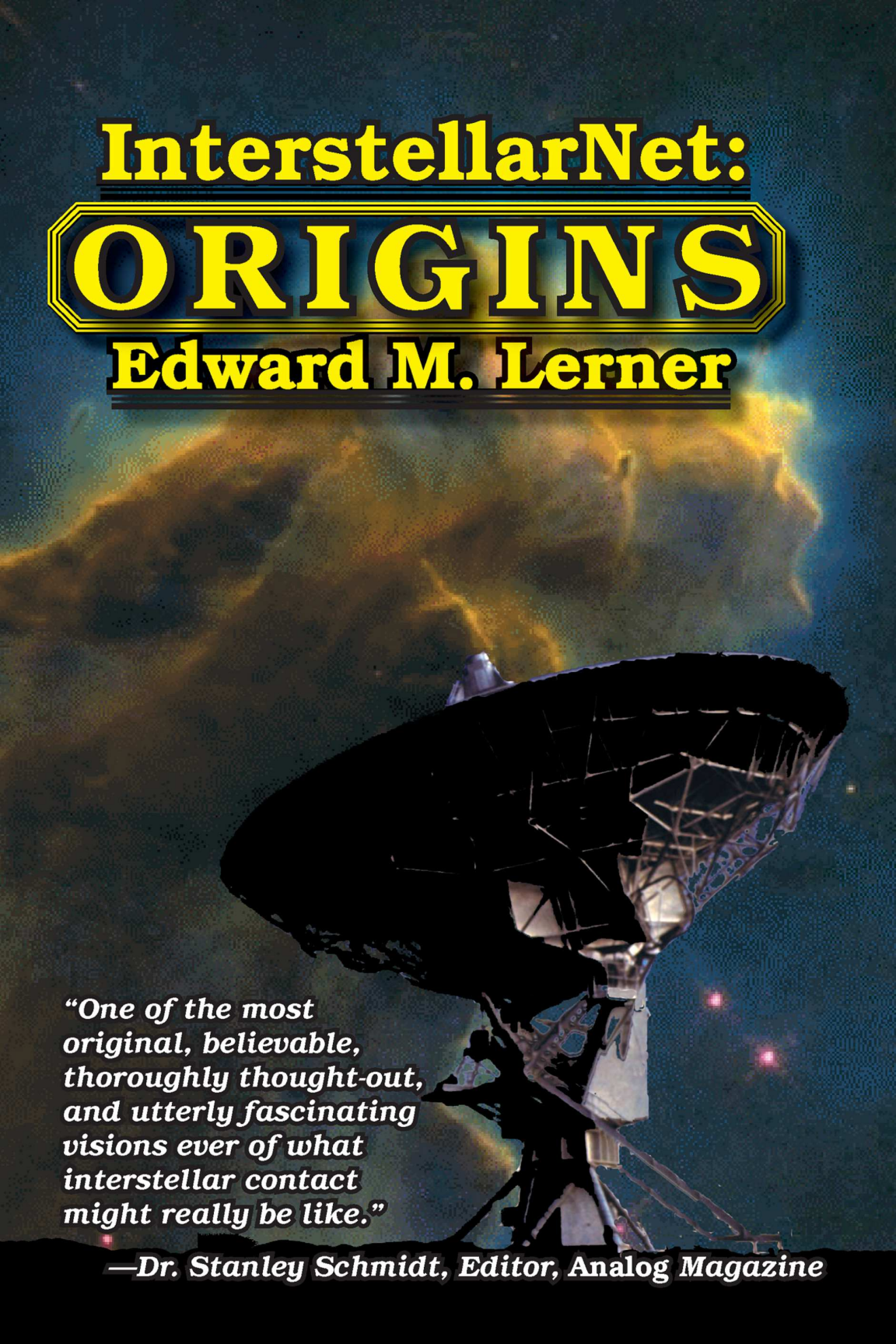
InterstellarNet:

ORIGINS

Edward M. Lerner



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—Dr. Stanley Schmidt, Editor, Analog Magazine

Sample Text from

InterstellarNet: Origins

Books by Edward M. Lerner

Probe
Moonstruck
Creative Destruction (collection)
Fools' Experiments
Small Miracles
InterstellarNet: Origins
InterstellarNet: New Order

In collaboration with Larry Niven
(the Fleet of Worlds series)

Fleet of Worlds
Juggler of Worlds
Destroyer of Worlds
Betrayer of Worlds

Sample Text from

InterstellarNet: Origins

by Edward M. Lerner

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Dedicated to the search for
extraterrestrial intelligence

Contents

Foreword

Some of my most popular magazine fiction deals with an alternate/future history that splits off from our familiar timeline in 2002. The triggering event: a radio signal from extrasolar aliens.

In episodes spanning more than a century, the InterstellarNet stories chronicled humanity's discovery of its interstellar neighbors, the formation and evolution of a radio-based interstellar trading community, and the long-distance jockeying for advantage among species.

So: SETI, alternate and future history, and aliens. It's a lot—and a lot of fun—to play with.

Over the years these stories have generated bunches of email (thanks!) and requests that I continue the saga. And readers often ask where they can find earlier episodes—the first InterstellarNet story saw print in 2000—and I've had no good answer for them.

Till now.

InterstellarNet: Origins incorporates and expands all but one InterstellarNet episode. (*InterstellarNet: New Order*, a standalone novel, picks up the future history after the close of this book.)

Thanks for the nudge.

Edward M. Lerner

DANGLING CONVERSATIONS

A.D. 2002

— 1 —

Dom Perignon flowed and beluga vanished. A chamber orchestra played Bach. Crystal chandeliers sparkled and gold-rimmed china gleamed. An indoor fountain sprayed upwards around an enormous ice swan.

The ITU knew how to party in style.

Dean Matthews observed the gathering from a broad stone terrace kept all but empty by the chill night breeze off Lake Geneva. Inside the hotel's Grand Ballroom dozens of international civil servants mingled with hundreds of national delegates. There was an even larger number of "accredited industry observers." Dean was one of the lobbyists, representing NetSat, a broadband satcom company.

A World Administrative Radio Conference successfully concluded *deserved* celebration.

New wireless technologies and the implacable growth of older ones kept the demand for spectrum high. Too many radio bands, for reasons of historical interest only, had differing uses in different parts of the world: an ever bigger problem as more systems went global. Users of old systems were entitled to monetary compensation and replacement bandwidth when new applications supplanted earlier frequency assignments.

The International Telecommunications Union took the lead in reconciling the many competing claims. That made the ITU an essential, if underappreciated, part of the global economy. Multi-billion-dollar fortunes rose and fell with ITU decisions.

Dean had spent weeks in Geneva so that one of those fortunes would accrue to NetSat.

A waiter glided by with champagne. Dean took a flute for himself and one for his companion. "Congratulations, Madame

Secretary-General."

They clinked glasses.

"You, too, Dr. Matthews," Bridget Satterswaithe said. She turned toward the lake. Great yachts bobbed at anchor, brightly lit by marina spotlights. In a black cocktail sheath, auburn hair swept up, delicate crystal ware in her slender hand, she cut a far different figure than the hard-charging, severely tailored ITU executive who had kept the WARC on track. For the first time in their brief acquaintance, she seemed relaxed. It worked for her. "Now that the conference is over, I look forward to some sailing. Maybe visit my parents in London. Even a quiet …"

Her clutch bag buzzed and she took out a cell phone. The caller ID seemed to surprise her. "Please excuse me. I have to take this."

Dean obsessively read everything in eyeshot: Post-It notes, cereal boxes, CD album covers, TV crawlers, scribbled notes on wall calendars—everything. The practice had ticked people off at him more than once, but, it was what it was. A habit. Reflex. Before Satterswaithe turned away, he had noticed the text on the cell's backlit display. *Sec Gen.* Of the United Nations itself, he presumed.

Bosses have prerogatives.

"I'll catch you later." Dean took the stairs from the hotel terrace down to the marina, giving her some privacy. Waves lapped peacefully against the shore. The wooden pier creaked under his tread. He, too, looked forward to some well-deserved rest.

Then *his* cell went off. He checked caller ID.

Bosses have prerogatives.

"What's up, Barb?" He glanced at his wristwatch: a bit after nine. Three in the afternoon back in Virginia.

"I don't exactly know," Barbara White answered. "Sorry to interrupt the big soiree, by the way. You earned a night off.

"Anyway, Dean, some crazy radio astronomer at MIT has been harassing the ISE-1 ops center. Now he's harassing me, and I have a board meeting tonight to prep for. I'm putting you on speakerphone. You need to hear a message from my voicemail."

ISE-1. The proof-of-concept comsat for Internet Service Everywhere. The WARC had *just* approved the frequency allocation

with which—after launching many more satellites—NetSat would provide worldwide mobile broadband coverage.

"Go ahead, Barb."

"This is Sherman Xu," someone shouted in a deep, agitated voice. "*Again*. NetSat must suspend operation of its communications satellite. The broadcasts are interfering with observations of critical importance, dealing with urgent matters I cannot explain at this time. Your operations center refuses to listen.

"Dr. White, you run the company. You can make it happen." That was followed by excited background chatter, muffled as though by a hand over the mouthpiece. "You *must* suspend operations. It is imperative. And it will happen soon anyway, once the authorities get in touch." And after a pause, plaintively, "I implore you."

"What do you make of that?" Barb asked.

"MIT, you say?" Dean had not ended up at an aerospace company by accident. Astronomy, spaceflight, and SETI (search for extraterrestrial intelligence) had fascinated him since childhood. He still used his old four-inch telescope when he found the time. "MIT operates a twenty-seven-meter dish about forty miles outside Boston. Haystack Observatory."

"Which tells us what?"

"Nothing, really." Dean tried to make sense of it. "I can call and ask for more information."

"Won't help." She sighed. "I've tried. More 'I am not allowed to tell.' The man is ready to burst with excitement and frustration about *something*."

"Get ready for your board meeting, Barb. I'll think on it, see what else I can find out, and get back to you." He broke the connection.

At the head of the stairs, Bridget Satterswaithe had finished her call. She looked—shaken.

Dean rejoined her. "Are you all right? You look like you've seen a lobbyist."

She forced a smile. "Just a heads up about a press conference tomorrow morning. No rest for the wicked."

Secretaries-General of the UN worried about war and peace and international disasters. Didn't they? Whatever they did, Dean doubted they worried much about radio spectrum. And two such curious phone calls so close together …

"The Sherman Xu announcement," Dean guessed.

"I don't know what you mean." Satterswaithe blinked. She was a terrible liar.

"*My* boss called, too. Dr. Xu asked—demanded—that NetSat suspend operations."

She nodded. "You should. You'll hear why tomorrow."

Why would ISE-1's operation or radio astronomy suddenly interest the Secretary-General of the United Nations? Only one possibility made any sense to Dean. SETI. Or, rather, that the search had found extraterrestrials.

His mind raced. He knew a fair amount about SETI. Radio noise filled the universe, and most of that noise fell outside the microwave band. Near one end of that band, neutral hydrogen radiated at a wavelength of twenty-one centimeters. The SETI folks had decided, since hydrogen was the most common element in the universe, that twenty-one centimeters was a radio-dial marker to listen near. The OH ion radiated nearby, at eighteen centimeters. H plus OH equals H2O: water. The SETI crowd called the spectrum between eighteen to twenty-one centimeters the "water hole," around which they predicted intelligent species would congregate. Too cute a name but logical, Dean had always thought.

Only the SETI Institute had examined the nearest thousand stars at water-hole wavelengths—without hearing anything unusual. And Dean knew of no recent SETI work at MIT. And ISE-1 operated far from the water hole, around 6.7 centimeters. Less than a third of the wavelength of neutral hydrogen.

The pieces came together.

Dean said, "The neutral-hydrogen wavelength divided by pi. That's the carrier signal. That sure sounds like a sign of intelligence to me."

"I suggest," Satterswaithe said, "that we go someplace private to talk."

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Within minutes of Satterswaithe's call, a limo glided up to the hotel's main entrance. The S-G gig evidently had its perks. Dean climbed into the limo after her.

"ITU Building," she told the driver.

His questioning look drew a slight headshake. Don't ask. No discussion in the car.

He took the opportunity to call his boss. "Barb, it's me. Yes, suspend operations."

"That was awfully fast. So the ITU is in on this? What's their interest?"

"I don't know much, Barb, and what little I do know I can't talk about." Dean felt a bit of empathy for Sherman Xu. "I think we'll all know more sometime tomorrow."

"So what is this about?" Barb persisted.

"Gotta go, Barb," Dean said. "Trust me and suspend operations." He hung up.

Satterswaithe smiled. "Thank you, Dr. Matthews."

They reached the ITU Building and made their way past surprised nightshift guards to her top-floor office. She shut the door. "Now we can talk."

Only where to begin? In the interminable five-minute limo ride, Dean had had an epiphany. He understood the science of SETI, but he had given little thought to what happened if—apparently, when—someone detected a signal. That had always seemed too theoretical. No more. "So there's going to be a big announcement tomorrow?"

"Ten a.m. in New York. The word has been quietly distributed to governments worldwide and the appropriate international scientific bodies. You've figured out much of it already. I'll share the rest … *if* you'll keep everything to yourself until after the press conference."

There was only one possible answer. "Of course."

"The International Academy of Astronautics and MIT will jointly open the press conference. Dr. Xu will make the announcement. His team at Haystack first detected the signal, but three more

observatories confirm it. Everyone believes the signal is indicative of an extraterrestrial intelligence.

"Once the scientists finish, the Secretary-General will have his say. As a small part of that, I'll be tasked to call an Extraordinary Administrative Radio Conference. We need to fence off the frequencies used by the alien signal."

Including the frequencies NetSat had hoped to use. Despite Dean's months of effort the loss seemed inconsequential. Intelligent alien life!

Satterswaithe took a decanter of amber liquid from her credenza. She half-filled two glasses. "The S-G will announce a UN task force, reporting to the Committee on the Peaceful Uses of Outer Space. Since ET uses radio, I've been asked to participate on behalf of the ITU."

He took a glass. "I want to be involved."

"My impression is that the team will consist of national government and UN personnel, plus academics." She looked genuinely sorry. "What else can I tell you?" Changing the subject.

He sipped. It was an unblended Scotch, very smooth. "Where is the signal from?"

"Lalande 2-something. It means nothing to me."

"Probably Lalande 21185. It's one of the stars closest to Earth, about eight light-years. Near Leo Minor. 21185 has been believed since 1996 to have at least one planet, Jupiter-sized."

"You really do follow this sort of thing."

"When the day job doesn't get in the way," Dean said. "Without new spectrum, that doesn't look to be a problem." For the sake of friends and colleagues at NetSat, he hoped he was joking.

Satterswaithe was silent for several minutes, making up her mind. "I can't promise anything, Dr. Matthews, but I'll see what I can do about getting you onto the task force."

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Bandwidth alone did not guarantee a successful satcom company—NetSat also needed a plan for getting its birds into orbit. Some

launches had been booked on Russian and Chinese boosters. That had meant obtaining licenses to export satellites to the foreign launch sites. And *that* meant Dean knew people in the Department of State.

The connection worked.

His assistant reached him on the flight from Switzerland. No need to dash across JFK for the plane to Washington—he had an urgent appointment in Manhattan with Dr. Alexander Klein, the American ambassador to the UN.

The diplomat was as circumlocutory as Dean was direct. In some manner, it would seem, with vague attribution to the auspices of the Department of State, and in public-minded and full support of a recommendation from the Office of the Secretariat of the ITU, it would appear—that Dean was in! He should expect an invitation to join the Lalande task force.

The implication was clearer that Klein's office was available to Dean as a resource.

Unambiguous, if deniably oblique in its delivery, was the subtext that Dean should be forthcoming with any data of a "national security nature" that might arise during the deliberations of the task force.

— 2 —

Held at a deluxe Caribbean hotel, the kickoff meeting of the Lalande task force could have been mistaken for a corporate boondoggle. The remote island was far from most of the idly curious, if not from Charise Ganes's impoverished homeland. A smattering of United Nations guards sufficed to turn away uninvited members of the press.

The registration line stretched far ahead of Charise, snaking around the sunlit lobby. The opening session, she predicted, would be opening late.

Charise was one of the very few ambassadors in the task force, and she meant to look the part. Her light-blue pants suit was businesslike, when most delegates and accredited observers had opted

for resort casual. In her mind's eye she cut quite the distinguished figure: tall, poised, and well dressed, with a *café au lait* complexion and raven hair neatly knotted in a bun—

"Miss? Excuse me, miss?" She turned in surprise. A correspondent from a big American TV network was offering his business card. "Do me a favor, hon. My assistant disappeared, to the hotel bar if I had to guess. Get my paperwork for me." She was still speechless when he added, walking away, "I'll tell the hotel manager how much I appreciate the service."

Mistaken for a maid! Cheeks burning, Charise could only hope her coloring hid her anger. She had not been so enraged since … it was a struggle to remember a time.

The Battle for Seattle demonstrations against the World Trade Organization. She had been inside, a delegate—while in her heart she had been on the street among the protestors. But as passionate as she remained about the travesty of globalization, *this* was personal.

She was still steaming when she reached the front of the registration line and collected her credentials. The clerk handed her a name tag, and she noticed a red dot just below her ambassadorial title. "It will be explained inside," was all the answer the registration clerk would provide.

The red dot related, she presumed, to the as-yet undefined committee structure of the task force. It did not surprise Charise that she had yet to recognize anyone else with a red-dot badge. That was the kind of dismissive treatment usually granted to Belize.

The auditorium doors finally opened, and the crowd surged inside. The Secretary-General of the UN gave the obligatory pep talk by satellite link. He introduced Kim Chun Ku, the Undersecretary-General for Administrative Affairs, as (the day's first news) head of the new task force. The S-G was followed by Ambassador Juan Roderigo of Argentina, the current head of COPUOS, the Committee on the Peaceful Uses of Outer Space.

Sherman Xu reprised his big announcement of two days before. The unexpected radio waves from a star Charise had never heard of: Lalande 21185. The carrier signal was at the hydrogen wavelength

divided by pi, although why hydrogen *had* a wavelength, or what dividing it by pi might signify, eluded her. Like naturally occurring cosmic radio sources, the faint signal faded in and out. Evidently unlike natural sources the carrier was—in yet more meaningless jargon—modulated with a narrowband signal, less than 300 Hertz. About every 30 hours the signal included a sequence of pulses: pulse, pause, two pulses, pause, three pulses … up to 128 pulses. That pulse sequence was repeated once.

For thirty hours, a complex message followed the easy-to-recognize pulse sequences. The cycle then repeated, although that conclusion was tentative due to noise and signal fading. Xu's team hoped to have recovered the full message from the many iterations within a week—if the signal persisted that long.

Leave it to a scientist to render stultifyingly boring the discovery of intelligent aliens. But interesting or boring, the news was surely irrelevant to daily life on Earth.

It was almost noon when Kim Chun Ku finally claimed his podium. Kim's remarks confirmed what Charise already knew: He was an administrator. Passionless. Kim's third viewgraph was an organization chart: five colored boxes. As one, the audience members checked out their name badges. Whispers erupted.

Kim rapped his mike until order returned, then confirmed widespread suspicions. The colored stickers denoted committee assignments. After lunch, at committee breakout sessions, the teams would convene for the first time.

The gold team, at the top of the chart, was the Steering Committee. Kim, of course, led the gold team. Its members were the leaders of the still undefined other teams, famous names from the SETI community, whatever SETI was, two assistants to ambassadors from COPUOS-participating countries, and a few UN agency heads like Bridget Satterswaithe. The leadership group, as far as Charise could tell, lacked representation from the less-developed countries.

Of course.

Blue team dealt with radio engineering, something about signal acquisition and recovery. They would work with the ITU on reduc-

ing Earth-originated interference in ET's preferred frequencies. They would coordinate the efforts of radio observatories worldwide at monitoring ET's signal. Blue team was mostly radio astronomers, including Sherman Xu, with some ITU staff thrown in.

The Green team's job struck Charise as the part of the project most likely to be second-guessed: analysis. They were tasked with decoding and interpreting ET's message. Membership included lots of strange folks: a codebreaker from the American National Security Agency, mathematicians, linguists, and more SETI specialists.

Gray team would ponder Earth's possible response. Kim had, quite properly, decided that opening a dialogue with another civilization was not about science. With Security Council blessing he had staffed this committee entirely with diplomats. Linguists and mathematicians from Analysis would encode Earth's message after a reply, if any, had been authorized. Studying gray team's short list, Charise fumed: again, no representation from the developing countries.

And the red team? The best had *not* been saved for last.

Red denoted the Media & Education Committee. The group to which she had been relegated was to coordinate the release and spinning of everyone else's work. Red team would also take questions and field unsolicited suggestions. Her committee mates were reporters—including the jerk who had just humiliated her, PR flacks, educators, a multicultural behavioral response team, and, oddly, an ITU-sponsored technocrat.

Dr. Dean Matthews, by happenstance, was seated a few seats to Charise's left. She had noticed him in the lobby: tall, about 185 centimeters; fit, in a middle-aged, office-worker sort of way; with wavy black hair and pale blue eyes. The title line on his badge read *VP of Strategy and Technology,* above a company name that was unfamiliar to her. He kept frowning at his nametag as though it might, if sufficiently rebuked, somehow change its spot.

Charise shared Matthews's disappointment, knowing no one would care. She was a credentialed ambassador, and this assignment was an affront. She had plenty of experience with such condescen-

sion, and with wringing every gram of possible advantage from others' guilt. If they—a group of uncertain and fluid composition, but always including the United States government—believed she would quietly accept their "generosity" in being included in their task force, they would learn differently soon enough.

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"And so," Paul Ricard concluded, "our role is to package and control the Lalande information, in a manner respectful of the various cultural sensitivities." He looked for approval to the woman glowering from front-and-center in the musty, overcrowded meeting room. "After a short break, I propose to discuss process concepts for that mission."

Red team's leader had spoken for twenty minutes, in all that time conveying no more than had been in his summation. All viewpoints are equally valid.

Such vapidity, alas, was what Dean expected from a PR flack—even one with a prestigious UN title. The sullen ambassador could not have helped.

So why am *I* here? Dean wondered. He cleared his throat.

"Dr. Matthews, have you something to add?"

"Yes, actually. I don't think our charter, as you've spelled it out, is entirely realistic."

"And why is that?" Ricard sniffed.

When the session had opened with brief introductions, Dean had wondered anew why he was there. He had a Ph.D. in physics, while no one else admitted to any background in a physical science. So give them the benefit of the doubt. They might honestly not understand.

Dean said, "Because we don't have a monopoly on ET information." (The media reps suddenly sat a bit straighter. The newsies had been quiet, as if from some misapprehension that task-force membership guaranteed them exclusive insights.) "If we withhold or spin any findings, we'll discredit the whole task force."

"I question the premise," Ricard said. "We have brought into the

task force the leadership of every major radio-astronomy observatory. Surely we can rely upon their cooperation in the responsible release of discoveries."

Irrelevant even if it were true, Dean thought. "In days, universities worldwide will be monitoring ET directly. They can easily build an adequate receiver from arrays of commercial satellite dishes. They know exactly where to point the antennas and the frequency to which to tune. And they will *all* be racing to post observations and interpretations to the 'net."

Unhappy looks were traded across the room while Ricard found his voice. "How sure are you about this?"

"Very," Dean said. "I'm on leave of absence from a satcom company, one of many such firms. Any of a dozen people from my former staff could do this."

"Dr. Matthews?" asked Amreesh Shah, a psychologist from the behavioral-response group. "What would you propose?"

"Publish our observations, completely and without editing," Dean answered. "Clearly mark as commentary or opinion any 'adjustments' we may choose to make." *Not that we should make any.*

"We won't have a monopoly on the signal, but we do have resources far beyond those of other listeners. If our postings are prompt and objective, our interpretations insightful, *we* become the preferred source of ET data. If we hold back, however well-intentioned our reasons, the best we can hope for is marginalization by other news sources. At worst, who knows what motives will be ascribed to us? There's no shortage of people who see conspiracies all around."

Shah nodded. "Distrust is the result the task force can least afford."

That was one point everyone in the committee could agree upon.

From the SETI Conspiracy chat room:

Suspect_Everyone: Does it strike anyone else as suspicious that the UN is orchestrating the

Lalande investigation?

UFO_believer: Absolutely! And who's behind this "International Academy of Astronautics?"

42_is_true: I would sure like to see the ET message text from a reliable source, not the US government, and *certainly* not the UN.

Suspect_Everyone: Does it strike anyone else as suspicious that it's suddenly very hard to buy satellite dishes?

"Whatever is so fascinating?" Bridget Satterswaithe asked. She plopped her carryon bag onto a spare seat at Dean's table.

Dean shut his laptop. He had been surprised but happy to discover the island's single-runway airport had wireless access. Or maybe he was happy because this tiny airport bar stocked ale from the local microbrewery. "Just catching up."

That was an easier answer than describing the intriguing new resource he had just run across: the Internetopedia. Maybe the web portal was the next big thing, and maybe it was only a marriage of desperation among dot-bomb media companies.

"Tropical punch," Bridget told the approaching waiter. The terminal had a roof but no walls. The afternoon sea breeze riffled her hair as she took the remaining chair. To Dean she said, "Quite an event."

He had run into her at banquets and between meetings, but always within a crowd. They hadn't been alone together since that extraordinary, adrenaline-fueled night when they had learned about ET. He was no longer lobbying, but she could still make or break NetSat. He was a peon on the Lalande task force. She was among its leaders.

How exactly was he supposed to relate to her?

He had Googled all the ITU leadership before the WARC, not just Bridget. He knew she was an electrical engineer, with a Ph.D. from Oxford, and that she had gone straight from university to a British government research establishment. He knew that post had

been her steppingstone to the ITU, which, after several promotions, she had come to lead.

Knowing her resume didn't help here. What else? Along the way she had acquired patience with committees and bureaucracy that Dean could not fathom.

And, to be honest, he was attracted to her.

Dean slid a bowl of mixed nuts her way. "It turned out okay. Maybe I'll cancel the mob contract I took out on you."

"For accomplishing what you pleaded for?"

"Requested in a dignified manner." He gestured for another ale. "No, for plunking me among the social scientists and spin doctors."

And with a perpetually difficult ambassador. Why was Charise Ganes always so angry? Googling her had revealed that she was one of the youngest ambassadors ever accredited to the UN. Maybe that and ET were too much to handle.

That seemed like too much candor.

Dean continued, "I respect their sincerity and good intentions, but I've *never* met so many people who see the glass as half empty."

"Don't blame me or the gold team. Yours was one of the few assignments Kim had made before Steering even met." A boarding announcement from a staticky PA drowned out Bridget's next words.

"What?"

"I asked, 'How is it that things turned out okay?' "

"Had it been up to me, I would've had a tough time deciding between Signals, Analysis, and Reply. It occurred to me that someone on the red team has to liaise with those other committees. A technically oriented point of contact made sense. So I've gotten myself access to all the information that Steering has, without, no offense, enduring all that bureaucratic ponderousness."

"No offense taken." She laughed. "Well, maybe a little. In any case, I'm off to my gate. I'm glad it worked out for you."

He found the silver lining to her abrupt departure. It avoided

the awkward question about who, since it wasn't the Steering Committee, wanted him on the Media & Education team. It could not have been Kim's idea: Kim could not possibly have ever heard about Dean.

At least the Undersecretary-General was unlikely to have heard about Matthews absent input from the US ambassador.

From the Earth First chat room:

All_Politics_Is_Local: So what is with the Lalande task force and its closed-door "organizational" meeting?

Stop_World_Government: What's the UN *always* up to? ET's message is simply another excuse for worldwide government. Whatever the task force is for—I'm against it.

All_Politics_Is_Local: It's welfare for rich-country scientists. Would a Bangladeshi textile worker think this is the best use for the money?

Radical_Dude: There is common cause among world-government resisters, ET skeptics, and Third World advocates. Expect the UN to get a taste of what we gave the WTO in Seattle in '99.

— 3 —

Alex Klein had alerted Dean to the unadvertised coordination between the Russian and American militaries and the Steering Committee. One thing led to another, and here Matthews was at a Manhattan deli with a Russian general and ex-cosmonaut.

Vladimir Grigorivich Antinov began his career in the Red Air Force. He'd been an advisor to Hanoi during the Vietnam War, a time he declined to discuss. He had graduated to, and risen rapidly in, the then-Soviet strategic rocket forces. Combining piloting and missile expertise, he had moved into the cosmonaut corps. He'd served two

tours aboard *Mir*, one as mission commander. His English, from years of joint planning with NASA, was excellent.

After an exchange of pleasantries and the ordering of lunches, Dean got to the point. "To be honest, I'm surprised that the militaries care about ET."

Antinov dumped spoonful after spoonful of sugar into his tea. "Our job is to worry."

"About what? ET is *far* away."

"That is an assumption it is best to validate."

A curious rebuttal. Delivery of their sandwiches gave Dean a chance to consider it. ET's signal was quickly recognized as artificial because of the pi factor. That observed wavelength, however, depended on the wavelength originally transmitted *and* Doppler shift due to relative motion between sender and receiver. Lalande 21185 and the sun moved relative to each other. ET's unseen planet must, like Earth, orbit its sun and rotate about its axis. The signal should have wobbled continuously around its "look at me" wavelength.

It didn't.

Without any decoding of content, that observation alone showed that the message was intended specifically for Earth. It meant that ET saw Earth well enough to measure its orbit and rotation, and then dynamically tune his signal accordingly.

"In ten years *we* could have a telescope able to resolve Earth-sized planets of nearby stars," Dean said. "NASA has requested funding for one for years. ET seeing Earth doesn't require technology much beyond ours."

Antinov waved over the waitress for another pot of hot water. "Or ET could be much closer. If he can correct a signal for planetary motions, his and ours, he can as easily compensate for blue shift to disguise transmission from an approaching vessel."

"But why announce your existence *and* hide your arrival?"

"The message may announce a visit. As you well know, we cannot yet read it."

Might ET be announcing his arrival? Matthews shoved away his plate, half a corned beef on rye untouched. He had heard nothing

like this from anyone on the task force. "Since we're discussing this in a crowded deli, you can't be too concerned."

"Did I have too much fun with you? I will explain what my people and yours are doing: probing with our most powerful radars along the signal path. These radars can detect the smallest bits of space junk in Earth orbit. We can track a dropped bolt that is hundreds of kilometers high. More than once," the cosmonaut smiled, "that has been a useful capability. We would expect to detect a starship *much* farther away. As yet, there has been no return pulse."

Matthews had never worked with military radar, but thought he could make an intelligent guess at its sensitivity from an understanding of radio telescopes. "If ET is coming, he's still well outside our solar system. Or stealthed."

Antinov winked at the mention of stealth. "I commend your newfound paranoia, though in this case such caution may be excessive. To visit us, a vessel must travel at very high speed through the scattered matter that makes interstellar space only a *near* vacuum. Could a ship maintain stealthiness against the ongoing particle bombardment? Would it not radiate, whether from collisions with such particles or some protective force field? We've seen no such evidence.

"We've even used the comet watcher trick of flipping back and forth between telescope photographs taken on successive nights of the same patch of sky. There are no unexpected moving objects, nor any unexpected occluded stars."

"You *have* been busy."

"We do only what your Space Command has done, I think."

Matthews grabbed the check. "So are you convinced that the signal is genuine, and from Lalande 21185?"

"It has been a most pleasant discussion, but duty calls." Antinov stood. "As for your question, I am *almost* convinced.

"I am entirely certain that were ET able to sneak up on us, nothing we could do in preparation would matter."

Continued in....
Interstellarnet: Origins — On Sale Now!

Afterword

and

InterstellarNet Background Material

Afterword

InterstellarNet began in musings about a far-future, star-spanning, human civilization. I presumed the pesky constraints of relativity: no FTL travel.

One thing led to another …

Soon I was pondering a comm network that functioned across the light-years. And, we homo saps being a tad competitive, about interstellar cyberwarfare.

I'm a computer guy. I started writing functional requirements for the network.

Human explorers will depart from our solar system with familiar languages, predefined protocols, and ready-made comm gear. NASA is already hard at work on an interplanetary Internet. It was more fun to imagine how an InterstellarNet might spontaneously arise—and thrive—among species that initially lack any common language, experience, or technology.

At this point, I should mention that I'm not only a computer guy. Besides computer science, there's physics and an MBA in my shadowed past. From that MBA program comes background in economics—also known as the dismal science.

Sometimes in my fiction I play with physics. As often I play with computer science. InterstellarNet lets me play with all three sciences.

I'm hardly the first SF author to wonder how distant species might establish communications. Nor am I the first to suggest that the universality of physical laws would provide common ground. (H. Beam Piper's "Omnilingual" did the latter way back in 1957.)

As you've seen, the InterstellarNet series opens with "Dangling Conversations." Three different sciences suggested their own challenges. On the physics side: What, exactly, do math and science

let us and ET say to one another? On the computer side: How, exactly, would a meaningful message be encoded between absolute strangers? On the economics side: Why would humans persist long enough to establish a dialogue with aliens light-years distant (or they with us)?

From its inception in "Dangling Conversations," InterstellarNet was a commercial entity. Limited to primitive communications, that early commerce involved barter.

Creative Destruction is the most famous phrase of a largely obscure economist, Joseph Schumpeter. It refers to the often brutal efficiency with which markets reallocate capital from mature technologies to emerging ones. In an example from after Schumpeter's time, think: mainframes, then minicomputers, then PCs, and now Internet-centric applications.

I imagined we would learn to converse effectively (albeit slooowly) with our neighbors in other solar systems. They know things we don't. They have wondrous capabilities like mature nanotechnology. To what lengths might some people go to obtain that technology, even after government bans its import because nanotech would be too disruptive or dangerous? Once everyone knows how to barter with the four-eyed, many-tentacled neighbors, who can stop the unscrupulous from violating such bans?

And so, "Creative Destruction."

Time passes. Technologies converge as an increasingly rich trading language and the increasingly robust comm infrastructure accelerate everyone's progress. Years-long Q&A becomes tiresome.

By "Hostile Takeover," most InterstellarNet species have swapped trade representatives: artificially intelligent agents. This, to a computer guy, is getting really interesting. What's to prevent us from stealing the intellectual property of aliens' trade agents? What's to stop us from hiding malicious software—we can all imagine things much nastier than mere viruses—in the agent software we transmit to our neighbors?

Of course whatever plots we can hatch—our neighbors can, too. Uh-oh.

As I said, I wrote functional specs. Herewith, a few of Lerner's Laws for Artificially Intelligent Trade Agents:

1. Agents run only inside mutually agreed upon containment: the sandbox. The sandbox protects:
   a. The secrets of the agent from the locals.
   b. The local infosphere from the agent.
2. Sandbox code is fully disclosed and fully agreed upon across the interstellar community. (Extraterrestrial e-commerce: one more argument for open source software!)
3. Access to/from the interior of a sandbox is only by messages.
4. An agent, its software entirely proprietary to its patron species, is transmitted encrypted across interstellar space.
   a. It unwraps itself inside a sandbox provided by the host species.
   b. It self-destructs, its secrets undisclosed, if the behavior of the purported sandbox deviates in any way from expectations.
5. Trade wares—that is, intellectual property—travel between solar systems in encrypted form. They are unwrapped in secrecy by the sequestered AI agent. Goods are sold, or not, and bought, or not, as the agent negotiates within its authorized parameters.
6. Agents buy and sell information using the host species's banking system. Credits not spent locally may be transmitted, securely encrypted, between solar systems.

There's (much) more to it, of course, some of which you've now glimpsed in "Strange Bedfellows" and "Calculating Minds."

Isaac Asimov's classic robot stories revolve around loopholes and

ambiguities in the Three Laws of Robotics. InterstellarNet stories likewise explore ambiguities and loopholes in interstellar commerce protocols.

InterstellarNet: New Order (serialized as "A New Order of Things" and not part of this book) is the most ambitious InterstellarNet tale to date. The good news is interstellar travel has finally become feasible. The starships are slower than light, of course—I'm not about to make InterstellarNet obsolete.

I hope to explore InterstellarNet for a long time to come.

Edward M. Lerner

Extraterrestrial Membership
In order of first contact with Earth

Common human name of star (see note 1)	**Constellation, as viewed from Earth** (see note 2)	**Species popular name(s)** (see note 3)	**Distance from Sol / Earth (light-years)** (see note 4)	**Date of first contact** (see note 5)
Lalande 21185	Leo Minor (the Little Lion)	Leos	8.3	2002
Alpha Centauri A	Centaurus (the Centaur)	Centaurs	4.5	2012
Luyten 789-6	Aquarius (the Water Bearer)	Aquarians	10.5	2024
Barnard's Star	Ophiuchus (the Serpent Holder)	Ophiuchans (Opies) Colloquially: Snakes	6.0	2052
Tau Ceti	Cetus (the Whale)	Whales, Mobies	11.9	2054
Wolf 359	Leo (the Lion)	Wolves	7.8	2060
61 Cygni 2	Cygnus (the Swan)	Swans	11.4	2064
UV Ceti	Cetus (the Whale)	Blobs	8.4	2065
Epsilon Eridani	Eridanus (the River)	Boaters, Jellies	10.5	2069
Alrakis	Draco (the Dragon)	Dragons	18.8	2113

Notes to table on facing page

1. Stars far outnumber any possible set of interesting names. Most stars carry only cryptic sky-census labels, such as Lalande 21185 (even more impenetrably known in another survey as BD+36 2147). Still, many human-eye-visible stars, like Alpha Centauri and Alrakis, have one (or more) traditional names. Common names of a few stars, such as Barnard's Star, honor their astronomer discoverers.
2. "Constellation" suggests the general direction from Earth to the named star. Some of these stars, despite their relative proximity to Earth, are invisible to the naked eye.
3. Human nicknames for ETs often come from the constellation where their home star is found. Alien physiologies inspire other common names—for example, Jellies for the medusoid natives of Epsilon Eridani.
4. Measurements of interstellar distance vary; some researchers report slightly different values.
5. First contact: the receipt date of the first confirmed radio message from the intelligent species native to the named star.

1958: Leos detect Earth's radio emissions. The faint signals are not at first recognized as evidence of intelligence.

2002: Earth receives Leos' radioed reply (transmitted in 1994). Humanity responds under United Nations auspices, opening an era of interstellar barter in intellectual property.

2003: The UN begins a program of radio beamcasts to other stars, in search of other technological neighbors.

2006: Start of the three-year-long Lalande Implosion: the collapse of petroleum-based portions of Earth's economy. The adoption of advanced fuel-cell technology, deduced from clues within the 2002 Leo message, triggers the crash. (The fuel cells, exploiting a revolutionary new catalyst, draw power from almost any fluid hydrocarbon, including natural gas and alcohol. After 2007, few new automobiles use internal combustion.)

2010: The "Protocol on Interstellar Technology Commerce" takes effect. The international treaty creates a new UN agency, the Interstellar Commerce Union, to oversee Earth's radio-based commerce with extraterrestrial species.

2012: The Centaurs contact Earth by radio, the first of many ET species to answer Earth's exploratory messages.

2031: A permanent lunar settlement is established. Colonies and research bases begin to spread across the solar system.

2041: Europan gambit: an interplanetary megacorp impersonates an ET species native to Jupiter's moon Europa, attempting to circumvent ICU refusal to import Centaur nanotechnology.

2050: Transmissions defining Centaur nanotech reach human space, but the plot of the "Europans" is foiled.

2052: The ICU proposes a secure e-commerce mechanism that gradually becomes the flexible basis of a more sophisticated interstellar trading community.

2055: The United Planets Charter is ratified; the UP succeeds the United Nations.

2061: An artificial intelligence is received from the Centaurs; the AI trade agent is successfully installed and confined by the ICU. Other AI agents follow, as more distant species receive, accept, and respond to Earth's 2052 proposal.

2072: The Ophiuchan AI trade agent announces a computing technology far in advance of human photonics. The debate whether to license incompletely understood alien biocomputers roils human society and interplanetary politics. The deal is not consummated until 2076.

2084: Human and Wolf authorities acknowledge their near parity in technology, paving the way for interstellar commerce between private parties. The practice spreads as InterstellarNet fosters technological convergence.

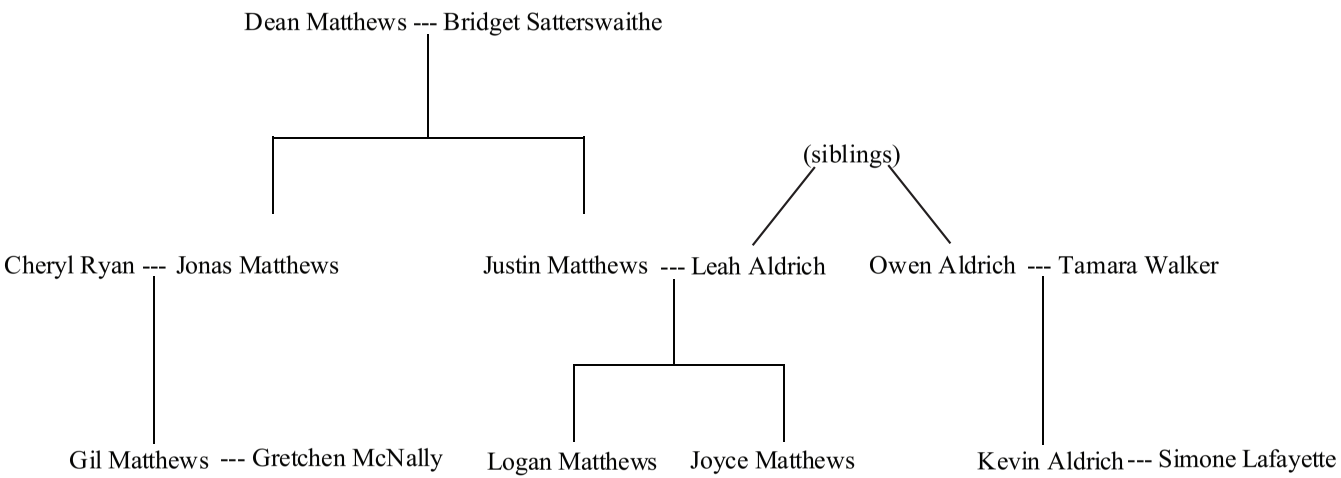
2102: Snake Subterfuge: the attempt, very nearly successful, to extort a fortune from humanity. The exploit involved trapdoors long hidden in the now ubiquitous—but still incompletely understood—Ophiuchan biocomputers.

2110: The asylum request of the Centaur trade agent precipitates an artificial-intelligence emancipation movement across human space.

2112: The AI emancipation amendment to the UP charter is ratified.

2126: A former Secretary-General of the Interstellar Commerce Union nearly succeeds in subverting InterstellarNet trade mechanisms by illegally cloning the agent from Tau Ceti.

Matthews Family Tree



About the Author

Edward M. Lerner has degrees in physics, computer science, and business administration, background that kept him mostly out of trouble until he began writing full-time. His books include the novels *Probe*, *Moonstruck*, *Fools' Experiments*, and *Small Miracles*. His short fiction has appeared in *Analog*, *Artemis*, *Asimov's*, *Darker Matter*, *Jim Baen's Universe,* anthologies, and the collection *Creative Destruction*. He also writes the occasional nonfiction technology article.

In collaboration with Larry Niven, Ed writes the Fleet of Worlds series novels, so far including *Fleet of Worlds*, *Juggler of Worlds*, *Destroyer of Worlds,* and *Betrayer of Worlds.* The four novels, set in Niven's "Known Space," are prequels to the Nebula-, Hugo-, and Locus Award-winning *Ringworld*.

Lerner lives in Virginia with his wife, Ruth.

His website is **www.sfwa.org/members/lerner/**.

Also from FoxAcrePress:

Good fences, said the poet, make good neighbors
… and interstellar distances made very good fences.

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Edward M. Lerner

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