My Space Poop Cover Letter

This is not a story about a hero, but an ordinary John. Sorry if it's not to your appetite.

NASA just held a storming festival on HeroX, maybe one of the most awesome prom ever here. Innovators from all over the world come to follow the challenge, just for a common goal-- help our brave astronauts to keep venturing on their journey without worrying about the poop problems, hopefully, not anymore!

And I'm glad I was in the prom.

So did I do a good job then? Well, I could only say, I've tried my best!

What NASA didn't tell the audience was, probably they already had hundreds of waste management design samples for spacesuits of every kind, heaped up high in a forgotten corner in their warehouse, which proved to be not too practical after numerous experiments. In fact, if you do a little effort googling, you would easily find, since the '60s, they'd started to develop a waste collection system for space vehicles. May 5, 1961, during the first Mercury flight, Alan Shepard still had to pee in his spacesuit. It was not until Feb 20, 1962, the esteemed astronaut John Glenn could have the convenience to let go in a urine collection device, and became the first American of accomplishing earth orbiting. So technology did contribute to the advance somehow.

In case we rush into too much depth, and this article become a humdrum compilation of waste collection device history, dealing with all human metabolic stuff, and your mind is boggled with concepts of feces, urine, and menstruation as well as urethrae and vaginae, which might null your palate for lunch. Let's say NASA has tried their best too in the past half century, yet not being able to get a satisfactory solution. It is an indeed challenge to technicians and engineers in NASA; they designed and modified, but sometimes an unanticipated usage from the crew would lead to unpleasant leakage, noxious odor and worries about bacterial contamination occupied the compact 100% oxygen capsule of a spacesuit, thence how could you expect a delightful and heedful performance from that astronaut to his or her mission, not to mention a positive feedback? Above all, all designs were meant for male crews in the first place.

We know that NASA is the leading department of technologies nowadays-- it's however, never an overappraisal. A lot of commercial hi-tech products we're using today, could easily find their prototype traces from inventions inside the aerospace industry, which would have little chance to survive, hatch and mature were it not such intimate collaboration with NASA's projects. Just like they've unfolded, even the adult diaper is one of such in the list. We can afford and utilize them at home like a charm, that's because of mass production from those big manufacturers. As a result, it shall not be difficult to figure that, how many rocket scientists have been employed by NASA since its establishment in 1958. They're all dandiest genii with top IQs in our living era! It's really a thrilling picture to imagine so many masterminds gather together in the same institute, trying industriously to make contribution to human civilization everyday. In my daunting daydream, I wish I could at least attend there once and have a chance to witness such a marvelous sight, maybe making acquaintances with some of them. It's not fair to say that they didn't do a good job in developing a versatile and well-rounded system for metabolic waste disposal in a spacesuit. If you thoughtfully take all the scarce limits in outer space into consideration, you shall know well, without the advent of new technology, it's almost impossible to stumble one step further in the design.

So who am I after all? Nobody. To be precise, a poor John living in the bottom society of Taipei, the only metropolis on this Pacific island Taiwan, which could offer enough opportunities for a living; the hut I dwell, is a penthouse appended on top of a slum building, with cheap sheet metal roof. The only difference is, I have access to internet, and educate myself in math, physics and handicrafts-- I'm not too bad in needle works as a man. My name is Eli Mustard, who had dropped out of college as an architecture student long ago.

When NASA unleashed this challenge to all thinkers of the world, and welcomed everybody without education or capital limits, frankly, I could hardly contain myself-- to me, it's an invitation from the technology Jerusalem on earth, so to speak. It has been a highly walled and strongly fortified temple located on the summit of human civilization since I have memory, then all of a sudden, it decided to held a carnival and post the announcement of a challenge right besides its long locked gates. How could a man subdue his curiosity under sanity? No, no, if I missed, I might suffer more than a lovesick, maybe my whole life. I got this message from Yahoo news, Nov 20. Without too much hesitation, I finished my works at hands in a haste, shoveled them aside, and emerged myself into the data labyrinth of unlimited possibilities, seeking for a hidden procedure within our existing technologies, and hopefully it could be the exit to a grandeur plateau.

How could I beat those genii in NASA?

Kidding me! Maybe I have a good IQ, but never so good.

The more depth I dived into the research, the more frustrated I got in altering my design. Built and rebuilt, disassembled and reorganized. In addition to that, I found one more critical problem: I would soon run out of cash! I don't have a big family support, neither could I find any relative to turn to. This is Taiwan, in our terminology, we nickname it "Ghost Island," which is only suitable for deceased men and their phantoms; it's an island without too much mercy to the poor, the minority, or the youngsters. So I had come to a crossroad, return or keep on the journey and exhaust all my resource in the following month? Hard as the dilemma could be, literally, a man in poverty shall never chase a daydream like this. And in the end of the struggle, I took the journey. I might lose everything in my little hut, and being cast out by my landowner, but I could not deny myself the craving to participate the festival, and maybe the only chance in my life to visit that mysterious temple and polish my eyesight with the vividness of my beloved world.

My original design was nothing special, in order to meet the requirements listed on the Challenge homepage, an in-suit device. Yet I'd done my homework and understood it has been half a century long, after so much endeavor striven by so many scientists and engineers of choice; it's impossible that I could add anything better to the crystals of their teamwork. Could you imagine how much budgets might already being bestowed on evolving such a system? I think NASA chose to omit all these details deliberately, lest they would intimidate the participants because of the inconvenient truth, which might become too overwhelming that no one dare to challenge at all. Anyway, anyone has a keyboard and not too bad in google could figure out eventually, why bother to say so much? In my ruggy imagination, during the past half century, representatives and agents from companies and partners filed in and out the exhibition room of NASA's headquarters, unboxing then trying to convince these rocket scientists how good and smart their solutions could be, oh…… And NASA was not too stingy, it did buy some, and handed these devices to their engineers to test. Nevertheless soon after the probation they'd started to lose confidence in their new toys, and went to clean out another space on the rack in their warehouse, listed the toys with their old ones, maybe tagged them something like No. X-1……. Nay, I thought to myself, I exhaust my resource here not to make one more toy for those genii to have fun and relax, I'm here to help. Everyday hereafter is so precious, if my solution could not benefit the advance and solve the problem, I'd better return.

You know there is one TRL (Technology Readiness Level) in the judging criteria, which occupies 20% of importance?

Before I came to my final design, I tossed all the criteria behind, and meditated for a while; actually I had contemplated about the solution to this challenge for weeks, and there was not too much time left already. It was a time I had to decide, do it or abort? I knew deep in heart I'm no better. The only way I could contribute was to move the whole waste management design out of the spacesuit, take advantage of this move, and build a complete system for long term usage in outer space, which is also applicable on other launch-entry type spacesuits, not for the orange ACES or MACES only. In order to achieve this attempt, however, I had no choice but to introduce a technology not existing in our civilization so far, the superconductivity cords made in the nanotechnology of microprocessor today. Of course no data available, worse than that, I'm not even sure if it will succeed or not? Because it'll heavily depend on how the manufacturers like Intel or TSMC arrange the design in a chipset, how they compound the silicon, and that's always the top business secrets of these giants. Without a fat contract, it's almost impossible to take a glimpse of that. All in all, the TRL is definitely zero, and my design will destined to lament the absence of that 20% criteria. This is the core system, without it, conveying wastes out of a spacesuit will become too expensive. And there were more than 20,000 of innovators from all over the world, including enterprises to small companies, for NASA had released the information of a cooperation opportunity. The lack of that 20%, also meant goodbye and thanks for your hard work. Well, I really needed a little time meditation.

Now, I could be proud to say, I did my design honestly, without swerving to the criteria, even though that meant I had no chance to pursue my dream anymore. Think this way, the superconductivity rifling is not the only technology I introduce, the whole system still needs some DNA manipulation and photovoltaic membranes, both are technologies existing only in the near future; they're comprehensible, yet maybe not now. My proposal might be too much a science fiction to the panel. While all that I can say is, I've tried my best, my really really best!

So far I've used up my resource, and since the Christmas Eve, I've started to mail my cover letters on major career sites in Taiwan. Merely a piece of high school certificate could not do me too much favor, since college diplomas are as cheap as packs of chewing gum in our Ghost Island. "Any ads board blown down on the street, there might be two or three doctoral students die on the spot." It's an old joke though, it also reveals what a mess our education system could be. Worse of worse, I got injury in my spine before demobilization, because of the fault of honest, which offended my officer, hence getting maltreated by senior soldiers. That injury makes me incapable of heavy loads, which is an important factor to blue-collar laborers. I'm losing my hope to life little by little. If you ask me if I would regret in participating such a challenge? No, never. Once again, I would still take the same journey, submit the same design, for it's my dream.

When I finished uploading this article, it's already Jan 10 in Taiwan, only a couple hours before my rent deadline. Two months without income is almost lethal to a poor guy like me. I've stayed up all night, typing down my little adventure behind my proposal and checking for grammar errors (apologize if there are still some, I wrote this in a hurry). I just hope when the landowner bursts open my hut door, he (a sturdy plumber) and his men will not be too harsh on me; or maybe he would be willing to allow me a couple days more to delay my rent?

A hero? When do you see a hero struggling in the mud, and looking forwards for a job online?

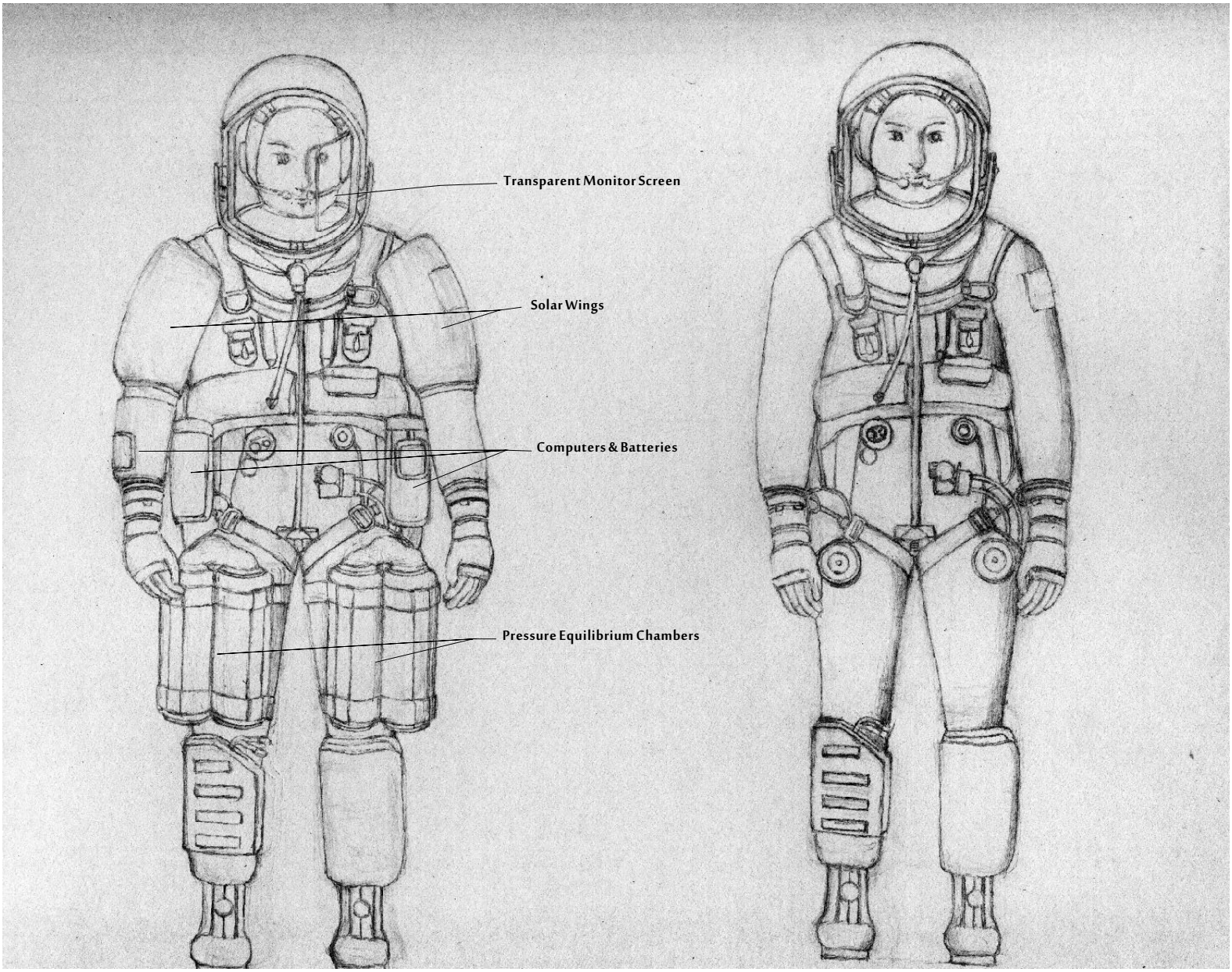
I upload this story not because I want to be a hero, but because in the guidelines of this challenge, it has promised that once a story is submitted, it will become public immediately everywhere on the website. And here is my story as well as my cover letter. See, I've uploaded my sketches to my design too, and I'm not too bad in illustrating; if I have enough time, I could refine them further into professional illustrations. My English might be a horrible disaster to many intellects, but my Chinese is pretty archaic and well-mannered. I could do you the illustration and the translation composition together, which has the potential to deliver a message far better than an article or a drawing alone. Other than that, I don't think I could show you any certificate instead.

In the end, thanks for your precious time to read my bizzare adventure, and tolerate those errors in my article. I think I must clarify, although here is my cover letter, I'm not a beggar.

zambu.dweep@gmail.com

Best Wishes from a subtropical Pacific Island, Formosa

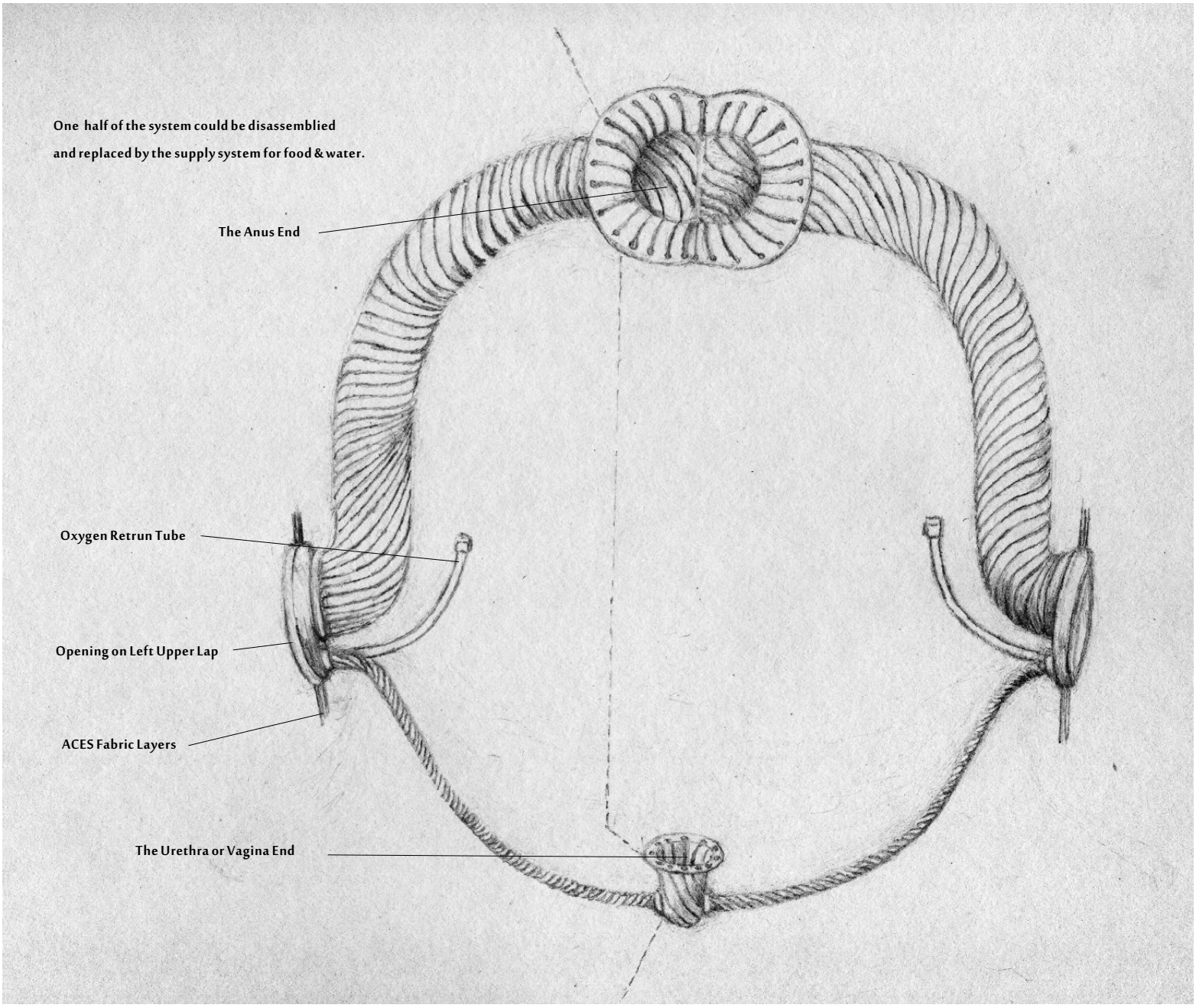
Eli Mustard



A rearrangement of the ACES front layout

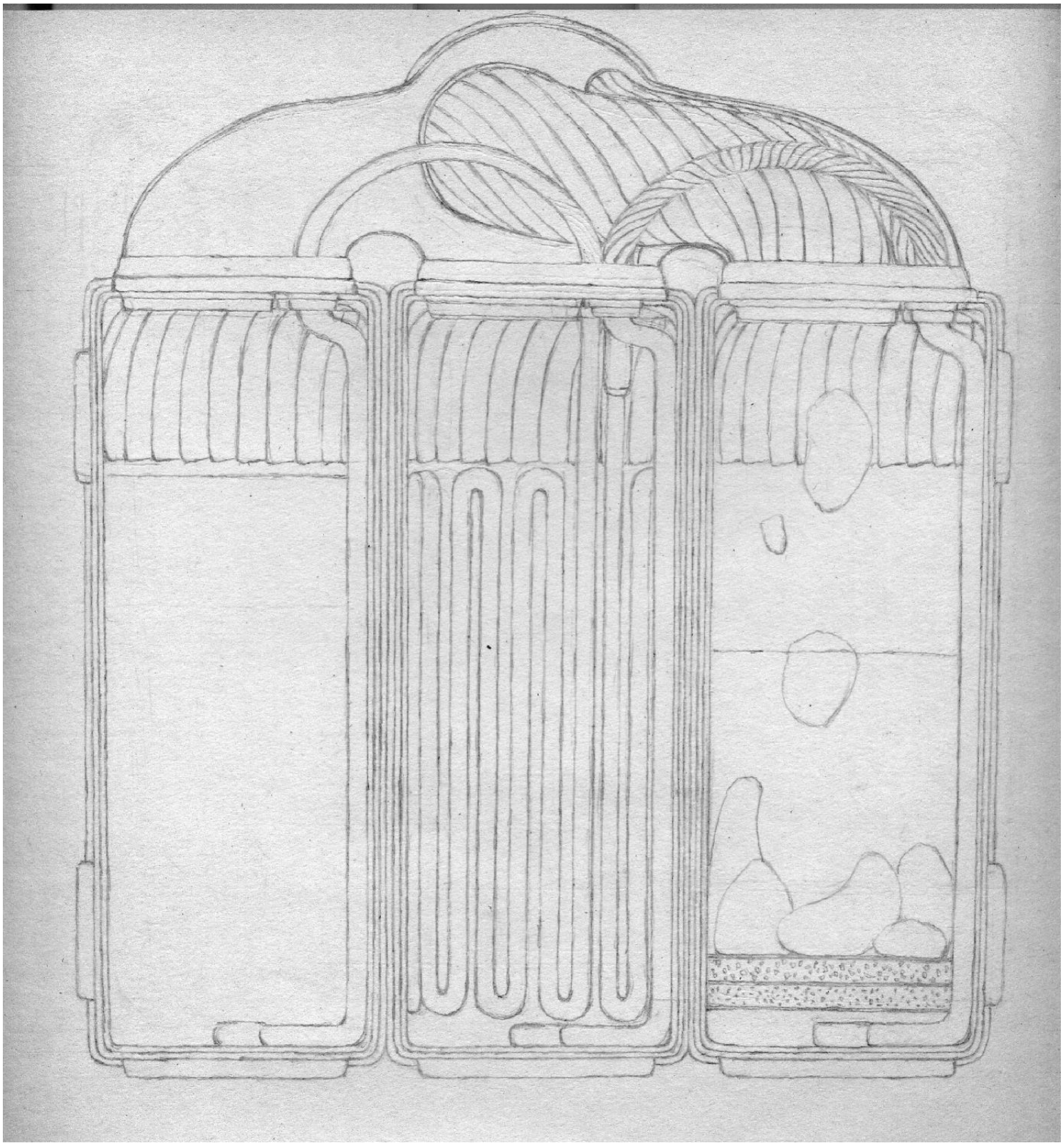
The right side is the ACES after the rearrangement yet without the management system

The left side is the ACES equipped with the supply & waste disposal system



The Electromagnetic Conveying System

The conveying system is fixed onto the spacesuit inner layer.



The Waste Disposal System via Three-Chamber Module

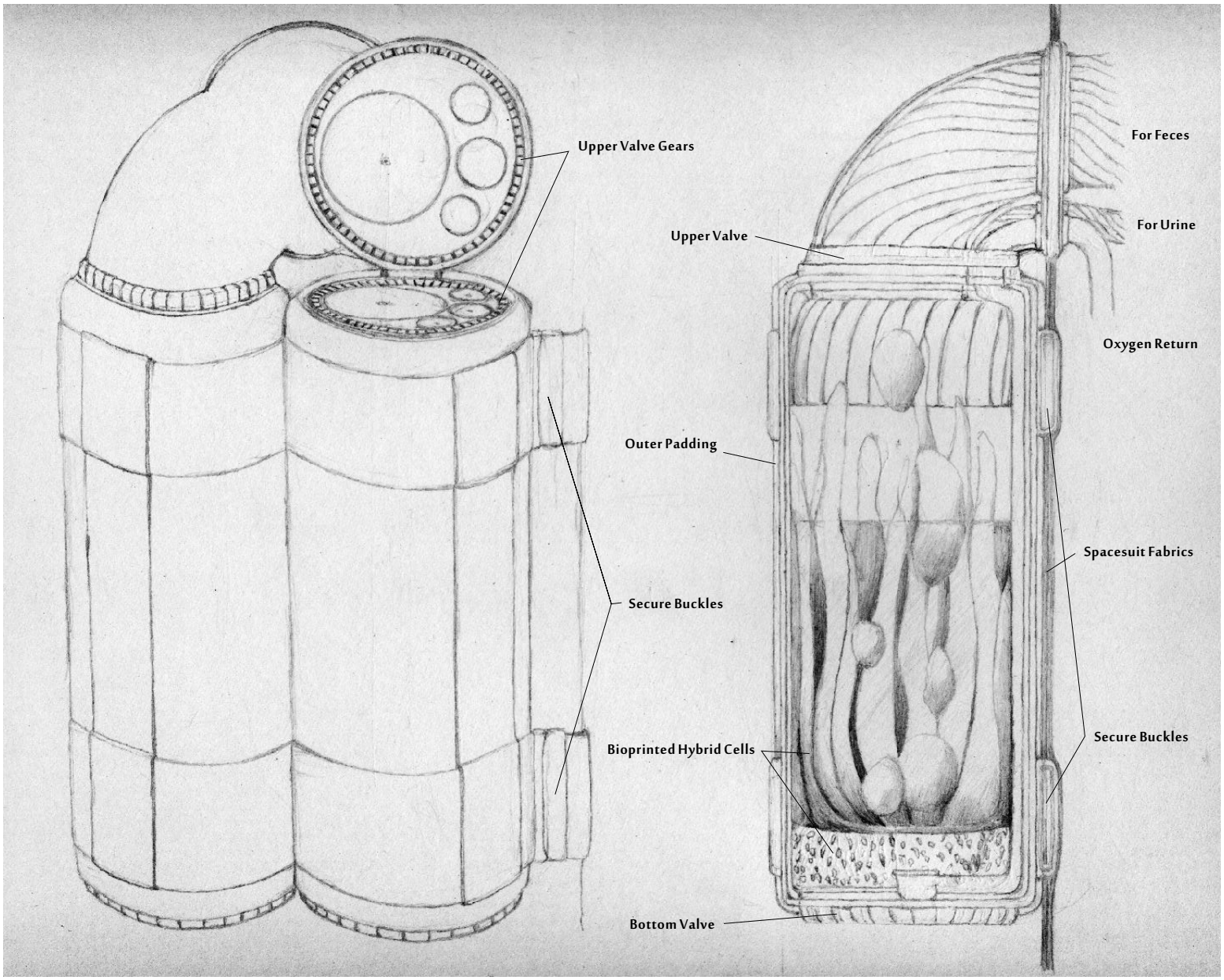
The right cartridge filters wastes via microfiltration, ultrafiltration, and reverse osmosis.

The middle cartridge separates oxygen from water after the RO process.

The left cartridge is liquid oxygen, used as refrigerant to keep water under freezing point in the middle cartridge.

After liquid oxygen in the condenser tubes gets enough energy, it will be released back into the spacesuit.

Electromagnetic Currents from the conveying system will become the required force for RO.



The Pressure Equilibrium Chamber Subsystem

Sensors in the chamber will check and ensure pressure equilibrium during cartridge replenishing.

With the help of the chambers, both supply & waste management are then replenishable.

In my ideal design, the waste cartridge should occupy only one chamber for mobility's sake.

Inside the cartridge, DNA hybrid cells from the sea live family will be bioprinted to help the filtration.