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Record - 1

DIALOG(R)

**Kepler passes first test - ready to hunt for other Earths**, Peter N. Spotts, Christian Science Monitor (USA), ALL ed, p2, Thursday, August 6, 2009

TEXT:

NASA's planet-hunting Kepler spacecraft has passed its first "spot that planet" test, detecting a giant Jupiter-like orb hurtling around a star roughly 1,000 light-years away. The test run clearly demonstrates that Kepler will have little trouble performing its primary mission: detecting Earth-like planets in the habitable zones of sun-like stars. In the process, Kepler has given astronomers a detailed look at the planet - its temperature and how its atmosphere operates. The results "are stunning indeed," says Alan Boss, an astronomer who specializes in the birth and evolution of solar systems at the Carnegie Institution for Science in Washington, D.C. The Kepler team was confident that their spacecraft would be able to achieve its main goal.

But nothing substitutes for checking the observatory out on orbit to be sure. "We now know that Kepler can do it," Dr. Boss said during a briefing Thursday afternoon at NASA headquarters. "The question that remains is: How many Earths are out there for Kepler to find?" Scientists have become adept at finding planets by measuring how starlight dims when planets pass in front of their suns - an occurrence called a transit. But that method has favored finding large planets that can dim the light of their star significantly. To see Earth-size planets, Kepler must be able to detect much more subtle changes - which is what it demonstrated in its study of the large planet dubbed HAT-P-7b. Kepler did see transits, but it also gauged the overall amount of light from HAT-P-7b's solar system and noticed that the light dimmed when the planet slipped behind the star. In other words, it could tell that the relatively small amount of light given off by the planet had disappeared. Detecting that dip constituted proof that Kepler is sensitive enough to find Earth-like planets, says William Boruki, the lead scientist on the Kepler mission. In its planet hunt, Kepler will measure changes in starlight for some 100,000 individual stars simultaneously. HAT-P-7b was discovered by ground-based telescopes in 2008.

It has about twice Jupiter's mass. It's roughly 1.4 times as large as Jupiter. It orbits its star at a distance of less than 4 million miles. So it whips around its parent star in 2.2 Earth days. Kepler scientists selected HAT-P-7b as one planet for analysis during the telescope's shake-down period because the research team that discovered the planet predicted that Kepler should be able to spot intriguing features in the solar system's light, says Dimitar Sasselov, a researcher at the Harvard-Smithsonian Center for Astrophysics and a member of the team that first detected the planet. And so it did. The rise and fall of the solar system's light when the planet was passing behind and then reemerging on the other side of the star has allowed astronomers to tease out some intriguing details about HAT-P-7b. The Kepler team, which formally reports its results in tomorrow's issue of the journal Science, estimates that the planet's temperature is a searing 5,000 degrees Fahrenheit. So it's trapping an enormous amount of heat from the star. Indeed, the star is so hot that the light Kepler is picking up from HAT-P-7b is not just reflected starlight, it's also light coming directly from the planet itself, according to Sara Seager, a specialist on such so-called exoplanets at the Massachusetts Institute of Technology in Cambridge, Mass. That implies an atmosphere with a high-altitude layer of elements that excel in absorbing heat - perhaps titanium oxide, or sulfur-based hazes. The high contrast between the planet's brightest and dimmest phases - its night half and day half - suggests that its atmosphere does a very poor job of circulating heat around the planet, she says. Although Kepler's main target is Earth-like planets, when it comes to the amount of data Kepler also will provide on this and other transiting planets it detects, "this is just the tip of the iceberg," Dr. Seager says. ----- Follow us on Twitter.

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Record - 2

DIALOG(R)

**OUR RELATIONSHIP WITH JUPITER? WELL, IT'S COMPLICATED.: THE GIANT PLANET PROTECTS EARTH FROM SOME CATASTROPHIC COMETS, THOUGH OCCASIONALLY IT FLINGS....**

Dennis Overbye, New York Times,  
St. Paul Pioneer Press (MN), St. Paul ed, pA10 Sunday, August 2, 2009

TEXT:

Jupiter took a bullet for us.

An object, probably a comet that nobody saw coming, plowed into the giant planet's colorful cloud tops sometime on July 19, splashing up debris and leaving a black eye the size of the Pacific Ocean. This was the second time in 15 years that this had happened. The whole world was watching when Comet Shoemaker-Levy 9 fell apart and its pieces crashed into Jupiter in 1994, leaving Earth-size marks that persisted up to a year.

**OUR RELATIONSHIP WITH JUPITER? WELL, IT'S COMPLICATED.: THE GIANT PLANET PROTECTS EARTH FROM SOME CATASTROPHIC COMETS, THOUGH OCCASIONALLY IT FLINGS A BIG ONE RIGHT AT US**

That's Jupiter doing its cosmic job, astronomers like to say. Better it than us. Part of what makes the Earth such a nice place to live, the story goes, is that Jupiter's overbearing gravity acts as a gravitational shield deflecting incoming space junk, mainly comets, away from the inner solar system where it could do for us what an asteroid apparently did for the dinosaurs 65 million years ago. Indeed, astronomers look for similar configurations -- a giant outer planet with room for smaller planets in closer to the home stars -- in other planetary systems as an indication of their hospitableness to life.

Anthony Wesley, the Australian amateur astronomer who first noticed the mark on Jupiter and sounded the alarm, paid homage to that notion when he told the Sydney Morning Herald, "If anything like that had hit the Earth it would have been curtains for us, so we can feel very happy that Jupiter is doing its vacuum-cleaner job and Hoovering up all these large pieces before they come for us."

But is this warm and fuzzy image of the King of Planets as father-protector really true?

"I really question this idea," said Brian Marsden of the Harvard-Smithsonian Center for Astrophysics, referring to Jupiter as our guardian planet. As the former director of the International Astronomical Union's Central Bureau for Astronomical Telegrams, he has spent his career keeping track of wayward objects, particularly comets, in the solar system.

Jupiter is just as much a menace as a savior, he said. The big planet throws a lot of comets out of the solar system, but it also throws them in.

Take, for example, Comet Lexell, named after the Swedish astronomer Anders Lexell. In 1770, it whizzed only a million miles from the Earth, missing us by a cosmic whisker, Marsden said. That comet had come streaking in from the outer solar system three years earlier and passed close to Jupiter, which diverted it into a new orbit and straight toward Earth.

The comet made two passes around the Sun and in 1779 again passed very close to Jupiter, which then threw it back out of the solar system.

"It was as if Jupiter aimed at us and missed," said Marsden, who complained that the comet would never have come anywhere near the Earth if Jupiter hadn't thrown it at us in the first place.

Hal Levison, an astronomer at the Southwest Research Institute, in Boulder, Colo., who studies the evolution of the solar system, said that whether Jupiter was menace or protector depended on where the comets came from.

Lexell, like Shoemaker Levy 9 and probably the truck that just hit Jupiter, most likely came from an icy zone of debris known as the Kuiper Belt, which lies just outside the orbit of Neptune, he explained. Jupiter probably does increase our exposure to those comets, he said.

But Jupiter helps protect us, he said, from an even more dangerous band of comets coming from the so-called Oort Cloud, a vast spherical deep-freeze surrounding the solar system as far as a light-year from the Sun. Every once in a while, in response to gravitational nudges from a passing star or gas cloud, a comet is unleashed from storage and comes crashing inward.

Jupiter's benign influence here comes in two forms. The cloud was initially populated in the early days of the solar system by the gravity of Uranus and Neptune sweeping up debris and flinging it outward, but Jupiter and Saturn are so strong, Levison said, that, first of all, they threw a lot of the junk out of the solar system altogether, lessening the size of this cosmic arsenal. Second, Jupiter deflects some of the comets that get dislodged and fall back in, Levison said.

"It's a double anti-whammy," he said.

Asteroids pose the greatest danger of all to Earth, however, astronomers say, and here Jupiter's influence is hardly assuring. Mostly asteroids live peacefully in the asteroid belt between Mars and Jupiter, whose gravity, so the standard story goes, keeps them too stirred to coalesce into a planet but can cause them to collide and rebound in the direction of Earth.

That's what happened, Greg Laughlin of the University of California at Santa Cruz, said, to a chunk of iron and nickel about 50 yards across, roughly 10 million to 100 million years ago. The result is a hole in the desert almost a mile wide and 500 feet deep in northern Arizona, called Barringer Crater. A gift, perhaps, from our friend and lord, Jupiter.

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Record - 3

DIALOG(R)

**technical negotiation,**

Cheimets, Peter

Gordon, Joshua

Tull, James

Mechanical Engineering, v131, n8, p26

Saturday, August 1, 2009

TEXT:

HEADNOTE

Product development today is often about teamwork, and there are teachable skills to give engineers more influence in group decisions.

most meaningful modern technical problems are beyond the reach of a single individual to solve. They require teams of individuals, sometimes large, geographically diverse teams, with distinct areas of expertise, to work together over long periods of time.

Though engineers may prefer working alone, a significant quantity of a team's work takes place in a group. The impact that each team member has in these group settings, and therefore on the member's own career, has as much to do with how one interacts within the team as it does with one's technical skills. Thus, to be successful, an engineer must be comfortable in this highly interpersonal environment. And to advance, the engineer needs to excel in it.

When the outcome of an exchange has as much to do with the personalities involved as with the information presented, that exchange is a negotiation.

Stated more generally\* negotiation is the process of two or more persons or parties working together to achieve an end that is beyond the reach of any one of them alone. The team environment is a serial set of negotiations, each the most difficult kind to carry out successfully. They are negotiations that must achieve the parties' goals, and at the same time, preserve their relationships.

Thus, beyond the skills that are necessary to excel as technical contributors, engineers need the skills of negotiators. Specifically, they need to be able to set goals for interactions, to understand their own and their team members' interests, to engage their team members in discussion, and finally, to be able to walk away from a non-productive discussion without walking away from the underlying relationships. A course that the authors have developed teaches engineers how to do just that. We call the course "Technical Negotiation."

The process of teaching negotiation is well established, rising from the seminal 1981 work *Getting to Yes*, written by Roger Fisher with one of his colleagues at Harvard University, Richard Ury, and later edited by Bruce Patton of Harvard. Various fields, starting with diplomacy, have adapted courses for their specific needs over the decades since *Getting to Yes* was first published.

Training proceeds through a combination of discussions and realistic exercises through which the skills are practiced. These courses focus on situations specific to the professions they are intended to serve.

ENTER TECHNICAL NEGOTIATION

People who plan to develop their skills as negotiators need to understand the baseline set of skills. If it were simply a matter of learning those skills, then any course on negotiation would be appropriate for engineers.

The authors' course, Technical Negotiation, makes two advances over other courses: the practical examples are specific to engineering, and the focus is on the difficult problem of balancing long-term relationships while achieving a desired goal.

The development of negotiation training courses for professionals working with technology began before the authors developed their course. One excellent existing course is taught through the Program on Negotiation at Harvard University by Consensus Building Institute (CBI). The focus of that course, also called Technical Negotiation, is negotiations that have a significant element of technology involved. CBI's course is tailored toward professionals who might find themselves in the process of buying or selling a major piece of technology, such as software or a large computer network.

Again, all of the baseline skills necessary to be proficient in negotiation are well presented, the examples involve technology, but the focus is on negotiations involving large sums of money and short-term relationships.

Our course, something we sometimes call small "t" technical negotiation to differentiate it, takes CBI's approach a step further. It trains engineers in the fundamental skills of negotiation, but it uses practical situations taken directly from the team-driven technical workplace, while at the same time it focuses on interactions in which the "created value" is information, better schedules, better understanding, improved work assignments, etc., as well as maintaining long-term relationships. Thus, engineers are exposed to the complex communication necessary for successful negotiation, yet tuned to their professional needs. The prescriptive nature of these techniques are at once familiar to engineers, but they offer a change in paradigm in professional interactions.

So what are the skills that an engineer needs to master to become an effective negotiator? The authors' course trains each engineer to approach and carry out an interaction by using the following steps:

- \* Explore the goals and objectives of all parties;
- \* Understand your own interests and positions, and those of the parties to the negotiation;
- \* Create multiple options, evaluate them, and select the one with the highest overall value;
- \* Balance the skill of advocacy with the skill of inquiry to improve both the effectiveness of communication and the likelihood of maintaining long-term relationships;
- \* Understand the best walk-away alternatives to any negotiated outcome, and how those alternatives compare to the options under discussion.

This last skill comes the closest to what most people think of when they hear the term "negotiation," and may seem a little out of place in a technical setting. But standing your ground, and learning how to do so without damaging your relationships, is key to achieving the confidence to negotiate effectively in the first place.

The best way to understand these steps, and how they might be used, is by example.

Here is one example that illustrates the dynamics of the first three points above. One of the authors, Peter Cheimets, had just finished a course in negotiation taught in the Department of Urban and Environmental Policy and Planning at Tufts University. He found himself in a meeting with the prime contractor on a project in which his group was the subcontractor. He had prepared for the meeting by setting a goal: achieve quick agreement on the way to deal with a request from NASA. The particular approach was not very important, but

keeping the options to a minimum, and getting a quick solution were. He pulled together a presentation that outlined a starting point for discussion that he thought was close to a likely resolution point. He distributed the presentation before the meeting. At this point he had a goal in mind, and he understood his interests.

The meeting started out badly. No one seemed to want to discuss the matter at hand. The conversation seemed stuck, but Peter could not lay his finger on the reason. He felt both attacked and forced to defend his presentation.

Once he regained his balance, he recognized what was going on: the manager from the prime contractor was treating the presentation material as Peter's desired solution.

Peter recognized this as a position versus interest trap. This is a classic problem covered by negotiation theory, in which the parties get stuck discussing each other's particular solution to a problem - that is, their positions - thereby failing to explore other mutually agreeable approaches to meeting their goals - that is, their interests.

By presenting a starting point for discussion, Peter had appeared to take a position on the final resolution. The manager was not comfortable with that apparent solution, but neither was he comfortable directly confronting Peter about it. The conversation continued in an oblique and frustrating manner until Peter recognized this fact.

Once Peter made it clear that he was quite open to other options, the conversational logjam broke. The manager felt comfortable offering alternatives that suited him better, and agreement was quickly achieved.

#### ADVOCACY AND INQUIRY

The fourth point, about balancing the skill of advocacy with that of inquiry, by itself is quite familiar to engineers. In order to move forward you need to inquire into the nature of the problem at hand, while advocating possible solutions to it. If you advocate too early or too much, you risk appearing strident and ill informed; if you simply ask questions but never offer a solution, you risk appearing indecisive.

But advocacy and inquiry, when well practiced, are powerful negotiation skills. When properly used, they foster an inclusive environment, illuminate choices, and steer the conversation toward valuable options.

In a years-long design process, Peter found himself in an intractable discussion over material selection. Each side was equally convinced that its selection was right, and the other selection was wrong. Meeting after meeting ended with nothing accomplished as each side held fast to its position.

Finally Peter asked a simple question: How do we want the final system to operate? The answer, which both sides immediately agreed on, was that the system should meet the science goals that had been placed on it. From a distance, this is a pretty obvious statement, but there are times when restating the obvious is exactly what is necessary.

In this case, once the statement was made it created the conversational space necessary for both sides to discuss a method for determining if a material would work effectively. At the end of that meeting there was agreement on at least that. Moving away from advocacy, and toward inquiry, they made progress for the first time in months.

It turned out that the problem was not solved; only one material would work. It became clear after further inquiry that the impasse had always stemmed from the fact that the acceptable material could not be found in the correct size in Peter's collaborator's country.

Peter, with more bravado than was warranted, offered to have the part made in the United States. As it turned out, acceptable material could not be fabricated in that thickness, anywhere, using standard metalworking processes. After about a month of further inquiry an acceptable process was finally identified, and the parts were eventually made using chemical milling.

The last step, which is sometimes viewed as a hardball tactic, is an important skill to possess. You must have the ability to hold your ground when you think the other candidate solutions on the table are wrong. Just because you are in a negotiation does not mean you must settle for an unacceptable option.

At some point in your career you will be presented with a set of options, all of which are unacceptable to you. You can have a screaming match, leave, quit, or get reassigned, but your professional relationships, and your professional standings are certainly going to suffer. You need a strategy that allows you to walk away from the negotiation but not necessarily from the relationships, and in the end, get a more acceptable outcome than the ones on the table.

### STRATEGY SEEKING

This is not easy, and it usually involves careful use of an exterior impartial force, like time. Whatever the ultimate strategy, it is going to be crafted for the particular situation. The skill involved is knowing to look for that strategy.

A good example is a situation that a test engineer found herself in. The test involved combining hot jet fuel with oxygen in a closed pipe. The test was clearly dangerous, and in the first run nearly exploded.

Once things were again under control, the two people she was working with said, "Okay, let's try that again." Her reply: "It's Friday; it's late. Let's pick it up on Monday."

Monday morning she presented the issue to her boss, who suggested that there ought to be a safety review. Although the review tied up the process for months, it was needed to address a hazardous situation.

Then, after all her effort, she didn't just walk; she traveled. In the intervening period she got into graduate school and moved 3,000 miles away. She maintained her friendships, avoided carrying out the tests, and was never blamed for holding them up; an extreme but effective strategy.

Another example involves international collaborators. The time had come to bolt together two important components in an instrument. One component was made outside the U.S.; the other in the U.S.

The process of how the assembly was going to be done was understood at a concept level. The details needed to be worked out. The actual work was to be done in a cleanroom, but everyone involved sat down in a conference room to plan the procedure.

After several hours of discussion the procedure was in hand, and six people from the meeting suited up and entered the cleanroom. Almost immediately questions were raised about the procedure, and changes were insisted on.

The changes were unacceptable to the engineer in charge, who felt he had three choices: to go along with the changes being offered, to fight to maintain the procedure as written, or to walk away.

None of these choices was appealing. Instead, the engineer suggested that, as a courtesy to everyone who had helped craft the procedure, they reconvene the meeting in the conference

room. This required removing the cleanroom gear, reassembling the other 20 participants, and reopening the discussion.

Once again an agreement was reached, and it was back to the cleanroom. The same thing happened again, and again the engineer in charge suggested that they reconvene the meeting in the conference room, a process that would be repeated several times over the next two days.

Finally, with the clock ticking down for the international colleagues to catch their airplane, objections were again raised in the cleanroom, and again the engineer in charge suggested a return to the conference room. The prospect of taking another hour to remove their cleanroom gear, convene the other participants, discuss the point, and re-don their cleanroom gear, all the while risking missing their flight, was enough for them to forgo the change. They settled the issue right there. The procedure was used as written, and within 30 minutes everything was assembled.

Once an engineer has mastered negotiation, many apparent barriers to action disappear. In fact, the process opens up many options and activities that seem closed before acquiring the skills. If you can formulate a goal, you can negotiate to achieve it.

Informed by the skills of negotiation, engineers can explicitly negotiate their work assignments: they have a way to ensure that their understanding of a problem is valid and remains valid, and that their efforts are coordinated with those of the rest of the team. By demonstrating both understanding and effectiveness, an engineer is more likely to be rewarded.

A successful negotiation maintains relationships by ensuring that all parties to the negotiation feel included in the process. As a result, the team is more invested in the result as well. This helps team morale, which in turn, helps the employer.

These heady new skills come with a single downside. Once you realize what you can achieve through negotiation, you are under some obligation to try to effect the changes you believe are necessary.

But this is the kind of problem engineers like.

## SIDEBAR

### To Learn More

The authors are working with a number of colleges in the Boston area to develop a Technical Negotiation curriculum and are available to train engineers in negotiation skills, or to assist in streamlining the technical teaming experience. They can be reached through Peter Cheimets's e-mail:

[peter@cheimets.com](mailto:peter@cheimets.com).

They also suggest the following books for further reading.

*Bargaining for Advantage* by G. Richard Shell (Penguin Group, 2006).

*Getting to Yes* by Roger Fisher, Richard Ury, and Bruce Patton (second edition, Penguin Group, 1991).

*3D Negotiation: Powerful Tools to Change the Game in Your Most Important Deals* by David A. Lax and James K. Sebenius (Harvard Business School Press, 2006).

*Leadership Without Easy Answers* by Ronald Heifetz Harvard University Press, 1994.

Difficult Conversations: How to Discuss What Matters Most by Douglas Stone, Bruce Patton, Sheila Heen, and Roger Fisher (Viking Penguin. 1999).

Beyond Reason: Using Emotions as You Negotiate by Roger Fisher and Daniel Shapiro (Viking Penguin, 2005).

#### AUTHOR\_AFFILIATION

Peter Cheimets is project engineer at Smithsonian Astrophysical Observatory in Cambridge. Mass: Joshua Gordon is a consultant with Part of the Solution ADR Services ([www.potsadr.com](http://www.potsadr.com)) James TuU is an independent international conflict management specialist.

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Record - 4

DIALOG(R)

**Jupiter takes hits for Earth,**

DENNIS OVERBYE,

Press-Register (Mobile, AL), 01 ed, p09,

Sunday, July 26, 2009

TEXT:

Jupiter takes hits for Earth

By DENNIS OVERBYE

New York Times

Jupiter took a bullet for us last weekend.

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That's Jupiter doing its cosmic job, astronomers like to say. Better it than us. Part of what makes the Earth such a nice place to live, the story goes, is that Jupiter's overbearing gravity acts as a gravitational shield deflecting incoming space junk, mainly comets, away from the inner solar system where it could do for us what an asteroid apparently did for the dinosaurs 65 million years ago. Indeed, astronomers look for similar configurations - a giant outer planet with room for smaller planets in closer to the home stars - in other planetary systems as an indication of their hospitableness to life.

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and Jupiter, whose gravity, so the standard story goes, keeps them too stirred to coalesce into a planet but can cause them to collide and rebound in the direction of Earth.

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#### CUTLINES:

AP, NASA

This image taken by NASA's Hubble Space Telescope on Thursday shows the sharpest visible-light picture taken of the impact feature (dark spot) and "backsplash" of material from an object that plunged into Jupiter's atmosphere and disintegrated.

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Record - 5

DIALOG(R)

#### **After decade of duty, Chandra still dazzling,**

The Huntsville Times (Huntsville, AL), 2 ed, p1B Friday, July 24, 2009

#### TEXT:

3 new images to be released to mark anniversary date

Ten years ago Thursday, NASA's Chandra X-ray Observatory was launched aboard the Space Shuttle Columbia.

The observatory was developed at Marshall Space Flight Center in Huntsville. Since astronauts placed it in orbit, Chandra's original five-year mission has been doubled and it has delivered unprecedented, high-resolution X-ray images of comets, black holes, dark matter, dark energy and more, transforming 21st Century astrophysics.

"Chandra's discoveries are truly astonishing and have made dramatic changes to our understanding of the universe and its constituents," said Martin Weisskopf, Chandra project scientist at MSFC, which manages the Chandra program for NASA's Science Mission Directorate.

The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center.

To commemorate the observatory's 10th anniversary, three new versions of classic Chandra images will be released during the next three months. These images, the first of which is available now, provide new data and a more complete view of objects that Chandra observed in earlier stages of its mission. The first image released is of E0102-72, the spectacular remains of an exploded star.

The next will be released in August to highlight the anniversary of when Chandra opened up for the first time and gathered light on its detectors.

The third image will be released during "Chandra's First Decade of Discovery" symposium in Boston, which begins Sept. 22.

"The Great Observatories program - of which Chandra is a major part - shows how astronomers need as many tools as possible to tackle the big questions out there," said Ed Weiler, associate administrator of NASA's Science Mission Directorate at NASA Headquarters in Washington.

NASA's other "Great Observatories" are the Hubble Space Telescope, Compton Gamma-Ray Observatory and Spitzer Space Telescope.

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