HERE COMES THE SUN

The night breeze at Cape Canaveral is pleasantly warm for late autumn. Regina finds a suitable rock by the light of her phone, brushes off the sand, and sits facing the sea. I take a seat on another rock a few feet away from her.

The coastline around here has changed drastically over the past few decades because of the crazy climate change and greenhouse gas control efforts. Who knows, the chunk of masonry my butt's planted on could be part of some historical artifact from the days of Wernher von Braun.

I pull out a cold Cuban sandwichy thing from my bag, and wash it down with the last sips of my Seven Up. Never thought I'd be eating a missed dinner in a place like this.

As I turn off my phone's backlight, the surroundings are illuminated only by starlight. My eyes gradually get used to the darkness. The winter con-

stellations sparkle like jewels in the eastern sky facing the sea. Just above the southern horizon, the first-magnitude star Achernar in the Eridanus constellation peeks out between some palm trees. The stars, at least on a human timescale, remain unchanged.

I notice her intently gazing at a spot in the sky slightly away from Orion's left foot. I have an inkling about the faint celestial body she is focused on.

"40 Eridani... around there, right?" I look up in the same direction. "Eridanus. I wonder if it was also in Mr. Grace's homemade planetarium—well, probably not, it's too minor, I guess. Anyway, we can't see Achernar from San Francisco."

"Yes, *it was*. Definitely charted on there," she states softly but with conviction. "We had it in the first-magnitude star lightning round. I was bummed when Abby beat me to the answer. But I made up for it in the nebula round after that."

"Oh, you've got a sharp memory, huh?" I'm somewhat impressed. I initially pegged her as the reserved type, but there seems to be clearly a competitive, tenacious side under that demeanor I haven't noticed before.

We were junior high classmates, and it's been twenty-six years since we last saw each other. Well, it's not like there's any romantic reason, mind you. Her name happened to be on the participant list for a meeting about a certain space mission, set to launch from the old Kennedy Space Center in two weeks.

Now she's a tenured professor in infrared astronomy. I've been a wandering researcher hopping between dubious biotech startups. Just half a year ago, the Taumoeba boom landed me a position at a decent biotech company. But whether due to our wildly different specialties or just getting sidetracked swapping Mr. Grace anecdotes, we can chat with the ease of thirteen-year-olds.

No, it's not what you're thinking. Not like having awkward crushes on the girl in a tank top sitting beside me back then, or any of that kind of bittersweet stuff—they're firmly in the past for me now.

It's more the feeling of being back, when we felt like we could be anything. When the scientific secrets Mr. Grace taught us filled us with wonder. When San Francisco was a temperate, peaceful world unto itself.

...Yeah, more nostalgic than romantic, I'd say.

"It's almost here," she says.

"Yeah." I squint towards where I think the launch pad might be. I can make out some illuminated tower-like structures way off in the distance, but I can't tell which one it is.

She has forcibly dragged me out to this beach, while I've been exhausted from meetings that lasted from morning till night. She said she has something to talk about. But I have no idea what it can be.

I glance at her sideways, waiting for her to start talking, and tip the almost empty Seven Up can. Only a few drops dribble out. Well, yeah, a starlit picnic like this once in a while isn't so bad.

When we were in eighth grade, the world turned upside down. To be honest, I can barely remember what life was like before that.

The sun dimmed. The Petrova line extending from the sun to Venus and the Astrophage were discovered—then the manned mission to Tau Ceti, Project Hail Mary, was launched.

I don't know all the behind-the-scenes details, but our junior high science teacher Mr. Grace got picked as one of the *Hail Mary*'s crew members. I can still remember the bewildered look on his face. A twenty-six-year round trip, a one-way mission for the crew - only the four unmanned probes dubbed the Beetles would come back to Earth. To us thirteen-year-olds, this all sounded like cruel absurdity.

In the end, he left for his twelve light-year journey. Without really getting a chance to talk to us.

That doesn't mean we've been idle these past twenty-six years. Despite having to allocate most of our resources to dealing with climate change, pandemics, and military conflicts, humanity has done pretty well. Contrary to the pessimistic predictions of half the population dying, we've managed to maintain about eighty percent of the population. The absurd energy efficiency of the Astrophage helped us store more food than expected.

But that's a miracle built on countless sacrifices and tragedies. There's a lot I'd rather not remember. Vast grain fields probably no longer exist on the North American continent. Non-synthetic produce now comes with outrageous price tags at Whole

Foods. For a low-wage guy like me, Walmart's alternative foods are the only option. But hey, it's waaaaay better than fifteen years ago when the whole of humanity survived on just potatoes—

I suddenly recall the badge I noticed on Regina's jacket earlier today.

A stylized emblem of a rye ear.

The insignia of *Consortium*—I recognized it instantly. The logo entrusted with humanity's hope.

"Regina, I just remembered," I say. "Are you involved with the *Consortium* on top of your university gig?"

"That's right. I'm working on the Petrova Light Observation Satellites," she replies.

Hmm, infrared astronomy is all Greek to me. But, well, I guess they have satellites like that. "Oh, I see. Sounds impressive."

"I'm talking about the three infrared observation satellites, positioned at 120-degree intervals in a solar orbit between Earth and Mars," she elaborates. "You might know them as *Li-Jie*, *Olesya*, and *Ryland*?"

Ah. Those names... I've heard them before. Many, many times. The reporter's voice on the livestream

kept repeating those names excitedly – the day they detected the...

Wow.

"Okay, yeah... It's coming back to me now," I say. "Those are the satellites that *discovered the Beetles*!"

"Exactly. It's thanks to that project that I've been able to continue my astronomy works in these rough times," she says. "Although, haven't really had time for my own research lately."

Ah, yes, that's right—the *Consortium* was established specifically *for that purpose*, I recall.

The Petrova Taskforce, including the renowned Eva Stratt, reunited to ensure the detection of the Beetles back to the solar system. I've forgotten the official name, but everyone simply calls it the *Consortium*.

In the middle of the chaos of nations merging and dissolving, they did everything they could to prevent the dispersion of people and technology. Through their extreme and desperate efforts, the three satellites were launched—named *Li-Jie*, *Olesya*, and *Ryland* in a bid for continued funding

—, to keep a twenty-four seven watch on the direction of Tau Ceti. Their mission was to pick up the Petrova light emitted by the Beetles as they decelerated.

And finally, the twenty-sixth year arrived.

From there on, it's just as reported in the media.

The first thing detected was the light spot. The spectroscopic data clearly showed the distinctive signature of Petrova light. Further precise observations revealed that what seemed like one point of light was actually a cluster of three points.

Three! Three Beetles somehow managed to return to the solar system! Three out of four. Not bad at all.

Their speed profile suggested that their mass was slightly over than the design specs. Yeah, at that time, everyone thought it was just an anomaly.

A few weeks later, the old giant antennas of the Deep Space Network began receiving burst transmissions from the Beetles.

The whole world was thrown into an uproar. The chaotic global situation was completely swept aside.

Humanity has neighbors. *Just a dozen light-years away*.

And to top it off, the first human to befriend them was our very own Mr. Grace.

Can you believe it? What would my thirteen-year-old self have thought if he'd known?

I know it sounds crazy, but get this—apparently he met an alien engineer named Rocky on Tau Ceti, and they totally hit it off and figured out a solution together.

From the Beetles came all sorts of data saved by him. Starting with video letters explaining what happened, daily logs, everything about the amazing neighbors Eridians, the incredible material called xenonite, the astonishing... okay, the list goes on and on. Anyway, there was a whopping five-terabyte "Taupedia" there.

"Amazing. You were there when they found the Beetles?" I say, recalling the global excitement at the time.

“Yes. Every day brought a new discovery,” she says. “But you were thrown into the Taumoeba fever too, right?”

“Well, it’s how I landed my current job—gotta be grateful for that.”

Having received all the data from the Beetles beforehand, humanity scrambled to deal with the unexpected souvenir: mini-farms full of Taumoeba. They were quietly retrieved in space far enough from the Earth-Moon system. We knew Taumoeba aren’t deadly to humans, and planetary protection protocols have become virtually meaningless nowadays, but we didn’t want them loose on Earth. It’s a matter of mood, rather than science.

Every day, I’m running around after the Taumoeba’s descendants that made the trip here, like some kind of sheepdog. I work for a startup company that jumped on the large-scale Taumoeba farming project. I’m still not sure why they hired a wandering research misfit like me, but I can say this—I’ve pored over Mr. Grace’s scientific papers more than anyone else on the planet.

For the past few months, we’ve also begun controlled seeding of Taumoeba on Venus, and my workload has increased even more.

“How’s the ‘Yellow Sub’ holding up?” she asks, referring to the Venus-orbiting Taumoeba seeding vessel. Its giant Taumoeba tank, wrapped in a golden thermal blanket, does indeed look like a submarine.

“So far, it’s working great,” I boast. “After all, we’re completely wiping out the Astrophage’s ‘nests’!”

“Like some kind of interplanetary pesticide,” she remarks. “Our observations show the Petrova Line has significantly dimmed. The sun’s luminosity has recovered to ninety-seven percent.”

It’ll likely take decades more for the environmental and geopolitical situation on Earth to fully stabilize. But now I feel a simple sense of gratitude that humanity has made it this far against all odds.

“Awesome,” I say.

“Indeed,” She seems oddly calm, even though she’s done incredible work.

Hmmm, am I getting closer to what she’s trying to tell me? It’s too dark to read her expression or intentions in the starlight.

What is our shared experience?—Science. Mr. Grace’s science classes.

Science will surely lead me to the core of the issue. ...Well, I’ll follow that notion on a hunch.

"Remember learning about the Doppler effect? Back in eighth grade?" Regina brings up a topic out of the blue.

We're still just shooting the breeze. Night is getting darker. The smell of the sea feels a little stronger. Achernar has disappeared below the horizon, and the Great Winter Triangle is leaning toward the west.

"Sure do. Mr. Grace explained it to us during our field trip to the Exploratrium. He used the sirens of downtown emergency vehicles as an example, right?"

You know, after that lesson, those faraway sirens that used to freak me out at night actually became kind of fun.

"Yes. The sound gets higher as the siren approaches, and lower as it moves away."

"Yeah, what about it?"

"Well, about the *Li-Jie*," she shifts to talking about one of the Petrova Light Observation Satellites. "After the Beetles returned, we repurposed it to observe the Petrova Line in the solar system. But last

year around this time, I got an idea. I wondered if I should try pointing it towards Tau Ceti again."

"To see the Petrova line at Tau Ceti?"

"That's impossible," she says. "The entire star system would fit into a single pixel. And, as expected, there was no change in Tau Ceti itself. However, a few arcminutes away from Tau Ceti, a point of light was captured. It was so faint that our image analysis AI could barely detect."

I scowl. Infrared astronomy might as well be ancient Sumerian to me. "A point of light? Wasn't it there when you were observing the Beetles?"

"No, I searched through all the past data, but there was no such point of light. It must've appeared during the few months we weren't looking."

"Could it be... a supernova in some faraway galaxy or something?" I ask a foolish question that anyone would think of.

"Impossible," she immediately denies it, as I expected. "It's a Petrovascope, after all. I mean, it's designed to extract *only* monochromatic Petrova light. The spectrum of a supernova is not monochromatic, and would be automatically filtered out."

I shrug. "I see."

But then, what the heck was it? Does she want me to guess? Or is she - hesitating about something?

There's silence for a while.

"Okay, I give up, Regina," I say.

She sighs. "Still don't get it?"

"I told you, I'm no astronomer."

"It's not about astronomy. It's engineering."

"What?"

"Such a high energy output and monochromatic infrared spectrum can't occur naturally," she continues. "It's clearly artificial light, the kind produced when a massive amount of Astrophage is converted to energy."

Artificial?

Wait.

"No way," I groan.

Regina, are you saying...

"Could it be that... you saw the light from the *Hail Mary*'s engine... from the solar system...?"

"Exactly," she answers simply.

Wow.

Holy cow. The *Hail Mary* was optically visible?!

I've never heard of such news.

"Whoa," I hold my head. "But it's twelve light-years away?!"

"Aren't you aware of the advancements in Petrova optics over the past decade?"

Okay... right. Back then, humanity was in full-on survival mode, going all Petrova-light-crazy. They poured all their scarce resources into detecting Petrova light to catch the Beetles. She's been at the cutting edge of that crazy tech.

"Plus, the amount of energy emitted as infrared radiation from a spin drive at full thrust surpasses that from the sun's surface by orders of magnitude," she continues.

"Yikes," I shake my head. "If that thing hit me, I'd be space dust in a nanosecond."

Well, if it's brighter than the sun, it makes sense we can see it.

She presses on. "The width of the *Hail Mary*'s spin drive is only a dozen meters or so. But the *Li-Jie*'s spectrometry and optics optimized for Petrova light can theoretically detect it. Much easier than direct imaging of exoplanets."

My brain feels like it might overheat and start smoking. Calm down, brain. It's not definite yet.

For example—maybe *Hail Mary* isn't the only thing that emits Petrova light?

"Wait a sec," I say. "What about... the Eridian ship? Couldn't it be from their engines?"

"I considered that. But the subtle fluctuations in luminosity indicated a precisely controlled output cycle of exactly four seconds. It's unlikely that an engine made by a species with a different time unit and using a base-six system would operate on a second basis. I concluded that it was definitely human-made."

"Hmm, that makes sense," I say, impressed by her brilliance.

I think back to our science classes in eighth grade. Unlike other students who only got excited during experiments, Regina was skilled at patiently analyzing the messy data afterwards, never boasting about her findings—just like now.

"Your discovery is amazing," I admire her achievement. But at the same time, my intuition is telling me something.

She's not finished. There's something else, something bigger, that she's trying to tell me.

The story of the Doppler effect isn't over yet.

"But, you know," I stammer. "The fact means..."

I'm recalling the news abruptly announced by the *Consortium* about half a year after the worldwide celebration of the Beetles' return. The emergency press release, which shocked all of humanity, in February of this year.

Regina's observation was several months before that.

"Hold on... are you saying you were the first one to notice that... the *Hail Mary*'s light was..."

I ask her nervously, grateful for the darkness. If I could see her expression, would I be able to ask her this question?

"...*Red-shifted*?"

After a short pause, I hear her voice quietly saying, "...Correct."

Light can be brutally eloquent.

Yeah, when the source of a wave moves away, the wavelength gets longer. Remember how the yelping siren's pitch dropped?—Mr. Grace's lively explanation echoes in my mind. And light is indeed a kind of wave too. In the case of light waves, its color shifts to the red side. It's called "redshift."

According to her, the *Hail Mary*'s exhaust light showed a redshift.

It can only mean one thing.

The *Hail Mary*, with Mr. Grace aboard, is moving *away from* Earth.

Everyone knows that now, of course. But back then, no one was aware of it.

You see, Mr. Grace's logs stored in the Beetles straight-up said: "I scored some fuel—I can *go back to Earth*!"

All of humanity was excited by this statement.

His log ended with a description of the Beetles' launch preparations after parting with the alien engineer "Rocky." So I assumed he was just sending the Beetles ahead first, and would follow along at a leisurely pace afterward. I wasn't the only one—even the *Consortium* interpreted it that way back then. After all, his ship must've been battered, and they thought he had launched the Beetles and sent them ahead at five hundred g's to deliver the Taumoeba to us as quickly as possible.

That's why none of us questioned it when *only* the Beetles returned to the solar system. According to the *Consortium*'s calculations, with a comfortable

acceleration and deceleration at 1.5 g's, *Hail Mary* should be back by next spring.

Humanity was utterly elated—until just one text file, disclosed in the *Consortium*'s emergency press release in February, revealed Mr. Grace's change of plan.

But she had seen it months earlier.

The decisive evidence that Mr. Grace was moving away from us. Our despair. Probably the first among humanity.

Directly, with her own eyes.

I can't even imagine how she must have felt in that moment.

Regina, oblivious to my worries, continues to speak calmly. "Just to be clear, when I say it's moving away, the *Hail Mary*'s heading is actually tilted about eighty-six degrees relative to the solar system. So it's basically moving sideways from our viewpoint."

"Sideways? Then its exhaust plume would hardly be visible, and there'd be almost no Doppler shift, huh?"

"Correct for a slow-moving object like an emergency vehicle. But when something gets close to the speed of light, we can actually see its sides. Ever heard of the Terrell rotation?"

She seems even more talkative than before. Hmm, maybe she wasn't as shocked as I've thought. Admirably clinical as a scientist.

"Nah, I'm afraid not," I reply honestly.

"When a ship's speed reaches around 0.9 c, it appears almost like it's pointing its rear end at us. Moreover, the relativistic transverse Doppler effect also becomes non-negligible."

"Is that really a thing?" Relativity always makes me feel like I'm being tricked somehow. "But wait—didn't you say only light at Petrova frequency would be captured? Can it detect red-shifted light too?"

"That's factored in. The *Li-Jie*'s Petrovascope can fine-tune its detectable wavelength range," she replies. "Because, you know, even the Beetles' thrust light is affected by the Doppler effect."

"Ah, makes sense."

Her logic is airtight.

"Of course, there are limits. By now, the ship's acceleration has pushed it beyond the Petrovascope's observable wavelength range. By next year, it'll likely fade into the cosmic microwave background."

"So you mean you just managed to catch it because it was last year? You were really lucky," I marvel. "How the heck did you come up with the idea?"

"At first, I was trying to detect light at shorter wavelengths than Petrova light, in the near-infrared range. But nothing was captured—so for troubleshooting, I tried imaging at various wavelengths. Then by chance, a light spot showed up in an image taken at a longer wavelength, far-infrared," she said self-deprecatingly. "That's a laugh, really. It wouldn't show up in the near-IR."

A Laugh? What does she mean by that? ...Wait, something else is bothering me. "Shorter wavelengths...?"

The wavelength of the wave emitted by an approaching object gets shorter—once again, Mr. Grace's voice echoes in my mind. In the case of light, it shifts towards blue.

"Ah... blue-shifted, you mean," I say. "You were expecting the *Hail Mary* to be *approaching*...?"

"Yes. Stupid me," She affirms my guess again, with a hint of frustration.

I'm at a loss for words.

She didn't point the *Li-Jie* at Tau Ceti on a whim. She meticulously prepared, right from the start, with the aim of imaging the *Hail Mary*'s approach.

Expecting the ship to be heading this way – for Mr. Grace to return – even factoring in its speed.

"Stupid? Not at all. Back then, everyone in the world thought the ship would return. The fact that you noticed the truth even before the news report is amazing enough," I say.

"Thank you. Yes, I think I was lucky," she says.

No. It wasn't luck. It was all thanks to her keen insight, nothing else.

"If the ship was following the Beetles, we should have already seen the deceleration phase light," she continues. "Even if it happened to overlap with Tau Ceti, the Petrova light Observation Satellites' annual parallax should have made it impossible for all three to miss it. But, no blue-shifted light was detected.—People around me interpreted it as the worst-case scenario happening on the *Hail Mary*.

They told me not to be down, since it was *that kind* of mission to begin with." Quiet anger resonates in her tone.

"That's horrible." Some people could be so insensitive.

"I couldn't accept it."

"I know," I silently applaud her unwavering faith in the *Hail Mary*'s survival.

"I swore I'd find it. I directly lobbied a retired Stratt and got her to secretly allocate observation time for me. Tried all wavelengths, and there it was —a point of far-infrared light showing a redshift." She starts speaking faster and faster. "Couldn't believe it. I thought there'd be a mistake in the settings. But no matter how many times I re-imaged, the result was the same. So I desperately searched for anything else I might've overlooked. Every nook and cranny of Taupedia and the Beetles.—And finally, at the end of last year, I found that memo."

"That memo – no way..."

What.

I have a feeling something incredible has just been revealed.

"Could it be Mr. Grace's—?" I'm stunned.

"Yes. The one that was disclosed in the emergency press conference."

The hidden file that sent shockwaves around the world in February. Also known as the Grace Memo. The text file with the *latest* timestamp among all the data in "Taupedia." That's how we learned the truth.

The hastily written text file contained only a few lines. In his usual humorous way, Mr. Grace explained that he was urgently heading to the 40 Eridani system to help his "friend" and wouldn't be returning to Earth, but not to worry. I can still recite the entire text from memory, and I can't forget Stratt's pensive face as she read it at the *Consortium*'s press conference.

"You found *that* too?!" I'm so surprised I feel numb.

"Yes. We've never publicized the light spot or the redshift, so the memo is the only public evidence."

"Wow... just wow," I mutter.

"It was just luck too," she says. "Without the redshift, I might never have noticed the memo even

now. I mean, its file name was just 'New Text Document.txt'."

"That's awful. I'd definitely missed it," I say.

"And it wasn't even on the RAID array containing Taupedia. A separate USB stick. Fixed to the the Beetle's inner wall with duct tape over cushioning material, with 'LOOK HERE!' written on it in pen."

"*Physically* attached?!"

"Yes. It was electrically disconnected. That's why it wasn't included in the Beetles' transmission data and was overlooked for so long."

"...Wow."

Holy cow.

If she hadn't found it, we might still be blissfully unaware, waiting for the *Hail Mary* to come back. That's the terrible idea.

The whole humanity should immediately be grateful for her meticulousness and tenacity.

But for some reason, I don't think Regina's name was mentioned in the news about the Grace Memo. It was issued solely by the *Consortium*. As for *Le-Jie*'s data, they didn't even release that they'd detected Petrova light, let alone the redshift.

"Well, not just amazing. It's pretty darn incredible. Your work deserves proper recognition. Why

not publicize it more? Prove those doubters wrong," I say.

She's silent for a moment.

"I can say something to the *Consortium*—"

She sighs softly. "Thanks, but it's okay."

"...Regina?"

"When I read that memo, how devastated I was—*you understand*, don't you? In other videos and logs, he said he'd be back!"

I notice her tone starting to lose its usual calm.

"He said Rocky was giving him fuel. That he was a really good guy. Told us to wait for him, because it seemed he'd be able get back."

"Ah..." I was an idiot. Insensitive.

"He missed the sea, sky, and hills of San Francisco. That someday, he'd treat himself to Sally's Diner's two-egg combo, over medium, and splurge on pancakes too."

I clench my fist tightly, unable to do anything but listen to her earnest words.

"He even joked that because he'd left his classes in the middle, he had to do it properly again. Said he'd save the special Tau Ceti lightning round for last, and for us to be prepared...!"

Yeah, Regina is right.

The most fun part of my boring junior high life was Mr. Grace's science class. Having been in the front row as impressionable thirteen-year-olds for his lessons and subsequent mess—it's no wonder our lives were so deeply shaped by it.

Mr. Grace might not know this, but many of us from that class ended up in STEM fields. Besides Regina and me, Trang in Astrophage power generation, Theresa in greenhouse gas control, Abby who revived natural dairy farming, Harrison now leading the *Consortium*... Unfortunately, not everyone from the class is still with us. We live in bleak times. Still, everyone has been desperately working hard to restore humanity in their own fields. Driven by Mr. Grace's "will."

So just imagine how surprised and delighted we were to learn that Mr. Grace was returning in triumph to Earth! Of all the messages recorded in "Taupedia" about his Return To Base, the special video letter addressed to his former students was the ultimate surprise for us.

Regina must be another one whose life path was influenced by him.

Perhaps she was the first to find the Beetles' solo return suspicious. While even the *Consortium* was euphoric, she calmly tried to assess if *Hail Mary* would be really approaching. But her hopes were utterly crushed. the wavelength shift wasn't blue, but red. The ship wasn't approaching—it was moving away.

Not sure why she didn't loudly publicize this major discovery in her own name. But she must've struggled a lot. She knows the validity of her observational data better than anyone. Maybe that's why she couldn't bear to have it become the deciding factor in confirming the grim reality—to be the one who made the biggest contribution to the despair.

But in the end, she searched for corroborating evidence as a scientist should. The discovery of the Grace Memo was the killing blow to her hopes. Throwing in the towel, she opted to stay out of the spotlight and left everything to the *Consortium*.

Without the discovery of the Memo, the world might have simply declared the *Hail Mary* missing, as the insensitive pundits guessed. Sure, the truth

is definitely better than that. At least the ship is alive, heading to 40 Eridani while cycling its output every four seconds. Just as Mr. Grace intended. So objectively, it's not bad news at all, and in fact most of humanity has accepted his decision as a heroic act.

But I painfully understand her disappointment.

Because I felt the same way.

I couldn't wait for the spring of next year when he was supposed to come back. A lot to tell. A lot to ask.

So, when I found out he wasn't coming back, I was truly shocked. I was so shocked that I bawled my eyes out in the lab, overturning boxes of freshly sterilized pipette tips.

I have no right to complain about the file name. The other files in Taupedia were neatly organized. And even indexed. So it must've been a very unusual situation.

Mr. Grace must've found the crisis of his Eridian friend while en route to Earth. The timestamp of the Grace Memo indicates that it was likely the absolute last possible timing to turn back by orbital

mechanics. The Beetles were probably on standby, ready for release at any time, and late access to the RAID array was impossible. He wrote a message in a hurry, saved it on a USB stick nearby, fixed it inside the Beetles with duct tape, launched them toward Earth, then went back to save his friend.

What he did was right. Absolutely right.

He managed to save both of his friend and the world at the same time.

Could I have made that decision in the heat of the moment, instead of dithering until I missed both chances? Yes, just like I'm now...

"That's why... That's why I volunteered. For the Lateral Pass mission," Regina's voice snaps me back to the present. Her tone has regained its usual composure while I was lost in sentiment.

The Lateral Pass.

In American football, a Hail Mary is a last-ditch long forward pass attempt by an underdog team. But such a play is literally a desperate, all-or-nothing gamble. A quarterback throws a variety of passes. You can throw lateral passes as many times as you want during a game.

Not a one-shot Hail Mary bomb challenging Tau Ceti, but a pass to the "neighbors" right next to us. Thrown again and again toward 40 Eridani to keep the game going alongside them. Humanity's new interstellar round-trip mission—the Lateral Pass. It actually has a longer, more formal name, but we just nicknamed it that, inspired by the Project Hail Mary.

She takes a breath and continues. "Information about our sun's luminosity will reach Eridani in sixteen years. By then, Mr. Grace will probably be in his fifties."

"Yeah. Erid has high gravity. His body must be falling apart," I say.

"Right. So I don't think he plans to come back," she says. Her silhouette is all I can see. "We've been transmitting Earth's data stream towards Eridani too, but again—sixteen year lag, and who knows if it can penetrate that dense, hazy atmosphere."

"Same in reverse. If he's to send a something from Erid to us, it's a sixteen-year wait," I point out. Indeed, 40 Eridani's luminosity, as seen from Earth, still hasn't recovered.

"It's too long. Can't wait for decades from now," she says. "So I'm going to meet him in person instead. While he's still well."

There's a definite passion in her voice.

"I'm going to chase down that gosh-darn redshift I found and *cancel it out* as much as I can. That's the true reason I volunteered."

Perhaps there were many around the world who had similar thoughts, but maybe for slightly more practical reasons than hers.

The Beetles' data suggest humanity and the Eridians can hopefully remain cosmic buddies going forward. But a distance of thirty-five years round trip is way too frustrating. We need to visit while Mr. Grace is still around to act as an interpreter. At least I don't think we can pull it off without him.

The sooner we act, the more beanbags we get—a universal truth we learned from Mr. Grace's lightning round. His time is limited. We humans are more shorter-lived, impatient, and impulsive species than the Eridians. And if we missed this chance, humanity would prioritize *internal* affairs over outer space.

So, we'll send multiple waves of envoys to Erid one after another, from now on—the Lateral Pass Mission. And the parts for the first ship will be launched from this very beach in two weeks. The initial step in an eight-month orbital assembly process.

Regina was brilliantly selected as the main crew for the first flight. And me? I'm the backup crew. Once the first mission departs, the backup crew will immediately become the main crew for the second mission and start departure prep. Due to the relative positions of the solar system and 40 Eridani, we only have one launch window per year. This means that I will also be chasing their trail a year after her.

I'm well past crying like a kid over the Grace Memo these days. Instead, I'm proud of his decisive

action and his unshakable friendship. So glad he was the one—the first human to visit Erid.

But Regina must have a stronger intension for this mission than anyone else.

She's the original discoverer of that frustrating redshift. That's why she can't accept its existence. I totally get her desire to physically cancel it out with her own hands, and she absolutely deserves that right.

And I felt a bit happy that she confided in me about this. As comrades who learned from Mr. Grace together. Her accomplishments should be more widely known, but for now, I'll respect her feelings and keep it our secret.

"Yeah. I feel the same. It might be our last chance to see him.—And, well, sorry about earlier. I said some insensitive things," I say.

We're both past the halfway point of our lives. The one-way ship time will be four and a half years, but we won't be able to see our families and friends left on Earth for thirty-five years. We're prepared for that too.

We won't use long-term coma. It's too risky, as Commander Yáo and Ilyukhina, the other crews of the *Hail Mary*, taught us at the risk of their lives.

Besides, this is not a suicide mission anymore. The pass we throw will come back.

"As a student of Mr. Grace, I've been there too. I know your disappointment. Your resolve. But I'm no match for your passion. You're strong," I honestly admire her tenacity. Her determination to catch up with our teacher using every bit of science she has. "You absolutely deserved that prime crew slot. That's way different from me getting chosen by just a fluke."

I feel her gaze turns towards me.

"Don't sell yourself short," she counters. "Now you're leading comparative astrobiology worldwide. The foremost expert on Taumoeba. Hold your head high."

That's a bit too much praise. Comparative astrobiology is a fledgling field, so even a average researcher like me can work at the cutting edge.

"Okay. Thanks, Regina," I shrug. "Well, it's one of my few skills. Without it, I'd only be good for making mac 'n' cheese." Mac 'n' cheese is the only dish I can manage. Both the macaroni and cheese are still substitutes for now though.

"You know, you really are starting to sound like Mr. Grace," she chuckles.

"Wow. Am I?! In what way?" Not so bad. ...Um. Okay, be honest. I'm super happy. He has been my hero, the one I've admired. Can't stop grinning. "My face? ...Nah, couldn't be."

"The way you talk, the way you think. Is this what happens when you play with Taumoeba every day?"

"Could be. I do talk to my cute Taumoeba every time I culture them—Okay, everyone. Today we're going to split! First team to finish gets beanbags!" I try to imitate Mr. Grace's tone. ...Oops, was that cringy? I can't see her face well yet, but I feel there's a hint of a smile.

And it's true, that's how I treat my Taumoeba every day.

Driven by the excitement I felt in his science class, *here* I am now. I'm sure she's the same way.

"—He's been my role model. Can't deny being heavily influenced by him," I shrug.

"Then I'm sure you'll be a great teacher too."

"Oh, for real?"

"We're the *last* generation who remember him directly. It's our job to pass what he gave to us on to the next generation. Including his way of thinking."

After saying that, She gazes silently at the eastern sky where the astronomical twilight is about to end. The boundary between the Atlantic Ocean and the sky is faintly tinged with white, and the out-of-season spring constellations are losing their brilliance.

Soon, the nearest star to Earth will rise again beyond the horizon today. The ninety-seven percent restored white light will fill this small biosphere.

Suddenly, a mellow guitar intro starts playing in my head. It's a song from nearly a century ago, embedded in the preamble of the transmission data from *George*, one of the four Beetles. Must be the designer's prank, I guess. A phrase that all the humanity got tired of listening to every time they received data. The very same number that was supposed to be included on the Voyager probe's Golden Record, intended for "neighbors" somewhere in space.

"Here comes the sun," and I say, under my breath. "It's alright."

Humanity and our Sol will surely be alright, Mr. Ryland Grace.

Maybe the broadcast from *George* has even reached distant Erid, but we still want to tell them in person. To our Mr. Grace and his friend, Rocky.

The wind calms, and a flock of eager seabirds starts chirping loudly in the distance. I can feel with my whole body that the long, dark night is finally breaking.

If we ever share this song with our *first neighbors*, who speak in chords and notes—will they get this feeling?

That's what's now vaguely crossing my sleep-deprived mind.

[Notes]

This is a fanfic of "Project Hail Mary." Translated from the original written in Japanese.