Newsletter of the
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In memorium

Please join us in extending our deepest sympathies to Russ Johnson and his family on the passing of Frankie Johnson on August 27.

MEETING TIME AND LOCATION

September 8, 2005, dinner (or just come to network) at 7:00 PM, presentation at 8:00 PM.

Denny's Restaurant
3315 N. Scottsdale Rd.
Scottsdale, AZ

PRESIDENT'S MESSAGE

by Vaughn Treude

Keeping Up Appearances

You may remember that one of the big scares of the 1990's was “assault weapons.” These guns were supposedly too powerful and too dangerous for mere civilians like us to possess. What the media and the politicians didn't tell us, was that these semi-automatic weapons were no more effective or dangerous than many others that remained perfectly legal. The difference was that assault weapons *looked like* their full-automatic military counterparts, and could thus be used to scare the public.

Politicians aren't the only people that are out to deceive by playing up superficial resemblances between things. It's also a big racket in the technology industry. Microsoft is one of the biggest offenders. A lot of the changes between Windows 2000 and XP were silly bells and whistles like the animated start button. And then there's the so-called Windows CE that they put in pocket PC's. I once supposed that these devices would have the advantage of a familiar software interface, as opposed to Palm's very PDA-specific control. Then I tried one. Superficially, the windows and the menus resemble Windows XP, but don't operate in much the same way at all. A case in point: its File Explorer won't display the modification date of a file. (Or if it does, Dell's manual didn't say anything about it.) I haven't tried the Pocket PC versions of Office but I'd hope they're better designed.

Another Microsoft offense is the much-ballyhooed “.Net” development environment. First of all, there's the god-awful name, which evokes the excesses of the dot-com boom. Then there's Microsoft's claim that they've integrated the different languages into one common interface.

Again, it's a case of form over substance. I recently acquired a copy of Visual Basic dot-net and was favorably impressed. They'd really put some effort into making VB more than a “toy” language. But then I got Visual C++. I had high hopes for that as well, but they appear to have made very few improvements, apart from making its developer interface look exactly the same as VB's. On the good side, they've brought the compiler into ANSI compliance. On the bad side, its graphical design interface is still the same horrible kludge from the 1990's. You can't set different font sizes in the same dialog. You can't change their color. If you want to change the size of a control, you can't specify its height and width in pixels. Dimensions in VC++ use “dialog units”, which are tied to the current font size. In its ability to create a *nice-looking* application, VB is far superior, as is Borland's C++ Builder.

On the opposite side of the fence is (of course) Linux. Linux systems vary a lot in the appearance department. It can be confusing for newcomers, that, for example, the Fedora desktop and the Debian desktop are set up very differently. But under the hood, everything's much the same. The same fundamental tools are all there, and if the distributors of a particular version leave something out, you can download the source off the Web, compile it, and install it. And these source builds pretty much all work in the same way. I recently saw a Linux-based PDA. It wasn't pretty, but it had a full-blown Linux kernel and all the familiar tools.

It's not that there's anything wrong with having a good appearance. But what's inside is really more important.

Hope to see you all at Denny's on Thursday the eleventh.

Vaughn

EDITOR'S MESSAGE

by Clark Jones

Last month we got to talking about the Drake Equation. I've updated (and to a great extent reworded) an article I wrote a few years ago, and included it in this month's version of *The Advisor*.

A comment on Vaughn's column: if you think that writing *anything* in .Net is easy, I invite you to try porting it to another platform (e.g., Linux). The .Net platform is designed to force you to lock into the horrid Microsoft system interface.

I also need to apologize about being a bit late this month. The second Thursday sort of “snuck up” on me. (I know that there are some corrections that should go into the “contact info” section, but I've mislaid the sheet of paper, and don't have time to look for it at the moment.)

See you all Thursday!

Clark

Contact Info:

Editor:	Clark Jones	(480)641-7801	cjPACNeditor@cox.net
	Executive Board		
President:	Vaughn Treude	(602)750-3662	vaughn@nakota-software.com
Vice President:	C. Bruce Johnson	(480)759-2826	bruce.johnson@ieee.org
Secretary:	Eli Kawam	(480)706-8561	elikawam@mindspring.com
Marketing:	Ron Sprague	(480)966-1380	r.sprague@ieee.org
Treasurer:	Bill Morgan	(480)921-4094	bill.morgan@cox.net
Member at Large:	Lane Garrett	(480)966-1380	LaneGarret@aol.com
Member at Large/ Webmaster:	Paul Everett	(480)706-4753	peverett@ieee.org
Program Chair:	Michael Jordan	(480)726-3552	mike.jordan@ieee.org
Member at Large:	Ed Mischen	(480)752-6314	ed.mischen@philips.com
PACN Website:	http://www.ieeepacn.com		

IEEE Phoenix Area
Consultants Network

Contemporary Technologies

Jim Soudriette (The Galaxy Organization) and John Barnabas (Stellar Technologies)

Date: Thursday, September 8, 2005
Time: Networking begins at 6:30 p.m.
Dinner begins at 7:00 p.m.
Place: Denny's Restaurant
3315 N. Scottsdale Rd.
Scottsdale, Arizona 85251

Abstract: Where will technology go in the near and far future? What are the latest developments in semiconductors, their applications, wearable technology, home appliances, personal communications, and video and digital photography? This presentation is a review of what is happening now and a projection of how things could evolve. Consultants in all business sectors will benefit. It's a dialogue that's as entertaining as it is informative.

Speakers: Jim Soudriette and John Barnabas are independent consultants who often partner together on speaking projects. Jim's work involves asset management and mergers and acquisitions. John's work is broadcast on Financial News Radio, KFNN (AM 1510) every Monday at 7:50 a.m.

Directions: In Scottsdale, go west from Highway 101 and Indian School Road. Turn left on Scottsdale Road to head south. It is at the southeast corner on Scottsdale Road at Osborn Road.

Contacts: Vaughn Treude, IEEE PACN President, vaughn@nakota-software.com
Mike Jordan, IEEE PACN Program Chair, mike.jordan@ieee.org

The Drake Equation

a short essay by Clark Jones

In 1961, Frank Drake proposed a formula for estimating the number of civilizations in our galaxy that would be "radio communicative". Although I vaguely remember running across this in the 1970s, most of us first heard of the Drake Equation in the early 1980s on Carl Sagan's *Cosmos* TV series.

$$\mathbf{N = N_* \times f_p \times n_e \times f_l \times f_i \times f_c \times f_L}$$

where **N** is the number of "radio communicative" civilizations, $\mathbf{N_*}$ is the number of stars in our galaxy, rate of star formation in our galaxy, $\mathbf{f_p}$ is the fraction of those stars having planets, $\mathbf{n_e}$ is the number of planets around each star capable of supporting life, $\mathbf{f_l}$ is the fraction of those planets on which life actually develops, $\mathbf{f_i}$ is the fraction that develop intelligent life, $\mathbf{f_c}$ is the fraction where a technological civilization arises (being defined as one that is capable of radio astronomy), and $\mathbf{f_L}$ is the fraction of planetary lifetime that such civilizations exist. (If you look on the Internet, you'll find a slightly different form of the equation, which substitutes $\mathbf{R_*}$ [star formation rate] for $\mathbf{N_*}$, and **L** [life expectancy of the civilization] for $\mathbf{f_L}$. The two equations are, more or less, equivalent.)

Over the past couple of decades, I have given considerable thought to the terms of this equation. Carl Sagan presented a range of values for each of the terms of the equation in the book *Cosmos* which was copyrighted 1980, but for some of them I don't agree. Please note that this is my personal opinion.

Dr. Sagan presented a value of 4×10^{11} (I've seen 20 stars per year for $\mathbf{R_*}$ for that form), and I see no reason to differ with this number. (Note that $\mathbf{R_*}$ is an estimate of the number of stars created in the galaxy per year that meet the conditions of being "reasonable" to have civilization at some point in their lifetime, whereas $\mathbf{N_*}$ is all of the stars in the Milky Way galaxy.)

For the value of $\mathbf{f_p}$, Sagan used value 1/3 in the *Cosmos* book. On the Internet, I've seen 0.1, or 10% of stars have planets. Since then, we have discovered a large number of large planets orbiting around other stars, mainly by noticing "wobbles" caused by the planets' gravitational attractions on the stars, which, due to the Doppler Effect, causes minute spectral shifts. Unfortunately this technique is limited to only observing very large planets. Much more exciting is the Kepler Mission (see http://www.kepler.arc.nasa.gov/) which is going to use a different technique to look for planets orbiting other stars, namely, looking for the slight decrease in brightness when the planet passes directly between us and the star. This technique could easily detect a planet smaller than Mars if it's orbit crosses the "line of

sight" from its star to Earth. They estimate that from random chance, about 0.5% of all planets of the correct size should pass between their primary and our sun, and they'll be monitoring about 100,000 stars. By the time the Mission is complete, and the data analyzed, we should have a much better idea of the correct value for $\mathbf{f_p}$, but meanwhile, I like to use 0.5, or 50%.

Cosmos uses 2 for $\mathbf{n_e}$, though some other sources use a value of 1. In the past quarter century, we've found some possible evidence of life having arisen on Mars, and some potential for the Jovian moon Europa. I tend to think that 1 is very conservative, but go with it simply because of mathematical laziness.

Carl Sagan used a value of 1/3 for $\mathbf{f_l}$ in *Cosmos*, but I think that this is way low. Think about it: you're looking for the formation of a "proto-virus" molecule, an event that only has to happen *once* in several hundred million years in the volume of the world's oceans. I think that it will probably happen somewhere between once a year, and once every thousand years. I tend to use the number 0.9995, saying that 10,000 planets (or moons) were the conditions are reasonable for life to arise, there will be at most 5 where it *doesn't* happen.

To recap the numbers so far, Carl Sagan says he has roughly $1x10^{11}$, or 100 billion worlds with life. (The numbers come out closer to 89 billion, but what's 11 billion worlds between friends?) My numbers give roughly twice that, or 200 billion worlds.

Dr. Sagan combines $\mathbf{f_i}$ and $\mathbf{f_c}$ into a single value of 1/100. I would rather keep them separate. First, let's analyze $\mathbf{f_i}$, the likelihood of intelligent life arising. Once life achieves multicell form, the probability of creating a nervous system is almost unity – the ability of actively distinguish between "friend" and "foe" is a tremendous asset to survival. However, getting to the level of *Homo Sapiens* is another issue. The K-T event, which killed off the dinosaurs, gave the opportunity for supremacy to mammals. Some think that the K-T event was unlikely, but more recent evidence suggests that something like it had a fairly high probability of occurring. We see a lot of "die-offs" on a fairly regular basis throughout the geological time frame. Indeed, I think that getting to something on the level of the chimpanzees or gorillas, given hundreds of millions of years, was fairly likely. The problem, though, comes when going from our common ancestor with the chimp to modern man. A couple of million years ago, the Isthmus of Panama closed off, dramatically changing the climate in Africa. (If you think modern hurricanes are major storms, think about what would happen if one could go all the way around the planet from the west coast of Africa to hit the east coast of Africa, and maybe even survive the land crossing to do it again.) Had this event not happened at just the

right time, *Homo Erectus* would probably not have evolved. For the sake of argument, let's give that a 10% chance of happening. Paleontologists tell us that at one point, *Homo Sapiens* came very close to becoming extinct, down to less than 20,000 individuals, and possibly as low as 10,000. If $\mathbf{f_i}$ is restricted to "enough intelligence" to be able to do radio astronomy, then my opinion is that 1/1000 is probably a fairly optimistic value for $\mathbf{f_i}$ alone.

In considering $\mathbf{f_c}$, the fraction of places where some form of intelligent life (capable of doing radio astronomy) actually develops a civilization to the point of doing radio astronomy, we start seeing an assortment of other factors. *Homo Sapiens* have been around roughly 65,000 years, and it's only been the past 4 or 5 decades that we've actually been doing radio astronomy. Our own development of science and technology has been very much in spurts. Although it can be argued that virtually all of our advancements happened during periods totaling only about 300 years, those three hundred years have been scattered out over several millennia. The ancient Greeks accounted for some of the first periods, but these typically only lasted 30 years or so. Probably none of the younger generation was interested. There was even occasionally outright hostility, which lead to such travesties as the burning of the library at Alexandria. Many rulers have even seen learning as a threat to their power: witness, for example, the opposition of the papacy to Galileo Galilei, or, more currently (though probably not affecting radio astronomy) the opposition of George W. Bush to stem cell research. There was also a Chinese queen who decided that exploration was not needed, and so recalled her fleets, leaving the world to the European explorers of later centuries.

Getting into the twentieth century, there were two highly unlikely events that, I would argue, are key to the development of radio astronomy. If either had not happened, we would not have radio astronomy today. The first is the sinking of the Titanic. It is well known that there was another ship just a few miles away from where the Titanic sank, but she had her radios turned off for the night, and so did not receive the SOS that the Titanic was sending out. What does this have to do with radio astronomy? Well, the public outcry over it pushed the governments of the world into requiring that ships keep their radios manned around the clock. This probably tripled the number of trained radio operators prior to the First World War, which also meant that there were many more technological advances during this time. This burst of improvement in radios meant that they were much more effective during WW I. Both the requirement to man the radios and the developments of the War gave a huge boost to radio in the 1920s and 1930s.

The second key event was that during the First World War, a French soldier had drawn a bead on a German soldier, but seeing that he was already wounded, did not fire. The German soldier turned out to be Adolf Hitler. Although there probably would have been a war between Japan and the U.S., without Adolf Hitler Germany probably would not have gone to war, and quite likely Italy would not have gone to war either. The War in Europe

drove the development of electronics and rocketry. Hitler's antisemitism pushed many key players in the development of nuclear energy into coming to the U.S., and fear that he might be developing an atomic bomb pushed us into doing so. Much of our space technology was based on developments made at the behest of Hitler, as was the development of the superhighway which is key to the current economic vitality of the world. Hitler was unspeakably evil, but he definitely caused a lot of progress.

True, without these two events, we might still have developed radio astronomy sometime in the next few hundred years. But would we see yet another collapse of civilization before then? Our history is already littered with collapsed civilizations.

Another nasty little wrinkle in $\mathbf{f_c}$ is that there was a dramatic warming of several degrees about 10,000 years ago, which lead to the development of agriculture and, indeed, civilization. It came right at a point when *Homo Sapiens* were ready to develop agriculture, and also at a point in the evolution of wheat to a point of allowing it to be cultivated, and *Homo Sapiens* happened to be in the right place at the right time. Frankly, I think that given these three unlikely occurrences, a value of 1/50,000 is an optimistic value for $\mathbf{f_c}$. (It might even be as low as 1/1,000,000,000.) The optimistic value for $\mathbf{f_c}$ gets us down to about 4,000 civilizations having radio astronomy during the lifetime of our sun.

The final factor is $\mathbf{f_L}$ is, and this, again, is a place where Dr. Sagan and I do not see eye to eye. He gives as a range $1/10^8$ to an upper bound of 1/100 for $\mathbf{f_L}$. I tend to think that a good value for the lifetime of a technological society might be on the order of 500,000 years, especially if we can get to the point where we can establish colonies on other worlds. However, this gives us a value of just 1/16,000 for $\mathbf{f_L}$. Which leads me to a final value of an average on the order of 0.25 civilizations at any one time. This implies that there's a 1/16 chance of there currently being another technological civilization in our galaxy right now.

Even if I'm overly pessimistic by several orders of magnitude, our galaxy is roughly 100,000 light years across. If we take the average "thickness" to be "just" 1000 light years, that works out to be some 7.85×10^{12} cubic light years. If there are, for the sake of argument, 7850 other technological civilizations, that's still only one per billion cubic light years, suggesting that on the average, there's a thousand light years separation between them. If Dr. Sagan's optimistic numbers had been right, wherein he suggests a high of 10^7 civilizations, I really think that "SETI at Home" would have found one by now.

IEEE Phoenix Area Consultants Network
Membership Application Form

Membership is available to anyone who is interested in the goals of the organization. Full membership entitles a member to voting privileges at business meetings, and to a web site listing. Associate members are not listed and do not vote, but receive all mailings. Note that the newsletter is distributed via e-mail.

I hereby apply for (full____ associate____) membership in the IEEE Phoenix Area Consultants Network.

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