10:00:00	**1.Teaser** A humorous montage of sci-fi B-roll trailers on flight to Mars. It starts and finishes with an old movie title: **FLIGHT TO MARS**	
10:00:23	Fade out	Andre Brack: **"Finding life on Mars has a wonderful, huge, importance…"**
10:00:28		John Thatcher **"Dare I say, the first mega-discovery in the new Millennium?'**
		Andre Brack: **…because this may give indication to the existence of other intelligence."**
	Clouds.	Sound effect
10:00:38		Jim Clemmet **"It is difficult to imagine that there hasn't been life before us, that there isn't life now or will not be life in the future somewhere."**
10:00:47	Clouds, music ends on space image of planet Earth.	Effect. Blur music swells
10:00:57	**2.Introducing the Mission.** Fade out. Beagle 2 animation.	Voice over **In June 2003 a little lander, Beagle 2 will begin its voyage towards the Red Planet.** **The odds against success are huge but its mission is great…It 's heading to Mars to find evidence of life beyond the Earth.** **It will be the smallest, smartest landing craft we have ever sent into space.**
10:01:30	Intro to Colin Pillinger at OU rushing down on stairs, seeing John Bridges with his Martian maps. Map of Mars.	Voice over **Beagle 2 is the brainchild of Professor Colin Pillinger, who has raised the money for a project that puts Britain on the map of space exploration.**
10:01:41	Interview at lecture hall Beagle 2 image projected in the background. NASA animation of ALH84001 hurtling in space towards Earth Super: Leading scientist, Open University Change in background slide	Colin Pillinger **"The idea goes back a long way. We've been working on rocks that have been thrown accidentally to us from Mars by impact occurring on the surface - Martian meteorites if you like.** **We've worked on these meteorites for over 15 years and it became obvious to us that the conditions on Mars are rather more suitable for life than we previously thought.** **So we know now that water has been percolating through rocks on the surface of Mars in the comparatively recent past.** **So you know if you've got the fundamental ingredient of life, which is water, then you really should be thinking about of whether or not there is any evidence of life there."**

10:02:26	**<u>3. Our Fascination with Mars</u>** Fade out. (NASA, Malin Space Science Systems, Mars Global Surveyor's Mars Orbiter Camera images.)	<u>Voice over</u> **It's place of beauty, mystery and intrigue.** **It had the most extraordinary power to fuel our imagination.** **Its seasonal colour change and its channels sparked fantasies of alien civilisations….and they weren't very friendly.**
10:02:52	Original radio broadcast. Read by Orson Welles. Images of deep space, planets, Earth. The radio play with listeners. <u>Super:</u> H.G Wells: The War of the Worlds The voice of Orson Welles	<u>H.G. Wells: The War of the Worlds</u> **"Across an immense infernal gulf minds that are to our minds as are minds are to the beasts of the jungle, intellects, vast, cool and unsympathetic regarded this Earth with envious eyes…and surely they ruled their plans against us."**
10:03:25	Change in music. NASA Mariner and Viking images of the surface, and in growing distance of the planet <u>News flash</u> on NASA's claim	<u>Voice over</u> **But the Martians of H.G. Wells kept themselves well hidden!** **During the 60s and 70s we sent a series of probes, but all they revealed was a cold and barren world, ravaged by dust storms—not a single little green man in sight…** **For the next 20 years Mars was largely forgotten until suddenly science fact caught up with science fiction: Life on Mars!**
10:03:58	<u>Super:</u> NASA administrator	<u>Daniel Goldin at the Press Conference:</u> **"We think life might have existed at some point on Mars."**
10:04:06	<u>BAS/NASA footage</u> on ALH84001 (Animation and scientist looking at the microscopic images of rod-like features.) NASA animation	<u>Voice over</u> **Scientists investigating meteorites that had fallen in Antarctica came across a fascinating specimen…** **ALH84001- a rock from Mars.** **It had hurtled through space and lay undiscovered for 13,000 years. And what a story it had to tell!**
10:04:30		<u>Daniel Goldin at the Press Conference:</u> **"We may see the first evidence that life might have existed beyond the confines of the small planet, the third rock from the Sun."**
10:04:39	Grab from the scientist at the press conference <u>Super:</u> Exobiologist/NASA	**<u>David McKay</u>** **"We have a number of forms which are very attempting for us to interpret as Martian microfossils."**
10:04:50	Change of music. Detailed images of the rock, the carbonate globules, the minerals and the 'fossils'…	<u>Voice over</u> **The sensational claim, that a meteorite from Mars contained fossil evidence of life sparked renewed interest in the Red Planet.** **But the claim is still the subject of much debate- just what are we really looking at?**
10:05:06		

	Scientists working on meteorite in sterile chamber.	Colin Pillinger **"It is very very difficult to keep the samples pristine and uncontaminated…"**
10:05:11	Meteorite arriving to Earth (animation) Super: Planetary scientist, Open University	Ian Wright **"as soon as it arrives into the terrestrial environment through the atmosphere it begins to be contaminated. The same could happen if we go to Mars and we return samples to Earth. What we are hoping to do is by taking our laboratory to Mars we will avoid that step.**
10:05:30	**4. From the idea to realisation** Change in music Shorter Fade out. Lab shots in Orleans at CNRS, Andre Brack walking in the lab. The Loire with Orleans as backdrop.	Voice over **The Mars rock controversies helped to crystallise a new branch of science - exobiology - the search for extra terrestrial life.** **One of the leaders in the field is a French Professor Andre Brack. The Orleans based scientist urged the European Space Agency to go to Mars with a lander capable of searching for signs of alien life.**
10:06:01	Interview at the riverbank Super: Chairman of ESA exobiology science team	Andre Brack **"Mars is our first major objective to find life outside, beyond the Earth. We are going to look on Mars for this primitive life, which is hopefully, hopefully fossilised sediments near to the surface."**
10:06:20	Water-life-sediment-water	**Music bridge**
10:06:26	Animation from ESA ESA footage	Voice over **Every 17 years the orbit of the Red Planet brings it close enough to us to make getting there possible on a relatively modest budget.** **With the next conjunction due in 2003, and with some spare parts available from an ill-fated earlier spacecraft, ESA announced a mission called Mars Express…. an orbiting laboratory with room for some special cargo.**
10:06:54	Change in music . Colin Pillinger in an OU staff meeting. John Thatcher at MMS passing satellite assemble- suites, Jim Clemmet in elevator and passing Beagle 2 poster. Mark Sims arriving to Space Research Centre and discussing design with Shaun Whitehead. Ian Wright sitting down to his computer, looking at isotope graphs. Colin Pillinger rushing on the footbridge to the main building at Open University.	Voice over **It was the opportunity Colin Pillinger was waiting for. In 1997 he challenged the UK space science community to build a lander to be carried aboard Mars Express.** **A multidisciplinary team of planetary scientists and space engineers was assembled from all over Britain. Seven universities and a dozen major companies joined together to guide the project to success. For most it's the challenge of a lifetime… And when Professor Pillinger dubbed the project *Beagle 2* he hoped they might emulate one of the greatest scientific journeys of all time.**
10:07:53	Interview in lecture hall, Darwin's image projected in the	Colin Pillinger **"Charles Darwin travelled on the HMS Beagle in 1830's. It**

	background	**told a great deal about what we know about evolution on Earth.** **Because we are going to see whether or not evolution appeared on another planet it seemed a very obvious name for us."**
10:08:14	Animation: ME as it sails above Mars	Breathing space
10:08:16		Mark Sims "**In lots of people's mind, is like a pet dog…it needs looking after, it needs taking care of etc."**
10:08:24		Colin Pillinger **"We never intended to use the animal connection but when we take our model lander around and we put it on a trolley we sometimes says we take the dog out for a walk."**
10:08:40	Pan on model	Mark Sims sound track **"It's new technology to a lot of people, and it's new science to a lot of people…**
	Super: project manager, University of Leicester	Mark Sims **…It's a whole new approach really, an integrated approach, the whole team has to work as a team in order to deliver B2 on schedule."**
10:08:53	Interview. Space image in the background. Super: engineering manager Matra Marconi Space UK	Jim Clemmet "**Sometimes we rub each other in the wrong way, but we all move to the same direction."**
10:08:57	Interview in lecture hall. A slide of Colin and the Blur boys projected on the screen	Colin Pillinger **"I am just a lucky guy who happened to have a project that people want to be involved with."**
10:09:10	Change in music (Blur: Song 2) Fade out. Classic London sights: double deckers, black cabs, Virgin record store. Split screen. Blur boys in interview situation Footage from Anglia TV Beagle 2 animation: the touch down Blur: Beagle 2	Voice over **So Britain is going to Mars… and it's taking the nation's creative energy with it as well…from some unexpected quarters.** **The project has received some unexpected support from Brit band Blur.** **One-time schoolboy astronomers, Alex James and Dave Rowntree called up Colin Pillinger with an offer.** **They'll create the voice of the little Beagle. After successfully unfurling its solar panels, it will call home by sending out a Blur tune specially composed for the occasion…** **The sound track will be beamed back to Earth and will inform European Space Agency of the successful landing**.
10:09:48	Footage from Anglia TV with split screen images if the Universe (NASA, Hubble Space telescope)	Dave Rowntree **-"Something like this you know, which ultimately asking the question: 'Are we alone in the Universe?', it is probably the most important question in history."**

10:10:09	**5.The challenges in the design** Change in music . Fade out. Montage of Beagle 2 as a 3D-computer model.	Voice over **But it's the art of the *space engineer* that will get Beagle 2 successfully to Mars - and that means overcoming some exceptionally difficult design problems…**
10:10:18	Series of launches.	John Thatcher **"The biggest challenge is the mass and also the volume. We have to keep the size that goes on that rocket to the smallest possible to keep the cost down, but then you have to protect the equipment you are sending to space."**
10:10:32	Split screen NASA footage of the Sojouner… Lighter background projection. Mole (cross cut between the real model the computer model and the 3D animation)	Colin Pillinger "**We don't have enough mass to have a rolling vehicle like what was launched on Mars Pathfinder mission. They had 16 KGs for this little truck trotted around the surface.** **We came up with this ingenious idea, the thing that we call the mole, which is able to crawl across the surface and then get subsurface samples…** **The way in which the mole works it taps across the surface, it uses the contours of the boulder to change it's direction and it burrows underneath and that's the sort of place where we might find some surviving evidence of organisms that existed in the past, through their organic matter which has not been oxidised away."**
10:11:17	Split screen: ESA animation on searching for life	Mark Sims **"Looking for life is not a single test. It's a combination of tests. You have to look into the geo-chemical background, the geology of the planet."**
10:11:29	Background projection: Martian rock Beagle 2 animation Explains with his hand movements.	Colin Pillinger "**You want to characterise the rock**. **That means looking at it from its chemistry, using the Mossbauer spectrometer to get its mineralogy. Now all the instruments are something you want to bring up in a sequence to the rock. Now all these operations are dangerous. Something might stick, something might grab, and something might fall off or you won't get electrical contact. Put them together in one place, you minimised the risk."**
10:11:56	The paw montage.	Voice over **Beagle's moving laboratory has been dubbed the 'paw'. This can be manipulated to search for the most promising specimens that will be worthy of further investigation.**
10:12:04	Cross cut with close ups on computer screen	Shaun Whitehead "**The tools that we have particular are up here. We have the X-ray spectrometer. This is one of the first things that we use to look at rocks and we can get the chemistry of the rocks.** **We also have a microscope in which we can look in details into the rocks.** **Once we had take a basic look at the rock we need to get away with the weathering grind and to do this we have a grinder, then we could take a core sample, using a corer."**
10:12:37	Sojourner slide in the background	Colin Pillinger "**You need to go inside rocks. Now when Pathfinder went it made an elementary mistake, - they used a big deal of mass for this rover – but they made this elementary mistake of not appreciating that the outside of the rock**

		will be very weathered and eroded and the evidence of life doesn't survive well."
10:13:06	Change in music The sound of experimental machines Montage of a rather huge set of valves and wires. 3D computer animation	Voice-over **What makes Beagle 2 different from any other previous lander on Mars is that it can test directly for the presence of organic carbon - the very stuff of life. And it can tell if it's biological in origin…** **All of this in a tiny lander that weighs only a little more than a Beagle dog…**
10:13:32	Split screen NASA archive on Pathfinder touch down.	John Thatcher **"We are about the tenth of the size of the Pathfinder probe that went to Mars couple of years ago and yet proportionally we carry significantly more science in that very small mass and volume we've got."**
10:13:45		Jim Clemmet **"Its small, the model is a full scale model, and it's cramped full."**
	Pan on the model.	**Music bridge**
10:13:55		Mark Sims **" We don't have spare capacity for backup systems…"**
10:13:59		Jim Clemmet **"If we did put redundancy in then we wouldn't have a mission because we would be too heavy to fly."**
10:14:05		Mark Sims **"All the systems on B2 have to work for the mission to succeed. "**
10:14:09	Slide: Beagle2	Colin Pillinger **"B2 has to be perfect."**
10:14:15	**6.The flight** Change in music Fade out Mars Express leaving Earth. ESA animation. Beagle 2's voyage in space.	Voice over **Beagle 2 will be launched from Baikonour in Kazakhstan. It will take six long months to reach its destination.**
10:14:25	Split screen: Interview grab with animation. Beagle 2 as it separates from Mars Express	Colin Pillinger **"When we get to Mars a few days before Christmas 2003 there is a very dangerous manoeuvre when we have to separate the lander from the mother spacecraft which goes into orbit around the planet. And then of course we are the most vulnerable when we fly through the atmosphere…"**
10:14:41	Flying through the atmosphere	**Sound effect**
10:14:45		Jim Clemmet 16.23.44."**When we come to the surface of Mars, we'll be shrouded by airbags…"**

10:14:49	Airbags	**Sound effect**
10:14:54		Colin Pillinger **…"and the bags will be shed and the lander will be dropped on the floor…"**
10:14:57	The free fall	**Sound effect**
10:14:59		Jim Clemmet **…"only from a height of a meter in a Martian gravity which is only a little less than 40% of the gravity of the Earth. And you think that would not be severe…"**
	Close up and slow down of free fall	**Sound effect**
10:15:07		Colin Pillinger **…"but still it is a dangerous manoeuvre, because it is just like at home putting your computer off the edge of the table and hitting the floor on the side…"**
10:15:22	Beagle 2 in stationary position on the surface of Mars.	Jim Clemmet **…" and still expecting to work perfectly. And that's what we are doing."**
	Beagle2 in the distance, send off the signal of its safe landing and starts to open up.	**Music bridge**
10:15:27	B2 on the surface of Mars	Jim Clemmet sound track **"Having to come to a stationary situation automatically…**
10:15:30	Cross cut with close up of the lander as Jim opens up its solar panels	Jim Clemmet **"…the computer system inside will set off sequences of events in motion, first of all opening the lid of the lander and followed immediately by the deployment of 3 solar panels."**
10:15:44	Change in music B2 animation. Pan on Martian surface	Voice over **Beagle will then recharge its batteries, and deploy a wide-angle camera and sensors to have a good look around the landing site.**

10:15:57	**7. An Earth-like planet.** Change in music Mariners approaching Mars. Photos of Viking in split screen. Viking photos of snow on Mars. Summer on Mars. Mars Observer Camera's recent pictures of the Earth like features of the Martian surface. Earth from low orbit. Geo-morphological evidence of water on the surface of Mars.	Voice over **Over the centuries, we've come to understand quite a bit about our closest planetary neighbour…** **And we've discovered it's not as alien as we thought…** **It snows on Mars during the winter and on a Martian summer day the temperature can be a pleasant 15 degrees Celsius.** **But it's also a place of violent dust storms, and shifting sand dunes.** **Still, we know places on Earth not unlike this…and in the past it may have been even more like our own world than we first imagined.** **There are signs of a warmer and wetter past.**
10:16:37	Super: geologist Natural History Museum, London Split screen: relevant Viking and MOC images	John Bridges "**There is growing evidence taken by MOC and also from the older Viking images for channel networks on Mars showing the movement of liquid water. There are two types of channels, the large out wash channels associated with catastrophic floods and small so called run-off channels and these are thought to be caused by flow of groundwater creating these little dendrite networks.** **It's possible that there was a large ocean at a very early stage."**
10:17:13	Change in music. Life montage	Voice over **And if there was water and even oceans, scientists now must seriously consider the Big Questions: could life have evolved there? Could life still be there? And, most astounding of all, did life here on Earth possibly originate on Mars!?**
10:17:36	Spit screen with small Mars on the other screen	Andre Brack **"Mars cooled down earlier than the Earth and it was habitable earlier than the Earth**."
10:17:42	Split screen with Earth on the other screen	Mark Sims **"Both could have been the abodes of life or even the origin of life."**
10:17:47		Andre Brack **"It is not impossible that life started earlier on Mars and that some part of that life was ejected from Mars in a meteorite and transported to Earth."**
10:17:59		Mark Sims **"In reality we could all be Martians.**
10:18:05	**8.Life in extremes** Change in music. Fade out. Life montage.	Voice over **In 1976, when Viking went to Mars, we thought that life was a frail thing. Now we know all it needs are nutrients and liquid water.** **On Earth we have found life flourishing in searing heat and shattering cold, bright light and pitch darkness.**
10:18:24	Images of different micro-organisms	Ian Wright **"We have learnt a tremendous amount about life on Earth in the last 10 years, about the variety of life forms and the places that they can survive and really certainly on Earth**

		in the few ten kilometres of the surface there is practically nowhere that you can't find life."
10:18:51	**9. Mars on Earth.** Music change Fade out. Ariel shots of Antarctica. Landscape. Ice thawing. Rocks. Dry Valleys. Scientist appears behind the rock, collecting samples…	Voice over **With all its water frozen, Antarctica is as dry as any desert. In places like this, it hasn't rained for millions of years.** **Wind blasted rocks, blinding UV radiation.** **It is the nearest we can find on Earth to the surface of Mars.** **Although it appears completely barren, in reality it is teeming with life.** **It is the ideal laboratory for British exobiologist David Wynn-Williams, who studies the limits of survival.**
10:19:44	David Wynn-Williams on its way to the BAS base, enters the base. Melting glaciers in split screen with cyano bacteria images.	David Wynn-Williams voice track **"Cyano bacteria used to be called blue-green algae. This sort of cyano bacteria can grow in places where other organisms can't. As the glaciers melt they provide plenty of surface water and cyano bacteria grow in really dense mats on the surface."**
10:20:00	Interview in his lab in Cambridge, Showing photo of cyano bacteria Close up cyano bacteria	David Wynn-Williams **"They can also grow on the surface of soil like in this little soil core here.** **We can show how they desiccate, how they dehydrate completely and then they come back to life again. We can show how they can live at –28 degrees, they can survive that temperature quite easily, they can even grow at that temperature.** **They are the microbes that live at the limits which is why they are so important for this life at the limits research.** **This is why Antarctica is an interface between the Earth and Mars.**"
10:20:30	Change in music Mars surface, sound of waves, dissolve seascape into the surface, Lake Vanda ESA animation Rocks on Antarctica	Voice over **3.5 billion years ago there were probably oceans and rivers on Mars and that's when evolution could have started.** **Then gradually as the planet cooled, the water started to retreat...** **First to ice-covered lakes - like this one in Antarctica - and later into the rocks below the surface.** ***On Earth* life survives within rocks even in the most barren desert.**
10:21:00	Interview and demonstration. Close ups of the layered micro-organisms inside the rock sample.	David Wynn-Williams **"I've got a sample of the rock here, these are actually layers inside the rock itself. The surface of the rock is rust coloured, nothing on it at all, it's been sun blasted, dehydrated, but inside the rock this is the sort of impression you get. There is a black layer of lichens, a white layer of fungi and a green one of algae.** **So this is the sort of thing we might find on Mars in the final stage of water but after that it is just a desert."**

10:21:31	**10.Where to land?** Music John Bridges and Colin Pillinger talks	Voice over **However the evidence of *past life* on Mars could still be there just beneath the oxidised surface.** **But with an entire planet to choose from how do you choose the best landing site?**
10:21:45		John Bridges **"Chrysie is interesting because it's got hundreds of millions of years history of flood deposition which would be interesting from the exobiology point of view."**
10:21:54	John Bridges and Colin Pillinger talking off camera	Voice over **John Bridges has narrowed the search down to two possible sites. He had to compromise between safe landing and finding the best samples.**
10:22:03		Colin Pillinger **"Our back up site is not without a problem. I think it got some of these features called 'mesas' on Earth."**
10:22:11		John Bridges **"That's right. Tratinus Lacus is covered by 1% of these table-like ''mesas'. This one for instance is 360 metres high and the slopes are rather dangerous."**
10:22:22		Colin Pillinger **"You wouldn't like to land on that.."**
10:22:24		John Bridges **"No. It's got to be a bit of compromise between the engineering constrains and the and the ideal scientific terrain…But I think there is plenty of potential to land in an area which is suitable for the sort of experiment we want to do."**
10:22:43	**11. Life on Mars** Music. Fade out. NASA archive on Viking experiments.	Voice over **But even if they land successfully, the search for life may still throw up some totally unexpected surprises…what will life on other planets really be like?**
10:22:54	Montage of sci-fi B roll.	
10:23:07		Colin Pillinger "**We are not making any assumption of what life on Mars might be like we are only assuming it is using carbon…"**
10:23:15	Split screen with 'alien life on Mars'	Mark Sims **"The problem comes if life is sufficiently different, if it is not carbon-based, if it is based on some exotic chemistry. There is a chance that you might even not recognise life. You might go there you might with unmanned or manned project, and you walk right pass the life form and never know it's there. The Universe is full of possibilities."**
10:23:40	Music.	Voice over

	Montage	**But what ever form life comes in, evidence that it exists beyond our planet will profoundly influence our own lives. It may help us explain our own origins.**
10:23:55	**12. Why does it matter?** Interplanetary clouds and dust.	Colin Pillinger **"What we still don't know is what triggered the transfer between organic matter and living organic matter."**
10:24:05		Ian Wright **"Now just maybe, Mars actually did see an equivalent beginning of life and that record could still be retained there."**
10:24:17		Jim Clemmet **"If you find it in the neighbouring planet and you'll recognise it…it will look different form us, it won't be like H.G. Wells WW or anything like that, but to have it so close it has to stretch the theories of evolution."**
10:24:39		Andre Brack **"Finding life on Mars would be a good indication that life on Earth started with simple molecules because it is repeatable, it repeated on Mars as well, so this means that life is probably everywhere……. life is possibly universal. This way we give an answer to a very old question: 'Are we alone in the Universe?'."**
10:24:58	Change in music. Universe images	Voice over **Big issues to be solved by a little Beagle… but onlyabout half of the probes we have sent to Mars have made it successfully, so Beagle will need luck as well as science. Sooner or later though, these are questions we will need to answer.**
10:25:24	**13. Credit roll*** Ending music.	Mark Sims **"You could worry yourself sick about what could happen to B2."**
10:25:29		Jim Clemmet **"Our fingers have been crossed since day one and won't be uncrossed until 180 Martian days after we landed."**
10:25:37		Colin Pillinger "**We have to stand on that launch pad and believe that we've done a good job."**