100,000 for a five-day stay.

"The hotel will be aimed at wealthy individuals and people working for private companies who want to do research in space," said Sergei Kostenko, chief executive of Orbital Technologies, which will construct the orbiting guest house. "A hotel should be comfortable, and this one will be."

Guardian newspaper August 27th 2011

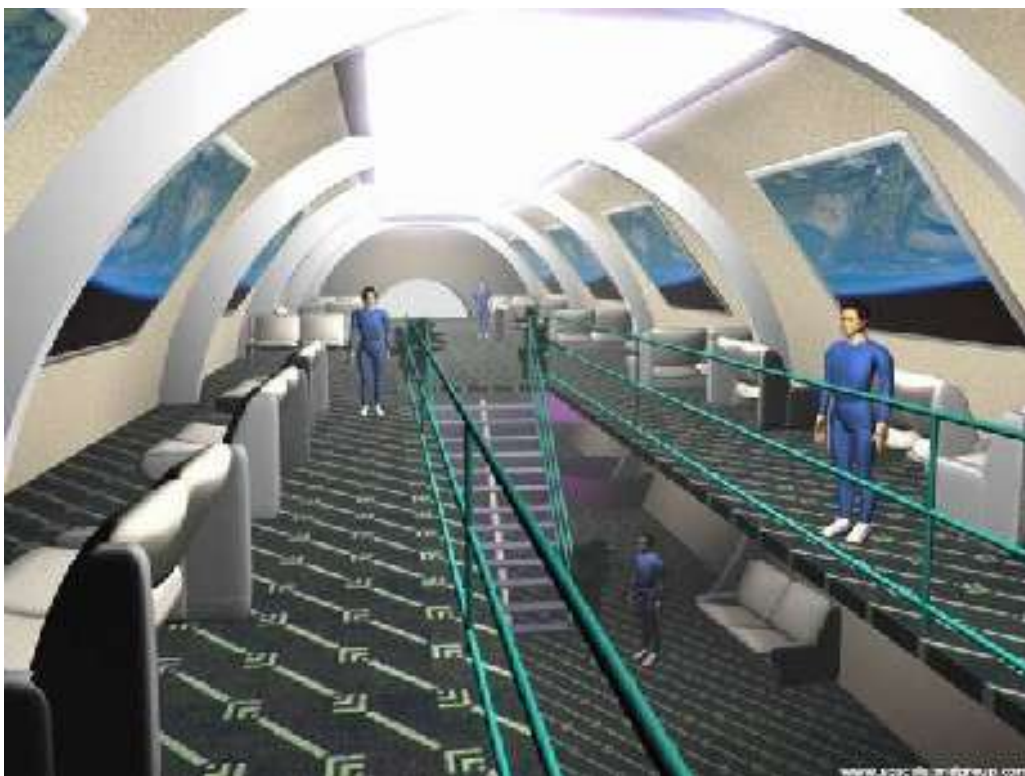
So that is a £600,000 5 day stay

But they are not the only company looking to develop a space hotel

## Fashion and Space

Bigelow space, an offshoot of a Las Vegas Casino group are investing in an inflatable modular space hotel which will accommodate passengers from Virgin Galactic

Again a flight and stay will be £600,000



Interior view of Bigelow space inflatable hotel

So far the developing space hotel industry talks about how exciting it will be to be in space (we will come later in the document to explore some of my concepts, about what the tourists might be wearing) but what about the workers? Chefs, receptionists, waiters, security staff, cleaners and what will they wear?

Again if we look back to historical precedence from film we might gain a slightly clearer understanding:





From **2001 a Space Odyssey**



from **the Fifth Element**

But as with the astronauts discussed previously, the garments will have to perform and still retain the standards expected of a six (multi billion?) star hotel.

#### Chapter 4, historical fashion precedents

In this chapter I will be exploring the 1950's to the late 1960's where space fever hit a chord with a world confident with itself and excited by the stream of space launches from both the Russians and the Americans. The idea of new frontiers, exciting technologies and heroes produced a heady mix of fashion influences. This excitement as we have seen, inspired film and television series including Star trek, The Jetsons, I dream of Genie, to name but a few as well as inspiring fashion designers.

So let's go back to the 50's:

Where there was a fascinating phase of inflatable fashion



Here I must thank Getty images for their foresight in collecting these images (but I am not sure whether nowadays we would get as close as the man in the suit in image 1)

This has evidently inspired notable designers including:

**Gareth Pugh**



**Junko Koshino**



**Rei Hosokai**





And the idea of inflatable fashion has been one of the influences in my fashion exploration, of which more later.

We then move forwards a decade to the 1960's with the American space programme in full flight and four influential designers, Pierre Cardin, Paco Rabanne, Pucci and Couregges start to produce their space inspired fashions:

### Pierre Cardin



**Paco Rabanne**



**Coureges**



**Pucci**



(Outfit for Braniff airways cabin crew (this should also be seen in the context of the flight crew uniforms referenced earlier))



The exploration of new silhouettes, materials and detailing was carried through to the high street and advertising allowing everyone to touch the fashion Zeitgeist.



So the influence of space age clean lines and materials defined an era of fashion in the 1950's and 60's, which from the distance of 2011, inspires silhouette and innovation to this day.



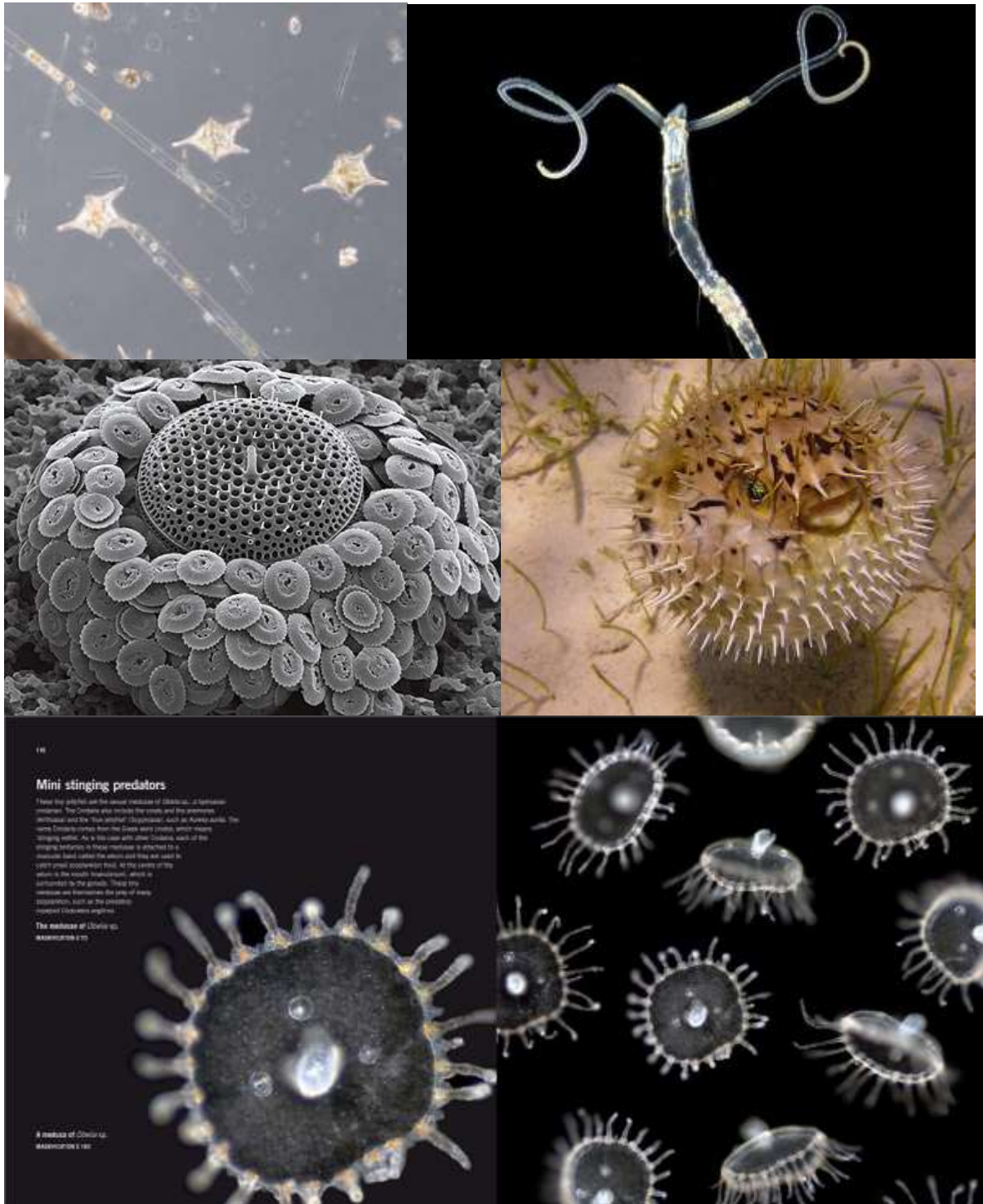
## **Chapter 5: Outfits for space tourists, designs by Mark Timmins**

With this rich heritage of influences stretching back for over a century, it was time to look forward to the near future when after paying £600,000 for your week in space; you have the eternal problem of what to pack. The fashion has to be lightweight and definitely not look like a boiler suit or even a T shirt and shorts and make a statement that the tourist has really arrived.

And this was the starting point for the collection.

### **Influences:**

The starting point was to look at things that already lived in weightless conditions and it was decided to look at plankton with their fascinating shapes and the change state of the puffa fish with its inflatable body and spikes



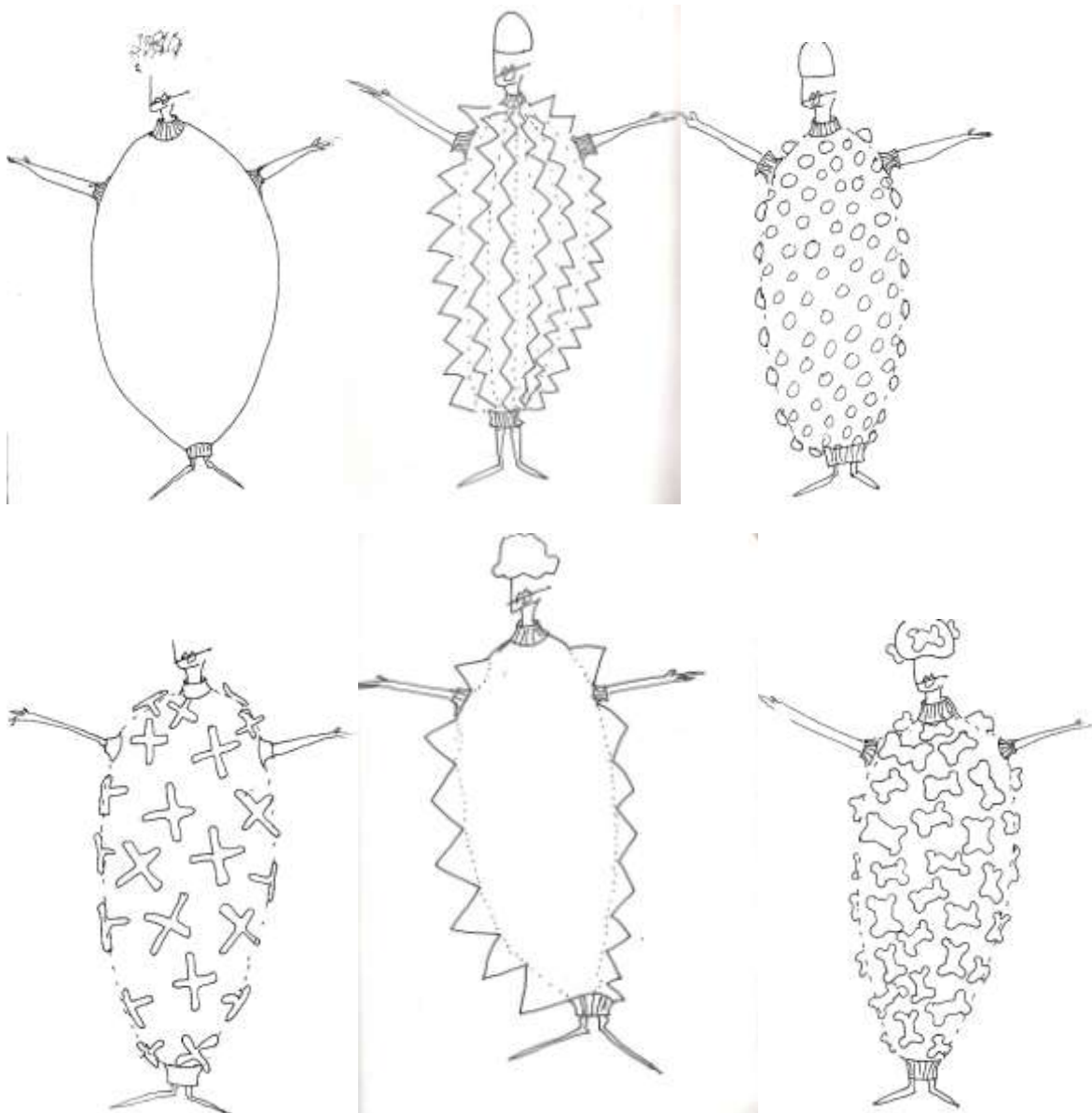
It was then decided to look beyond the water to the skies and reference the balloon which again changes in state from flaccid to full and provides clues as to the innovations in pattern cutting and manipulation.



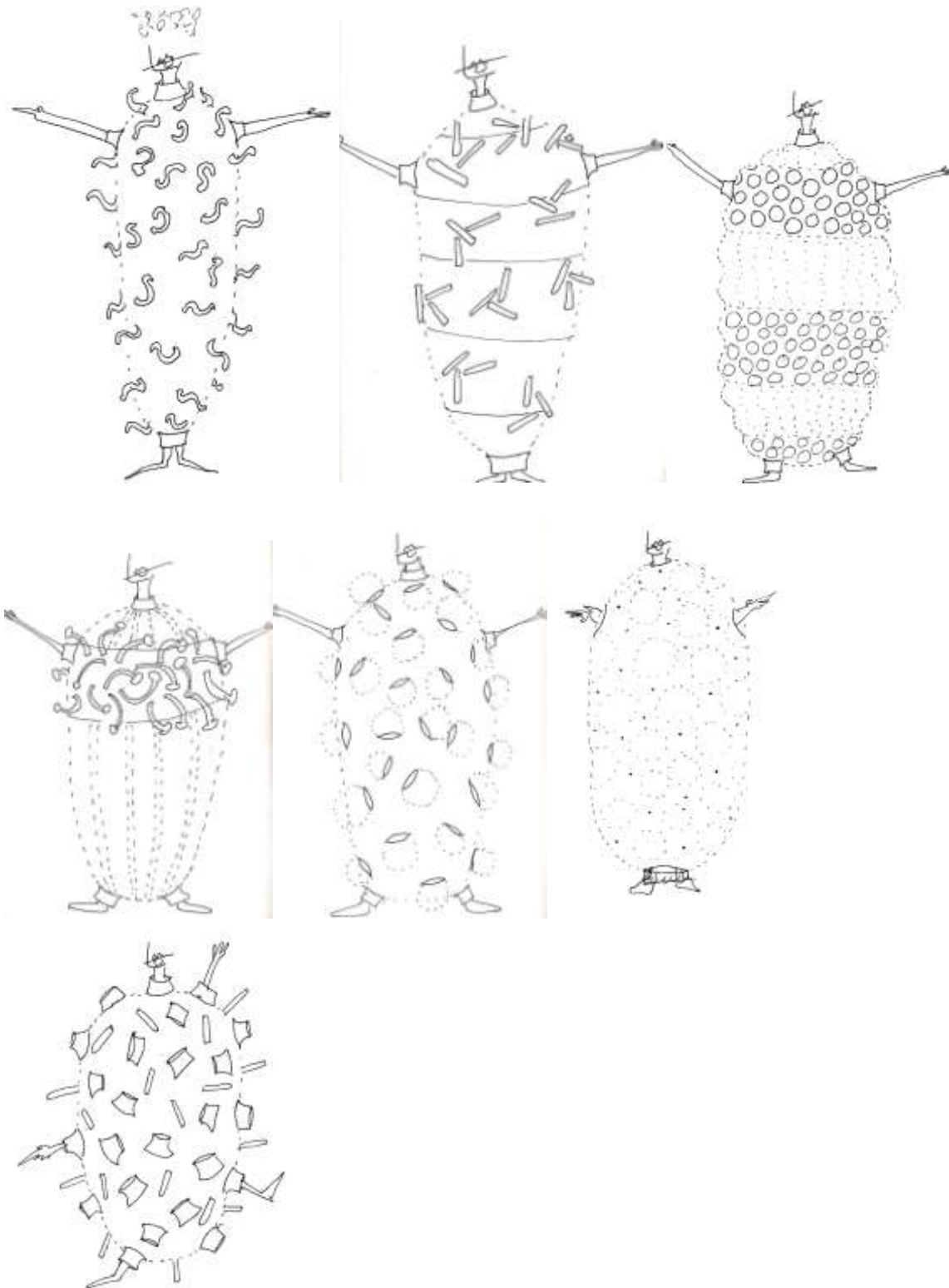
## Materials

As has been previously discussed weight is at an absolute premium in space and it was decided to explore the use of fine silks with their ability to retain strong colour and having a smooth sheeny surface, as well as the ability to compress into a small space with little weight.

**Early design concepts**







The designs will exploit the fact that air will not leak from inside the garments in zero gravity and do not drape in zero gravity. Therefore whatever shape a garment is inflated to, it will remain in that shape until pushed or pulled into another shape.

### **Conclusion “Fashion and space”**

We have seen in the previous pages that fashion influenced by space has been tested in different media since the beginning of the last century. It is not an exhaustive treatise on every minutiae of fashion in space but an overview which leads the author into new areas of design and fashion research. However it is not just blue skies research with no real outcome, the age of space tourism is fast approaching with Virgin Galactic, Bigelow space and the Russian Hotel in the Heavens all vying to provide an out of this world experience.

The first designs require a large amount of refinement and will provide an avenue of pattern exploration and new technologies to realise in the future. However the opportunities do not stop there as we can explore comfort and individuality for workers in space whether they are astronauts or workers in these new hotels and tourist space ships. Still further forward we have the opportunity to explore garments with a function, be that a hug or a stage change affected from a distance, as the astronauts embark on the next great era of space exploration to our nearest neighbour, the planet Mars.

These innovations do not only have impact in space or for the uber rich and we only have to look at the ubiquity of Velcro (a product of the American 1960's space programme) to see that some of the unknown developments in the field could have a major impact on our world in the future.

It is not often that a fashion designer has the opportunity to work in a completely new field of design and the author for one is looking forward to what the future brings and how that future can be influenced by fashion.

Key words: Fashion, Space, Inflatable, Zero Gravity, Tourism, Mars