



SAM Says

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February 2014

Volume 39 Issue 02

Special points of interest:

- From the Prez
- Aero 101
- Ernie Micheli
- Crazy Ivan
- Seen at the Field

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From the Desk of the President

I spent Christmas last at my son's and family up in Cotati. For those that don't know Cotati, it's just up the road from Petaluma and adjoins Ronert Park. My son and my oldest grandboy fly R/C which is pretty cool for me as a dad and a grandpa. They belong to a small club with a field just outside of Petaluma. In conversation, my son and I were discussing club events and various related issues. He mentioned that he and his wife had gone to their clubs Christmas party in December. I had asked about the attendance and he told me they had about 60 show up. Now you might ask what is the significance here as it relates to our club. Well, considering they limit their membership to 50 but increased that to 60 last year, the significance is that they have a total of 60 members and get 60 people (members and spouses, or significant others) attending their dinner party. We are a club with 90 plus members (last year) and we get the usual member attendance at our party of around 30 plus or minus one or two. Now, the question is why the difference? Well in further discussion it came out that their club sets aside a portion of their yearly revenue to buy a number of hobby related prizes to be given away in a drawing at their party. And, these are nice gifts not just trinkets and such. It appears that the old adage "that you catch more flies with honey than vinegar" holds true. Or, bribery works every time.



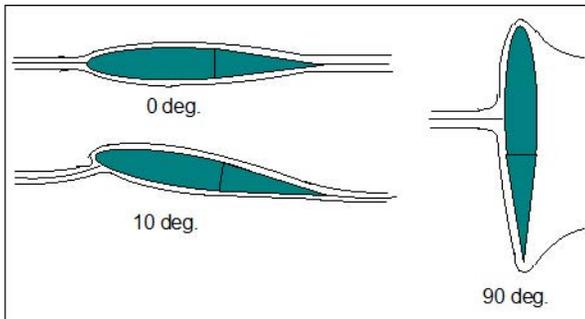
At our last board meeting I was making mention of the preceding story and to which Randy McGregor, who was visiting from Denver, commented, "why not give out tickets to members who come to club meetings and these will be used in a drawing at the end of the year." And, you know this seemed like such a simple but good idea that I've put it into play. We've expanded on it a bit to include additional tickets to be given out for meeting presentations, news letter contributions, etc. This will also hold true for work day and event help volunteers. Those who attended this months meeting received one ticket each. Alan brown who gave a presentation received three additional tickets. Crazy Ivan who was not at the meeting gets two tickets for his published newsletter letter article. The more you're willing to contribute the greater your chances of winning a new car. Oh drat! Sorry, our treasurer says no car. Well, we will have some worthwhile stuff to raffle off. And, to make it a little more interesting we will be

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Aero 101 - HOW A WING REALLY WORKS

By Alan Brown

A number of articles have been written in model aviation magazines, supposedly illustrating how wings work and how they generate lift. Most of them have had serious errors in them, and so this article will attempt to correct them. The first thing to note is that there is no dispute among professional aerodynamicists on this subject over the last 350 years! Here is a picture of flow patterns around a symmetrical airfoil at several angles of attack.



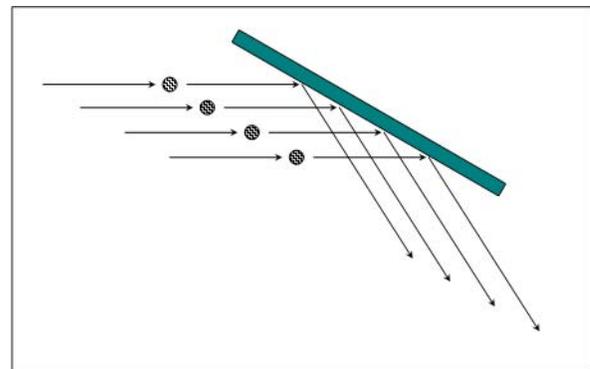
The sketches at 0 degrees and 90 degrees seem quite reasonable. Clearly, the flow over a symmetrical airfoil at 0 degrees will divide symmetrically at the nose and continue symmetrically to the trailing edge with no lift generated. At 90 degrees, the airfoil is like a flat plate at right angles to the stream direction, and air will flow around both sides, probably separating as it tries to go round the edges.

However, it's the intermediate 10 degree position that seems to get people into trouble. There is a common assumption that the airflow divides right at the leading edge of the airfoil despite the obvious fact that it couldn't be true at 90 degrees. In fact, an article was written some time ago allegedly proving that modern aerodynamic theory must be all wrong, because if one measured the distance round the top and bottom of a Cessna 172's airfoil, and used that information to calculate the pressures on the wing from Bernoulli's Theorem (more on that later), there wouldn't be enough differential pressure to sustain the weight of the airplane. The answer is, of course, that the writer's initial assumption is incorrect, and the dividing point for air that goes over the wing, from the air that goes under the wing, is underneath the wing, and not at the leading edge.

Many general aviation aircraft have mechanical stall warning devices which are triggered by a small floating lever on the underside of the wing which is pushed backwards at low angles of attack (angle of attack is the angle that the airfoil sees from the incoming airflow, and which varies with the airplane's attitude). As the dividing airflow point moves backwards, there will come a point where it is behind the lever, and will force the lever forward, thus alerting the pilot to his critical angle of attack.

Now we can see that a symmetrical airfoil can experience lift at an angle of attack because the air has to accelerate in going round the corner, thus reducing the pressure on the top side of the airfoil. We'll get to the equations that describe this in a few minutes.

Now let's go back into history. In the 1670's, Isaac Newton, a very bright physicist and mathematician, applied his postulated laws of motion to the flow over a wing, using his momentum theory, as shown below.



He assumed that the air could be thought of as a bunch of little particles striking the underside of the inclined surface, and giving lift via the change of particle momentum. He tested this, and I don't know exactly how, perhaps by hanging his wing outside his coach window while his coachman drove at a known speed (England had milestones on all major roads in his day). Surprisingly, he found that the lift measured was almost three times what his momentum theory calculated, and so he realized that he was missing something in his analysis.

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HOW A WING REALLY WORKS

(continued from Page 2)

It was in fact left to another brilliant man, Daniel Bernoulli, to come up with the mathematics that explained the dilemma. In 1738 he published his classic book "Hydrodynamica" which explained how mass and momentum conservation in fluids could account for the different pressures and velocities associated with the streamlines through pipes and around bodies.

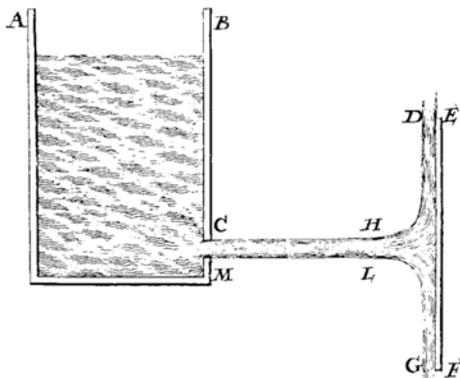


Fig. 4-3. Liquid jet flowing from a vessel and impinging onto a flat plate. From D. Bernoulli, *Hydrodynamica* (Strasbourg, 1738), fig. 84.

This is an illustration from his book, and here are his two fundamental equations as adapted to airflow. As he was mainly concerned with water, the weight of the water was part of the total head or total pressure in his equations, not present here.

$$H = p + 1/2 \cdot \rho \cdot V^2$$

where H = total pressure
 p = static pressure (measured on surface)
 ρ = air density
 V = velocity

Mass Flow Continuity

$$\rho \cdot A \cdot V = \text{constant}$$

where A = area of stream tube

The first one says that what we call the total pressure, nowadays we measure it with a pitot tube, equals the sum of the static pressure, as measured nowadays by holes drilled in the surface of the airfoil or body, and the dynamic pressure generated by the local velocity of the airflow. Furthermore, for an airplane operating

at a given speed and altitude, the value of H is given by free stream conditions, and remains constant over the surface of the airplane. The equations are completed by noting that along what we call a stream tube, the mass flow must be invariant, and so as the area gets reduced, the velocity must increase, which means that the static pressure must go down. Here is a graph of pressure over a wing with various flap deflections. Let's look only at plain wing first, and come back to the effects of flap angle later.

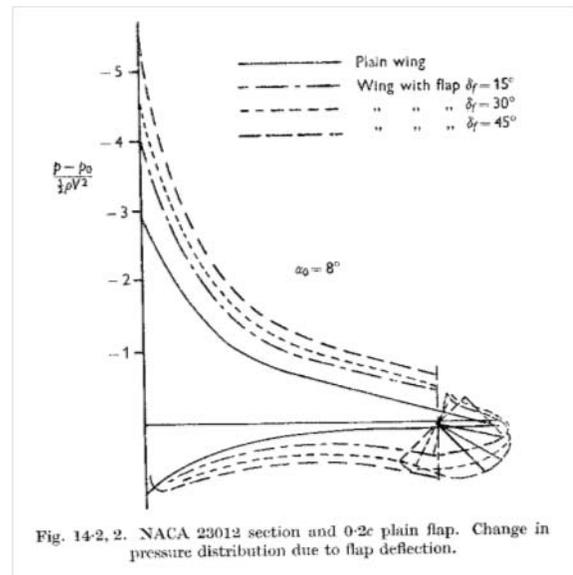


Fig. 14-2, 2. NACA 23012 section and 0-2c plain flap. Change in pressure distribution due to flap deflection.

The wing, NACA 23012, is what we generally would call a semi-symmetric airfoil, 12% thick, at 8 degrees angle of attack. The flow round it will be similar to that shown for the symmetrical airfoil at 10 degrees in the first figure of this article. Just to confuse the reader, we generally plot pressure upside down, so negative pressure is upward and positive pressure is downward, corresponding to the upper and lower parts of the airfoil. The first very striking thing is that within the first one or two percent of the distance back from the leading edge, the pressure goes from a maximum value on the lower surface representing the total pressure where the air has come to rest, and rapidly as it moves round the leading edge at very high speed drops to a minimum value on the top surface, well below atmospheric pressure, p_0 , (the zero line on the graph).

So the smallest pressure, and therefore the greatest lifting suction, is very close to the leading edge on the top surface.

(continued on page 4)

2014 CALENDAR

<p style="text-align: center;">JANUARY</p> <p>6 Board Meeting 8 Membership Meeting</p>	<p style="text-align: center;">FEBRUARY</p> <p>3 Board Meeting 5 Membership Meeting</p>	<p style="text-align: center;">MARCH</p> <p>3 Board Meeting 5 Membership Meeting 22 Slope Soaring—Seaside 31 Board Meeting</p>
<p style="text-align: center;">APRIL</p> <p>2 Membership Meeting 11-13 Float Fly* 20 Easter 26-27 Bob Francis Memorial</p>	<p style="text-align: center;">MAY</p> <p>3-4 IMAC I 5 Board Meeting 7 Membership Meeting 11 Mother’s Day 16-18 Float Fly* 24 Rudder gate</p>	<p style="text-align: center;">JUNE</p> <p>2 Board Meeting 4 Membership Meeting 7 Glider Contest 1 14 Work Day 28 Rudder gate 30 Board Meeting</p>
<p style="text-align: center;">JULY</p> <p>2 Membership Meeting 5 Glider Contest 2 19 Memorial Fun Fly 26 Rudder gate</p>	<p style="text-align: center;">AUGUST</p> <p>2 Glider Contest 3 4 Board Meeting 6 Membership Meeting 9 Pylon Races 23-24 Scale Fun Fly</p>	<p style="text-align: center;">SEPTEMBER</p> <p>1 Board Meeting 3 Membership Meeting 5-7 Float Fly* 20-21 IMAC II 27 Rudder gate</p>
<p style="text-align: center;">OCTOBER</p> <p>3-5 Float Fly* 6 Board Meeting 8 Membership Meeting 11 Electric Powered Event 25 Rudder gate</p>	<p style="text-align: center;">NOVEMBER</p> <p>3 Board Meeting 5 Membership Meeting</p>	<p style="text-align: center;">DECEMBER</p> <p>1 Board Meeting 6 Toys For Tots 6 Christmas Dinner/Annual Meeting</p>
<p>*Float Flies were put on the calendar as a placeholder and will take place providing we have water in San Antonio Lake sufficient for flying or can find an alternate site. Stay tuned.</p>		

HOW A WING REALLY WORKS

(continued from page 3)

This is why good shaping of the leading edge is of paramount importance in obtaining an efficient lifting surface, much more so than tapering the trailing edge, which predominantly affects drag due to the width of the wake, but has little effect on lift.

You can see that as we move backwards over both the top and bottom surfaces, the pressures move steadily towards the atmospheric value, being almost, but not necessarily exactly, equal to it at the trailing edge. Here we can dispense with another common fallacy. The molecules on the top and bottom surface do not necessarily rejoin their original free stream mates at the trailing edge. They are not smart enough to do that!

The reason why we balance our models typically at the 25% point on the wing is that simple theory shows that this is where the overall lift acts, based on the dominant pressures being well forward on the wing. This lifting point is independent of angle of attack until the flow breaks down due to incipient stall.

So to summarize up to this point, Bernoulli’s equations give a very good result to explain lift on an airfoil as long as viscous effects, like flow separation and boundary layer, are not significant. Fortunately, that is generally true for most of our flow regimes. Newton’s original application of his momentum theory does not explain lift at all, and so it is completely erroneous to talk about Bernoulli versus Newton in explaining how lift works. (continued on page 5)

Calendar of Events

February

- 3 Board Meeting
- 5 General Meeting—Landing Zone
7:00 PM (Dinner at 5:45 PM)

March

- 3 Board Meeting
- 5 General Meeting—Landing Zone
7:00 PM (Dinner at 5:45 PM)
- 22 Slope Soaring—Seaside
- 31 Board Meeting

April

- 2 General Meeting—Landing Zone
7:00 PM (Dinner at 5:45 PM)
 - 11-13 Float Fly (depending on water)
 - 20 Easter
 - 26-27 Bob Francis Memorial
- See calendar on page 4 for the entire years' schedule.

Notes: Board meetings are open to any member wishing to attend.

Everybody is invited to dinner at the Landing zone before the general meetings at 5:30 PM or so. Come and support James and Helen, who so graciously host us every month, and join in the fellowship and hangar flying.

Club Contact Information

2014 SAM Officers

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Others:

To send any submissions to the newsletter editor:

newsletter@salinasareamodelers.org

Pat O'Keefe has an email address for people assisting him with pictures or for anybody that has a picture they would like to submit for the newsletter:

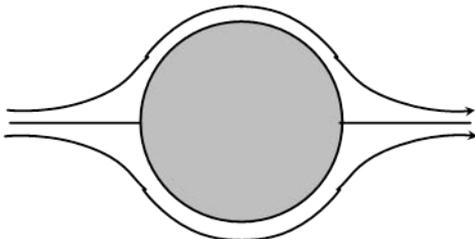
samphotos4newsletter@gmail.com

Submissions for the newsletter of any kind (this includes opinions) are welcome and will be used on a space available basis. The newsletter editor retains editorial rights to any submission solely for the purpose or correcting spelling, grammar, etc., but not to alter the intent.

HOW A WING REALLY WORKS

(continued from page 4)

So how did the theory come about? We can work with a thing called a Stream Function to produce a simple picture of the flow round a circular cylinder, which looks something like this.



Note that we can't, at this stage, represent flow separation behind the body. It can be transformed into an airfoil shape, and we'll get into that in our next issue.



Dennis Stanley's "parachuter" dropped from Dennis' aircraft with Tristan Williams "flying" the parachuter to the ground.

Ernie Micheli—First SAM President Deceased

by Manny Casquilho

On September 3, 2013 the Salinas Area Modelers lost their first President and founding member Ernie Micheli. The following is how Salinas Area Modelers came to be primarily due to Ernie Micheli and some cows.

I met Ernie at Woody's Hobby Shop located on Alisal Street in Salinas in the early 70's. He was interested in RC Planes and Boats but was not yet involved with them. Ernie was an avid modeler from Childhood and built stick and tissue airplanes using razor blades, Ambriod glue, dope and tissue. Ernie told me he would work on building his models until his fingers were so cut from holding the razor blade by hand , he had to stop because the plans were getting bloody. I think Ernie and Jack Jella did some free flight flying together way back when with these type of planes. Because of his love of modeling and airplanes Ernie took an interest what was being flown and where in our area.

At this time, there were only two flying clubs in our area, the Fort Ord Flyers, with a limited/restricted membership and the RC Bees in Watsonville. Because of this, there was a small group of us flying RC gliders and powered planes at the Alisal High School athletic field area.

Ernie would come out and watch the flying and became more and more interested in RC.

As all school fields seem to go, this one was becoming less available to us and it was clear we were going to lose it altogether in the near future.

Ernie started contacting some of his friends and eventually was able to get permission to fly on Borchard's property located just off Espinosa road. There was a dirt strip for crop dusters that was not used much anymore and with a drag pulled behind our trucks we could remove enough of the cow pies to fly. Since we were guests at this field and only because Ernie was a friend of the landowner, Ernie wanted to protect that privilege by keeping the number of flyers small and did not want to open it up to the public.

This went on for a few years but as some of the more adventurous flyers kept flying into Borchard's cows, a need for insurance became clear. I talked with Ernie about forming a club and getting AMA insurance that would cover any damage done to the property or the cows.

Ernie was against it at first and it took a lot of talking and a few more cows to convince him. His main concern was once a club was formed, politics would get involved and would ruin the good times we presently had.

The Salinas Area Modelers was formed, Insurance was obtained and Borchard's cows were covered and to Ernie's dismay he was elected the first President. Our meetings were held at Woody's Hobby Shop for quite a while. Ernie served as president for a few terms but as the politics he warned about got involved Ernie eventually refused to run for President.

Ernie became more involved in RC flying and he also became quite involved in RC Boat racing. He traveled the circuit for a while racing boats and even winning sometimes. He love to build airplanes but was somewhat less interested in flying them, but the planes he built were beautiful and very good flyers.

I think his reluctance to fly was because he became too nervous when flying. To show you what I mean, Ernie bought a Top Flight P-40 at an auction held in San Jose. It was a very good looking airplane (ready to fly except for radio) and Ernie made up his mind he was taking that plane home. Problem was there was another person that had the same thought.

The bidding war that ensued was something to witness. The whole place went quiet as the number went higher and higher. When it was over the plane was Ernie's, but if I remember correctly it was the highest dollar amount



Ernie's P-40

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R/C SUBTERFUGES (7)

Visual Perception

Perception of your crafts orientation is one of the most difficult things to learn in R/C because we are disconnected except via the Radio and Vision. Airspeed perception was conquered in article 1 via paying attention to the up elevator you're holding and getting to know your particular crafts "breaking point" in so far as stall goes. But what about other required perceptions? Well we have to rely on our vision but let's remember that we can also utilize knowing what to expect to see via keeping track of what we are doing on the sticks. The important thing here is to believe what we see in regards to what control input we have introduced to the craft. It's easy to trick the eyes especially when the craft silhouettes in difficult conditions. If you've ever been completely disoriented as to your crafts position, 9 times out of 10 if you trace it back to the beginning of the trouble your first inclination was correct because you knew what to expect to see via the control inputs that you administered but you believed your lying eyes instead. After becoming confused and inducing 3 or 4 stick motions that really don't get remembered because of your confused state you can be in a whole heap (pun) of trouble real fast.

I once (twice) flew an R/C aircraft over 160 miles non-stop to an R/C meet in Boulder City Nevada from the back of a pickup truck. Holy visual misperceptions Batman! Being in motion with the craft meant that I was effectively staring at a still object (the R/C aircraft) for 3 1/2 hours, there were "many" times when my eyes would just blip to a foe perception and I'd of sworn it was in a 90 degree skid inverted (impossible) instead of coming along with us right side up as it was in reality. It's an unnatural feeling to choose to believe your sticks over what your mind is telling you that your eyes are seeing.

OK, I can't resist telling a funny story regarding the trip. We had built an 11' span Mig 27 Flogger D (a Russian fighter/ground attack aircraft) for the trip; it utilized a modified 140cc 2 stroke gasoline go cart engine. It was a pretty good replication and was Russian camouflaged with red stars on the wings, I had an observer by my side to warn me of bridges, houses and visually obstructive traffic; Busses were worst! We had a passenger in the cab so as my observer could pass info thru the back window of the pickup truck with ease (speed up slow down etc). We had cleared the trip with the California Highway Patrol (CHP) for obvious reasons and we also tried to get AMA involved too but they would have nothing to do with an 80+ lb R/C aircraft flying down a freeway in 1985 (or so) and I don't blame them for sure! The FAA told us that so long as we kept it under 1000' AGL we were a non-issue but insisted on a spotter. So... at one point my observer calls out "we have an oncoming aircraft coming head on 4 miles out, he's at about 100' AGL on the left side, looks like a Cessna" I'm at about 100' AGL too so I switch sides of the road and snuggle up a little closer (more parallel with the truck) so as my eyes can't trick me with a silhouetted aircraft, and reminded my observer that he can call out "stuff it" at any time if needed and I'll oblige in an instant! I also had the truck speed up to 80mph as that speed was comfortable in paralleling the truck as 70mph wasn't. Well...as the plane passes we recognize that it's the CHP aircraft and he cuts one hell of a U-turn. I'm snickering inside knowing that he probably didn't get word of our flight and probably thinks he's stumbled on a drone that's gotten loose from the nearby military base. FYI, we had previously taken air to air photos of this very craft as my friend was a full scale pilot; I knew I could safely mess with his brain. Closer and closer he moved until he simply got too close for my comfort. I abruptly banked to exactly 30 degrees (away from him) froze that bank attitude as if it were controlled by an onboard computer (he flinched a little) solidly put it back to exactly level after about a 10-15 degrees compass heading

Ernie Micheli (continued from page 6)

paid for a plane at this auction. As the hammer slammed down as sold, the place erupted in loud applause.

Ernie had me test fly the plane, he had me fly it for him many times, but he would not fly it, but he loved to see it in the air. I think the price he paid for it and its good looks added to the nervous condition. Well one time, after Ernie had spent some time at Mike's in Castroville (a local watering hole), Ernie had the P-40 in the back of his truck and the flying field was on his way home from Mike's. You guessed it, he flew it successfully, all alone at the field, late in the afternoon, just before sunset and the plane survived to fly another day.

Well, we eventually lost the Borchard site and another field that was found and built before the one that Salinas Area Modelers now has and Ernie was involved in all of them in one form or another. If it was not for Ernie, Salinas Area Modelers may never have happened, or at least not in such a colorful way.

Ernie loved modeling and being with modelers. We lost a good friend and modeler last September, but I am sure he is still watching us fly.

(Editor's note: Manny Casquilho resides in Hollister and is a past member of Salinas Area Modelers. Thank you for this contribution, Manny, as there are still a few members in the club that remember Ernie and it is fitting to pay tribute to people that played a large role in the birthing and growth of this great Model Club.)



Ernie pictured with his Edge 540

From the Desk of the President (cont. from page 1)

having a mid year drawing at the June RudderGate. A number of winning tickets will be drawn (number to be determined) and the winners will have the opportunity to choose from a selection of hobby related products. The winning tickets will be removed from the bucket. All remaining and newly earned tickets will be in the pot for the Christmas drawing. Now there is one important stipulation. You must be present at the drawings to win. I'm making it easy in the way that you don't have to hang on to a matching ticket. Only single tickets will be given and you will simply write your name on the back. Prizes will be acquired throughout the year and announced as we go along. So, pitch in, help out, contribute to the club and increase your chances to win.

Happy flying!



Ed Pare's Edge 540. Beautiful airplane, Ed, and I'll be it flies as nice as it



Gees, Dennis, the least you could do is provide the poor guy a door to be shoved out of. Looks like the government missed out on a few regulations! Time to notify the ALUC!

R/C SUBTERFUGES (7) (continued from page 7)

change, 15 seconds later I got to the far side of the road + 500' (on each side) and robotically banked opposite at exactly the same 30 degrees of bank, turned to the original compass heading and solidly leveled out. He waited awhile in confusion and then followed suit and began closing in on me again, when he got too close for my comfort again I repeated the computer animated process again as if he was intruding on a proximity sensor and causing the craft to cross back to the original side of the road and re-level out to the exact same compass heading, this went on about four or five times until he finally saw us in the truck or got word of our authorized escapade and finally turned around and left, I still laugh about what must have been going on in his mind in seeing a Russian drone flying down the freeway under the radar near a military base and too, we were headed right towards Area 51!

The Russians are coming! Ha.

Tips to maintain orientation of your aircraft:

1st Don't fly to far away, your aircraft will silhouette and you won't be able to perceive the top or bottom of your craft via its opposing colors.

2nd If you do find yourself silhouetted don't perform a loop or roll, get it close first.

3rd Don't fly directly above your head, its hard to determine if your diving towards the ground as your focal point is the only reference to distance, focal point doesn't register well in your mind in determining distances.

4th Pay close attention to your control inputs and use them to clue your eyes in as what to expect to see and, believe your sticks first.

5th If you do get confused as to what your craft is doing, first use the elevator only; use the horizon as a gauge to maintain altitude, if that's working... relax it'll show itself.

6th Always flight trim your aircraft the very best you can, it should be capable of remaining

level hands off for a "very" long period of time. This will allow you to freeze your controls and let the aircraft continue awhile (while you use only elevator to prevent descent); to allow it time to expose its orientation as its' perspective angle changes.

7th Don't go back into the abyss, at least not un-prepared!

Hopefully this will also help when someone hands you a radio saying "I can't see my airplane can you get it back?" Even if it's only a spot in the sky you can win the wrestling match but only with super gentle, well thought out, control inputs; God help you if it's out of trim.

Crazy Ivan



Cool Bipe!



Jeff Bogdanovich helps Tristan's friend on his first supervised flight. Gretta (who is learning to fly) looks on.



Howard Power's P-39



Tristan Williams' Apprentice. These are an amazing airplane with three phases of stability built in—beginner, intermediate and advanced—recoverable from any unusual attitude when in any mode by triggering one switch. Technology has come a quite a distance since many of us started our RC

For those who may not have noticed or have not been at the field in the past week, the gate combination has been changed to the code on your 2014 card. Please remember, if you don't have a current AMA card and a 2014 SAM membership card, you don't have flying privileges at the Salinas Area Modeler's field until the above parameters are met.