

Looking Up

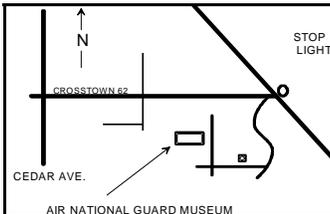
May 1999

Issue 26

Wanted: Sailplane Pilots!!

All MRCSS members must also be a member of the **AMA**, Academy of Model Aeronautics. See any hobby shop or contact an officer for an application.

To join **MRCSS**, Send \$20 to **MRCSS**
5354 Newton Ave. S.
Minneapolis, MN 55419



MRCSS Newsletter

<http://www.rcsoaring.com/mnclubs.htm>

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Schedule of MRCSS Events:

May	20th	meeting 7:00 – 10:00 pm Air National Guard Museum
May	22nd	Builders Contest Jirik Sod Farm 10:30 AM
May	23rd	Builders Contest Rain Day 10:30 AM
June	17th	meeting 7:00 – 10:00 pm Air National Guard Museum
July	15th	meeting 7:00 – 10:00 pm Air National Guard Museum
Aug	19th	meeting 7:00 – 10:00 pm Air National Guard Museum

MRCSS Message Line

Call 612-985-1525 At the proper time, enter "Star" (*) and the five-digit password 67277 (MRCSS). Press P (7) for Play to hear the first message. Press K (5) for Keep to move to the next message and again press P.

JIRIK SOD FARM	ROBINSON LANDSCAPING	PRESCOTT SLOPE	SUPERSLOPE
4 miles East of FARM-INGTON on Co Rd 66. Park on Co Rd 66 or on Blaine ave (N/S road). Winch and high starts available on site. Contact an officer for locker combination.	2 miles East of Lexington Ave on Main Street (CR 14, 125th street) in Lino Lakes . This is the Sod Farm on the South side of the road. DO NOT FLY ON THE SOD FARM ON THE NORTH SIDE OF THE ROAD.	8 miles east of Prescott Wisconsin on Hwy. 10 Take Minnesota Hwy. 61 to Hwy. 10 just north of Hastings. East on Hwy. 10 into Wisconsin, through Prescott. Continue east on Hwy. 10 8 miles to "The Virginian" restaurant on north side of road. Park in north-west corner of lot, hop the electric fence and climb the hill. beware the fence. It's hot! N.N.W. to N.E. winds.	4 miles SE of Northfield . Take MN 246 to Ibson ave. South on IBSON then East on 135th to Isaacson Trail. Isaacson Trail follows top of the Ridge. SSE to WSW winds at 5-25 MPH needed.

FIELD RULES for SOD FARMS

Nos

- No walking on newly seeded or new growth area
- No driving or parking on the property unless owner permission given on the day you visit (even on "on site" roads).
- No Smoking or Alcoholic beverages
- No Littering
- No music or yelling
- No walking on wet areas
- No recreational vehicles
- No flying of GAS models
- No flying near owner buildings
- No assisting none-insured flyers
- No parking in front of access points

YESs

- Use bright colored streamers on all stakes
- Use frequency board when 5 or more members are flying
- Take all trash home with you
- Pick up any debris found, even if it is not yours
- Park only on the road, and appropriately
- Yield to all farm work and all farm workers, be friendly!
- Use off-site rest rooms
- Report all questionable none-MRCSS activities
- Report rule violations to a Leader Member
- YOU ARE A GUEST SO ALWAYS ACT LIKE ONE

l o o k i n g u p

Meeting Minutes - April 15, 1999

President Kirk Hall called for order at 7:31 P.M.

VISITORS AND NEW MEMBERS - Kevin Finke joined the club tonight. Brian Olson, who joined by mail this past week, was present also.

TREASURER REPORT - Jack Perecman said the treasury can support our budgeted expenses. Jim Ladwig requested the club pay \$35 for artwork for the new membership cards. Club approved same.

PAST ACTIVITIES - Kirk Hall, Ed Berris and Jim Smith reported on the Toledo show. No flying activities were reported.

FUTURE ACTIVITIES -

Elk River Fun Fly - Craig Lamatsch will host LMR and RCHLG events at 10 AM Sunday, May 2.

Builder's Contest - Andy Karl (CD) urged all to be at Jirik sod farm at 10 AM Saturday, May 22 (or next day in case of weather). Beauty judging of new models will be at noon; brats and soda are available. This is a Fun Fly for new and old sailplanes.

Builder's Challenge - Dave Engleson needs more prizes from members and dealers. Call his home phone, (651) 695-0708. Deadline to complete your model is the May meeting (May 20).

Contest Calendar - Mark Miller asked about copies of scheduled contests for this year. Bob Botha had to cancel his planned contest on July 24. [He had not yet applied for an AMA sanction.] There was a discussion about holding a Slope Contest that day.

Sailplane Design Series - Kevin Finke, a degreed aeronautical engineer with 2 years experience at Boeing, will begin a series of brief talks as part of our May 20 meeting, starting at 7 PM.

DISTRIBUTION OF NEWSLETTERS - A large majority of members indicated they will take Internet delivery of the newsletter, saving work and money.

FLYING SITE STATUS - Jirik sod field was nice before today's rain. Has both N-S and E-W stretches.

Slopes are being used regularly. Stanton North is better for S and SE winds. Stanton South can now be used for northerly winds. Use this year of the Hager City slope is still under discussion.

Kirk Hall will contact the new owner of the Northfield Supers-

lope, Rob Ryden, about the club trimming the brush this season.

WASHBURN CLASS - Bill Igoe reported that the class was about to begin, and asked for volunteers to help with the flying sessions some mornings at the end of May. Three members indicated interest; Russ Bagley, Bob Griffiths and Andy Karl.

RCHLG Kit, Electrics, EPPs Shown

Mark Miller told how he had found an estate sale of kits and tooling for the Aria RCHLG. The design has a T-tail glass fuselage and foam wings. Mark has two full kits now, with 10 more needing wing cores. An interesting feature is the carrier for the RX pack and servos. Finished weight is said to be 12 to 14 ounces. Mark will donate one kit to the Builder's Challenge, is deciding on a price for the others.

Conrad Sowder brought his recently completed Highlander all EPP foam 2m thermal sailplane. He replaced the cloroplast tail surfaces with sheet balsa, and reinforced the aft fuselage against tail flutter. The ailerons use silicone hinges and an embedded drive for low drag.

Larry Sorenson showed two electric powered sailplanes. The first was a modified Palio 2 meter ARF, a \$129 kit from Sky Bench. Larry built a new wing with 99 inch span and flaps. Power is a geared Magnetic Mayhem motor with a 9-cell pack of 800ARs. One charge gives three good climbs. He estimates the cost of the power package to be \$120.

Larry's other plane was a Gentle Lady with a MM geared motor and 8x800AR battery. The gearbox is mounted to the front of the plane without a cowling. Larry builds his own battery packs, and these fit nicely into the standard fuselage.

Jeff Tucker explained his RCHLG which features an EPP pod and a carbon arrow shaft tail boom. On 2 channels, it has flown with no problems. Finished weight is close to 10.5 ounces. Jeff adjusts the balance point by moving the tail boom in or out. He is working on a low wing version, using the wing of a Baby Birdy pattern plane. This is very low cost, and Jeff thinks it might make a good club plane.

Conrad Sowder brought his recently completed Highlander all EPP foam 2m thermal sailplane. He replaced the cloroplast tail surfaces with built-up

balsa, and reinforced the aft fuselage against flexing at high speeds. The ailerons use silicone hinges and an embedded drive for low drag.

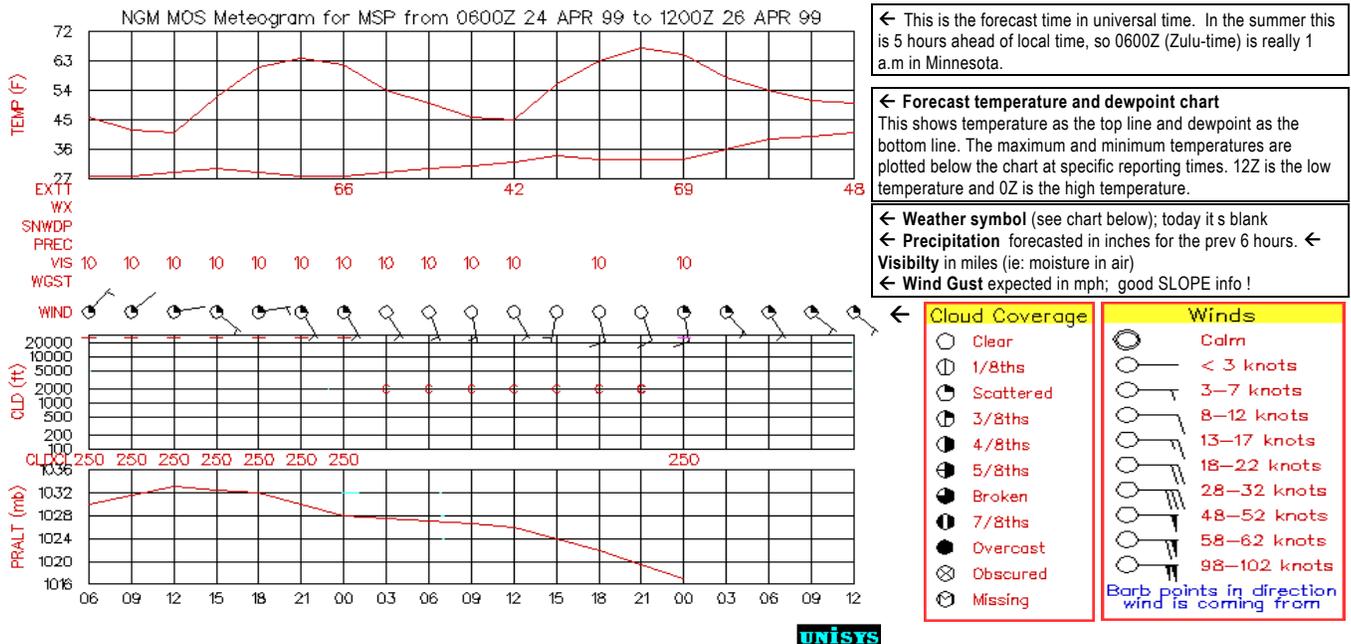
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UNDERSTANDING A METEOGRAM CHART; Tom Rent MRCSS

If you have ever visited my base web page called the MINNESOTA SOARING GATEWAY, located at <http://www.goldengate.net/~tmrent/soar/> you will see several soaring related weather links. One of these links is for the current Minneapolis-St.Paul (MSP) Meteogram. I find the Meteogram extremely helpful in planning my model and full-size soaring activities for the upcoming days.

A meteogram is a 60 hour time cross-section of data for a specific surface reporting station, in our case this is MSP. The data plotted include temperatures, winds, pressure, clouds and present weather. These plots are updated once every 12 hours at around noon.

At first glance the plot looks very complex, cluttered, and confusing, but after learning about the symbology you will actually enjoy reading the plot, and I think it will help you too in planning your thermal, slope, or "stay home" strategy.



As you can see there are 4 panels above:

Panel 1 gives you the predicted High temp and predicted Dew point. **You want a wide spread for soaring.**

Panel 2 gives details on wind direction and speed. **Very good for slope planning.**

Panel 3 gives cloud layer information. The vertical axis is height of cloud base in feet and is logarithmic. The layers are plotted as horizontal lines. Clear skies are plotted as a 'C'. Scattered cloud layers (1/8th to 3/8th coverage) are plotted as a single short dash. Broken cloud layers (4/8th to 7/8th coverage) are plotted as two short dashes. Overcast layers are plotted as a single long dash. The actual cloud ceiling is displayed below the chart in 100s of feet if the ceiling is below 10,000 feet

Panel 4 gives pressure information.

This chart plots sea level pressure in millibars. When pressure rises, it gets cleared, and vice-versa.

PRINT OUT THIS SHEET AND USE IT NEAR YOUR COMPUTER AT HOME OR AT WORK. YOU COULD FIND YOURSELF PLANNING MORE

Weather Symbols				
Rain	Drizzle	Snow	Freezing Rain	Miscellaneous
□ Light	□□ Light	×× Light	⊖ Light	△ Ice Pellets
□□ Moderate	□□□ Moderate	××× Moderate	⊖⊖ Moderate	↔ Ice Crystals
□□□ Heavy	□□□□ Heavy	×××× Heavy	Freezing Drizzle	★ Snow Grains
Rain Showers	Thunderstorm	Snow Showers	⊖ Light	⊕ Blowing Snow
▽ Light	⊚ Light	×▽ Light	⊖⊖ Moderate	= Fog
▽ Moderate	⊚ Heavy	×▽ Moderate	Tropical	∞ Haze
	⚡ Lightning		☞ Hurricane	☼ Smoke
			☞ Storm	D Dust

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ROTARY DRIVER SYSTEM (Marketing announcement)

GREAT NEWS! Soon you'll be able to operate ailerons and flaps, etc. without horns, clevises or any other external hardware. It's on the way. . . a new concept, totally all-internal, drag-cutting system for controlling surfaces that contributes zero slop! It's heart is a precision-molded 1.2 gram coupler that fastens to the servo output gear. This "ROTARY DRIVER SYSTEM", (let's call it "RDS" for short), provides A MAJOR BREAKTHROUGH IN SURFACE-MOVING TECHNOLOGY.

Beyond entry level, being size-adaptable, it's ideal for HLG, SLOPE SHIPS, THERMAL MACHINES, ELECTRICS and SCALE MONSTERS. Martin Hepperle's study concluded that 4 external linkages, covered or not, added 5 to 10% drag to an F3B type airframe. Using "RDS" to eliminate such drag should be especially appealing to dedicated competition flyers and others who just like the sweet sound of a quietly-moving sailplane.

With "RDS", nothing needs to hang out of those otherwise clean wings to mar the beauty of the ship, cause performance-robbing parasitic drag and shrieking noise in high-speed passes. There's nothing to catch on weeds or doorways, nothing to get ripped off in a dork or collision, nothing to tear away skin where servos are mounted, nothing to contribute slop or bind!!

Thanks go to Kimbrough Products (KP) of Tustin, CA for taking the initiative and to so precisely engineer and mold the coupler parts.

This system was demonstrated at the recent private Las Vegas hobby show for wholesalers and dealers. It got a great deal of attention and its distribution was promptly taken on by Horizon and Great Planes. It's in the pipeline and should be available from dealers in June. COST?. . .5 bucks per pack with a pair of coupler parts to do ailerons, flaps, flaperons or elevons, etc. What little else is needed is commonly available and measured in pennies of cost.

INSTALLING A ROTARY DRIVER SYSTEM USING THE KIMBROUGH PRODUCTS COUPLER

by Harley Michaelis, AMA 3234, LSF 023 e-mail: hmlsf023@bmi.net

What follows reflects my experience over 8 years on some 40 airframes with various versions of the system. That it is extremely practical has been well-proven. Just do an installation for first-hand experience. Its simplicity & effectiveness will be an eye-opener. The primary difference between what I was most recently doing & what can now be done, is based on the availability of the unique, ingenious, precision-molded **KP COUPLER**. Only 3/8" in diameter, it's less thick than most servos, so won't interfere with recessing. The molded parts weigh only 1.2 grams. Although small & lightweight, it's rugged. Its versatility makes it suited for anything from delicate HLG's up to heavy, fast, powered aircraft. Anything that can get rid of unsightly external hardware, drag, noise, slop & improve performance of your airframe, has to be worth learning how to do.

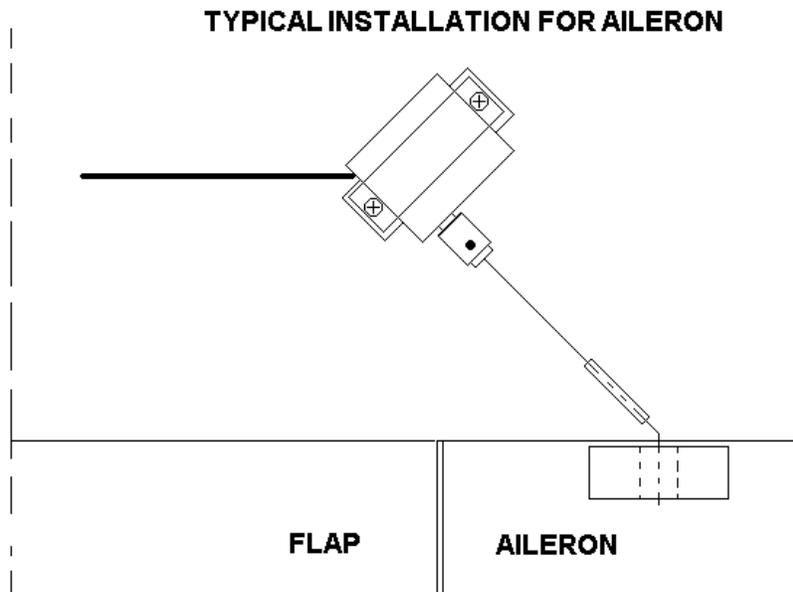
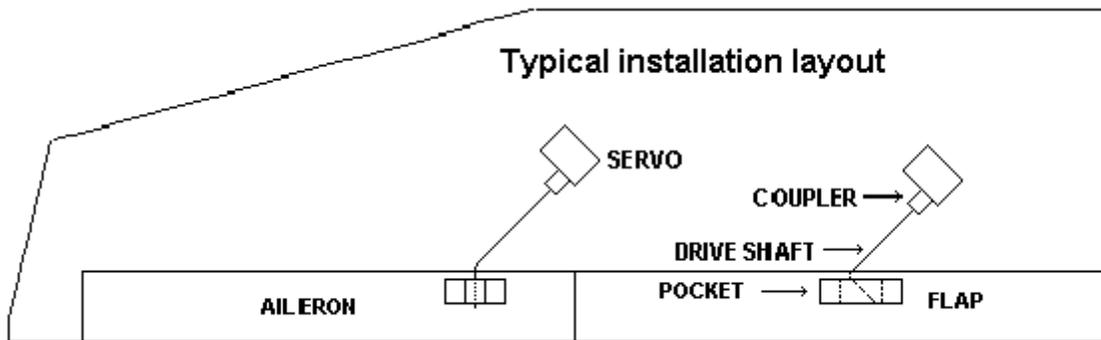
It's actually easier to do an installation than explain how. Text & graphics here address the essen-

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tials, which are hardly rocket science. Like anything new, there's a learning curve, but once an installation is done, it becomes routine. What took me years to learn is all here, so you can do it right the first time.

A frequently asked question is "How much torque can the plastic coupler handle?" The answer is: "A lot more than it can ever be subjected to." Protection is built-in by the connection between the drive shaft and the highly tempered steel setscrews. With setscrews most-tightly fastened and the shaft twisted with pliers, at the end point, the setscrews will circumferentially gouge the shaft, relieving stress to the plastic parts. This feature may save a servo under high stress, such as when flaps are dragged on landing.

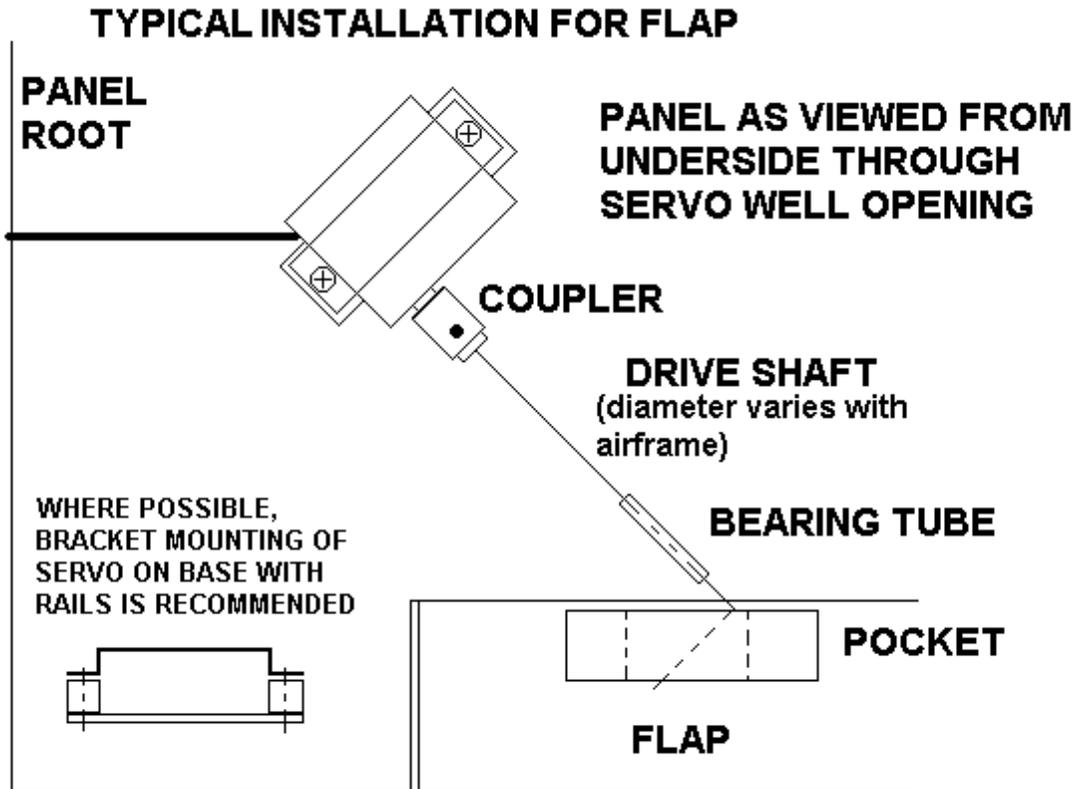
Sketches below depict typical layouts in a plug-in panel or half a one-piece wing. Click on the thumbnail to enlarge. Note how tubes are used as a rear bearing. Angling shafts 45 degrees relative to hingelines, using a 45 degree bend in the aileron shaft & a 90 bend in the flap shaft, work perfectly to provide full expected deflections. With pockets placed well inboard, servos are moved inboard to help keep mass more centered in the airframe for improved handling.



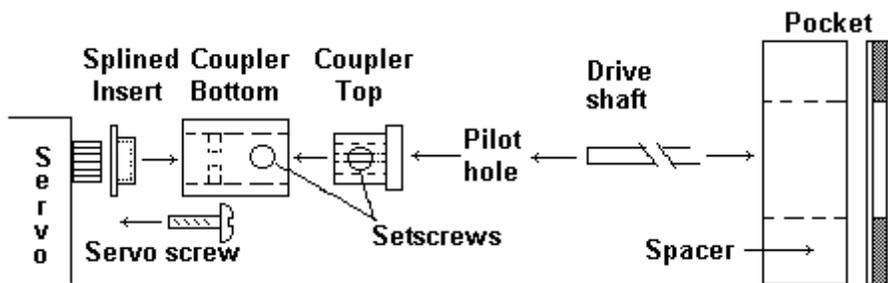
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KINEMATICS: As the servo rotates, the bent end of the shaft in the pocket deflects the surface. During deflection, the pocket automatically slides slightly fore-aft, relative to the shaft. This prevents binding from intrinsic misalignment between pocket & hinge axes!!!

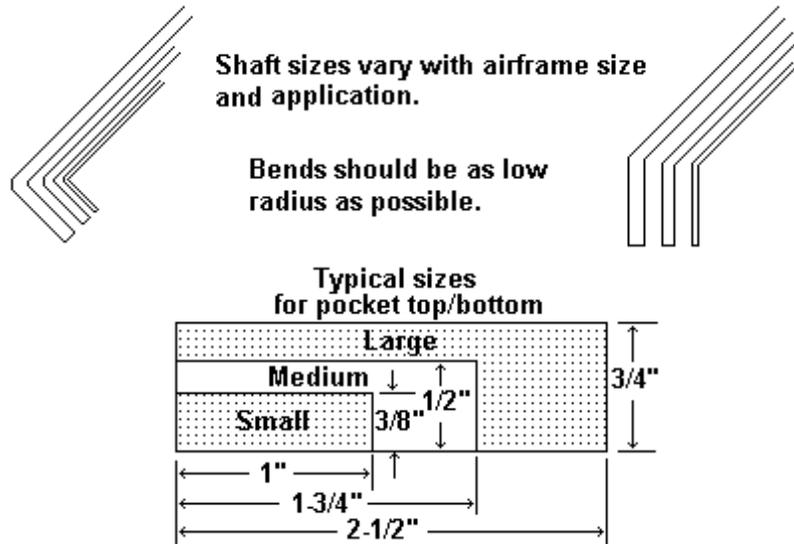
The flap shaft end moves in a broad fan pattern, requiring a wider slot than the aileron shaft, which moves in a narrow one. **No slop** is contributed if the pocket properly fits the shaft. Deflection is positive & there's a well-defined return to neutral if hinges or structure do not impede it. Friction between shaft & pocket is apparently inconsequential with the smooth laminate used. (See **POCKET** below.)



A Splined Insert, Bottom & Top parts of the molded Coupler are illustrated below, along with typical pocket sizes as might be used for differently-sized airframes. See **POCKET** & **SHAFT** paragraphs about making these custom-sized items from commonly available materials.



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INSERTS: These have a common outside spline. Insides differ. At this writing, it is known that the left insert by the "arrowhead" (see photo) fits the standard output gear of Airtronics, Multiplex, JR 341/351. The center one very snugly fits Hitec HS 60/80/85/101. The one on the right fits standard Futaba, FMA series 300, some ACE. Others compatible with Airtronics, Hitec or Futaba should have a fit. If no insert fits yours, custom splining is easily done. See below. Regrettably, the Volz Micro-Maxx type output gear with its unconventional splines does not lend itself well to this. A dedicated insert is needed. Perhaps Volz supporters can suggest that this be molded so these fine servos can be used with the **RDS**.

CUSTOM SPLINING: Plug output gear screw hole with paste wax. Smoothly coat case top & gear with paste wax, Chapstick, PVA, etc. **Mini & micro servos:** Tape over Insert hole. Almost fill with quick epoxy. Avoid bubble. Press over gear, flush to case. Remove tape to visually center over the gear hole. Let cure. Gently pry loose around edges. Clean away epoxy around output gear. **Larger servos:** Similarly spline Bottom Coupler. Keep top opening clear using Q-Tip dampened with alcohol, etc. I've never had epoxy splines fail, but if they did while dragging flaps, dorking in, etc. usual servo damage could be spared. Resplining is no big deal & custom-splined spare inserts could be kept in the field box.

DRIVE SHAFT SELECTION: Doubling the diameter of a given material increases its torsional resistance 16 fold. K & S wire, 2-56 & 4-40 rods, 1/16", 3/32" & 1/8" non-rusting stainless steel (SS) welding & regular welding rods are handy choices. Pilot hole takes .047" K & S wire for small aircraft, such as HLGs. To enlarge, first secure Top in Bottom with self-tapping setscrews. Do not use a tap to thread. The holes are sized so that tight, deep threads will be made with the setscrews. After initially running setscrews through both parts, make a reference mark to always reassemble the same way so threads in the two parts best align to each other.

To open pilot hole, grip Coupler assembly with sandpaper. Slowly & progressively open with sharp drill bits. A little clearance is recommended so the shaft can be removed after being gouged by the setscrews. Use #51bit for 1/16" shaft & #41 for 3/32", etc. Use 1/16"- 3/32" shafts for medium-sized, non-extreme aircraft, traditional 2m-3m thermal sailplanes, etc. I use only 3/32" SS on my 12', 5 plus pound competition sailplanes. For extreme aircraft such as pylon, pattern, large scale, slope racers, etc., select at least a 3/32" shaft. Torsional rigidity can be greatly increased by wick-

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ing or sweating brass tube on a shaft between what enters the Coupler & Pocket. This avoids a larger hole in the Top & helps keep the Pocket thin. A 1/16" ball wrench is handy to use in accessing setscrews when installing the shaft.

When later seating setscrews to the shaft, tighten reasonably well to prevent slippage from expected airborne stresses. Once the shaft resists moderate twisting force by hand, the setscrews will have cut into it to hold in flight. Resist the temptation to overdo it to "see if it will hold". If you overdo it the very hard setscrews will gouge grooves around the shaft, dislodging it from the intended position & may make it hard to remove to start over. Renewed attempts to then retighten can strip out the threads.

EXTRA HEAVY DUTY APPLICATIONS: Where a ship is expected to be regularly flown at high speeds and/or perform high-G maneuvers, it would be prudent to reinforce the setscrews to Drive Shaft connection. For this purpose a 3/8" I.D. aluminum, brass or steel collar, etc. with say 1/8" thick walls, to fit over the coupler body can be used. This should be tightly tapped across for 6-32 setscrews. When seated, setscrews used should extend fully through the outer collar walls as it would be the collar threads that primarily allow extreme tightening of the screws on the shaft. Shaft material should preferably be of larger diameter and filing of "flats" on them is recommended. Even if the pilot hole is opened for a 1/8" shaft, 1/16" of plastic wall will still remain intact to maintain the integrity of the coupler parts.

With an Insert in place, attach Bottom to the gear by fully seating it with the servo screw, so Top will properly seat & align setscrew holes. Unless the shaft selected is flimsy for the application, high speed surface buzz attributable to flex is unlikely, especially if shafts are kept short by using thin servos that can be mounted close to the hingeline. For delicate servos, flex may act as a "servo saver". In extreme airborne stresses, say trying to fully & abruptly drop flaps at high speed, the likelihood of a suitable shaft taking a set along its axis before the servo fails seems utterly remote. As usual, use servos with minimum gear slop for best results. The Coupler & a properly fitted Pocket, as detailed below, contribute no slop whatsoever.

BEND ANGLES: These set maximum deflection, unless structure or hinges restrict it. **Flaps:** to get 90 degrees down flap, bend shaft 90. **Ailerons:** 45 degrees possible deflection is more than typically needed, but using that angle the end points straight back & essentially moves up & down, either lifting the aileron up or pushing it down, with negligible friction thus involved in the operation of this busy surface. A little powdered lubricant may be used, too. **Bends need to be low radius.** Stainless steel takes a sharp bend without breaking. Clamp 1" or so in a vise. Pound near jaws. Trim later, keeping the bent end as long as practical considering pocket configuration. Right & left side bend angles should match, but a programmable Tx can fine tune throw, neutrals & provide aileron differential.

POCKET: Counter top laminate (Formica, Nevamar, Wilsonart, etc.) is well-suited for tops & bottoms. It provides low friction with shafts & resists wear. Thicknesses run from about 1/32" to 1/16". Home builder's supply have sample chips. Select flat, smooth & thinner ones so the pocket can best be fully recessed, even in thin surfaces. Cut with hacksaw, bandsaw, Dremel tool, etc. Smooth edges! To avoid slop, fit with the shaft must be slightly snug. Keep fore-aft dimension of top/bottom liberal. Otherwise, even if the fit is snug, the shaft may "rock" between them & allow flex of a surface. **SPACERS:** Balsa is easy to find, select, sand or compress for precise fit, if over-dimension. As illustrated at left below, sandwich spacer pieces between top/bottom, smooth sides inside, so 3 edges protrude, parts nicely squared up. Clamp with clothespins. To compress balsa

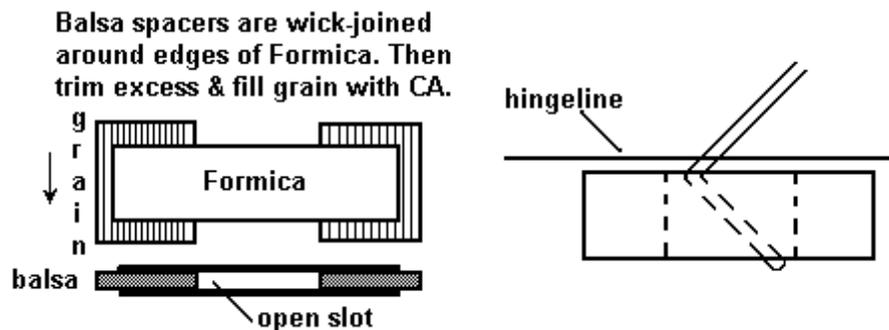
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to get a slot just right, use "C"clamps. Wick join with instant CA glue. Trim excess spacers.

Harden into solid blocks by filling thru the open grain ends. However, position the pocket so gravity does not take excess CA into the slot. For HLG's, top/bottom can be made from thin ply to minimize weight & thickness. Although a proper fit is made with the shaft, an inherently flexible, flimsy, poorly-hinged surface can still buzz at high speeds.

Position pockets 1/16" behind the hingeline. For ailerons or other applications, such as flaperons, where the surface is to deflect sharply upward for turn, the elbow goes slightly ahead of the hingeline. This avoids prying & jamming in the pocket by the bend when the pocket moves forward on the shaft during up deflection.

However, for true flaps, in which only a slight amount of reflex is used, the elbow should be behind the hingeline. As the low-hinged flap moves downward, the pocket then moves away from the elbow. This avoids bind as the flaps drop to extreme position. Also note that the elbow lays a bit away from the adjacent spacer so the bent end can't jam it and impede down flap. This flap shaft bend positioning is illustrated at right below.



Pocket vertical location, relative to hinge axes: In ailerons, if hinges are high, pocket low & shaft bent end short, it might slip out in extreme up deflection. This is not a concern in thinner surfaces, say up to 1/4". However, in thicker ones, the pocket should be shimmed up closer to high-mounted hinges. This is not a concern for flaps with both hinges & pocket low. As usual, depending on hinge type & placement, flaps may jam the wing as they drop, unless clearance is provided. Where it can be used, continuous tape hinging on the bottom minimizes the need for clearance.

Elecons/flaperons: Generally speaking, put pockets vertically near the hingeline to assure short bends can't slip out as referred to above.

Servos should preferably be firmly mounted. Extra layup or reinforcement where they go is always advised so any skin does not flex. Where practical, mount on a thin ply base between rails. Cap rails with ply to prevent splitting. On the unmounted base, screw mount the servo using case side lugs or make a bracket of thin sheet aluminum to go over & down the case to the rails. This will be mounted as a unit in a well cut to accept it. Where structure is to be skinned (foam cores, etc.) some planning ahead is needed. Invert the core. Locate & mark the hingeline, servo location, well perimeter, shaft path, pocket location & path of leads. Hot wire or router the channel for the long leads as usual. The pocket goes in before skinning or bagging. After, using a **template** (see below) that can be precisely positioned on the outside, a cover is marked & cut away so other things can be installed.

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Having determined pocket locations (remember they go 1/16" behind the hingeline), they must not get plugged with adhesive. Assuming edges are well-squared, a good bet is to seal the front & rear by lightly wicking on softer 1/16" & 1/32" balsa, respectively. Sand away excess, then cut snug openings in the core that put the front edge of the 1/16" balsa at the hingeline. Epoxy the pockets in place & add fill to core level. Seal any gaps with spackling. Skin will firmly imbed the pocket, particularly if bagging with a little extra layup on core surfaces in the area of the pocket.

Note: To remove a servo for service after a drive shaft is installed & a surface hinged, have clearance behind the pocket to slip the shaft out of the Coupler. In foam, clearance can be made through the slot before hinging. Alternatively, the well could be sized to allow the servo to be shifted off the shaft.

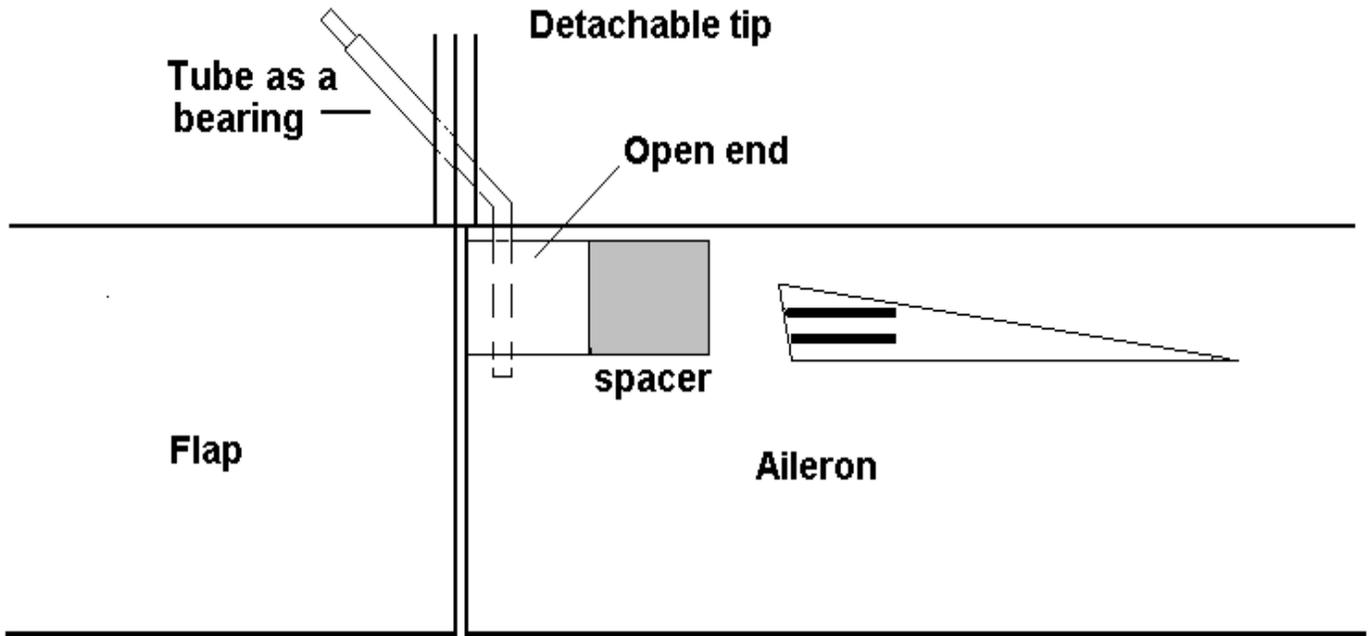
COVER OUTLINES & LOCATIONS: Mark the cover outline on the core going 1/8" or so beyond the well perimeter so it can be taped back flush. Position some "see-thru" semi-rigid plastic with edges placed at reference points, such as an endcap, wing center line, hingeline, LE, etc. Mark the outline of the cover & make pinholes at key points on it. After skinning, use as a template to locate where to cut. Cut, peel skin & then cut wells to slip the base/servo assembly in place. Know precise hingeline ends to cut 1/16" forward of the pre-installed pocket. Open the balsa caps so the shaft can enter the slot.

TUNNEL & ALIGNMENT OF AXES: Since there is no universal joint, axes of output gear & drive shaft must align. Where access is limited, as in skinned foam, do this: With aileron/flap cut loose, work a tunnel along the shaft path toward the Coupler. As an aligning tool, cut a length of the shaft with a 1/4" 90 degree bend at its rear end. Wax it & slip a 1" or so length of tubing on it for a rear bearing. This can have a somewhat loose fit. As needed, enlarge the tunnel where the bearing goes so the shaft can run directly from inside the pocket fully into the Coupler, with the surface temporarily taped to the wing. The servo/base may have to be tilted to facilitate alignment. The tubing has to be located forward of the bend in the real shaft. The lower the radius of that bend, the closer the tube can be to the hingeline. A little play between tube & shaft is not detrimental since once the shaft is in the pocket, it is vertically stabilized. When tube position is set, center an access hole, 1/8" or so in diameter in the skin over the tube. Get epoxy to the tube with small syringe, less needle. Use care so the epoxy does not reach the ends of the tube. As it starts to harden, gently twist out the waxed shaft piece, clean, wax again & reinsert. When it's well-hardened, make the real shafts. See below. Put epoxy putty (epoxy & micro-balloons) under the base. Run the shaft thru the tube & into the Coupler to set the tilt. Let all cure well.

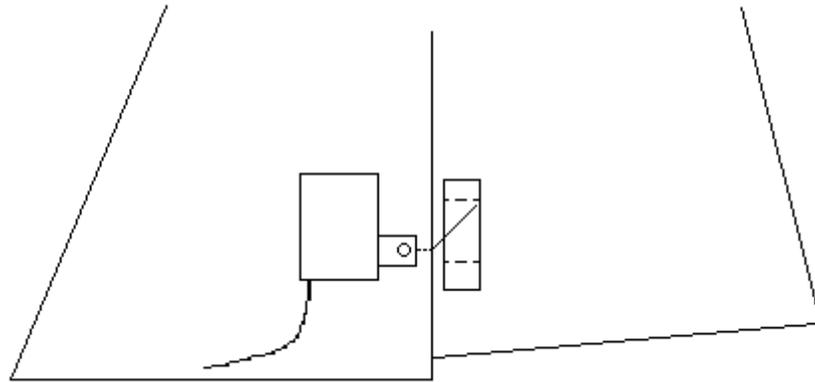
SHAFT LENGTH/INSTALLATION: Size shaft to put the elbow of the bend slightly ahead of the hingeline when the shaft butts the screw head in the Coupler Bottom. Put servo in neutral. Position the Coupler on the gear so the servo can be rotated manually or by the Tx, to access both setscrews. Manually rotate the shaft so the bent end is in the precise desired neutral. Seat setscrews well, but avoid stripping out. "Flats" can be filed in larger shafts. Notch bottom wing skin for clearance as the flap shaft bent end rotates down. When hinging, slip the shaft into the pocket.

THREE PIECE WINGS: As illustrated below, an open-ended pocket can be imbedded in structure at the end of the aileron. Place servo & bearing so shaft bent end slides some into the Pocket as the tip is attached. Position bearing tube to vertically align aileron & wing. With servos in the center section, no leads need to be connected outboard to fly.

l o o k i n g u p



TAILS: Think of the bottom sketch as part of a fin/rudder, or one side of a stab/elevator or V-tail. Center servo, pocket & hinges where practical. All works well with shaft placed at right angle to the hingeline with a 45 degree bend entering the Pocket as illustrated. The slot has to be wider since the bent end then moves in a broader fan pattern than when pointing straight back, as illustrated for ailerons.



RETROFITTING: Reshape wells to best utilize existing lead grooves. Fill old well gaps with scrap foam. Remove enough skin beyond filled-in areas so that old & new foam can be bridged with new skin. Level new foam to the old. Attach new skin with epoxy, bagging when possible or otherwise smooth, fill, paint. If film is used, cover with matching or contrasting color, trim material, etc. Work the tunnel under the skin. Remove foam from surface to mount pocket. Before mounting, fill opening with waxed soft balsa to avoid plugging it with epoxy.

RESERVED SPACE: As they come in, useful tips & hints from modelers using the **RDS** will be added here.

l o o k i n g u p

Home-made couplers

[Editor's Note: Here is a homebrew solution for using nylon bolts from **Harley Michaelis**.]

You will need: Some all-threaded, 1/4" x 20 socket head nylon bolts, a nice flat board (those worthless plaques awarded at contests will be just right, especially other than the first place ones), 15/64" bit, 9/32" bit (these need to be about the same length), a 1/4" x 20 tap, access to a drill press, a couple of "C" clamps to secure the board to its table. If the drill press has centering attachments, skip the board and clamps.

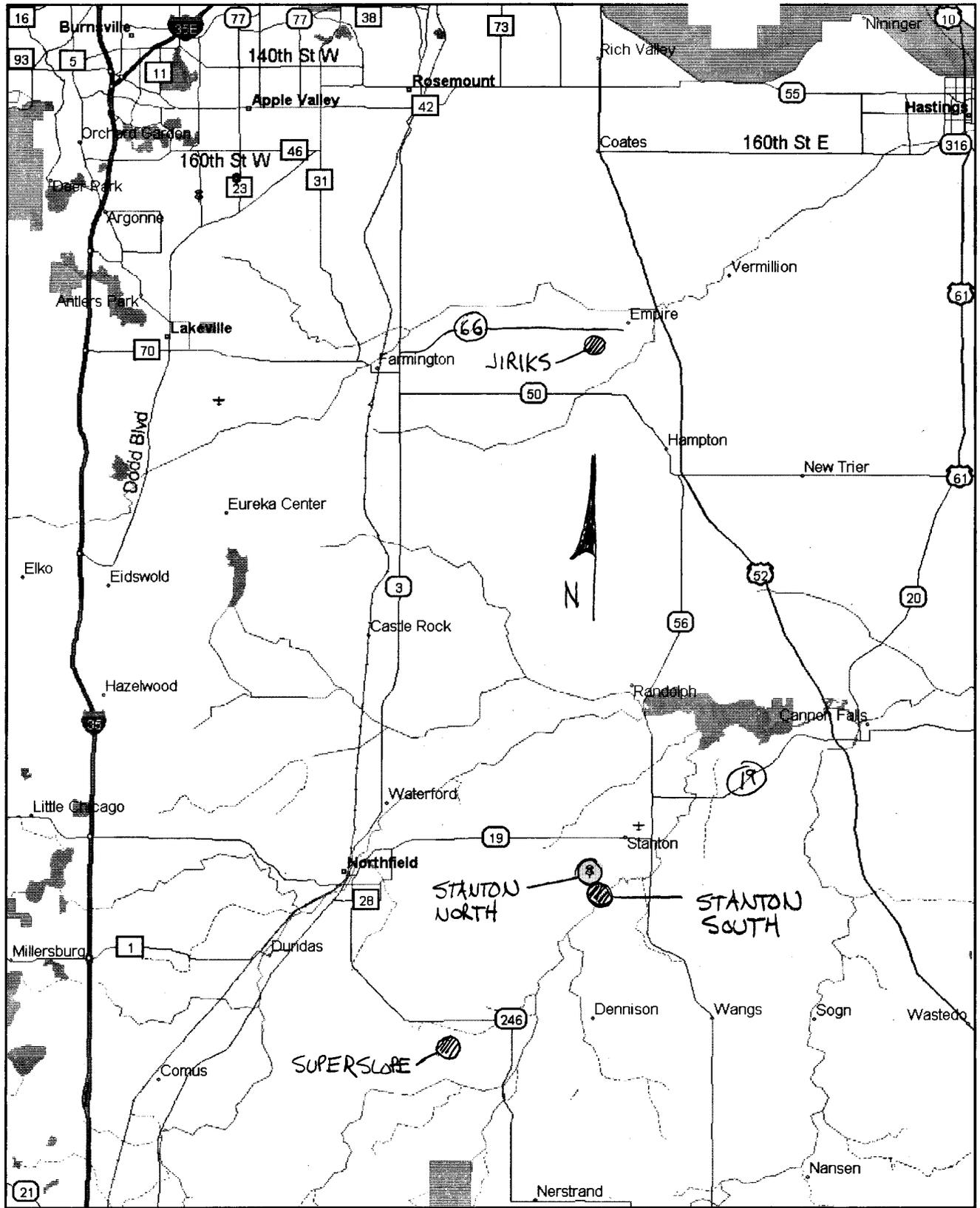
Cut the bolts to 3/4" overall length. Insert the 15/64" bit into the chuck, so that if shorter, it will extend out the same amount as a fully inserted 9/32" bit. Drill a centered hole through the board. Tap for the bolt threads. Adjust the table for 1" clearance from the 9/32" bit end (fully inserted) to the board. Tighten the table on the column. Use the 15/64" bit to center the hole. Clamp the board to the table. Insert the 9/32" bit in the chuck. Seat a bolt in the tapped hole. Lower the head so the bit contacts the bolt head, then adjust the depth setting nuts for a 3/16" cut. Slowly drill the hole to avoid melting the nylon. Loosen bolt with pliers and remove. If all looks good, so drill out several bolts. The dimple made in the bottom serves to center a pilot hole down the bolt shank. After deciding on the size of actuating rod to be used, this can be enlarged accordingly. CA will bond the two tenaciously.

MAKING THE SPLINED SOCKET: Plug or cover the top of the pilot hole. Coat the output gear and adjacent servo top with paste wax, PVA or other release agent. Use a paper punch to make a round hole in masking tape, etc. Concentrically scribe a 3/8" or 7/16" circle around that hole. Position this over the output gear, as a guide to centering the socket over the gear. Avoiding a bubble, nearly fill the socket with quick epoxy and press the socket to the case. Let cure 1/2 hour or so, pull off the gear and allow several hours to fully harden.

[Editor's Note: Here is another idea from **Robert Adomeit**.]

I've been using rotary drive ailerons in my mini slope warbird for almost a year now! They work great! To save weight, I drill & tap the servo shaft, install the threaded linkage rod & lock it in place with a jamb nut.

l o o k i n g u p



Microsoft Expedia
Streets98

l o o k i n g u p

Builders Contest / Non Builders Contest, Saturday May 22nd, Rain day May 23rd

Open to all AMA silent fliers

We encourage beginners to come to join the fun as there will be experienced pilots to help assist with your flying education.

Giders and Electrics built since 7/1/98 may be entered in the "beauty/workmanship" judging.

Flying starts at 10:30 AM

World famous Brats, chips, and soda served at 1200 hrs for lunch.

Contest will conclude by 3:00 pm

Judging of "new builds" will be during lunch.

This contest will be geared towards beginners, and experienced pilots.

You do not need a "new" plane to fly.

Any glider or electric may be entered in the flying portion.

We will have:

- Hand Launch Gliders
- 7 cell electrics
- 2M, Std, Unlimited gliders

We will have winches and high starts for those who prefer

Don't forget the "Builders Raffel" after the flying is complete.

We hope to see all of you Saturday May 22nd, Rain day May 23rd, 10:30 - 3:00

Come join the fun.

Andy Karl, Contest Director.

l o o k i n g u p

Here's the scoop this year at Hager City.

For those not familiar with the arrangement at Hager City, I'll give a brief summary. Just across the Mississippi from Red Wing is a 280' south facing bluff that the Northern Sky Glider Association has been flying hang gliders at for many years. Starting last year they are offering a RC membership to their club for use of the site for slope soaring RC gliders. With the mix of hang gliders and RC gliders, naturally there are rules. The worst of which is when the hang gliders are flying we don't.

As last year, AMA membership is required.

Also as last year, an application form needs to be filled out and you must sign a waiver.

Again only 6 members are allowed. The 6 members from last year will have first dibs on a slot this year.

Annual membership fees:

\$50.00 without the use of the tram.

\$100.00 with the use of the tram.

PLEASE DON'T SHOOT THE MESSENGER! This is right from the VP of Northern Sky Gliders.

I will not be joining this year so one slot for sure will open up.

Please contact me if you would be interested in receiving more information and/or the forms to apply.

Mike Trutwin

MRCSS APPLICATION/ RENEWAL FORM

NAME: _____ AMA: _____

STREET: _____

CITY: _____ STATE: _____ ZIP: _____

PHONE (N): _____ PHONE (D): _____

E-MAIL ADDRESS : _____

NEWSLETTER DELIVERY BY : _____ E-MAIL OR _____ POSTAL SERVICE

COMPUTER RADIO CHANNEL NUMBERS : _____

OTHER RADIO CHANNEL NUMBERS : _____

FEES (for calendar year) :	Associate	\$10	(Newsletter Only)
	FULL / FAMILY	\$20	
	Junior (to age 19)	\$10	

MAKE CHECKS PAYABLE TO MRCSS BRING TO MEETING OR SEND TO :
Jim Ladwig, 5354 Newton Avenue South, Minneapolis, MN 55419

l o o k i n g u p

MRCSS CLUB RECORDS 1999

STUFF

LONGEST SLOPE DURATION ALL TIME HIGH RECORD

CLASS	NAME	TIME	DATE	NAME	TIME	DATE
1.5M/HL				Tom Rent	3:21:00	10/98
2 METER				K. ROGERS	4:29:00	10/87
STD				TOM RENT	3:17:07	8/89
OPEN				K. ROGERS	2:45:38	10/82

LONGEST THERMAL DURATION

HL				Brian Brinkman	0:46:01	7/96
ILLUSION HL				Dave Degroot	0:11:13	5/96
ILLUSION				Jim Ladwig	0:02:55	5/98
1.5M						
2 METER				K. ROGERS	1:37:48	8/83
STD				R. DIABAISO	2:13:00	6/87
OPEN				S. BOWMAN	3:17:10	5/90

LONGEST ELECTRIC DURATION

5/6 CELL				TOM RENT	0:44:49	4/93
7 CELL				J. SMITH	2:44:12	8/94
OPEN				Brinkman	1:04:38	9/94

FLIGHTS AFTER 6 pm

SLOPE						
THERMAL				C. KOTVAL	0:45:02	4/88
ILLUSION HL				Jim Ladwig	0:00:13	5/98
Thermal						
ELECTRIC				JIM SMITH	0:20:44	8/93

CROSS COUNTRY FLIGHTS

<12' SPAN						
>12' SPAN				KARL/ PERECMAN	6 MILES	6/90

*** BOLD NAMES REFLECT ACTIVITY RECORDED DURING THE MONTH ***

PHONE ALL RECORDS INTO JIM SMITH..831-8184.

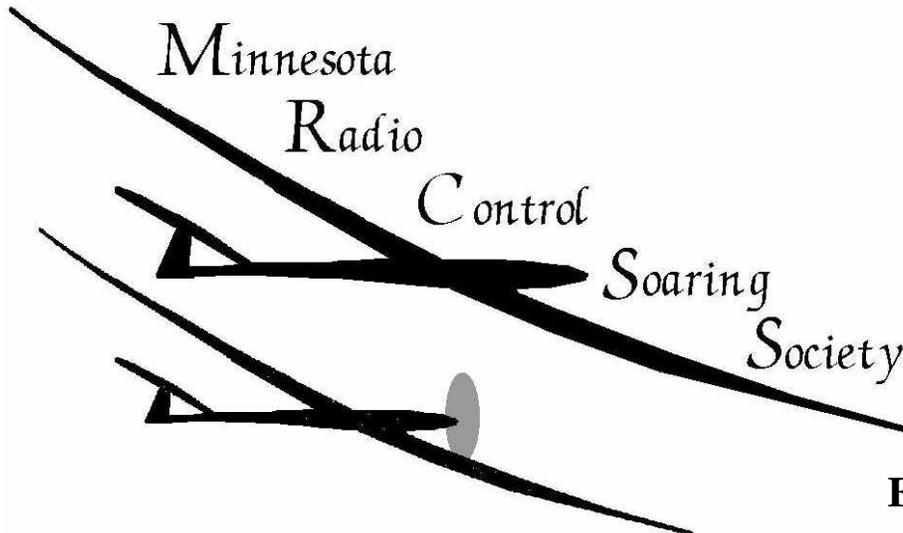
LOTS OF OPEN RECORDS PICK A CATEGORY AND GO FOR IT !!!

100 Minute Club

Thermal Tom Rent Level 2
Tom Schworer Level 1 2M

Slope Mike Trutwin Level 2
Tom Rent Level 3
Level 4
Level 5

Steve Stadler / MRCSS
786 Cannon Ave.
Shoreview, MN 55126



FIRST CLASS MAIL