



AMOS April 2015 Newsletter

*****Special Helicopter Setup Edition*****

AMOS Board meeting 4-6-15

Guest - Fred Light

Unfinished Business

- **Field Improvements** Only thing left to do is some minor Petromat work and ADA pad plus cleanup and haul off old rugs and petromat.

New Business

- **Letter and Membership for Jesse Torrez** for all the work and money saved by Jesse for the club, Letter to be prepared thanking him. 5 year membership cost proposal.
- **Shade structure for Heli and Planes.** Planning to put up a shade structure for the Heli area. Also want to use the existing \$246 for an additional shade for this area running East to West.
- **Financial Summary.** A discussion was had about money Don Schwartz has spent to keep the mowers going. The Board felt he should be compensate for his expenses.
- **A discussion was held regarding starting the payoff of loans.** Gloria Ireysaid we could start paying some off and recommended we start with the oldest outstanding loan first. This motion recommended paying off \$13,000 on one loan.
- **Events Summary.** It was discussed that we could have a booth at the EXP Fly-in at the Lincoln airport June 6th and 7th.
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Board Reports

- **President - John Sorenson** Chaired the meeting. Discussed moving the Board Meeting to Richard Nowatzke's house. Most members preferred here at Raley's in Lincoln.
- **Vice President - Mike Haston** Mike wanted approval to purchase shirts to sell for the Warbird event.

- **Secretary - Marvin Bennett** Pointed out there was an error in last months board minutes. We had 197 members instead of 97 as reported. The official minutes have been corrected.
- **Treasurer - Gloria Irej** Passed out Treasurers report and Cash Flow Analysis. These show that we have \$17,960.98 funds on hand. Of this there is still \$2404 left for field Improvement if needed..
- **Safety / Training - Fred Quartier** Wanted us to consider providing a better visitor viewing area. No motions were made for any changes at this time.
- **Membership - Jim Irej** We have presently 198 members..
- **Past President - Doug Keller** Will apply for the Raley's room for the July Board meeting.

AMOS General meeting 4-14-15 at 7:00 PM

New Members

Guest Ben Boyd (Former Member)

Lawrence Tougas - AMA District X Vice-President spoke at the meeting;

Lawrence gave a very complete review of the AMA . He covered its Program and Benefits which include Flying Site Assistance, Take off and Grow Programs, Grants, Disaster Relief ,Leader Club Program and Leader Member Program.

Also covered was the AMA Hall of Fame and Scholarships along with the Carl Goldberg award. Also how to get Club Activities into the AMA Magazine. He then discussed the Problems with the Federal Regulations and the need to hire attorneys and the AMA spending \$1,500,000 fighting for good ruling for Model Airplanes from the FAA.

It will probably not be resolved until 2017, as the AMA has filed a lawsuit in August 2014 and in October 2014 it was put on hold until comments can be recorded.

He also briefly discussed the AMA Insurance program that we rely on. Lawrence went on to describe all the publications that AMA provides for us including digital options. They also provide plans for planes.

There is a “Know before you fly” that is aimed for novices that buy multirotor planes and of course there is the AMA Foundation the charitable wing of AMA. Lastly don't forget the AMA Safety Code that spells out guidelines for safe flying, as we should not be flying over people or structures. John Sorensen said the only reason we had radio frequencies for flying models is because of AMA. A big hand was given to Lawrence for his professional talk.

Board Reports

President John Sorenson chaired the meeting,
Vice President Mike Haston Pre ordering Warbird Shirts
Secretary Marv Bennett Minutes of last meeting were accepted.
Treasurer Gloria Irey Summary of field Improvement cost came in under budget. About \$2400 left for cleanup work. We have paid off the \$13,000 loan. Debt is down to \$32,000.
Membership Jim Irey. We are back up to 200 members.
Safety/Training Fred Quartier Things going good. Pilot training off to slow start.
Field Marshall John Kinne Some gopher problems
Past Pres-Doug Keller - Local Hobby Store was robbed per Perry.
The Robbery of the Local Hobby Store was covered on the nightly news.

Unfinished Business

Report on Field Improvements—Just minor work left. Field looks great, including fences and pit areas.
Shade structures-- Jim Irey said money has been donated for shade structure near the helipad. We could also install one running east-west south of the food area. A Motion was made by Mike Haston and 2nd by Randy Sizemore for a second shade structure as proposed. Motion carried.

New Business

A discussion was held about giving out free memberships for outstanding work by a member. A Motion was made by Randy Sizemore and 2nd by John Kinne to table any action on such a reward at this time indefinitely, at least until the Board prepares overall guidelines. Motion Carried.

AMOS 2015 Events

4/18-RC Country Swap - Tracy Trammell
4/25-Rotors over Roseville - Basil Yousif - Coming Up!!
5/13- to 5/17-Float Fly - John Sorenson - Camp Far West
6/13- Warbirds over Roseville - Mike Haston
7/11- Club Appreciation Day - John Sorenson, Mike Haston
8/29-Electric Fun Fly - John Heinlen, Basil Yousif
9/12-Presidents Fun Fly - John Sorenson, Mike Haston
9-26-Thunder Valley Rally of Giants - Mike Dunbar, Basil Yousif
10/10- Jet Fun Fly - Randy Sizemore, Mike Haston
12/19- Christmas Dinner - Jim Hill

Decorated AMOS Club Members

Col. Steve Patti was saluted Saturday, march the 14th. for his service in world war two. He was awarded with the Congressional gold medal which is this nations highest civilian honor.

Steve Patti joined the Civil Air Patrol in January of 1942 and in June of that year was assigned to the 12th task force anti – submarine patrol in Brownsville Texas as a aircraft mechanic.

Steve also flew also flew as a replacement observer on convoy escort, anti-submarine, beach and border patrols.

In May of 2012 he was also awarded the distinguished service medal which is the organization's highest award.



Col. Steve Patti



Setting up a R/C Helicopter with a CCPM Rotor Head by Basil Yousif

CCPM abbreviation:

CCPM - Cyclic Collective Pitch Mixing

eCCPM - "electronic Cyclic Collective Pitch Mixing"

How it works:

On the R/C helicopter 3 servos are used to simultaneously control the Elevator, Aileron and Pitch functions by moving linkages that are attached to the outside circle of the round Swashplate. The Swashplate is a circular part that mounts on the shaft just above the body of the helicopter. It transfers the motion of the servos to the Fly-bar and Rotor heads to activate Aileron, Elevator and Pitch functions.

The outside connections on the Swash ring are the Elevator being in the rear, the Aileron in the front right and the Pitch in the front left. Looking from the back of the Helicopter.

4 Linkages also run from the smaller inside ring of the Swash up to the mixing levers which control the pitch of the Rotor Blades and the Flybar - Aileron / Elevator movement. A push up and down of all the servos becomes the pitch function. A front to back movement becomes the Elevator and side to side movement of the servos becomes Aileron function. Both upper and lower link sets turn freely around each other. Only the motion of the swash is transferred from the lower to upper link sets.



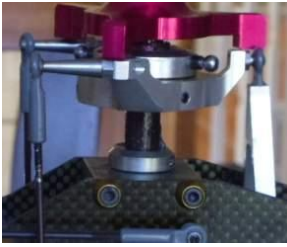
There are some different layouts. This is a CCPM setup for a Trex 500 electric.

The CCPM system is a great advancement over older helicopter setups because all three servos are sharing the work load when each function is needed. They use team work. Older Helicopter's had a single servo to solely control each function. It wasn't like they burned up servos out but performance was lacking. The older setup was sluggish and not very responsive for advanced helicopter aerobatics like 3D flying.

The three types of CCPM Swashplate types - 120, 135 and 140 degree:

The rotational degrees between the Elevator Linkage on the Swash to the Aileron linkage on the Swash is the type of CCPM. The Swashplate is round and the arrangement of the links that connect to the servo linkages are distributed in a circular pattern. For 120 degree the Elevator to Pitch linkage degrees would be 120 and likewise the Aileron and Pitch linkages are also 120 degrees apart, giving you the whole 360 degrees.

On a 130 and 140 degree Swash the Aileron and Pitch connections (front two) are closer together and are extended out using Ball link extension arms. There is a ball link extension on the 120 degree system but it is usually on the rear elevator ball link.



140 Degree CCPM with a Leveler tool on the shaft

120 degree is the most popular CCPM system but has some unequal servo motions for 3D flyers. The Aileron function isn't linear with the elevator function, which causes a slight change in pitch because the elevator servo has to move 35% more than the rest.

Futaba's explanation:

On a 120 degree setup, the left/right cyclic is slightly faster than the fore/aft cyclic.

135 and 140 degree CCPM offers smoother operation of the combined servos and an equal cyclic rate all around because the Aileron and Pitch controls on the swash plate are closer together.

Although 135 and 140 CCPM give up some Aileron function to gain linearity in the overall cyclic operation.

Some higher end radios like the Futaba 14MZ have programming to compensate for the lack of 120 CCPM linearity but cost big bucks. All Futaba radios have the ability to do 135 and 140 CCPM even the cheaper models, that's why there popular with Helicopter flyers.

The higher end radios give the helicopter flyer the ability to adjust more points for the pitch and throttle curves. For example instead of the 5 points on most radios the Futaba 12FG has 17 point curves. 10 can be adjusted and 7 are to check transition.

CCPM Heli/Radio Setup



Initial Radio Setup - Setup the Radio for Helicopter and the Swash Type, on many radios these are configured in the same menu called - Model Type or Parameter.

Your manual will have a chart of the abbreviations used to set your radio for the type of Swash on your helicopter. It should contain pictures of the different Swash layouts. For instance on a Futaba Radio 120 degree is HR3, 140 and 135 degree are H-3. Advanced Flybarless setups use H-1 which lets the Flybarless module control the Swash setup. Since the Flybarless Control Module is a 3 axis gyro it can do the Swash mixing on its own based on the position of the helicopter without the Radios preset mixing for a regular Flybared Swash.

1) Center all sub-trims before starting. Don't preset throttle and pitch curves. You want to calibrate with full pitch and throttle movements when you start your setup.

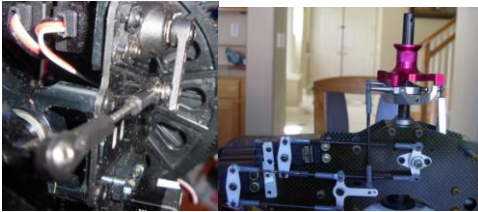
2) Remove the Head assembly (if it's installed) by removing the top shaft screw and nut then disconnecting it's links from the Swash assembly.

3) Install Servos and connect them to the receiver, then turn on the radio and let them center. Set the Throttle stick to 50% or half throttle. At this point some will even go into the throttle curve and set all the points to 50% so the throttle stays at half even if the throttle stick is moved by accident. Some radios have a temporary half stick hold setting.

4) Assemble the Pitch, Aileron and Elevator linkages. The lengths should be shown in the manual. Everything should be close to lining up if you use the manual link lengths. Use a caliper to set the length. Some links go on to the ball only one way. If there is some writing or a notch on the link, that is the outside direction.

5) With the throttle at 50% all linkages controlling the Swashplate should be at half throw. The servo arms or linkages that directly control the Swashplate will be either parallel or Horizontal to the Swash. The Swash should be level if everything is aligned.

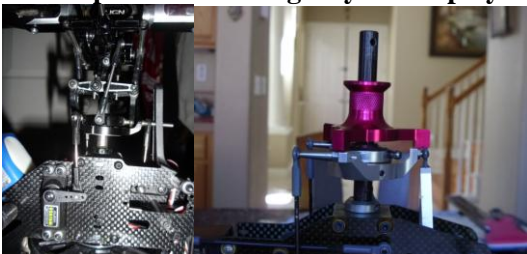
Smaller Helicopters use a linkage directly from the servo mounted below and larger ones use linkage arms that work to transfer the servo motion to the swash. All pushrod linkages running up to the Swashplate have to be at 90 degrees - all the way around. A linkage that's slightly angled won't work very good. If the linkage is angled look for a ball link to be installed on the wrong side of a servo or linkage arm.



6) Make sure the stick movements on the radio activate the Swashplate and throttle correctly. If a function is working backward reverse the channel in the radio settings. This can be tricky for CCPM as all three servos are doing Pitch, Elevator and Aileron. Looking from the rear of the Heli the Aileron and Elevator should react the same as the stick movement on your radio. Forward stick forward Swash and so on. The Pitch should increase /decrease with the throttle. Increasing throttle will raise the Swashplate on the shaft (Pitch) and push the throttle linkage out turning the engine carburetor throttle arm counter clockwise. Some European Heli's have reverse pitch and Rotor turn direction.

7) Install the Swash plate leveler tool. This tool slides on to the shaft and has three arms that cover each of the three ball link mounting blocks on the swash. The arms of the tool should cover each of the three link blocks with no space. If there is a open space adjust the particular linkage to close the space. After adjustment the swash should be at 90 degrees with the shaft all the way around.

If this is done correctly after the Rotor Head assembly is installed all the mixing levers that activate the pitch and Ail /Elev functions should also be level. So at Mid throttle you will be at 0 pitch. This will give you full play to both Plus and Minus Pitch limits.



With the leveler tool installed move the throttle up and down to increase and decrease the pitch. The Swash plate should move up and down with the Leveler tool. There shouldn't be any space between the 3 leveler tool arms and the link connection blocks on the Swash as it is going up and down. If two arms have a space you would adjust the linkage of the remaining arm that has contact with the tool. If there's a space in one arm you adjust only that arm to make contact with the tool. If the leveler tool sits flat on all three arms at low pitch but there's a space on one arm at high pitch or visa versa you can adjust the end point on the radio only if you have adjusted the link lengths as good as you can get them.

8) After installing the whole rotor head assembly, screw/nut and links, the goal is to keep the Washout levers horizontal at 0 pitch which is at half throttle. When the Washout levers are level you are in the center of the pitch movement. This way the rotor blades will move - + 10 deg to -10 deg. These end limits can be different for various models. Again adjust the link sizes to achieve this. Start with the manual adjustment sizes they should be close.

Watch out for aftermarket ball links that are different in size they can throw off the linkage arm length if the measurement in the manual is not given as the full linkage length.

You don't need as much negative pitch as positive because negative pitch is for flying inverted and the body of the helicopter isn't in the way of the air stream.

Now with the whole setup correct you can balance your Blades and install them on the Rotor Head Grips. Use a blade balancer to get the blades equal in weight.

Adjusting the pitch of the Blades:

After the blades are on the Rotor Head you need to adjust them so they both have the same pitch at the different throttle settings. You will need a Pitch gauge that fits your size helicopter blades. Line up the Pitch Gauge with the Flybar to read the pitch. At low throttle you should be at -10 deg and Full throttle you should be at plus 10 degrees. Mid stick should be at 0 degrees. The pitch limits can vary from model to model see your instructions.

To adjust the Blade tracking you check the pitch of one blade then lock the pitch gauge on that setting and switch it to the other blade. Both blades should be the same pitch for each point up and down the Pitch/Throttle range. If not adjust the linkages to make them equal.

When flying you might still have to adjust the tracking that's because the blades might weigh the same but the distribution of weight in the material up and down there lengths between the two might be different.

Look at the blades in a hover both blades should look like one blade. If you see two blades splitting apart at the ends you'll need to adjust the top Rotor linkage on one side. To make things easier put a red decal at the end of one blade so you can tell which blade is higher or lower.



Throttle Adjustment:

Make sure the throttle servo activates the throttle arm on the engine from low to high limits of it's travel. Fully closed Carb Barrel for Low throttle and fully open barrel for High throttle. The throttle range is automatic on electric models as it's controlled by the ESC.

Radio Configuration of Mixing Controls

Condition Setup - Some radios need to have the helicopter mixing switches activated or assigned so they can be used for Idle-up and hold functions. This is done in a separate menu.

The basic Helicopter radio mixing switch setup uses two mixing switches. The Idle-up switch which has 3 positions and mixes the Throttle and Pitch settings through Normal , Aerobatic and 3D modes called Normal, Idle-up 1 and Idle-up 2. This switch is usually located on the top left of the transmitter case to the front and has three positions.

The other is a Throttle Hold switch which overrides the Idle-up switch and forces the motor to run at idle and gives you only pitch control on the throttle stick for Autorotation landings. Practicing Autorotation is good in case the engine dies. You can always switch the Throttle Hold off and fly with power again. To bring the heli down using Autorotation bring it down with forward speed and at 5-10 feet above the ground increase the pitch to soften the landing. Moving forward is much better than dropping straight down. The hold switch is usually located on the top right of the transmitter case to the front.

You thought this mixing nightmare was over not so fast! Now you have to adjust the Pitch and throttle curves.

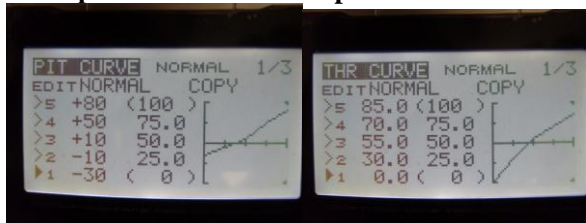
The default curve adjustments for the Pitch / Throttle are linear. Both Pitch and Throttle increase in equal motions when the throttle stick is moved. Adjusting the Pitch and Throttle curves separately but relative to each other allows you to change this response.

On the Normal Setting you only want a small amount of negative pitch at low throttle so you reduce the Pitch curve to say -30 to give you -2 degrees of pitch at 0 throttle. When you initially set up the pitch on the helicopter you had full negative throw which is -100 so when you reduced that number to -30 at 0 throttle you got the -2 degrees what you need for Normal flying. On my heli -30 = -2 degrees of pitch on the blades but how do you find that on your Helicopter.

You use a pitch gauge on your heli to help with adjusting the pitch curves. Set your pitch gauge to -2 degrees lock it, and put it on a blade and adjust the pitch curve low stick number on the radio to change the pitch of your blades to -2 at 0 throttle. Then set the gauge to +10 degrees and adjust the high throttle point for +10 of pitch. Now set all the points in between to give you a linear curve.

Using the approximate numbers for the pitch curve is useless if you don't check that the value on your radio will give you the exact pitch you need on your helicopter blades along the curve.

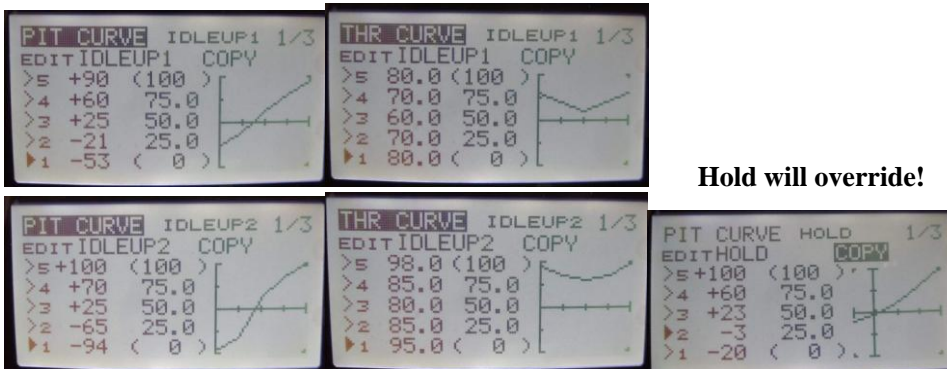
Idle-up Normal mode example:



Number set on the left is the setting.

When flying you can fine tune these curves. Land first then add more throttle or Pitch where you need it. Remember the stick position.

The Helicopter should "Float" at Mid stick in a nice hover. If the Helicopter drops fast as you reduce the throttle you want to increase the throttle curve numbers. 0 to 30 might go from 0 to 40 to get a slower "Dropping Feather" type decent. Adjust throttle curves before you change the pitch curves. Remove the control of any dials on your radio that change pitch and throttle curve settings. They could get moved accidentally and drastically change the curves. These dials were designed for flyers that wanted to do basic flying with the preset linear curves. They could dial in a little more or less pitch or throttle as they needed.



Moving the Idle up switch on the radio up one click will take you to the Idle-up 1 mixing mode. Two clicks and you'll be in Idle-up 2. In these modes the negative pitch at low throttle will be increased giving you more negative pitch on the rotor blades for flying inverted for doing stunts. -5 degrees is good for loops and rowels and slow inverted flying. -10 on Idle-up 2 for high speed 3D stunts.

The throttle response will increase for both negative and positive pitch with Mid throttle stick being the lowest throttle but still at 60% for 1 and 80% for 2. These values can vary from Model.

The Hold switch will override the Idle-up switches and force the engine to run at idle. This sets the pitch control for autorotation. The motor go to idle and you will only have pitch control.

Be careful with the Idle-up switch-if you activate it by accident into say Idle-up 2 and you think your in Normal flying mode your Helicopter will drop at a super fast rate and smash into the ground when you reduce the stick to low throttle. Always gradually reduce throttle to bring the Helicopter down. You have to return to the Normal setting to land the Helicopter.

Idle up Pitch Movement - example settings:

- Idle up Normal -2 to +10 degrees - Rotor Head RPM - 1200- 1900 (depending on Model)
- Idle up 1 Pitch Movement -5 to +10 Rotor Head speed - 1500-2100 RPM
- Idle up 2 Pitch Movement -10 to +10 Rotor head Speed- 1600 - 2300 RPM

Throttle Hold Settings:-2 to +10 degrees of Pitch movement - engine at solid idle

Idle-up Throttle Settings

- Idle-up Normal - 0 to 100% throttle
- Idle-up 1 - 80% at low throttle 60% at Mid-stick and 90% at high throttle
- Idle-up 2 - 90% at low throttle 80% at Mid-stick and 100% at high throttle

These are examples, a good quality helicopter will have examples of these settings in the manual usually in the form of a table. Use the manual settings.

Rear Rotor Blade Direction Check:

The easy way to check if the rear rotor blades are moving in the right direction left to right is to simply put one rotor blade straight down and think of it like the steering fin of a boat. Looking from behind the helicopter the Right Rudder radio stick movement will turn the blade right and left will turn the blade to the left just like a boat steering system.



Difference between reverse on the Gyro and reverse on the rudder channel in the Radio:

The reverse/normal setting on the Radio for the rudder controls the direction the rear rotor blades activate which will control the right and left turning of the helicopter. If you do the Rotor Blade Direction check and the direction is wrong you would reverse the radio channel for rudder.

The Gyro reverse/normal setting controls direction the Gyro activates the rudder rotor blades to counteract forces trying to turn the helicopter in flight, like the opposing force of the main rotor blade movement and the wind. This keeps the helicopter tail steady. If the Gyro reverse/normal setting is incorrect the helicopter tail will spin on the ground and it will not take off. Usually the normal setting on is used when pairing the Gyro with the same set rudder servo.

Governor:

A Governor is a unit which adjusts the throttle and pitch automatically. A RPM sensor is attached to the fuel engine so the unit reads how fast the motor is turning. The Pitch and throttle servo leads run through the Governor. It has to be configured usually through a computer connection or through radio stick movements.

They are very good for 3D flying because they keep the engine running at the top of the RPM level needed for the amount of pitch your pushing to do stunts. The downside is they can consume more battery power for electric models and use more fuel up for engine models. The Governor will tax you!

On many high quality electric helicopter ESC's they have a Governor mode you can use without having to buy a extra unit. No engine sensor needed as it's electric.

Usually the Pitch and throttle curves in the Radio menu have to be adjusted to some default value. The Governors directions should show how to do this.

There is much more to setting these Helicopters up but this article should get most starting helicopter flyers a good push to getting there helicopters set up correctly. If you have a older helicopter most of these same instructions apply. Older helicopters are even simpler to set up in many ways. There are also may Youtube instruction video's to help.

How good you setup your Helicopter makes up for 90% of the success you will have with it !!

Jokes:

The Electric Chair

Three guys go down to Mexico one night, get drunk and wake up in jail. They find out that they're to be executed for their crimes but none of them can remember what they have done.

The first one is strapped in the electric chair and is asked if he has any last words. He says, "I am a priest and I believe in the almighty power of God to intervene on behalf of the innocent." They throw the switch and nothing happens; so they figure God must not want this guy to die, and let him go.

The second one is strapped in and gives his last words. "I am an attorney and I believe in the eternal power of Justice to intervene on the part of the innocent." The switch is thrown and again nothing happens. Figuring the law is on this guy's side, they let him go.

The last one is strapped in and says "I'm an electrical engineer, and I'll tell you right now, you'll never electrocute anybody if you don't connect those two wires. " God rest his soul!!"

Too Hot!

A blonde, brunette and redhead are in a desert.

The brunette says, "I brought some water so we don't get dehydrated."

The redhead says, "I brought some suntan lotion so we don't get sunburned."

Then the blonde says "I brought a car door." The other girls said, "Why did you bring that?" Then the blonde says,

"So I can roll down the window if it gets hot."

Screaming Brother!

Little Johnny's new baby brother was screaming up a storm. He asked his mom, "Where'd we get him?"

His mother replied, "He came from heaven, Johnny."

Johnny says, "WOW! I can see why they threw him out!"

AMOS Newsletter prepared by: Basil Yousif, Send Newsletter feedback and topic info to - basil.yousif@sbcglobal.net use AMOS Newsletter as the Subject for the E-mail. Also see the clubs website at www.amosrc.com for more field information and Flyers.