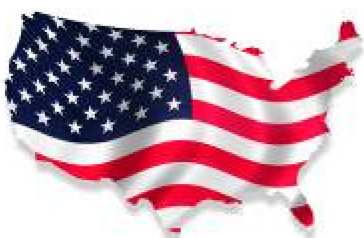
CHAPTER 613

July 2008

(Chapter 613 web site)
www.eaa-chapter613.org

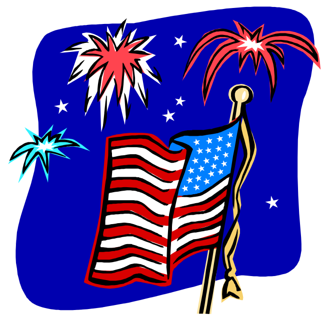
News and Views: Bruce Richardson



HAPPY

INDEPENDENCE

DAY!



President's Column: Tony Speranza

EAA CHAPTER 613 "FLY-OUT":

What: EAA Chapter 613 "Fly-out"...group flight for lunch & more.
Where: Chapter 613 Aviation Center @ FSO (Franklin County Airport) [Note: check NOTAM - runway work]
When: Saturday, July 5th @ 9am

Details: Informal meeting w/coffee & donuts from 8:30 to 9:30 (hanger flying). We'll check the weather & pick a spot for LUNCH. If it looks really nice we've been discussing a trip to seacoast? We can also "arrange seats" assuming we have folks with extra capacity & others w/o wings (chip in for gas).

NOTE: We have a number of new members that are trying to understand how to "fly affordable" - can discuss club ownership options & how to connect (HINT - use our newsletter AND website)...partnerships are a great way to significantly reduce cost of flying.

Flight Advisor Corner: Hobie Tomlinson

Maneuvering Flight ~ Part I

This summer I thought we would work through a series on **Maneuvering Flight.** This is the second area where the New England Region's accident statistics indicates we have some work to do. This is verified by being an area of potential difficulty during flight checks as well as being a major source of fatal takeoff and landing accidents.

In this series we will discuss the following topics:

- **Problems**
  - Change in Wing Loading
  - Change in Mission
  - Automation & Egos
  - Deficient Training
- **Slow Flight**
  - Performance vs. Control Speeds
  - Reverse Command & Adverse Aileron Yaw
  - Control Force vs. Control Deflection
  - AOA Indicator
- **Approach to Stalls**
  - Not power limited
  - Intentional
  - Power limited
  - Unintentional/Autopilot
- **Full Stalls**
  - Effect of Weight/Power
  - Effect of CG
  - Effect of Wind Shear
  - Effect of Contamination
- **Aggravated Stalls**
  - High Power
  - Uncoordinated
  - High G
  - Extreme Nose Up
- **Spins**
  - Unintentional
  - Intentional
  - Inverted
  - Flat

Well, that's quite a list, so let's start working our way through it.

The Problem is that we keep stalling airplanes and killing people. This accident area does not seem to improve over the years and involves all experience levels and aircraft types. Just last month in North Philadelphia an instructor and student were killed in a stall/spin accident in a Grumman American Trainer during a normal departure. Why? I have some thoughts on the subject.

A Change in Wing Loading has occurred in the quest for performance. This is usually accompanied by a corresponding change in power loadings. One of the things EAA looks at in the Flight Advisor program is how much experience a builder has in aircraft with similar wing and power loadings. The reason they do this is that aircraft with similar wing/power loadings will usually exhibit similar handling characteristics. People who learned to fly in typical training aircraft are buying high performance aircraft which handle quite differently and have a lower "docility level" than these pilots are used to. ***As performance goes up, tolerance for pilot ineptitude goes dramatically down! An aircraft with the wing loading of an SNJ will tend to behave like one.***

A Change in Mission has occurred with the increase in light aircraft acquisition costs. New aircraft are primarily being purchased for business transportation, not recreational flying. This means flying in unfamiliar areas, flying longer distances, and flying in weather. ***(If icing is encountered, remember that contaminated airfoils stall very differently then uncontaminated ones).*** There is also business pressure to complete the mission, regardless of undesirable conditions.

Automation has occurred throughout the General Aviation fleet. Small single engine aircraft are now equipped with glass cockpits (and autopilots) that have capabilities which are only found in the newest airliners. All this automation capability has emboldened General Aviation Pilots to undertake missions which they would not have even entertained a few years ago. The very automation which has revolutionized cockpits (along with the proliferation of "ballistic" aircraft parachutes) has made pilots think they are "bulletproof" and that current cockpit technology will solve all their problems. Basic Airmanship has been lost in the shuffle as we evolved to a "drive it off ~ drive it on" flight training system. C***ombine this with the fact that ego size is usually directly proportional to checkbook size and you have all the makings of a real problem.***

Deficient Training is the last (and most critical) area which needs to be addressed. Historically people learn to fly in a training type aircraft (i.e. CE152/172). They usually fly these until obtaining their Private Pilot Certificate and Instrument Rating. Then somewhere down the road they purchase a high performance, cross country aircraft. This is usually where the trouble starts, as they typically receive only a cursory check ride in the new aircraft. This is doubly bad if they initially received low quality/minimum time training followed by a trip to the easiest examiner reachable. ***(Unfortunately weak instructors know the "easy" examiners, which voids the "checks and balances" in the flight training process).***

Although insurance companies sometimes require additional flight training in a new high performance aircraft, it is my experience that they depend on their "guru's" and do not pay enough attention to the training curriculum. ***(This changes with turbine aircraft, as insurance companies require simulator training).***

The training deficiency in high performance, piston aircraft is that pilots are not re-exposed to maneuvering flight and trained to an appropriate proficiency level for all operations in their new aircraft. The industry makes a big fuss about TAA (**T**echnically **A**dvanced **A**ircraft) training, yet the majority of accidents have little to do with flight display failures. Most accidents in these aircraft follow the same old pattern of loss of control and CFIT (**C**ontrolled **F**light **i**nto **T**errain). These accidents happen both day and night in both VMC (**V**isual **M**eteorological **C**onditions) and IMC (**I**nstrument **M**eteorological **C**onditions). Continued VFR (**V**isual **F**light **R**ules) into IMC is the primary cause of day CIFT accidents. ***Obviously these involve deficient cognitive processes (i.e. Risk Management) rather than deficient motor skills (Stick & Rudder).***

The last training issue is instructor proficiency. While there were 590,349 active pilots in 2007, 92,175 of those held Flight Instructor Certificates! That means that there is one flight instructor for each 6.4 pilots. It is obvious that not all of these instructors can stay proficient at instructing. Combine this issue with the following facts: 1) Not all new instructors receive quality training in maneuvering flight, 2) Many of the older instructors do not stay current in this area, and 3) Most instructors operate independently with little or no supervision. We now start to see the magnitude of the problem.

The Solution begins with proper training and an understanding of the issues involved. Let's work through some of the various training maneuvers aimed at preventing loss of control, with the goal of developing a better understanding of the conditions leading to stall/spin accidents.

Slow Flight is the first area of maneuvering flight we will discuss. Slow flight can be broken down into two categories. ***The first category***: "The establishment, maintenance of, and maneuvering of the airplane at airspeeds, and in configurations appropriate to takeoffs, climbs, descents, landing approaches and go-arounds." ***The second category***: "Maneuvering at the slowest airspeed at which the airplane is capable of maintaining controlled flight without indications of a stall" (usually 3 to 5 knots above stalling speed). At this speed any further increase in angle of attack, or increase in load factor, or any reduction of power will cause an immediate stall.

Performance vs. Control Speeds are the first area of discussion. Performance speeds (i.e. Vx, Vy, and Vref /1.3Vso) are always above (higher than) control speeds. Thus a pilot adhering to the appropriate performance speed will not encounter control issues with an uncontaminated airfoil. The problem occurs when a pilot tries to force performance which is not there. This is done by continuing to increase the pitch attitude beyond that which is required to maintain the appropriate performance speed. It gives the false impression of increased performance by providing a momentary gain (speed exchanged for altitude), followed by an even larger decrease in performance. As the pilot tries to prevent the subsequent performance loss by even more nose up pitch, speed and performance now both rapidly decay followed by an abrupt stall. The cure for this is pilot discipline and a solid understanding that ***the appropriate performance speed will provide all the performance that is available and is required to be maintained. Further speed reduction will worsen performance and provide serious control issues.*** This is especially true in Grumman/American series aircraft and during single engine flight in multiengine aircraft.

Area of Reverse Command is the next item to consider. When an aircraft is slowed below minimum drag speed (LD/max – typically about 1.3 Vso) four things happen. These are as follows: 1) ***Speed Instability***, 2) ***Adverse Aileron Yaw,*** 3) ***Pitch can only control airspeed,*** and 4) ***Power now must control altitude (the reverse command).***

Speed Instability occurs during slow flight below 1.3 Vso. This is because more power is required to fly slower due to the large increase in induced drag. Thus even a slight turbulence disturbance will cause the airspeed to drop. As the airspeed drops, the induced drag increases and causes it to continue dropping at an increasing rate. Unless power is increased, or the nose lowered, airspeed will rapidly decay down to a stall. Conversely, if an area of lift should increase airspeed, it will continue to increase above minimum controllable airspeed unless power is reduced or the nose raised. This is because induced drag decreases as the airspeed increases. ***Because of speed instability, slow flight requires constant attention to - and adjustment of - both pitch and power.***

Adverse Aileron Yaw raises its ugly head in this speed regime. While some adverse aileron yaw exists at all speeds, its effect is especially dramatic during slow flight. Adverse aileron yaw is the tendency of the down aileron to yaw the airplane opposite the turn. Because aileron effectiveness is inversely proportional to the angle of attack, they are least effective during slow flight. This causes the down aileron to produce more drag than lift, hence adverse aileron yaw. The rudder (whose relative effectiveness increases with angle of attack) now becomes needed to augment roll control. During all normal flight regimes, the ailerons are capable of overpowering the rudder; thus rudder authority becomes the limiting factor in slips (i.e. crosswinds). At low speed this reverses and the rudder becomes dominate for roll control. ***The speed at which ailerons are no longer capable of overpowering the rudder is called the crossover speed.***

Pitch and Power functions reverse during slow flight (hence the term reverse command). This is because increasing pitch will cause induced drag to increase faster than lift, thus raising the nose will cause the aircraft to lose altitude (constant power setting). Lowering the nose reduces lift, also causing the aircraft to lose altitude. Because a pitch change in either direction will cause the aircraft to loose altitude, only increasing power can maintain altitude. Power now becomes the primary control for altitude and pitch defaults to controlling airspeed. ***An easy technique for flying at minimum controllable airspeed is to use a relatively constant pitch attitude to control airspeed, while adjusting power to maintain the desired vertical speed (0 FPM for level flight).***

Control Force vs. Control Deflection is the next topic on our list. In non-powered flight control systems, control forces required vary directly with airspeed while control deflections required vary inversely with airspeed. In other words, high speeds produce high control forces, but only require small control deflections. The reverse is true in slow flight. Control forces are low, but large control deflections are required. ***Sloppy control pressures, ragged control response, and difficulty maintaining altitude are the hallmarks of slow flight.***

When airspeed is reduced, the normal nose down tendency is reduced, the flight controls become less responsive, and large control deflections become necessary to retain control of the aircraft. Note: ***Even though large control deflections are required, control forces are relatively light – making it easy to over control***. Because of the high power required for slow flight, the slipstream effect produces a strong yaw which must be countered with rudder. The deflected rudder now induces roll, which is countered with opposite aileron. ***Therefore, it is quite common for slow flight to require crossed controls to stay coordinated.***

Elevator Trim is very important during slow flight. Because large elevator deflections are required to maintain flight at minimum controllable airspeed, elevator forces will be high unless the aircraft is kept in trim. ***An elevator which is drastically out of trim will make it difficult to make precise control inputs or develop a good feel for the required elevator pressures.***

Even though large control deflections are required, ***it is important that they be applied smoothly***. ***Rapid, mechanical control inputs are hazardous during flight at minimum controllable airspeed.*** This is because the low energy state prevents the aircraft from quickly changing its flight path. Therefore, abrupt control inputs change the AOA, but not the flight path. This is the road to an accelerated stall. Sparky Emerson, the mountain flying guru, was involved in just such an accident when the student he was training abruptly applied up elevator to initiate a box canyon turn. ***The rapid back pressure produced an accelerated stall rather than changing the flight path!*** The speed at which an aircraft can make a minimum radius turn is called the **Cornering Speed.** It is typically about 1.6 Vso for light aircraft. ***It is also possible to stall a wing with abrupt (ham-fisted) application of down aileron during flight at minimum controllable airspeed.*** (Although it is pure speculation on my part, as the final NTSB report has not yet been issued on the North Philadelphia accident, I would suspect that an abrupt, mechanical control input in response to an ATC request for an "immediate left turn" after departure may have initiated the event.)

The Best AOA indicator on the typical light aircraft is the elevator (yoke or stick) position. What we really want to know is AOA (**A**ngle **o**f **A**ttack) not airspeed. This is because a wing always stalls at a fixed angle of attack. Even though this relates to airspeed, the airspeed at which the critical angle of attack will be reached varies with weight, C.G., G load, airspeed calibration, etc. Although an aircraft can be stalled at any airspeed or in any attitude, it only stalls with full up elevator (yoke/stick full aft). ***Thus an awareness of how close to full aft the control yoke/stick is provides an invaluable clue to impending stall.*** The closer we are to full up elevator, the gentler and more precise the control inputs have to be to maintain controlled flight. ***It is especially important to maintain coordinated flight and prevent yaw from developing in this flight regime.***

Slow Flight Proficiency is a necessary component of avoiding stall/spin type accidents. This means being able to fly medium banked turns, as well as climbs, descents, and level flight (both straight and turning) in all flap and gear configurations. Flight instructors should be able to enter and exit stalls at minimum controllable airspeed during the above maneuvers, as well as be proficient at them. ***This training must be a part of the checkout in any new type of airplane and develops a skill set known as Airmanship.***

We will break here for now and continue next month. The thought for this month is: "**We are what we repeatedly do. Excellence, therefore is not an act but a habit" --** ***Aristotle*****, Greek philosopher.** So until next month, remember to **Think Right to FliRite!**

~North American SNJ-5 @ 2007 Reno Air Races~

Safety Tip By Don Taylor — Auto Fuel Alcohol Test Kit

Assure The Safety Of Auto Fuel Used In Your Airplane With EAA's Alcohol Test Kit

May 8, 2008 — With all the recent state legislation regarding ethanol in auto fuel throughout the U.S., it's more important than ever for pilots who use auto fuel in their airplanes to be absolutely sure that the fuel is safe for flight operations. That's why EAA is helping pilots stay safe when they use auto fuel by offering an easy-to-use alcohol test kit.

EAA's auto fuel Alcohol Test Kit allows a pilot or aircraft maintenance technician to make preventative tests on auto fuel, even before fuel is purchased for an aircraft. Simply pour water, then auto fuel, in the included test tube and shake it to mix the contents. When the mixture has settled within five to 10 minutes, a gauge on the test tube indicates whether the water level has risen. An increase in the amount of water on the gauge indicates that alcohol is present in the fuel. The gauge will also indicate the percentage of alcohol. EAA's kit is simpler than previous tests, as much less fuel is used to make a determination.

For more than 30 years, EAA's auto fuel Supplemental Type Certificates (STCs) for a variety of manufactured aircraft have saved aircraft owners money by allowing them to use unleaded auto fuel. Such fuel without ethanol is safe and effective for aircraft use, based on more than 30 years of thorough testing.

The addition of ethanol, however, creates chemical properties that are harmful to aircraft engines and fueling systems. It is critical for aircraft owners using auto fuel to know if the gasoline being used in their aircraft is pure. Some states do not require the marking of gas pumps indicating ethanol is present in the fuel, so EAA recommends that all auto fuel be tested before fueling an aircraft.

EAA's auto fuel test kit is a necessary tool for every auto fuel STC holder, and is just $15, including shipping via US Postal Service Priority Mail. The kit includes padded insulation for the test tube, so you can keep it in your aircraft without worrying about breakage. The test kit is easy to use and will last as long as the glass does. The test kit can be ordered from EAA by emailing Debi Walker at dwalker@eaa.org or call 920-426-4800 or visit website www.eaa.org.

Did You Know? By Don Taylor — Runway Work at FSO

Work is being done on the north end of the airport at Franklin County (FSO). The knoll at the end of the grass strip has been blasted and is being used for fill to extend the length of overrun for Runway 19 by 300 feet. The length of the runway will still be 3000 feet.

While they are working, they have closed 300 feet of runway on the north end, so right now our runway is only 2700 feet.

The grass strip is closed for now, but should be open in a couple of weeks.

Young Eagles: Donald Taylor

Young Eagles flown so far for 2008:

Fred Gribble -	1	Don Knowakowski -	2
John Butterfield -	33	Frank Gibney -	2
Thomas Edwards -	7	Donald Taylor -	25
George Coy -	1	Michael Pecue -	22
Charles Robitaille -	3	Ronald York -	20
Anthony Speranza -	2	Richard Axelrod -	3

We have flown 121 Young Eagles so far - 179 more to go for our goal of 300 for 2008.

Montpelier was a good day, and Mike Pecue had lined up 82 kids. They all had a flight and became Young Eagles.

The pilots and Young Eagles flown:

John Butterfield -	20	Richard Axelrod -	3
Michael Pecue -	22	Donald Taylor -	17
Ronald York -	20		

International Young Eagles Day, Franklin County Airport

It was cloudy all day, but the rain held off until 4:00pm. There was so many other things going on that day, we didn't do as anticipated. Next year we should change the date to Saturday June 6th.

We did fly 30 Young Eagles:

William Yendrzeski -	2	Anthony Speranza -	2	John Butterfield -	4
George Coy -	1	Don Knowakowski -	2	Frank Gibney -	2
Charles Robitaille -	3	Thomas Edwards -	6	Donald Taylor -	8

Supporting Members:

Paperwork and Donations: Marge Butterfield and Jean Cozelis

Barbecue: Earl Taylor and William Cheney

Mug Sales: Cora Clement

Cash Drawer for Food: Judy Cheney

Parking Cars: Bob Deming

Parking Planes and Safety Officers: Bob Paradis and Steve Couzelis

For a small turnout, we did okay:

	Donations for Aviation Center -		$ 444.00
	Mug Sales -		360.00
	Barbecue -		249.00
	Total (before expenses):		$1053.00
Expenses:	Mugs -	$ 180.00	
	Food -	25.00	
	Total Expenses:	$ 205.00	(205.00)
		Net Sales:	**$ 848.00**

P.S. Our mugs went over great! We sold all wee had (36), have ordered more. Everyone liked them.

Chapter Members in the news... from the June 2008 "Business People-Vermont" magazine:

Winging It

A classic plane, a camera, and a can-do spirit lift Shirley Chevalier above the fray

by Keith Morrill

Shirley Chevalier, the owner of Fli-Rite Aviation in Colchester, shoots aerial photos for a long list of Vermont businesses.

Shirley Chevalier has a rare perspective on Vermont's landscape. While most Vermonters have their feet planted on t*erra firma*, Chevalier soars above it all. Literally. As the owner of Fli-Rite Aviation in Colchester, she spends most of her days flying the open skies, snapping photos for clients and loving every minute.

Around Burlington International Airport, where everybody seems to know her, Chavalier goes by a different name: "Champ 99 Echo," or Champ for short. That's her runway moniker and the name of her plane, a 1959 American Champion. It's the sort of classic that makes most aviation aficionados drool, and with its red-and-white trim and heart motif, it's absolutely Chevalier — as is her comment, "It's a brand new, 1959 plane." ...

(For the rest of the article, see http://www.vermontguides.com/2008/06-jun/flirite.html)

UPCOMING EVENTS

Calendar of Events

July 5, 2008	EAA Chapter 613 "Fly-Out", Chapter 613 Aviation Center @ FSO (Franklin County Airport, 9am
July 12, 2008	Chapter 613 Saturday meeting, Franklin County Airport (FSO), Highgate, VT 12:00pm - ?
July 28-August 3, 2008	EAA AirVenture, Wittman Regional Airport (OSH), Oshkosh, WI
September 20, 2008	SHELBURNE DAY, Shelburne Airport (VT8), times TBA

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FIRST CLASS MAIL

July 2008