



**WESTERN
OREGON
CONTROL
LINE
FLYERS**

THE WOLF CALL

October / November 2019

**ACADEMY OF MODEL AERONAUTICS
CHARTER CLUB #3464**

Upcoming Area Events

**NW Fireballs Racing Contest
Delta Park, Portland
November 30**

**Oregon Flying Fun #1
Delta Park, Portland
January 1**

The "WOLF CALL" is the newsletter for the Western Oregon Control Line Flyers. WOLF members fly at the Bill Riegel Model Airpark facility at the Salem Airport.

WOLF membership is not required to utilize the facility, but fliers should be A.M.A. members. If you are not a WOLF club member, please consider joining us to help support control line model aviation activity in our area.

WOLF CLUB OFFICERS:

President: Craig Bartlett

Vice-President: Dean Singleton

Secretary-Treasurer: Mike Hazel

Safety Officer: John Thompson

Newsletter: Mike Hazel

For the latest Northwest Control Line news go to:
flyinglines.org

Miscellaneous Ramblings from Ye Olde Editor

Greetings All! Sorry this issue is a bit late. Most of you know your editor had knee surgery not long ago which definitely sidelines one's activities. Recovery is now coming along.

It's been a plenty busy flying season this fall. All the events, both competition and fun fly, are updated in reports this issue.

Also included in this issue are some technical articles, nostalgia reprints, and a photo series of .40 size racing engines. This could have been titled "Forty years of Forties", except it is way too late to do that since Fox came out with their Rat Race 40 in about 1962. Anyway, hope you enjoy that article.

In this issue we have our first draft of what the CL schedule will look like in 2020. Some of the events listed are still in tentative status, with traditional dates being assumed. The calendar will be updated as we receive new information.

Speaking of the calendar, looks like the NW Fireballs racing contest will be the last event of this year. Then at the same location will kick off the 2020 flying season on New Years Day.

Have a great and blessed Thanksgiving Day holiday! Next issue should be out sometime in late December.



Question of the month.....

Why is "phonics" not spelled the way it sounds?

Northwest Contest Results

R.F. Stevenson Memorial/ Raider Roundup September 7 & 8, 2019 Auburn, Washington

This meet returned to the Auburn airport this year. The contest was hosted by the Seattle-based Northwest Skyraiders club.

Turnout of WOLF members for this event was a bit light this year, consisting of just Jerry Eichten and Fred Underwood. Jerry took 2nd place in Classic Stunt and 4th in Profile Stunt. Fred took top honors in Profile Stunt.

Northwest Control Line Speed Championships September 28 & 29, 2019 Salem, Oregon

The threatening weather forecasts did not come true for this weekend of speed competition. Temperatures were a bit cool for this time of year and limited the jet activity. Overall turnout was about average with some speedsters missing. As usual, the most popular event was NW B Proto. The top Speed champion was the team of John Newton and Ken Burdick who bested the NW 1/2 A Proto speed record.

Following are both the individual Speed event results, and the top to bottom record ratio scores.

Individual Speed Event Results

Northwest B Proto (8 entries)

1. Chris Sackett	108.99 mph
2. Ken Burdick	104.75
3. Mike Hazel	97.55
4. Steve Lindstedt	95.44

5. Don Curry	92.65
6. Doug Powers	90.18
7. Gene Pape	89.31
8. John Thompson	85.68

F2D Proto (2 entries)

1. Ken Burdick	103.67
2. Steve Lindstedt	97.62

21 Sport Speed (1 entry)

1. John Newton	138.72
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1/2 A Proto (1 entry)

1. Newton-Burdick	103.58
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Formula 40 (1 entry)

1. Ken Bugar	107.71
--------------	--------

NASS Sport Jet (1 entry)

1. Jim Booker	142.57
---------------	--------

D Speed (2 entries)

1. Ken Burdick	132.49
Loren Howard	attempt

All Results, Record Ratio:

1. Newton-Burdick (1/2 A Proto)	112.0%
2. Ken Burdick (F2D Proto)	97.9
3. Chris Sackett (NW B Proto)	96.4
4. Jim Booker (NASS Sport Jet)	96.2
5. Ken Burdick (NW B Proto)	92.6
6. Steve Lindstedt (F2D Proto)	92.2
7. John Newton (21 Sport Speed)	90.2
8. Mike Hazel (NW B Proto)	86.3
9. Steve Lindstedt (NW B Proto)	84.4
10. Don Curry (NW B Proto)	81.9
11. Doug Powers (NW B Proto)	79.7
12. Gene Pape (NW B Proto)	79.0
13. John Thompson (NW B Proto)	75.7
14. Ken Burdick (D Speed)	74.9
15. Ken Bugar (Formula 40)	66.3

33rd Annual Fall Follies
October 5 & 6, 2019
Salem, Oregon

WOLF's annual big event had a change of flavor this year. A full slate of Combat events were added to the weekend, and one more racing event was also included. So while this could have made the overall contest very busy, it did not turn out so. There was a very large drop in the Stunt entries this year. Don't know why, but it did happen. Hopefully next year we will see a good return of the Stunt troops.

Meanwhile, it was a very pleasant event, great weather, some good competition, and of course the traditional Sunday BBQ lunch.

Prior to the contest on Friday, WOLF put on a Ringmaster fun fly. See separate report following.

CLASSIC STUNT (4 entries)

- | | |
|---------------------------|--------------|
| 1. Jerry Eichten, Newberg | 534.5 points |
| 2. John Leidle, | 533 |
| 3. Dane Covey | 488.5 |
| 4. John Thompson | 473.5 |

Judges: Tim Wescott and Dave Royer

OLD-TIME STUNT (4 entries)

- | | |
|------------------|--------|
| 1. Dave Royer | 276.25 |
| 2. John Thompson | 266.75 |
| 3. Dane Covey | 184.25 |
| 4. Pat Chewning | 220.25 |

Judges: Bruce Hunt and Tim Wescott

SPORTSMAN PROFILE STUNT (0 entries)

EXPERT PROFILE STUNT (5 entries)

- | | |
|-------------------|-------|
| 1. Fred Underwood | 542.5 |
| 2. Jerry Eichten | 510 |
| 3. Bruce Hunt | 501 |
| 4. Tim Wescott | 498 |
| 5. Dane Covey | 411 |

Judges: John Leidle and John Thompson

BEGINNER PRECISION AEROBATICS
(1 entry)

- | | |
|--------------------|------|
| 1. Lynette Lickley | 81.5 |
|--------------------|------|
- Judges: Bruce Hunt and Jerry Eichten*

INTERMEDIATE PRECISION
AEROBATICS (0 entries)

ADVANCED PRECISION
AEROBATICS (1 entry)

- | | |
|---------------|-------|
| 1. Dave Royer | 497.5 |
|---------------|-------|
- Judges: Bruce Hunt and Jerry Eichten*

EXPERT PRECISION AEROBATICS
(4 entries)

- | | |
|------------------|-------|
| 1. Chris Cox | 596.5 |
| 2. Howard Rush | 590.5 |
| 3. John Leidle | 521 |
| 4. John Thompson | 494 |
- Judges: Bruce Hunt and Jerry Eichten*

NORTHWEST SPORT RACE (4 entries)

- | | |
|---------------------|----------|
| 1. Gary Harris | 9:16.54 |
| 2. Leighton Mangels | 12:14.46 |
| 3. John Thompson | 12:32.31 |
| 4. Doug Powers | 13:37.77 |

NORTHWEST SUPER SPORT RACE
(2 entries)

- | | |
|---------------------|---------|
| 1. Mike Hazel | 8:17.05 |
| 2. Leighton Mangels | 9:12.02 |

1/2-A COMBAT (6 entries)

- | | |
|-----------------|------------------|
| 1. Greg Machen | 5 wins, 0 losses |
| 2. Russ Hester | 3-2 |
| 3. Robert Smith | 2-2 |
| 4. Buzz Wilson | 1-2 |
| 5. Gene Pape | 0-2 |
| Jim Green | 0-2 |

80MPH COMBAT (7 entries)

1. Buzz Wilson	5-0
2. Robert Smith	2-2
3. Greg Machen	2-2
4. Russ Hester	2-2
5. Gene Pape	1-2
6. Jim Green	0-2
Pat Chewning	0-2

15 FAST COMBAT (5 entries)

1. Russ Hester	3-1
2. Buzz Wilson	3-2
3. Greg Machen	1-2
4. Jim Green	1-2
5. Gene Pape	0-2

WOLF Ringmaster Fly-A-Thon

October 4, 2019

Salem, Oregon

The Western Oregon Control Line Flyers participated in the World-wide Ringmaster event on October 4th thru the 6th. WOLF president Craig Bartlett organized the Friday Ringmaster day which had a small but enthusiastic group.

The flying was cut short on Friday with some afternoon rainfall, but the rest of the weekend was nearly perfect. A few more flights were put up during the Fall Follies contest on Saturday and Sunday. Following is a summary of the pilots and planes and flights flown for the overall event in Salem. These 21 flights will be added to the World-wide event tally in which a goal of 6,000 flights was made. By the way, for those of you who are Ringmaster-illiterate, "S-1" is the original design with a 42 inch wingspan.

David LaFever, 4 flights (S-1, and Junior)

Mike Hazel, 4 flights (S-1, and Baby)

Craig Bartlett, 2 flights (S-1)

Gene Pape, 2 flights (S-1)

Dane Covey, 3 flights (S-1)

Pat Chewning, 2 flights (S-1)

John Thompson, 4 flights (S-1)

Here are some more notes regarding the Annual Worldwide Ringmaster Fly-a-thon. John Cralley was the contact person who compiled the flight information. From his report we learn that the goal of 6,000 flights was achieved, with 6,121 being the final total. There were 581 pilots making flights in 102 locations. These locations included Australia, Brazil, Canada, Italy, Japan, Korea, Czech Republic, Romania, New Zealand, Slovakia, Philippines, and the UK. Wow!

If you want to see a PDF version of the final tally, you can get it at: RingmasterFlyAThon@groups.facebook.com

New Members Department

Recently added to the WOLF ranks are Loren Howard, and the Lickley family.

Loren is on the "other side of the river" in Ariel, Washington. His current interest is Speed flying and has been doing so for plenty of years. He currently holds the NW record for the 21 Sport Speed class and also competes in other classes. He was also a formidable Carrier competitor in years past.

The Lickleys hail from the other side of the mountains, i.e. Redmond. John is active in Carrier flying. Daughter Lynette flies sport planes and just recently flew in her first contest in the Stunt event.

A hearty WOLF welcome to you all!

from August 1952 Air Trails magazine

It's America's *Champion* stunt plane!

GUILLOW's *Trixter* BARNSTORMER

Now is the time to enjoy the thrill of U-Control stunt flying and the Barnstormer, a two out of two times National Stunt Champion, is your best bet for top in-the-air performance.

Right now your dealer has one of these fine kits on his shelf, similar in every way to the one that swept top honors in the "world series" for stunt models. Why not stop around and look it over? There's no obligation and you'll surely be impressed by its quality and prefabrication.

SPECIFICATIONS

Wing Span 47 in.
Wing area 470 sq. in.
Engine23 to .35 disp.

\$5.95



**HAIL THE
CHAMP!**

1951 NATIONALS
Open event winner.....382 points
Senior event winner.....389 points
Awarded Jim Walker Trophy

1950 NATIONALS
Open event winner.....418 points
Senior event winner.....390 points
Awarded Jim Walker Trophy

designed by

Lois Andrews

**1950 NATIONAL
STUNT CHAMPION**

4 other fine *Trixter* stunt models



\$2.95

Baby BARNSTORMER

Outstanding class 1/2 A Stunt Ship. Completely prefabricated kit. A junior version of champion Barnstormer. 23 1/2" wing span. For engines from .035 to .049 cu. in. displacement.



\$3.50

PROFILE TRAINER

A basic trainer with readi-shaped balsa wing and ready to assemble fuselage. Ideal stunt ship for beginners. 32" wing span. For engines from .19 to .29 cu. in. displacement.



PROFILES A-B and B-C

Class A-B stunt model. 32" wing span; for engines from .19 to .45 cu. in. disp. \$2.50.

Class B-C model. 38" wing span; for engines from .29 to .60 disp. \$3.50.

DIE-CUT BALSA

SHELF MODEL KITS

Lockheed P-80 Shooting Star
McDonnell F2H-1 Banshee
Republic F-84 Thunderjet
No. Am. F-86 Sabre
Bessie May 15
Vought F7U Corsair
No. Am. B-45 Tornado
Boeing B-47 Stratojet
Convair B-36 Bomber
Fairchild C-119 Packet

Martin B-26A Corsair
Liberty H-3
Transport
No. Am. T-28 Trainer

**25¢
EACH**

Northrop F-89 Scorpion
Grumman F9F Panther
Douglas AD-1 Skyraider
No. Am. P-51 Mustang
Vought F4U-1 Corsair
Republic P-47 Thunderbolt
Curtis P-40 Warhawk
Lockheed P-38 Lightning
Lockheed C-69 Constellation
Boeing B-29 Superfortress



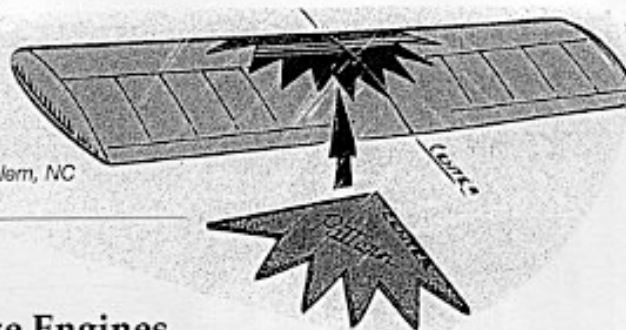
SEE YOUR LOCAL DEALER FOR GUILLOW KITS -
IF NOT AVAILABLE, SEND DIRECT TO FACTORY,
ADDING 15¢ TO ALL MAIL ORDERS

**PAUL K. GUILLOW
WAKEFIELD, MASS.**

FLIP-FLOP PATTERN

To make your plane's trim symmetrical, cut a pattern out of stiff paper or thin card, and place the template on the covering material. Cut around the template to make the trim for one side, then flip it over and cut around it again to create the other side's trim.

Jesse Williams, Winston-Salem, NC



Forty (.40) Size Engines

The following photo spread features high performance versions of that size engine. These were used in Rat Race, RC Pylon Racing, and in CL Speed events. And yes, even in Carrier.

This is far from an exhaustive roster of these engines. There were quite a few more variations of the K&B mills. No Foxes are shown here. Also missing is the O.S. VRP and the Super Tigre G-21 versions. Also missing is the Jett, and some versions of the Nelson.

The photos are courtesy of the M.E.C.A. newsletter. Other source material is from Tim Dannel's American Model Engine Encyclopedia, and some personal commentary.

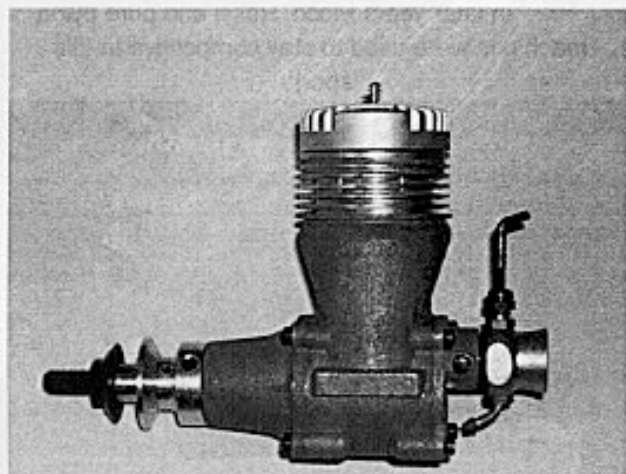
Here's some history regarding domestic production. It appears that the first 40 engine was made by Fox, at least in the USA. It was designated as the Fox 40 Rat Race, and entered the market in 1961. This engine was basically a stroked version of the Fox Rocket 35. Subsequent versions were based off of the 35X and 36X combat engine crankcase with the large square intake.

In late 1965 K&B marketed the Torpedo 40 Series 66. This was a front intake engine with dykes piston ring. Later came the rear intake Torpedo 40 series 67. There were changes made almost every year up through and including 1971.

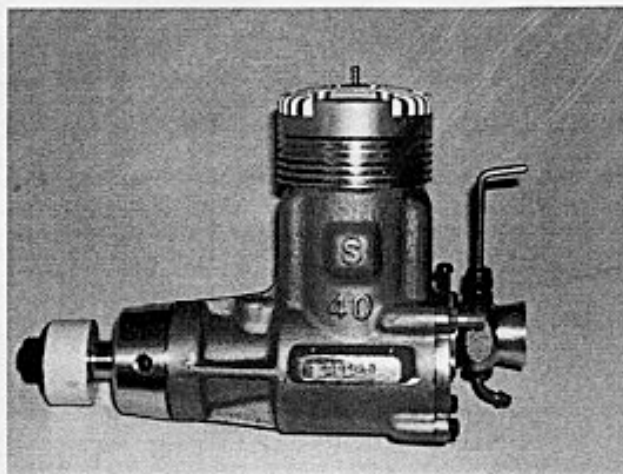
The next change in the lineup came in 1972 with the "40 R" (not 40RR as per the photo). This was a totally new configuration featuring schnuerle porting. These are real collector items as only 100+ were produced. In 1973 (not 1972 as per photo) came the 40 S, which was very similar to the 40 R, but produced in much larger quantities.

The next big shakeup in the K&B line was the introduction of the 6.5 cc Series II. The new configuration featured rear exhaust, and ABC piston/cylinder. They were available in both front and rear intake versions. These are sometimes referred to as the "metric" series engines.

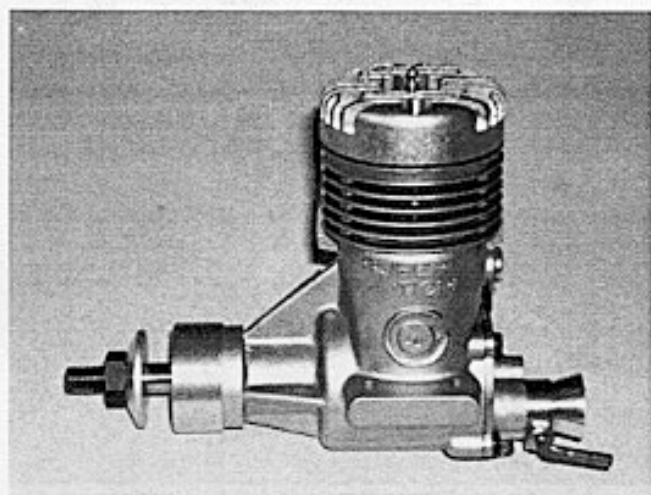
OK, that's enough of that. If you have any corrections or additions to this narrative, please let me know. Now enjoy the pics!



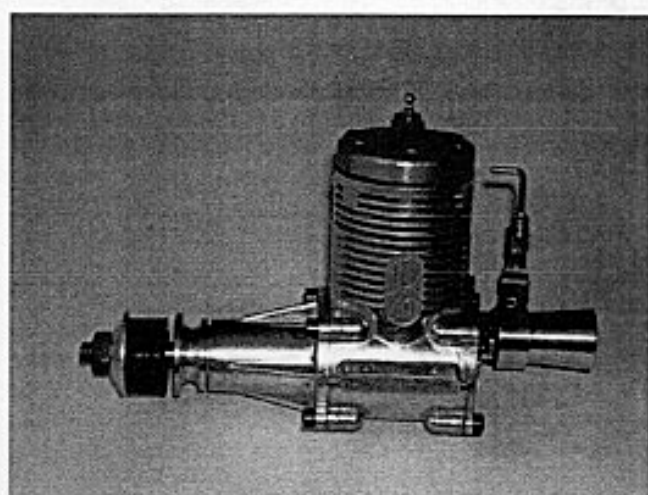
K&B Torpedo 40 USA ca. 1965



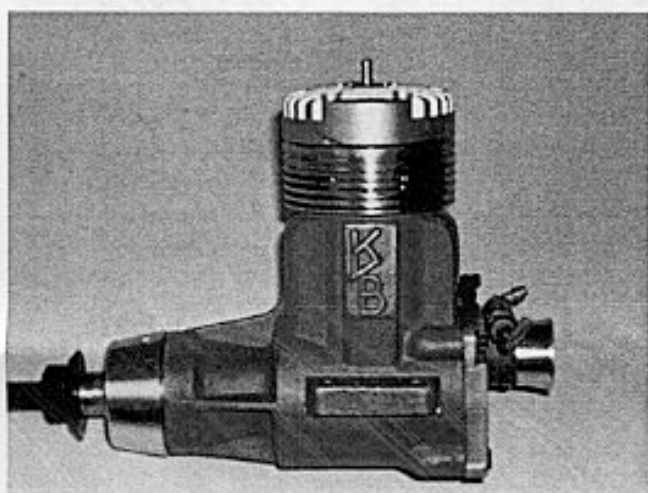
K&B 40 S1 USA ca. 1972



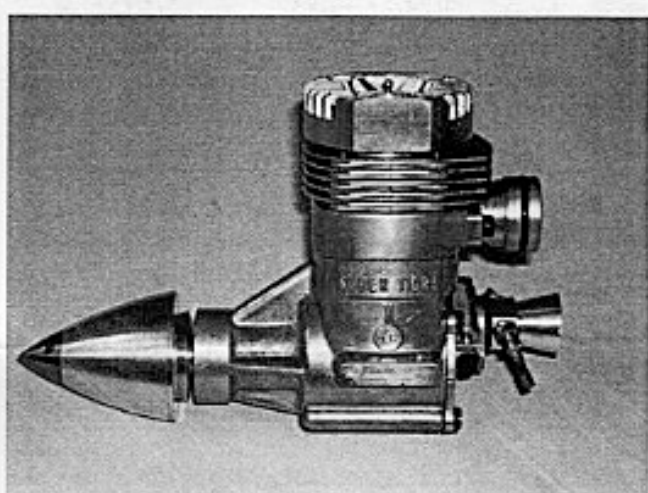
Super Tigre G40 RV Italy ca.1965



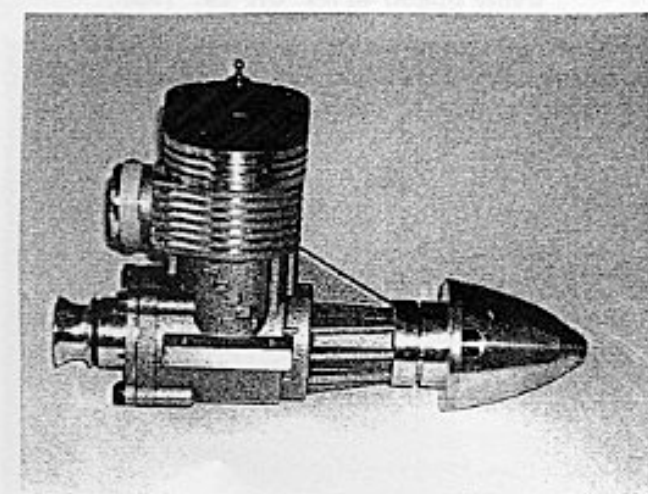
HP 40 Pylon RR Austria ca. 1972



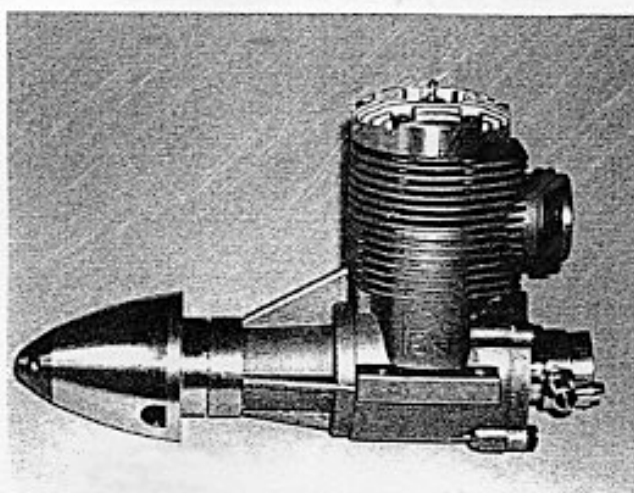
K&B 40 RR USA ca. 1971



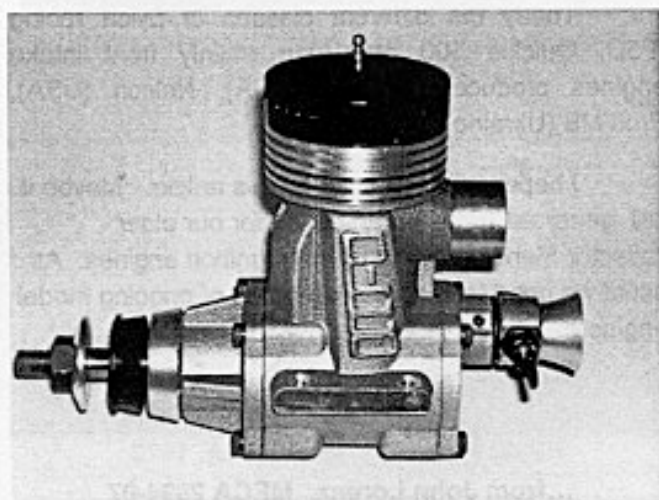
Super Tigre X40 Mk I Italy ca.1972



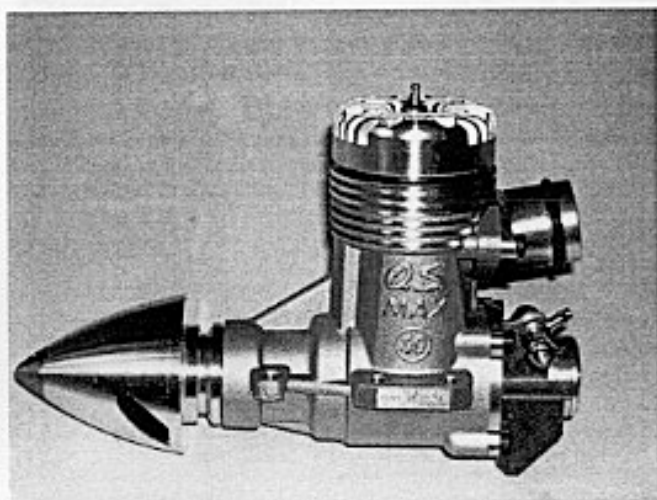
Rossi 40 Pylon Italy ca. 1998



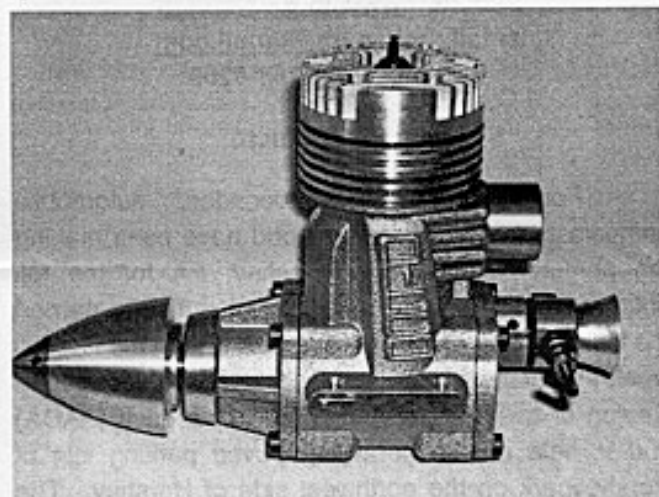
PE 40 (Rhanit Phelan) Australia ca. 2000



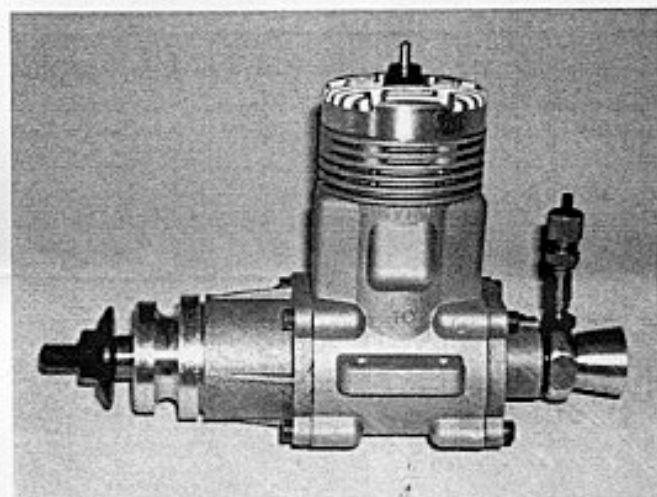
Picco 40 Pylon Mk II Italy ca. 1982



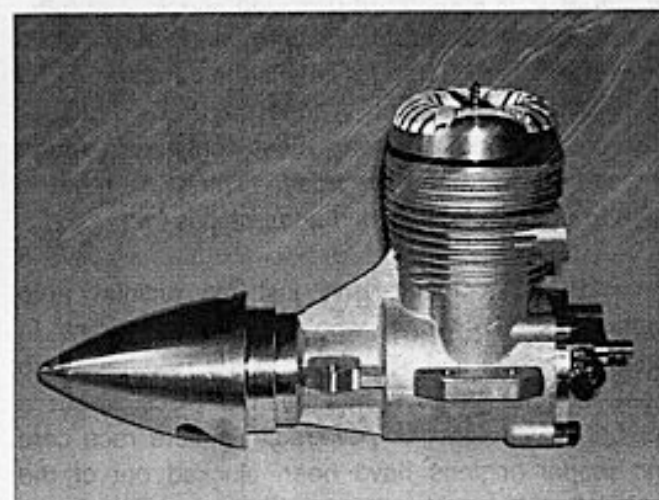
OS Max 40 PS Japan ca. 1992



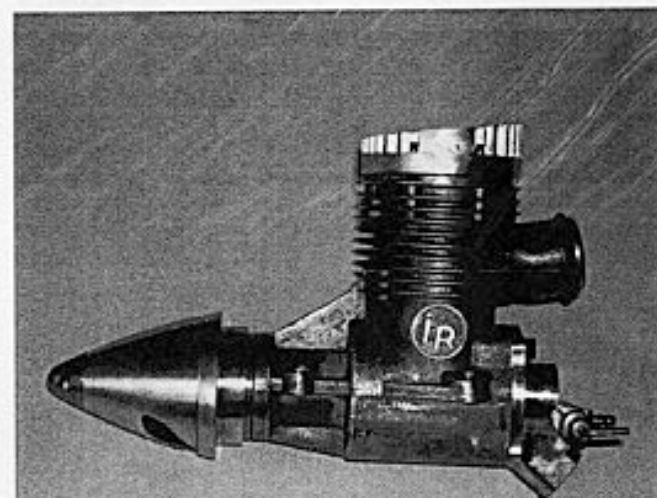
Picco 40 Pylon Mk III Italy ca. 1985



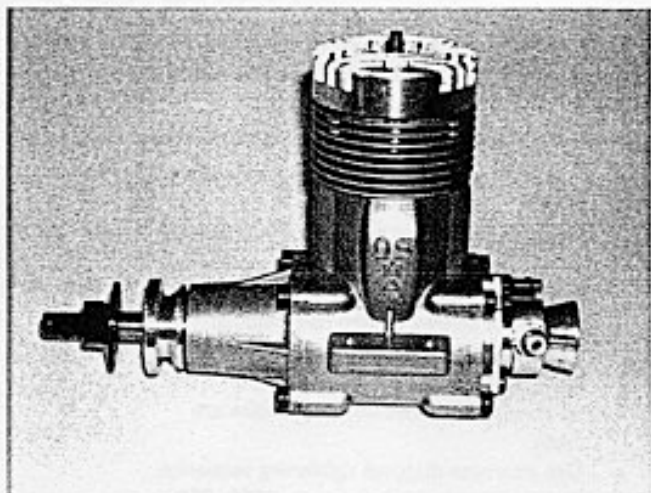
Irvine Speed 40 RV UK ca. 1995



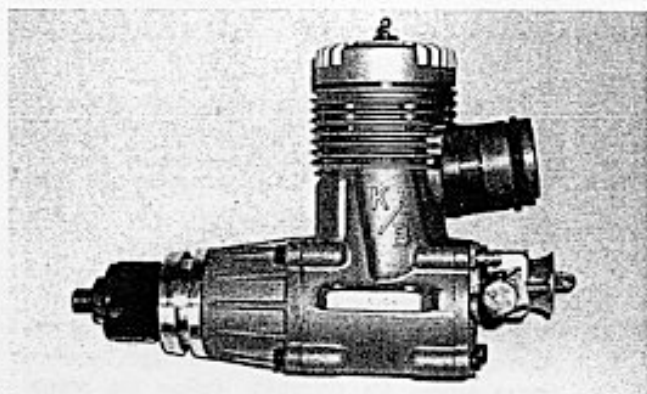
Nelson 40 Pylon Mk I USA ca. 1990



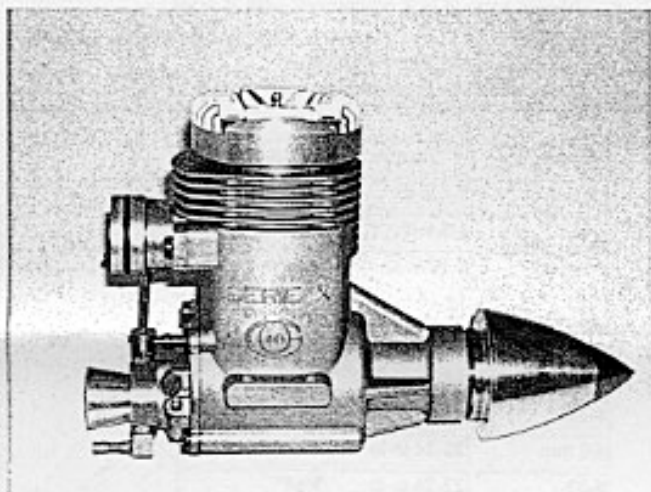
IR 40 Ibragimov (well used and modified) Ukraine ca. 1995



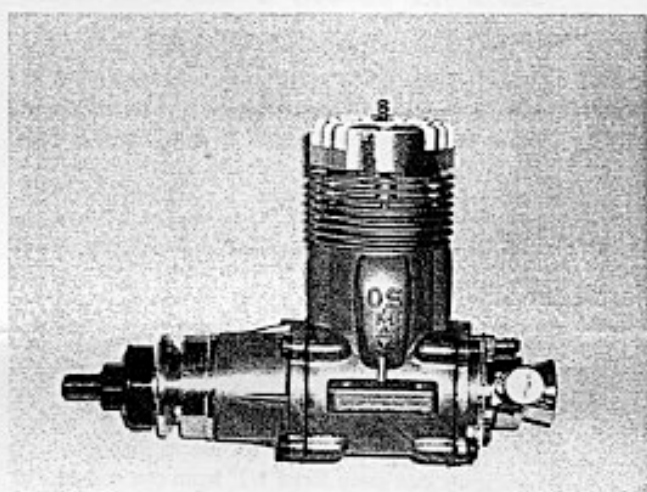
OS Max 40 SR 1 Japan ca. 1973



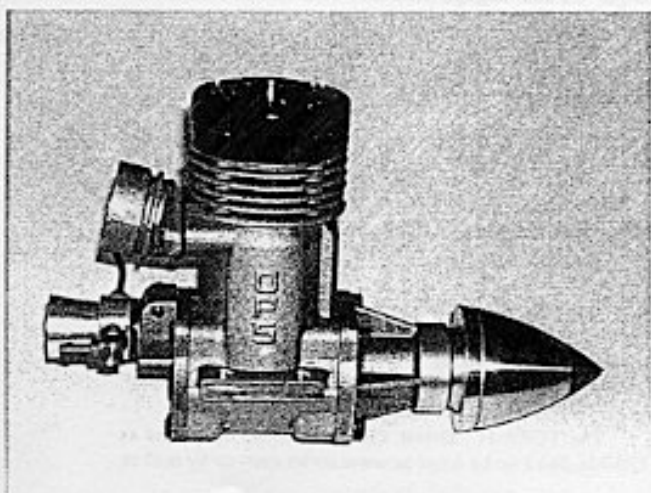
K&B 40 S 2 USA ca. 1975



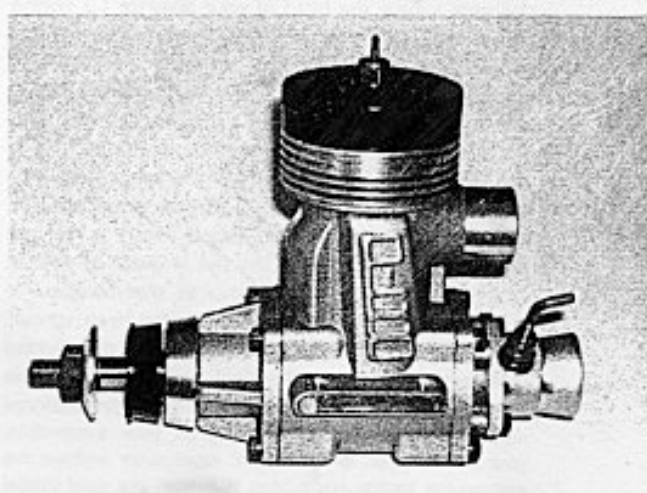
Super Tigre X40 Mk II Italy ca. 1973



OS Max 40 SR II Japan ca. 1976



OPS 40 Pylon Italy ca. 1974



Picco Pylon 40 MK I Italy ca. 1980

BOLT TORQUE FOR MODEL ENGINES

By John Snider

Torque is a force applied to an object that tends to rotate that object. When parts are fastened together with screws, the torque applied to these screws determines the pressure holding the parts together. The more torque we apply, the tighter the parts are held together. The correct torque takes into consideration factors such as strength of the screw, the threads engaged, the cylinder material, thermal expansion, etc. Equally important as the correct torque is the sequence and stages by which these screws are tightened. Follow the proper tightening sequence and tighten the fasteners to 50%, then to 75%, and finally to 100% of the desired torque.

Torque is measured as the amount of force times the length of the lever arm. As an example, 12 in-lb. means 12 lb. applied to the end of a 1" lever (or 1 lb. applied to the end of a 12" lever). The Tork-It Model 36 is a release type device that releases at the preset torque. It complies with ANSI Type 3, Class A, Style 1, Screwdriver Grip torque wrench standards. You cannot apply more than the preset amount of torque.

Specific torques for model engines run from 7.5 in-lb for 2.0mm (valve cover) screws to 24.0 in-lb for 4.0mm (cylinder head) screws. If you apply 5 pounds of force to the end of a typical L-shaped (2 3/8" long - 3.0mm) socket head wrench, you have applied approximately 11.9 in-lb of torque to that screw. If you apply that same force 1/2" from the end of that wrench you have applied about 9.4 in-lb of torque. That is a 25% difference in torque applied. To properly torque the head of your favorite 1.2 engine to 21 in-lb, (using the L-shaped wrench above), you should first apply 4.63 lbs. to each of the head screws in alternate rotating sequence, then 6.73 lbs., and finally 8.84 lbs. to reach a final torque of 21 in-lb. Who can tell the difference between 4.63, 6.73, and 8.84 lbs. of force as well as the exact place you are applying force on the L-shaped wrench? The entire procedure is very simple with a torque screwdriver. You simply set the amount of torque desired and the device releases at that torque. In the above case you would tighten the head screws to 12 in-lb on the first pass, 16 in-lb on the second pass, and 21 in-lb on the final pass (observing the alternate rotating sequence). No professional mechanic would consider working on your automobile, your lawn mower, or even your weed eater without the appropriate torque equipment. Chances are your model engine cost more than your weed eater and perhaps more than your lawn mower. Why settle for less with your model engines? Although many factors affect engine performance, correct assembly is the first step to longer engine life, improved reliability, and more consistent performance.

TORQUE CONSIDERATIONS

- Never use your torque instrument to hammer or pry.
- Never use a torque device as a breaker bar.
- Always store your torque instrument set below 25% of capacity.
- Loosen all screws before re-torquing.
- Clean fasteners and apply a film of lubricant (anti-seize compound).
- Be sure threads and threaded holes are clean.
- Use alternate diagonal tightening sequence.
- Tighten in at least three stages, 50%, 75%, and finally 100%.
- Never torque hot equipment - let it cool first!

RECOMMENDED MAXIMUM TORQUE (STEEL SCREWS INTO ALUMINUM)

Screw Size	Torque	Socket Size
2.0 mm	5-7 in-lb	1.5 mm
2-56	6-8 in-lb	5/64"
2.5 mm	8-10 in-lb	2.0 mm
4-40	12-14 in-lb	3/32"
3.0 mm	13-15 in-lb	2.5 mm
5-40	14-16 in-lb	3/32"
6-32	17-21 in-lb	7/64"
4.0 mm	20-24 in-lb	3.0 mm
8-32	22-26 in-lb	9/64"

Use the higher values for head screws with longer thread engagement and the lesser values for back plates, valve covers, carbs, etc.

GLOW PLUGS

1/4-32 Standard Glow Plug: 20-24 in-lb (with gasket)

More torque may be needed for glow plugs in high performance / high RPM applications (18,000+)

There are many small sets of 1/4" drive hex bits on the market. Allied is a brand found in many discount stores. I sell the AM-(nn) series of APEX bits in the sizes listed above. They are top quality (US Made) bits and the 2" length allows you to get past cooling fins.

The TORK-IT Driver can be ordered by phone at 770-736-0613 or by email at www.torkit.com or by mail at

TORK-IT
1250 Kelvington Way
Lilburn, GA 30047

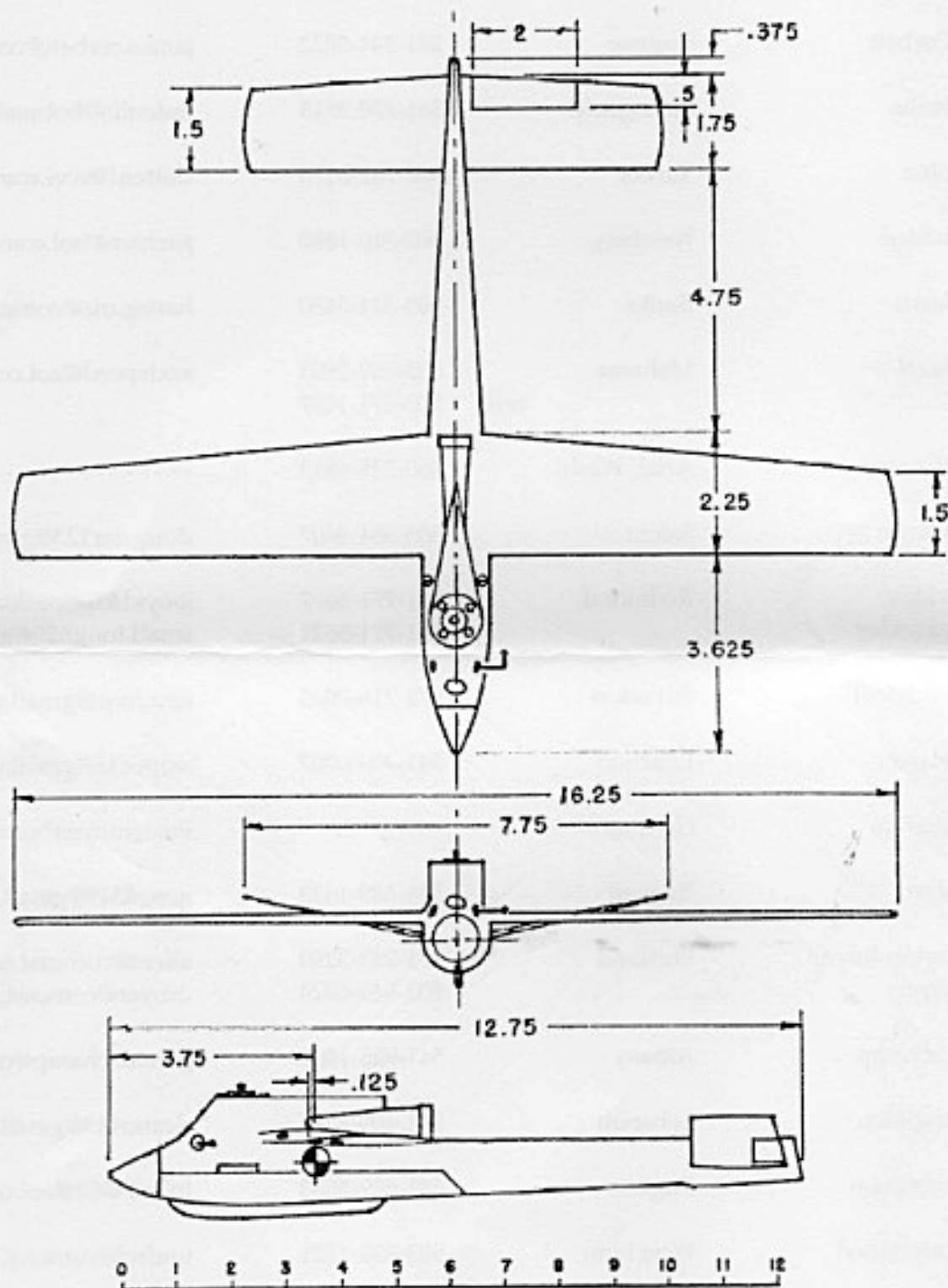
Good Luck and Good Flying
John W. Snider

WOLF MEMBER CONTACT LIST 2019

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Jerry Eichten	Newberg	503-310-1660	jeichten@aol.com
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Robin Mason	Lebanon	541-409-0707	skipee45@gmail.com
Will Naemura	Germany		wnaemura@hotmail.com
Gene Pape	Eugene	541-689-1623	gene4349@gmail.com
Alice Cotton-Royer	Portland	971-285-3290	alicot@comcast.net
Dave Royer		503-946-6824	droyer@comcast.net
Gerald Schamp	Albany	541-926-1061	geraldschamp@comcast.net
Dean Singleton	Lebanon	541-409-8284	deano443@gmail.com
John Thompson	Eugene	541-689-5553	JohnT4051@aol.com
Fred Underwood	West Linn	503-656-1221	undrcf@comcast.net

Please notify the editor of any changes!

1/2 A SPEED



AMA 1/2A SPEED BY JERRY ROCHA, NAPA, CA.
146.51mph BEST TO DATE (APR 2002) C.S..049 Engine

Northwest Fireballs, Western Oregon Control-Line Flyers, Eugene Prop Spinners and
Roseburg area CL fliers present ...

Oregon flying fun!

Four control-line fun-fly events

Everyone invited — No entry fee! 10 a.m.-3 p.m.

If the weather is bad, go to the alternate site listed for "hangar flying" socialization!

Wednesday, Jan. 1 at East Delta Park, Portland

Pot luck lunch, plus coffee and doughnuts

Bad weather meeting site: Elmer's at Delta Park; cell 503-867-2101

Info: Northwest Fireballs, Richard Entwistle, 503-867-2101

Saturday, Feb. 8 at Sunshine Park, Roseburg

Bad weather: Elmer's restaurant at I-5 Exit 125; cell 541-537-0061

Info: Dave Shrum, 541-672-8893

Saturday, March 28 at Bill Riegel Model Airpark, Salem

Bad weather: Flight Deck restaurant, 1 block south of the flying field; cell 503-871-1057

Info: WOLF: Mike Hazel, 503-871-1057

Saturday, May 2 at Can Do Ranch, Junction City

Bad weather: The Kozy restaurant, 1600 Coburg Road, Eugene; cell 541-554-8848

Info: Eugene Prop Spinners, John Thompson, 541-689-5553

- Bring any and all airplanes ... do any kind of flying!
 - Every flight is an entry in the "flying raffle."
 - Flying raffle prizes will be awarded after a drawing
- Come to *all four* fun-flies and support *four* great Oregon CL flying groups!
Academy of Model Aeronautics membership required



WOLF / Northwest Control Line Calendar

Nov 30	Racing contest, Delta Park in Portland, sponsored by NW Fireballs
Dec 7	NW Skyraiders Swap Meet, Kent, Washington
Jan 1	Oregon Flying Fun #1, Delta Park in Portland
Jan 25	WOLF Annual General Meeting (details tentative)
Feb 8	Oregon Flying Fun #2, Sunshine Park in Roseburg
Mar 10-14	Vintage Stunt Championships, Tucson, Arizona
March 14	McMinnville Aircraft Modelers Swap Meet
March 28	Oregon Flying Fun #3, Salem
April 17-19	Jim Walker Memorial, Delta Park in Portland (details tentative)
May 2	Oregon Flying Fun #4, Junction City
May 22-24	Northwest Control Line Regionals, Roseburg
June ??	Northwest Skyraiders Stunt-a-Thon (details tentative)
June ??	Salem Spring Tune-up (details tentative)
July 13-18	AMA Control Line Nationals, Muncie, Indiana
August 7-9	Bladder Grabber Combat Contest, Snohomish, Washington (tentative)
Sept ??	Northwest Skyraiders Raider Roundup (details tentative)
Sept ??	Northwest CL Speed Championships, Salem (details tentative)
Oct 3 & 4	Fall Follies, Salem (details tentative)

For more details go to flyinglines.org, or ask ye olde editor