DigitalArtLIVE.com

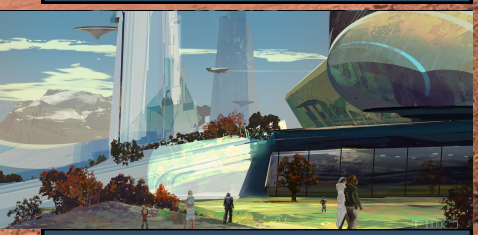
SCIENCE FICTION ARTIST IN-DEPTH INTERVIEWS

Digital Art LIVE

'OUR FUTURE FRONTIER' ISSUE

THE MARS SOCIETY

LUDOVIC CELLE

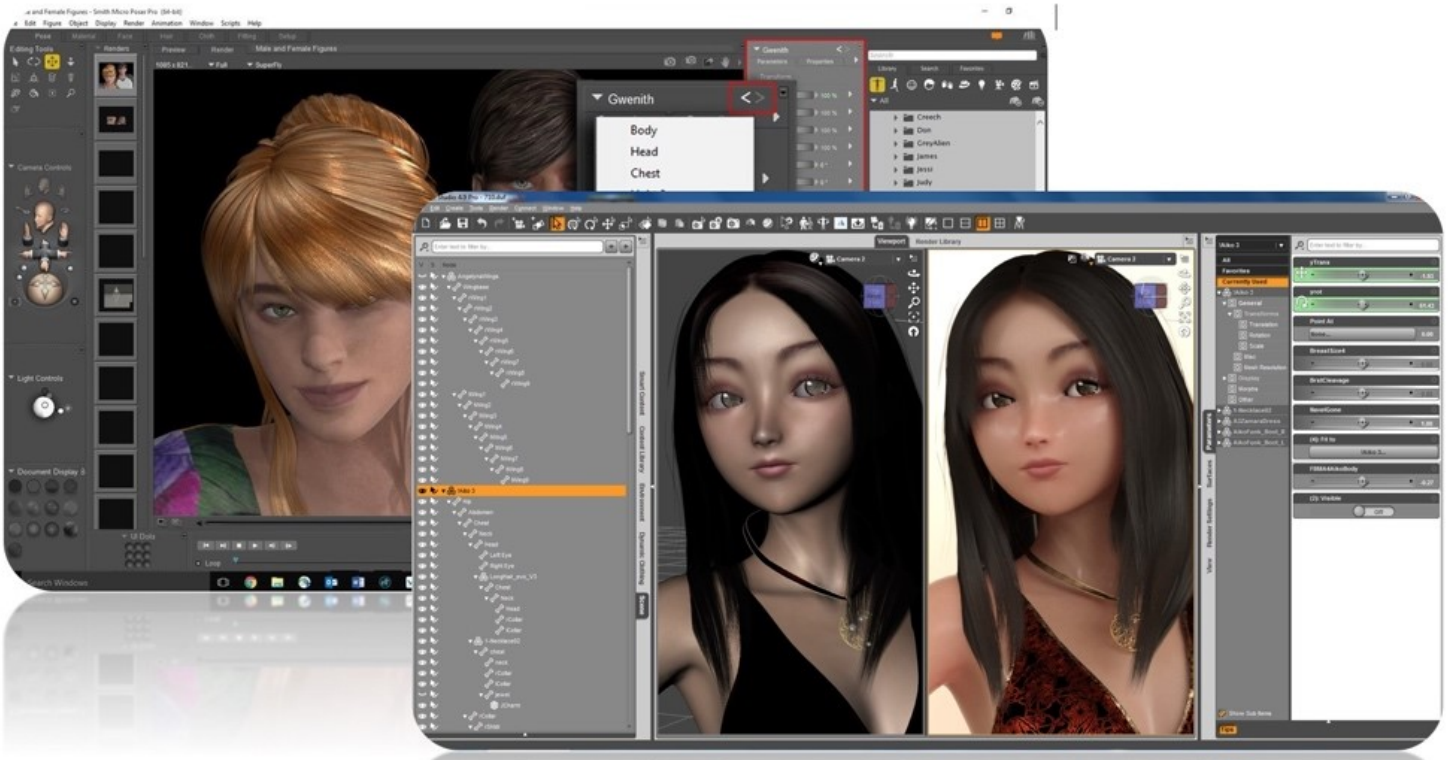


THREE GALLERIES!

ISSUE EIGHT
MAY 2016

VUE • TERRAGEN • POSER • DAZ STUDIO • REAL-TIME 3D • 2D DIGITAL PAINTING • 2D/3D COMBINATIONS

DAZ Studio Foundations and Essentials Course



Saturday 15—Sunday 16th May

20:00 BST/12:00 PDT/15:00 EDT

These two webinars give you a thorough grounding and essential key knowledge to help you become accustomed to the workspace and tools of DAZ Studio.
These two sessions are also particularly for you if you have started to explore DAZ Studio and want to get things right from the beginning. Get into good habits and set things up right now to save pain later down the line. Learn where important time saving functions are and learn an easier workflow from a presenter who's had eight years of experience with creating content in DAZ Studio.

In this two part course you'll receive over three hours of live interactive instruction.

Presented by Esha

Session 1 (Saturday 14th May)

Date and time : Saturday 14th 20:00 BST London

12:00 PDT Los Angeles
15:00 EDT New York

Installation
- Software installation & content installation
- Manual installation vs. DIM installation vs. Smart Connect
- File Structure

Customizing the workspace

- Changing UI layout & style
- Managing libraries
- Custom keyboard shortcuts

Setting up a scene

- Finding & loading content
- Selection methods
- Fitting conformers, parenting props
- Moving, scaling & rotating objects
- Creating groupings

Using the camera

- Navigating the scene
- Normal cameras vs. perspective camera
- Important camera settings
- Pointing eyes to the camera

Posing and morphing the figure

- Applying presets & useful tricks
  - Manual posing & morphing
  - Using pose controls

Session 2 (Sunday 15th May)

Date and time : Sunday 15th May 20:00 BST London

12:00 PDT Los Angeles
15:00 EDT New York

Tweaking content inside DS

- Deformers
- Push modifiers
- SubD
- Geometry editor tool

Setting up lights

- For 3Delight
- For Iray
- Working with shadow cameras

Shaders

- 3Delight shaders
- Iray shader
- Using the Surface Tab
- Difference between shaders & materials

Rendering

- Iray
- 3Delight
- Quality vs. render time

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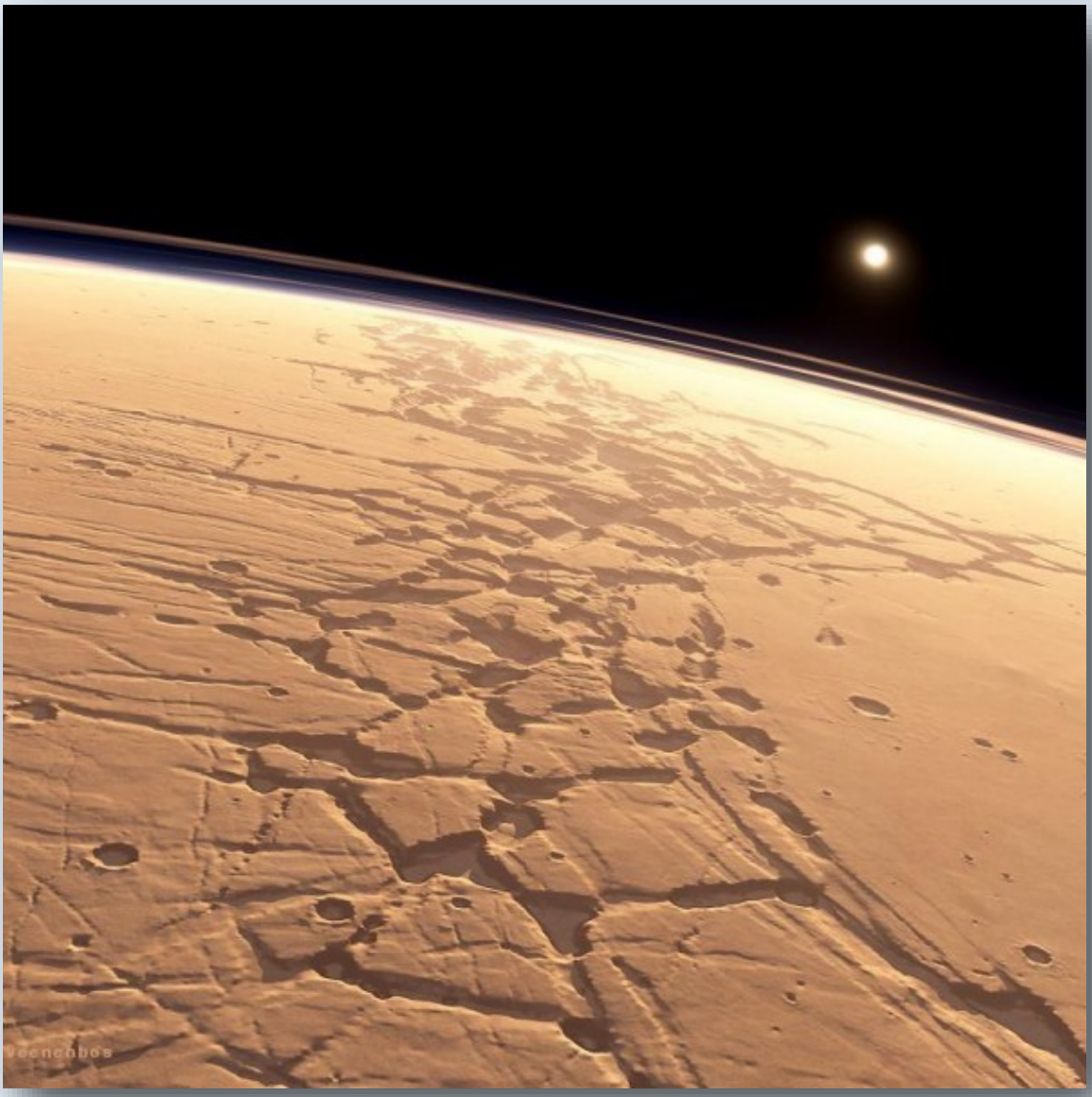
The Spirit of Mars



This webinar recording examines some excellent examples of digital art depicting the Red Planet. You'll learn how they created some incredible vistas that are almost indistinguishable from the many real photographic references that we are now lucky to have.

1.5 hour presentation includes:-

- History and facts about Mars
- Stunning illustrations of Mars vistas by Kees Veenenbos (created with Terragen)
- Creating a Mars base illustration with Christian Hecker(using Vue)
- Illustrations from the Russian artist Alex Niko (Mojoworld)
- Techniques artists have used in creating these scenes

30% Off!

Having problems viewing this magazine in two-page spreads? Here's our handy guide on how to set up your desktop PDF viewer:

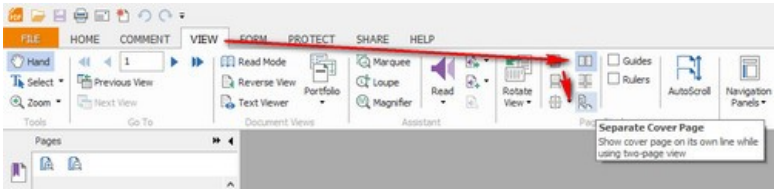
For users of Adobe Acrobat Reader:

1. Open Adobe Acrobat Reader. In the top menus, select VIEW and PAGE DISPLAY
2. Make sure that the option for a TWO PAGE VIEW is ticked.
3. Make sure the option to SHOW COVER PAGE IN TWO PAGE VIEW is ticked.

That's it!

For users of the popular Foxit Reader PDF Viewer:

1. In the HOME tab select FIT PAGE.
2. Then select the VIEW tab.
3. Then highlight FACING PAGE and SEPARATE COVER.



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Fan art is an incredibly useful tool for channelling inspiration and motivation into a real project that can get your work **noticed**. After all, the most useful inspiration is that which is acted upon, rather then left in the back of our minds.
Creating fan art can generate understanding of design and techniques during the process, which may not have otherwise been learned.

In this 1.5 hour webinar session, **John Haverkamp** provided live sculpting of the character Tywin Lannister from the HBO TV Game of Thrones!

From this recorded session you'll learn:-

- The importance of strong proportional and anatomy knowledge so the photo reference doesn't mislead.
- "Reading" the reference correctly to get essential particulars of the features; starting from broad to narrow.
- Using a reference to inform details like wrinkles and skin pores.
- The sculpt technique with the paintover process
- Adding and Subtracting: standard brush, clay build-up brush and dam standard brush.
- Smoothing and trimming: smooth brush, trim dynamic brush and trim curve brush
- Use of the move brush, move topological brush and snake hook brush.

Front Cover: "Girl Pioneers of the Mars Frontier base Orion — in Martian terraforming year 036". Composite concept illustration made with Photoshop. With thanks for source pictures to Wikimedia, NASA and Moyan Brenn.

'OUR FUTURE FRONTIER' ISSUE

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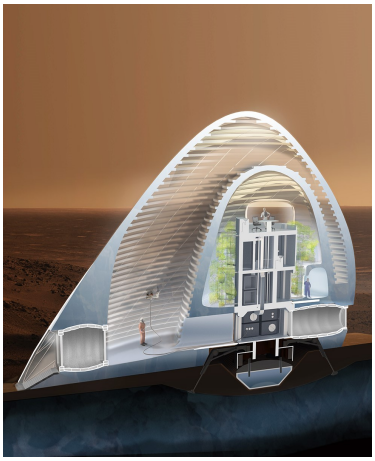

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Credits for backgrounds, from top left: **Ludovic Celle**, "Mars Dome SAS and Rover"; **Dave Haden**, detail from "Dome, Sweet Dome"; **Xistence Imaginations,** detail from "Terra Forming".

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EDITOR'S LETTER

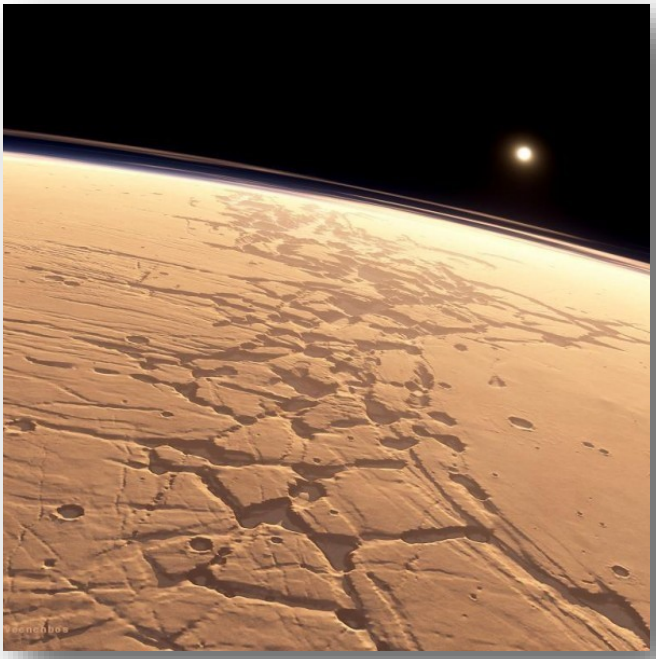
WELCOME...

"What is one of the most boldest human endeavours of our time? It is the exploration and settlement of Mars. What an audacious thought, but as the **Mars Society** mentions as part of their tagline "We're ready".

And we are. There are some large technical hurdles to overcome, but the likelihood of these being solved in our lifetimes are relatively high. The largest challenges as Nicole Willett, education director for the Mars Society mentioned in her interview with Digital Art Live are gravity, radiation and the psychological aspect of getting the right crew of people together that can work as a team.

Excitingly the goal of getting humans to Mars could be closer than we think, if the will was there. "We are much closer today to being able to send humans to Mars than we were to being able to send men to the Moon in 1961, and we were there eight years later. Given the will, we could have humans on Mars within a decade." (Dr. Robert Zubrin, Mars Society President).

One of my all time favourite digital artists that has depicted Mars in such a realistic way is Kees Veenenbos, who uses Terragen to render images that not only show Mars as it is now, but Mars how it may have looked (with water) and projects Mars into the future as a terraformed world. See his incredible work at SpaceForCase.com



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MARS SOCIETY

Science-fiction is becoming science-fact on a daily basis, and even a Mars frontier could open up sooner than we may think. *Digital Art LIVE* talks life on Mars with **Nicolle Willett** of The Mars Society — which already has Mars-like research stations in the Utah desert and the Arctic.

NICOLE WILLETT

USA

EDUCATION DIRECTOR | THE MARS SOCIETY

WEB

ABOUT NICOLE WILLETT:

Nicole has served as Education Director for The Mars Society since September 2012, working to reach the public with the vision of human Mars exploration and colonisation. Nicole is an Astronomy and Environmental Science teacher at Benedictine Military School in the USA. She received her degree in Biology, with a concentration in Astronomy and Astrobiology, and has done volunteer work with Dr. James Nienow in collaboration with Dr. Chris McKay, NASA Ames, on micro-meteorology of hypoliths ('extremophiles').

Picture: “Spacer”, by Adrian Mark Gillespie.

DAL: Welcome Nicole. You’re the Education Director of The Mars Society. It's great to have you here.

Nicole: Thank you very much for having me. It's my pleasure.

DAL: What first gained your interest in space science, and developed your passion in it?

Nicole: I was very curious as a child, and I explored outdoors a lot. I love being outside in nature — looking at the stars, playing with frogs, things like that. I read a lot. I was an avid reader and I still am to this day. I just can't seem to get enough information in my brain.

DAL: Did you read any specific titles?

Nicole: Well, my father always got the *National Geographic* magazine. I have the December 1988 issue still with me, and it had a story in it called "Mission to Mars." That was the first time that I had ever heard of anything that crazy and exciting and inspiring. Then, a couple of years after that, I discovered Dr. Zubrin's Mars Direct Program that he pitched to NASA several years ago. I've been studying astronomy just about constantly ever since then, and I'm a full-time educator and I recently applied for my university Masters degree programme. So I'm very excited about that.

DAL: Congratulations. Where is that Masters degree going to be taken?

Nicole: At the Swinburne Institute of Technology, in Australia.

DAL: Oh, great. It's good for star-gazing down there too, if you ever get down there.

Nicole: Yes, hopefully.

DAL: Now you mentioned that your passion for science has led you to many amazing experiences in your life. What's one you'd like to share, from amongst those?

Nicole: Going to The Mars Society conventions and participating and meeting with all of the scientists from NASA and entrepreneurs, businessmen who all have the same goal to get people to Mars… and hopefully to other solar systems. That's the most exciting thing for me. When people geek out about meeting Hollywood stars, that doesn't faze me in the least. Meeting scientists excites me.

DAL: So the type of discussions you had at that conference must have really fired you up, and must have increased your excitement even more and given you a lot of energy in going forward, I imagine?

Nicole: It really makes my passion for science come into much more clear focus when I'm talking to like-minded people who have the same goal. When you're just in daily life and you're grocery shopping and taking the kids here, and there and going to work, it's not as... you don't think about it in the same way as when you're in a room full of people with the same ideas and goals. That's when the passion really ignites for me.

Picture: the Mars Society's Desert Research Station (MDRS) in Utah, in its original configuration. From left to right: the astronomical observatory; the former Greenhab (now replaced); and the main living and storage Habitat.

DAL: I imagine you get some opportunity to speak to youth in the same vein as well. And that must be wonderful because they're open minded and they're ready to engage with you and use their imaginations to talk about a mission to Mars or habitats on Mars. Do you get those kind of experiences and opportunities quite often to speak to the youth?

Nicole: Very often. Every day, I'm a full-time educator. I also do Skype sessions, WebEx's. I do sessions where I talk to youth all over the world with various different technology. That is the most exciting part, to me. Many times, I have found kids that are 'left behind', who nobody has any hope for, are the ones I reach the most. Because they are so curious and they love learning, but nobody notices that they love learning. And they're the ones whose passion gets ignited, the most.

DAL: So it's good that that type of conversation, that type of discussion can reach down to those type of children that maybe perhaps put aside because maybe they're not interested in other subjects or the concept of it is just so huge and so wide, and so deep that they lap it up. They just want to explore it.

Nicole: Yes. They're mis-labelled by adults, often, and they're the ones I try to reach. They're the ones that get reached the most — wonderful, wonderful.

DAL: What is The Mars Society, and when was it formed?

Nicole: Okay. So… The Mars Society is a humans-to-Mars advocacy group. We don't build any rockets. The Society's main goal is to educate the public and to bring people together around the goal of reaching Mars.

To do this we get like-minded scientists and entrepreneurs together to discuss the best way to get to Mars, and to hopefully get people to collaborate on projects. People have started a lot of Mars projects, but the collaboration is our goal. Get everybody together, share ideas, and let's *get to Mars*. Let's stop having everybody have their own opinion and not cooperate and instead just get together and collaborate, and we'll get there. We can do it.

DAL: The Mars Society, part of its mission is to provide... just focus to try and unify some of these ideas, to streamline them perhaps?

Nicole: Yes.

DAL: So that's a really important mission. And illustrations can help to inspire passion for projects to do with Mars and exploring the solar system. Having an illustration, having a concept image can help people, can help draw people together and unify them and say, "Yeah, *this* is what we're going to be doing." Have such concept illustrations played that part with the society and have you seen that happen, help to bring people together in that way?

Nicole: Yes. We have several different things The Mars Society does. One of them is the Mars as a research station and that's in the desert in Southern Utah. We have concept designs for the habs [habitat modules] and we have layouts showing how they're designed inside. They're 16 foot diameter habitats that are two stories high, where people have to live — and that simulates what the actual habs will be like on Mars.

The missions to these research stations do two-week rotations there — and inside it's all based on this graphic that was designed years ago and they've been doing this ever since. But it's very

Picture: The Mars Society's Desert Research Station (MDRS) in Utah in its 2016 layout. From left to right, the main two-story living and storage Habitat, a line of rovers, the astronomical observatory, the new temporary Greenhab (a geodesic dome). Lines of posts have been sunk between each of these habs, which will in time become covered walkways.

specific to the way you have to live and work with six people in that small area. The design works wonderfully. It's been tweaked here and there, but it is very important. You can't just throw up a hab and just put six people in it. You have to have the design and the schematics. So that's one example of a design.

DAL: The emphasis by The Mars Society is on viable human exploration of Mars. What benefits are there for human exploration, when we could do robotic exploration?

Nicole: Well the robots have been wonderful and they've made a lot of discoveries. The United States has been very successful, compared to other countries. We've been very successful at landing them. Curiosity has been there since 2012 and it's climbing Mount Sharp and Gill Crater and still doing a wonderful job, taking beautiful and useful pictures.

The Opportunity rover has been working for over 12 years, instead of its 90-day original mission, and is still doing science. But what a rover does in a week, a human can do in a few seconds. So in twelve years that the Opportunity rover has been working, a trained astronaut could have done that work in a week or two. People can think critically and make decisions and we're more agile. If we fall down a mountain, it's not going to cost $2 billion. We might break our leg, but we'll recover in a couple of weeks. Humans have the dexterity of the fingers and like I said, you just need the human brain power to make the decisions.

DAL: Yes. So things can be done faster, more efficiently, and essentially, there's other aspects as well or other advantages that humans getting to Mars and doing human exploration as well which we'll talk about later.

Picture: The Mars Society's remote and cold Flashline Mars Arctic Research Station (FMARS) in the Arctic region of Canada, seen in its initial phase in 2013. The Arctic station should, in time, start to develop in a similar way to the station in Utah, when the Society's funds permit.

Another question that came to mind — is it easier to colonize the moon rather than Mars?

Nicole: Well that question is relative, and it depends on who you ask. A moon-colonizing scientist is going to say, "Colonize the moon, it's closer." A Mars scientist is going to say, "Colonize Mars."

The moon is closer — which has its advantages — but the moon does not have even close to the natural resources that Mars has. Mars has a day/night cycle and very similar to the earth. It has a seasonal cycle. The axial tilt is the same, just about. It has an atmosphere, we can't breathe it yet but in time we can terraform Mars and make it more Earth-like. It has tons of water in the soil.

There are so many advantages, in my opinion, of going to Mars — because you can warm it up a little bit and then the water is going to start trickling across the surface more, more so than the little bit we think we see now.

DAL: In essence, there's more of a long term future, because of the expansiveness, for colonizing Mars than the moon. Because with the moon, you've got certain resources that are just plain missing from there. Whereas on Mars, you've got all the resources that you'd need for self-sustainability?

Nicole: Yes. Yes. There's geothermal activity there. There's wind, plenty of wind for wind turbines. Solar power, you can still have solar power on the same day and night cycle as earth does. The resources, the mineral resources, the soil is conducive to growing certain type of crops right now. So yes, many more resources for self -sustainability, yes.

DAL: What would you say are the two most significant barriers that are being worked on now, I imagine, for getting humans to Mars?

Nicole: I would say gravity on a six-month space trip. Gravity and radiation for the physical aspect and psychological aspect of getting the right crew of people together that can work as a team without any major blowups or difficulty emotionally. In-fighting could be an issue, if you don't pick the right team.

DAL: Hopefully the type of missions you've been performing in your Mars Society research stations that you mentioned, they will be testing the human aspect you've just talked about. Hopefully you haven't had too much in-fighting during those test missions!

Nicole: Well, we would have to talk to Shannon Rupert about that. She is the one that's on site *all the time* with the missions, so she would be the one. But I have honestly never heard of any problems in that regard. They're two-week missions and usually the people who apply are *very* serious about doing it and go there to get

Pictures: Library of Congress, NASA, Mars Society.

the job done. Even if they do have a little emotional issue, they see 'the light at the end of the tunnel'. They know they're not stuck there for five years or whatever, or they know it's just a short period. So that also will go into play psychologically, for most people. Is it going to be 'two weeks and I'm out of here' or 'is this going to be five years?' You really have to have the right type of person, just like any astronaut. So, not just anybody could be an astronaut.

DAL: Now the new '160 Mission' that's just been announced, what's hoped to be achieved with that. That's a lot longer than two weeks.

Nicole: It's going to be two 12-week missions. One will take place in the Artic, in Northern Canada, in the summer of 2017. Then the same team will do another one in the desert in Utah in the autumn. That's in our Mars Desert Research Station. It's easier to get supplies to and from the Mars Desert Research Station in Utah… because it's in Utah. But when you are up at the FMARS, the Flashline Mars Arctic Research Station in Northern Canada, it's the Arctic and is very far from civilization. So that is going to really test people's self-discipline and ability to work through problems quickly to be able to work through any issue that we might foresee happening on Mars when we're far away from humans on earth because you have to be able to figure things out. You can't just put five valedictorians [the highest ranking student in a final-year graduating class] in a hab and think 'everything is going to be fabulous'. You have to have people that can think critically, work together as a team, and make decisions very quickly to save lives.

DAL: Why is this experiment done in tandem at two locations? Is it a 'compare and contrast' type thing going on?

Nicole: '160' will have the same crew, both times. So we have the two missions to compare and contrast the difficulties from the High Artic versus Utah — because they're two completely different environments.

DAL: Okay. I was going to mention about The Mars Society declaration and there's all kinds of reasons in there about going to Mars — but two of them I wanted to emphasise. One was essentially 'we must go for the challenge' and the second one was 'we must go for the youths'. So let's talk about 'we must go for the challenge' first. Why is that an important aspect of going to Mars?

Nicole: I have heard Dr. Robert Zubrin, the president of The Mars Society say many times, "If you're not challenged, you're dead." Humanity — we have the innate want and need to *explore*, to *learn*, to stretch our imaginations. And if we meet this challenge, then we will be able to meet many other challenges.

One of those challenges is going to another solar system. So I have a website with all my Mars blogs on it, the education website and I always say, "Humans to Mars, as a bridge to the stars." Because Mars is maybe a fix for us over the next hundred or 200 years, but eventually we will have to also inhabit planets in other solar systems. So if we learn how to live on Mars, if we accept and greet that challenge, we will have the ability and the confidence to go to another solar system and maybe inhabit another planet inhabitable zone there. So 'going for the challenge' is important for human nature.

DAL: The second, 'we must go for the youth'?

Nicole: That's very much like 'going for the challenge'. It is our obligation as adults to show children that don't just sit on your phone all day. There's more to life than Instagram and Twitter. We have things that we can do, that can be done greatly. We need to inspire these children to want to make our world a better place on earth and to want to seek challenges, to seek long-term goals. If we're just sitting around saying, "Oh, so what, the earth is going to blow up or overheat or whatever..." the kids are going to be like, "Okay, we'll just sit here and eat Doritos..." We have to lead by example for the youth.

DAL: It's important to have a challenge that's multigenerational — even though it seems long and 'impossible'. So you're talking about having the challenge of Mars as a stepping-stone challenge to perhaps go into our closest stars. And I think if society in general thought about things in a multigenerational long term way, it would solve so many problems. Unfortunately, our attention span is becoming shorter and shorter like you say with things like Twitter and Facebook. We get so easily distracted — but if governments and if individuals could look to the longer term and look beyond that problem of being so distracted, what would you say are the top two achievements of the society since it's been started?

Nicole: We have created and managed the first two Mars surface-mission analogue simulation programs, in Utah and Arctic Canada. The one in Utah has been running for years. The one in Canada has been run before and is going to be running again next year.

DAL: Yes, our readers can see the photos of those sites, alongside the interview.

Nicole: These sites help us plan for future human missions to Mars. They help us train future crew members for the mission to Mars. The second thing is that we help publicise — among the general public and in the media — the importance of 'humans to Mars'. Like you said, this will be multigenerational. It's not just about today. It's about our future humanity.

So we do this through news articles, blogs, news videos. We've had people go to our Mars Desert Research Stations several times. It's used all the time on TV in little clips, and you'll see the potential Mars astronauts on earth. Utah is easy for the media to get to, so that's used a lot. Anytime you see that on the Discovery Channel or anything, those are our people.

DAL: And you have many chapters across the world. Members can also attend your annual convention?

Nicole: We have our annual convention every year. This year, we're going to Washington D.C. and last year, we were also in Washington DC and we decided to go back because it's right before our U.S. election — which I'm sure you've heard news about.

We are going to try to get some last-minute inspiration to some of the members of the U.S.Congress — so they will realize how important STEM [Science, technology, engineering, medicine] education is and 'humans to Mars' missions. And hopefully, get some funding to NASA — because their mission budgets get slashed a lot — and make some decisions with Congress.

Hopefully, we can influence them *a little bit* to make the decisions to move this plan forward and let them know how important this is for our future.

We also have lots of social media. We have The Mars Society on Facebook. We have several chapters all over the world, many chapters, as you said. On Twitter, it's @themarssociety. We have tons of social media, conventions, news, videos, articles. The public outreach is the second most important.

DAL: Because we have a number of illustrators and artists reading, and I know in the past you've had poster contests to help promote The Mars Society Convention, can I ask — are you planning to have that type of contest again?

Nicole: We did. We did just have that, and now we have our winner. Our winner well… has been informed but I can't announce it here. But yes, we do have a first, second, and third place winner. Actually I spoke to one of the contestants earlier today and he said he used Adobe Photoshop. He took several different images and overlaid them in layers, and changed the blending and colours, added different text to say, "The Mars Society Convention" etc. — and then he said he put a Photoshop filter over the top of the flattened picture, to blend all images together.

DAL: Sounds good. Here's a curveball question for you. If you just had one more week on earth — because in a week's time, you'd be going to Mars — and you had one last public message that you could leave us all, what would you say?

Nicole: How long can the message be?

DAL: I'll give you five minutes or less.

Nicole: Okay. I can do it in that, plenty of time. My message would be number one, 'be kind to each other, to everyone'. I would also say 'always do your best and try to do even more than your best'. Always try to follow your passion, no matter what it takes. Follow your passion in some way, as long as you're not harming anybody. And move humanity forward. So that's what I would say.

DAL: Fantastic. That sounds like a great message. I hope your kids will take that up as well and that they would say, "Yes, Mummy, I'll do all of those things."

Nicole: Me too.

DAL: How can listeners actively help The Mars Society? Is there something they can join in on or support?

Nicole: Listeners can become a member of The Mars Society just by clicking 'membership' on our main website. They can support by attending or helping promote the convention in Washington D.C., which will be 22nd – 26th September 2016. You can always make donations. There's a 'donate' button on the main website, and if you have any questions about Mars in general as the education director, please feel free to email me at: NicoleW _at_ marssociety.org.

DAL: Nicole, thank you for your time today. It's been great to talk to you. Thank you very much.

Nicole: Thank you very much.

http://www.marssociety.org/

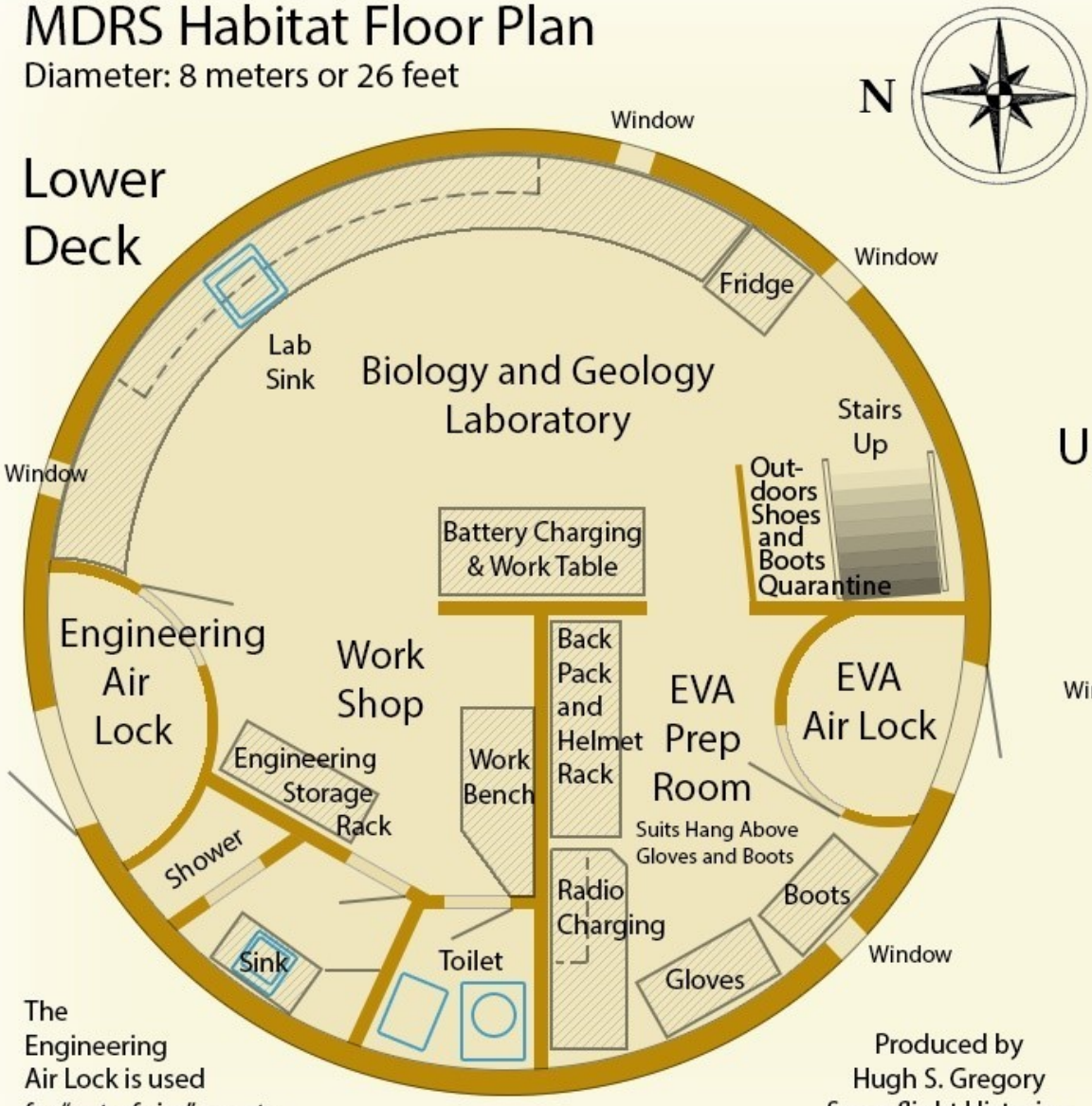
Facebook: The Mars Society page.

Twitter: @themarssociety

We can't do more here than sketch the bare outline of The Mars Society's many activities. But for those interested there is a wealth of news, mission reports and other content online. The **Mars Society annual conference** is coming up soon in Washington. If you can't attend or view it online, then there is a wealth of Mars information on the website, including free back issues of *The Mars Quarterly* to 2013. Mars Society members presumably also get access to the most recent issues.

MDRS Habitat Floor Plan

Diameter: 8 meters or 26 feet

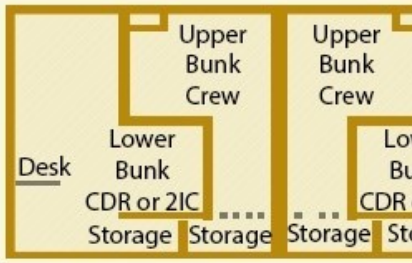


The Engineering Air Lock is used for "out of sim" events such as refuelingsGenerators or ATVs.

Produced by
Hugh S. Gregory
Spaceflight Historian
MDRS Document Editor

Upper Deck Sleeping Are

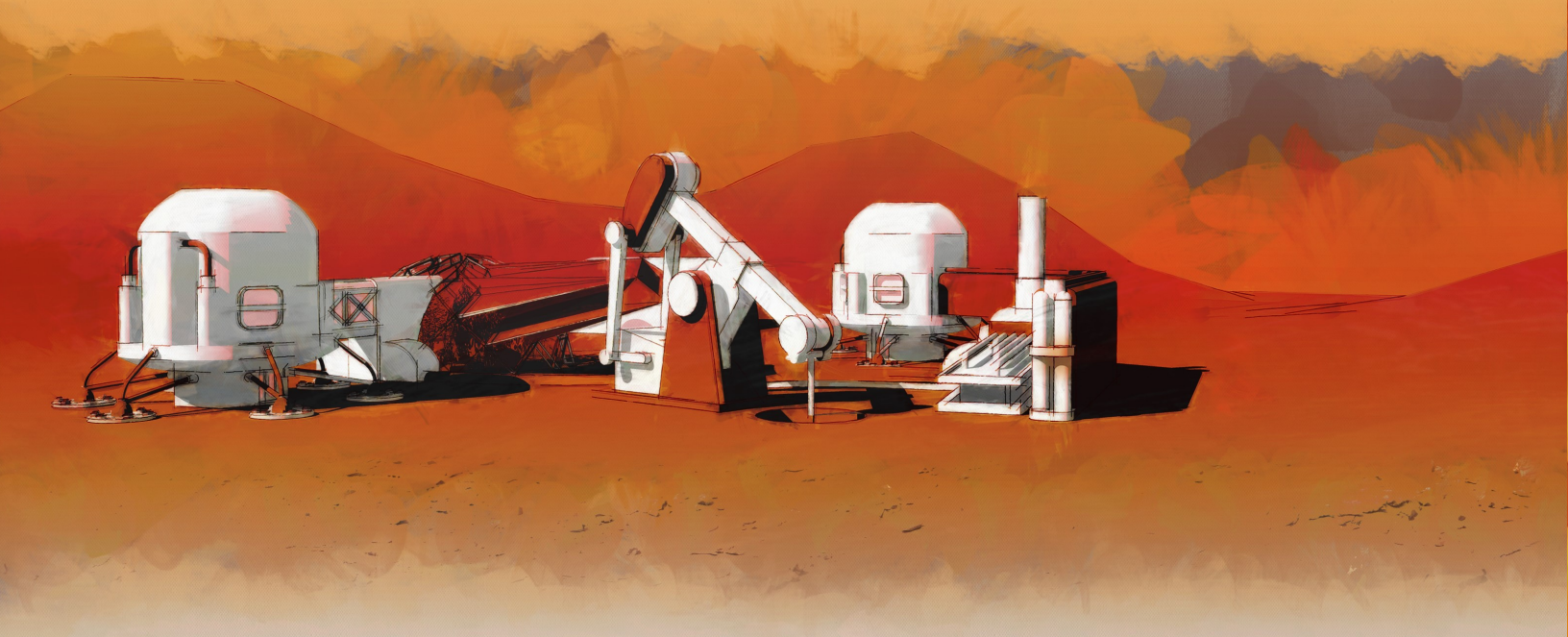
Upper Bunk Rooms Have A 14" Raised D
Inside Door To Form Their Sto

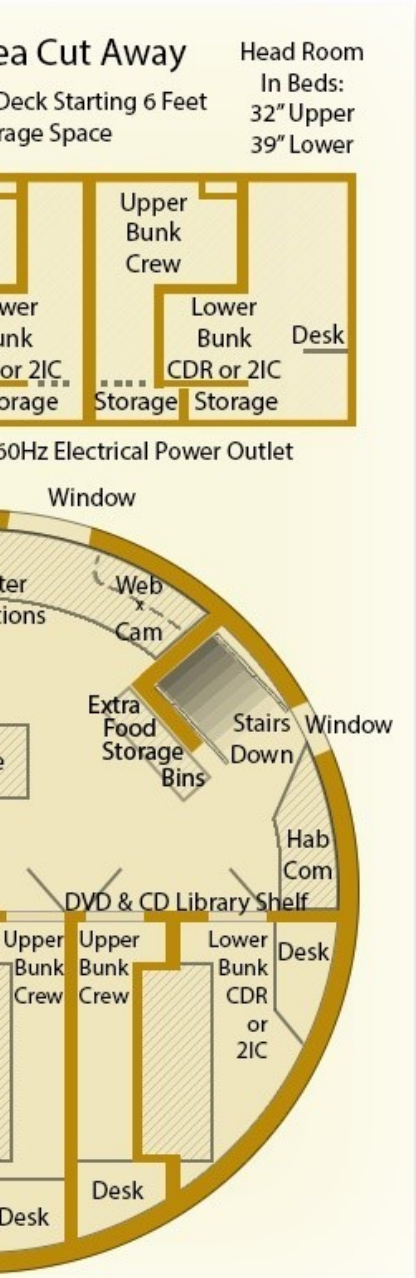


All Rooms Have Desk With 120V/

Upper Deck

Above: Seen above is The Mars Society's floorplan design for the living Habs at their MDRS (Utah) and FMARS (Arctic) research stations. **Below:** Dave Haden's SketchUp/Photoshop 3D illustration of a small terraforming outpost. **Right:** The Mars Society's 3D render of a robot-run 3D-printing plant, using the local rock and water.

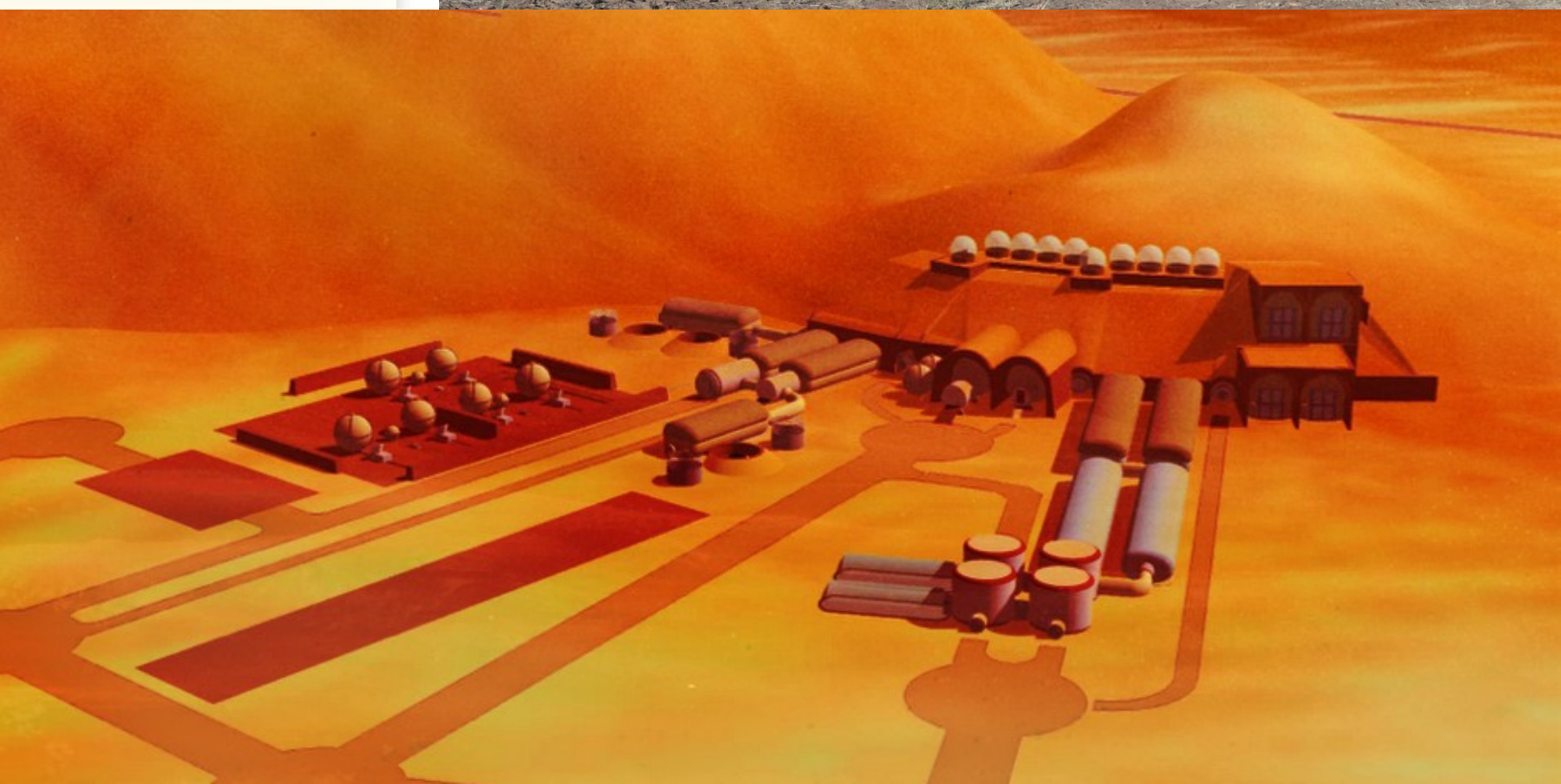




LIFE ON MARS: "HAB, SWEET HAB"

The Mars Society is a worldwide organisation promoting the principals of human space exploration and scientific endeavour, specifically about human missions to Mars. Integral to this is the development of two research stations on Earth. Seen left is the internal arrangement of the Society's main Habitat module, or 'Hab' for short. These are 16 foot diameter living and storage habitats that are two stories high, where people have to live for extended missions. The full-size and functioning Habs are serve to simulate what the actual habs will be like on Mars.

Picture: NASA has also developed a similar desert Hab for Mars, seen here.



Pictures: The Mars Society's Desert Research Station (MDRS) in Utah in its first layout, with the Greenhab seen at the side of the main living Habitat module.

LIFE ON MARS: THE MDRS GREENHAB MODULE

A hi-tech greenhouse module named the **Fisher Greenhab** (seen opposite, alongside the main Hab) was an integral part of The Mars Society's Mars Desert Research Station (MDRS), their Mars-analog outpost in Utah. Built in 2003 as a water-recyling module, after five years the Greenhab became a greenhouse module and sustained mission crews with fresh vegetables and tasty herbs. It also doubled as a relaxation room, and had niches for science projects. For over a decade the GreenHab concept was, in various ways, an integral part of the MDRS experience for 1,000 Mars Society pioneers.

The post-2008 Greenhab used a top-drip consumer hydroponics system drawing on a large nutrient reservoir. This drip system fed two tracks of felt-material 'grow bags' filled with a soil medium enriched in mycorrhizae and bat guano. The Greenhab had a high-flow exhaust fan for forced-air ventilation to cope with hot desert weather.

Maintaining any small greenhouse in desert conditions required patience and continual care, and the MDRS team devised procedures and a schedule to care of all seed germination, transplanting and harvesting across an entire field season. In 2013 and 2014 the MDRS team made a start on developing new DIY hydroponics mixes from raw chemicals, adding additional environmental and automation controls, and seeking new Greenhab soil mixes which might mimic the Martian regolith.

Then, after three seasons of operation as a greenhouse, disaster struck the GreenHab. On 29th December 2014 the team noticed an unusual power surge in the Greenhab — a simple electric heater had malfunctioned. Soon there was an intense fire, with flames ten feet high. Within a half-hour the team had the fire under control. No lives were lost, and no-one was injured. But the central section of the GreenHab was lost.

The Mars Society successfully crowd-funded $12,000 in late summer 2015, to make a start on the new Greenhab.

A wholly new Greenhab is likely to be larger, based on a geodesic dome design and buried deeper in the ground — having thick adobe earth walls around the base should lessen the thermal load from the desert heat and the cold nights, meaning less need for electric heating.

Even without a large new geodesic Greenhab, in 2016 a temporary Greenhab at the MDRS has enabled the testing of NASA's plant-watering technologies and soil-free growing. It can be seen on page 14, earlier in this magazine.

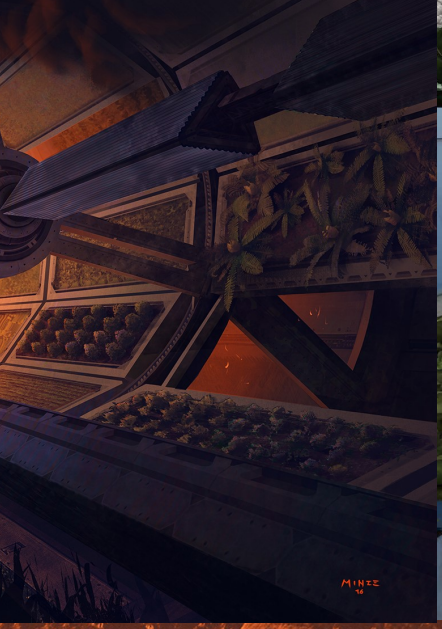
In February 2016 the potential of Chinese cabbage as food on Mars was explored in the temporary GreenHab. The Greenab was also home to an early attempt to see if cyanobacteria might naturally help convert Martian resources into a medium suitable for plant growth. In April 2016 the temporary GreenHab was able to sprout tomatoes, and grow onions and radishes — although there is not yet enough fresh food for the MDRS's programme of Food Studies to begin again.

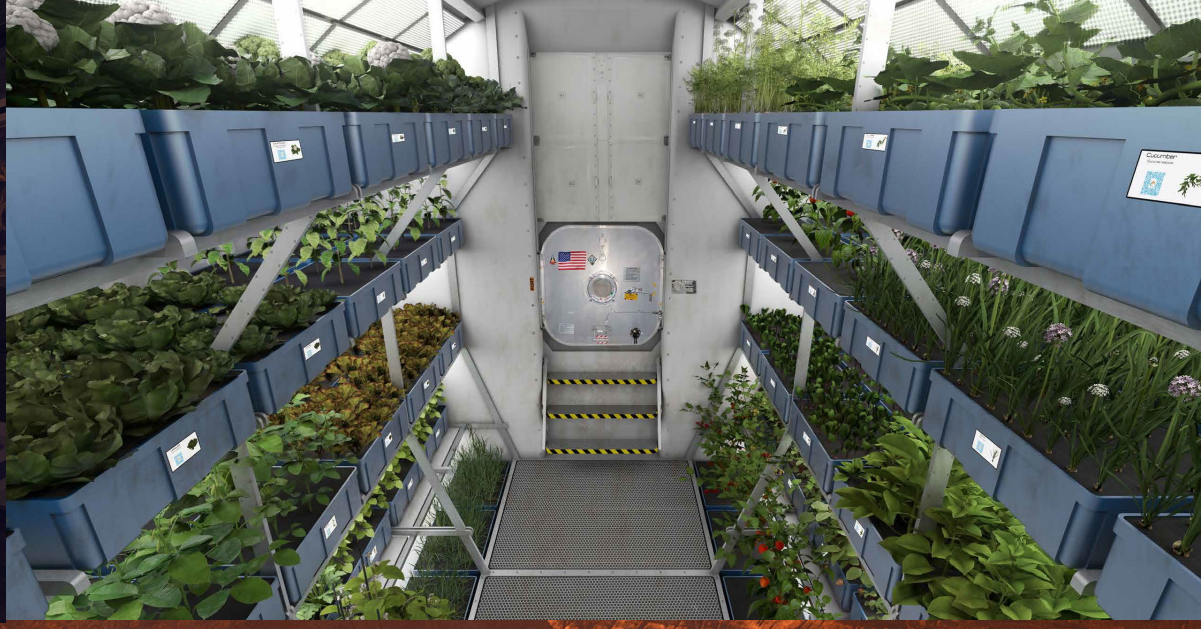
A full review of the 2015-16 progress at MDRS will be given at the 19th Annual International Mars Society Convention, which will be held on 22nd-25th September 2016. More details will be given then on how the MDRS and its habitat modules will be part in a new long 160-day mission, "Mars 160". A crew of seven scientists and mission managers will live for 80 days at the MDRS in the Autumn of 2016 and then continue with another 80 days at the Mars Arctic Research Station (FMARS) in the summer of 2017. The crew will conduct a sustained program of geological, paleontological and micro-biological field exploration. While operating under many of the same constraints that human explorers on Mars would face, the crew will also carry out research on how humans can best explore on the Martian surface. The "Mars 160" mission will also serve as a crew selection method for The Mars Society's long-planned year-long "Mars Arctic 365" mission (MA365) — which is still waiting necessary funding and construction work.

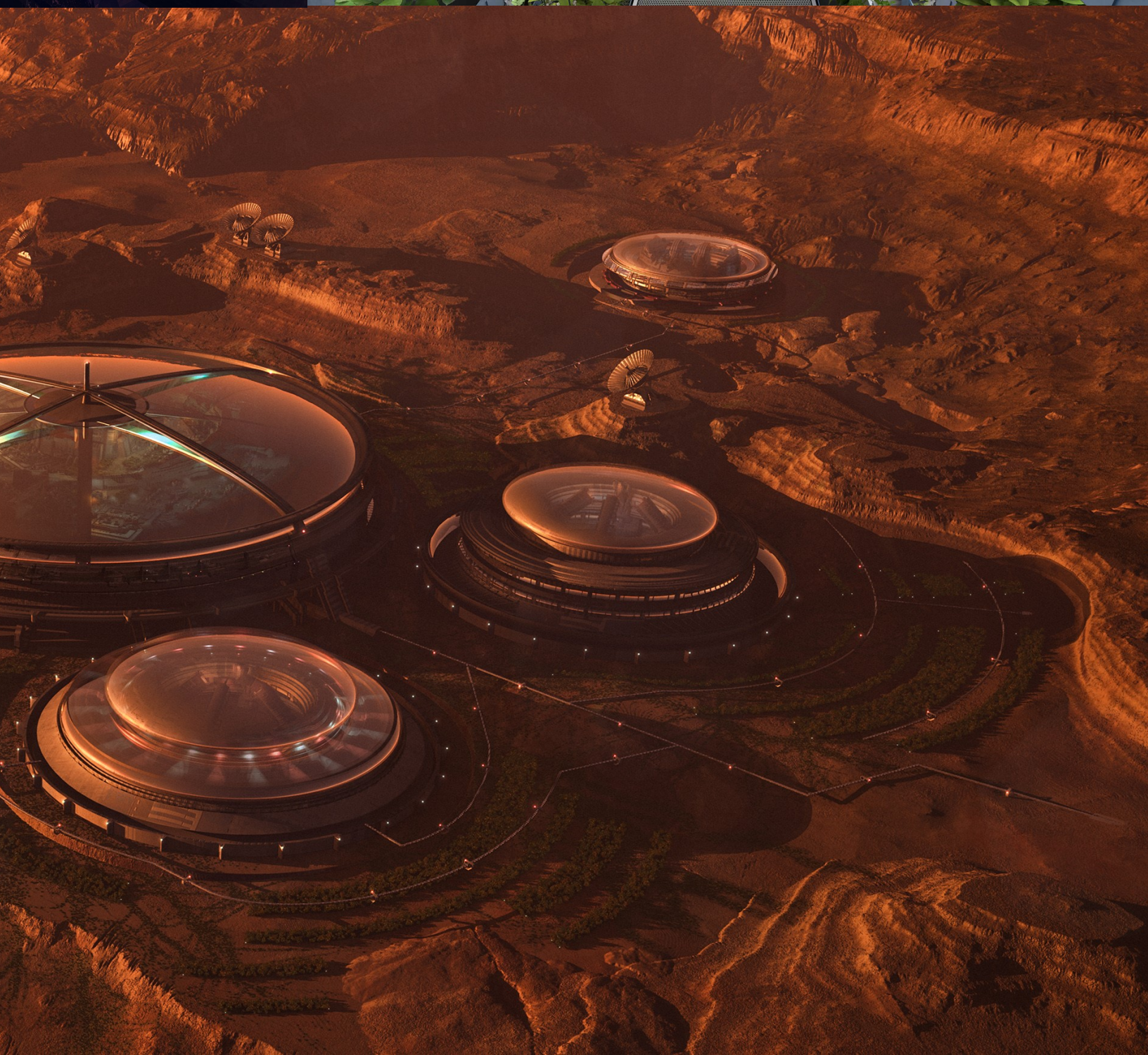
Picture: "Greenhouse 1" by Alexander "Minze" Thümler, a concept illustration for a large greenhouse habitat in space. Since there is no 'floor', all surfaces can be used for growing.


MINZE
16

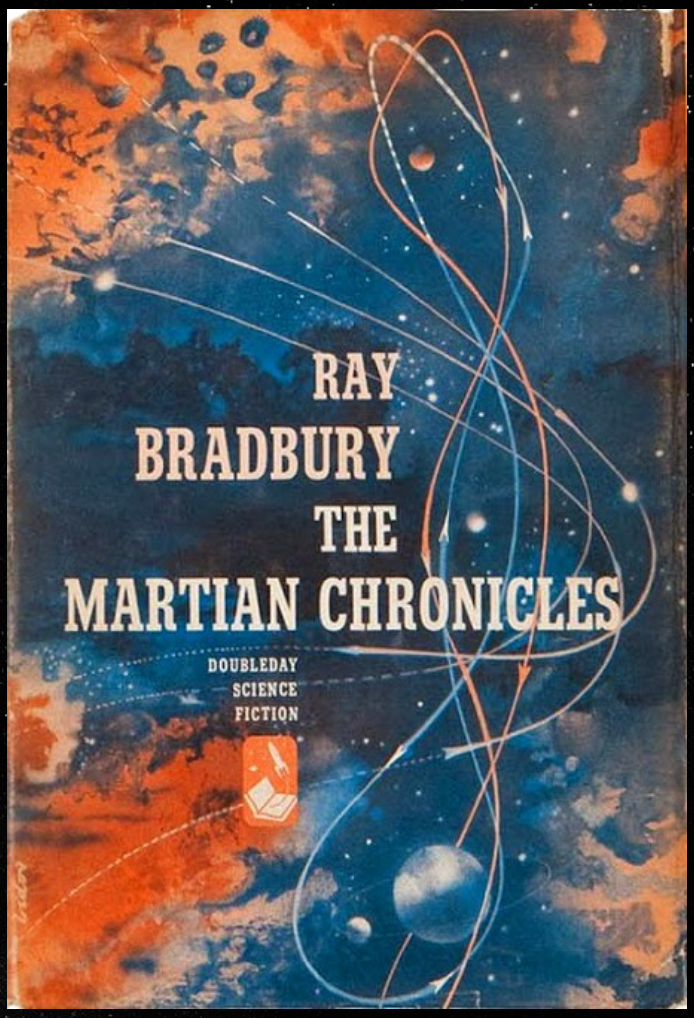
Pictures: Top, left — "Greenhouse on Mars" concept illustration by NASA. Top, centre — "Greenhouse 2" by Alexander "Minze" Thümler, illustrating the dangers of fire in a greenhouse space full of dry plant materials and electricity. Top, right — photograph of NASA's 'Veggie' plant growth testing chamber in space. Main — far-future Mars domes imagined in 3D by Tigaer in "Red Sands" (WorldMachine, Vue, Cinema 4D, Photoshop).



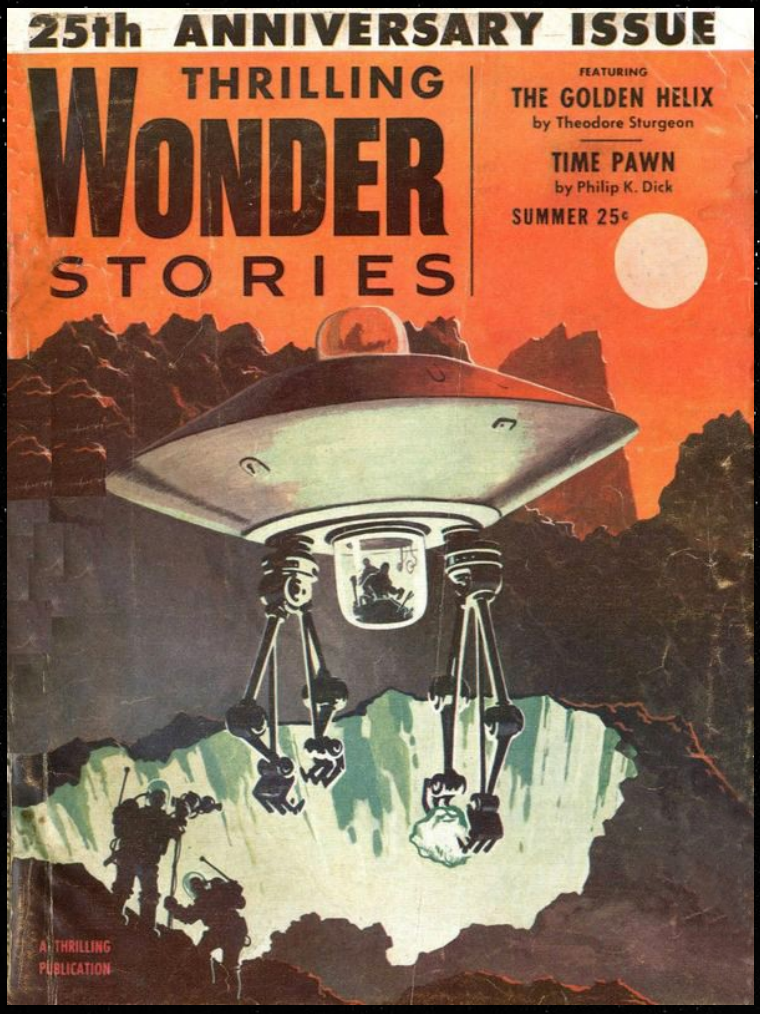




CREATIVE IDEA: abstract backdrop + precise map.



CREATIVE IDEA: four colours + a semi-silhouette look.



THE MARS FRONTIER IN PULP ART

The Martian Chronicles

Ray Bradbury. First edition cover, 1950.

Apart from a few British paperback covers in the 1970s, Ray Bradbury appears to have been especially ill-served by his book cover artists. That's not the case with this fine cover for the 1950 first-edition of his famous book *The Martian Chronicles*, by **Arthur Lidov**. The scientific map-like looping space-lanes, between Earth and Mars, serve to reassure the hesitant buyer of 1950 that this is serious sci-fi — not to be confused with the ray-gun zapping Flash Gordons of the 1940s. The art also subtly conveys something of the long loping structure of the book. *The Martian Chronicles* begins in 1999 and then shows the expeditions and colonists moving on far into the future, as humans create our new destiny on Mars.

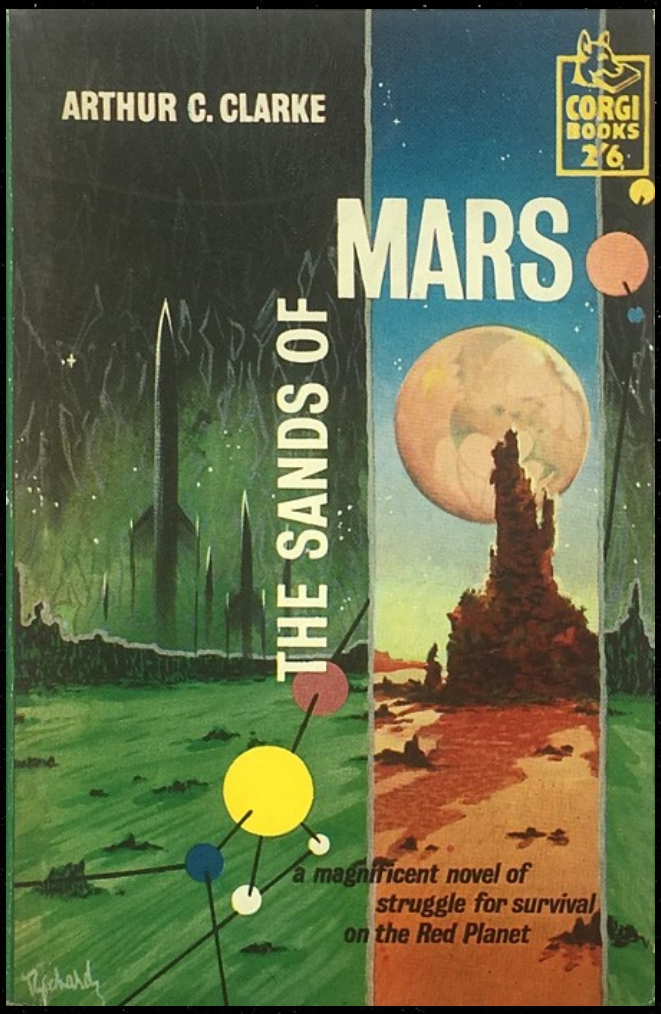
Thrilling Wonder Stories

25th anniversary issue, Summer 1954.

Artist **Jack Banham Coggins** here shows a masterly use of semi-silhouette and a restrained colour palette. It's then unsurprising to learn that he was primarily a marine artist, and had also been a quick-sketch war-artist on the front lines of the Second World War. The magazine's typographer / layout artist has sensibly not overlaid text onto the detail of this striking image, and where there is a small publisher's label the colour complements the overall colour scheme. The small detail of technical instruments is convincingly outlined in the silhouettes.

Jack Coggins passed away in 2006, but a large selection of his artwork lives on at http://www.jackcoggins.info/

CREATIVE IDEA: triptych panel + strong colour-shifts.



The Sands of Mars

Arthur C. Clarke. Corgi Books, UK, 1958.

A striking and mysterious book cover from artist **John Richards** for this cheap British news-stand paperback from Corgi Books in 1958. The typography and atom elements, though bold, struggle to work in tandem with the artist's equally bold triptych.

A mystery is immediately posed to the potential reader — why is Mars green in two of the panels? If the artist meant to indicate night, why did he not use dark blue? Why is the Martian sky blue, and how can one see Mars *from* Mars? 'Open the book, to solve the mystery...' is presumably the answer intended by the clever publisher. Actually the story does fit somewhat with these odd visuals, so the curious purchaser of 1958 would not have felt swindled by the cover art.

CREATIVE IDEA: Two heads in the sky of a space-scape.

Startling Stories

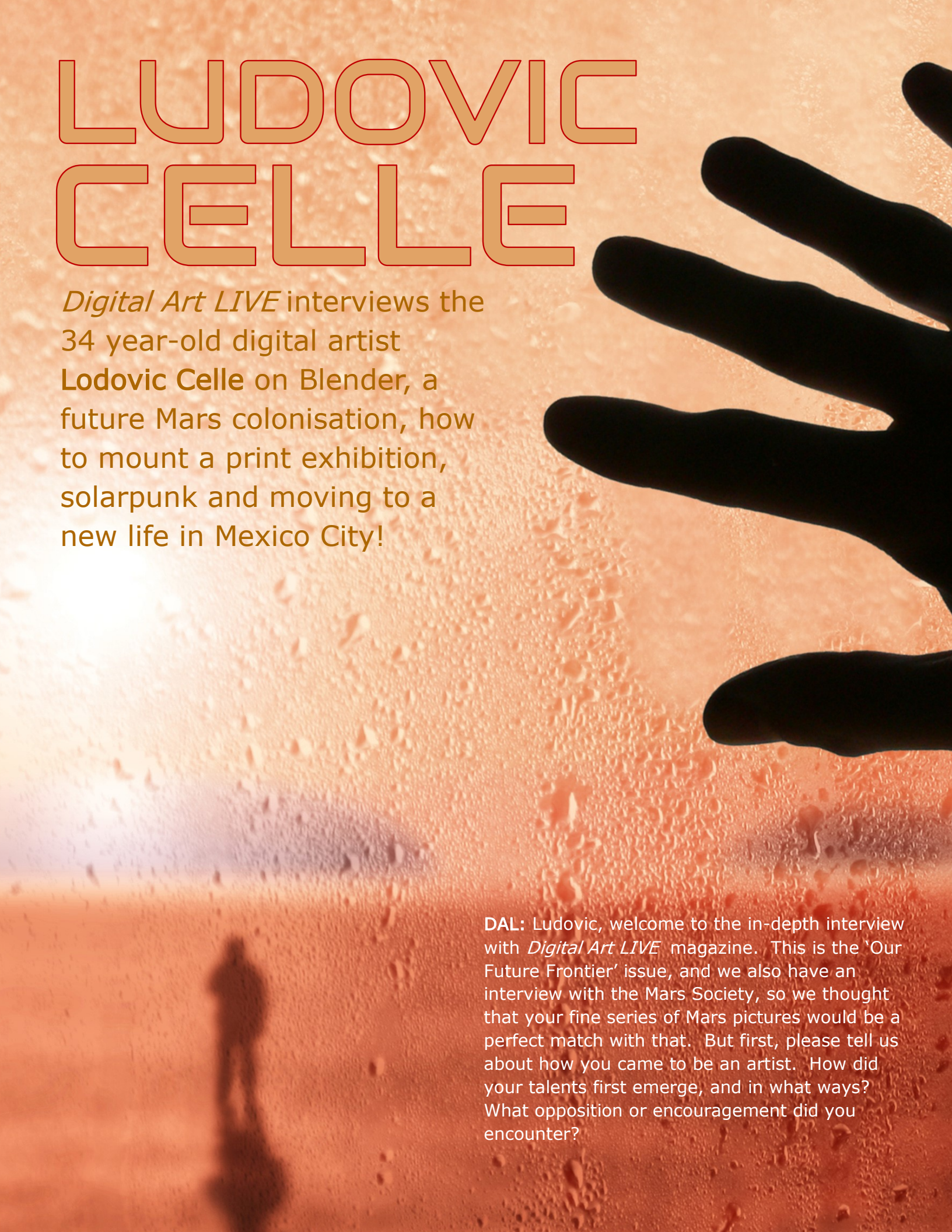
Vol. 24, No. 1. September 1951.

This restrained and intelligent cover by artist **Earle Bergey** appears to combine the two lead stories in one artwork — the heroines from "House of Many Worlds" and the Earth-Mars travel of "This Way to Mars". Despite this, and the cartoonish lettering, the sense of humanity in motion to a new frontier in space is palpable.

It would be a very bold art critic who could suggest this cover may have had some attraction for lesbian readers in the early 1950s. So it was a surprise to read author James Reasoner write, of the lead story "House of Many Worlds", that... "There are also a couple of things that are pretty daring for 1951, such as an offhand mention that the heroine is bisexual." Yes that was indeed rather bold, for the time! The story stars "Time Watcher Elspeth Marriner", a time-travelling agent who watches over the time-streams.

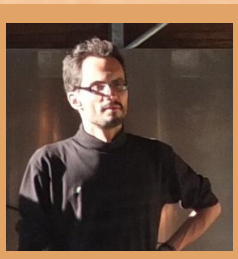
LUDOVIC CELLE

Digital Art LIVE interviews the 34 year-old digital artist **Lodovic Celle** on Blender, a future Mars colonisation, how to mount a print exhibition, solarpunk and moving to a new life in Mexico City!



DAL: Ludovic, welcome to the in-depth interview with *Digital Art LIVE* magazine. This is the 'Our Future Frontier' issue, and we also have an interview with the Mars Society, so we thought that your fine series of Mars pictures would be a perfect match with that. But first, please tell us about how you came to be an artist. How did your talents first emerge, and in what ways? What opposition or encouragement did you encounter?

Picture: "Mars View with Condensation".



LUDOVIC CELLE

FRANCE / MEXICO

BLENDER | GIMP | INKSCAPE

WEB

LC: Hi! First, thanks for the invitation. Well, I am 34, and I feel I have been immersed in images since early childhood. Especially through videogames, TV, cinema and comic books, and I think that was the start of this fascination for worlds, creative images and visual explorations. I also was born into a family where art and culture are praised and encouraged. That really helped me to grow — first in drawing, later as an architecture student, and now as a freelance digital artist. I'm glad that I met few obstacles, mostly encouragements, mostly from family and friends. It is funny to think back on how much 'the most boring hours and days at school' were when I mostly drawn and imagined other worlds in the margins. I should thank my school for having, unknowingly, given me the time and energy to develop my personal drawings!

DAL: And then how did your later interest in the Mars Society and Mars colonisation emerge?

LC: I have always been attracted by space, spaceships, etc. But the fascination for Mars started during my reading of Kim Stanley Robinson's *Red Mars* trilogy, back in 2007-2008. It was a mind-blowing read, one that would impact my vision of space and of the potential of mankind's future for a long time. While reading the books, I could visualise very easily what the scenes would look like in reality, and then I started to draw storyboards, and made photo-manipulations after that. I *needed* to make these images, 'it called from within'!

Beside the reading and illustration of the novels, I connected with many Mars fans and space professionals, including the Mars Society, with which I shared images several times. Their experimental approach inspired me early for my Mars illustrative explorations, as they are very much in the spirit of Kim Stanley Robinson's 'the Mars underground'.

DAL: Ah yes, and Robinson's famous *Red Mars* trilogy is now set to be filmed as a TV series. We have news of that toward the back of this magazine, in our 'Imaginarium' section. Let's hope the new TV series is done well, and that they get enough of the hard science in there. If you were called on to help with the visualisation work for the forthcoming TV series of *Red Mars*, what visual ideas or approaches might you suggest?

LC: I love this question, thank you! Well, first, it's important to show Mars in its true colours, which are not deep red like in so many artistic depictions.

DAL: Whoops-a-daisy. We've gone with deep red to open the interview with The Mars Society. Oh well, 'artistic licence', and all that… As with the adolescent desire to design flags and uniforms and suchlike, I think all that can be left until after we get there and settle. The point is to get there, and if the 'red' Mars brand catches attention for now, then I say 'let it run'.

LC: Second, Mars also has a very rich geological diversity, and shapes and landscapes that feel really different from any desert on Earth, so it is both fascinating and accurate to respect this originality and richness of Mars. I was disappointed by the lack of variety of landscapes in the trek sequence at the end of Ridley Scott's film of *The Martian*. They lost the opportunity to show that Mars is not just covered by mesas!

DAL: Yes, that would have been great. But is is just so expensive these days to do more than about five minutes of a big fully realised CG environment, to the standards required by today's big screen audiences. But even some mattes in that direction would have been welcome, it's true.

LC: This realism and diversity is what I would focus on first. And for all the human and architectural elements, I would try to honour the very rich and referenced vision of Kim Stanley Robinson, all the inspirations he had from ancient architecture, various Earth cultures, the mystical and peaceful Sufi branch of Islam, the Swiss, the Mediterranean hill-village atmosphere, the utopians and co-operators, all this. That gives his book a pretty unique feel in the SF landscape, I think, and of which the series would surely benefit too. A bold science-fiction approach, something fresh and many-cultural, just as much as a whole world is in reality. Because Mars will be an entire world, of staggering complexity and diversity as it realises itself through time.

DAL: Very true. And we're only going to get one go at it, so we need to get it right. One hopes that the consequent need for caution — and probably also the need to calm the irrational anxieties of big political and religious lobbies on Earth — won't stifle those who want to try to take on the big challenges.

Your own "Red Mars" series of pictures built up into a major gallery exhibition, held in the French city of Grenoble, in 2014. Tell us about the experience of a digital artist putting on an exhibition of prints, please? What did you learn from that? What mistakes should digital artists avoid in such a situation?

Picture: "Clarke and the Space Elevator", showing the upper terminus of such a space elevator in orbit above Mars.

LC: This exhibition happened three times, actually, and it evolved a little bit each time, always growing and for the better. It has been a great experience, and a way for me to discover my own art at a bigger scale, which was thrilling in itself. It makes you feel your graphic art exists even more, that it vibrates wider and stronger. It's a beautiful feeling and self-discovery. In terms of the pure financial and client impact, the result was close to zero, because I guess it was in a too small town and it was just my three first events. People will easily tell you how great is your art, but very few will actually put the money on it, so, better be ready for no special impact with an exhibition, and enjoy it as a nice moment between you and your art, and eventually have some good surprises, nice meetings, interviews, sales or new opportunities.

DAL: Yes, I often think that it's a pity that galleries don't get themselves a really good HD camera and a good metal SteadyCam add-on, and just make a non-wobbly single-take archival 30-minute walk around the exhibition. So that they can archive it online, and show future generations what the exhibition looked like when it was all set up.

That would seem to hold very few copyright implications for artists — even a good screen-grab of an artwork from a video frame would be low-grade, even from an HD video. But such camera and some minimal video editing and uploading would still costs money, of course.

Picture: "Martian Oasis", and the poster for the March 2014 version of Ludovic's gallery exhibition of his Mars pictures.

LC: If I happen to mount an exhibition again soon, I would ensure I don't spend too much money on it, and would probably choose to explore some exciting techniques such as projection, mapping, and maybe some 3D-prints of some of my models for instance. Like, trying to give more dimension and presence to my visions.

DAL: Yes, the whole 'VR galleries' thing is potentially very interesting, if it is given to the right people to experiment with. If I were a gallerist I think I think I would be worried that VR could become seen as just another branch of the generally rather boring genres of video art / installation art. Instead of the Fine Art degree crowd I might instead give some VR funding to, say… a real poet, a radio play producer and… maybe an infographics designer. Talking of design, you also did a lot of picture selection and curation in 2013, to create a huge and very impressive large-format mosaic of images which evoked the *Red Mars* books. Tell us about the process of assembling and printing that, please.

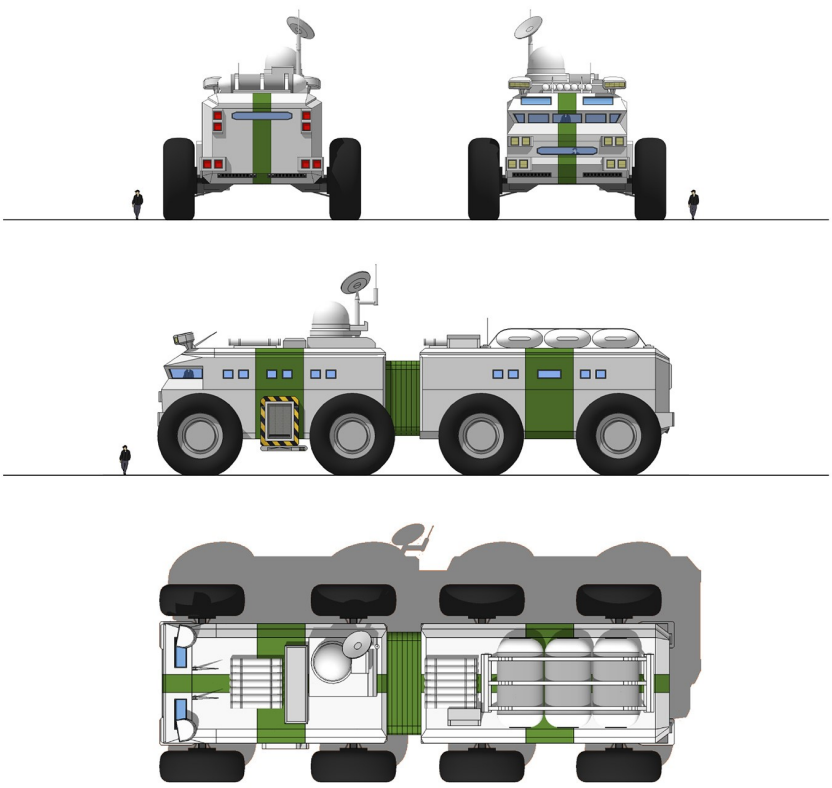
LC: This piece was a very special one, one that indeed occupied me for months. I loved the idea of a kaleidoscope of pictures that could convey all the wealth of Kim Stanley Robinson's *Mars* trilogy. I wanted to find a way to put together as much of it as possible, and I couldn't think of one *single* image to have this effect, so I started to collect photos and photorealistic images that would fit Robinson's super powerful and very credible human saga.

Picture: "Martian Trilogy Mosiac", illustrating aspects of the *Red Mars* trilogy of Mars colonisation and terraforming novels by Kim Stanley Robinson.

As I have quite the attitude of an archivist, this work was very natural and fun to me, though the work stretched on several months. I assembled the hundreds of images with Andrea Mosaic, an open-source mosaic program, super easy to use by the way.

DAL: Interesting. That's not one I've heard of. Free, so I'll have to take a look at that.

LC: The final vision I wanted was this 'eye-flag' based on the colours of the three books — and thus the three stages of Mars evolution. I wanted to give all this a slight 'mandala' mood, as in the classic mandalas of ancient times. Something that went beyond the hi-tech style, to hint at something almost spiritual and cosmic. For the print, as I wanted it to be very large and to make the surface rather steady. So I chose to print on plastic textile, which allowed rolling and storing in a cardboard tube, very easy to transport. It was a clever choice. It's a piece that will serve me again someday. I don't remember the price, but it was way more affordable than I thought. Really worth it.



Pictures: Ludovic Celle's SketchUp development in 3D of Peter Elson's 'Elson Explorer' manned vehicle for Mars. Elson is a British sci-fi artist who designed the pressurised vehicle. The same vehicle is then seen at night in "Rover at Dusk".

DAL: That's a great tip, thanks. Now, you started learning to 3D model a few years ago — making several Mars rover vehicles in SketchUp, then in 2013 moving on to a model of the *Arrowhead* spaceship from *Red Mars* made in Blender. How is that 3D modelling skill -set developing, three or four years later?

LC: Yes, I learned SketchUp at the architecture school. My Sketchup years were very cool, as this program is insanely easy to use. But as you say, in 2013, I started to move to Blender, because I wanted to build and render in ways that you can't with Sketchup. Honestly, it took me more than two years to master Blender enough, but it was 100% worth it. Since the *Arrowhead* model — made as a test 2 years ago — I can now very easily build very cool things in 3D and render them almost photo-real directly into Blender with the Cycles render engine. I haven't made Mars art using Blender for the last 2 years — but when I'll come back to it, the difference will be obvious and the potential exciting.

DAL: What is your opinion of Blender's current direction, both as a software and also in the form of its users and the Blender Institute?

LC: I love Blender, even though it's been tough to learn it several times.

DAL: Yes, *that* interface… it's always been...

LC: But I'm amazed by how much progress it gets at every update, at various times along the year. It is indeed 'a leading program' now, and one of the things I love most with it is its user

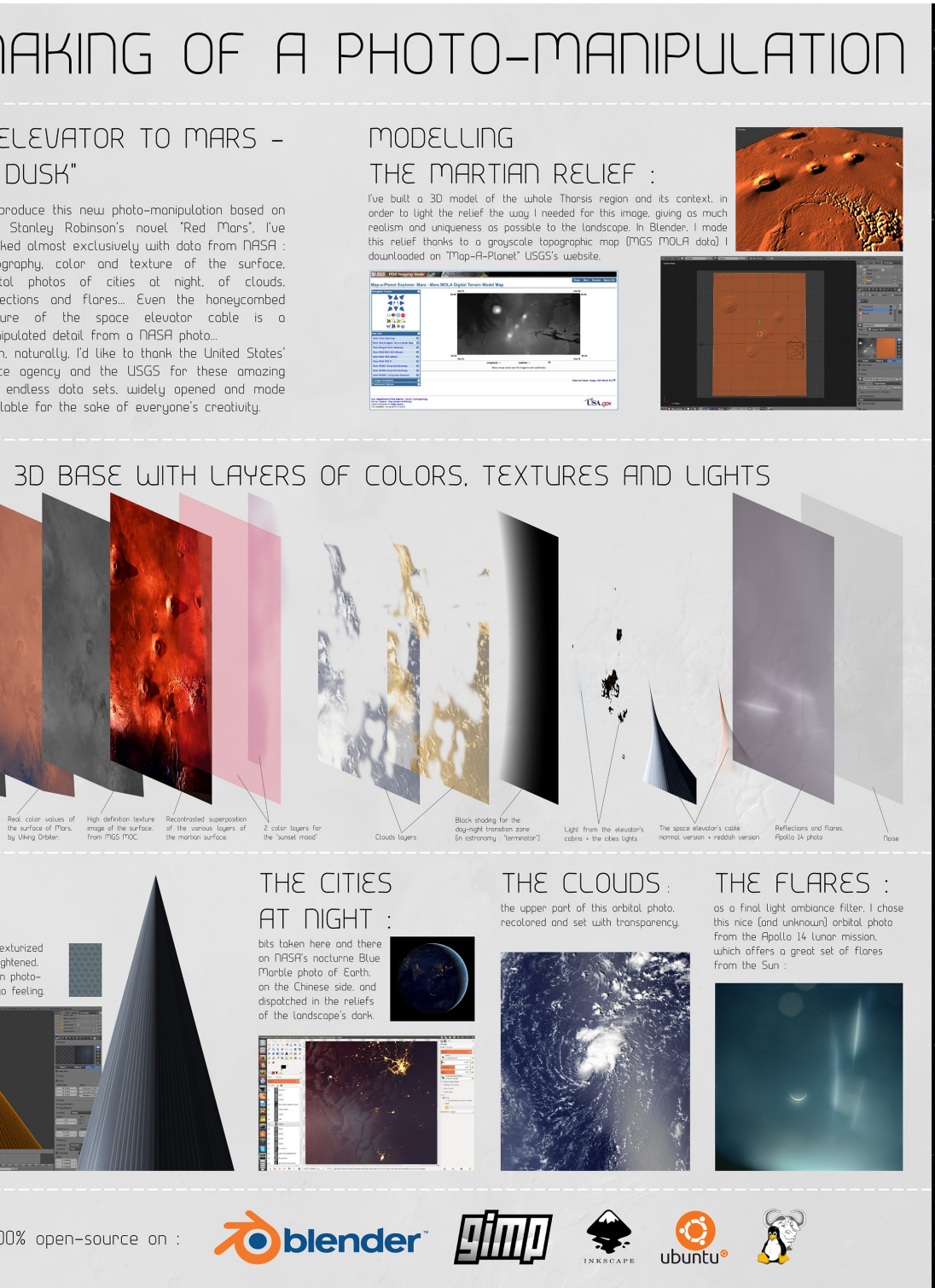
community, very warm and dynamic family of creative and collaborative minds. It has been essential in my learning of Blender. What I can say is that Blender seems to benefit considerably of the production of short movies made with it and constantly pushing forward for new tools, improved UI, etc. That said, Blender is so big that I haven't yet used more than a fourth of its tools and settings. It's a massive program, a superb 'art station'.

DAL: Great, well hope to make our next issue a Blender special, so I hope that you comments have whetted reader's appetites for that. More widely, you use *only* open source software, am I right? Blender, GIMP, and others. And your work is all published under Creative Commons. Could you tell us about the reasons for that choice, please?

LC: Right, I'm 100% open-source free software. I work on Ubuntu, the Linux distribution, do my photo art with Gimp, vector work with Inkscape and 3D with Blender. Up until now it has been perfect. And yes, I choose Creative Commons, and try to be open my art as much as I can.

The reason for this has something to do with my activist life. I believe in cooperation, sharing, and the opening of culture. I also am very critical of consumerism and capitalism, and do my best to participate in building other models of development, and open-source free programs and artworks are totally part of this.

DAL: Yes, but I sometimes wonder if such rebellion doesn't often serve as 'free R&D' for wider commercial forces, though… in time larger forces will snip off the radical edges, re-work and re-package 'alternative' approaches and ideas, and then deftly integrate them into the commercial system. There's a very good book on how that works, published a few years ago now, called *The Rebel Sell*. I've seen radical political hopes attached to many new technologies and methods, and they always come to nothing. I suspect the same will be true of open source, Creative Commons and open access. They *will* have a big impact, and a very positive one, for many people including the 'new billions' in Africa — but I doubt it will happen alongside the wider social change that their most fervent activists hope for.



LC: So I abandoned Windows and Photoshop about eight years ago, choosing to encourage free and open graphic art, contribute to its visibility and its progress. I hope that my pictures show that Linux and Gimp can be just as impressive art tools as Windows and PS. I do wish these alternative programs finally set themselves free from the label of 'amateurism', and gain some deserved respect and admiration. Gimp has evolved beautiful during the last three years. Blender too. Inkscape is great but would need a new push to get even better, which could be in the form of a crowdfunding.

DAL: Yes, Inkscape is a nice software. It also has a useful free royalty-free clipart library online, to which Inkscape users often donate their clipart. 95% of it is the usual 'clipart cringe', but the library is now big enough that one can also find some quality work in it. And, of course, one can then open and adjust the art in the free Inkscape.

LC: The fact that all these powerful programs are 100% free to everyone makes them remarkable. I try to help make them famous and acknowledged in offices, among families and just everywhere.

DAL: Now, Arthur C. Clarke's Space Elevator is a concept that you've explored very vividly and in-depth in your Mars art. We show it across the previous double-page spread. It's an idea that I expect will be known to most of our readers. What approaches did you explore, in order to visualise this most un-photogenic of structures?

LC: /*Laughter*/ Yes, you're right about the 'un-photogenic' thing. Yes, the space elevator is so extreme that if you decide to depict it realistically, it has to be invisible or thin as a hair most of the time — where it's in the distance. I actually love that kind of visual challenge, sticking to realism but also nailing a powerful image. I haven't read Clarke's *The Fountains of Paradise*, so my space elevator is the *Mars* trilogy one. As for most of my Mars images, I started with storyboards of the space elevator views, and while building my photo-manipulations of it, I remember that I several times refined the cable thickness closer to invisibility — because it really mattered to me to show how insanely stretched and over-scaled it is. Robinson does a great deal at making you feel how totally crazy this structure is.

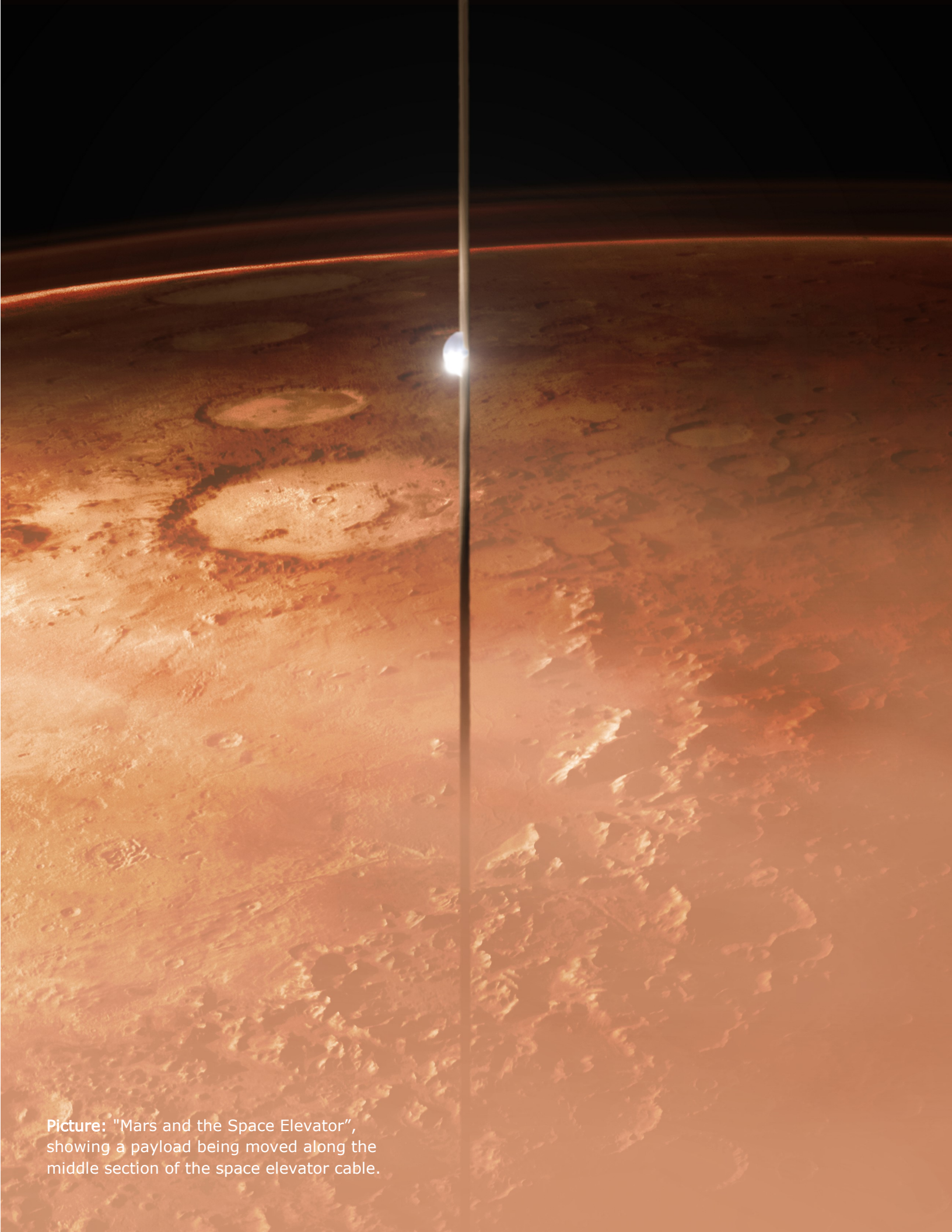
The last image I made of the space elevator is this vertiginous perspective view from orbit. It's my most ambitious photo-manipulation of Mars so far, dozens of hours of work at high definition, and the cable is 3D, made in Blender. Blender texture and camera settings allowed me to attain a style that I wouldn't have got in Sketchup.

Oh, and just one small additional point about the very red tone of this vertigo image — this deep red is exaggerated, I admit. I wanted to give a dusk mood, as the scene happens over the Mars 'terminator line'. Showing Mars so red should remain an exception, rather than a rule, because soon we will really walk on Mars. We will see its real tone, which is a rusty grey most of the time, and this will look terribly boring to those who didn't accustomed to it enough at first ! /*Laughter*/

DAL: Right. We may need to make our Mars helmets out of slightly red-tinted glass, then! Now, your online gallery shows another big interest — one of our oldest prehistoric monuments, England's famous Stonehenge stone circle. How did that interest in historica sites arise for you, and how did it then develop in your art?

LC: Since childhood I had a fascination for the Ancient World, its archaeology and ancient architecture. Which is why, after years of science fiction, I started more recently to make imagery of ancient structures and to have a lot of fun doing that. Ideally, I'd love to work for archaeologists, museums, documentaries, etc.

I think there's a lot to be done to valorize more of our world heritage, the grandeur we achieved by mankind in ancient times, the cities and monuments that we made. Way beyond Stonehenge or the great pyramid of Giza, there are thousands of ancient sites that await a 3D model, an illustration, something to bring them back to life.



Picture: "Mars and the Space Elevator", showing a payload being moved along the middle section of the space elevator cable.

DAL: So true. I recently tried to start a commercial sideline in the re-creation of historic landscapes, based on terrain data and 3D. But sadly there were no takers, even in England and at a very modest price for a very high quality. Which suggests that the market is rather small.

LC: There is much that needs to be done anyway, though. For instance, major historical city, Cusco, capital of the Incas, has only been finally 3D-modeled last year, and still not in high detail and with good texturing. There are thousands of 'lost cities' to rebuild in 3D, it's a fascinating territory for graphic artists in collaboration with historians and archaeologists.

DAL: Yes, I would to see a full recreation of the original Memphis at its height. An Arab traveller once wrote of Memphis in the medieval period that… "The ruins of Memphis hold a half-day's journey in every direction." And also I love some of the Vue and Terragen recreations of English megalithic and Bronze Age sites, as they would have looked at their height.

LC: I try to be part of this effort to visualise the past, just as much as I try to be part of the future with my pictures. And I believe the past, even the very far past, can be a powerful inspiration for the present and future. There are many examples of things that we recycle of the far past. Let's get inspired by the best of our ancestors!

DAL: Yes, humanity can always benefit from a more long-term vision, which I why I'm so fond of the projects around the excellent Long Now Foundation. I guess that Stonehenge was of the same scale — at the time it was built — as opening a viable Mars frontier will be, in some ways. Huge social and engineering effort required, vast size and scale, a time horizon of thousands of years, big risks and very uncertain outcomes.

So one suspects that Mars pioneers will almost need what the Stonehenge people had, a deep spiritual structure, to help us make it a success. The recent excellent TV series *The Expanse* seems to just hint at that, which I hope the showrunner may get explore in more depth in the next series, if it's not also in the novels. Possibly Mars will need a new sort of 'rational religion', based around progress and human potential and fair-dealing. What is you view on that idea?

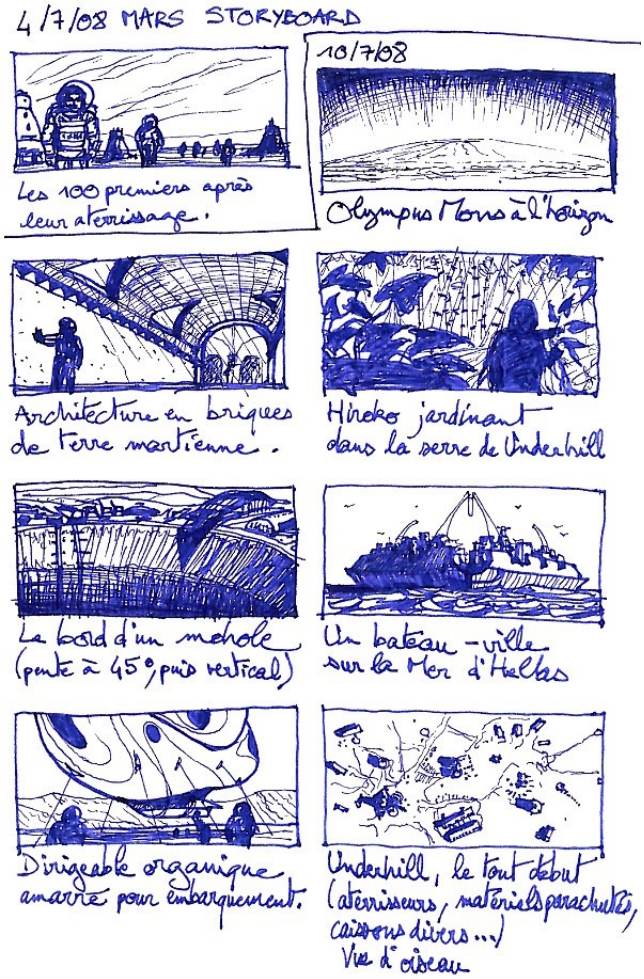
LC: I have yet to watch *The Expanse*, but it has indeed attracted my attention. Because some have compared its cultural depth to the work of authors like Robinson. And yes, I believe we are moving slowly but firmly toward a new culture able to unfold our potential and a religion-free spirituality, somehow based on more cosmic consciousness, thanks to the progress of astronomy and space exploration. Today, from Earth, everybody can witness how vast space is and how connected we are to it, by the power of the Sun as a source of life and energy, by the threat of asteroid impact, the expanded use of orbital technologies, and indeed our upcoming human exploration and settlement on Mars. Our interest in space has the potential to change our lives on Earth.

DAL: Yes, I think that, as well as starting to move toward living in longer time-frames, our most imaginative thinkers and do-ers are also starting to become a *little* more at home with thinking about vast scales and distances. Slowly at first, but that does seem to be happening a bit. And also starting to know tacitly that the best way to be able to actually make the big leap into those vast spaces is by an accumulation of all our small and precise changes — what Carl Sagan termed… "small moves, small moves…" in his *Contact*.

LC: We do live a fascinating era. By the way, I feel totally in harmony with the new conceptual and artistic movement called Solarpunk, which brings together positive change, renewable energy, ecological architecture and design, social progress, anarchy, psychedelic consciousness and open-source culture. It's a recent trend, but I feel it has some coherence and shine, and may last at least as long as cyberpunk and steampunk. It's part of the cultural tools we have to produce real change. I love how the human community finds ways to have fun while improving the world.

Picture: Artwork for "The Mars Society Convention, Poster Art for 2013".

DAL: Yes, I recently wrote a short article on Solarpunk. It's mostly literary and there's very little in English so far. So far as I know, the key sci-fi anthology is still un-translated from the Brazilian Portuguese, *Solarpunk: Historias Ecologicas e Fantasticas em Um Mundo Sustentavel*. I suspect solarpunk ideas will have the most impact on eco-futurist / ecomodernist architects and on African literary sci-fi — provided it retains its optimism, and doesn't just become another vehicle for tired old ideologies.



Finally, that leads nicely into asking if you could you tell us about your interest in visualising new ecologies and new architectures, here on Earth. You trained as an architect, you mentioned earlier?

LC: I studied architecture, yes. I graduated in 2007, in Grenoble, France. After the diploma, I realized I wasn't so much made for architecture itself, but rather for its illustrations — and until now, many of my pictures have had a strong link to architecture and landscapes. I grew up a family of ecologists, so yes, my view on architecture and urbanism is ecological. People like Michael Reynolds and his Earthships, or William McDonough and his principles of Cradle to Cradle are those who inspired me most.

DAL: I do love the idea of adobe rammed-earth building and Earthships in the deserts. I'm not quite sure they'd work in the damp English climate, though. Ours would turn out more like thickly turfed hobbit-holes or ancient earth burial-barrows, I suspect!

LC: To use again the word "potential", a word that I love, I think there is a huge *huge* potential in ecological design in architecture and urbanism. We really developed territories very badly in too many areas of the world, and now we're stuck in traffic jams, we breathe smogs and we consume way more energy than needed. It's time to be smart, efficient and responsible.

DAL: Very true. In just 35 years we completely rebuilt the German cities and roads, most of which were quite literally miles of flat rubble after the Second World War. More recently the Chinese have shown how to build cities and do vast engineering projects in a decade or so. Surely we can turn such energies to giving our existing cities some serious 'eco-makeovers'.

LC: Many people in the world have solutions to propose, to which we must pay attention more than ever. It's time to develop the planet in a permaculture and solarpunk way!

DAL: Your behance.net site says you're currently in Mexico City? How did you get there, from Grenoble in France? What's the story there? Are you part of the recent generation which felt obliged to leave France, because of the mis-managed economy there?

LC: I moved to Mexico in September 2014. It was the result of my ongoing interest in this Latin country, a deep fascination that grew over a period of about four years. I had an intuition that I had to make my life here. And up until now, the move has been a success. I feel wonderful in Mexico, and seriously — for an artist and a thinker — this is a very inspiring country.

DAL: Yes, it's always had that reputation among western artists and intellectuals. Cheap and warm, but also a fascinating culture and a relatively easy language to learn. And really great light, and (until recently) affordable human models, the combination of which is what many visual artists and photographers traditionally crave.

LC: Mexico is certainly filled with powerful symbols, landscapes, faces, colours, and a very intense 'human vibration', a very vibrant culture, for the best and the worst, but always inspiring and thought provoking. So, no… I didn't leave France to flee the crisis in the economy, but rather I 'followed a call from afar', telling me I had a lot to discover, to explore if I went to live in Mexico. And it's true.

DAL: Congratulations. And what's the 'imaginative arts' scene like in Mexico City, these days? I don't mean the tired and cynical internationalist 'contemporary gallery art' scene (see any recent issue of *Modern Painters*). But rather, those art trends which are optimistic and imaginative, and vigorous about engaging with the past and the future.

LC: Mexico in general is a land of mural art [large and usually figurative 'folk art' murals, traditionally painted on walls] and so you can't miss it. That art is everywhere and it evolves throughout the year, in the streets, in the bars, on the buses, etc. It's excellent and very free. I particularly love the freedom that Mexicans have in their local art. I don't go to the art galleries, I like this mural art.

I also pay a lot of attention to the traditional or traditionally-inspired craft arts — be it textile, metal, clay or else, art that is sold in the streets and in the markets.

Also, I can't talk about Mexico's visual world without mentioning that it's a country where I discovered shamanism and the use of 'plants of power': the cactus peyote and the psilocybin mushrooms that give visions that are part of the heritage of this exceptional country. Learning about these has had a seriously life-transforming for me, and it's having a real impact on my art. I started to put more colours, more light and more 3D relief in my images, sort of trying to evoke the sensations induced by 'the plants of power'. To me, the real visual power of Mexico is not in the art galleries, but rather in the mystical explorations — out of which evolved the indigenous people and the large civilisations such as the Maya.

DAL: Yes, I heard a fascinating BBC *In Our Time* radio discussion in March 2016, on the Maya and their unique eco-cities. It's free online as an .MP3, and is one of the series' best. There should be better visualisations of their remarkable civilisation, using digital art, as you suggested earlier. Most were either naff Terence McKenna end-times romanticism, stiff children's book illustrations, or simple archaeological reconstructions — if my quick look for such art was anything to go by.

LC: Then there are also the people who go to Mexico. I should also mention them. The nation is filled with artists and travellers — of both the physical and the invisible world, and so I recommend coming here and meeting with all this spicy and cosmic intensity! I'm grateful I dared making this big step of leaving my cradle and moving over to Mexico. It was the right thing to do in my case.

DAL: Great, well — we wish you all the best with your work there. Ludovic, thanks again for this in-depth interview, and please keep in touch. It's been fascinating.

LC: Thank you very much, it's been a pleasure to share experience and visions of the past and future with you. May the most positive of these visions find a way to realisation.

Ludovic Celle is online at:

http://ludo38.deviantart.com/

http://ludoviccelle.com/

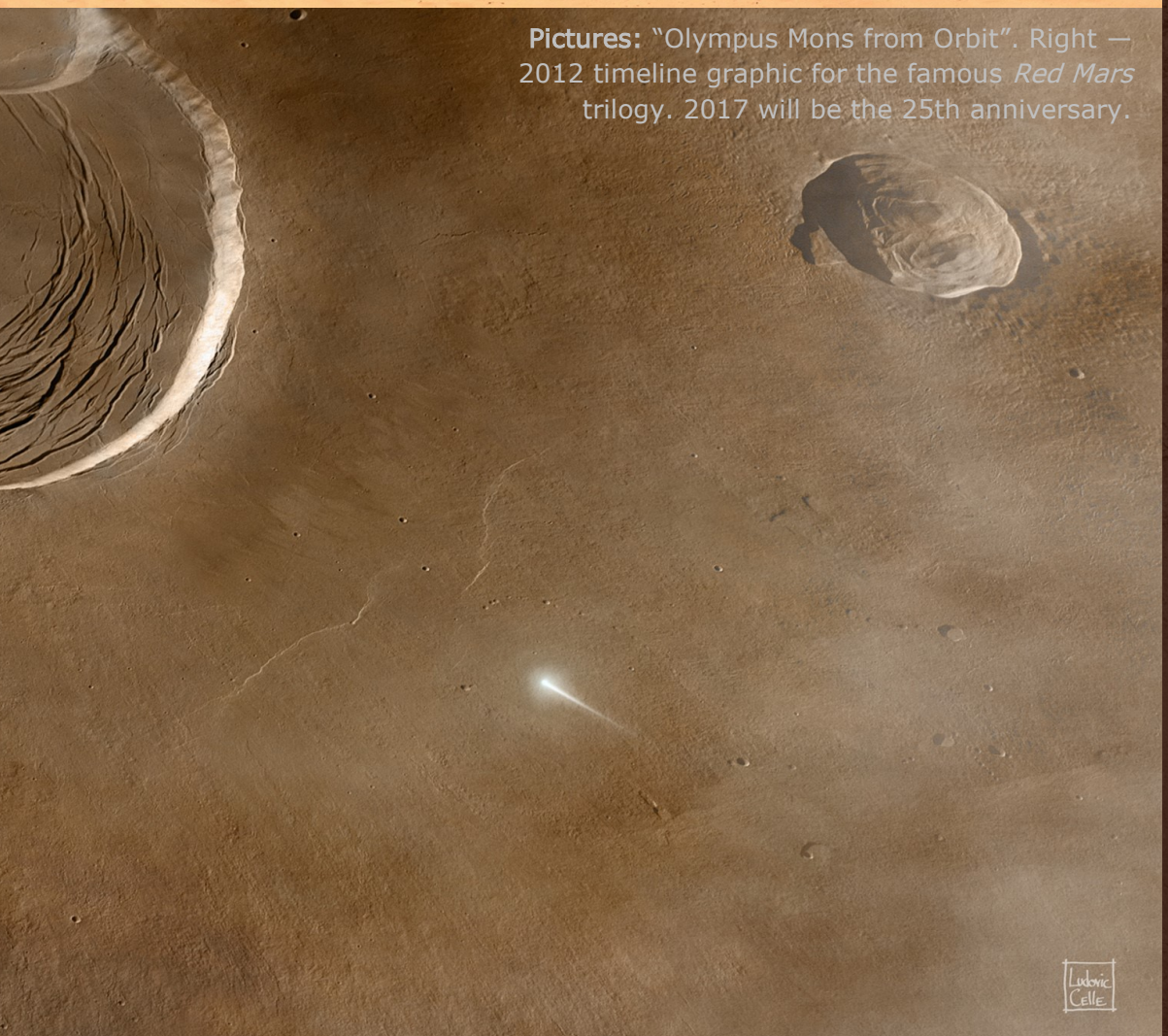
See a 30 minute video of Ludovic's 2013 Mars exhibition, in French.

Ludovic Celle

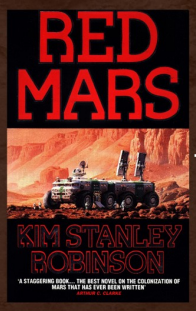
+ desert background photo
by Hansueli Krapf, CC BY-SA 3.0

20 Years
since the launch of
Kim Stanley Robinson's
landmark *Mars* trilogy

Picture: "A Mohole Behind the Horizon". There are around 30 known natural 'moholes' on Mars now, and *Red Mars* envisions that more would be artificially formed, to help with the terraforming of Mars.

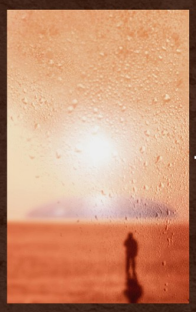


Pictures: "Olympus Mons from Orbit". Right — 2012 timeline graphic for the famous *Red Mars* trilogy. 2017 will be the 25th anniversary.



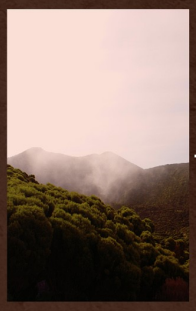
1992
Red Mars is released
-
First volume of the *Mars* trilogy

2012
Curiosity Rover Lands on Mars
-
300 years after the steam engine and the First Industrial Revolution

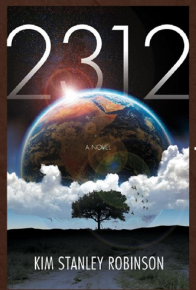


2027
First Colony on Mars
-
The *Ares* lands the First Hundred

2061
First Martian Revolution
-
Fall of the space elevator cable



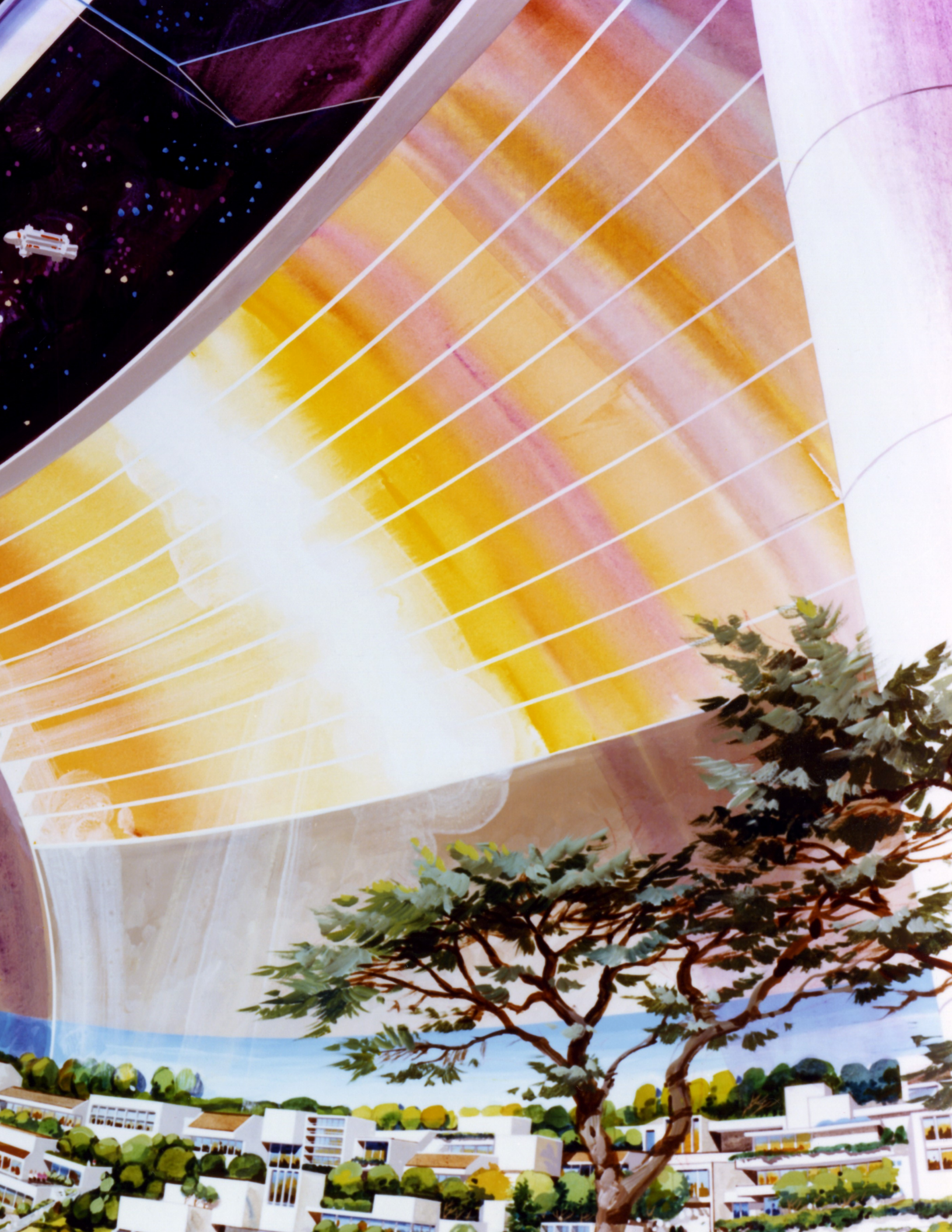
2127
Free Mars
-
Mars acquires independence while Terra faces sea level rise

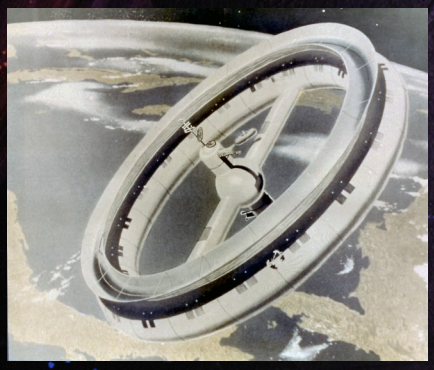


2312
Beyond Mars
-
Technology allows fast interplanetary travel - Neptune to Mercury in 16 days

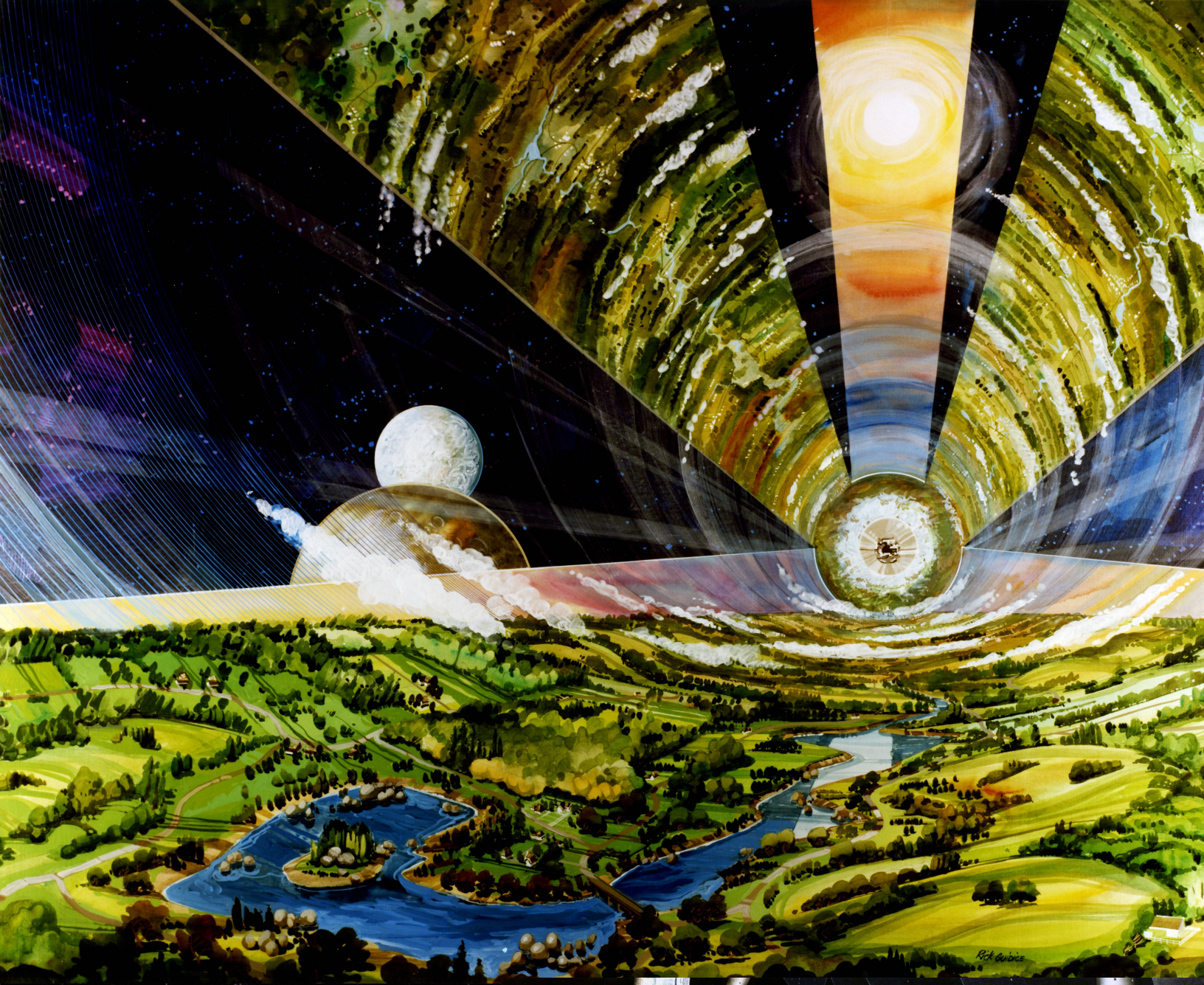
CITIES IN SPACE

In the mid 1970s paintings made by **Donald E. Davis** and **Rick Guidice** visualised a ring-shaped rotating space city for NASA, based on space station ideas originally from scientist Wernher von Braun.





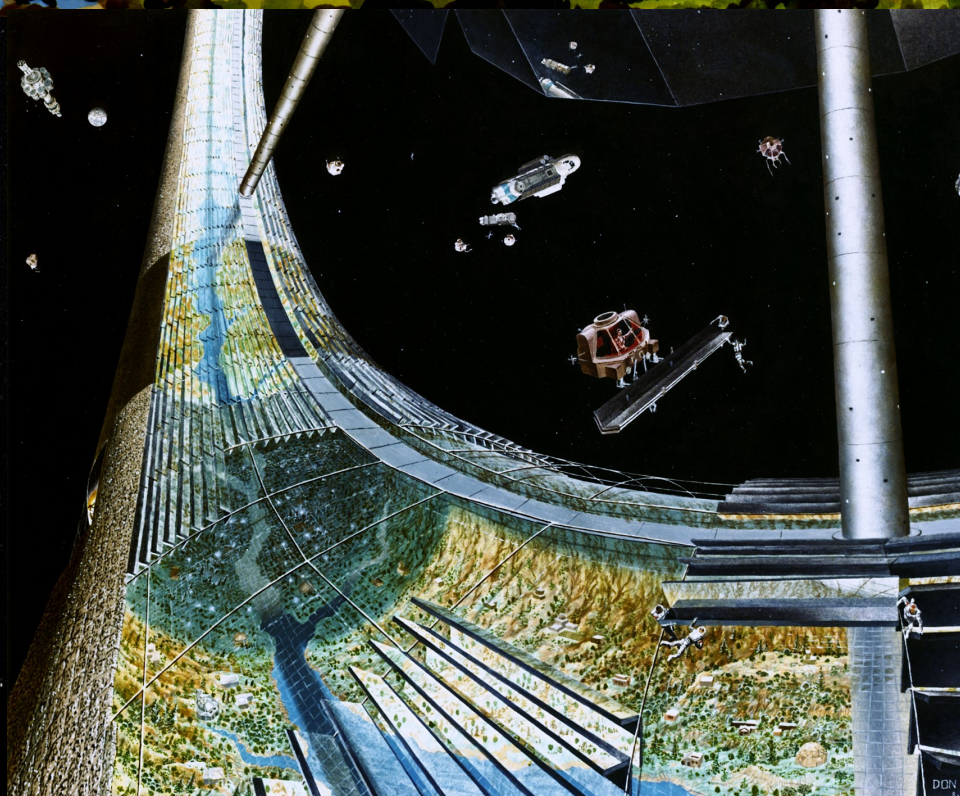
Picture: Chesley Bonestell's concept for "Von Braun's Space Station, 1952". NASA/Wikipedia.



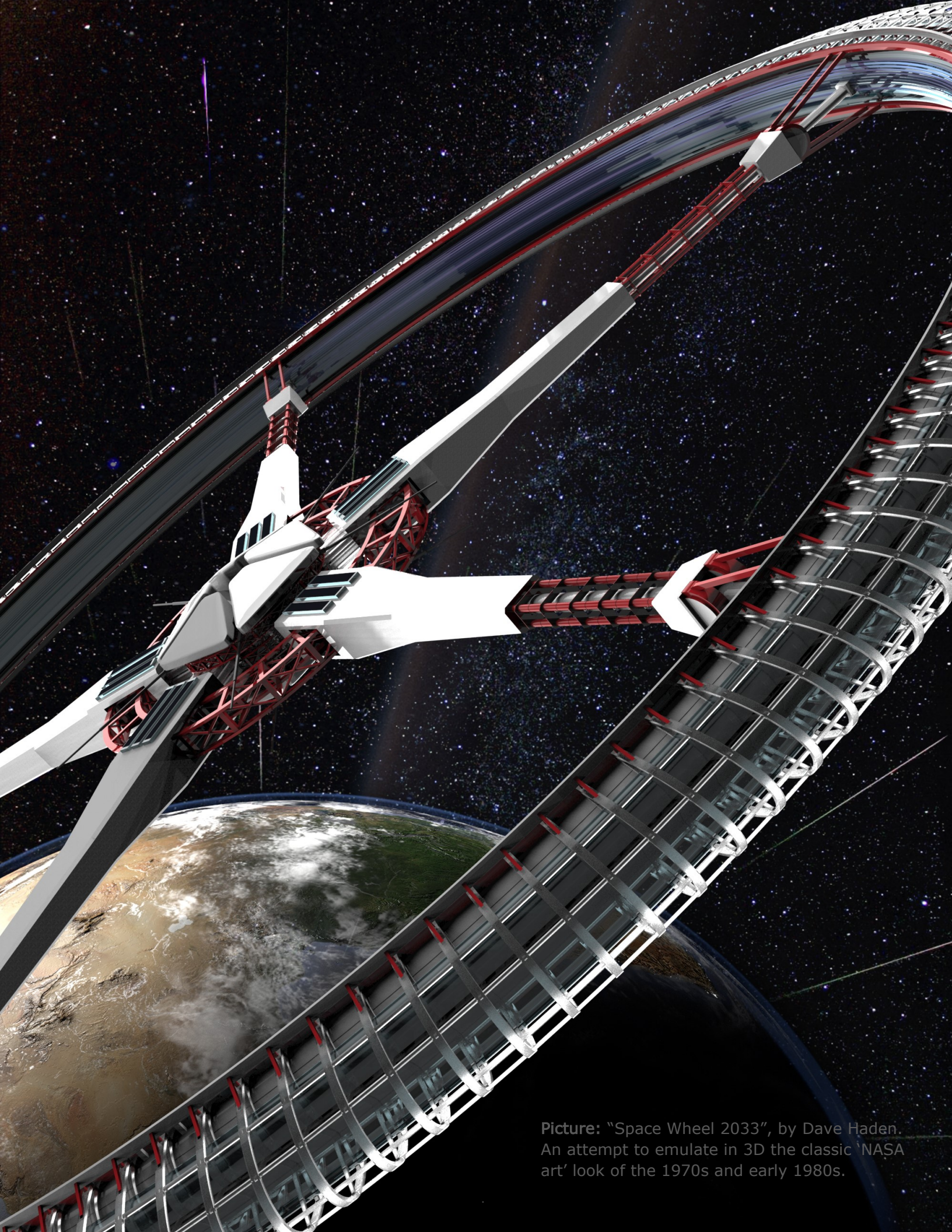
Pictures: This vibrant 1970s NASA art — now in the public domain — arose from serious research work, on what was called the Stanford Torus, the Bernal Sphere and O'Neill Cylinders, developing the work of Von Braun. These forms are now copiously documented online, for those interested in the technical details.

Seen right is the concept of how the Stanford Torus space-city would look under construction, with a proto Space Shuttle opening its cargo bay doors.

The tubular space city concept was famously illustrated by later artists, including Syd Mead and a number of paperback book-cover artists. More recently it has been found in top sci-fi videogames such as *Mass Effect*.




RICK GUIDICE

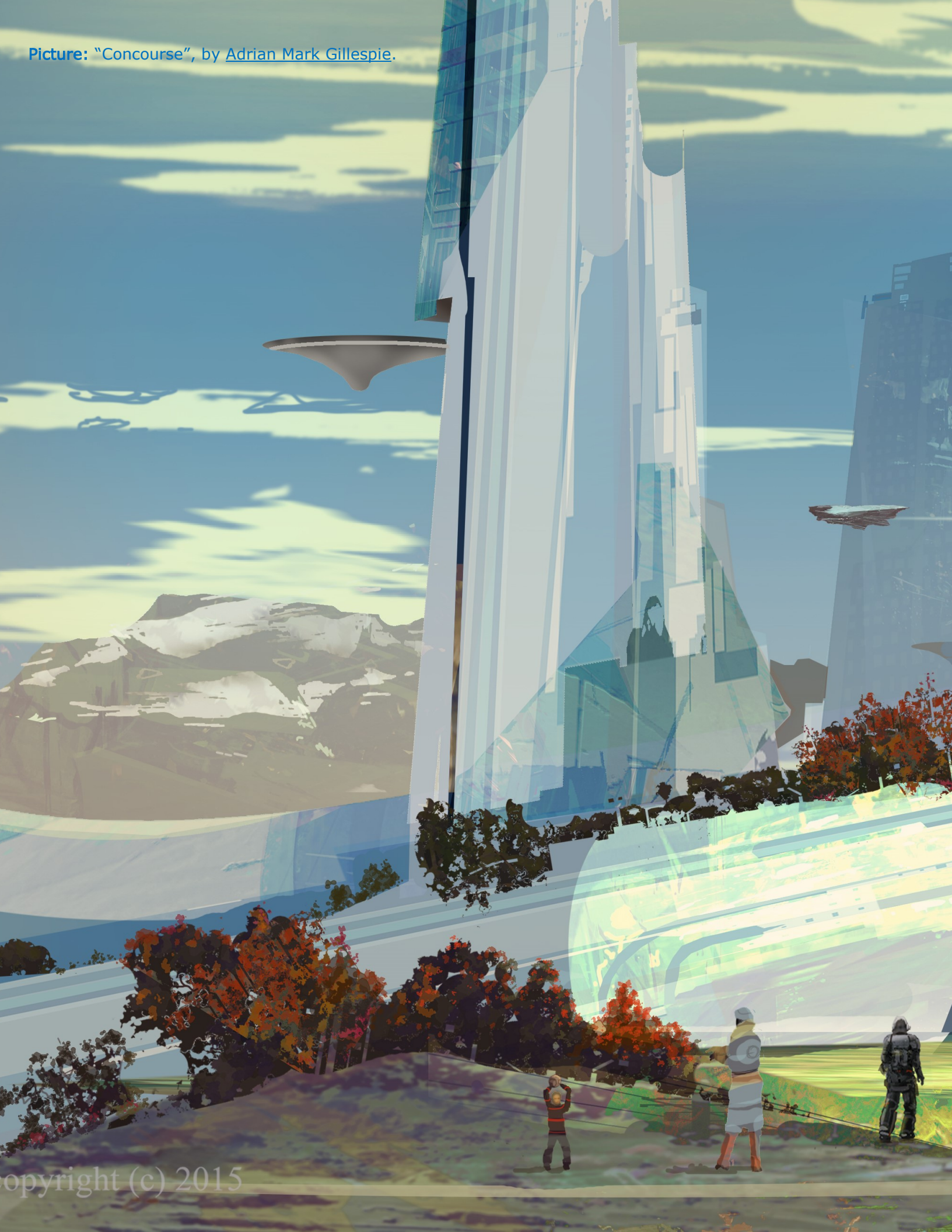


Picture: "Space Wheel 2033", by Dave Haden. An attempt to emulate in 3D the classic 'NASA art' look of the 1970s and early 1980s.

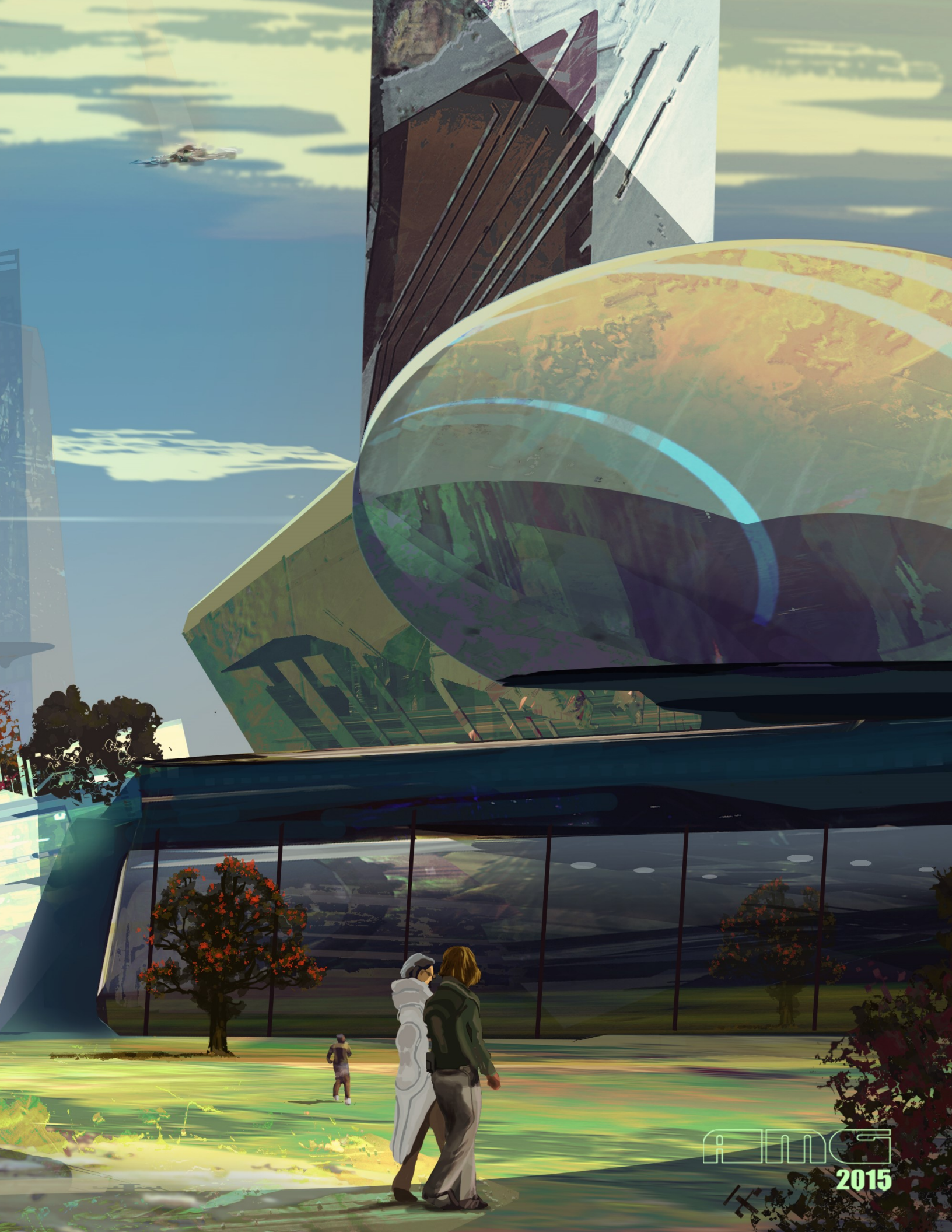
GALLERY

This issue's gallery continues this issue's theme of "Our Future Frontier". From soaring idyllic ring-cities to the dust and grit of Mars colonies, via terraforming with as-yet unimagined technologies, to outposts among distant stars.

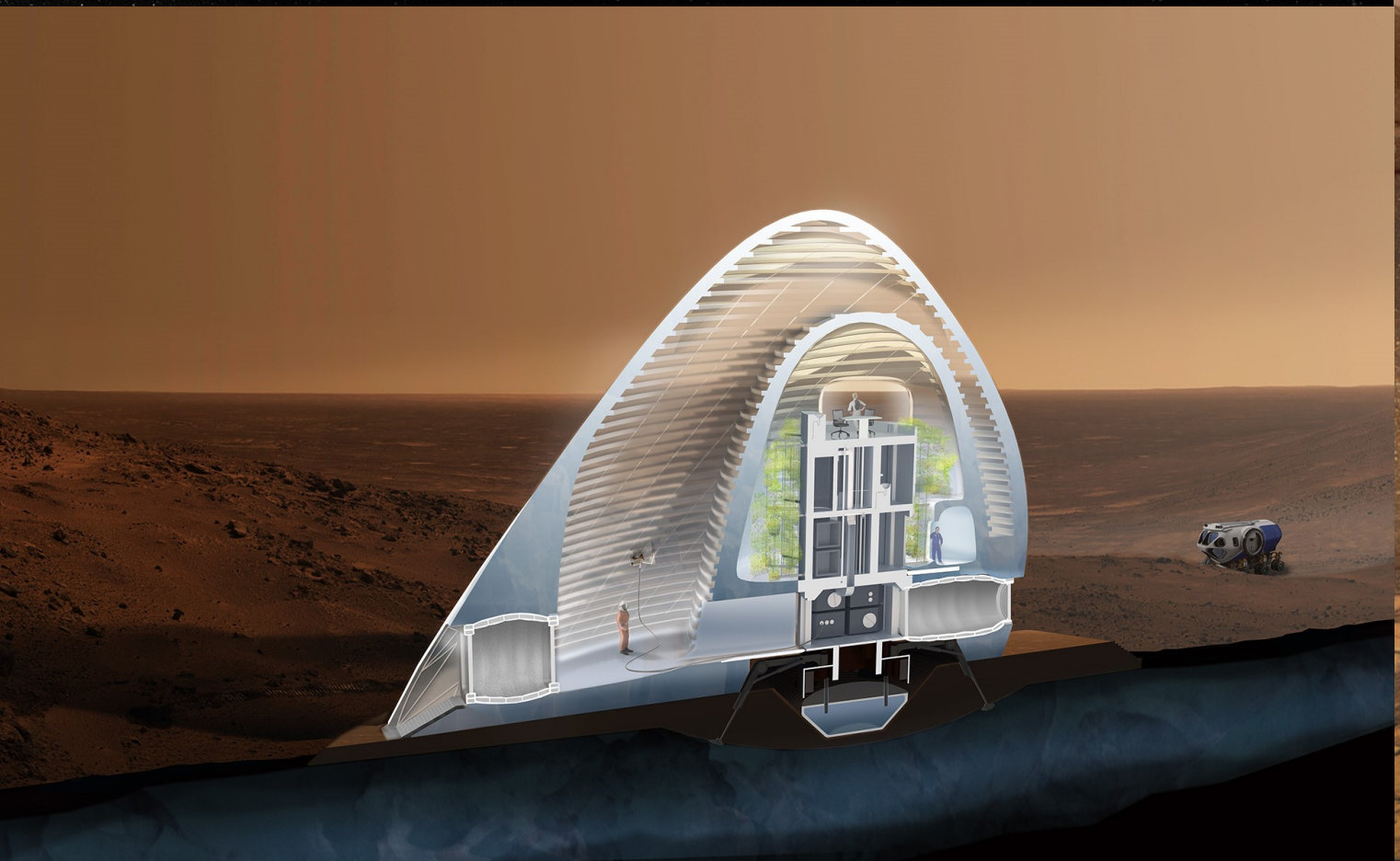
Picture: "Ring World VII" by Richard Fraser.
Rendering is in Terragen with XFrog plants.



Picture: "Concourse", by Adrian Mark Gillespie.


2015

Pictures: opposite — A future Martian "Dome, Sweet Dome…", by Dave Haden, composited using a causeway section by Richard Fraser, and dome by Tom Blackwell. Rover is a DAZ/Poser 3D model by DzFire. Above — A drone maps a Mars-like planet in "Cartograph" by Xistence Imaginations. Below — "Mars Ice House", winner of the NASA 3D Printed Habitat Challenge, won by Team Space of New York.




REMUS-02

Pictures: top — "Terraforming of Mars" by Arjun Prakash. Bottom — "Terra Formers" by Xistence Imaginations.

The terraforming of planets, moons and large desert regions may be done by technologies which we can as yet barely imagine. One might think that Arjun Prakash's impressionistic picture evokes the future possibilities of nanotechnology and biotechnology, when applied to the terraforming of Mars. Is this a self-assembling nano-swarm in action? A cluster of bio-engineered flying Martian 'water bears', swarming around a feeding station made of carbon nano-tubes that sucks moisture out of the ground?

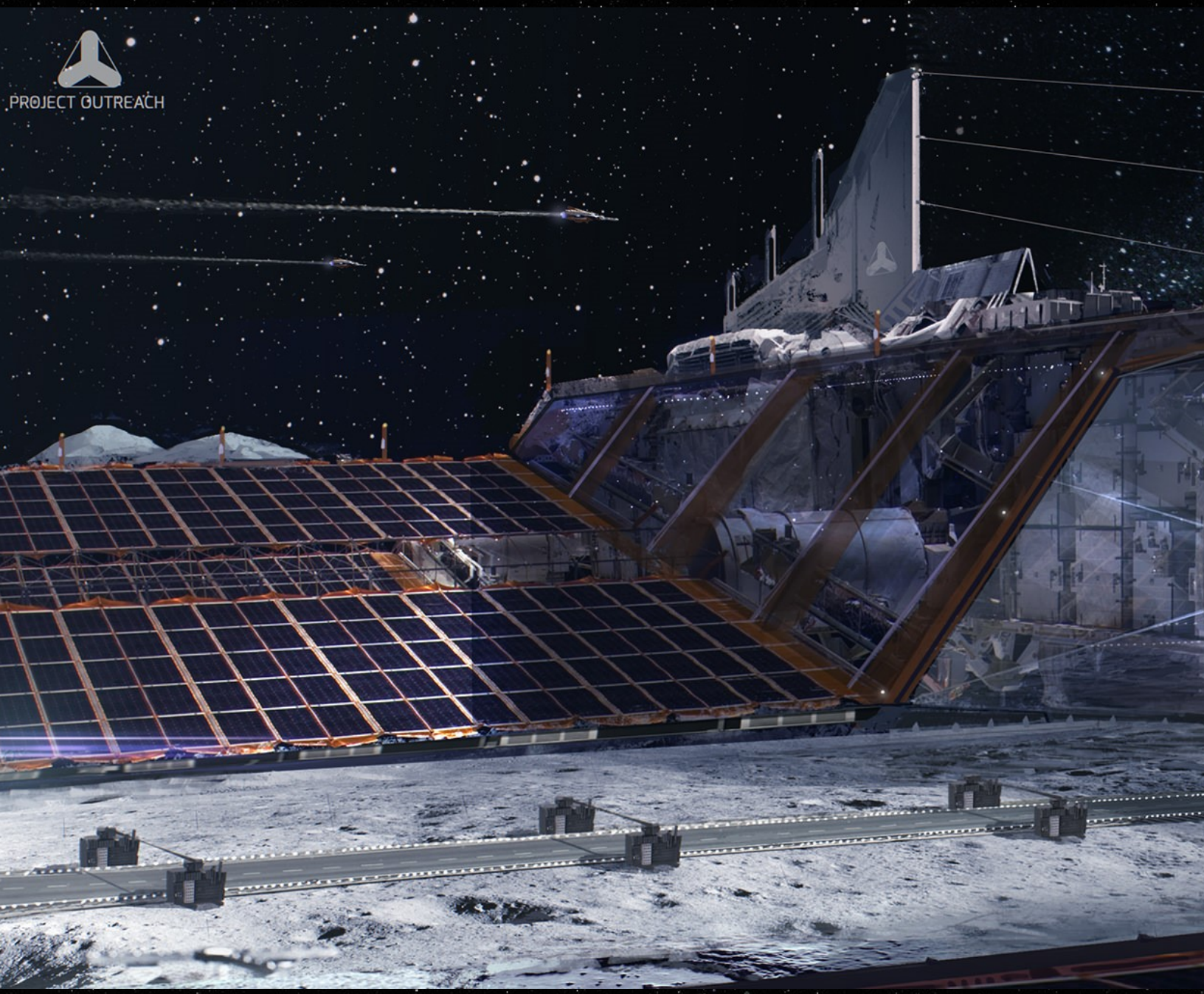
The picture by Xistence Imaginations, on the other hand, seems to suggest the tapping of a planet's own huge geothermal resources, and the use of this to power atmospheric conversion technologies on a planet-wide scale — in much the same way as Earth's own volcanos radically change the upper atmosphere when they erupt.

Picture: "Terraformer" by Tigäer; perhaps evoking the original sci-fi terraforming mechanism of 'the Red Weed', used against Earth by the Martians in H.G. Wells's classic novel *The War of the Worlds* (1897).

Picture: "Giants in The Playground", by Adrian Mark Gillespie.

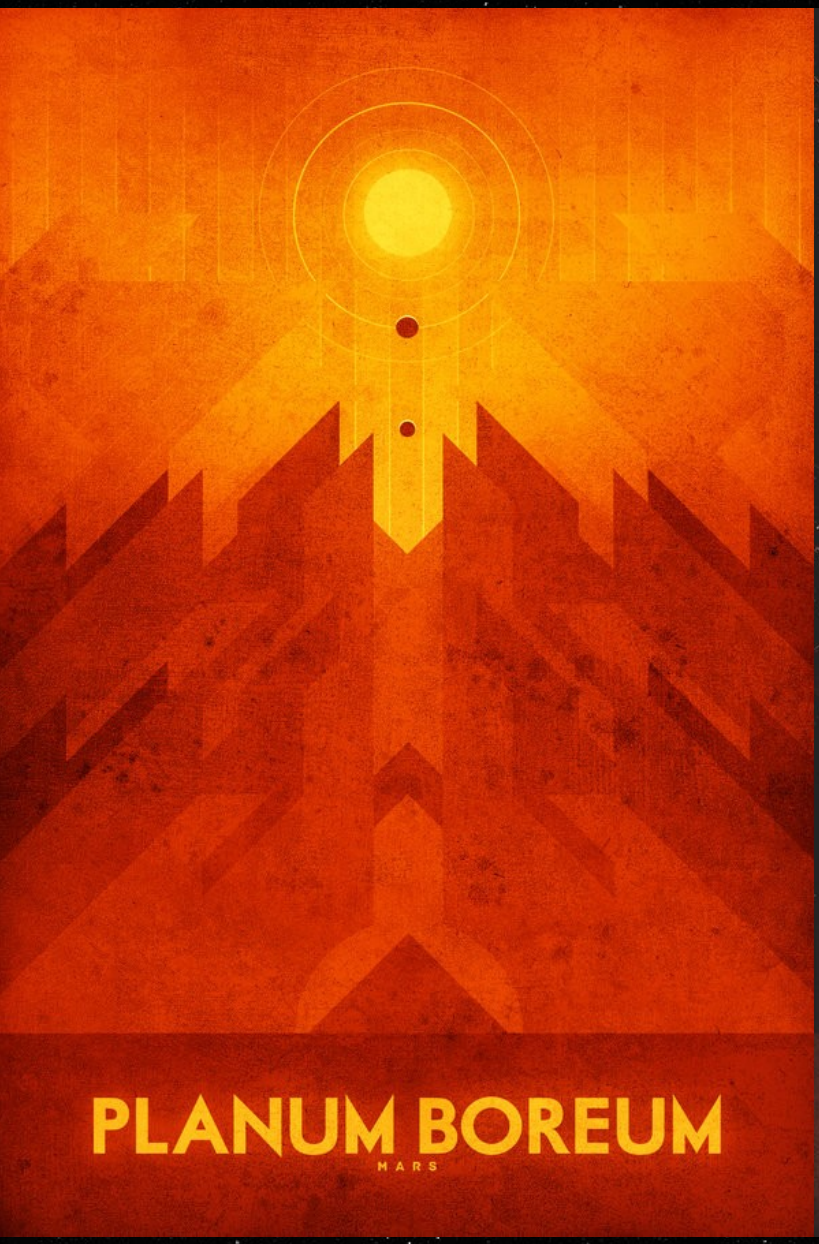
AMG

2014



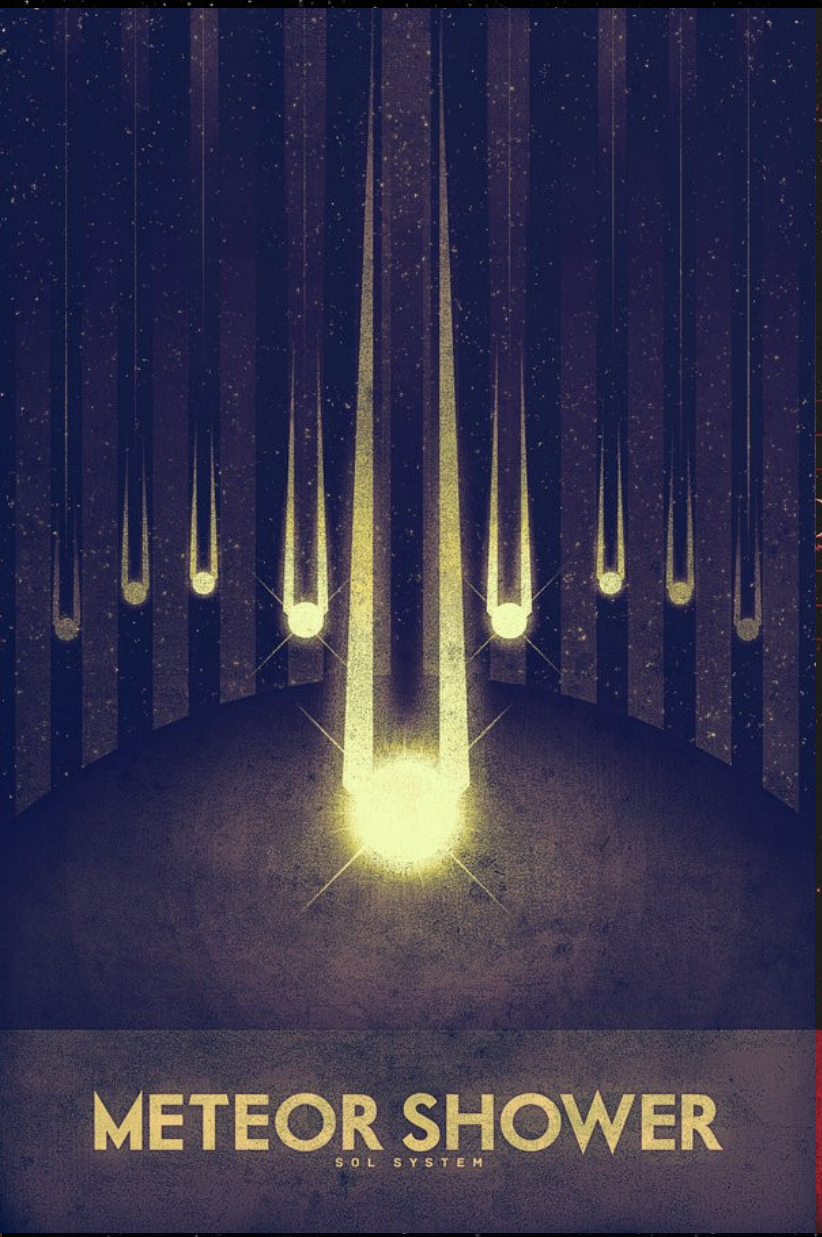
Picture: "Lunar Base 2" by Simon Fetscher.

Picture: Photoshop combination picture, combined by Dave Haden. Made by adding the Montreal Ecodome and a U.S. Navy dome to the European Southern Observatory 3D artist's Terragen impression of “Sunset on the recently-discovered 'super-Earth' world Gliese 667 Cc” (ESO, public domain), and adding haze and additional colouring with Photoshop filters.



Pictures: A small sample of four, selected from a very large and comprehensive series of solar system "Space Destinations" posters, made by Ron Guyatt of Canada. Framed prints of his poster works are available at FabledCreative.com.

From left: "Planum Boreum, Mars" | "Tritonian Geysers, Triton" | "Meteor Shower" | "Ida & Dactyl, the Asteroid Belt".



METEOR SHOWER

SOL SYSTEM

IDA & DACTYL

THE ASTEROID BELT

Picture: NASA's travel poster for Europa. "Saturn's largest moon Titan has a thick frigid and organics-rich atmosphere, and a surface shaped by rivers of methane. There may be volcanoes of liquid water. NASA's Cassini orbiter will peer through Titan's haze and unravel the mysteries of this planet-like moon."

Picture: "Discovery" photocomposite by Dave Haden, of NASA pictures. Will we one day find, waiting for us out there, some *other* form of life? Will it be just dry and ancient traces, or perhaps strange under-sea crustacea, or... much stranger beings?


Digital Art
LIVE
IMAGIN
Our pick of the hottest inspirational art & science. Make your imagination LIVE!

ANTARCTICA: A YEAR ON ICE

New Zealand filmmaker Anthony B. Powell's film *Antarctica: A Year on Ice* (2013) is perhaps the best 'Earth analog' documentary for Mars, letting the audience experience — via Antarctica — a little of what life on a Mars frontier base might be like in the future.

The full-length documentary chronicles a year spent living on the remote Antarctic stations, and contains stunning photography of the weird and dangerous 'alien' landscapes that the teams encounter, as well as the stunningly clear and active night skies. While the film does have a few minutes of penguins in it, it is very different from your usual TV nature documentary.

It concentrates mostly on 'man in the landscape' and on the human aspects of living and working on the Antarctica research bases. It also touches on the maladies, such as a T3 syndrome, that arise from such isolated lives — giving a taste of some of the unforeseen problems that the early Martian colonists may have to overcome.

The documentary *Antarctica: A Year on Ice* has won many awards, is visually inspiring, and is highly recommended for anyone interested in 'life on the frontier' in the 21st century. See it on the largest screen possible!

http://frozensouth.weebly.com/

ARIUM

Promotional press pictures courtesy of Anthony B. Powell.

FREE MAGAZINE — *SPACEPORT*

NASA now produces a free monthly PDF magazine, *Spaceport*, with great photography of NASA's latest module construction, spaceports, launches and space experiments. The title also has occasional news of art & design competitions and other opportunities to engage with NASA.

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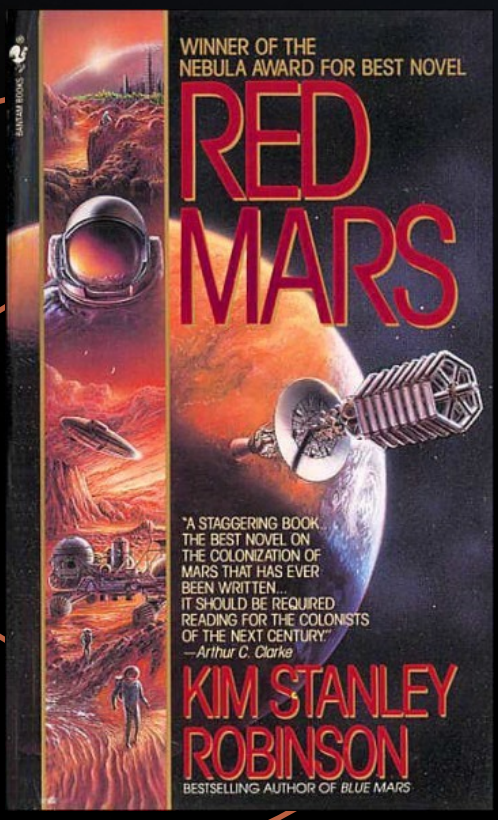


TV — *RED MARS* TO BE FILMED AS A MAJOR TV SERIES

Kim Stanley Robinson's epic *Red Mars* trilogy is to be adapted as a major TV series, telling the 200-year story of the terraforming and colonisation of Mars. But the *Red Mars* TV incarnation recently hit a wormhole, in the form of the departure of its key 'showrunner'. It was all going *so* well, too! American network Spike TV had confirmed a ten-episode season for *Red Mars*, which was set to screen from January 2017. Writer J. Michael Straczynski (*Babylon 5* series) had ably adapted the novels. *Game of Thrones* producer Vince Gerardis was to be Executive Producer alongside Straczynski, with Kim Stanley Robinson himself as consultant. Greg Yaitanes (*Lost*) was to direct. The filming schedule was approved. The fans were leaping up and down in anticipation... and then the showrunner Peter Noah (*The West Wing*) abruptly left the whole project in the lurch, citing his "creative differences". We now suspect that we won't see a pilot episode until well into 2017, but Spike TV has assured the fans that *Red Mars* will be underway when the creative team can be re-jigged. In the meantime, we suggest the **unabridged audiobooks of the *Red Mars* trilogy** would make excellent deck-chair entertainment this summer.

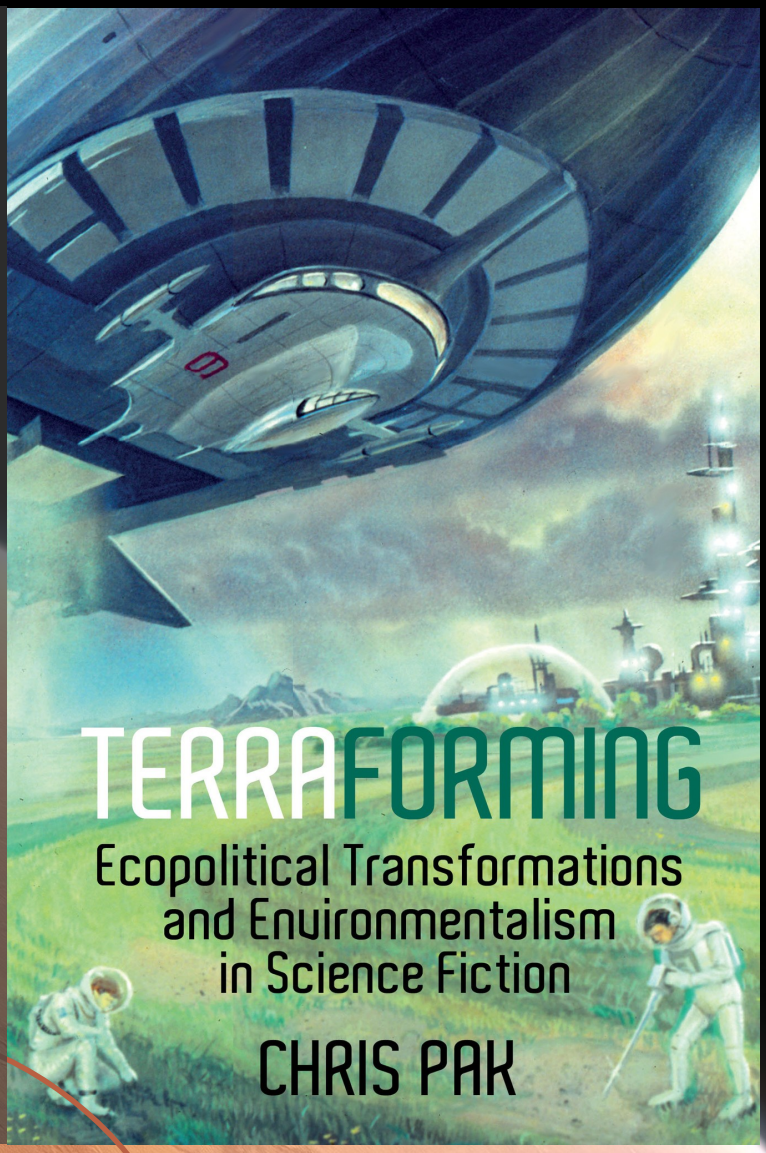
FREE BOOK — *TERRAFORMING*

Each year Knowledge Unlatched select a list of top-quality academic books to be made free to the public as Open Access titles in PDF. That's free as in "forever"! One of the books is Chris Pak's *Terraforming: Ecopolitical Transformations and Environmentalism in Science Fiction* (2016, seen right).

Pak's book is a sweeping and comprehensive scholarly survey of terraforming in literary science fiction from H.G. Wells to today. Being an academic book, it would normally cost £80 ($120)!

The books on the 2016 Knowledge Unlatched list are being released in batches, and *Terraforming* should be available for download very soon now, from the following Web address.

http://collections.knowledgeunlatched.org/collection-availability-2/

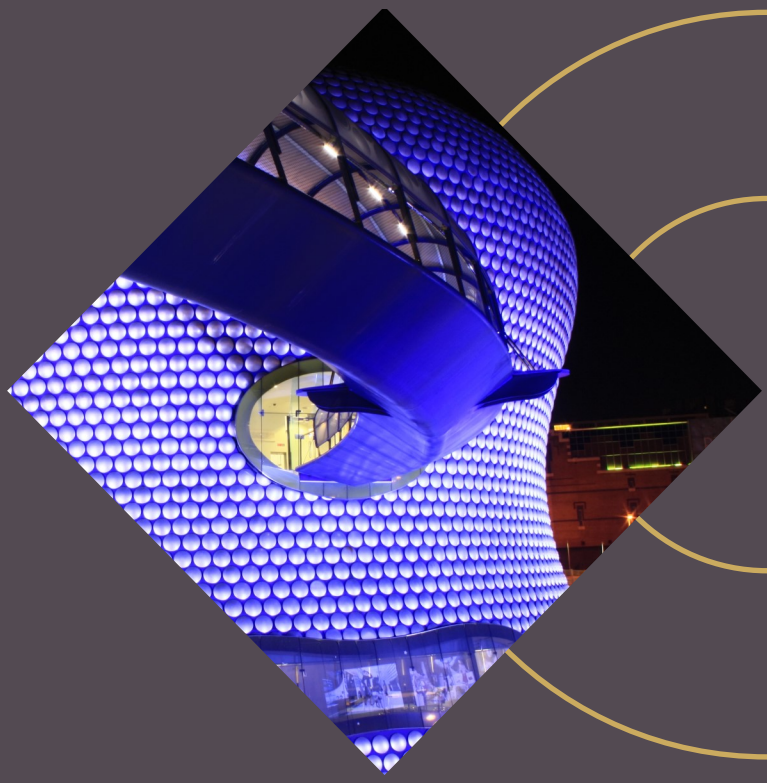


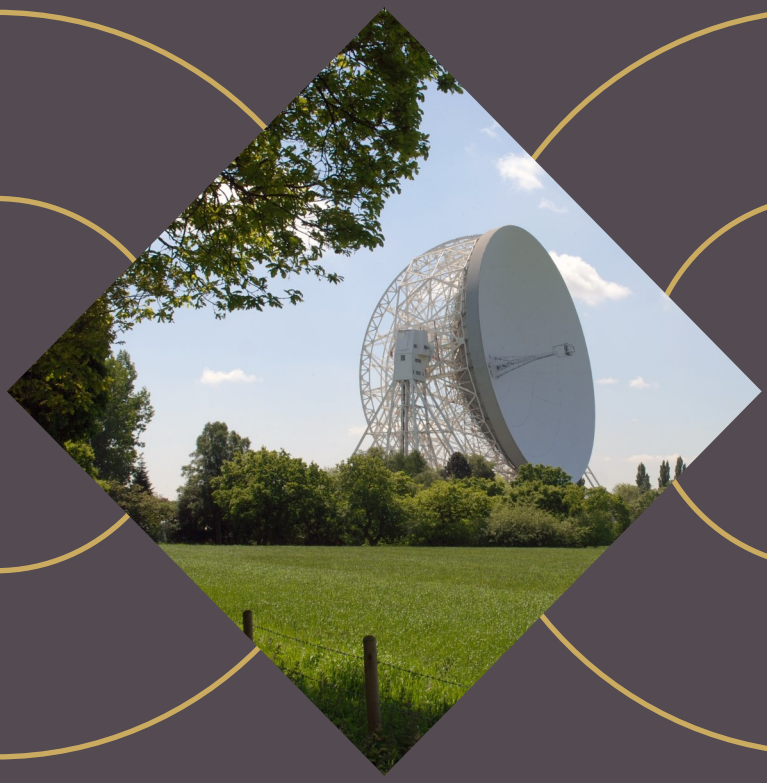
Pictures: Spaceport magazine covers and Orion launch photo, NASA. *Generation One* artwork by Timothy D. Stewart. Backdrop is Mars, courtesy of the ESO. *Red Mars book* cover by Don Dixon. *Terraforming* cover from Liverpool University Press, artist unknown.

COMIC BOOK — *GENERATION ONE*

The new digital/print comic book series *Generation One* tells the story of the courage and determination of the first generation of children to be born and raised on Mars. After a successful $30,000 Kickstarter campaign, the *Generation One* series is printing its first issue now, and Kickstarter backers can download all issues in PDF for free. The four-issue comic has been specifically created with the goal of getting kids and adolescents interested in science and in future Mars colonisation.

A Kickstarter 'stretch goal' was also scored during the fund-raising campaign, meaning that the creative team will be able to add an appendix to the comic, packed with scientific and other factual details about how Mars will be colonised.





Eastercon 2017

14th—17th April, Birmingham, UK

The English Midlands city of Birmingham is to host Eastercon 2017, the UK's major convention for literary science fiction. Guests of Honour are to be Colin Harris, Judith Clute and Pat Cadigan. The Birmingham NEC venue is on the outskirts of Birmingham, but is easily accessible via rail and the adjacent Birmingham International airport. This will be the 68th British National Science Fiction Convention, part of which is always the famed Eastercon art show, highlighting some of the best science fiction original art by artists from the UK and elsewhere. The Art Show is currently booking now, as are the dealer tables.

http://eastercon2017.uk/

Pictures, from left, across double-page spread:

Birmingham Selfridges dept. store at night. Courtesy of Wikimedia.

Jodrell Bank and fields. Courtesy of Allan Watkin.

A Gateway to Space exhibition-preview guest examines a real Moon rock. Courtesy of Sandton Convention Centre, Johannesburg, South Africa.

Garden and pool in the Mori museum complex, Tokyo, courtesy of Wikimedia.

Bluedot festival

22nd-24th July, Jodrell Bank, UK

The famous Jodrell Bank telescope, located on the Cheshire plain 14 miles north of the Midlands city of Stoke-on-Trent, is to be home to a major new three-day music and arts festival on 22nd-24th July 2016. Bluedot is, of course, named for the phrase made famous by Carl Sagan.

Electronic music maestro Jean-Michel Jarre (*Oxygene* / *Equinoxe*) will headline the music stage, along with Air, Underworld, Caribou, British Sea Power. Brian Eno will do projection-mapping of visuals onto the iconic telescope bowl and structure. There will be a full slate of arts-and-science events and talks — guests will hear a programme of 'DotTalks' by leading researchers in astronomy and astrophysics, and a Stargazing series headed by Pete Lawrence (BBC's *The Sky at Night*), and be able to visit the Luminarium and Science Garden among many other science-based attractions.

The venerable and historic Jodrell Bank site continues to be scientifically important, having recently been chosen to be the site of the H.Q. for a new £1 billion mega-telescope, and guests will also be able to learn about the site's future.

http://www.discoverthebluedot.com/

Gateway to Space

1st June-31st July, Johannesburg

This will be one of the biggest exhibitions ever staged in South Africa. Its authentic Space Age artifacts required 20 shipping containers to get to Johannesburg. From the Russians came Sputnik 1 (the first space satellite), part of a Vostok rocket, a life-sized walk-in Mir Space Station replica section, plus original Russian spacesuits and space food. From the U.S. came Moon rocks, a Space Shuttle cockpit, Mercury-era astronaut trainers, an Apollo Moon Rover, plus NASA's new Mars-bound Orion capsule and rocket technology.

It is hoped that the vintage Space Age hardware will excite the nation's space enthusiasts and dreamers alike, as Africa gains increasing expertise in astrophysics, satellites and rocketry. "Gateway to Space" will also run alongside a new wave of African literary science fiction. African futurist writers can now reach audiences wherever they are, through mobile phones and satellite Internet. Millions of imaginative and newly-literate Africans are eager for fresh local narratives of pioneering inventiveness, rational optimism and long-term thinking about the future.

http://gatewaytospace.co.za/

The Universe and Art

30th July onward, Tokyo

On July 30th Japan's Mori Museum will open a huge six-month show in collaboration with *The Yomiuri Shimbun* (Japan's equivalent of *The New York Times*). The Mori Museum is one of Japan's leading museums, located in the cool Roppongi Hills outside Tokyo.

The art show is a first for Japan, with 150 items carefully selected from across the globe and down the centuries, and from multiple genres. Objects will range from meteorites and fossils to historic astronomical drawings by Da Vinci and Galileo; ancient 'cosmic' Indian mandalas; Japan's oldest sci-fi novel (an illustrated Edo-era scroll-work titled *The Strange Boat Drifted Ashore*); many 'cosmic' installations and objects by major living artists; and also the latest from the frontlines of space exploration.

The exhibition will run until 9th January 2017. There will be four sections: "How Have Humans through the Ages Viewed the Universe?", "The Universe as Space-Time", "A New View of Life—Do Aliens Exist?" and "Space Travel and the Future of Humanity".

http://www.mori.art.museum/

Back cover: "Bionic StarChild" by JTorrevillas. Made with Blender 3D, Inkscape, and GIMP (all free 'open source' software).

Are you interested in being interviewed in a future issue of the magazine? Or offering a webinar for our series? Please send us the Web address of your gallery or store, and we'll visit and take a look!

digitalartlive.com/get-published

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BLENDER