



# EAA602 Log Book

Adirondack Chapter Newsletter

May 2010

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HOMEBUILDERS

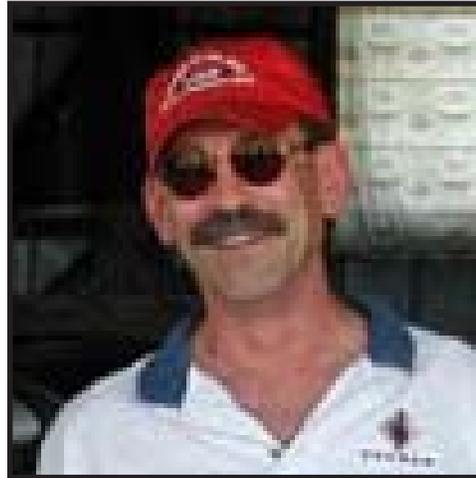


## From The Presidents Desk

*by Tim Devine*

The weather is getting warmer, the days are getting longer and things are definitely getting busier as the 2010 flying season gets rolling. Last month's meeting was a busy and productive one.

First off, I want to thank all the members who volunteered their time and effort to helping move some important issues forward. Thanks to Roger Johnson for following up on the Geneseo Air Show and tracking down info as we continue to work on a possible over night fly out. Thanks to Larry Saupe and Doug Sterling for their work on getting a first draft of the new member hand out ready so that we could all check it out. Outstanding job guys! Special thanks to Rick Riccardi, John Pashley, Doug Sterling and Chris Brown for the job they did in collecting, sorting and putting together a presentation on possible memorial tribute for Tony Rizzio. We all owe you a debt of gratitude. Their selections will be explained separately later in the news letter for all to consider. Please take some time



to weigh the merits of each of the final selections. We will be voting to select which one the club wants to initiate at this months meeting.

Thanks to John Peck for our second safety briefing. Good timing with take off and landing video as we are all preparing to head out for another season.

I hope that you all have been busy getting your airplanes prepared and have been able to get some flying time in because May is going to be busy. I have tried to be proactive in getting out possible event plans so make sure you keep checking the emails.

This month will be our last meeting at Broadalbin Perth HS. Thanks to Darryl White for helping to set this up. I hope that this has worked out for everyone, it certainly improved our Winter meeting attendance. I would like feed back to see if we want to be back at PBCSD for next Winter's meetings.

Last but not least, thanks to Fred Blowers for running the 50-50 raffle and Darryl White for brewing the coffee. See you all on the 26<sup>th</sup>. *Tim*

**Meeting This Month  
Will Be At:  
Broadalbin Perth  
High School  
April 26 @ 7pm**

- EAA602 Officers**
- |                    |                      |
|--------------------|----------------------|
| <i>President</i>   | <i>Tim Devine</i>    |
| <i>V-President</i> | <i>John Peck</i>     |
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- Board Members:**
- Tim Cowper*  
*Fred Blowers*  
*Roger Johnson*



## Tony Rizzio Memorial

*by Tim Devine*

In the following paragraphs I will describe to the best of my ability the three final selections of the Tony Rizzio Memorial selection committee. There were many great suggestions and I appreciate the committees reviewing them all and narrowing down the list. Please take the time to review each one for its individual merits and come prepared to discuss and vote for your choice. I want to thank everyone who contributed ideas and I especially want to thank Rick, John, Chris and Doug for dedicating their time to this task. These are being listed in no particular order, each has its own special characteristics so please take your time in reviewing.



## EAA Memorial Wall

The Memorial wall is located at the edge of Pioneer Airport at the EAA Air Adventure site in Oshkosh WIS. Each year the EAA adds new names to this enduring tribute to those who loved aviation. The cost is a donation of \$350.00 or more. With the donation you receive a personalized plaque with the persons name and a description of his life in aviation. Each inductee also receives a one page biography that will be entered into the Memorial Wall Registry Album. If you would like more info , go to the EAA web site and search Air Adventure Memorial Wall.

## Empire State Aero Sciences Museum Commemorative Walk and Plaza

The Empire State Aero Sciences Museum is located on route 50 in Glenville NY. The museum is situated in the old GE Aviation test hanger. The museum has a varied collection of aircraft and memorabilia which are in their own way significant to New York State. Commemorative bricks ranging in price from \$50.00 to \$250.00 depending on whether they are located in the walk or the plaza. If you would like more information go to [www.easm.org](http://www.easm.org)

## Mayfield CSD Library Commemorative Aviation Section

Since Tony was a well known fixture and resident of Mayfield , the Mayfield CSD Superintendent of Schools and head librarian were approached about the possibility of accepting a donation of aviation related literature (no magazines) to open a aviation section in the HS library. The section would be dedicated to Tony's Memory and a plaque denoting his dedication and contributions to aviation would be placed in the library. A base amount of materials will be submitted to the school to get the section started and then each year it can be added to. We can either start the base donation with contributions from members, a cash donation which the librarian can then use to purchase materials or a combination of both. Size of the plaque will be determined by MCSD and cost will be decided by EAA 602 member vote. Both the superintendent and librarian were very enthusiastic.



## Letter From Terry Waite

Tim,

I just got back from Sun and Fun. While I was there I often leave Marty sitting on a bench while I go from hanger to hanger looking at airplane stuff. On one occasion I left her on her usual bench while I went for two hours to look at the new Cossario amphibian that I want to buy. While I was gone my wife had a conversation with a woman whose husband had left her on the same bench for the same reason.

While they were talking it was revealed that she was from Brazil and her husband was looking to buy an airplane in America. Marty said her husband (me) was off looking to buy an airplane made in Brazil. The woman said "yea bit my husband has an airplane in the garage that he hasn't finished yet". My wife said "so has mine". The woman looked at her and said "I guess men are the same everywhere". He who dies with the most toys Wins and I don't want to come in second place.

*Terry*

## Food For Thought

The difference between a duck and a co-pilot? The duck can fly.

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A check ride ought to be like a skirt. Short enough to be interesting, but long enough to cover everything.

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Speed is life. Altitude is life insurance.

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It only takes two things to fly: Airspeed, and money.

## EAA 602 Events Calendar 2010

### May 1

Albany Airport GA Day group fly out.

### May 4

Air Safety Foundation Seminar Cohoes NY. check [www.faasafety.gov](http://www.faasafety.gov) for details.

### May 15

Chapter 811 is having a Young Eagles Rally need pilots Thompson County (ITH)

### May 22

EAA 602 Poker Run and BBQ

### May 23

PCB Sidney N23 8:00- 12:00

### June 7

EAA 602 2nd Annual Saratoga Pancake Breakfast (fund raiser)

### June 26

Wings and Wheels?

### July 7-9,10,11

EAA 602 Geneseo Air Show and camp out.

### July 26 - Aug 1

Oshkosh

### August 7

EAA 602 Annual Young Eagles Fulton County Airport

### August 21

Family Picnic Day Great Sacandaga Lake

### September 4

Johnson's Labor Day Fly In

### September 11

EAA 602 3rd Annual Saratoga Pancake Breakfast (fund raiser)

### September 25

2nd Annual Glider Ride Day Adirondack Soaring Club

### October 2

EAA 602 3rd Annual PPC Fly In and Barbecue

### October 9

EAA 602 Basin Harbor/ Lake Placid leaf peepers flight

### October 16

EAA 602 Bennington VT leaf peepers fly out and lunch.

*Other Spur of the moment events that can take place on short notice.*

*North Creek Ski Fly In  
Ballston Lake Ski Fly In  
Basin Harbor VT brunch*



## Keeping your cool in the Air! (Part III)

by Larry Saupe

This is part 3, of a 4 part series dedicated to heat transfer. In part 1 we discussed the flow of heat through a solid surface (conduction). In part 2, we investigated the flow of heat between a solid (such as a heat exchanger tube or fin) and a moving fluid (convection). Part 3 will focus on the exchange of heat between objects of different temperature in the absence of any medium between them. This mode of heat transfer is termed radiation.

Radiation deals with heat transfer between objects when there is no conductive or convective medium between them. One good example that comes to mind is exchange of heat between bodies in space. We know the earth receives a tremendous amount of heat from the sun, even though there is only a very cold "space" between the earth and sun. So... how do we transport all of this energy through... nothingness?

The answer lies in the method in which the energy is exchanged. Thermal radiation is defined as propagation of electromagnetic waves, with wavelengths ranging of 0.1 to 100 microns (which encompasses the infrared to the visible light spectrum).

These electromagnetic waves pass easily through space and most gases. When they hit a solid object they are either absorbed, reflected or in some cases allowed to pass through (though typically a combination of absorption and reflection will happen). Any waves that are absorbed are immediately converted to heat. The reflected waves are then absorbed and/or reflected by some other body and so on. One way to visualize the process is to consider a light bulb in the middle of a dark room. When the light is turned on, light emanates from the bulb in all directions (in a line of sight fashion) to the walls and various objects within the room. Light is then reflected off of the walls and objects further filling the room with light (providing some light to the shaded areas). The strongest (line of sight) waves will produce shadows when blocked by solid objects. Just like looking for shade on a sunny day to avoid the intense direct radiation from the sun. These waves will travel in a straight line unless reflected into an area by another object. It is these strongest line of sight waves that will hold the greatest amount of energy. All objects emit radiation. This radiation (frequency and strength) being primarily a function of an objects temperature and what is called its surface emissivity. All objects absorb, reflect and/or transmit radiation as well, termed its absorptivity, reflectivity and transmissibility.

Emissivity is strongly a function of color and finish. Values can range from 0 to 1. Emissivity is a comparison of a bodies radiation emissive power compared to that of a

black body. The term black body relates to a body with the maximum emissive power attainable for a given wavelength and frequency. The most radiation an object could produce for a given shape and temperature etc.

Typically darker colors and rough surfaces will emit more radiation than lighter colors and polished surfaces (one reason wood stoves are painted flat black). Black high temperature exhaust paint, as an example, may have an emissivity rating of 0.98, while a silver exhaust coating may have a rating near 0.30 or less. Highly polished clean metals may be as low as 0.1.

Absorptivity is also a strong function of color and finish with the same relations holding true as for emissivity. Typically a strong emitter is also a strong absorber. This is one reason why solar panels used to heat hot water are black. Put a flat black surface in path of direct sunlight and will quickly become very hot whereas a silver or white surface would not. Materials with low values of absorptivity typically reflect the radiation (such as a silver opaque surface), allow it to pass through (as may happen with glass at short wavelengths) or often a combination of both.



Radiation emanating from a surface can be seen with special Infrared (IR) cameras, and for some temperatures and wavelengths even with the naked eye. The thermal radiation spectrum ranges from 0.1 to 100 micro-meters (0.0000039370 to 0.003937 inches). The naked eye can see wavelengths in the 0.4 to 0.7 micro-meter range. This will often allow us to see items in the temperature range of 800 to 100,000 oF (depending on the objects emissivity). So, just about

everything from a very hot engine exhaust pipe (when it gets "red hot") at 800 oF to the sun at 100,000 oF. The colder an object is, the longer wavelength it will produce. These longer wavelengths are in what is termed the infrared range. Special optics (cameras) are required for us to visualize and quantify radiation in this longer wavelength spectra. These cameras can actually calculate a surface temperature of an object if its emissivity is known, or measure an objects emissivity if the temperature is known (such as with an attached surface thermocouple). Two such companies who make such cameras are Sierra Pacific and FLIR. Boldstar Infrared Services, which is a company specializing in IR imaging and troubleshooting, donated two images for this newsletter. These images show what a running automotive engine block looks like through an IR camera (Image 1). The lighter areas being the regions with the highest outgoing radiation (and often the highest temperatures). Note the low radiation value on the valve covers, while they may in fact be very hot, a surface finish with low emissivity (such as chrome) has reduced the outgoing radiation levels. Image 2 provides a look at the exhaust headers. Depending on the temperature and emissivity we might be able to see some of what is depicted in Image 2 with the naked eye if it were dark



enough outside.

Calculation of heat transfer due to radiation between objects requires that the hot object's temperature and emissivity be known (or at least estimated). It also requires knowledge of the cold object's temperature and absorptivity. Values for emissivity and absorptivity can typically be found in (or estimated from) many available handbooks and tables.

The calculation for heat leaving a hot object per unit area

$$Q = \epsilon \sigma T_h^4 - T_c$$

Where:  $\left( \frac{\text{BTU}}{\text{hr-ft}^2} \right)$

- Q = Rate of heat transfer per unit area (BTU/hr-ft<sup>2</sup>)
- e = hot objects emissivity
- s = Stephan-Boltzmann Constant (1.71E-9 BTU/hr-ft<sup>2</sup>-oR<sup>4</sup>)
- Th = Hot objects absolute temperature oR (oR = oF + 459.67)
- Tc = Cold objects temperature oR

The heat received by a cold object would be a function of its absorptivity and what is termed a viewing factor. The viewing factor allows for non perfect alignment between the sources (I.e. decreases the incident radiation received if it were on an angle). Maximizing the viewing factor is the primary reason solar panels are angled to match the angle of the sun on the horizon.

The heat received by the cold surface would equal then take the generalized form:

$$Q_{cold} = \alpha QV$$

Where:

- Qcold = Rate of heat transfer per unit area being received by the cold component (BTU/hr-ft<sup>2</sup>)
- a = cold objects absorptivity (0 to 1)
- V = Viewing Factor between hot and cold objects (0 to 1)
- Q = Rate of heat transfer per unit area leaving the hot object (BTU/hr-ft<sup>2</sup>)

As the cold object heats up, it too will start to radiate its own power back out according to its own emissivity and temperature. As such, the "net" heat transfer will reduce the closer in temperature the two objects become. The take away here is to recall that the emissive thermal power of thermal radiation goes as a function of Temperature raised to the 4th power. The hotter an object becomes, and the greater the temperature difference between objects the more heat that will be transferred.

At small temperature differences, say less than 50 oF, the effects of radiation are typically very small (if not negligible) when compared to the magnitude of heat transfer by conduction or convection. When temperature differences start to climb to several hundred or several thousands of degrees then you can obtain very significant



values for thermal heat transfer. One primary example is the heating of the earth by the sun. Another example is the cooling of the earth to space at night. Consider an average earth temperature of 70 oF (529.67 oR) and a deep clear effective sky temperature of -46 oF (414 oR). This will provide for a T4 temperature difference of (529.674-414.004) = 49 billion. This is one reason why you may see ice or frost form on the ground during a clear night even when the outside air temperature is above 32 oF. Emissivity due to color is also one reason you may see frost form on the hood of a black car (or black Kitfox aircraft wings) during these conditions while a lighter colored car (or white CH601 wings) would only show signs of condensation or dew.

So... how do we handle radiation when it concerns our aircraft? Some generalities include:

1. Reduce the absorptivity near sensitive items. To protect sensitive components from heat gain due to thermal radiation (from such hot items as exhaust systems or engine blocks), shield them with a shiny silver surface (such as polished aluminum, stainless steel or many of the adhesive radiation shield tapes available). Commonly shielded items would be wire bundles, engine cowlings and electronics. When placing a shield, visualize the hot component as a light source and then try to arrange the shielding to keep this light off your component.
2. Properly align shielding. One problem with shielding as mentioned above is that you effectively are reflecting the radiation somewhere else (just like reflecting light with a mirror). The thermal radiation will not get to your component, but may get sent elsewhere to an equally sensitive spot. The best option would be able to reflect the radiation right back to the hot source from where it came. Keep reflections in mind when placing a shield.
3. Lower the emissivity of the hot components. Black components have very high emissivity (such as black exhaust paint). Many silver and ceramic based coatings exist which are designed to lower the emissive power of these hot items. Results from some of these have been quite impressive. A great article comparing coatings of this nature (tested on an exhaust system) can be found at: <http://www.flirthermography.com/media/2004-015-DeMonte-FINAL.pdf>

This has been a very brief introduction to radiation heat transfer with hopes that it provided enough background information that you can better address radiation problems on your aircraft and possibly spur some interest to research more information on the topic (plus the fact that I overshot Doug's page limit

and he will quickly be cutting me off). :o)  
 Next month will conclude with cooling system design and troubleshooting.  
 See some more great IR images at the Boldstar and OEM websites:  
<http://www.boldstarinfrared.com/infraredinspectionsservice5.html>  
[http://www.ir55.com/infrared\\_IR\\_camera.html](http://www.ir55.com/infrared_IR_camera.html)

**but you can pay them anytime now for this year 2010**

Name \_\_\_\_\_ EAA Number \_\_\_\_\_ Exp Date \_\_\_\_\_

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Experience Years \_\_\_\_\_ Hours \_\_\_\_\_ Aircraft Owned \_\_\_\_\_

Mail To: Darryl White ~ 19 Third Avenue ~ Broadalbin, NY 12025 ~ Phone 518 883-4203

**Notes From Your Editor**

*by Doug Sterling*



Hi all. Well it's been an interesting month to say the least. As most of you folks know, I spent the end of March and beginning of April in the west. What a blast it was, and of particular interest to all might be my flying over Las Vegas and Grand Canyon. I will do a small presentation on flying the Canyon at the next meeting (if anyone is interested). I promise to have only pictures of the flight and none of the

other 500+ pictures I took around the west coast. I also have the 5 charts from the area which are to say the least interesting.

The really interesting part started when I returned from the west coast. After I returned home and turned on my computer I had a total system failure. You never want to have this happen a couple of weeks from having to send the Edinburg News to the printer. Total devastation!! It's amazing that I can get our newsletter out this month but thank God for backups. Any way I put it together as best I could. The other problem was my e-mail. I think I might have gotten some more articles from other members which I might have lost so if you don't see something you sent **please** send it again (thank God for Larry)!!!

Anyway hope to see you all at the meeting on Monday.

*Fly Safe, Doug*

**EAA602**

**819 North Shore Rd  
Hadley, NY 12835**



**GOD BLESS AMERICA**  
September 11, 2001  
We will never forget.

**May 2010**

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