



A MESSAGE TO SPACE

A TEAM OF SURVEYORS HAD TO THINK LATERALLY FOR A RECORD-BREAKING PROJECT – TO RECREATE A HANDWRITTEN NOTE IN THE EARTH USING WRITING SO LARGE THAT AN ASTRONAUT COULD READ IT. JOHN STENMARK EXPLAINS HOW THEY DID IT

Mari Boghossian wasn't convinced the person on the phone was serious. He was describing a project to write something on a dry lake in Nevada in the US. He needed to write it big enough to be read from high above the ground – very high.

Mari manages office operations for George G Boghossian and Associates, an engineering and surveying firm. She handed the call to her husband and company vice president, Eric Boghossian. The caller was Johnny Lee, a producer with Duo Films, a production company in Los Angeles. After speaking for a few minutes, Eric knew that Lee was quite serious about a very intriguing project.

Lee explained that his company produces commercial films for the car and electronics industries. One of his clients, Innocean Worldwide, had approached him with a film concept for Hyundai. The story would highlight a 13-year-old girl called Stephanie. Her father was an astronaut on the International Space Station (ISS) and was on a mission that would keep him away from home for more than six months.

Stephanie wanted to send a message to her dad. Innocean developed the idea of taking a handwritten note from Stephanie and making it large enough to be read from the ISS orbiting roughly 400km above the Earth. The letters in the note would need to be more than 300m tall and written with the equivalent of a pen 30m wide. But how could they write a message that big?

The producers and creative teams threw around several ideas. One approach was to use lights that were visible from space – another involved ropes and structures. The team considered other ideas before

the concept emerged to use Hyundai cars to carve the message into the ground. The project would use eleven cars choreographed to drive in formation along precise paths to write out the message. Land and airborne camera crews would film the activities to create the commercial.

Lee knew accurately reproducing the handwritten message would require a surveyor to map the landscape around the chosen location, Delamar dry lake, and keep everything in scale. Lee pitched the project to several local engineering and surveying firms.

"I felt most comfortable with the Boghossians," Lee recalls. "I told Eric that we are trying to write large letters on a dry lake bed large enough to be visible from the air. I gave them the area of the location that we had in mind, and let them know we were trying to fill three or four miles of dry lake bed with carved lettering."

Eric says that initially the project didn't seem complex, but soon recognised that the scale of the work would carry challenges. Using a scanned image of Stephanie's message to her dad, they digitised the lettering. They needed to digitise enough points to scale the message from a letter-size sheet of paper to cover much of the lakebed's approximately 890ha.

"We maintained the irregular slopes and breaks of her note," Mari says. "We didn't want it to look like a standard font – it needed to look like her actual handwriting."

Lee provided additional information, including the width of the cars that would drive on the lakebed and the desired size of the letters.

Wind, orbits and the Air Force

The orbital path of the ISS passes over Delamar at irregular intervals, with many passes occurring at night. The message needed to be ready in time for a daylight pass with the station nearly directly overhead. The next suitable pass would occur in late January 2015 – not a pleasant time of year at Delamar, with winter bringing cold temperatures and biting winds. A windstorm at the wrong time could obliterate the writing before the ISS could see it. Any clouds could obscure the view from the space station and produce unwanted shadows on the ground.

The sky harboured another, unexpected issue – the US Air Force. “Every morning at 6am, they would come around with fighter jets for practice,” Mari says. “We called it our daily aerial show.”

“The day after the filming was scheduled to wrap up, the Air Force was coming in to do their test landing,” says Eric. “So, wind or no wind, whatever was on the surface of the ground was going to get ripped up.” Given that information, missing the schedule simply was not an option.

A clean, flat canvas

Eric, Mari and colleague Mark Price arrived at Delamar Lake in a recreational vehicle (RV), equipped with a computer, printer and large-format plotter, that would serve as their on-site residence and mobile field office.

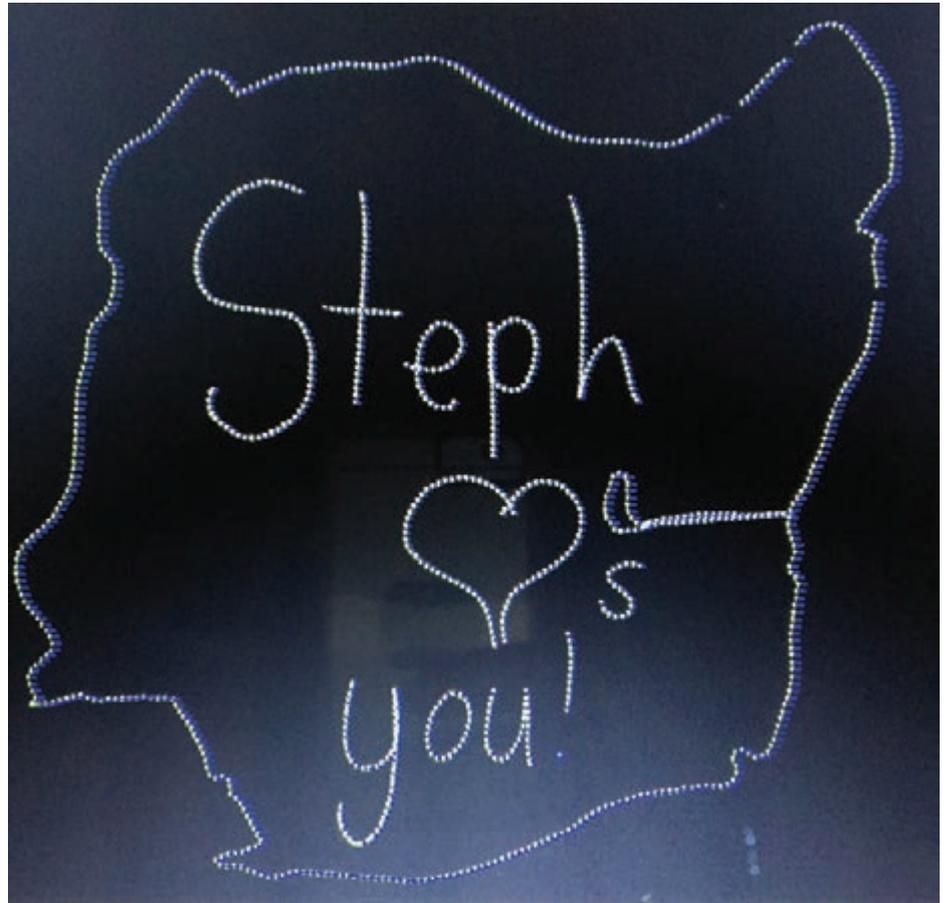
The first task was establishing control for the mapping and layout. With no phone service in the area and no requirement of ties to geodetic control, Mark set a few reference points and used a pair of Trimble R10 GNSS receivers to capture their positions. Then he used the GNSS data to devise a local coordinate reference system for the project.

From there, the team started mapping the site. They collected data on the perimeter of the lakebed, a large rock outcrop and a power transmission line passing through the site. They then worked with the project art director to orient the writing onto the lake. They needed to maximise the size and obtain optimal lighting angles from the sun.

The art director also wanted to incorporate the rock outcrop into the message: it would serve as an apostrophe.

To add one more twist, representatives from Guinness World Records would witness the event to certify the work as the largest ‘tyre track image’ ever created. The lettering became even bigger, and Eric, Mari and Mark plotted several options before the final layout was selected. They then created centreline alignments for the lettering and computed coordinates for stakeout.

The smooth lakebed was the canvas onto which Lee’s team would write the message. The surveyors were not allowed to use a vehicle, as it would leave tracks that might distract from the writing, so every time they went on the lakebed, they walked.



Stephanie’s note to her father



Surveyors Mark Price (left) and Eric Boghossian prepare for a day’s work on the dry lake

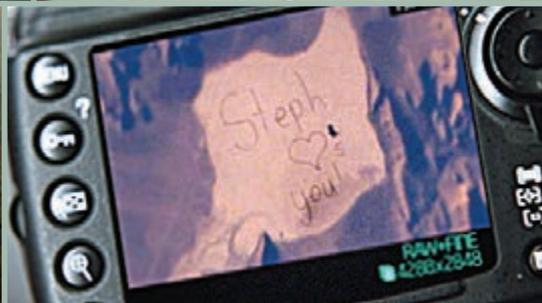
“I think that was difficult for everybody,” Lee says. “The area was large, but we couldn’t access it by car or we’d leave tracks everywhere and then our canvas wouldn’t be blank. So we had the surveyors and art department marking the path of travel for the vehicles. They were walking on the surface, eight to 10 miles (13-16km) a day for a whole week. That was probably one of the hardest things.”

The surface was a powdery dust that got everywhere. “Every night we would try to clean it,” recalls Eric. “If you plopped down on the couch in the RV, you’d let off this big poof of dust.” When dampened by overnight frost,

the lakebed became very sticky. “As you’re walking, every step of the way you build up goo on your boots. You get taller and taller until you finally slide off or you can’t lift your feet up. You’re stuck to the lake.”

The surveyors used a Trimble R10 GNSS receiver and TSC3 controller running Trimble Access software to lay out the points. They were accompanied by a team from the art crew. Each letter was assigned a group of points, and Eric and Mark divided the field work.

Eric says that the stakeout process was straightforward. “We’d decide where to start for the day and tell the controller, ‘I want to



go to, say, point number 1,400. The controller display tells us, 'Okay, go about 5,000 feet (1.5km) this way and 4,000 feet (1.2km) that way and that's your start point,' and we just start walking. Lots of walking."

When the surveyors set a point, the art crew would measure and place offset points 15.2m on each side of the centreline. The points were marked with pin flags, which would not be visible in the film. A film crew accompanied the surveyors, shooting video for the commercial and a companion film about how the commercial was made.

The stakeout took four days, but Eric believes they could have completed it in two if not accompanied by the film crews and art teams. By the time the surveyors finished their work, they had staked 14km of centreline at 30m intervals. They also worked with the production team to plan the routes the cars would take between letters to minimise any

visible tracks. Finally, the Delamar lakebed was ready for the team of drivers to etch Stephanie's message into the ground.

The new record

The weather cooperated. When the message was complete, the Guinness team certified it as a new world record, covering more than 5.5km². As the driving and filming wrapped up, word went to Stephanie's dad aboard the ISS advising him to look for the lakebed at a certain time. He captured the scene with a digital camera and radioed a "thank you" to his daughter and the crew.

Duo Films had accomplished their mission. "We got through it with no missed deadlines and didn't have any weather issues," Lee says. "The film was obviously a big hit this year. I honestly didn't think it would be this successful. But it turned out great. The director, ad agency and the creatives involved did a great job

putting the footage together and telling a heartfelt story." The work reinforced his belief in working as a team. "Nobody could do this alone. It's always a collaborative effort. I have learned not to micromanage. Let the experts do what they do best and trust them to do their job."

Eric is glad they took that first phone call. "What sounds like a far-fetched project can turn out to be interesting and even fun," he says. Most of his company's projects don't require GNSS and he saw the Hyundai commercial as a good opportunity. It was an ideal project to use GNSS and gain a new client. "I'd do it again in a heartbeat."

I'D DO IT AGAIN IN A HEARTBEAT

John Stenmark is a writer and consultant in the geospatial industry

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