Systematic Innovation

e-zine

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In this month's issue:

The Systematic Innovation e-zine is a monthly, subscription only, publication. Each month will feature articles and features aimed at advancing the state of the art in TRIZ and related problem solving methodologies.

Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.

Readers' comments and inputs are always welcome.
Send them to **darrell.mann@systematic-innovation.com**

Three Valid Patent Strategies

If you'd have asked us five years ago about the future of the world of patents we'd have told you that the system no longer served its original purpose of protecting individual inventors and as such two scenarios were likely to play out: the first that the whole system collapsed; the second that the big organisations whose interests the system protects would ensure that the system survived in something as close to its current form as possible. The primary factor determining which way the system would go, we said, was whether or not China and large companies in China decided to play the game or not. Patent protection has not traditionally been in the DNA of Chinese industry, partly because copying someone else's solution is often seen as a compliment, but mainly because the driving ethos is the first to market rather than the first to invent should be the winner.

In the last five years, it has now become clear, China appears to have moved firmly in the direction of supporting the current system. 2012 was the first year in which Chinese inventors generated more patents than their counterparts in the US. The patent system, dysfunctional as it might be, seems as though it will now be with us for the foreseeable future.

Which then begs the question, if we have to play the game, how should be play it to best effect?

There are, of course, many reasons for an individual or organization to be interested in and contemplating fling patents over and above the desire to prevent others from copying their idea. From personal ego to company-pride, via 'because filing patents is part of my KPIs' and 'it's good for morale', while these reasons might have nothing at all to do with the performance of the enterprise, they are likely to be present in some form or other. People do things for good reasons and real reasons says the J.P. Morgan aphorism, and when it comes to intangible assets like patents, the emotional intangibles are always going to be present.

For this article, however, we need to put those things – important as they might be – on one side. They're there, but they have little if anything to do with any rational 'business' reason for generating and owning patents. And, given the high cost of maintaining a portfolio of patents, it's a good idea in our view to have a tangible, defendable argument for doing or not doing something.

We start the discussion, then, by looking at the lone inventors and SMEs that might have had the good fortune to invent a protectable new solution. Should they file?

Well, in theory, the whole patent system was set up to protect their interests, and so the answer ought to be a clear 'yes'. The realities of our global economy, however, indicate that for the most part, patents protect only big businesses. The heart of the problem is this: a lone inventor protects their beautiful new million-dollar idea, only to find that a year later it is being blatantly copied by one of the big enterprises whose interests the new solution threatens. What that inventor is about to discover is that in order to challenge the big company and get them to cease and desist is going to require going to court. And that going to court carries with it a bill that very quickly looks like half a million dollars just to get the process started. An amount the big company is fairly certain the lone inventor won't have. And, even if they do, the time required to prepare and fight the cause will starve the business of the time and energy needed to do all of the other things that need to be done. All in all fairly depressing for the small player.

Their best outcome typically in this kind of scenario is that they get the big business to buy the IP from them. They won't get the ultimate true value, of course, because very often the strategy of the big company is to acquire the IP so that they can sit on it and thus prevent it from disrupting their established operations, but it is a likely 'way out'. If this sounds like a fairly cynical perspective on the world, sadly it is one borne of several experiences in which we have seen it happen. Even to the extent that we've been to court to help defend a small business that has had it happen to them.

Does all this cynicism mean that small companies shouldn't file IP? Probably 'yes'. With one important exception. What we call the 'Big Friendly Giant (BFG) strategy. The lone inventor has little if any chance of beating the big business, but their BFG absolutely has. Especially if they choose the right BFG.

There are a number of insurance companies and products that purport to protect small companies in these kinds of David-versus-Goliath situation. They probably don't count as BFGs though. A real BFG, in our terms, is a large organization that not only has deep financial pockets to do all of the necessary court defense of the IP, but also has appropriate knowledge of the technology domain and market. Per our previous discussions about the Rule Of Three, the number Three player in an industry often makes for a very good BFG: they have to be interested in innovation, they need new solutions, and they have every incentive to defend and commercialise them.

As far as we can tell, based on our research, this is the only tangible business reason for a small company or lone inventor to file IP. No BFG; no file. Either keep your IP as a trade-secret, or be agile enough that you've already made the next leap by the time the big boys start copying your current solutions.

Simple. Cruel also, but that's what 'survival of the fittest' seems to boil down to in the world of innovation for the small player.

What about the big companies, then?

The classic consultant answer: 'it depends'.

We've spent a lot of time and research hours trying to work out what these dependencies are. The first thing to say is that there are ultimately several of them. The second thing to say is that the near-universally most important one is the step-change pulse-rate of the industry.

Plus or minus a couple of years and legal games and loop-holes, the approximate life of a patent once it has been granted is around 17 years. The other important number to bear in mind is that, a patent application is going to take on average 2 years to reach the point of grant. With a strong following wind, some patents will make it through in around a year, but two years is the average.

Taken together, these two numbers give us a way of bracketing what an effective patent strategy might be. Figure 1 makes an attempt to illustrate how that bracketing works. The graph shows the attractiveness of filing IP versus industry step change pulse rate. What the solid red line curve says is that, if the industry pulse rate is such that step changes happen more slowly than every 17 years, there is no tangible business reason for owning the IP. The patent has basically expired by the time the industry makes its next jump, so all of your competitors can use your solution. The fact that you filed the patent merely, therefore, showed your competitors what the recipe was not long after you discovered it.

You did their hard work for them in other words. Something few sensible businesses would contemplate.

At the other end of the graph, if the industry step change pulse rate is such that jumps are happening at a rate of greater than one per year (by way of a reference, the ICT sector is currently pulsing at a rate of about 1.7 significant jumps per year), there is also no tangible benefit in owning patents: by the time the patent is granted, the commercialized version of the invention has not only entered the market, it has most likely already been superseded by the next innovation. In high pulse rate industries, the primary success driver is the ability to get an ongoing stream of good products to market faster than your competitors, and the global patent system is not fast enough to keep up.

The only tangible business reason for filing IP, given these two extremes, is if the pulse rate of the industry is somewhere between. It's difficult to know what the optimum is, but our current analysis suggests that it's somewhere within the first quarter or half-life of a patent.

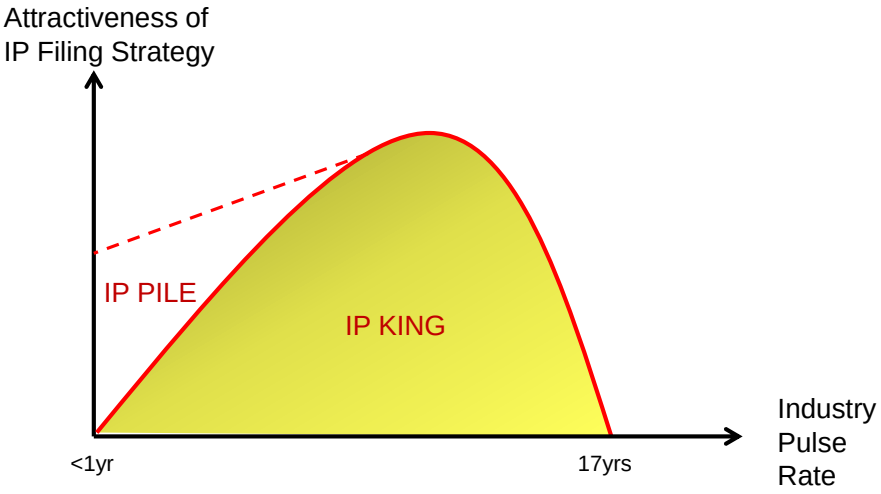


Figure 1: IP Filing Strategy Versus Industry Pulse Rate

We've labelled the patent strategy of this between space under the solid red line, 'IP King'. What we mean by this expression is a strategy that involves filing the most effective solutions possible. For organisations using SI, what this means is using untapped Evolution Potential to define the spectrum of jump possibilities, and then using some form of market analysis (we recommend TrenDNA ☺) to determine which of those jumps is the most likely to occur 'next'.

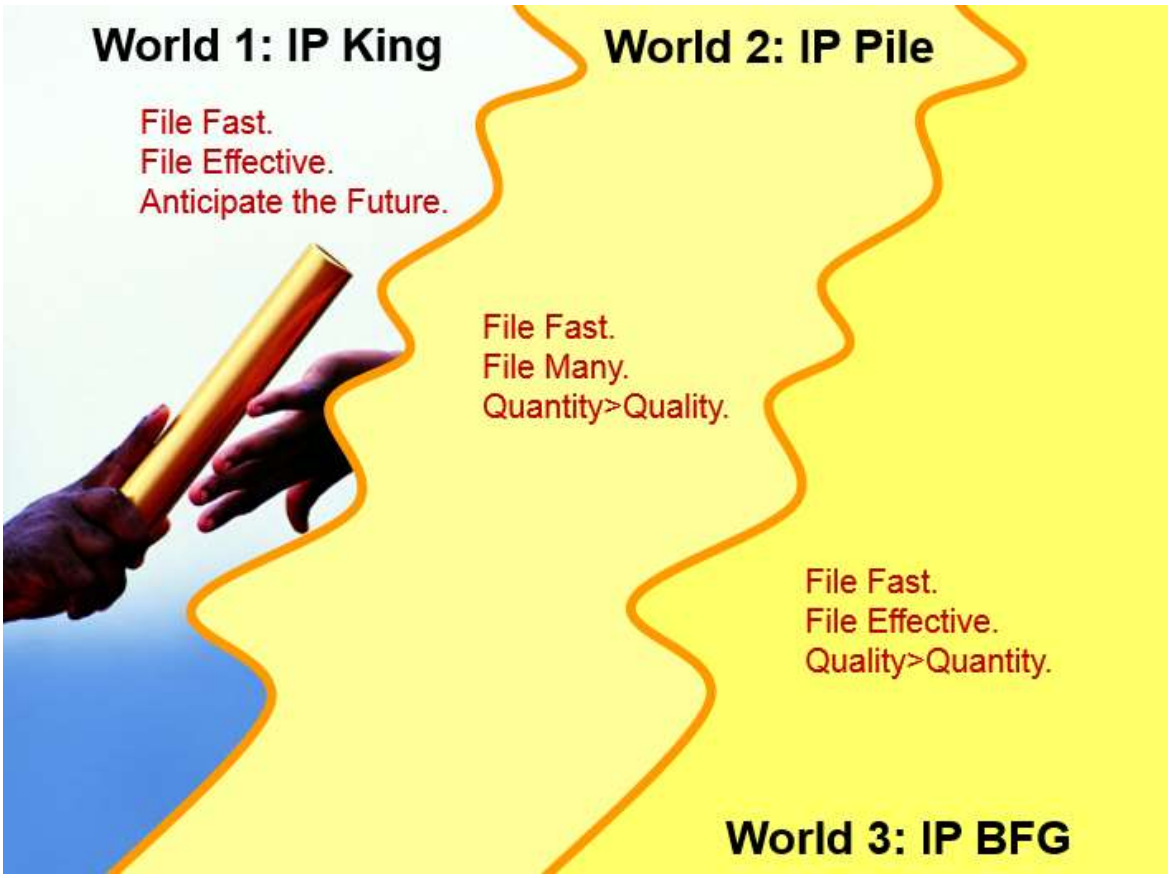
So far so good. But there's another segment on the Figure 1 graph labelled 'IP Pile'. This is a very different patent generation strategy to the IP King version. 'IP Pile' is relevant to high pulse rate industries in a manner that says the faster the pulse rate, the more beneficial the strategy becomes.

Another way of describing 'IP Pile' is cross-licensing. It currently happens the most often in the semiconductor and electronics sectors. What it crudely means is that competing companies within a sector generate respective piles of patents, look at the relative heights of the two piles and use this ratio to formulate a commercial agreement that in effect says, 'arguing in court is a waste of time and money, so let's agree to accrue and share the spoils of the market in accordance with the relative technical contribution of our respective R&D teams'.

It's pretty much all a game in other words, that has little if anything to do with the quality of the patents being generated. It quite literally boils down to the relative height of the respective piles of patents. Okay, maybe not that crude – it usually comes down to the respective ratio of Claims within the respective IP Piles, but close enough for the purposes of our discussion here.

SI and Evolution Potential can also help companies to play this game. The main difference to the IP King version of the game is that potentially every jump could form the basis of a new invention. Including some of the backwards jumps. Quality of the patents, in other words, is not the issue here. Generating the biggest number of Claims is.

And that, is pretty much that. Three –and only three – tangible business scenarios in which filing patents makes sense to the accountants in the enterprise…



…unless you know better?

One-Hour Turbo-TRIZ

Picture the scene: you have a group of important managers for an hour, they've never heard of or experienced TRIZ or SI before, and they want you to help them solve some difficult, long-standing problems. A smart person would most likely say, 'you're asking the wrong question, tell them they must be crazy'. A smart person would say this because they know there is a very clear trade-off between the amount of time devoted to something and the efficacy of the result achieved. Something like the picture shown in Figure 1:

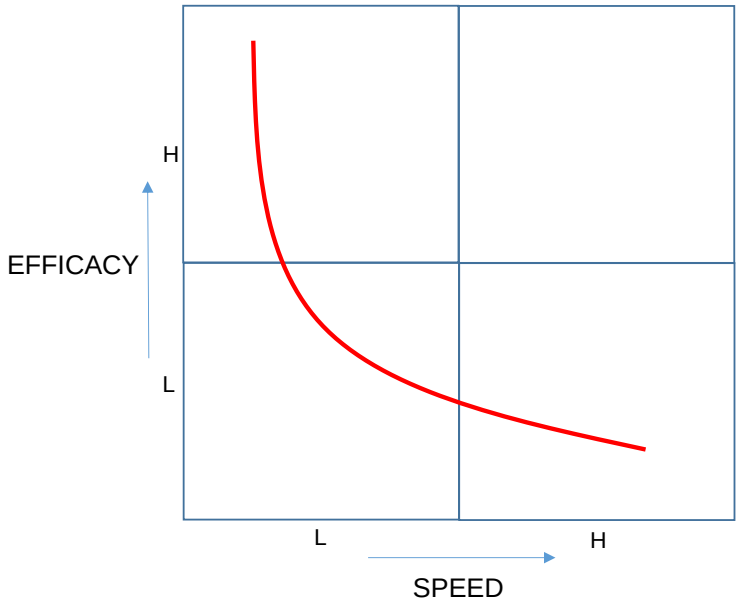


Figure 1: Efficacy Versus Speed Trade-Off

Do something quickly, the graph says, and you have no right to expect a good result. If you want something to be done well, spend a lot of time doing it.

Well, up to a point anyway. Anyone familiar with TRIZ will know that it manages to add a lot of both speed and efficacy to any problem situation compared to the 'normal' ways of doing things. TRIZ solves that conflict by, in effect, a deployment of Inventive Principle 10, Prior Action: learn a bunch of smart things beforehand such that you don't have to waste a lot of problem solving time working on the wrong problem, exploring nugatory solution directions or generating random, value-less ideas. The only problem, traditionally, with that as a solution strategy, is that the learning curve that has to be climbed in order to know enough about the tools, method and philosophy and to know what's going to help most in what situation is a pretty steep and long one.

So how to solve that new problem? That is the situation we find ourselves in when trying to answer the problem posed at the start of this article.

We could try using the Contradiction Matrix to see what it recommends. Figure 2 shows the result of mapping onto the business version of the tool.

Hmm. Not sure how much help Principle 21 is in this situation… merely 'Hurrying' doesn't seem to solve the problem. Except, maybe it offers the clue that we shouldn't allow ourselves time to over-think the problem. One of the clues we often provide with Principle 21 is the David Lloyd George quote, 'you can't cross a chasm in two small jumps'. Maybe there's a clue in those words of wisdom?

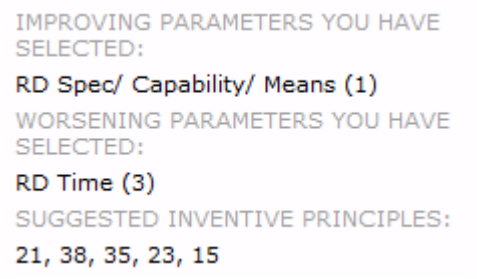


Figure 2: Speed Versus Efficacy Conflict Mapped Onto Business Matrix

But what single big jump could help solve the problem? Nothing we could come up with seemed to make complete sense. Teach people a few Principles and have them brainstorm? Too random. Get them to draw a perception map? Too long. Do an evolution potential exercise? Too abstract.

What if the real problem is that there were not one but two chasms: one chasm associated with finding a good problem, and then another associated with coming up with a genuinely efficacious solution?

Crossing The First Chasm

We decided to very simply ask participants to find a contradiction. Distill TRIZ down to its absolute essence and this is pretty much it: breakthrough solutions solve contradictions. So finding a good one ought to be a pretty good start.
Time allowed: 10 minutes
(If people aren't making progress after five, get them to think about the two ever-ready questions – what are you trying to improve? What's stopping you?)

Crossing The Second Chasm

Having found a good problem, we need some solutions. The key hurdle here is that none of the participants had any prior knowledge of the Inventive Principles, Trends or any other of the classic TRIZ solution generation tools in the toolkit. Do we hope that the contradiction they just found is amenable to solution using a randomly chosen Inventive Principle or Trend?

Maybe. If – a big if – we had the opportunity to pre-analyse the contradictions they'd defined. But in a room of 24 people, working on a dozen different problems, this didn't seem possible.

So what else categorises breakthrough solutions?

How about, 'they solved the problem without complicating the system'?

This implies that we need the novice problem solvers to try and identify an existing, under-utilised resource in whatever is already there in the system they're looking at.

What else?

If the problem we're working on is to be solved, something has provided the solution. The solution, in other words, should be model-able as an S-Field. But S-Fields are abstract at the best of times to even the most ardent TRIZ aficionado, never mind with a group of managers that had never even heard of them. How to make them more tangible? 'Substances' are pretty tangible anyway. Maybe 'fields' is the key: give people a list of field

types and then ask them to see if there is evidence of any of them being present and un- or under-utilised in the current system?
The set task then becomes:

1) Look for an untapped ‘field’ resource based on a checklist of possible fields
2) Think about ways that the untapped field resource can help to solve the contradiction you just found. Write down a minimum of five possibilities
3) Combine at least two of the possibilities to make a solution

Time allowed: 30 minutes.

So, all in all, the hour breaks down as follows:
0-5 – facilitator introduction and description of process
6-15 – find a contradiction
16-45 – find untapped resources and combine to make solution
46-55 – 30 second, 60 word ‘headline’ presentation to other groups
56-60 – facilitator explanation of what just happened.

We’ve done this three times now. Every time with the same effect: some great solutions in under an hour. Not Mona Lisa quality yet, but very definitely transformable into Mona Lisa’s.

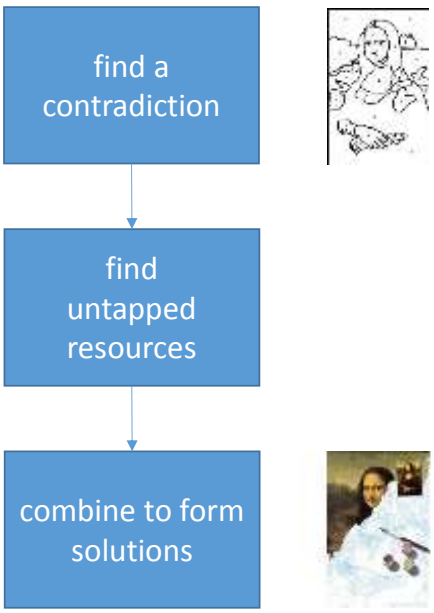


Figure 3: Fast-Efficacious, One-Hour, Turbo-TRIZ Process

Next time you find yourself with a spare hour, we recommend you give it a go. You might just surprise yourself.

Not So Funny – Inventive Principle Fashion

Apparently some of the most creative people on the planet work within the fashion industry. We decided to investigate.

Our methodology was simple: if fashion designers are creative, we should be able to find widespread evience of Inventive Principle usage.

It didn't take long to confirm the theory: fashion designers are, by a considerable distance, the most creative people on the planet….

Principle 2 – Taking Out



Principle 4 – Asymmetry


One giant sleeve and one normal one – if that isn't genius, I don't know what is?

Principle 5 – Merging

Principle 13 – The Other Way Around

(as we often say, Principle 13 can give some of the very biggest step-change advances!)

Principle 17 – Another Dimension

Patent of the Month – Active Sonar

Patent of the month this month takes us to the prestigious TsingHua University in Beijing, and a cluster of inventors that look to have assigned their invention to a Taiwanese industrial operation, so a higher than average likelihood that something might happen with this one. US8,537,640 was granted to the team on September 17. Here's what the disclosure tells us about the problem being addressed by the invention:

SONAR (Sound Navigation and Ranging) is a technique that uses sound propagation under water to navigate or to detect objects in or on the water. As is known in the art, there are two types of sonar: passive sonar and active sonar. Passive sonar seeks to detect an object target by listening for the sound emanating from the object being sought. Active sonar creates a pulse of sound, and then listens for reflections of the pulse from a target object.

An active sonar system for detecting objects in the water usually includes a transmitter, a receiver, an electronic cabinet, and an auxiliary device. The transmitter includes a transmitting transducer array capable of continuously transmitting an acoustic signal. The receiver includes a receiving transducer array capable of receiving a reflected acoustic echo of said acoustic signal from the objects. The electronic cabinet includes a sensor, a display, and a process control computer. The auxiliary device includes powder, a carrier, a rotatable device, and cables.

The transmitting transducer converts mechanical, electrical, and magnetic energy to sound energy. The transmitting transducer is usually a piezoelectric transducer consisting of a piezoelectric ceramic, a giant magnetostrictive transducer consisting of rare-earth alloy, or an electrostrictive transducer consisting of ferroelectric material, any of which make the structure of the transmitting transducer complicated.

What is needed therefore, is an active sonar system which has a transmitting transducer with simple structure.

A very succinct description of the problem that requires us to interpret the conflict the invention addresses. Here's how we decided to map the story onto the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Energy used by Stationary Object (17)

WORSENING PARAMETERS YOU HAVE SELECTED:

System Complexity (45)

SUGGESTED INVENTIVE PRINCIPLES:

35, 28, 4, 3, 13, 5, 16, 34

And here's how the inventors solved the problem:

What is claimed is:
1. An active sonar system comprising: at least one transmitter to transmit an acoustic signal, the at least one transmitter comprising at least one carbon nanotube transmitting transducer submerged in a liquid medium, the at least one carbon nanotube transmitting transducer comprising at least one first electrode, at least one second electrode, and a carbon nanotube structure configured to generate sound by heating the liquid medium to cause a pressure oscillation in the liquid medium, the carbon nanotube structure being electrically connected to the at least one first electrode and the at least one second electrode; at least one receiver to receive a reflected acoustic signal; and an electronic cabinet to control the at least one transmitter to transmit the acoustic signal and the at least one receiver to receive the reflected acoustic signal.

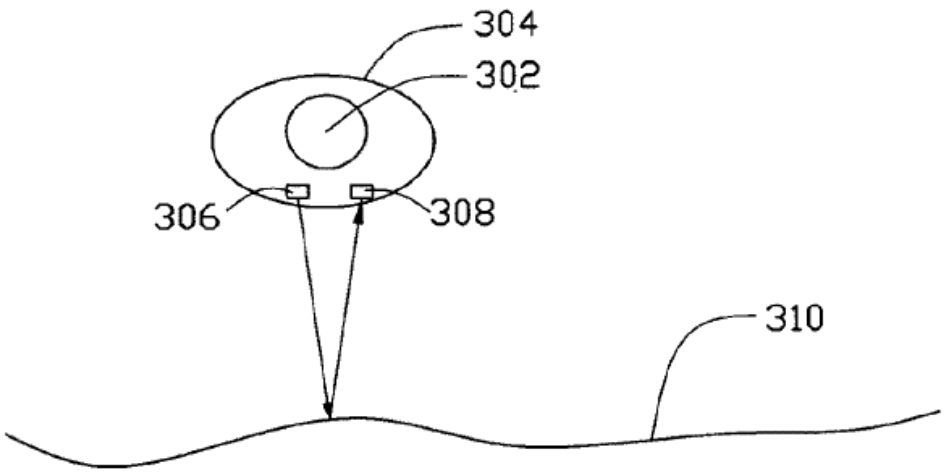
And here's why:

The active sonar system has the following advantages. Firstly, the active sonar systems have simple structure because of the carbon nanotube transmitting transducer, thus a special device for supplying an electric field or magnetic field can be omitted. Secondly, the precision of the orientation of the active sonar systems is increased because the acoustic signal produced by the carbon nanotube transmitting transducer has excellent directional property.

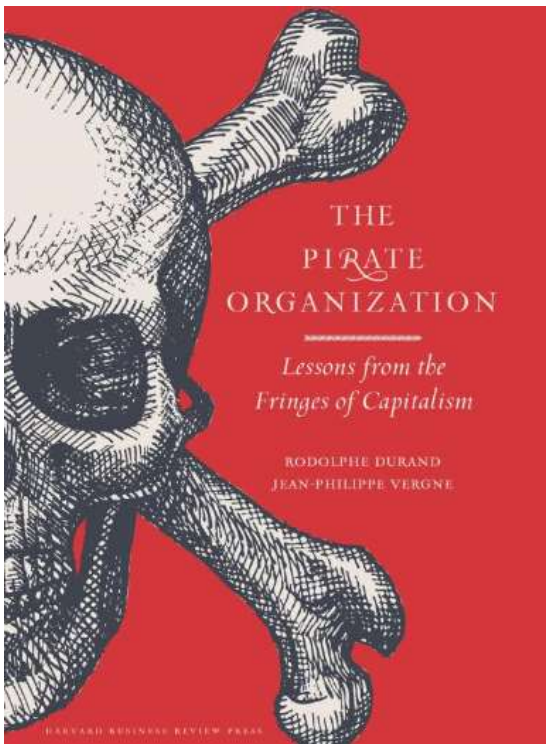
The switch from conventional to carbon nano-tube (CNT) materials is a Principle 35, Parameter Changes solution. Like a lot of these kinds of material-jump solutions, it has to be said that, had the inventors tried to use the Matrix the other way around – i.e. solve their problem by mapping it onto the Matrix, being told to use Principle 35 – it would have required a very large leap of imagination to get to the eventual solution.

That said, patents involving carbon nanotubes represented over 1% of all patents granted in the US during September. Maybe, therefore, it's now a common enough solution that it may be worth adding specific mention of CNTs into Principle 35 example databases.

Meanwhile, this patent looks like a very elegant (Level 4) one and we look forward to seeing if it manages to be successfully commercialized in the coming years. The inventors suggest that their sonar solution is intended to be applied in torpedo guidance, fish and other marine detection, ocean prospecting, ship navigation or underwater working.



Best of the Month - The Pirate Organization

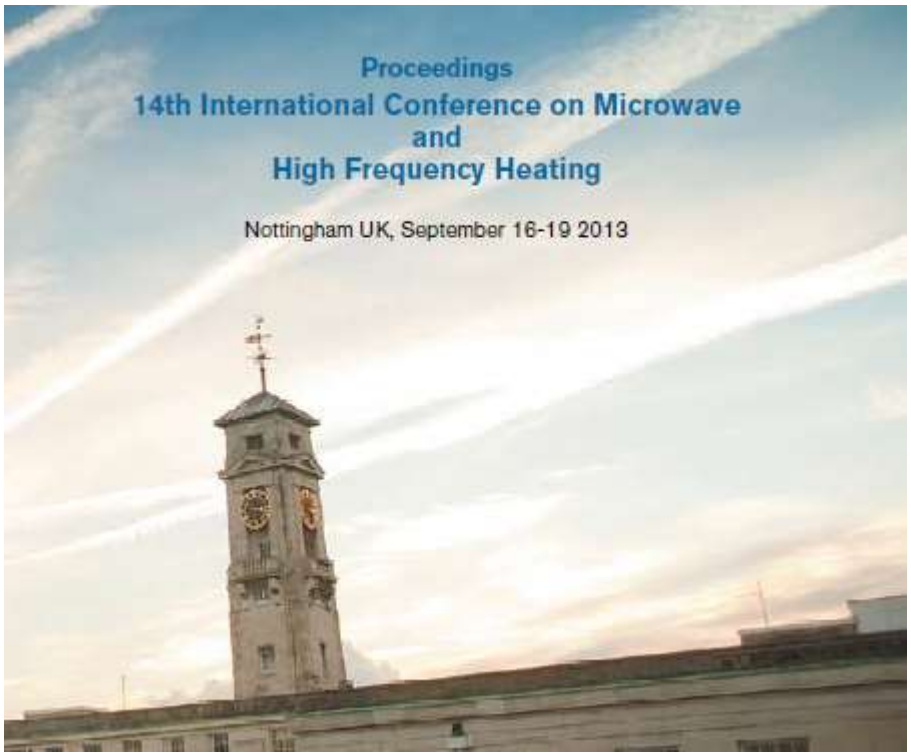


I have to confess to having slightly mixed feelings about this month's best-of the month recommendation. If there was such a thing as a half-book of the month, then the decision would be much easier, since the second half of the Pirate Organization is really very good. The problem is the first half, which for some reason, the authors feel the need to devote to defining what a pirate is and is not. So, a present-day Somalian pirate is not a pirate, but a participant in Wikileaks is. It's a thin line between piracy and theft. Or at least it is until we reach page 79 of the book. Where we get:

"…the pirate organization thrives on the fringes of partially uncharted territories, it participates in their normalization, albeit indirectly. The pirate organization does not hide within the interworking of the system. It stands on the surface, flies a recognizable flag, catches people's attention, and arouses the fury of sovereign-protected owners. It meddles in the gray areas and keeps on countering organizations of the milieu at every turn. The pirate organization is truly a force that acts out against capitalistic overcoding. It tries to clear the paths of incessantly repeated normalization but keeps advocating publicly for changes in perspective."

Beyond this point, the book turns into a sly cornucopia of stories and insights that together serve to reveal the importance of understanding pirate dynamics. Irrespective of whether we're a small cog in a big corporate wheel or a crew member on an SME pirate-ship, there is some important stuff here. Not quite a recipe book (a pirate would always be looking to change any kind of existing recipe anyway), what the book does manage to do is convey a clear set of operating heuristics. A pirate's code for innovators in so many words. And as such, an ideal complement for anyone operating in an ICMM Level 1 organisation.

Conference Report – AMPERE Conference



Once in a while, it's great to get yourself right outside all of the boxes your instincts tell you you're starting to get stuck in. Once in a while, it's also great to watch a large room full of other people stuck in theirs. Psychological inertia was certainly rife at the Faculty of Engineering in the University of Nottingham and the National Centre of Industrial Microwave Processing, which hosted this year's Association for Microwave Power in Europe for Research and Education (AMPERE) conference during this month.

The conference revolved around three large thematic areas:
•Industrial microwave processing
•Sustainable chemical processing and modelling
•Fundamental microwave interactions

The conference aims were to bring together delegates from the national and international academic and industrial community and in particular from the rapidly growing microwave chemistry community to discuss current trends in Microwave and RF system design and process development.

My reason for going was to explore some of what my instincts told me were a host of emerging microwave technology opportunities. In true, 'the field always wins' fashion, we've seen a host of extraordinary microwave-based technology solutions in recent years, and so, in theory at least, my day at the conference was an opportunity to take the pulse of those people that devote their lives to creating those extraordinary solutions.

Without getting in to too many technical details (anyone interested can download the conference programme from http://www.nottingham.ac.uk/ampere/documents/conference-programmeweb.pdf) – not that I claim to have understood many of them – the overall impression I came away with was that people would generate an awful lot more extraordinary solutions in the microwave world if they knew some TRIZ. Even just bringing

the Rhythm Coordination trend to bear might have solved over half the problems I heard presenters talking about.

As it transpires, unless I've gone completely nuts and don't understand anything about electromagnetic radiation at all, because I did know a little bit about TRIZ, I left my day at the event with several pages of potentially patentable solutions. Which on later investigation, nearly all proved to have both novelty and a fair degree of merit. Quite likely the highest patentable-idea generation rate I've ever achieved in fact… now all I need to do is follow up some of the contacts I made and see if we can start turning some of them into something potentially useful…

…whether I manage that or not, the point here was that climbing in to someone else's box when you're carrying some knowledge they don't can be a very intoxicating, exhilarating experience. I heartily recommend it… next stop, another wavelength on the electromagnetic spectrum…

Investments – Portable Radar

Reported this month: NASA and the U.S. Department of Homeland Security are collaborating on a first-of-its-kind portable radar device to detect the heartbeats and breathing patterns of victims trapped in large piles of rubble resulting from a disaster. The prototype technology, called Finding Individuals for Disaster and Emergency Response (FINDER) can locate individuals buried as deep as 30 feet (about 9 meters) in crushed materials, hidden behind 20 feet (about 6 meters) of solid concrete, and from a distance of 100 feet (about 30 meters) in open spaces.

Developed in conjunction with Homeland Security's Science and Technology Directorate, FINDER is based on remote-sensing radar technology developed by NASA's Jet Propulsion Laboratory in Pasadena, Calif., to monitor the location of spacecraft JPL manages for NASA's Science Mission Directorate in Washington.

"FINDER is bringing NASA technology that explores other planets to the effort to save lives on ours," said Mason Peck, chief technologist for NASA and principal advisor on technology policy and programs. "This is a prime example of intergovernmental collaboration and expertise that has a direct benefit to the American taxpayer."

The technology was demonstrated to the media Sept. 25 at the DHS's Virginia Task Force 1 Training Facility in Lorton, Va. Media participated in demonstrations that featured the device locating volunteers hiding under heaps of debris. FINDER also will be tested further by the Federal Emergency Management Agency this year and next.

"The ultimate goal of FINDER is to help emergency responders efficiently rescue victims of disasters," said John Price, program manager for the First Responders Group in Homeland Security's Science and Technology Directorate in Washington. "The technology has the potential to quickly identify the presence of living victims, allowing rescue workers to more precisely deploy their limited resources."

The technology works by beaming microwave radar signals into the piles of debris and analyzing the patterns of signals that bounce back. NASA's Deep Space Network regularly uses similar radar technology to locate spacecraft. A light wave is sent to a spacecraft, and the time it takes for the signal to get back reveals how far away the spacecraft is. This technique is used for science research, too. For example, the Deep Space Network monitors the location of the Cassini mission's orbit around Saturn to learn about the ringed planet's internal structure.

"Detecting small motions from the victim's heartbeat and breathing from a distance uses the same kind of signal processing as detecting the small changes in motion of spacecraft like Cassini as it orbits Saturn," said James Lux, task manager for FINDER at JPL.
In disaster scenarios, the use of radar signals can be particularly complex. Earthquakes and tornadoes produce twisted and shattered wreckage, such that any radar signals bouncing back from these piles are tangled and hard to decipher. JPL's expertise in data processing helped with this challenge. Advanced algorithms isolate the tiny signals from a person's moving chest by filtering out other signals, such as those from moving trees and animals.

Similar technology has potential applications in NASA's future human missions to space habitats. The astronauts' vital signs could be monitored without the need for wires.
The Deep Space Network, managed by JPL, is an international network of antennas that supports interplanetary spacecraft missions and radio and radar astronomy observations for the exploration of the solar system and the universe. The network also supports selected Earth-orbiting missions.

We suspect the technology will also find its way into several other measurement domains in the coming years. Definitely one to watch, we think.

Generational Cycles – Old Guys Rule (Not)

Depending on where you were born, there's a grey area boundary between the end of the Baby Boomer generation and the start of Generation X. As far as we can tell, the oldest Xers were born in 1961; the youngest Boomers born in 1964, meaning there's a three year period between 61 and 64 when a person could feel like or behave like either. And typically, the key word there is 'either' – with generational metters people fall on one side of the fence or the other.

The easiest way to determine which side of the Boomer/X fence a person fell, in the UK at least, is to ask them about punk rock: pro-punk and they're a guaranteed Xer; anti- or 'what's punk?' and they're a Boomer.

These days, there is another clear sign of the divide. Enter the Old Guys Rule apparel company…

According to their website, Old Guys Rule was established in 2003 as a tribute to the legendary American surfer Doug Craig. The brand developed on a regular day while Doug and his professional surfer son Don were out enjoying a surfing session on the magnificent Californian coastline. While watching his father catch a perfect peeling right hand wave Don turned to his surfer buddy and mused 'Gee - old guys rule'.

After this epiphany Don made a bumper stickers for his Dad affectionately using the phase 'Old Guys Rule'. The saying 'Old Guys Rule' soon caught on striking a nerve with the 40-65 year old baby boom surfers. Don decided to print his phase on a few tees and sold them through several California Surf Stores. They sold out immediately!

'Old Guys Rule' is now a massive success in the USA selling through speciality chain and lifestyle stores. In 2008 'Old Guys Rule' arrived in the UK. 'Old Guys Rule' has quickly established a strong hold in the hearts of the British public. It seems that even this side of the pond the baby boomers agree 'Old Guys Rule'!

SYSTEM·ATIC INNOVAT·ION

So, little doubt that the brand is aimed at Boomers. Or if there was, here's another extract from the website:

There comes a time in your life when comfort meets substance. When all your hard work seems to have paid dividends and the world is at your command. All the things your hoped you could do someday you are doing. The toils of youth are now your experiences…..no longer the student but the teacher. To celebrate your accomplishments we offer up "Old Guys Rule" to be worn as a badge of honour for a life well spent, but not nearly over...

You can almost feel the Xers wince when they read those words. To say that Old Guys Rule is the antithesis of pretty much every shred of what Generation X stands for would be an understatement of slightly epic proportions.

So. The Boomer/X test that emerges here is very simple:

If you see someone wearing anything with an Old Guys Rule logo on it:

a) They're a typical Boomer (i.e. lacking in any sense of irony)
b) They're a fashion-neutral Boomer who had the clothing bought for them as a present, either by a spouse, or – more likely – by a Gen Y relation.

If you see a Generation X person wearing anything with an Old Guys Rule logo on it:

a) They're on the stage, in a play, acting out the part of a typical Boomer
b) They're blind and one of their (also X) friends thought it would be funny
c) They were bought the garment and have added a graffiti 'Not' – actually another clear generational signal (see prototypical GenX movie Wayne's World) to the end of the logo. And they're also blind.

Biology – Planthopper (*Issus coleoptratus*)

To the best of our knowledge, the mechanical gear—evenly-sized teeth cut into two different rotating surfaces to lock them together as they turn—was invented sometime around 300 B.C.E. by Greek mechanics who lived in Alexandria. In the centuries since, the simple concept has become a keystone of modern technology, enabling all sorts of machinery and vehicles, including cars and bicycles.

As it turns out, though, a three-millimeter long hopping insect known as *Issus coleoptratus* beat us to this invention. Malcolm Burrows and Gregory Sutton, a pair of biologists from the University of Cambridge in the U.K., discovered that juveniles of the species have an intricate gearing system that locks their back legs together, allowing both appendages to rotate at the exact same instant, causing the tiny creatures jump forward.

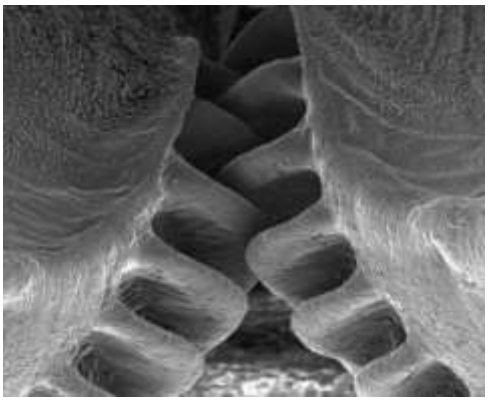
The finding, which was published in this month's *Science*, is believed to be the first functional gearing system ever discovered in nature. Insects from the *Issus* genus, which are commonly called "planthoppers," are found throughout Europe and North Africa. Burrows and Sutton used electron microscopes and high-speed video capture to discover the existence of the gearing and figure out its exact function.

The reason for the gearing, they say, is coordination: To jump, both of the insect's hind legs must push forward at the exact same time. Because they both swing laterally, if one were extended a fraction of a second earlier than the other, it'd push the insect off course to the right or left, instead of jumping straight forward.

The gearing is an elegant solution. The researchers' high-speed videos showed that the creatures, who jump at speeds as high as 8.7 miles per hour, cocked their back legs in a jumping position, then pushed forward, with each moving within 30ms of the other.

The finely toothed gears in their legs allow this to happen. "In *Issus*, the skeleton is used to solve a complex problem that the brain and nervous system can't," Burrows said in a press statement.

The gears are located at the top of the insects' hind legs (on segments known as trochantera) and include 10 to 12 tapered teeth, each about 80 micrometers wide (or 80 millionths of a meter). In all the *Issus* hoppers studied, the same number of teeth were present on each hind leg, and the gears locked together neatly. The teeth even have filleted curves at the base, a design incorporated into human-made mechanical gears because it reduces wear over time.



To confirm that the gears performed this function, the researchers performed a neat (albeit morbid) trick with some dead *Issus*. They manually cocked their legs back in a jumping position, then electrically stimulated the main jumping muscle in one leg so that the leg extended. Because it was rotationally locked by the gears, the other non-stimulated leg moved as well, and the dead insect jumped forward.

The main mystery is the fact that adults of the same insect species don't have any gearing—as the juveniles grow up and their skin molts away, they fail to regrow these gear teeth, and the adult legs are synchronized by an alternate mechanism (a series of protrusions extend from both hind legs, and push the other leg into action).

Burrows and Sutton hypothesize that this could be explained by the fragility of the gearing: if one tooth breaks, it limits the effectiveness of the design. This isn't such a big problem for the juveniles, who repeatedly molt and grow new gears before adulthood, but for the mature *Issus*, replacing the teeth would be impossible—hence the alternate arrangement.

There have been gear-like structures previously found on other animals (like the spiny turtle or the wheel bug), but they're purely ornamental. This seems to be the first natural design that mechanically functions like our geared systems.

"We usually think of gears as something that we see in human designed machinery, but we've found that that is only because we didn't look hard enough," Sutton said. "These gears are not designed; they are evolved—representing high speed and precision machinery evolved for synchronisation in the animal world."

From a contradiction resolution perspective, the answer is obviously 'gearing'; the problem the gears solve is the need for the planthopper to jump to an intended destination, and the thing that would otherwise prevent it from happening is the need to coordinate the movement of the two independent jumping legs. Here's how we might map that problem onto the Contradiction Matrix:

IMPROVING PARAMETERS YOU HAVE SELECTED:

Length/Angle of Moving Object (3)

WORSENING PARAMETERS YOU HAVE SELECTED:

Duration of Action of Moving Object (12) and Speed (14)

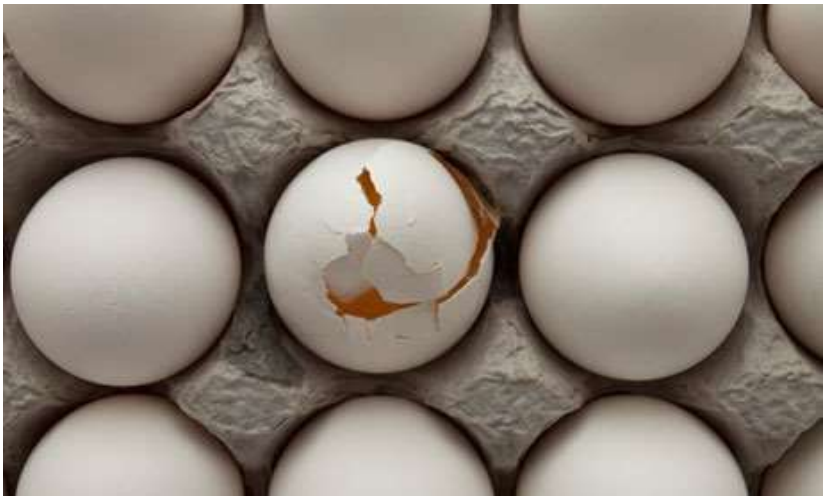
SUGGESTED INVENTIVE PRINCIPLES:

1, 17, 3, 19, 14, 10, 13, 4, 2, 12, 28, 7

While it's not easy to see which of the 40 Inventive Principles best corresponds to the use of gears, Principles 1, 17 and 3 all feel like pretty good analogues.

Short Thort

"How we waste our afflictions!
We study them, stare out beyond them
into bleak continuance,
hoping to glimpse some end.
Whereas they're really
our wintering foliage,
our dark greens of meaning,
one of the seasons of the clandestine year;
not only a season:
they're site, settlement,
shelter, soil, abode."
Rainer Maria Rilke,
Duino Elegies



Stalk the flaw; Live the flaw; Break the flaw.

News

PanGenic Music
We now – finally – have confirmation of the funding for our TRIZ-Wow-in-Music knowledge transfer partnership programme with The University of Plymouth. Recruitment of an appropriately qualified post-graduate/post-doctoral researcher will be happening over the next couple of months, with hopefully a start date in January 2014. We're very excited about the possibilities to re-invent what is presently a very sluggish industry. Anyone interested in taking part should get in touch with Darrell.

The Old Vicarage
Speaking of music, after a long summer of chasing builders, it finally looks like we have got them to do everything that needs to be done in the Schoolroom (i.e. new recording studio). The idea is to have the facility running in the next 6 months. No doubt we'll be running workshops there before that. Anyone that's been to the Clevedon ChangeHub will know we have lots of character on the inside of the office; at the new HQ, the idea is we have character on the inside and the outside.

Hargraves Conference 2014
In addition to running a special session on Step-Change Commercialisation at next year's conference in Melbourne, we've also been asked to run a separate one-day 'bootcamp' event on the similar theme. With a following wind it will be the first outing for our new complex-systems step-change resilience business scenario game! Details of the session on the Hargraves website shortly.

DTU '100 Day Growth Challenge'
We are pleased to announce that we will be participating in all four of 2014's planned rounds of this amazing executive programme at the Danish Technical University. Our job is teaching a day of Voice Of Customer/Voice Of System. February 17, May 23, September 12 and November 7 are the dates in the diary (don't you just love the long-term diary planning in academia!) if anyone fancies a visit to lovely Copenhagen. The programme has been so successful this year, there are plans to transfer the curriculum to other countries – we're already looking at the UK and Australia – get more details from the DTU Executive School Of Management website.

New Projects
This month's new projects from around the Network:

Government – innovation strategy study
FMCG – Eyes on the World study series x4
FMCG – TrenDNA workshops
Construction – 'Invent To Order' project
Water Utilities – SI Certification programme
Publishing – TrenDNA workshop
FMCG – Turnkey process innovation pilot-plant development
Marine – Turnkey technology transfer project
Healthcare – PanSensic study