Radio Controlled Soaring Digest

March 2007 Vol. 24, No. 3

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Front cover: Siegfried Schedel launches his Schocker at the Welsh Open F3F, August 2006, where he placed third. The model was designed by the Herrig brothers, well known competitors in both F3B and F3F. Photo by Mike Shellim. Pentax *ist DS, ISO 200, 1/1000 sec.

Back cover: Lionel Brink (South Africa) and Ziggy Kusiak (Australia) towing for David Hobby at the start of the infamous last flight of the senior fly offs in the F3J World Championships, August 4, 2006, .
Photo by Jo Grini. Nikon D50, 1/500 sec., F5.6, 55mm.

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R/C Soaring Digest (*RCSD*) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January 1984. It is dedicated to sharing technical and educational information. All material contributed must be exclusive and original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of each article is the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author.

In the Air

The agenda for the 22 March 2007 CIAM Bureau Meeting was recently posted on the FAI website. <http://www.fai.org/aeromodelling/meetings/200703 > There are a few changes proposed for "F3BJ" rule book at this meeting.

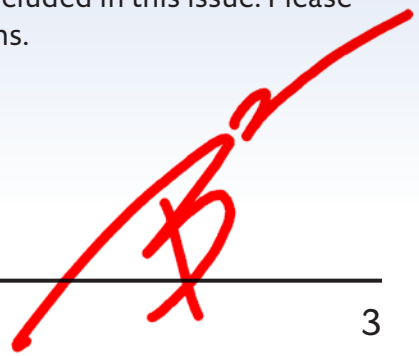
For F3B, the rules changes include two series wired solenoids and a hand switch on the winch, in addition to modifications to the penalties for safety infringements.

The greatest change may occur within F3K, RC-HLG. There are two proposals which will affect this provisional event. The first is a near complete rewrite of the F3K rules. The new rules were proposed by Germany, which has been running very large events for several years with great success. Germany also proposed that these new rules be permanent and replace the current provisional rules. Removing provisional status would make F3K a World Championship event.

Deferred to a subsequent meeting are two proposals affecting F3J — a change to the number of radio channels assigned to each entrant, and another to reconfigure the landing circles from the current one meter spacing to 0.2 meter increments. This will have the affect of more accurately apportioning landing scores, with the hope that pilots will be forced to land more slowly.

All of these proposed changes are included in this issue. Please refer to the Contents for the locations.

Time to build another sailplane!




Gregory Luck, bikeabout@mac.com

Shortest day of the year. First day of winter. I'm inside for most of the day, pushing hard and getting nowhere against the framework of life. But as the door of the day begins its swing toward the longest night of the whole year, the wind picks up out of the southeast. There isn't much daylight left, but there's enough to burn.

The wind is strong enough that I leave the light lift plane at home. Two gliders go in the bag. One for medium lift and the other -- just in case -- for the big stuff. The bag goes on the bicycle and the bike goes on the street, the road, then the snow-covered dirt. The air is below freezing, but the bright sunshine and the traffic have cleared the pavement and turned the gravel road slightly muddy.

I pedal smoothly over the increasing rattle of the route, turning from gravel onto the snowy track, then onto the narrow trail that dips across the muddy gulch and climbs the ridge. The south-facing trail has mostly melted off since morning, which means a combination of snow, mud, and dry dirt. I try to ride the snow or dirt, to avoid the adobe mud that stacks up on tires and wedges into fork and frame. I ride most of the steep climb cleanly and push the parts I don't.

The bike stays below the summit, but boots, planes, pack, the wind, and I climb upward to the tabletop of the ridge. The gloves come off and I fight the joiners into the wing halves and the plugs into the receiver. Bolts into the fuse, one piece of cold tape, and switch the radio gear on. The gloves go back on as I walk to the lip, feel the bite of the wind as it tears the warmth out of the hungry winter sunshine.

Below is a mottled landscape of negatives. Where there has been shadow, there is white. Where the sun has been shining, it has blazed through to the darker earth. I pause. Then pull

back and throw, sending the deep vee of the Talus falling through the sky. It finds its speed, and then the lift, pulling away from the corrugated earth, the sharp-cut cliffs and into the ice blue sky.

The glider and I brush through the sky and paint the earth in smooth strokes that leave the same perfect patterns and colors as before. Leaving nothing while rolling past. Leaving nothing while pulling through tight turns. Leaving nothing while arcing upward through the light and plunging downward into the shadows below. Leaving nothing while covering the world in front of my eyes with grace and silence.

I leave nothing. And yet I take... something.

I gather the scene before me, the rough texture and solidity of the land. I gather the red angle of the sunlight slicing through an open sky. I gather the grip of cold that presses on my warm clothes. I gather the thick scent of mud and ice, the slight taste of dusty winter brush, the crack of sparse grass and the crystal crunch of frost underfoot. I gather the motion of my ride out here, the improbability of this winter venture, the breath and throb of the final climb to reach the solitude of this spot. I gather the wing-beats of ravens in the snow.

And I gather the sweep of the air that lifts the glider as I, not creator but interpreter, direct it into fine strokes across the sweep of the world.

What I gather shows in my grin. I'm grinning and flying when a black ridge of shadow sweeps in behind me and pulls the color out from under the glowing cliffs. I dive the plane deep into the bowl and climb back upward, burning away the speed, nudging over the lip and into my glove.

A brief dance gives the grin larger substance, and -- importantly -- returns heat to my numbing fingers. The hard disk of the sun is being cut away by the dark horizon and in moments it is gone from me. To the east a shadow melts upward to the top of the cliffs, then into the air, taking the radiance with it and leaving a duller glow from a thin streak above the western horizon. The shortest day of the year is done.

I gather and go. Down the sharp ridge trail to the bike. Then rolling steeply downward. The crunch and whir of snow and dirt gives way to a slurp as I hit a mud patch I missed on the way up. Wheels get caught in the soggy rut and wet brakes are failing, falling... And yet slowing down while going down the steepness as the mud packs up on the tire and jams into the fork and the bike rasps to a heavy halt with me still on it.

Front wheel won't turn and the bike weighs a ton. By rolling it firmly backwards, most of the mud pops loose like a sticky brick, and, again, I'm rolling down the trail while the remaining mud freezes in the chilly air.

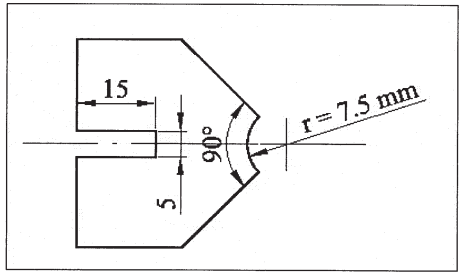
The trail becomes the track becomes the gravel road. I'm starting the longest night of the year under an open sky where the thinnest slice of crescent moon gathers strength in the growing darkness, then slips shyly below the horizon. I take what I have gathered -- a strength, of sorts, a step backward that breaks me free -- and slip slyly along the road toward home.

11.7 Section 4C Volume F3BJ – RC Soaring

F3B Thermal Soaring Gliders

a) 5.3.1.3 Characteristics of RC Gliders F3B **RC Soaring Subcommittee**

Exchange the drawing and pertinent legend:



F3B nose and tow hook template.

Reason(s): Clarification.

b) 5.3.1.7 Cancellation of a Flight and Disqualification **Germany**

Amend paragraph b) as follows:

b) The flight in progress is annulled if the model aircraft loses any part during the launch or the **whole** flight ~~time. The losing of a part during landing (i.e. in contact with the ground) is not taken into account.~~

Reason(s): Only in task A (Duration) the launch is directly followed by the flight time. In the tasks B (Distance) and C (Speed) the flight time starts later, that means that there is a not defined time gap in which the model aircraft also should not lose any part. Loosing any part during should be also forbidden because is not typical for a landing.

c) 5.3.1.7 Cancellation of a Flight and Disqualification **Germany**

Amend paragraph b) as follows:

~~b) The flight in progress is annulled if the model aircraft loses any part during the launch or the flight time. The losing of a part during landing (i.e. in contact with the ground) is not taken into account.~~

b) The flight in progress **will be penalised with 100 points if the model aircraft loses any part during the launch or the whole flight. The losing of a part in a collision with another model aircraft** ~~or during landing (i.e. in contact with the ground)~~ **is not taken in account. The penalty of 100 points will be a deduction from the competitor's final score and shall be listed on the**

Reason(s): When the model aircraft loses a fairing part (canopy, servo covers, fuselage rear end covers) during the launch or the whole flight it's not adequate to cancel the flight. 100 points penalty are enough. Loosing any part during should be also forbidden because is not typical for a landing.

d) 5.3.1.7 Cancellation of a Flight and Disqualification **Germany**

Amend paragraph e) as follows:

e) **The upwind turn around device must be fixed safely to the ground. If the pulley comes loose from its mounting support or the turn around device is torn out of the ground, the competitor gets a penalty of 1000 points. The penalty of 1000 points will be a deduction from the competitor's final score and shall be listed on the score sheet of the round in which the penalisation occurred.**

Reason(s): If the pulley comes loose from its mounting support or the turnaround device is torn out of the ground it's very dangerous for all people on the flying field. The existing rule allows discarding this zero result, when more than five rounds are flown. There should be no opportunity to reduce the penalisation for this severe violation of the safety.

e) 5.3.1.7 Cancellation of a Flight and Disqualification **Germany**

Amend paragraph f) as follows:

f) **The winch must be fixed safely to the ground. If the winch is torn out of the ground or rotating parts of the winch are separated (excluding parts of the tow-line) the flight is penalised with 1000 points. The penalty of 1000 points will be a deduction from the competitor's final score and shall be listed on the score sheet of the round in which the penalisation occurred.**

Reason(s): If the winch is torn out of the ground or rotating parts of the winch (mostly heavy parts of the drum) are ejected its very dangerous for all people standing around. The existing rule allows discarding this zero result, when more than five rounds are flown. There should be no opportunity to reduce the penalisation for this severe violation of the safety.

f) 5.3.1.8 Organisation of Starts **Germany**

Amend paragraph b) as follows:

b) The composition of the groups must be changed every round in order to have different combinations of competitors. For task A (duration), there must be a minimum of five competitors **in a group**. For task B (distance) there must be a minimum of three competitors in a group. ~~For task C (speed) a group may consist of a minimum of eight competitors or all competitors.~~ **For task C (speed) the starting order is identical with the inverted ranking calculated out of the results of all tasks flown until that moment. For the first round the starting order for task C is identical with the starting order of task A.**

Reason(s): At the very beginning of F3B there was no group scoring at any task. In the moment we have group scoring for all tasks, but it is the only a absolute good solution for task A (duration) and task B (distance); group scoring for task C (speed) does not really help very much to reduce the influence of the weather changes in short time intervals.

The only way to reduce the weather influence (not to eliminate the weather influence like in task A and task B) is to fly task C in the currently ranking of the competition at that moment. To make it a little more interesting, task C should be flown in the opposite currently ranking.

When using this system the competitors which are placed one besides the other have nearly the same weather conditions during their speed flights. We use this system at many competitions in Europe with a great success.

g) 5.3.1.8 Organisation of Starts **RC Soaring Subcommittee**

Add to the third sentence the words:

b) (...) **in a group.**

Reason(s): Clarification.

h) 5.3.1.8 Organisation of Starts **Germany**

Amend paragraph c) as follows:

c) The result of a group is annulled if only one competitor ~~is not entitled to a new working time. In this case,~~ **has a valid result. In this case,** the group will fly again and the result will be the official result.

Reason(s): Clarification.

i) 5.3.10 Safety Rules **Belgium**

Add following paragraph at the end of 5.3.1.10 as follows:

In the case the line breaks at the moment of the release of the model by its launcher, and the model subsequently lands in the area of the winch lines, the 100 points penalty is not applicable.

Reason(s): Breakage of the line at the moment of the launch happens rarely and is generally totally beyond the control of the flying team.

j) 5.3.1.10 Safety Rules **Germany**

Amend paragraph b) as follows:

~~b) Except in the circumstances described in paragraph 5.3.1.5 b) items 1, 2, 3, and 5, after release of the model aircraft from the hand of the pilot or helper, the contact of the model aircraft with any object (earth, car, stick, plant, line, etc.) or a person within the safety area will be penalised. The number of contacts during one flight does not matter (maximum one penalty for one flight). The penalty will be a deduction of 100 points from the competitor's final score and shall be listed on the score sheet of the round in which the contact occurred.~~

b) Except in the circumstances described in paragraph 5.3.1.5 b) items 1, 2, 3, and 5 or in the case of a line break in the moment of release of the model aircraft, after release of the model aircraft from the hand of the competitor or helper, the contact of the model aircraft with any object (earth, car, stick, plant, tow- line, etc.) within the safety area will be penalised with 200 points; the contact with a person within the safety area will be penalised with 1000 points. If a model is caught by someone in order to prevent physical injury, the penalty is reduced to 200 points. The number of contacts during one

flight does not matter (maximum one penalty for one flight). The penalty will be a deduction of 200 or 1000 points from the competitor's final score and shall be listed on the score sheet of the round in which the contact occurred.

Reason(s): In the past the safety area was not enough respected by the competitors, therefore it is necessary to increase the penalty for hitting an object up to 200 points. Hitting a person must be penalised higher with 1000 points. In case of a line break in the moment of release of the model the competitor should be not penalised because this is an unexpected event, outside the competitor's control.

k) 5.3.2.2 Launching **Germany**

Amend paragraph c) as follows:

c) The winch shall be fitted with a single starter motor. The starter motor must come from serial production. It is allowed to fit the arbour of the rotor with ball or needle roller bearings at each end. The drum must be driven directly by the motor. Any further change of the original motor will lead to disqualification according to paragraph B.18.1. The drum must have a fixed diameter. ~~and the width between winch drum flanges shall be 75 mm minimum.~~

Reason(s): The width between the drum flanges of 75 mm minimum was fixed during the period of the power winches with a lot of torque to prevent a quick increase of the diameter. Nowadays with the low torque we use winches with extremely wide drums to keep the diameter nearly constant during the high start; out of this reason it makes no sense to stay on a minimum width between the drum flanges nowadays.

l) 5.3.2.2 Launching **Belgium**

Amend paragraph h) to read:

h) **The internal resistance of the motor must be at least 18.0 milliohms. The allowed resistance may be obtained by adding a fixed resistor(s) to the motor. The design must not allow an easy change of the total resistance at the launch line (e.g. by shorting the resistor, or resistors) except opening and closing the circuit. Resistance measurement shall be made at ambient temperature corrected to 20°C using the formula**

$R(20°C) = R(T)/(1+0.003 \times (T - 20°C))$

Reason(s): The current rule is not acceptable, as measuring with different apparatus and without taking into account the effect of temperature produces unacceptable inequalities.

m) 5.3.2.2 Launching **Germany**

Amend paragraph k) to read:

k) For the test a digital voltage-measuring instrument (accuracy less or equal **to** 1%) is used, which enables the measurement of the voltage of the battery and the output voltage from the I/U-transducer 300 ms (+-30 ms) after the current to the winch is applied. The transducer for measuring the current may be a clamp transducer (range 0-600 or 0-1000A, accuracy less or equal **to** 2%) or a calibrated resistor (0.1 mΩ,

accuracy less or equal **to** 0.5%) in the negative path of the circuit. The resistance is calculated with the formula:

Measurement with clamp transducer

$R_{tot} = 1000 \times U_b/I_{300}$

Measurement with shunt

$R_{tot} = (1000 \times U_b/I_{300}) - 0.1$

R_{tot} in mΩ , U_b in V, I_{300} in A

Reason(s): The original formula is physically incorrect in case of the shunt measurement. The shunt resistance must be subtracted, when the shunt is removed from the circuit.

n) 5.3.2.2 Launching **Germany**

Amend paragraph l) as follows:

~~l) One measurement will be taken. If the result of the first measurement is more than the limit and less than 1.3 times the limit then the winch is declared as being in accordance with the rules. If not, three more measurements will be made and the resistance of the complete circuit is the average of three consecutive measurements.~~

l) A first measurement is taken in order to check the correct functioning of the measuring equipment and is discarded.

Three subsequent measurements should be made with an interval of at least two minutes after the previous test or launch. The total resistance of the winch equipment is the average of these three respective results.

The winch equipment is declared as being in accordance with the rules if its total resistance is at least 23 mΩ.

Reason(s): One measurement is not enough to decide if a winch equipment is in order or not. On the other side the first measurement can be totally wrong, if the battery comes directly from the charger (test before the competition). To make more measurements when a winch equipment has an extremely high resistance makes no sense and is waste of time. We should go back to the old rule and make a first measurement to check the measurement equipment and than make three subsequent measurements.

o) 5.3.2.2 Launching **Belgium**

Amend paragraph n) as follows:

n) **The organiser must appoint at least two processing officials, who will process all winches before the contest with a single measuring apparatus, or several measuring apparatus proven to produce reproducible results within a tolerance of 0.5 %. For any complete team, the organiser should measure a maximum of seven winches and seven corresponding batteries. Approved winch-battery combinations have to be marked and should not be checked on the field. Compliance to the rules of unprocessed winch-battery combinations can be checked at random on the field during the contest.**

Reason(s): The reason for changing the first sentence is to prevent measurements with inconsistent measuring apparatus. The intent of the second part of the paragraph is to limit the number of batteries, winches and peripheral hardware used by any team. Long distance travellers and financially less endowed teams are in clear disadvantage when the amount of towing hardware is unlimited.

p) 5.3.2.2 Launching **Germany**

Amend paragraph o) as follows:

~~o) There must be a quick release mechanism on the power lead to the battery in order to remove power from the motor in an emergency. (Connections to the battery must be removable without the need for tools).~~

o) For safety reasons there must be two solenoid switches in a serial arrangement in the high current circuit. Each of these solenoid switches must be operated by a separate hand operated pushbutton. To check the right function of the solenoid switches the two pushbuttons must be operated separately one after the other; if the winch can be operated only by one pushbutton, than the solenoid switch of the other pushbutton sticks and must be changed.

Reason(s): The less problems with our winches we have with sticking solenoid switches; it can happen, but it's very seldom. More problems we have with the foot operated push buttons lying in the grass; out of this reason we should realise a safety system that considers all eventualities and is save itself. The two hand operated pushbuttons can be integrated in one unit and can therefore be operated by one hand.

Supporting Data: See the diagram in ANNEX 7 F3B Winch Wiring Circuit.

q) 5.3.2.2 Launching **Germany**

Amend paragraph p) as follows:

~~p) The penalty for using a winch-equipment not in accordance with the rules results in zero score for the competitor for the task flown before the test.~~

p) The flight is penalised with 1000 points if the winch is not in accordance with the rules; this is valid for the flight before the test. The penalty of 1000 points will be a deduction from the competitor's final score and shall be listed on the score sheet of the round in which the penalisation occurred.

Reason(s): To use a winch that is not in accordance with the rule is a severe violation of the rule. The existing rule allows discarding this zero result, when more than five rounds are flown. There should be no opportunity to reduce the penalisation for this severe violation of the rules.

r) 5.3.2.2 Launching **Belgium**

Add new paragraph:

s) In the case of Continental and World championships, a maximum of six winches and six batteries may be used on the field by any complete team (3 pilots). Interchanging among winches and batteries while keeping compliance with the minimum resistance rule is totally under the responsibility of the team.

Reason(s): Like in proposal to change paragraph n), the intent is to limit discrimination between teams based on number of helpers, financial means, etc.

s) 5.3.2.5 Task C - Speed **Germany**

Amend paragraph h) as follows:

h) During task C the timed flight shall take place to one side of the safety line, whilst all judges / time keepers shall remain on the other side of the safety line. The side which is to be flown shall be indicated by the organisers taking into account the direction of the sun, etc.

~~The flight is annulled if, when sighted by means of an optical aid, the safety line is crossed by any part of the model aircraft.~~

The flight will be penalised with 100 points, when sighted by means of an optical aid, the safety line is crossed by any part of the model aircraft. The penalty of 100 points will be a deduction from the competitor's final score and shall be listed on the score sheet of the round in which the penalisation occurred.

Reason(s): To annul such a flight is not in order, because there is in the most cases no real danger for the people. 100 points penalty for this infraction is enough.

t) 5.3.2.8 Classification **Germany**

Amend as follows:

If only five rounds are flown, the competitor's classification is determined by the sum of all Total Scores for each round. ~~For each task, which is flown more than five times, the lowest Partial Score is omitted from the sum of all Partial Scores.~~ **If more than five complete rounds are flown the lowest partial score of each task is omitted from the sum of all partial scores.**

To decide the winner when there is a tie, the two (or all who have the equal score) competitors will fly an additional round (three tasks).

Reason(s): It makes no sense to discard tasks which are flown more than five times. We should discard only the lowest partial score of each task if we have more than five complete rounds.

u) Class F3K RC Hand Launch Gliders **Germany**

Replace the whole of the current F3K (Provisional) rules with those specified in Agenda ANNEX 7 F3K

Reason(s): The current F3K rules are based on the standards of F3K flying of the late 90ties. Many things have changed and must be specified

with new wording. Many of the old flying tasks must be cancelled due to the technical development of F3K models.

Many explanations to the organization of competitions, also under aspect of future championships, are detailed with the new proposal. It's easier to replace the complete rule, instead of a change of every rule according F3K.

v) Class F3K (Provisional) - RC Hand Launch Gliders **Germany**

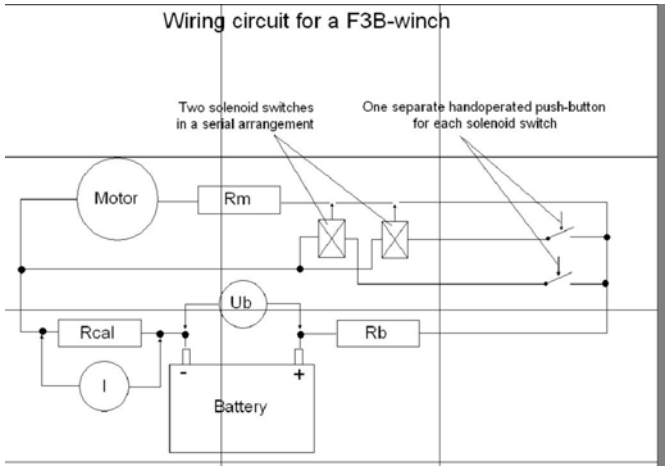
Change Class Status as follows:

~~PROVISIONAL RULES~~

CLASS F3K - RADIO CONTROLLED HAND LAUNCH GLIDERS

Reason(s): The class meets the requirements to become an official FAI rule, after the last amendment of the SC ABR, paragraph A.14.2 "Where there is great demand for a class, the Plenary Meeting may decide to waive the conditions contained in paragraph A.14.1 and adopt the provisional rules as official rules, effective from the following January."

Supporting Data: German Open Nationals F3K was very successful over the years, 2006 with a record of competitors coming from 13 nations. In order to comply with the conditions of International Championships the F3K rules had been revised (proposal from Germany). They will be accompanied by a bid to held F3K World Championships 2008 in Germany.



German Proposals for Changes to FAI F3K Rules

• Replace the whole of the current F3K (Provisional) rules (left column below and following pages) with those specified in Agenda ANNEX 7 F3K (right column below and following pages).
Reason(s): The current F3K rules are based on the standards of F3K flying of the late 90's. Many things have changed and must be specified with new wording. Many of the old flying tasks must be cancelled due to the technical development of F3K models. Many explanations to the organization of competitions, also under aspect of future championships, are detailed with the new proposal. It's easier to replace the complete rule, instead of a change of every rule according F3K.

• Change Class Status as follows: PROVISIONAL RULES CLASS F3K - RADIO CONTROLLED HAND LAUNCH GLIDERS
Reason(s): The class meets the requirements to become an official FAI rule, after the last amendment of the SC ABR, paragraph A.14.2 "Where there is great demand for a class, the Plenary Meeting may decide to waive the conditions contained in paragraph A.14.1 and adopt the provisional rules as official rules, effective from the following January."
Supporting Data: German Open Nationals F3K was very successful over the years, 2006 with a record of competitors coming from 13 nations. In order to comply with the conditions of International Championships the F3K rules had been revised (proposal from Germany). They will be accompanied by a bid to held F3K World Championships 2008 in Germany.

(CURRENT) PROVISIONAL RULES

CLASS F3K - RADIO CONTROLLED HAND LAUNCH GLIDERS

5K.1 General

A multitasking contest where RC gliders must be hand-launched and accomplish specific tasks. The contest should consist of at least five rounds.

The organiser must provide a sufficient number of timekeepers in order to allow enough simultaneous flights at all time.

(PROPOSED) RULES

CLASS F3K - RADIO CONTROLLED HAND LAUNCH GLIDERS

5.K.1. General

A multitasking contest where RC gliders must be hand-launched and accomplish specific tasks. In principle the contest should consist of at least five rounds. The organiser may announce more rounds to be flown before the start of the contest. The jury can decide, if, due to e.g. weather conditions, less rounds than announced by the organiser (also less than five rounds) will be flown and will be considered as the final result.

In principle, the organiser should provide a sufficient number of well-trained, official timekeepers in order to allow enough simultaneous flights at all time. If this is not possible, the organiser may ask competitors not involved in flying or helping another competitor to operate as official timekeepers. The official timekeeper is not allowed to assist the competitor and his personal helper in any way. The personal helper has to write

In principle, each competitor is allowed one helper who should not become physically involved in the flight. Handicapped persons may ask for assistance at launching and retrieving (catching) their model aircraft. During a competition with only one class, the competitors of less than 1.5 m height may be assisted for launching-catching.

If junior and senior classes are scored separately, the limit is 18 years of age for juniors.

The organiser should provide a transmitter impound where all transmitters are kept in custody while not in use during a flight or the corresponding preparation time. Competitors not involved in flying or helping another competitor may be asked by the organiser to operate as timekeepers.

5.K.2. Definition of model aircraft.
Model aircraft are gliders, with the following limitations.
Wingspan max. ..... 1500 mm
Weight max. ..... 600 g
Radius of the nose, minimum 5 mm in all orientations (see F3B nose definition for measurement technique).
The model aircraft must be launched by hand and are controlled by radio equipment acting on an unlimited number of surfaces.

The model aircraft can be equipped with holes, pegs or reinforcements, which allow better grip of the model aircraft by hand. The pegs must be stiff and remain a firm part of the model, neither extensible nor retractable. Devices, which do not remain a part of the model during and after the launch, are not allowed.

down the result of a flight attempt immediately, the competitor and his personal helper are entitled to read their results during the working time for information only. After the end of the working time the competitor and the timekeeper must sign the results of the round. If the result is not signed by the competitor, the score of this round is 0 points.

Each competitor is allowed one personal helper who is not allowed to become physically involved in the flight, except for retrieving the airplane, if it is landed outside the start and landing field (ref. 5.K.2.).. The personal helper as well as an official timekeeper have to stand close to the competitor during the working time on the start and landing field. Team managers are not allowed to stand inside the start and landing field, they have to position themselves outside the start and landing field.

Disabled persons may ask for assistance at launching and retrieving (catching) their model airplane. This start helper has to be different in every round, meaning that every start helper can only be used once. The competitor has to touch the start helper before each launch of the model. During a competition with only one class, the competitors of less than 1.5 m height may be assisted for launching-catching.

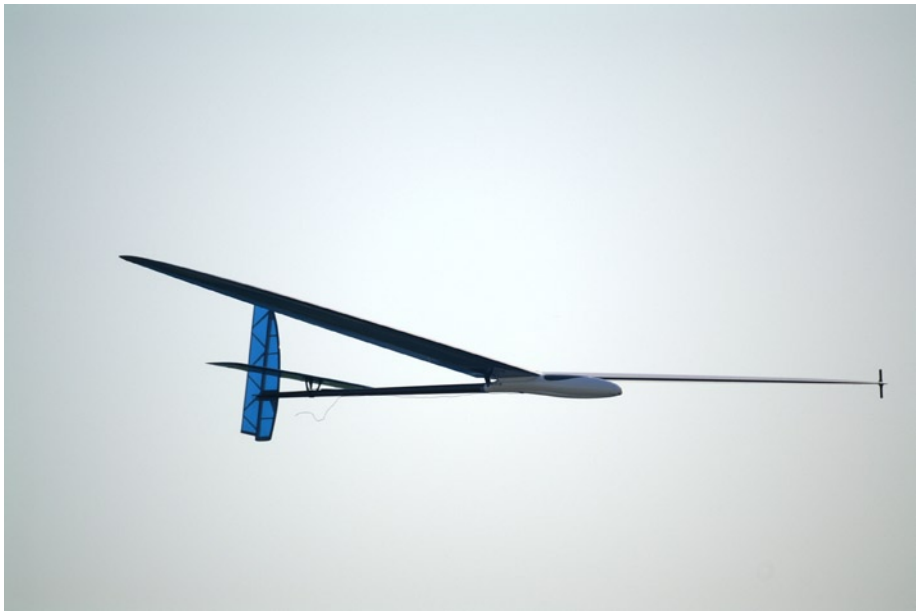
If junior and senior classes are scored separately, the limit is 18 years of age for juniors.

The organiser should provide a transmitter impound where all transmitters or antennas are kept in custody while not in use during a flight or the corresponding preparation time.

5.K.2. Definition of model airplane.
Model airplane are gliders, with the following limitations.
Wingspan max. 1500 mm
Weight max. 600 g
Radius of the nose, min. 5 mm in all orientations (see F3B nose definition for measurement technique).
The model airplane must be launched by hand and is controlled by radio equipment acting on an unlimited number of surfaces.
The use of gyros and variometers onboard the model is not allowed.

The model airplane can be equipped with holes, pegs or reinforcements, which allow better grip of the model airplane by hand. The pegs must be stiff and remain a firm part of the model within the halfspan of the wing, neither extensible nor retractable. Devices, which do not remain a part of the model during and after the launch, are not allowed.

The competitor may at any times change his model aircraft as long as they confirm to the specifications and are operated at the assigned frequency. Each competitor must provide two frequencies on which his model aircraft may be operated, and the organiser may assign any of these frequencies for the duration of any round or the complete contest.



Para B3.1 of section 4 b (builder of the model aircraft) is not applicable to class F3K. Any ballast must be inside of the model and must be fixed safe.

5.K.3. Definition of the flying field: The flying field should be reasonably level and large enough to allow several model aircraft to fly simultaneously. The main source of lift should not be slope lift. The organiser must define the launching and landing area before the start of the contest and all launching and landings should happen within this area. Any launch or landing outside this area is scored zero for the flight. A typical launching and landing area could be a rectangle 100m x 50m oriented with longer side perpendicular to the wind direction.

If the flying model loses any part during the flight, the flight is scored zero according to 5.3.1.7. If this happens during the landing (ref. 5.K.6.) of the model, the flight is valid.

The competitor may change his model airplanes at any times as long as they confirm to the specifications and are operated at the assigned frequency. Five model airplanes in total are allowed for each competitor; it is allowed to change parts between these five models. The organiser has to mark the five models and all interchangeable parts of each of the five models. The competitor may only change model airplanes during the working time, if both models are within the start and landing field. All spare models have to be positioned outside the start and landing field and can only be brought into the start and landing field for an immediate model change.

If the competitor lands outside the start and landing field, the model has to be retrieved back to the start and landing field either by the competitor or his personal helper, who is the only person allowed to help the competitor on the start and landing field; no other person, including the team manager is allowed to retrieve the model. If a model change is planned, the outside landed model also has to be retrieved back to the start and landing field before the model change can be done. A third person is not allowed to retrieve the model. While retrieving the model, it is not allowed to fly it back to the start and landing field. If a model change is planned, the outside landed model also has to be retrieved back to the start and landing field before the model change can be performed.

Each competitor must provide a min. of two frequencies on which his model airplane may be operated, and the organiser may assign any of these frequencies for the duration of the complete contest. The organiser is not allowed to change the assigned frequency of a competitor during the event. Only if a separate fly-off is flown, the organiser may re-assign frequencies to competitors for the duration of the complete fly-off.

Para B3.1 of section 4 b (builder of the model airplane) is not applicable to class F3K. Any ballast must be inside of the model and must be fixed safe.

5.K.3. Definition of the flying field: The flying field should be reasonably level and large enough to allow several model airplane to fly simultaneously. The main source of lift should not be slope lift. The organiser must define the start and landing field before the start of the contest and all starts and landings must happen within this area. The border line defining the start and landing field is part of the start and landing field. Any launch or landing outside this area is scored zero for the flight.

5.K.4. Definition of landing: A landing is considered valid if:
- the model aircraft comes to rest and at least one part of it touches the launching and landing area,
- the competitor catches the model aircraft by hand (or if competitor is handicapped, his helper, if launching was made by this person), while standing with both feet inside the launching and landing area.

Competitors may position themselves outside the start and landing field for flying their model, but starting, landing, and catching the model is allowed within the start and landing field only.

The starting and landing field should be big enough, so that each competitor has adequate space to conduct his starts and landing, at least 30 m distance to any person in the start direction. As a rough estimate, the organiser should consider about 900 m2 per competitor, i.e. a square of 30 m x 30 m. This results in about 100 m x 54 m for 6 competitors in a group, 120 m x 60 m for 8 competitors in a group and about 150 m x 72 m for 12 competitors.

In general the long side of the starting and landing field should be perpendicular to the predominant wind direction.

5.K.4. Safety and mid-air collisions: In order to guarantee the highest level of safety, any contact between a flying model and a person either on the start and landing field (except the competitor of the model) or outside the start and landing field has to be avoided. If a contact happens between a flying model either within the working or preparation time, the contest director assigns a penalty of 100 points on the total score of the competitor. In addition, if a contact happens during the starting phase of the model and during the working time of a round, this will result in a zero score for the whole round.

If the competitor is disabled, his start helper is also allowed to touch the model during start and landing, e.g. catching the model.

In cases of collisions of two or more models in the air, no re-flights or penalties for the involved competitors are granted, even if the models land outside the start and landing field, which results in a zero score of the affected flight.

5.K.5. Weather conditions: The max. wind speed for F3K contests if 9 m/s. The contest has to be interrupted or the start delayed by the contest director or the jury if the wind is continuously stronger than 9 m/s measured at two metres above the ground at the start and landing field for at least one minute.

The contest director should consider to interrupt the contest in case of rain.

5.K.6. Definition of landing: A landing of the model (and thereby the end of a flight) is defined as, when:
the model airplane comes to a rest anywhere, or
the competitor touches the model for the first time by hand or any part of his body (or if the competitor is disabled, the same applies for his start helper, if launching was made by this person).

5.K.5. Flight time: The flight time is measured from the moment the model aircraft leaves the hands of the competitor (or his helper, see above) to the moment the model aircraft comes to rest on the ground or ground based object or the competitor catches the model aircraft by hand (or his helper, see above) or the working time expires.

The flight time is official if:
- the launching happens from inside the launching and landing area and the landing happens inside this area
- the launching happens within the working time of the task

5.K.6. Definition of round: The contest is organised in rounds, each of which allocates a competitor a working time identified in the task list. The start and end of the working time are announced with a sound-signalling device. The competitors are arranged in as few groups as possible. A group should be a minimum of 5 competitors. The results are normalised within each group, 1000 points being the basis for the winner of the group. For each round, the competitors receive at least 2 minutes preparation time, as announced by the organiser. Alternatively, the working time of the

In addition, a landing as defined above is considered valid, if: at least one part of the model airplane touches the starting and landing field (or any ground based object within the start and landing field), or the competitor (or his personal helper) touches the model for the first time, while standing on the ground with both feet inside the starting and landing field.

5.K.7. Flight time: The flight time is measured from the moment the model airplane leaves the hands of the competitor (or his start helper, ref. 5.K.1.) until a valid landing of the model as defined in 5.K.6. or the working time expires.

The flight time is official if: the launch happens from inside the starting and landing field and the landing is valid according to 5.K.6., and the launch happens within the working time of the task. This means, that any flight is scored zero, if the airplane is launched before the beginning of the working time (acoustic signal). In those tasks, were max. flight times are specified, the flight time is scored up to this max. flight time only.

5.K.8. Local rules: The contest director or organiser may introduce local rules. Local rules are only possible in case of safety issues, local flying areas, but not for changes of tasks, etc.
The organiser or contest director may define certain security zones. The organiser and contest director have to ensure, that these security zones are permanently controlled by well-trained personal. A penalty of 100 points is assigned to a competitor, if: his model lands inside the security zones or touches ay ground based objects like e.g. cars or buildings, the model flies below 3 meters in the security zone.

In addition the organiser or contest director may define security zones, where flying inside the airspace above the security zone is strictly forbidden at any altitude. If a competitor flies his model inside such a forbidden airspace, a first warning is announced to the competitor. The competitor immediately has to fly his model out of the security zone as fast as possible and on the shortest way. If in the same flight the model is entering the restricted airspace again, the contest director may assign 100 points penalty to the competitor.

5.K.9. Definition of a round: The contest is organised in rounds, each of which allocates a competitor a working time defined in the task list. The start and end of the working time are announced with am acoustic device. The competitors are arranged in as few groups as possible. A group must consist of at least 5 competitors. The results are normalised within each group, 1000 points being the basis for the best score winner of the group. The result of a task is measured in seconds. The normalized scores within

preceding group may be declared the preparation time for the next group. During the preparation time, the competitor is allowed to turn on and check his radio, but is not allowed any launch of his model aircraft, either outside or inside the launching and landing area.

Maximum wind speed for F3K competitions The contest should be interrupted or the start delayed by the Contest Director or the Jury if the wind is continuously stronger than 9 m/sec measured at two metres above the ground at the launching area for at least one minute.

a group are calculated by using the following formula: normalized points = competitors score / best competitors score * 1000.

For each round, the competitors receive at least 5 minutes preparation time. This preparation time should ideally start 3 minutes before the end of the working time of the previous group (or at the beginning of the last attempt in task “all-up-last-down”), in order to save time. After the working time including the 30 seconds landing window of the previous group is over, the competitors flying in the next group receive at least 2 minutes of flight testing time, which is part of the preparation time. During this flight testing time the competitors are allowed to perform as many test flights inside the starting and landing field as needed for checking their radio and the neutral setting of their models; other competitors not flying in the next group are not allowed to perform test flights neither inside nor outside the start and landing field. A competitor receives 100 points penalty, if: he is starting or flying his model outside of the working and preparation time, he is starting or flying his model during the working and preparation time of a group, in which he is not assigned to fly.

At the beginning of a preparation time, organisers have to call the names and/or starting numbers of the competitors flying in the next group. Organisers may define a ready box next to the start and landing field, in which all competitors, their personal helper, and the official timekeeper can prepare themselves during the preparation time.

Each competitor has to ensure that he’s finished in time with his test flights and is ready to start when the working time of the group begins. The 5 last seconds before the start of the working time have to be announced by the contest director. The first moment the acoustic signal can be heard, defines the begin and end of the working time.

An example using 10 minutes of working time is:

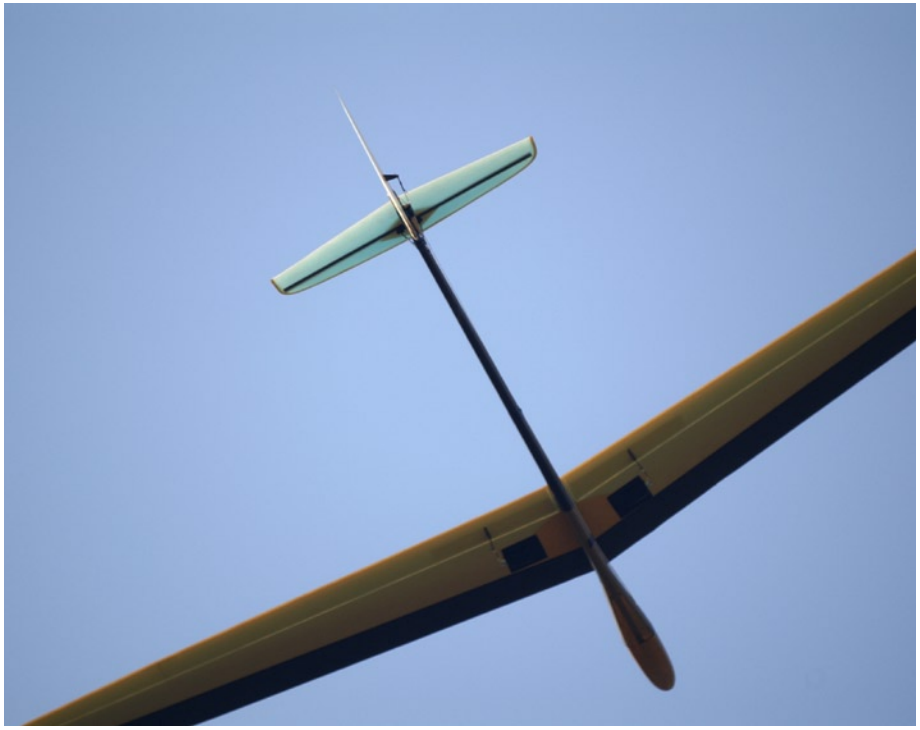
3 minutes before the working time of the previous group finishes: ”call for preparation for the following competitors …” immediately with the end of the working time plus the 30 seconds landing window of the previous group and using that countdown:

“2 minutes flight testing begins”

“30 seconds remaining until your working time begins”

“10 seconds remaining until your working time begins … your working time begins in 5, 4, 3, 2, 1, signal … halftime, 5 minutes working time remaining … 2 minutes working time remaining … 30 seconds working time remaining … 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, signal, end of working time, 30 seconds landing window … 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, signal, landing time over“

5.K.7. Final score: In case of more than 4 flown tasks the least score is crossed out, in case of more than 8 flown tasks the least two scores are crossed out. In case of a tie break the crossed out scores are taken into consideration to get a clear ranking.



5.K.8. Definition of tasks: Detailed specifications including the tasks to be flown for the day must be announced by the organiser before beginning of the contest. The tasks of the program are defined below. Depending on the weather conditions and the number of competitors, the working time may be reduced by decision of the organiser. No points are deducted for flying over the maximum flight time or for flying after the end of working time. All competitors must land as soon, as their flight or task has been completed. If the model aircraft does not land within 30 s after the end of working time (acoustic signal) the last flight has to be scored with 0 points.

TASK LIST

5.K.8.1. Task A (30 seconds or a multiple of 30 seconds):

5.K.10. Final score: At least 3 rounds have to be completed in order to get a valid final score. If 5 or more rounds are flown the lowest score is dropped, if 9 or more rounds are flown the lowest two scores are dropped. If 14 or more rounds are flown, the lowest 3 scores are dropped, if 19 or more rounds are flown, the lowest 4 scores are dropped out. If 24 or more rounds are flown, the lowest 5 scores are dropped.

All penalties points are subtracted from the final score and after the lowest scores are crossed out. Penalty points have to be shown in the final scores with an indication for the round in which they were assigned. If a competitor collected more than 300 penalty points, he will be erased from the final scores.

In case of a tie break the best dropped out score defines the ranking. If then the tie still exists, the next best dropped score (if enough rounds are flown) defines the ranking. If all dropped scores were used and a ranking can not be achieved, a separate fly-off for the involved competitors will be flown to achieve a ranking. In this case the contest jury will ad-hoc define one task that will be flown.

The organiser has the possibility to announce a fly-off prior to the beginning of the event in order to e.g. find a national, continental or world champion. The max. number of competitors in a fly-off is limited to 12, the min. number of competitors is 10-15 % of the total number of competitors of the preliminary rounds. A juniors fly-off can be done with a max. number of 2/3 of the seniors fly-off. A separate juniors fly-off is not mandatory.

A fly-off has to consist of at least 3 rounds and max. 6 rounds. If 5 or more rounds are flown, the lowest score is dropped.

If a fly-off is flown, the points of the previous rounds are not considered, every competitor starts in the fly-off with 0 seconds.

5.K.11. Definition of tasks: Detailed specifications including the tasks to be flown for the day must be announced by the organiser before the start of the contest. The tasks of the program are defined below. Depending on the weather conditions and the number of competitors, the tasks and the according working time may be reduced by decision of the organiser as defined in the task description. No points are deducted for flying over the max. flight time or for flying after the end of working time.

All competitors must land within 30 seconds after the end of the working time (acoustic signal) or for the task “all-up-last-down” after each attempt. If the model airplane lands later, the last flight will be scored with 0 points.

TASK LIST

5.K.11.1. Task B (Last flight):

During the working time, the competitor must try to accomplish the greatest number of flights, lasting 30 seconds or multiples of 30 seconds. Each completed 30 seconds increment is scored 1 point.
Examples: 1st flight is 15 s - 0 points
2nd flight is 63 s - 2 points
3rd flight is 48 s - 1 point
etc.
Minimum working time - 5 minutes.

5.K.8.2. Task B (Last flight):
During the working time, the competitor may launch the model aircraft an undefined number of times, but only the last flight is taken into account to determine the final result. The length of the flight is limited to 5 minutes. Any additional release of the model aircraft annuls the proceeding timing. When the competitor announces that he has completed his last flight (his official flight for this task), he must leave the launching and landing area, together with his timekeeper.
Minimum working time - 7 minutes.

5.K.8.3. Task C (Next to last and last flight)
Each competitor has unlimited number of flights, but only the next to last and the last flight will be added up. The last flight has to be announced after the end of this flight to the timekeeper. The competitor and helper have to leave the flying field immediately after this announcement. Max time is 180 s.
Minimum working time - 10 minutes.
Example: 1st flight 65 s
2nd flight 45 s
3rd flight 55 s
4th flight 85 s
Total 140 s

5.K.8.4. Task D (All up, last down, points):
All competitors of a group must launch their model aircraft simultaneously, within 3 seconds after the signal of the organiser. Maximum measured flight time is 3 minutes. The model aircraft that lands first gets 1 point; all successive model aircraft get an additional point. The last landing model aircraft gets an additional point. Two model aircraft landing within the same second, according to the official timing, get the same score. The next model aircraft gets two points more. All model aircraft still flying at the end of the 3 minutes slot time get the same number of points (previous + 2), provided they land inside the launching and landing area. This procedure of mass launch is repeated up to 3 flights in total during a 10 minutes working time. The new launch may be ordered after all model aircraft from the previous launch have landed. The scores of all three flights are added

During the working time, the competitor may launch the model airplane an undefined number of times, but only the last flight is taken into account to determine the final result. The max. length of the flight is limited to 300 seconds. Any additional start of the model airplane in the start and landing field annuls the previous time.
Working time: min. 7 minutes, max. 10 minutes

5.K.11.2. Task C (Next to last and last flight)
Each competitor has an unlimited number of flights, but only the next to last and the last flight will be scored.
Max. time per flight is 240 seconds for 10 minutes working time.
If the number of competitors is large, the max. flight time may be reduced to 180 seconds and 7 minutes working time.
Example: 1st flight 65 s
2nd flight 45 s
3rd flight 55 s
4th flight 85 s
Total score: 55 s + 85 s = 140 s

to obtain the final score for this task. Time of a slot may be reduced to 2 minutes if the number of competitors is large. The number of launches may be increased to five (5).
Minimum working time - 7 minutes.

5.K.8.5. Task E (All up, last down, seconds):
All competitors of a group must launch their model aircraft simultaneously, within 3 seconds after the signal of the organiser. Maximum measured flight time is 3 minutes. Each flight time of the 3 attempts of each competitor is to be added up and will be normalised to obtain the final score for this task. Time of a slot may be reduced to 2 minutes if the number of competitors is large. The number of launches may be increased to five (5).
Minimum working time - 7 minutes.
Example: Competitor A: 45+50+35 s = 130 s = 812.50 points
Competitor B: 50+50+60 s = 160 s = 1000 points
Competitor C: 30+80+40 s = 150 s = 937.50 points

5.K.8.6. Task F (Increasing time)
Each flight has to be at least 1 second longer then the previous counted flight. Number of throws is unlimited. Maximum for the first flight is 3 min. The score is counted by addition of all successful flights.
Minimum working time - 10 minutes.
Example:
1st flight 40 s
2nd flight 26 s not counted
3rd flight 29 s not counted
4th flight 42 s
5th flight 60 s
Total 142 s

5.K.8.7. Task G (Increasing time by 5 s)
Each competitor has unlimited number of flights. The first flight has to be 10 s, the second 15 s, the third 20 s and so on up to 70 s.
Minimum working time - 8 minutes.
Example:
1st flight 11 s l0 s
2nd flight 17 s 15 s
3rd flight 21 s 20 s
4th flight 28 s 25 s
5th flight 20 s 0 s
6th flight 32 s 30 s
7th flight 37 s 35 s
8th flight 38 s 0 s
9th flight 45 s 40 s
Total 175 s

5.K.11.3. Task E(All up, last down, seconds):
All competitors of a group must launch their model airplane simultaneously, within 3 seconds after the signal of the organiser. Max. measured flight time is 180 seconds. The official timekeeper takes the individual flight time of the competitor according to 5.K.6 and 5.K.7. from the release of the model and not from the acoustic signal of the contest director. All competitors must start their model within 3 seconds after the signal of the contest director. Starting a model later than 3 seconds after the acoustic signal results in a zero score for the flight. The contest director or an personal helper have to control, that all competitors start within the 3 seconds after the acoustic signal.
The landing of the model in each attempt has to be done within 30 seconds after the max. flight time. If not, the flight is scored zero. The number of launches may be min. 3 and increased up to a max. of 5 and must be announced by the organiser before the contest begins.
The preparation time between the attempts is limited to at most 60 seconds after the additional 30 seconds for landing. Thereby the competitor has at most 90 seconds after the max. flight time of the previous attempt to retrieve or change his model, or to do repairs.
Each flight time of the 3 attempts of each competitor is to be added up and will be normalised to calculate the final score for this task.
No working time needed.
Example: Competitor A: 45+50+35 s = 130 s = 812.50 points
Competitor B: 50+50+60 s = 160 s = 1000 points
Competitor C: 30+80+40 s = 150 s = 937.50 points

5.K.8.8. Task H (Increasing time by 15 s):
During the working time, the competitor may accomplish as many launches as he likes. Each competitor must try to complete a flight of 30 seconds. Once this is accomplished, the next two flight times must be incremented by 15 seconds. So flight times should be: 30 s - 45 s – 60 s - 75 s - 90 s. The longest flight time is 90 seconds. To reach any specific flight time, the number of launches is unlimited. The time of the last flight is taken into account. In adverse weather conditions, the organiser may reduce the increment to 10 seconds (30 s - 40 s, etc. up to 70 s). Flight score are given 1 point per completed second of flight. For each second of flying the competitor will get 1 point but only to the max. time of this flight - see following example).
Minimum working time - 7 minutes.
Example: (increment 15 seconds)
1st flight 32 s the max of 30 s is reached. Next flight should reach 45 seconds. Partial score is 30 points
2nd flight 38 s 45 s not reached, score 0
3rd flight 42 s 45 s not reached, score 0
4th flight 47 s the max of 45 s is reached. Next flight should reach 60 seconds. Partial score is 30 + 45 = 75 pts
5th flight 81 s the max of 60 s is reached. Next flight should reach 75 seconds. But the remaining working time is only 65 seconds.
Total score of the task is 30 + 45 + 60 = 135 points

5.K.8.9. Task I (Poker - variable target time)
Before the first launch, each competitor announces a target time to his timekeeper. He than can perform an unlimited number of launches to reach this time. If the target is reached, the target time is credited and he can announce the next target time, which can be lower, equal or higher. The announcement can be repeated 5 times. 5 flights with a reached target can be credited. The reached target times are added up.
Minimum working time - 10 minutes.
Example: Announced time Flight time Scored time
45 s 1st flight 46 s 45 s
50 s 1st flight 48 s 0 s
2nd flight 52 s 50 s
47 s 1st flight 49 s 47 s
60 s 1st flight 57 s 0 s
2nd flight 63 s 60 s
60 s 1st flight 65 s 60 s
Total 262 s

5.K.11.4. Task H (Increasing time by 15 seconds):
During the working time, the competitor may accomplish as many launches as he likes. Each competitor must try to complete a flight of more then 30 seconds. Once this is accomplished, the next flight times must be incremented by 15 seconds. So flight times should be more then: 30 s - 45 s - 60 s - 75 s - 90 s - 105 s - 120 s. The longest flight time is 120 seconds. To reach any specific flight time, the number of launches is unlimited. The time of all achieved max. flight times is taken into account. See the example below.
Working time is 10 minutes.
Example: (increment 15 seconds)
1st flight 32 s the max of 30 seconds is reached. Next flight should reach 45 seconds. Partial score is 30 points
2nd flight 38 s 45 seconds not reached, score 0
3rd flight 42 s 45 seconds not reached, score 0
4th flight 47 s the max of 45 seconds is reached. Next flight should reach 60 seconds. Partial score is 30 + 45 = 75 pts
5th flight 81 s the max of 60 seconds is reached. Next flight should reach 75 seconds. But the remaining working time is only 65 seconds.
Total score of the task is 30 s + 45 s + 60 s = 135 s

5.K.11.5. Task I (Poker - variable target time)
This task has to be flown with official helpers from the organizer. If, for any reason, the organizer does not provide official helpers, the task cannot be flown, no matter if its on the program or not. The time of the official time keeper is considered in the final scores, not the time of the helper.
Before the first launch, each competitor announces a target time to the official timekeeper. He can perform an unlimited number of launches to reach this time. If the target is reached, the target time is credited and he can announce the next target time - which can be lower, equal or higher - before he releases the model during the launch. If the target time is not reached, the announced flight time can not be changed. The competitor has to try until the end of the working time, to reach the announced flight time. Towards the end of the working time, the competitor has to announce a real time specified in minutes and/or seconds. Just calling “until the end of the working time” is not allowed. The announcement can be repeated 5 times. 5 flights with a reached target are scored. The reached target times are added up.
Working time is 10 minutes.

Example:

Announced time	Flight time	Scored time
45 s	1st flight 46 s	45 s
50 s	1st flight 48 s	0 s
	2nd flight 52 s	50 s
47 s	1st flight 49 s	47 s
60 s	1st flight 57 s	0 s
	2nd flight 63 s	60 s
60 s	1st flight 65 s	60 s

Total 262 s

5.K.8.10. Task J (3 out of 6):
During the working time, the competitor may launch his model aircraft not more than 6 times. The maximum measured flight time is 3 minutes. This time may be reduced to 2 minutes if the number of competitors is large. The sum of the three longest flights is taken for the final score. For this task the CD may decide the duration of the working time, the number of launches, the number of credited flights and the max single flight time.
Minimum working time - 7 minutes.

5.K.8.11. Task K (Three longest flights - three minutes max time per flight)
Each competitor has unlimited number of flights. Only the best three flights will be added up.
Minimum working time - 8 minutes.

5.K.8.12. Task L (Four longest flights - two minutes max time per flight)
Each competitor has unlimited number of flights. Only the best four flights will be added up.
Minimum working time - 8 minutes.

5.K.8.13. Task M (Five longest flights- two minutes max time per flight))
Each competitor has unlimited number of flights. Only the best five flights will be added up.
Maximum for one flight is 120 s.
Minimum working time - 10 minutes.

5.K.8.14. Task N (Five longest flights - one minute max time per flight)
Each competitor has 6 throws (flights). Only the best five flights will be added up.
Maximum for one flight is 60 s.
Minimum working time - 10 minutes.

5.K.8.15. Task O (Eight longest flights)
Each competitor has unlimited number of flights. Only the best eight flights will be added up.
Maximum for one flight is 60 s.
Minimum working time - 10 minutes.

5.K.11.6. Task J (3 out of 6):
During the working time, the competitor may launch his model airplane not more than 6 times. The max. measured flight time is 3 minutes. The sum of the three longest flights is taken for the final score. Max. accounted single flight time is 180 seconds. Working time is 10 minutes.

5.K.11.7. Task M (Five longest flights- two minutes max time per flight))
Each competitor has an unlimited number of flights. Only the best five flights will be added up.
Max. accounted single flight time is 120 seconds. Working time is 10 minutes.

5.K.8.16. Task P (A one, two, three and four minute flight, any order)
Each competitor has unlimited number of flights.
Minimum working time - 10 minutes.

5.K.8.17. Task Q (Total time - two minutes max time per flight)
Each competitor has eight throws (flights).
Minimum working time - 8 minutes.

5.K.8.18. Task R (Total time - three minutes max time per flight)
Each competitor has eight throws (flights).
Minimum working time - 10 minutes.

5.K.11.8. Task P (A one, two, three and four minute flight, any order)
During the working time, the competitor may accomplish as many flights as he likes. He has to achieve four different max flight times of 60, 120, 180, 240 seconds in any order. This basically means that the four longest flights flown in the working time are assigned to the four max times, so that the longest flight is assigned to 240 seconds, the 2nd longest flight to 180 seconds, the 3rd longest flight to 120 seconds and the 4th longest flight to 60 seconds. Flight seconds longer than the assigned max time are not taken into account.
Working time is 10 minutes.

Example:	Flight time	Scored time
1st flight	63 s	60 s
2nd flight	239 s	239 s
3rd flight	182 s	180 s
4th flight	90 s	90 s

Total score of this task would be 60 s + 239 s + 180 s + 90 s = 569 s

Proposals Affecting FAI F3K

Deferred:

This section contains all proposals received by the FAI Office according to rules A.6 andA.7, but not eligible to be voted on at the 2007 Plenary Meeting: rule A.12 applies. They are presented here for information and discussion and will be placed on the next appropriate Plenary Meeting agenda.

F3J Thermal Duration Gliders

DEF h) 5.6.1.3 Characteristics of RC Gliders F3J **Germany**

Amend paragraph 5.6.1.3.f as follows:

f) For the sake of randomness for the starting order among the successive rounds, each competitor must enter (three) different frequencies with 20kHz minimum spacing. The organizer is entitled to use any of these three frequencies for setting the flight matrices. Once the competitor is given one of these three frequencies he must not change to another frequency during the whole preliminary rounds in any case other than reflights. In case of a reflight ~~.T~~ the competitor can be called to use either of these three frequencies for only this reflight, so long as the call is made at least 1/2 hour prior to the beginning of the reflight in written form to the pilot (or team manager when applicable)

Reason(s): Safety. To avoid crashes of models and to set the safety level as high as possible not changing frequencies is the more reasonable way than penalizing a pilot for having forgotten to change his frequency.

Several Incidents due to that issue occurred in the recent years especially during Continental- and World Championships, which showed the necessity of not having the pilots to change frequency during the preliminary rounds of the contest. Flight paths of models out of control because operated with the wrong frequency for it has not been changed are not predictable and the possibility of a crashing model into the competitors or visitor spectator area is way too dangerous.

DEF i) 5.6.10 Scoring **Germany**

Amend 5.6.10.5 as follows, page 19:

5.6.10.5 A landing bonus will be awarded in accordance to the distance from the landing spot marked by the organisers according to the following tabulation:

Distance from Spot (meters) up to m	Points
~~1~~	~~100~~
~~2~~	~~95~~
0,2	100
0,4	99
0,6	98
0,8	97
1,0	96
1,2	95
1,4	94
1,6	93
1,8	92
2	91
3	90
4	85
5	80
6	75
7	70
8	65
9	60
10	55
11	50
12	45
13	40
14	35
15	30
over 15	0

Reason(s): Dividing the inner two meters of the 15m concentric landing zone leads to more appropriate separation of the results. Timing tenth of a second but rewarding the landing meter wise - and thereby in steps of five points – occurs not to be equalized level of fight and landing credit.

The more precision needed for a 20cm-wise landing task leads towards less speed needed for a proper approach.

Mike Walsh's Skorpion, captured in flight at the sixth 2006 event of the BMFA F3F League, the UK national league for F3F models. In medium to good conditions, the Skorpion has become the one to beat in F3F in the UK, achieving the top two places in 2006 in the hands of Mark Southall and Kevin Newton. Photo by Michael Shellim. Pentax *ist DS, ISO 200, 1/350 sec, 200mm, f5.6.

A Portable PA System for HLG Contests

Drew Arnett, Torrey Pines Gulls, San Diego, California

I wanted to find a compact self contained PA system for our monthly HLG contest series. During these contests, someone was always shouting out the window time while simultaneously trying to do a good job timing for his pilot. While this was a cheap system ($9.99 for a kitchen timer), it always seemed rather poor.

The other choice would be to set up the big and bulky PA system our club uses for the big invitational meets. However, HLG is about flying without bulky and excessive equipment. I wanted to find something compact and self contained.

On the internet, I asked for suggestions. One suggestion was to use car audio components to piece something together. Another was to use the Sonic Impact P/N 5066 amplifier ($39.99) and cheap bookshelf speakers.

Shopping for portable PA equipment, I found the Peavey Solo. (Peavey P/N 00476100 MSRP $149.99 www.peavey.com) Basically it's 10 Wrms in a 12 pound package that's approximately 12x13x7 inches.

And, it has a battery compartment built in. Perfect. I ordered one for $110 shipped from a retailer. It holds eight D cells.

MP3 players are ubiquitous and therefore the obvious choice. Useful playback modes include repeat one

track or play one track and stop. Plus, the ability to jump to the beginning of a track or stop at the push of a button is nice. I used a flash based (no moving parts) player from Creative. (Creative Zen Nano Plus MSRP $69.99 www.creative.com)

Cabling is straightforward. I used a 1/8" stereo jack to 1/4" mono plug adapter and a foot long 1/8" stereo plug to plug cable. (Radio Shack P/N 274-348 $3.99 and Radio Shack P/N 42-2497 $4.99)

This system was tested out at TPG's January HLG contest. Timing tapes, or rather, MP3s, were loaded onto the MP3 player for ten and eight minute windows. Also, a three minute window was loaded for some friendly all up last down competition after the contest.

Without cranking it up all of the way, the system worked great. It was easily heard to 50 yards. I consider that to be enough, as pilots tend to clump up during HLG contests. I loved not having to time the window as well as a pilot at the same time.

Feedback from the contestants on the new system was interesting. One contestant said that he loved the Stephen Hawking voice. Another said he would like a bit more spacing between phrases at one point in the recordings. That is easily fixed, because the recordings were, obviously, computer generated. A third participant said that the new system didn't answer his cries for how much time is left in the window. This sort of hand holding isn't available in the big contests, so it will be good practice for our farm league operation. Having his timer hold a second stopwatch for the window may be his solution.

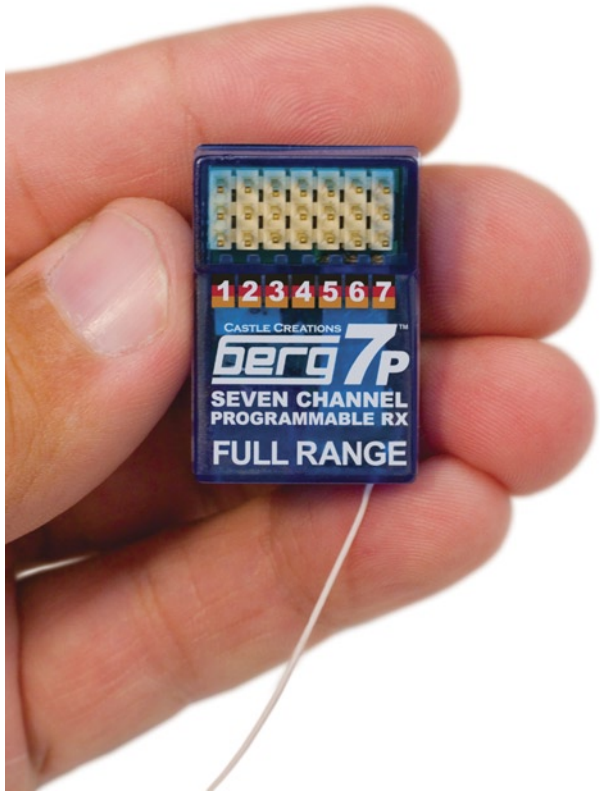
I was very pleased with this system. It cost less than two hundred dollars. If you already have an MP3 player, it would only be $120. It is small, compact, and self contained, so it fits in with the spirit of HLG. It simplified the operation of our club contests, and it was well received by all of the pilots. It works great in conjunction with the computer generated timing MP3s.

A Program to Generate Timing Tapes

I thought it would be interesting to be able to create scripts for timing tapes. The timing tapes, or rather, MP3s, would be useful for HLG contests and precision landing practice for TD contests. Besides being able to create a custom recording based on one's wishes, it makes it easy to make changes to a recording and regenerate it at the touch of a button. As it turns out, using available open source speech synthesis software, it didn't take much to write a small program to generate a recording from a script.

Here's an example script that was used for an all up last down HLG competition. There are three types of lines: comment, time stamp with something to be spoken, and time stamp with a tone to be sounded. The time stamp is given in a time line format in seconds. The tone is given in frequency and duration. The recording that is generated is dead on accurate to the time stamps. An error message will indicate if something cannot fit.

```
#          HLG 3 minute window with 1 minute lead in
-60        1 minute until a 3 minute window
-45        45 seconds until a 3 minute window
-30        30 seconds until a 3 minute window
-15        15 seconds until a 3 minute window
-10        10
-5         5
-4         4
-3         3
-2         2
-1         1
0          TONE 440 1
1*60       2 minutes left in the window 2 minutes
2*60       1 minute left in the window 1 minute
3*60-45    45 seconds
3*60-30    30 seconds
3*60-15    15 seconds
3*60-10    10
3*60-9     9
3*60-8     8
3*60-7     7
3*60-6     6
3*60-5     5
3*60-4          4
3*60-3     3
3*60-2     2
3*60-1     1
3*60       TONE 440 1
```



CASTLE CREATIONS berg 7P™

SEVEN CHANNEL PROGRAMMABLE RECEIVER

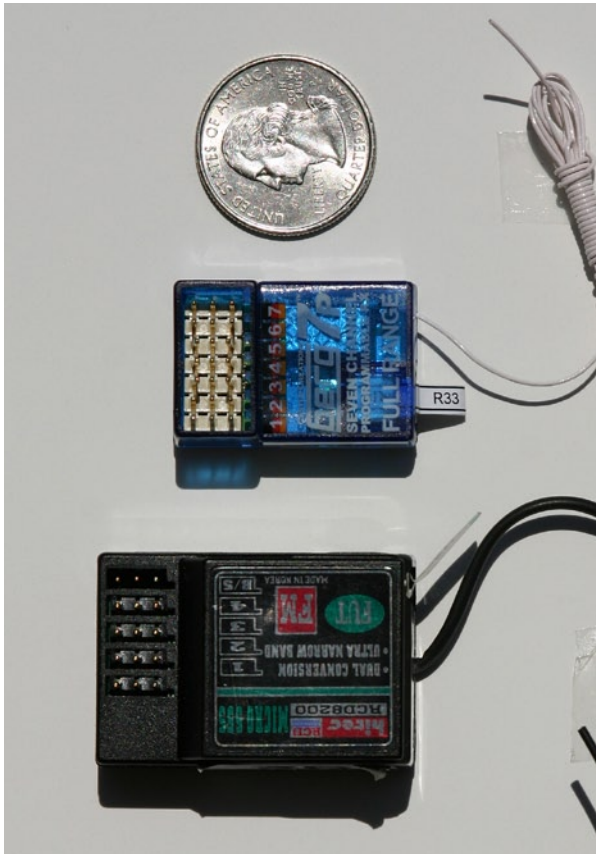
A review by Mark Nankivil, nankivil@covad.net

I've been a fan of Castle Creations' electronic speed controllers (ESCs) for years, having experienced excellent results with both their brushed and brushless ESCs. Castle Creations donated a number of their new Berg 7P 7 channel micro receivers as raffle prizes at the World Soaring Masters this past September, and when I saw how small and light the receiver was, I knew I needed to obtain one for use in an upcoming project. Lee Estingoy with Castle Creations was kind enough to grant my wish and send one my way for review.

When the package arrived in the mail, I was still quite impressed with how small this full range seven channel receiver is. If I were to have come across this receiver at the local hobby shop, my first inclination would have been to think of it as a micro receiver for use in only Park Flyer type applications. As I read further about the Berg 7P capabilities, it was clear that such an impression would have been way off base!

The obvious first thing is the size which at 0.85 inches x 1.25 inches x 0.5 inches, will fit in even the slimmest of fuselages, or within the wing thickness of a flying wing. Most of us have seen or use the Hitec 555 receiver, and you can get a good idea of just how small the Berg 7P is in comparison. At only .28 ounces (that's lighter than a Hitec HS-55 servo), with the translucent blue polycarbonate case still in place, the Berg 7P can also be located in other areas of an airframe quite easily. Presently the Berg 7P comes with the connector block facing upward at one end of the receiver case but by the time you read this, it will also be available with the connector bock at the end of the receiver. The antenna wire is 30 gauge wire. I used the Berg Micro Crystal which is recommended by Castle Creations for use in their Berg receivers.

When it comes to the electronics of the Berg 7P, these are mounted using SMT (Surface Mount Technology) with assembly being made robotically. This is technically a single conversion receiver, but it is claimed to equal a dual conversion receiver in terms of filtering and signal discrimination. This is achieved through the use of True Digital Signal Processing (TDSP) and triple tuned RF circuitry with an eight pole IF ceramic filter set. Signal sensitivity is better than 1.2μV. The Berg 7P is compatible with most brands of



U.S. quarter, Berg 7P, and Hitec 555.

Berg 7P with end plugs.

transmitters and it auto detects either positive or negative shift polarity. It is not meant for use with PCM encoded signals or the Futaba 9Z series transmitter with the synthesizer module. There are seven channels available, though using all seven will require the use of a Y-connector to allow the battery and a servo to share one connection.

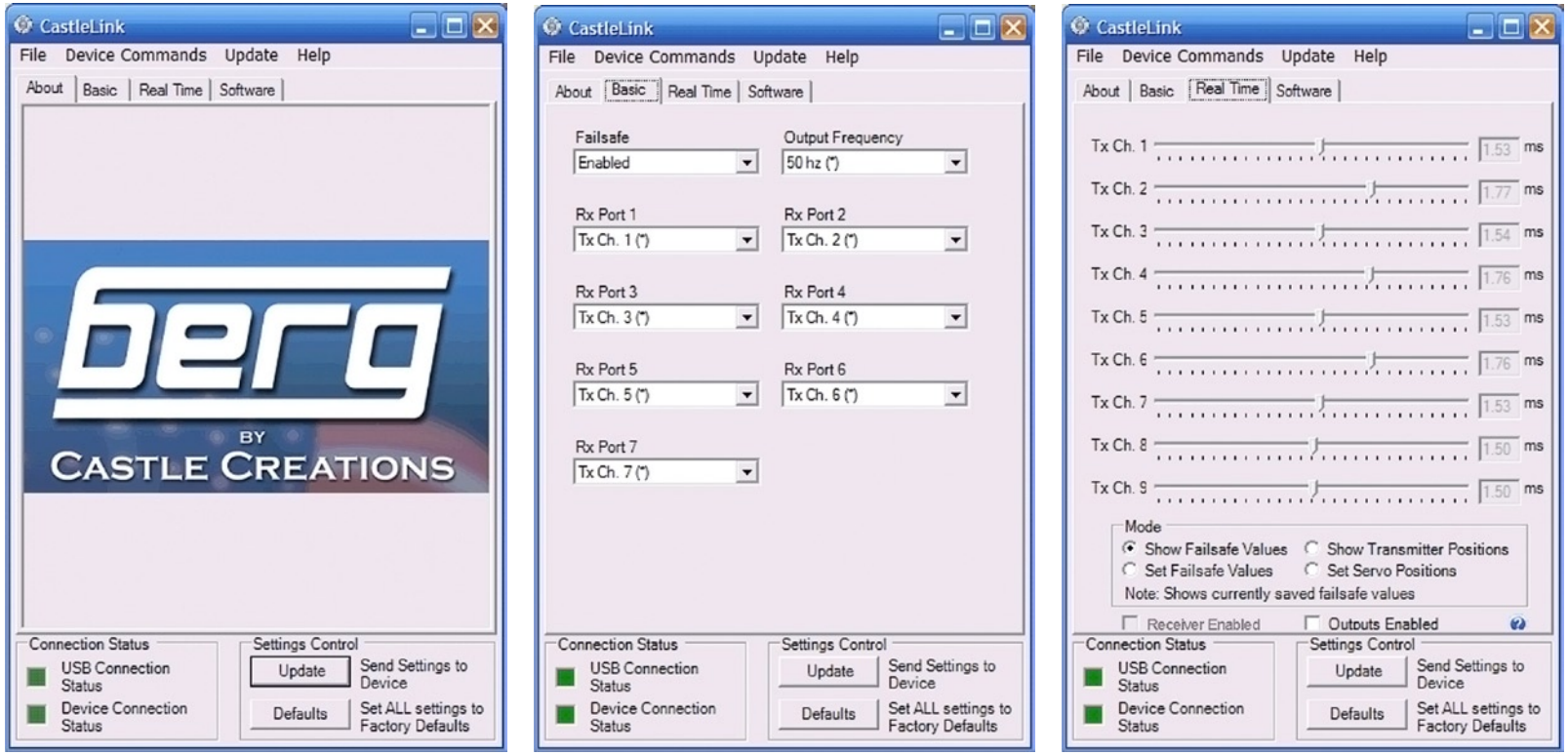
When powering up the Berg 7P, the receiver goes into a learning cycle where it acquires the characteristics of the transmitter, looking at the shift polarity, number of channels and the frame timing used by the transmitter. This all takes less than a second, and the Berg 7P will tell you via a red LED, visible through the top of the translucent case, that it has a valid transmitter signal. For the remainder of the time the receiver is powered up, it will only recognize that unique transmitter signature.

The Berg 7P comes with a short servo lead jumper that allows you to manually program features of the receiver. To do this, you need to plug in a servo into Channel 2 and then plug in the jumper to Channels 6 and 7. When the battery is plugged in and the receiver is powered up, this set up will activate the Fail Safe Mode and you'll see the servo arm wave or move continuously to confirm that the Fail Safe Mode is activated.

A fascinating feature of the Berg 7P is that it is fully programmable on your PC through the use of Castle Creations' Castle Link USB Interface Adapter. I bought the Castle Link at the local hobby shop where it was stocked as it is also used for programming Castle Creations' various brushless electronic speed controllers. The software is downloaded from Castle Creations' website and after installing the software, it was time to plug the Berg 7P in and see how the programming worked.

The initial screen tells if you have a good connection both with the USB port and with the receiver. This also is confirmed with the small circuit board that is part of the Castle Link USB Interface Adapter. There is a green LED light that comes on and stays solid and a smaller red LED that pulses when everything is correctly configured.

Programming the Berg 7P with the Castle Link software allows the user to program the fail safe positions of the servos as well as assign servos to each of the output channels. In other words, you can set up where you want your servos to go in the event of a signal loss greater than two seconds. Note though that in the event the signal is reacquired, full control is restored. You can assign or map multiple servos to the same channel for use in dual servo set ups such as flaps, split elevators, rudder and nose gear and the like. You can even assign or map the "extra" channels of a transmitter with more than 7 channels. The Castle Link software also displays the pulse



From left: Initial, failsafe and servo channel assignment, and pulse width and servo position screens.

width of the servo as well as the relative servo position. Castle Creations plans on further features becoming available in future firmware updates that will include V-tail and elevon mixing, servo reversing and other as yet unnamed options.

I did a range check of the Berg 7P receiver and easily had a solid signal (with transmitter antenna down) using my JR X388S and maintained a solid connection up to 100+ feet away. This testing was done with the receiver, servos and battery taped to a piece of foam board so that the receiver was about three feet off of the ground. The printed information that comes with the Berg 7P carries a special warning that warns you may see poor range if the receiver is very close to the ground as the receiver is tuned for flying above the ground. This may be a problem you would see when doing a range check on a model with the fuselage laying flat on the ground.

Flight testing is on hold due to the weather here in the Midwest and a lack of time to get out to the field to fly. I am confident, though, that the performance of the Berg 7P receiver will meet my expectations. I am presently scratch building a new 2 meter and the fuselage pod has a fairly low volume along the lines of a DLG so the Berg 7P will be an excellent choice for the receiver to use. Be sure to check their website out for further details on the Berg 7P and information on their full line of receivers and electronic speed controllers.

www.castlecreations.com

Tony Johnson and his Superhawk

I designed and built the Superhawk sailplane from scratch about 12 years ago as a challenge to myself to see if I could reproduce a plane that Hobie Alter said could not be reproduced by a scratch builder - the original Hobie Hawk - using the same processes and materials, but on a shoestring budget.

The gauntlet was laid down, and after a couple of years of tinkering and asking lots of questions from every source I could find, the Superhawk was born.

The prototype flew in 1996 at the SVSS field in Davis California (before I moved back to Washington State in 1997) and flew so well I decided to make it even better!

I even built a set of two meter wings for the slope. I have a set of factory prototypes that never made it into production.

I also redesigned the original “stubby” plane around the short lived legacy of the 10 foot wings (Didn’t work so hot with that small, short-coupled rudder that wagged like a dogs’ tail!) along with a modern airfoil choice of the RG-15 and the SD7037.

The fuselage was lengthened by 11" total, and the rudder area increased by about 35%. Later on I also added spoilers and an integral carbon fiber “I“ beam spar plus a thicker wing rod for winch towing.

I met up with Brian Joder, of the Hobiehawk.com website, and he contacted Dennis Ross, the original tooling owner for the Hobie Hawk, and got him onboard the project as a supplier of the original injection-molded dorsal and bellcrank assembly.

Interest peaked when Brian put it on his website and I made a few for the die hard fans out there.

I sure learned a lot about working with production tooling and vacuum bagging. It was a fun experience and a challenge, too, but I think I’ll catch thermals or lean into the breeze on Whidbey Island from now on...

Anyway, I digress... Later on, through Brian, I was able to contact Hobie Alter and arrange a meeting with him and show him the Superhawk. He has model planes hanging in his house as he still likes to tinker with a lot of things, even in official retirement!

The first thing he did was to weigh the wing of my prototype Superhawk. With

Left: Hobie Alter holding the Superhawk (yellow) and one of his factory finished original Hawks.

Right: Hobie with another version of the Superhawk - this one has a 27% larger wing and the MH32 airfoil. This is an awesome flyng plane.

a short pause he said “It’s lighter than mine!” We talked half that day about various things, and I got this great picture of him holding the Superhawk and one of his factory finished original Hawks.

He and I later got together to fly another version of the Superhawk at Skagit River Park in Mt. Vernon that sported a 27% larger wing and the MH32 airfoil. Awesome flying plane.

I also made up a V-tail version of the Superhawk. I don’t care much for thermalin’ V-tails, but gave it a shot.

The orange glider with the spoilers coming in for the landing tape is Brian Joder’s Superhawk at an RES contest in Poway, California. The spoilers are very effective in hitting the mark. He came up with the ingenious “floating arm” spoiler linkage on his Superhawk. He has more pictures and drawings posted on his build pages on hobiehawk.com.

Some info on the Superhawks that were produced:

Wing:
Span 122”
Weight approximately 300 grams per panel (11.25 ounces) unfinished.
Total wing area : 770 sq. in. (5.4 sq. ft.)
Wing loading: 7.5 ounces per sq. ft. (with 8 ounces R/C gear)
Airfoil: SD7037 on all planes (thermal type airfoil)

Left: Tony and his Superhawk at a contest in Poway California.
Right: Kit components, right out of the box.

1/32" Finland birch plywood top skin and 1/64" Finland birch ply bottom skin. Dow-Corning very high density blue foam cores. An endgrain balsa/Carbon fiber I-beam spar system is installed in the wing for extra stiffness on launching equipment. The spar extends 28" from the wing root. Wing rib bays routed and lightly sanded. Require finish sanding and covering. Spoiler bays routed and conduits installed. Spoiler panels fabricated from builders choice of material, balsa recommended for weight savings. Builder decides how to run their wires to the HS-55 servos or other.

Fuselage:
Overall length 54 inches with rudder installed
Constructed from fiberglass reinforced epoxy matrix, reinforced with Dupont Kevlar 49 aramid fiber and Hexcel carbon fiber tow. Oven cured for complete

reaction and curing of the epoxy matrix for maximum strength to weight ratio. Fiberglass reinforced injection molded polycarbonate dorsal assembly made by Ross Models, original producer of the Hobie Hawk.
Weight empty and unfinished approximately 290 grams/10.7 ounces. Pushrods are pultruded carbon fiber tubes with control pushrod ends installed. Builder solders on the brass threaded coupler on the cockpit end adjusted for his choice of radio installation.
Requires filling, primering, and painting with builders choice of finish.
RIT dye tintable CAB (Butyrate) canopy is supplied.

Empennage:
Construction same as wings but 1/64" Finland birch plywood is skinned on both surfaces. Brass control tubes installed. Approximate weight is 57 grams/2.1 ounces for all three components. Rudder has fiberglass reinforced injection molded root rib supplied by Ross Models. Surfaces routed out for weight savings and ribbed appearance. Require finish sanding and finishing with choice of covering material.

Hardware kit:
Includes thorough instruction manual, “Hobie Happenings” DVD from Brian Joder of Hobiehawk.com. Pine blocks for wing and tail tips are supplied as well as wing and tail rods. Brass threaded pushrod ends, 1/16” ball-link servo hardware, and canopy screws are included.
Towhook, if desired, is supplied and installed by builder. Several types are available that are satisfactory. The Superhawk is winch launch capable if used conservatively due to the spar system installed in the wing. A minimum of a heavy duty high start is recommended.
Radio gear should be three channels (rudder, spoiler, elevator - RES) and a fancy computer radio is not required at all.

Tony and his Superhawk at a contest in Poway California

Left: The V-tail Superhawk on the ground.
Upper right: The Superhawk at the Northwest Model Expo, where it won first place in the RC sailplane category.
Right: Brian Joder's Superhawk comes in for a landing. He has more pictures and drawings of his "floating arm" spoiler linkage posted on his build pages on hobiehawk.com.

Total weight of the unfinished airframe is approximately. 37-39 ounces. Radio gear, paint, covering and miscellaneous hardware excluded.

Brian's website gives much more archival information on the plane than I can tell you about. It is a great site. Once again it is Hobiehawk.com.

Whidbey Island, Washington
Winter Sloping at Fort Ebey

Sanders Chai, sanderschai@yahoo.com

One of the best perks of living in the Northwest is the proximity to water. Certainly it enhances a slope soaring experience as it did this past January on Whidbey Island.

During World War II the US government created gun installations to protect from a potential water invasion. Fort Ebey is currently a beautiful State park that allows visitors to hike and view one such set of historic battlements — and fly right off the predominantly west facing bluffs over the waters of beautiful Puget Sound.

On this particular blustery but sunny January afternoon, Fort Ebey winds clocked in at 30+ from the WNW. Landing on the cropped grass field to the north of the launch site was OK, perhaps a tad turbulent. Our typical landing site to the south on this day was populated by a group of friendly paragliders.

The tide was in the whole time but not to worry 'cuz the lift was great. You could fly real low; even I, the perennial novice, flew mostly at eye level. Sunny skies the whole time, we had to stay to our right to avoided burning retinas. It was winter so the glair off the crystal blue waters was minimal.

Photo by Chris Ploof

The Ft. Ebey “hangar” area. Photo by Bill Henley.

The flying started before noon. Bill and I got there late after a detour to check out telescopes at Anacortes Wild Bird and Telescopes up north.

Dave maidened his LEG Le Fish, carving up the skies quite nicely. It was an appropriate setting for his carp (?) color scheme. Per Dave: “What can I say other than it does most everything well. Tail slides with a sloper is something I have never done before.”

Todd had his Bowman Hobbies JW and beautifully covered NCFM Halfpipe up.

Archie, a fellow novice, flew, lost around the bend to the south, then found his Multiplex Easyglider - I think we have a new sloping recruit!

Actually, Archie and Dave went off hiking to find the plane with no luck. Dave came back after about 20 minutes with Archie nowhere in sight. We wondered how wet he was getting, knowing him being so sure footed. Some folks appeared with a white foamie and I thought “Cool! More folks joining us.” The plane looked oddly familiar, though, and if it was to fly, it would need a bit more grace from God. Alas, Archie’s plane, but without Archie! The hikers kindly handed the bashed plane over, with Archie coming over the hills soon after.

The thing is, these Easygliders are so fun, inexpensive and well, expendable, Archie had an easy attitude about the ordeal. I jealously figured he got some good hiking from a typically sedentary hobby!

I’ve flown an Easyglider on a slope before, before I myself biffed it at Discovery Park. It is a well behaved craft. Erik, who maidened it for me up at Sentinel Gap last summer, once remarked it was too slow (for his taste: “Hmm, maybe if we cut the winglets off, it would get some more speed.”). The 2.5 meter version coming out this year should be a hoot. I am pretty tempted.

we also shared the field with about a dozen paragliders

Chris was out with his SoarUSA 60" moldie, the Scorpio I think. Funny how Chris and I had been exchanging messages on RCGroups for about three months now discussing Whidbey wind conditions. We finally met today, but only to realize we had met this past summer at (long live!) 60 Acres at one of the HLG fun flies!

Ed, another local, had his homemade foam Me-163 up early. I missed that, but he also had a Zagi combat wing zipping around with some very entertaining decals.

Bill flew his homemade PSS, and a NCFM Bluto. I even got some stick time on the former. The cobbed PSS according to Bill was in part his first plane which he built with his son. I handed the transmitter over to Bill for the landing, despite his insistence that it could take it. He cartwheeled it down to a stop, nary a scratch.

I had my trusty Liftworx Red Herring out. Too turbulent for my Art Hobby Falco and I, duh, forgot to bring the wing for (formerly Andy’s) beautifully built Sig Ninja, so it got to stay in one piece for another day.

Like I said, my Herring was eye level most of the time, which was a novelty for me, as most aspects of soaring are at this stage. That’s what I like about Scobie’s Herring though (which it literally is — his own personal airbrushed Herring which he sold after he loaned it out to me on a mountain soaring trip last summer!), it is so responsive but tough and forgiving. Close in and at eye level and today with a small chunk of lead, it is a blast. And when it does blast apart, which it did a few times today, it does in the right places, so all you do is tape it back together and upupandaway!

Dave Jensen's photo of his newly completed LEG Le Fish, and Bill Henley's photo of Dave piloting it over Puget Sound.

Chris Ploof

Bill Henley

We had some visitations by a few Bald Eagles and their kids the whole day. Bill tried to get some nice shots with his camera, but alas, nothing spectacular except the memories. One was of an adult who flew across us, slightly above the bluff over the water. I had never seen an eagle so up close, it looked like a monster! It floated by, headed south down along the coast looking for tastey morsels, no doubt, or perhaps just enjoying the lift.

There was also this real neat black-brown-white long haired herder-type dog who was going wild over our flight patterns. S/he was real fun, as s/he'd go back and forth the whole time, chasing our planes. Then when you, *ehem*, landed/crashed, he'd run up and stand right over the plane, not even touching it.

As I mentioned before, we also shared the field with about a dozen paragliders who for the greater part of the day had to stand around and watch us as it was too blustery. They got their turn, though, after around 3 PM, so it worked out nicely as we left around 4:00.

It was a bit of a party, they even shared their food with us! We overlapped a little, but I just kept below them as they took off and headed north up the coast and back. In total there were maximum about six paragliders up at one time. The launch was the trickiest. They were polite, though, in staying away from our hangar zone.

Next time, I do breakfast as Dave and Todd did. I think it's the Tyee Inn in Coupeville, right along the way.

Dave and Chris have posted some more photos of our adventure on RCGroups.com.

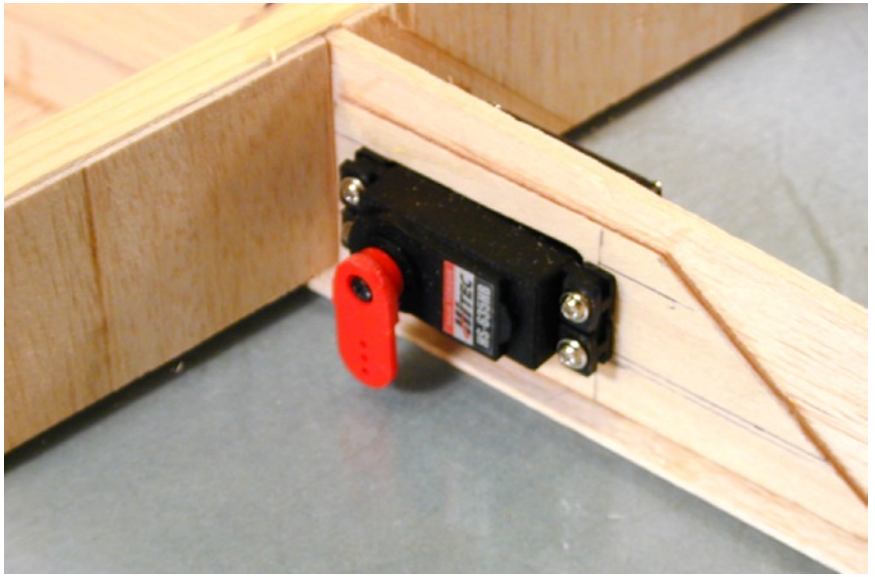
Till the next outing!

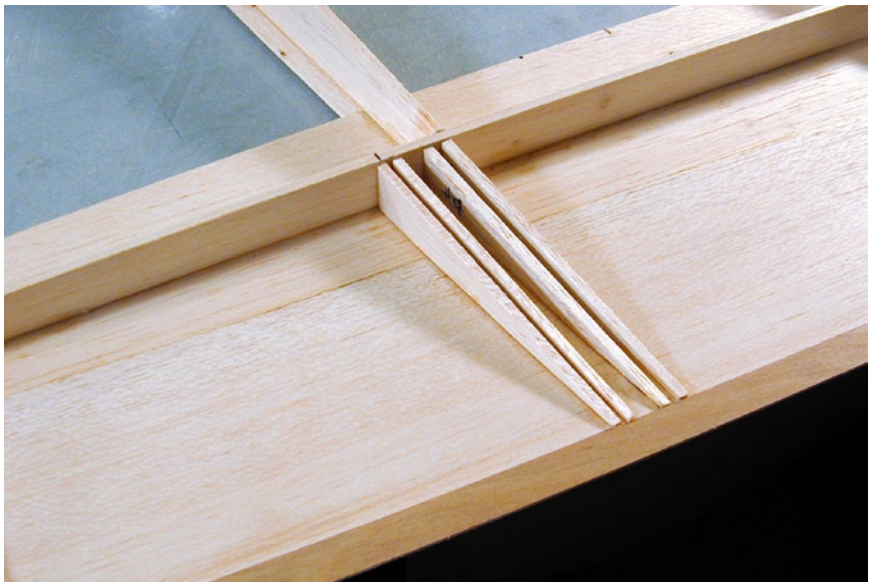
Ed flies his Me-163 while the "black-brown-white long haired herder-type" dog attentively watches another glider cross the slope. Photo by Chris Ploof.

On the 'Wing...

Bill & Bunny Kuhlman, bsquared@themacisp.net

Redwing XC, Part 2





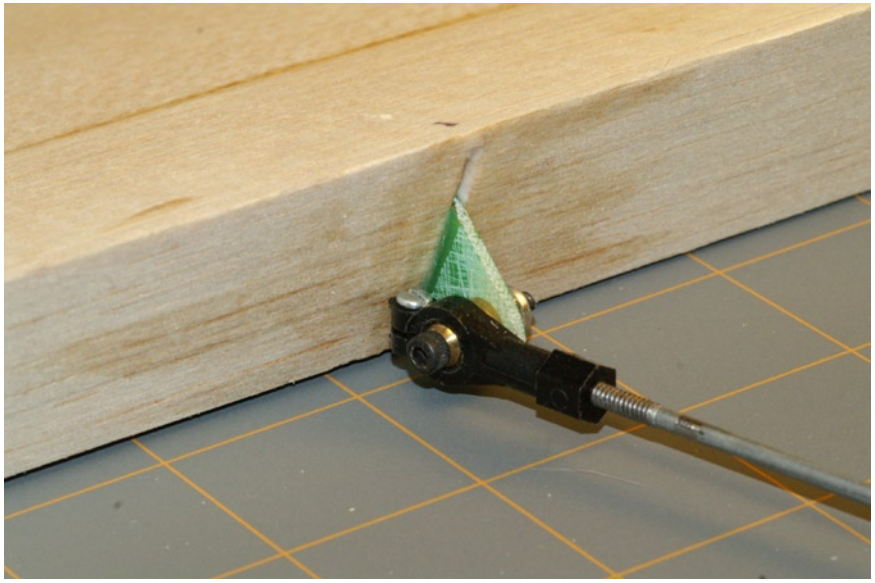
Our Redwing 2M performed admirably at the 2007 Visalia Fall Soaring Festival, putting in several good flights before a transmitter electrical problem prevented it from flying. Observers were quite impressed by its climb angle on tow. It's relatively high flying speed had raised doubts regarding its thermalling abilities, but it had no problems at all indicating lift, circling tightly, and climbing out to make the task times. Our sincere thanks to Brendon Beardsley for piloting it so skillfully.

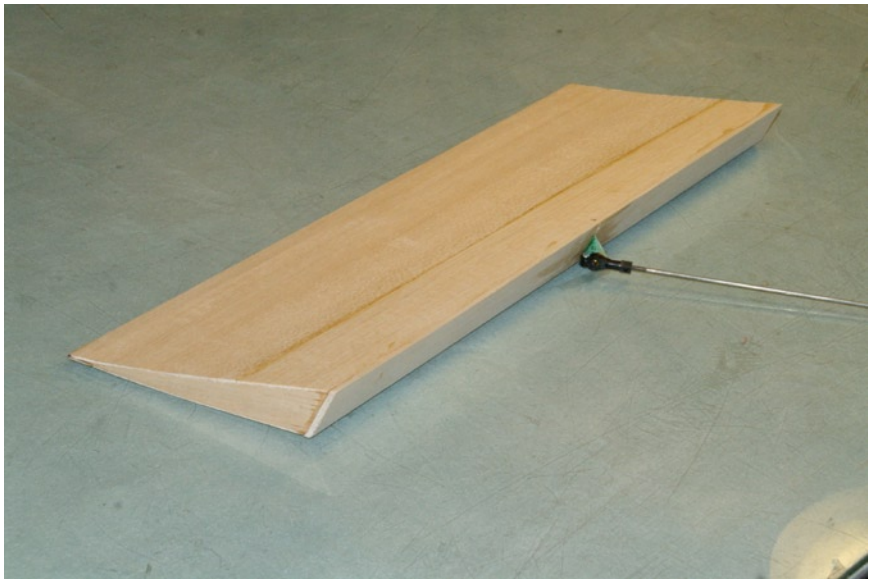
With that positive experience, we were quite excited to get back to work on the cross-country version. Things do not always work out they way we'd like, however, so it's only been recently that we've had the opportunity to actually get some more work done on the airframe.

The first project to be tackled was construction of the four horns for the control surfaces.

The wing is thick enough to completely enclose both the servos and the servo arms, as shown in the included photo, and if the control surface horn is placed on the face of the surface on the edge opposite the hinge, the entire control system can be entirely internal.

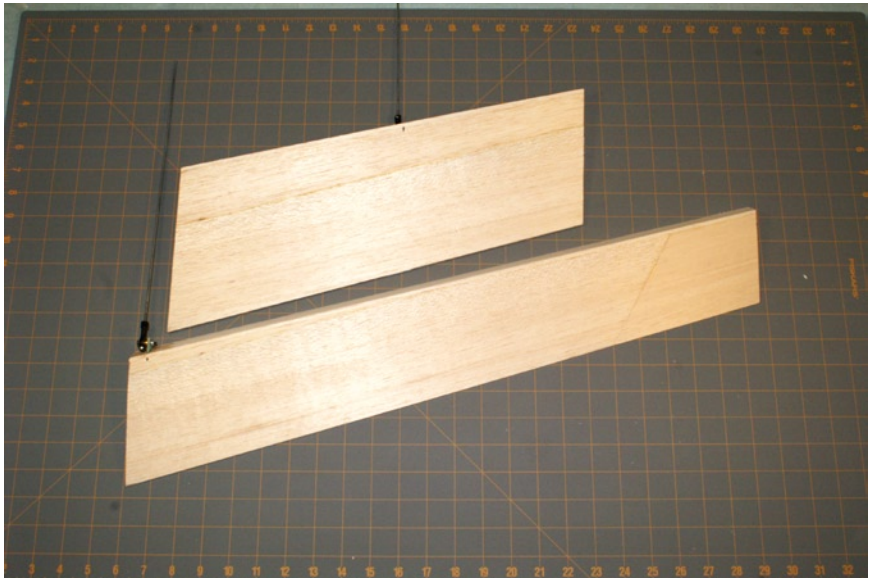
We fabricated the horns from 0.0625" printed circuit board. The material was cut using a razor saw, using the template of an adjacent rib. The lower portion of the control horn protrudes forward so the ball link clears the leading facing and is properly oriented to the hinge line to eliminate any built-in differential.





Top: The printed circuit board control horn is epoxied in a slot formed by two additional ribs.

Above: The left elevator, ready for installation.

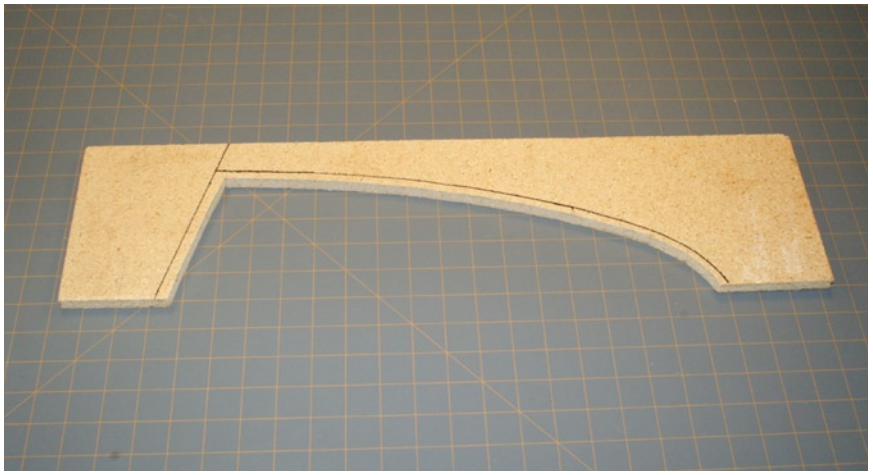


Right elevator (upper) and left aileron (lower) with control horns installed, ready for covering and hinging.

The hole for the linkage mount was then drilled out for the ball link attachment screw, and the corner was rounded using a PermaGrit sanding bar. At the same time, the face surfaces were lightly sanded to remove any coating and to roughen the surface in preparation for the epoxy adhesive. Additionally, several holes were drilled near the perimeter to assure a strong bond to the control surface.

As shown in a photo in the last installment, reproduced here on the opposite page, each control surface has a pair of additional ribs specially placed to provide a slot for the control horn and to spread stresses across a wider area.

A slurry of epoxy and microballoons was pushed into the control surface slot and spread on both sides of the control horn. With the control surface upside down on the table surface, the horn was then pushed into the slot until



*T*op: A piece of 1/2" particle board, cut to the wing tip outline with a 1/4" border. This supports the lower surface sheeting at a consistent height above the table while the top sheeting is shaped and glued into place.

Above: Trailing edge stock is used under the leading and trailing edges to support the wing. Weights on the spar hold everything solidly in place while work progresses.

the center of the ball link was directly over the protruding leading edge of the surface.

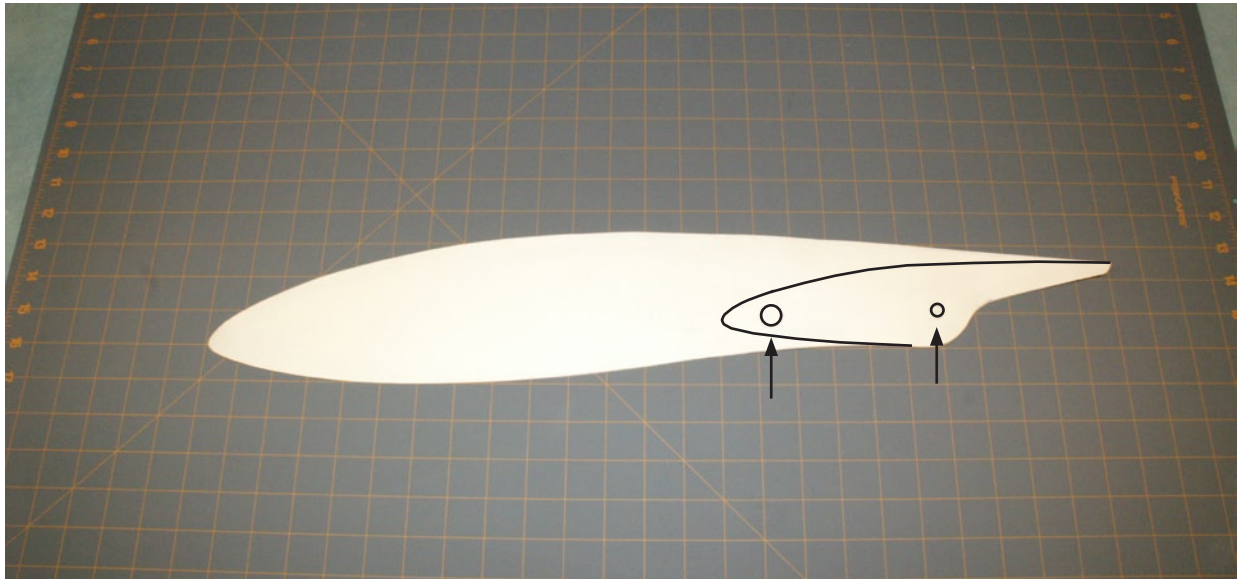
The control surface will eventually be attached to the main wing panel with a hinge made from the covering material. The distance between the hinge and the linkage pivot is 0.75" on the aileron, and 0.9" on the elevator. At the servo, the pushrod will be placed about an inch out on the arm, so the control surface will deflect to an angle a bit larger than the arm. This is particularly helpful when it comes to setting up the ailerons for “crow” deflections, when the aileron is called upon to deflect much more than when it’s simply performing its up aileron function.

We also constructed the wing tips. These hollow structures are made from 1/16th" balsa sheet tops and bottoms. The bottom sheeting is outlined with 1/32" plywood with a width of about 1/2", and one inch at the trailing edge. This substantially strengthens the edge of the wing tip and firms the trailing edge.

The wings tips are built using a thick outline of the wing tip to support the outer edge. We used 1/2" particle board, cut out so that 1/4" of the material can be placed under the entire edge of the wing tip.

The main wing panel was supported at the leading and trailing edges and weighted. The lower sheeting was then glued onto the last wing rib using a metal ruler to hold the sheeting against the rib while the glue (thin CA) hardened. The particle board outline was then moved into place and the sheeting weighted around the perimeter so the entire outer edge rested firmly on the particle board support.

The upper surface sheeting was first cut to match the compound curve at the top of the rib. While being held firmly in place, the outer edge outline was then cut, using the particle board as a backing for the cutting blade.



The forward fuselage in template form. The outline was drawn on paper, and the paper was glued to aluminum flashing material with rubber cement. Cutting this material with a pair of sturdy scissors is relatively easy, and the edge of the template is then smoothed and squared using a fine grit PermaGrit sanding bar. The outline of the wing leading edge has been enhanced. The arrows point to the location of a large diameter dowel which serves to prevent crushing of the fuselage and the location of the main wing rod. The fuselage pod will be held at two integrated points which will readily handle the landing loads.

The top wing tip sheeting was then glued into place using thin CA. Afterward, we used a PermaGrit sanding sheet to taper the interior of the sheeting to match the face of the plywood reinforcement. Once a good fit was attained, the outer edge was glued to the plywood core using thick CA.

The resulting wing tip is both lightweight and strong.

It was sort of strange to not install an antenna tube in the wing while it was being built. This is something we've included in all of our two meter Blackbird and Redwing models. The XC version, however, has a fuselage which is long enough to run the antenna internally, from the receiver to the top of the fin. In the Blackbird XC, a couple of inches of antenna wire extend back over the top of the rudder, but we anticipate the antenna will be completely internal on the Redwing XC because of the longer nose and the more forward position of the receiver.

The last project to be completed for this installment was the creation of a template to be used during the fabrication of the fuselage keel. This is the third airframe we've built using this type of front end structure. It consists of a plywood vertical keel with hollowed balsa blocks on each side. The structure is very strong in the vertical plane because of the plywood keel. Side loads are easily handled by the balsa blocks, aided by several dowel keys located around the edge of the keel.

The nose on our two meter Redwing is quite long in comparison to the nose length of the two meter Blackbird on which it's based. This is because the CG moves forward a surprising distance as the wings are swept forward. For this XC version, we considered a proportionally longer nose as well, but then decided to go with a shorter length. Our last Blackbird XC weighs 8 1/3 pounds, well below the FAI limit of 5kg (about 11 lbs.). A longer nose means less weight will be required for CG placement, but it also means more inertia in pitch, something we want to avoid. More weight and less inertia is a better way to go for this aircraft.

More next time!