

MOBILITY™

Magazine of Worldwide ERC®

August 2018

EMPLOYEE HHG TRANSPORTATION POLICY: IS YOURS STRATEGIC?

MOVERBOTS & EXOSKELETONS?

COMING RELOCATION INNOVATIONS

SPECIAL EDUCATION NEEDS

AND ASSIGNEE CHILDREN'S SCHOOLING

IGNORANCE OF THE LAW:

EXPATS IN TROUBLE



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A Few Years Down the Road

Only a little money, a little work, and some early adopters stand between us and innovations that are already technically feasible

By Steven M. John, SCRP, SGMS-T

Bill put his coffee down on his desk, reached up, and answered the phone by touching the base of his jaw. "Relocation Management, Bill Jacobsen," he said.

"Hey Bill, Peter George here with Global Moving and Storage. I am at the Smith residence, and we have a delay. Our moverbot is stuck at the top of the stairs flashing a 'refuse' code. Looks like the armoire is too much for it to handle on the stairs. I've called central, and they're sending someone over with a powered exoskeleton. We'll just have to get it downstairs the old-fashioned way."

Bill chuckled. "The old-fashioned way," he thought. Bill was well into his second century and still going strong—one of those lucky enough to still be healthy when rejuv treatments were made widely available. He could remember when "the old-fashioned way" meant you put the furniture on your back and hoofed it down the stairs. The powered exoskeleton was just coming into vogue when he was well into his first career as an owner-operator.

Bill was not overly worried. Peter and his wife, Molly, did not trust the bots with the breakables, so they still packed all the dishes, glassware, and expensive stuff by hand. They rarely had a claim. They'd get everything wrapped and loaded, and then send the truck off to Scottsdale. Peter and Molly would sleep at home tonight, and a new crew would handle the unload at the destination. Bill would wait to notify the crew in Arizona. It should not take the truck more than 20 hours to travel 1,700 miles, so it should still be able to make the scheduled unload the morning of the second day.

Bill enjoyed being in the relocation business. After his first "retirement," Bill started RM Inc. to stay busy. He loved talking to new people, and there was never a dull day in the world of relocation. Many people thought relocation would go away over the years, with virtual presence and most work done by bots. While the need to relocate people decreased to some extent, the rise of a truly global economy and the explosive growth of off-planet colonies and industry fueled demand. Differences in culture and language meant business was still conducted face-to-face, and physical presence was much in demand. And of course, virtual presence was still subject to the speed-of-light limit, so workers needed to be physically near the work they did whether it was around the globe or off-planet. Even a two-second transmission delay could spell disaster in critical industries such as energy, construction, or medicine.

Bill's phone buzzed again: "This is Jim Eyberg. I can't seem to get hold of Alicia." Jim was the spouse of Karen Eyberg, CEO of Space Mining Inc., one of Bill's biggest clients. They were preparing for a two-year assignment to the U.S. colony on Mars.

"What can I do for you, Mr. Eyberg?" asked Bill.

"Alicia sent me a note that we need passports for Mars, and mine is expired. I don't understand—Mars is a U.S. colony!" Jim protested.

"Yes, it is, Mr. Eyberg," replied Bill. "And you will be traveling through the lunar station at Tycho, which is a Chinese colony. The Chinese will want to see your passport, and then U.S. customs will want it again on Mars, since you went through Chinese jurisdiction. It's the best routing we can get you to meet your schedule. I can send a car to take you to the passport office."

"I don't understand why I have to go in person," complained Jim.

"The passport folks are just like that, sir—they want to see that it's really you," said Bill. "Should I arrange for a car?"

"Oh, no, I'll have Karen send our car back from downtown to get me. Thank you, Bill; we appreciate everything you and Alicia are doing. Karen and I have moved three times with this job, and I still can't quite believe we are going to live on Mars!" he exclaimed.

Bill said goodbye and smiled again. Yes, never a dull day in relocation.

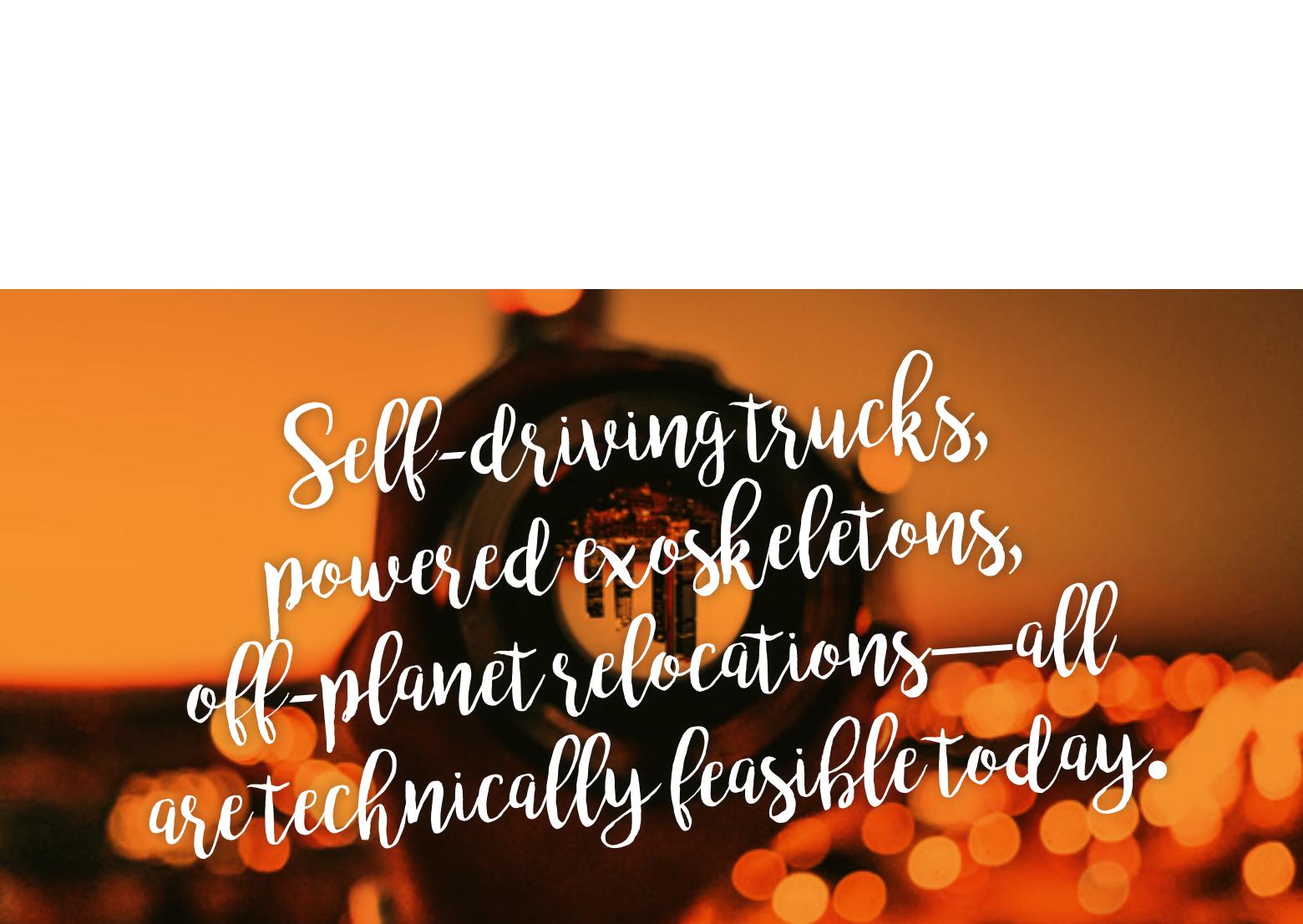
Seem far-fetched? Far from it. Self-driving trucks, powered exoskeletons, off-planet relocations—all are technically feasible today. In some cases, the technologies to support these activities already exist. All that is required to make this future a reality is a little money, a little work, and some early adopters.

Adoption is often the difference between "just a good idea" and "mass-market presence." The first mobile phone call was made 45 years ago, in 1973. It took another 10 years before Motorola released the first commercially available mobile phone, at a retail price of \$3,995. Texting was introduced in the '90s, and phones that combined voice, text, email, music, and internet came into popularity with Apple's iPhone 3G in 2008. Mass adoption of mobile phone and smartphone technologies has dramatically changed the way we live, work, and socialize. The future is not built on wild fantasies, but on the popular adoption and implementation of current technologies and concepts. If we look at the world today, there are several ideas that are just starting to take off and will easily be the way we work a few years down the road.

AUTONOMOUS VEHICLES

No single technology will have more impact on how we work than fully autonomous vehicles. Envision a world where going to work means getting into your car and telling it where to go, and then you get to focus on something else. The car will also have Wi-Fi, allowing you to connect to the internet and work email, review data, and edit documents and spreadsheets. You can arrive at your workplace having already tackled a variety of tasks from the car.

Autonomous vehicles will also significantly reduce congestion and accidents, while allowing for increased highway speeds. Commutes of 100 miles



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or more one-way will become commonplace, as such a trip could take less than 60 minutes, most of it productive time.

As a direct impact on the relocation industry, we will likely see an end to the driver shortage in household goods moving. Autonomous moving vans will show up at the departure location, be loaded by a local team, and then make their own way to the destination to be unloaded by another local crew. Autonomous vans will be able to operate 24 hours a day, 365 days a year, making more efficient use of a single vehicle and allowing for shorter transit windows.

How far in the future is this? Much of the technology required already exists; it simply requires additional investment and development to be market-ready. Legal hurdles and consumer acceptance will take longer. Experts suggest that fully autonomous vehicles could easily be available by 2025, but they will probably first see use in private, contained settings, such as gated communities and airports, or in limited-use geographies, such as urban centers. These initial applications will allow

for further testing of technology and user acceptance. Jeremy Carlson, an autonomy and mobility analyst with industry research firm IHS Markit, sees private vehicles with significant autonomy closer to 2025, and the possibility of no driver participation whatsoever within a few years after that. “Even then, both [public and private segments] will remain at relatively low volumes, with significant growth expected about five years after the initial deployment in the segment—meaning increased growth in the latter half of next decade and through the 2030s,” says Carlson.

TELEPRESENCE

In the future, will we even go to work? Or will various forms of virtual presence and virtual reality allow us to do all our work from home? As with most things, the answer is a little bit of both.

“Telepresence” is defined on Wikipedia as “a set of technologies which allow a person to feel as if they were present, to give the appearance of being present, or to have an effect, via telerobotics, at a place other



than their true location." We already have a variety of online meeting services such as GoTo, Skype, and Webex, and collaborative internet sites such as Basecamp, Mango, SharePoint, Slack, and many more. Telepresence can incorporate voice, audio, vision, and even remote operation. True virtual presence may one day incorporate both smell and taste.

The benefits of telepresence can be immense, particularly at the ultimate level of remote operation. Remote piloting (drones), medicine (surgery), and inspection are very real-world examples. The value of telepresence is dependent on its fidelity, meaning both how real it seems and the actual quality of the transmission. Telephones are an early example of telepresence, but only one sense—hearing—is involved, and transmission clarity can suffer. The more senses are involved, even including touch, and the greater the clarity, the more value is offered by telepresence and the less likelihood that actual presence is required.

Soon after the internet gained popular support, many predicted that working from home would quickly become commonplace. But like the Jetsons' flying car, that reality is still a distant dream. According to the U.S. Bureau of Labor Statistics, there has been slow growth in work-from-home models: "The share of workers doing some or all of their work at home grew from 19 percent in 2003 to 24 percent in 2015. Workers in managerial and professional occupations were more likely than workers in other occupations to do some or all of their work at home." The current state of telepresence and virtual reality technologies is far below the level of sophistication required to eliminate the need to physically be somewhere. We can conduct meetings and collaborate on documents and spreadsheets, but that's about it. Mass-market acceptance will require a level of fidelity, combining the highest level of "trueness" and transmission quality, unavailable today or even in the foreseeable future.

Finally, there is an economic aspect to providing the kind of experience that will make working from home the same as being in the office. Videoconferencing platforms available today that simulate meeting attendees being in the same

room cost more than \$500,000 in equipment, with additional annual costs in licensing and maintenance. These tools will be economically rewarding for some real-world applications but are unlikely to show up in your home office anytime soon.

ARTIFICIAL INTELLIGENCE (AI)

Probably more important than the question of where we work is the question, "Will we work at all?" Pundits are heralding AI as the most impactful invention since fire. The kinds of AI we see in movies such as *The Matrix* may never come to pass. But narrow, application-specific AI is here today and will grow dramatically over the coming years, with a big impact on the way we work and how we as humans interact with businesses.

In the narrow sense of the word, intelligence requires learning, adaptation, and flexibility within a wide range of environments and scenarios. In "What Is Artificial Intelligence? An Informed Definition," in *TechEmergence*, Daniel Faggella writes, "Artificial intelligence is ... able to receive inputs from the environment, interpret and learn from such inputs, and exhibit related and flexible behaviors and actions" based on that input.

For work applications, artificial intelligence will be able to "sense" inputs—initially text, audio, and video, and ultimately touch, taste, and smell. More significantly, AI can be given sensors that will allow it to "sense" things no human can, such as radar, infrared, or sonar. Exposure to a variety of inputs over time allows the AI to "learn" through pattern recognition and classification of those patterns. Thus, an AI exposed to a wide variety of music would be able to categorize music it has never heard before into classical, jazz, blues, etc. AI will recognize patterns within business and customer data and, based on past results, point out trends, identify solutions, and even take action. Early applications of AI are analyzing data, interacting with customers for basic needs, and running machinery and vehicles.

A recent survey of 1,634 experts in artificial intelligence, done at the University of Oxford, attempted to predict how long it would take before AI would be



capable of certain tasks. Some, like the ability to play the game of Go or function as a retail salesperson, are attainable within the next five to 10 years, while AI capable of handling “all human jobs” is more than 100 years in the future.

It is likely that superintelligent AI will be the reserve of governments and large corporations, as the necessary infrastructure and investment will make it economically unfeasible for the local dry cleaner to be run by a superintelligent AI. AI will be developed and implemented according to business economics. It is a significant milestone that AI can play and win at Go, but there is little call for such a device by consumers, making it unlikely to represent a commercial breakthrough.

There will also be a “final mile” challenge. While one can foresee using a kiosk to make your fast-food order and an automated assembly line of burger and french-fry cookers, it seems impractical to staff the local fast-food place with a robot that is sophisticated enough to accept deliveries, work with vendors, maintain equipment, and handle issues for which the machines are not programmed. Given the variable nature of such jobs, it is likely that human labor will be much cheaper. The question is not, “Can we develop AI to handle any task?” but, “Will anyone pay for AI to handle that specific task?”

Some jobs will not be easy to automate, which makes the economics of replacing such jobs prohibitive. Jobs that require empathy—clergy, nurse, doctor, counselor, psychologist—could possibly be automated, but would you want them to be? There will ultimately be a “robot” football league, but people will still want to watch humans who can excel and humans who can entertain. Some jobs will remain human as a luxury. High-end restaurants will still employ sommeliers and waiters to distinguish themselves from fully automated dining.

The most challenging economic factor in realizing a fully AI-powered robot workforce is the most obvious. If no one is working, who is paying for the robots? Robots can take only jobs that are available because there is a strong economy of workers who support those jobs.

The most likely scenario is that many mundane, rote work tasks will be delegated to

application-specific devices and AI. The kiosk at the fast-food joint will be able to take your order and accept customizations within certain limits, while understanding a wide variety of speech and language. It will be connected to a central restaurant AI that handles ordering new supplies and controlling food processing equipment. But that’s it. It won’t be able to write a symphony, discover a cure for cancer, or build more robots and take over the world.

We are also likely to see “intelligent assistants.” Think of Siri or Alexa, but much more capable. These assistants will help us in our day-to-day work by finding existing data and files within our systems, performing data analytics and research, and helping to pre-read and classify email for action. A customer service representative will work with an intelligent assistant while on the phone with the client. The rep will talk to the customer, providing empathy and understanding, while the assistant listens in, calls up relevant data, and offers suggestions and solutions from available options. The rep can then explore these options with the customer to make a final purchase decision. Order processing is left to the assistant, while the rep is free to take another call. Such human-AI partnerships will greatly enhance our effectiveness, but at some level it is not different from the spreadsheets, word processing, and other automation that serves us today. This will make our economy more productive, lower prices, and increase demand for all manner of goods and services. That increased demand is what will ensure that most of us will remain employed for a long, long time. **M**

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