

# Engineering for a Better Life



## THE SKUNKWORKS AT NEW RINGGOLD

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### So What's the Buzz?

When you begin an engineering project as complex as a Robotic Bee the task may seem overwhelming. God has designed an extremely efficient, social creature which does so many different and critical tasks in the service of nature.

So where to begin? As an engineer you are trained to examine a problem from the prospective of system analysis. In this case we are fortunate because we have a model from which to work, the Bee.

For our purposes we need to ask what are the key functions that must be preformed?

Our Robotic Bee will be required to operate in a designated area. Our farmer friends will need to see as much activity from our bee as they would see from the real thing. This will involve number of "lights" over a specific period of time in a select area. These lights must be on flowers blooming on the designated flowers of the farmers choice.

So in this simple paragraph we have defined several critical tasks.

These are:

- 1: Delivery of the Robotic Bees to specific locations.
- 2: The ability to "fly" and to land multiple times without damage to the flowers in question.
- 3: The ability to select only those flowers in question.

Of course there are many more parameters to consider, but we will start with these.

Perhaps the simplest of these tasks is the delivery of the Robotic Bee to a designated area. This could be accomplished by any sort of vehicle manned or robotic, which can be guided to a precise point by a GPS system.

The second task is much more complex. The ability to fly and to land without damage to the flowers in question. This problem demands the same system analysis as would any modern aircraft.

Again, because we have a model to work from, we could study the bee's structure and systems and begin to emulate them. It is possible to duplicate these systems by using modern materials, electronic systems and nanoscale mechanical devices. A topic for many more articles on

What's the Buzz.

I will leave you with this hint, AEROGELS, specifically those derive from tree cellulose! These are light in weight, incredibly strong, machine able and moisture resistant. More to follow...

The last task on our short list is the ability to select "only" those flowers in question. This is another difficult task but one that can be mastered if you understand the following concept.

Every flower is genetically unique and our friend the Robotic Bee can be "tuned" to that flower.

Here's the gig, light refracts from the chemical/genetic sequence of the flower's chromatic structure. This refracted light can be a selective signal by which our bee can detect the correct flower on which to "light"

Of course our bee will have to operate in many different lighting values. That being said we must compensate by using a light source which cannot be confused by such variations in natural light, can you say infrared?

### Special points of interest:

- LECTURES AND CLASSES
- POLLINATORS IN YOUR BACKYARD
- ALTERNATIVE ENERGY
- ENGINEERING FOR KIDS

### Inside this issue:

SO WHAT'S THE BUZZ?	1
A CLASS REPORT	2
WOMEN ENGINEERS!	2
PLANTING FOR A BETTER BUZZ	3
METHANE—THE OTHER CANERY IN THE COAL-	3
THE REAL WORLD DESIGN CHALLENGE 2014/2015	3
THE NASA MARS SAMPLE RETURN CHALLENGE	4

# Engineering for a Better Life

## A Class Report

My wife, Deborah and I are currently teaching three classes a week.

Monday we are teaching at St. Joseph Church School in Danville, PA. This is my third year teaching young folks at this school. We have 23 students registered and to this point have focused mainly on imagination, symmetry, structure and transference of power along linear lines as well as those that change direction and axis by the use of gears and pulleys.

We will begin our first simple robotics projects this coming week. This school has registered for the *FIRST* Lego League competition this year and hopes to compete at least twice. I have four girls in this class. Young women in engineering are a continuing point of emphasis in all of my classes this year. Deb has developed a real “knack” of creating a repore with the gals and helps me get my “engineering lessons” across very well indeed!

## Planting for a Better Buzz

My wife Deborah is a great gardener. She likes flowers almost as much as she likes me. I would like to think that I have the edge, but... Anyway she spent a great deal of time this past spring and summer listening to me talk about climate change and the effects that it is having on our pollinators.

On Tuesday evenings we teach at the First Presbyterian Church in Weatherly, PA.

This church has supported our programs over the past ten years and continues this outreach ministry to develop young people who are willing and able to help our society overcome many of the daunting issues that face our world today.

We currently have two very young students ages 5 & 6, one guy one gal. This is a very rewarding class because these children are wide open to new ideas, and they have the ability to look at problems in ways that we “adults” never thought of before. So in a manner of speaking, they teach us as much or more than we teach them!

Our Wednesday class is our newest class. We are teaching at St. John Neuman’s Church School in Palmerton, PA We have eleven students registered and I am delighted that five of them are young ladies!

## Women Engineers

Currently only 18% to 25% of engineering students in the United States are women.

It has been my experience that when a young man looks at an assigned problem he will usually derive a solution very quickly and drive that solution until it works or fails.

A young woman on the other hand generally looks at the problem from several different solutions and then will go back to her female teammates and together they come up with a synthesis to the problem.

Both may succeed, but we need both methodologies in our work.



What is your favorite sandwich?

By covering the joints of any materials both top and bottom with a solid layer of materials you have created my favorite sandwich.

They especially liked our bed of oregano and mint. Filling the air with the sound of their busy movements.

We had other pollinators visiting all season as well. The humming birds loved the geraniums. Our special guest was the Hummingbird Clear Winged Moth, fascinating!



## Methane—The Other Canary in the Coal Mine

Yes it is the butt, if you forgive me, of many a joke. From the bean eating scene in “Blazing Saddles” to the worry over the gases produced by our herds of cows.

Still it is one of the more dangerous greenhouse gases that have become the topic of our conversation on global climate change.

There is and always will be methane in our atmosphere, it is a natural byproduct of life. When we study the atmospheric makeup of exoplanets it is one of the key indicators that there might be life on other planets. So why the concern?

Well we only need to look at Venus our nearest neighbor going in towards the sun. The atmospheric composition is mainly Carbon Dioxide. This greenhouse gas is mainly responsible for the runaway atmospheric heating of the planet. The average daytime and nighttime temperature is 450 degrees Celsius, or 840 degrees Fahrenheit.

Wait we were talking about

Methane so what’s the to do over Carbon Dioxide? Well I am glad that you asked!

It turns out that Methane is about 30 times more potent as a greenhouse gas than is Carbon Dioxide.

So here’s the rub. There are areas on our planet that are vast store houses of this potent gas. The gas itself is held in check by physical parameters that can be easily understood. These are temperature and pressure.

It is important to understand that because they are physical parameters the discussion of cause and blame have no place here. This is not a conversation of a political nature but of fact.

So let’s look at one area that these gasses are held in, the permafrost found in the arctic and Antarctic areas of our planet.

Permafrost stores an immense amount of carbon and methane. In a warming environment, permafrost is expected to degrade, and these gases

which have been in storage will be released. This process has already begun in some parts of the world, including western Siberia, and is expected to increase in earnest by the year 2020.

These greenhouse gases are released directly into the atmosphere. This increases the effect of global climate change simply by adding to the gases that reflect the sun’s energy back to the planet instead of allowing it to be released into space.

The second and perhaps more worrisome source of methane is to be found along the deep waters that are found off the shores of every continent. These gases are currently suspended in a slushy layer in the form of methane hydrates. This is a physical compound where water forms icy crystals. The gases are “trapped” inside of these crystals like birds in a cage. Once either of the physical parameters change enough to release these gases then they will be sent through the water column and released into the air.

## The Real World Design Challenge

My group from last year has agreed to come back to add to their wonderful competition design. This project involves the conceptualization, design and testing of an unmanned robotic drone which is to visualize the activity of the European Corn Borer in a mile square area.

The data retrieved from this study needs to be

downloaded and then sent back to a central clearing house where the team members would be able to analyze it and in turn disseminate it to the farmers on whose land the study was done.

The farmer then uses the data to determine where and in what concentration he would need to apply the appropriate pesticides needed

to stem the activities of the borer.

There are still several openings on the team for any high school students that wish to learn more about the engineering design process and in doing their work in a three dimensional CAD (computer aided design) package.

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### **We are a Christian Based Organization. We Believe!**

For ten years I have operated two distinct corporate structures. My For profit company: KG Projections, Inc. and The Weatherly Institute for Robotics and Engineering or W.I.R.E. a PA recognized non-profit.

My for profit company generated most of the monies needed for my non profit to survive and help teach the children.

Now I am introducing a third arm, The Skunkworks at New Ringgold. While not a separate company it will become the umbrella structure to support my other two enterprises and will allow me to open up a research facility dedicated to creating new technologies to help in our struggle with a changing climate and alternative energy strategies.

I intend to share some of these concepts with you my readers beginning with the Robotic Bee program. So please look for further developments in the pages of this newsletter and those to follow.

I would also like to invite you to donate as you see fit. I currently need a stereoscopic microscope with camera mount.

Thanks: Stephen Goodale

It is the goal of The Weatherly Institute for Robotics and Engineering to create a culture of Science and Technology in which young people and adults may come to learn and be inspired!

Over the years we have watched as technology has increasingly driven our culture, while the number of people who are actually taking engineering and technology courses have decreased. Even more maddening is that this knowledge base has found its way overseas and to other countries making the United States vulnerable to the whims of a global economy.

W.I.R.E. has taken the challenge up in a small way, bringing young children, young adults and adults to the class room and exposing them to a wide range of engineering opportunities.

## The NASA Mars Sample Return Competition

NASA has once again issued a challenge in the 2014—2015 year to any organization, school or private group who might be interested in competing in the MARS SAMPLE RETURN CHALLENGE.

There are two levels of competition both are “played” on an 80 meter square playing field. Level one is designed to allow a robot to leave its “home” platform and to attempt to “capture” and bring back to that platform a designated pre-packaged sample.

The robot must do this adequately in order to advance to level Two, the retrieval of different shaped/sized/colored samples in that 80 meter square field. Sometimes as a single robot sometimes with other robots on the course.

The Weatherly Institute for Robotics and Engineering has registered for this year’s challenge and is awaiting acceptance from the Worcester Polytechnic Institute of

MA, who is administrating and overseeing the event. W.I.R.E. will accept 11 and 12th grade students as well as 1st and 2nd year college dtudents onto the team. There will be ten spots available. If you are interested or if you know someone who might be interested please pass along this newsletter to an interested student.

You can contact me via email at:

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Or by phone at:

570-401-7813

If you or your organization are interested in helping with the costs involved with this project, thank you in advance, all donations are welcomed. Please contact me and I will give you the information needed to send those monies or materials along.

Please keep reading the newsletter for more information and additional details/progress.

