VARIOMETER

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THE UPS AND DOWNS

OF THE

KANSAS SOARING ASSOCIATION

Editor: Tony Condon

Volume LVII **November 2017** **Number 10**

Paul Sodamann preparing to launch in Betty Boop

KSA CALENDAR

November 4th - Fall Work Day at Sunflower

November 11th - KSA Meeting - Landing Out - Hutchinson Community College Science Center Room 103

Nov 26th - Dec 8th - 2nd FAI Pan-American Gliding Championships - Santa Rosa de Conlara, Argentina

December 9th - KSA Meeting

2018

January 13th - 2017 KSA Banquet - Kansas Cosmosphere

February 10th - KSA Meeting

March 10th - KSA Meeting

April 14th - KSA Meeting

June 9th-16th - Region 10 North at Sunflower

Youth Scholarship Opportunities

The Soaring Society of America is excited to announce two new glider flight training scholarships for SSA Youth and Juniors. Get the word out to your eligible members now as time is short.

These awards will require the support of the organization fulfilling the awards as the allowable expenses of training will need to be invoiced to the SSA for payment.

NEW! DENNIS PURDUSKI FLIGHT TRAINING SCHOLARSHIP (December 31)
$2000 for primary training, pre-solo to solo and beyond. Details and application for are available at Dennis Purduski Flight Training Scholarship.
http://www.ssa.org/Youth?show=blog&id=4458

NEW! COSTELLO INSURACE FLIGHT TRAINING SCHOLARSHIP (December 31)
$2000 for primary training, pre-solo and post-solo students pilot to solo and rating. Description and application form are available at Costello Insurance Primary Flight Training Scholarship.
http://www.ssa.org/Youth?show=blog&id=4459

The SSA Bultman Youth Flight Scholarship has a new application deadline (December 31) and changed application. Details and a downloadable application form are at Bultman Youth Scholarship.
http://www.ssa.org/Youth?show=blog&id=2389

Frank Whiteley
Secretary, Soaring Society of America
970-330-2050 7am-10pm MDT

Notes from the President

Greetings KSA! The scheduled season has wound down and we can mark up another successful one. Thanks one and all to the towpilots, instructors, and line managers who chipped in to do their part for another great season at Sunflower. However I want to remind you that activity does not stop just because there is no flying scheduled! The towplanes are still insured. Towpilots and Instructors are still happy to fly. You'll need to send out some emails or hit the phones, but if you see a warm day coming up, lets go gliding!

Winter often provides some opportunities to do auto tows and I don't see any reason why this winter will be different. We had a 1/2 day of auto tows a few weeks ago and everyone had a good time. I know I hope to spend some time this winter perfecting my launch technique in the Cirrus, in anticipation of more soaring flights in the spring.

As usual, the Grob will not be available for flying this winter. That is usually because it is removed from flight insurance. Well, this year we have removed it from flight insurance, but we've also began sanding down the finish on the fuselage to start the process of refinishing the glider. Opportunities will abound to help with this work so keep an eye on the Soar-Kansas Yahoo! Group for a chance to help. The next planned work day on the Grob is November 11th, during the afternoon before the KSA Meeting that night.

Speaking of the KSA Meeting, we've had a change of subject for the November meeting. **Brian Bird** will be talking about landing out. This should be of great interest to new and old pilots. Whether you are thinking about starting to go cross country next season or have a few decades under your belt, time spent considering landing out is time well spent. We will be meeting at the Hutchinson Community College Science Center in room 103. This is the building that is attached to the Cosmosphere. Park at or near the Cosmosphere and enter the double door at the north end of the lot. The room is the second hall on the right.

SSA Calendars will be available at the meeting for $10 each.

The work day was a great success. **Andrew** has a report later in this issue but I wanted to make sure to thank everyone who pitched in. As we know there is no shortage of work to do at Sunflower and it takes every member of the club to keep things running.

The SSA has approved our regional sanction for a contest next summer. Dates are June 9th - 16th. **Paul Sodamann** has already volunteered to help run the ground crew. Many other volunteer positions will be needed. Think about what you might be able to contribute and we'll talk about it at the November meeting.

Locations and topics for the December, February, March, and April meetings are still needed. Finding a free place to meet is proving to become more and more difficult. If anyone has access to a good meeting place, preferably with some basic audio/video equipment, at a low price, please contact me. Even more important we need ideas for meeting topics. I challenge each member who reads this newsletter to send me one idea for a meeting. That should cover us for the next few years. abcondon@gmail.com

Finally, with the banquet right around the corner, NOW is the time to submit your flights and nominations for trophy consideration. The rules are in this newsletter and have been in the past several. I encourage you to submit as many flights as you can for as many trophies as you can. Many pilots in the past have been surprised to find out they flew much better than they thought. IGC files for flights can be submitted here: http://www.soarkansas.org/soar/scoring.aspx. Nominations for the Maintenance, Tow Operations, Governors, and Praying Mantis trophies can be emailed to ksatrophies@gmail.com. Thank you for your prompt response!

Along the same lines, if you have a KSA travelling trophy, plan to bring it to the November or December meeting.

See you at Sunflower!

Tony

Sunflower Seeds

October 14th: No flying. **Tony Condon**, **Kevin Ganoung**, **Mike Warbington**, **Mike Logback**, **Steve Damon**, and **Steve Leonard** all were present during the afternoon. Many more arrived in the evening for the KSA meeting, including **Bob Leonard**, **Mitch Hudson**, **Brian Bird**, **Matt Gonitzke**, and **Jerry Boone**. I'm sure there were more that I cannot remember.

October 15th: Flying started in the morning with Auto towing. **Mike Logback** did most of the driving, using the pulley method with new pulleys he manufactured from a trailer wheel and spindle. **Alex Hunt** completed his flight review in the 2-33. **Kirk Bittner**, **Tim Double**, and Brittany Orr helped out on the ground. **Mike Warbington** flew in and observed along with **Kevin** and **J Riedl**. **Steve Leonard** was also seen. **Harry Clayton** and **Sue Erlenwein** ran wings. **Matt Gonitzke** flew a few tows, giving a friend a ride. **Dave Pauly** and **Tony** launched in his Pipistrel to complete his flight review. The rest of the operation switched to aerotow with **Mike Logback** towing and **Brian Bird** instructing. **David Kennedy** completed his flight review and **Steve Damon** had a few lessons. **J Riedl** flew a few flights and got solo again!

October 22nd: **Bob Hinson** towed. **Dave Wilkus** (SR) and **Paul Sodamann** (Betty Boop) flew. **Mike Logback** was present. **Tony Condon** instructed, doing flights with **Cooper Dube** and **Mike Warbington**. **Keith Smith** ran wings. **David Kennedy** flew the 2-33.

October 24th: **Tony Condon** (K) attempted a downwind dash. **Jerry Boone** provided auto tow service. **KC Alexander** chased. Successful launch at 11:30 AM but early landing at Pawnee, OK for 120 miles.

October 29th: **Steve Leonard** ran the line. **Mike Logback** towed for the final day of scheduled operations. **Brian Bird** gave friend Joe Hill a ride in the Grob. **Bob Holliday** flew in in his 182 and gave a friend a ride in the Grob. **Tony Condon** then gave **Steve Damon**'s son a ride in the Grob. **Mike Orindgreff** assembled F8 and had a couple hour flight. **KC Alexander** and **John Wells** disassembled KJ for the winter. **Becky Cole** observed. **Keith Smith** (Tinkerbell) and **Paul Sodamann** (BB) both took two flights. **Brian Bird** gave **Steve Damon**

KSA Election Results

Congratulations to **Tim Double** and **Mike Logback** for being elected as KSA Directors for 2018-2019!

Work Day Report

Well, it was damp, but not raining. We had several people brave the cold and come out to get some work done.

Burned the tree piles, moved the Silver 2-33 into Hangar 1, and got all the doors rolling easy on the tee hangar! We shared some pizza, scraped some cracks, and dreamed about the future.

Thanks **Jerry Boone**, **Kevin** and **J Riedl**, **Cooper Dube**, **Matt Gonitzke**, **Bob Holliday**, **Michael Groszek**, **Jerry Martin**, and **KC Alexander**

The restrooms are still operational, we will keep them open while the Grob work continues.

Happy Landings,

Andrew Peters

KSA at EAA Jabara Fly-In Oct 22 2017

By **Bob Hinson**

I left NW Wichita before dawn with low clouds knowing things would get better (I do believe in the weather-man). Around Haven I could see the stars and **Bob Holliday** (Grob pilot for the day) had already called on his cell to say he was on his way as well. Going to be a nice day ! After getting things in order (found the new tow rope to use Yea) we launched about 30 min after dawn.

It had poured rain the night before (can't believe I didn't remember my boots to get the Grob out of the hangar pond) so took off to the North and made a circle back over Sunflower to make sure everything was ok (did not want the Grob to have to land in mud). Headed East and called Wichita Approach to let them know what we were up too. Checked the Jabara weather before takeoff and they had clear skies just like Sunflower so I was very surprised to see a cloud bank between us and Jabara. Good news was it ended just a couple of miles north so not much of a go around and Wichita Approach did a great job of steering everyone around us until we reached Jabara and we were told lots of traffic in the area.

Change frequencies and **Holliday** released and both of us landed without issues. EAA was parking planes in the grass and I followed suite and they gave me a special spot so I could exit easy. Problem was it was very soft from the rain and the 175 sank and I mean sank. Good news **Matt Boone** and his Cadet friends were there and we were able to pull it out by hand and we staged on a taxiway 1000 ft from the north end of the runway. **Matt Gonitzke** and **Paul Sodamann** worked the sign up table in the hangar while **Kevin** and **J Riedl**, **Steve Damon**, and **Robert Estagin** ran the line getting the Grob on and off the runway and getting passengers seated and belted in.

Bob Holliday did a great job of giving the flights and all passengers came back with great smiles. Even with all the come and go traffic we had a safe day with all the pilots in the area announcing their locations and intentions early which helped a lot. A total of 9 rides were given and a couple of good prospects on new members. While returning to the airport after releasing **Holliday** one of the incoming planes asked if we were still giving rides. The father daughter pair showed up and she definitely has an interest in flying so it was beneficial to have **Robert** there to explain things.

The father asked about being a tow pilot so hopefully we can get both of them involved. The trip home we again used Wichita Approach and they cleared a nice path for us. However, if you get a call from an anxious controller telling you that your glider needs to talk to you it isn't a good thing (we were in some rough air and the line was going slack). A little chat with the glider pilot and problem solved. Another great day to fly KSA !

Paul Wants Photos

I have received several nice photos of KSA members in or around their gliders. However, I would like to receive as many members photos or videos either flying or around a/your glider as possible. I am trying to put together a video for the banquet in January.

sodie6390@gmail.com

Great Plains Vintage Rally 2017

By **Matt Gonitzke**

Another year, and another wonderful Great Plains Vintage Meet has come and gone. This year's meet was held at the Wichita Gliderport from September 21-24th. In what has become a tradition, the locals and early out-of-town arrivals met to socialize over barbeque and homebrewed beer at **Matt Gonitzke**'s house, prepared with help from his parents, Dave and Joanie, on Thursday night.

On Friday morning, **Neal Pfeiffer** and Dave Oschner started working to fix the Cushman truckster at the airfield so that it could be used to move gliders around. Dave's help was key to getting it repaired. The weather included a high temperature of around 85 degrees, decent soaring, and a strong south wind. Flying on Friday were **Mike Logback** (Phoebus), **Chad Wille** and John Hardy (Bergfalke), **Tony Condon** (Standard Cirrus), and **Matt Gonitzke** (Austria SH1). At the conclusion of the day's flying, **Harry Clayton** and **Sue Erlenwein** grilled up some wonderful venison sausages and burgers. **Scott Williams** and his girlfriend, Stacy, brought up a Phoebus C project that would soon become part of the **Steve Leonard** collection.

Saturday morning began with four excellent presentations. **Tony Condon** discussed the conditions required for a long 'downwind dash' flight. Then he shared stories and photos from several of the downwind flights he has flown in his Standard Cirrus. **Neal Pfeiffer** gave a very informative presentation on the evolution of sailplane design and performance over the years, with particular emphasis on the vintage and classic designs. Simine Short presented news clippings and short video clips detailing the first glider aerotows performed by Glenn Curtiss in the early 1920s. Dave Oschner concluded with a presentation on winches for ground launching. He shared videos, pictures, and information about glider winches, for which he provided engines.

The winds lessened Saturday, making for even better soaring than the previous day. VSA pilots and gliders flying included **Tony Condon** (Standard Cirrus), **Dartanyan Ingram** (Marske Pioneer flying wing), **Chad Wille** (Sagitta), **Matt Gonitzke** (Austria SH1), John Hardy and Jim Short (Bergfalke), **Jerry Boone** (Zuni), Neal **Pfeiffer** (Ka2b), **Mike Logback** (Phoebus), and **Brian Bird** (Libelle). Partway through the day, a game of 'musical gliders' occurred; Jim Short flew **Mike**'s Phoebus, John Hardy flew **Chad**'s Sagitta, and various rides and orientation flights were flown in the local 2-33 and Grob 103. The south wind produced great cloud streets, and several pilots experienced lift up to around 7000' MSL . **Tony Condon** decided to go downwind and flew to LeMars, Iowa (a distance of nearly 600 km), with his wife **Leah** chasing him with his trailer. **Chad** and **Matt** both achieved a Silver Altitude gain.

On Sunday, a few local pilots enjoyed the brief period of soaring before overcast and overdevelopment moved in. Everyone helped with the derigging in preparation for the drives home. We all began counting down the days until we meet again next year!

Bob Holliday and **Jerry Boone** sanding on the Grob

RULES FOR KSA FLYING AWARDS, 2017

Unless otherwise noted, the following applies to all awards:

For definition of bold terms, refer to the FAI Sporting Code Section 3-Gliding.

Awards are to be made for SOARING PERFORMANCES with a START POINT in the state of Kansas.

On distance and speed flights, the maximum LOSS OF HEIGHT allowed is 1000 meters (3281 feet)

For sailplanes without a SSA handicap, a handicap will be established by the KSA Board of Directors.

If disposable ballast is on board at takeoff, any handicap will be further multiplied by .92.

Flight documentation shall be submitted in .igc format

Task Declarations may be electronic, written, or verbal

TURNPOINTS will be attained by entering an OBSERVATION ZONE

Wooden Wings

The Wooden Wings Trophy is awarded for the longest distance SOARING PERFORMANCE in a wooden winged sailplane. The task may be FREE DISTANCE or 3 TURN POINT DISTANCE.

If the COURSE is abandoned before all TURNPOINTS are achieved, the flight will be scored as the distance for the achieved TURNPOINTS, plus the distance to the next declared TURNPOINT, minus the distance from the FIX establishing a landing or starting of a MoP to the next attempted TURNPOINT, but not less than the distance to the last achieved TURNPOINT.

Mamie Cup

The Mamie Cup is awarded for the longest distance SOARING PERFORMANCE of the year. The task may be FREE DISTANCE or 3 TURN POINT DISTANCE.

If the COURSE is abandoned before all TURNPOINTS are achieved, the flight will be scored as the distance for the achieved TURNPOINTS, plus the distance to the next declared TURNPOINT, minus the distance from the FIX establishing a landing or starting of a MoP to the next attempted TURNPOINT, but not less than the distance to the last achieved TURNPOINT.

KSA Flying Horse (Silver)

The KSA Flying Horse Trophy is awarded for the highest speed achieved around a CLOSED COURSE with a maximum of two declared TURNPOINTS and OFFICIAL DISTANCE of at least 100km and less than 200km.

Dennis Brown Memorial

The Dennis Brown Memorial Trophy is awarded for the highest speed achieved around a CLOSED COURSE with a maximum of two declared TURNPOINTS and OFFICIAL DISTANCE of at least 200km and less than 300km.

KSA Flying Horse (Gold)

The KSA Flying Horse Trophy is awarded for the highest speed achieved around a CLOSED COURSE with a maximum of two declared TURNPOINTS and OFFICIAL DISTANCE of at least 300km.

Curt McNay Pilot of the Year

The Curt McNay Pilot of the Year Trophy is awarded for the best combined score in four tasks - DURATION (6 hours maximum), GAIN OF HEIGHT, Handicapped Distance, and Handicapped Speed. Each task will be scored from a different SOARING PERFORMANCE.

The Distance task may be FREE DISTANCE or 3 TURN POINT DISTANCE.

If the COURSE is abandoned before all TURNPOINTS are achieved, the flight will be scored as the distance for the achieved TURNPOINTS, plus the distance to the next declared TURNPOINT, minus the distance from the FIX establishing a landing or starting of a MoP to the next attempted TURNPOINT, but not less than the distance to the last achieved TURNPOINT.

The speed task must be a CLOSED COURSE with an OFFICIAL DISTANCE of at least 100 KM. However, a 3 TURN POINT DISTANCE of at least 200 KM may be used if you are flying a sailplane with a handicap of 1.36 or greater. In this case, a wind correction factor of 15 MPH will be subtracted from the achieved speed prior to scoring.

1000 points will be awarded the best performance in each task. Each contestant's performance will be ratioed according to the best performance in the task being evaluated. The sum of each contestant's scores will be compared, the highest being the winner.

Charles Henning Award

The intent of this trophy is to encourage more people to fly cross country.

1) The cross country task will be a CLOSED COURSE with any number of TURNPOINTS.

2) Handicapped Speed will be determined by the DURATION or 2 Hours, whichever is greater.

3) There is no limit on start or finish altitude.

5) TURNPOINTS may be any TURNPOINT published in the KSA Turnpoint File or a public use airport marked on a Sectional Chart.

6) The winner will be determined by averaging the two best tasks of the year for each pilot. The averaging will be accomplished by adding the two speeds and dividing by 2.

Lead C

Awarded to the pilot or soaring supporter who makes the most noteworthy non-achievement during the calendar year.

Praying Mantis

The Praying Mantis is awarded to the pilot who makes the most significant advance in his or her soaring ability during the calendar year. To be eligible for this award, the pilot must not yet have his or her Silver Badge at the beginning of the calendar year. The Praying Mantis selection committee consists of the KSA President, WSA President, *Variometer* Editor, WSA Chief Instructor, and the SSA State Governor for Kansas.

Towing Operations

The Towing Operations trophy is awarded to the person making the most significant contribution to the operation of the KSA Towplanes for the year.

Maintenance Trophy

The Maintenance Trophy is awarded to the person making the greatest contribution via maintaining equipment related to soaring flight during the year.

Submit flights at

http://www.soarkansas.org/soar/scoring.aspx

Call for Abstracts

International Scientific and Technical Organisation for Gliding (OSTIV)
www.ostiv.org

XXXIV OSTIV Congress

Příbram, Czech Republic
28 July – 3 August, 2018

The XXXIV Congress of the International Scientific and Technical Organisation for Gliding (OSTIV) will be held at the site of the 35th FAI World Gliding Championships in the 18m-, 20m-, and Open Class, in Příbram, Czech Republic, from 28 July - 3 August, 2018. The Congress addresses all scientific and technical aspects of soaring flight including motorgliding, hanggliding, paragliding, ultralight sailplanes and aeromodeling.

Opportunity for presentation and discussion of papers is given in the following categories:

Scientific Sessions

- Meteorology:
  Meteorological data acquisition and service for gliding operations,
  Weather forecasting for soaring flight
- Climatology:
  Climates that support soaring flight
  Climate change and soaring
- Atmospheric Physics:
  Period cycles, turbulence, boundary layer in complex terrain
  Analytical techniques of delineating thermal and mesoscale structures from routine or experimental ground or flight data, or from remote sensors
  Modeling of thermals, mesoscale or microscale structures

Technical Sessions

Technical sessions will cover all aspects of design, development and operation of sailplanes, motorgliders, ultralights and solar-or human-powered aircraft. Topics may include

- Airworthiness, structural concepts, new materials, fatigue, crash-worthiness, manufacturing processes
- Aerodynamics and flight mechanics
- Trajectory optimization
- Stability and control
- Airframe vibration and flutter
- Propulsion systems
- Design integration and optimization
- New developments in flight testing
- Airworthiness requirements
- Cockpit instruments, including navigation instruments (GPS etc.)
- Autonomous soaring

Training and Safety Sessions

Training and Safety sessions will be held on subjects covering disciplines such as

- Flight training, theory and analysis of techniques and results, psychology, objectives, training facilities and material

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Address: OSTIV c/o TU Braunschweig,
Institute of Fluid Mechanics
Hermann Blenk Str. 37
D-38108 Braunschweig, Germany

Phone: +49 531 39194250
e-mail admin@ostiv.org

- Human and medical factors in aircraft design and operation
- Piloting techniques
- Flight operation in controlled airspace
- Safety devices

Joint Sessions
Joint Sessions cover topics of general interest in the field of gliding such as
- Soaring history
- General philosophy of competition classes
- Documentation of badge and record flights
- Common interests with other air sports like hanggliding, paragliding, microlights and ultralights
- Human-powered flight; Solar-powered flight.

Deadlines for Abstracts and Final Congress Contribution
The deadline for the Abstracts - max. two A4 pages including figures - is 31 January, 2018. Letters of acceptance together with instructions for paper preparation will be mailed by 28 February, 2018. **Final four-page Summaries** of your contribution to be included in the conference booklet are requested by 1 June, 2018. Please use the form below to send a copy of your Abstract to the OSTIV Secretariat, admin@ostiv.org . This form is also available on the OSTIV Website, www.OSTIV.org

Congress Presentations
Oral presentations at the Congress will be limited to 30 minutes. There is no registration fee for the Congress. OSTIV encourages submission of full papers to the international journal Technical Soaring (ISSN 0744-8996) after the Congress.

Best Student Papers Awards
Awards of EUR 200 will be presented to the students delivering the best presentations in the Scientific and Technical Sections. To be eligible, presenters must be the first author and submit an abstract and four-page summary by the aforementioned deadlines, as well as a manuscript to Technical Soaring prior to the Congress. Students who are unable to attend the Congress may designate a representative to present the work on their behalf.

Nominations OSTIV Plaque / Klemperer Award
During the Opening Ceremony of OSTIV Congresses the OSTIV Plaque and Klemperer Award may be presented to the person who has made the most noteworthy scientific and/or technical contribution to soaring flight in recent years. All OSTIV Members can send in nominations. In making such nominations, particular attention should be given to recent contributions to soaring flight by the nominee, although earlier outstanding work also will be taken into account. Nominations should include details of the nominee's contributions and a short biography. All nominations for the OSTIV Plaque / Klemperer Award must be received by R. Radespiel, the President of OSTIV, c/o TU Braunschweig, Institute of Fluid Mechanics, Hermann-Blenk Str. 37, D-38108 Braunschweig, Germany, president@ostiv.org by 31 January, 2018.

Pre-Registration Form and Abstract

XXXIV OSTIV Congress
Příbram, Czech Republic
29 July – 3 August, 2018

Please send the pre-registration form to admin@ostiv.org by 31 January, 2018

I wish to attend the XXXIV OSTIV-Congress

I wish to present a paper at the XXXIV OSTIV-Congress

…… Scientific Session
……Technical Session
……Training and Safety Session
……Joint Session

Name: …………………

Affiliation: …………….

City, Country: ………….

E-mail: …………………

Title of paper: ………

Abstract (maximum single page):

LZ DESIGN d.o.o. • Brod 3d • SI- 1370 Logatec • Slovenija • +386(0)5 99 48 89 • info@lzdesign.si • www.front-electric-sustainer.com

9th October 2017

Dear fellow glider pilots, FES owners and electric flight enthusiasts

Since its first test flight, 8 years ago, the FES system has proven itself to be very reliable and has expanded in popularity. There are presently over 140 FES systems installed in more than 6 different sailplane types and owners have successfully completed many thousands of safe flying hours with the FES. A great deal of effort went into its development and production, but we have not stopped there. We are constantly seeking ways to improve and upgrade the system, making it better, safer, and easier to use. Our business plan also includes good worldwide customer support.

Unfortunately however, two separate fires involving FES battery packs occurred recently. We are fully committed to understanding the cause(s), preventing reoccurrence, and ensuring open communication with owners, manufacturers, aviation authorities, and the gliding community at large.

The first incident occurred at the end of May in mainland Europe. The fire started outside of normal flight a few hours after the glider was disassembled and loaded into its trailer. The battery packs were left in the fuselage compartment with the power cables from the aircraft still attached to the quick-disconnect battery terminals, meaning the FES system was still under power, but with the battery management systems inactive.

After the incident, LZ Design carefully inspected the glider and its FES system, however due to many factors, including the improper operational procedure we were unable to determine the source of the problem. The manufacturer of the affected glider provided the investigation report to the European Aviation Safety Agency (EASA).

The second incident occurred in the middle of August in the United Kingdom, immediately after the pilot had landed.

After the occurrence of the second fire, EASA decided to issue an AD (Airworthiness Directive). The AD is officially valid only for the 3 types of FES equipped gliders which are currently EASA certified, but it also extends to the glider types which are still operating on a Permit to Fly. For FES equipped gliders built to other standards (sport and recreation aircraft, microlight, kit-built, etc) it is up to the manufacturers to evaluate the available information and establish recommendations for their aircraft.

We have collaborated with the BGA (UK) and the AAIB (UK). Their investigation is not completed yet, but the AAIB recently published a Special Bulletin regarding the course of the investigation so far, with some safety recommendations, which will be implemented to all FES equipped gliders.

Both incidents are described in AAIB bulletin, available online:

(https://assets.publishing.service.gov.uk/media/59c8f175e5274a49c07f4704/AAIB_S3-2017_G-GSGS.pdf)

LZ DESIGN INVESTIGATION

We were informed about both incidents on the same day they occurred. We immediately responded and offered our full support and cooperation.

As the investigation is still ongoing and tests performed thus far are inconclusive, we cannot share all the details, just some basic data and summary.

Our summary for both cases:

-fortunately nobody was injured
-fires were quickly extinguished, so fuselage damage was mostly limited to the battery compartments
-fires occurred within the front battery packs only
-rear battery packs were largely undamaged
-same type of sailplane was affected, however this is likely just a coincidence
-both sailplanes had a low number of flying hours since new
-both occurrences involved improper operating procedures (based on the pilot reports and were not according to the Flight and/or FES manuals)

Our inspection revealed evidence of a short-circuit between cells in the upper central area of the pack. It is not clear yet if the short-circuit appeared in a single cell or between two cells as this is very difficult to pinpoint once damage has occurred.

After our investigations we performed a technical review of the battery pack construction and production process.

We have developed a few theories on possible failure modes, however we still cannot be fully sure of what started the fires.

We currently assume a combination of factors caused these incidents. Some of the scenarios are still being tested and the investigation is not completed yet.

While the official investigation is also still ongoing, we are fully dedicated to resolving the problem. We intend to fully understand what has occurred and why in order to offer a definitive solution, not just a "quick fix".

In the mean time we have prepared a draft of Inspection manual so that all GEN 2 battery packs in service can easily be checked. We have discussed the inspection procedure with different manufacturers and have tested the procedure on several battery packs which were readily available for inspection. The inspection manual has not as yet been confirmed by EASA.

Parallel to this we are also evaluating certain improvements to the construction and production process for future battery packs.

OBSERVATIONS

We would like to take this opportunity to express our concern over potential problems we have recognized over the years.

-We have put a huge amount of effort into the preparation of the FES manuals and updating

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them continuously. They are freely available in English and German languages on our dedicated website, in the downloads section. On the other hand, it has become increasingly apparent that pilots do not use their FES system as described in manuals.

-In general, the FES system is easy to operate, but it contains powerful battery packs and power electronics, which require a basic level of understanding, which should not be underestimated. Before the first flight with the FES equipped sailplane, pilots should understand how the system works and its limitations. We will propose that before the first flight with the FES, the pilot should be asked to complete and submit a questionnaire regarding proper use of the system.

-During battery pack inspections we have found that some have clear evidence of mishandling damage to the housing walls, sometimes to the degree that nearby cells are also damaged. We are considering the required use of a rugged transport box which protects the batteries from mechanical damage during transport of the batteries by car, or trailer etc. Optionally we may offer two versions of the transport box: a plastic box for basic protection and more substantial metal version for additional safety and protection. Such battery transport box must be prevented from sliding around in the vehicle.

RECOMMENDATION

-Read and understand the manuals, especially those regarding the FES battery packs and the FES FCU instrument.

-Handle the battery packs carefully; use a transportation box for battery packs in order to protect them. Please inform us in the event that a battery pack is dropped or suffers substantial impact of any kind, so that the battery pack(s) can be checked for any possible internal damage.

FUTURE

To increase safety we will implement some improvements in accordance with the BGA, AAIB and EASA recommendations.

We are planning to introduce the improvements, including a more robust battery pack housing to better protect the cells from impact and at the same time be able to withstand higher temperatures without failure of the housing in the event of fire. Also the installation of a supplemental fire warning system will be introduced, which will provide an independent fire warning in the event that the FCU is switched off or the pilot does not observe the 3 levels of warning currently offered by the FCU.

Thank you for your support and understanding as we go through the necessary investigative and technical steps to further improve the design. I am confident, that we will make our FES system even better and safer.

Best regards,

Luka Žnidaršič, LZ design d.o.o.

U.S. Department
of Transportation
**Federal Aviation
Administration**

Small Airplane Standards Branch
Policy & Innovation Division
901 Locust, Room 301
Kansas City, Missouri 64106

OCT 16 2017

Stephen Northcraft
Chairman - Government Liaison Committee
The Soaring Society of America, Inc.
PO Box 2100
Hobbs, NM 88241-2100

Subject: Provide Information Regarding Service Life Limit of Intreprinderea De Constructii Aeronautice Model IS-28B2 Gliders

Dear Mr. Northcraft :

This letter responds to your request for the FAA to provide the glider community with information related to the service life limit of the Intreprinderea De Constructii Aeronautice model IS-28B2 gliders. It has been previously noted that a former design approval holder (DAH) for the model IS-28B2 glider, IAR S.A. Brasov, released mandatory Service Bulletin (SB) No. IS-28B2 / EO-26 in March, 2004, that defined the life limits for these gliders.

The FAA will always encourage owners and operators to follow all replacement times and inspections recommended by a DAH throughout the life cycle of the aircraft in order to keep it in a safe flying condition. However, for in-service aircraft, the FAA will only mandate incorporation of DAH service information if it addresses an unsafe condition as part of an Airworthiness Directive (AD). At this time, the FAA has not issued an AD for the service life limits of the model IS-28B2 gliders.

In addition, regarding information found in the manufacturer's maintenance manual or instructions for continued airworthiness (ICA), Title 14 of the Code of Federal Regulations (14 CFR) part 91.403(c) specifies that no person may operate an aircraft unless the tasks found in the airworthiness limitations section (ALS) of either the manufacturer's maintenance manual or ICA have been complied with. Therefore, only the tasks found in the ALS are considered mandatory by the FAA under the above referenced rule. Tasks that fall in other sections of the maintenance manual or ICA are considered manufacturer recommendations by the FAA.

Furthermore, if the DAH were to issue a new or revised ALS as a type design change, this would not be considered mandatory for in-service aircraft operating pursuant to 14 CFR part 91, unless the aircraft owner/operator voluntarily incorporated the design change, or it was mandated by an AD or other rulemaking action, or it was part of a previously accepted maintenance program. See Special Airworthiness Information Bulletin (SAIB) No. HQ-16-14, dated March 28, 2016, for more information.

If you have any additional questions about the issues presented in this letter, please do not hesitate to contact Mr. Jim Rutherford, Project Officer. He can be reached by telephone at 816-329-4165, by fax at 816-329-4090, or by email at jim.rutherford@faa.gov.

Sincerely,

Jacqueline Jambor
Small Airplane Standards Branch
Manager, Project Support Section, AIR-692

Determination of new Handicaps for Evaluation of Gliders in Club Class

Translation of:

Berechnung von neuen Handicap-Faktoren für die Wertung von Segelflugzeugen in der Club-Klasse

Kai Rohde-Brandenburger

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2017

1 Introduction and Motivation

The experience in competitions over the last decades led to the fact that certain aircraft were preferred by the pilots, because some aircrafts are given an advantage in the actual handicap system. The current registrations to championships and the results show a quite clear picture. In order to revert to the original character of this class, the handicap factors would have to be changed and adjusted. In addition, efforts should be made to focus the calculation of handicap factors on more modern aircraft. The idea of a separation of the actual club class was rejected. In order to be able to evaluate all of the aircrafts in competitions, handicap factors were introduced which include the performance of the aircraft. The current handicap factors are almost identical to the DMSt index list calculated in [1] for decentralized competitions and therefore refer to a relatively untypical weather model for central competitions. The motivation of this development is a fairer evaluation of all aircrafts and thus also the use of more modern and usually also safer aircrafts for competitions. The weather model for the calculation of the factors was adapted to competition values. In addition, all current wingloadings and flight weights were included in this new calculation, which is why no aircraft has the same handicap factor for different masses. The spreading of the handicap factors was then reduced by a factor in order to continue using the current scoring system and the evaluation software at competitions.

2 Modelling of Thermals

The thermal model was adapted based on the previous models by Horstmann, Quast and Ronig. For this purpose, the amount and trend of the thermal strength was adjusted following the consideration of the valuation of flights in the German Championship in Zwickau 2015. The percentage of thermal types and level flight without sinking on the overall route were also adjusted. As a result, the average climb speed is increased and the resultant calculated cross-country speeds are faster. This makes use of areas of the measured polar, which lies in a higher speed range than before.

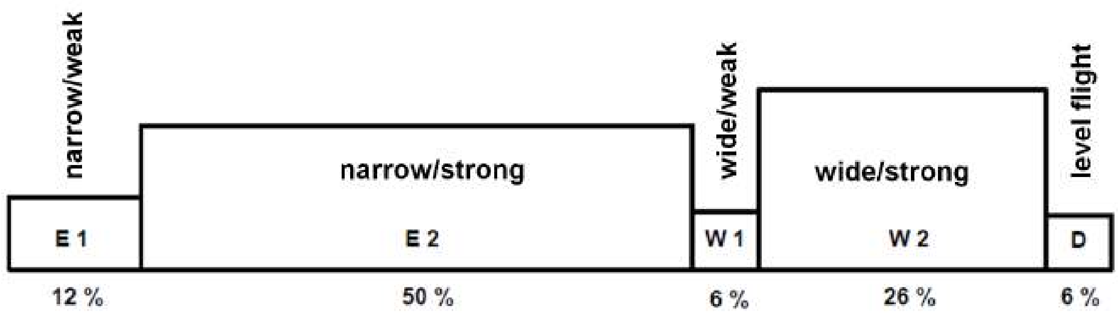

Fig. 2.1: Parts of the evaluation distance in the weather model ref. Ronig [1]

The new weather model calculates the course of the updraft velocity in the Thermal with a quadratic approach instead of an linear approach so far. In addition, thermals with weak and very narrow updrafts are removed. The old weather model simulates a DMSt cross-

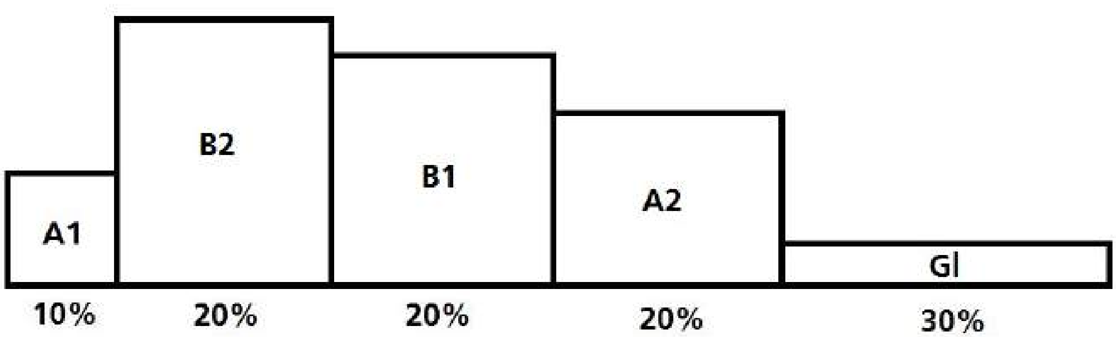

Fig. 2.2: Parts of the evaluation distance in the new weather model

country flight over a whole day, with weak thermals in the beginning, strong thermals

coefficents	Thermal A1	Thermal A2	Thermal B1	Thermal B2	GL	Unit
a	2.5	3.5	4.95	5.95	-	$[m/s]$
b	-0.00005	-0.00008	-0.00009	-0.0001	-	$[m/s/m^2]$
Part	10	20	20	20	30	$[percent]$

Table 2.1: Thermal data of the new weather model

coefficents	Thermal E1	Thermal E2	Thermal W1	Thermal W2	GL	Unit
a	3.5	4.2	2.0	4.0	-	$[m/s]$
b	-0.023	-0.02	-0.0042	-0.01	-	$[m/s/m]$
Part	12	50	6	26	6	$[percent]$

Table 2.2: Thermal data of weather model ref. Ronig [1]

over midday, and weak but wide thermals for the final aproach. The new weather model simulates a competition day, with good thermals at task start, strong thermals over the day and even at final glide.

The course of the updraft velocity in the thermals over the thermal radius is calculated with the linear approach:

$$w_{A(r)} = a + r * b \tag{2.0.1}$$

With the new quadratic approach changes this formula to:

$$w_{A(r)} = a + r^2 * b \tag{2.0.2}$$

The values for calculating the updraft in the individual thermals are shown in the tables.

The course of the updraft over the radius for all used thermals is shown in figure 2.1, to allow a comparison of the new model to the DMSt model.

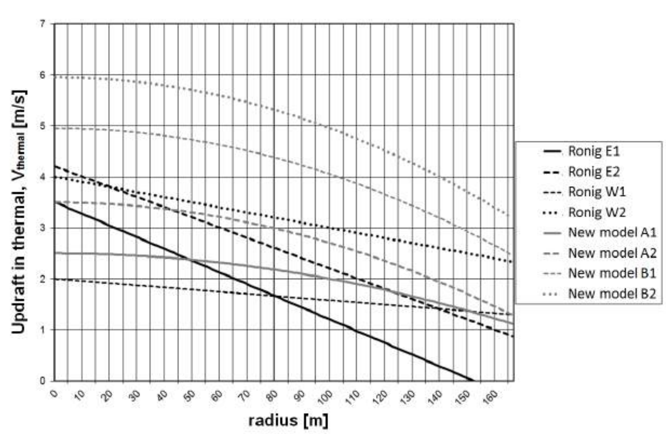

Fig. 2.3: Thermal profiles of both weather models

3 Determination of cross-country speed

While calculating the averaged cross country speed with this methods, everybody should be aware that this is a theoretical value. It shall be assumed, that the pilot is flying optimal, the circling polar is identic with the calculation from the straight flight polar, the modelling of the thermals is correct and that there is no horizontal wind. This is an often used approach to calculate new sailplane designs and to show the influence of those designs without the influence of the pilot. Approaches from across europe, which make use of the IGC-files, can only be done with a lot of flights and statistic methods. That is an interesting approach, and should be observed in the future.
Further possibilities, like the integration of the handling characteristics and the correct measurement of the circling polar are current research topics. Furthermore this is a pure thermal model, without the influence of waves and ridge lifts. It is only an attempt to include an averaged weather model. There will always be competition days with so less thermal updrafts, that some gliders can still climb and some gliders have to land or the highest glide ratio makes the result. The fair consideration of those sporadic cases is not possible in a handicaped class and should be considered by the competition director.

3.1 Polars from Flight Performance Measurements

For those calculations, the performance of the sailplane must be known. The perfomance in this case is plottet as a speed polar. This has the biggest influence in the theoretical model. Because those values are hard to calculate, and the values from the manufacturer are to good in most cases, which would lead to unfair handicaps, the measured polars of the DLR/idaflieg are used. With considerable effort, the flight performance of the majority of sailplanes was measured and catalogued over the last decades, started at 1961. Sailplanes, which are not measured yet, will be sorted into the list by experience of known sailplanes and expertise. Normally those values are not to far out, but they will be adjusted after measurement data is available.

3.2 Influence of Wingloading to Flight Performance

The wing loading has decisive influence to the flight performance. Because the wing area is constant at flight for nearly all sailplanes, the only factor is the take off weight, if water ballast is prohibited. Different pilot weights and ballast can change this weight. Over the last decades the mass of some old sailplanes increased, which led to an increase of the allowed mass. This was not taken into account for the present handicap list, so some sailplanes still have their old handicap factor for a take off mass of 330kg, but are allowed to fly at 361kg.

$$V_{WL_{new}} = \sqrt{\frac{WL_{new}}{WL_{old}}} * V_{WL_{alt}} \tag{3.2.1}$$

$$V_{S,WL_{new}} = \sqrt{\frac{WL_{new}}{WL_{old}}} * V_{S,WL_{old}} \tag{3.2.2}$$

In figure 3.1 the shift of the polar for the measured speed polar of the ASW19B from 1980 is shown. In this example, the flight performance was recalculated from the measured wingloading of 32kg/m*m to the maximum wingloading of 41kg/m*m. In club class the maximum wing loading of each glider is limited by the reference weight in [8]. Figure 3.1 only shows the maximum effect for the ASW19B.

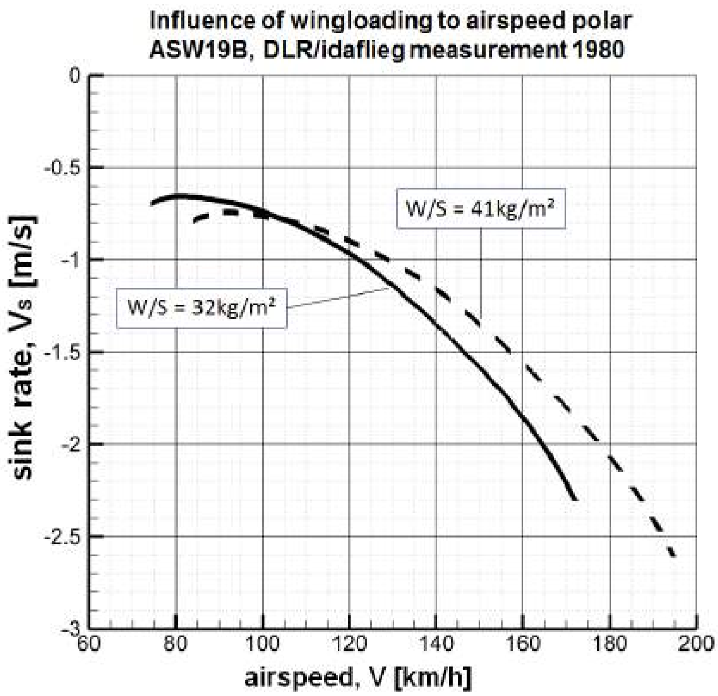

Fig. 3.1: Effect of wing loading on airspeed polar

The privious calculation by the formula above took this into account, however the glide ratio in the old calculation stayed constant for all wing loadings, just shifted to faster or slower speeds. With this calculation method, there is no big advantage in cross country speeds at higher wing loading with water ballast, even at fast thermal updrafts. This contradicts with the experience in competitions. To calculate this positive effect, a measurement of a cirrus at different wingloadings was evaluated. The factor, which was calculated from this evaluation, influences the cross country speed if the wingloading varies from the wingloading at measurement. This effect of increasing the flight performance with higher wing loadings is mentioned in [5], but not taken into account by the old calculation.

$$WL_{factor} = 1.00409 * \frac{WL_{new} - WL_{old}}{10\frac{kg}{m^2}} \tag{3.2.3}$$

$$V_{C,WL} = WL_{factor} * V_C \tag{3.2.4}$$

This increases the cross country speed with changed wingloading per 10kg/m*m variance from measurement wing loading with 0.41%. The value is selected intentional small, because every sailplane with a unequal airfoil reacts to this reynolds number caused change different. The influence is not that big, because at club class all gliders are very near to their measured wingloading. The biggest influence would have the Cirrus, because he varies most from his old measured wing loading, but the new measured polar with higher wing loading is used to calculate the new cross country speed.

3.3 Decrease of Handicap Spread

The spread of the calculated cross country speeds is higher than before, due to the new thermal models with higher climb rates and the resulting higher interthermal speeds. In this calculation, every glider is calculated for it's own. The effect of many gliders with different performance flying the same task can just be estimated. It is supposed, that a slower glider is faster and a faster glider is slower on the task, if both planes are flying together in a competition. This problem is caused by the big difference in performance in this handicaped class. To take this effect into account, a factor was created to decrease the spread to values lower than before.

To get a plausible handicap value, the value calculated the old way. After that the square

Fig. 3.2: Comparison of old and new spread in handicap system

root is calculated, which decreases the spread of the handicap to nearly 70% of the old spread.

$$H = \frac{V_{C,WL,X}}{V_{C,WL,ASW19}} \tag{3.3.1}$$

$$H_{spread} = \sqrt{H} \tag{3.3.2}$$

With this formula, the spread of the handicap is reduced consistant over all gliders.

3.4 Calculation Method

The cross country speed is calculated for each thermal part in the weather model. The climb speed for each thermal is calculated and with that value the McCready speed is determined. Therefore the measured polar of the glider is used, calculated to the wing-loading at reference weight according to Reichmann.

It is an iterative calculation, due to the real course of the sinkspeed polar. For a speed a

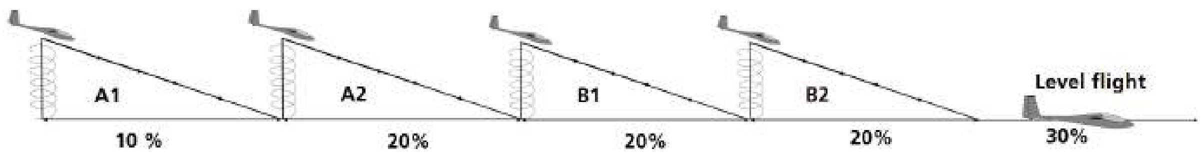

Fig. 3.3: Parts in the weather model

little lower than minimum sinking, the optimal bank angle in each thermal for best climb performance is determined. Then the cruising speed according to McCready is determined. With the sinkspeed polar, the climb speed in each thermal and the corresponding cruising speed, the cross country speed for each thermal part in the weather model can be calculated. The time needed for each part in the weather model can be summed up with the time for the straight level flight and results in the averaged cross country speed for this glider.

3.4.1 Thermal Calculation

All four thermal parts are calculated the same way. The velocity while thermaling is determined according to the speed polar. The speed polar is calculated to actual wing-loading. The minimum velocity and teh velocity at minimum sink rate are determined. The velocity on the polar for flying in the thermal is calculated with the following formula:

$$V_{K_{straight}} = \frac{(V_{S,0} + 2 * V_{S,min})}{3} \tag{3.4.1}$$

The sinking speed at the speed for flying in the thermal is determined from the straight flight polar:

$$V_{S_{K_{straight}}} = V_S(V_{K_{straight}}) \tag{3.4.2}$$

The speed polar can be calculated to the coefficent polar:

$$C_{L_K} = \frac{m * g}{\frac{\rho}{2} V_{K_{straight}}^2 * S} \tag{3.4.3}$$

$$C_{D_K} = \frac{C_{L_K}}{\frac{L}{D}_K} = \frac{C_{L_K}}{\frac{V_{K_{straight}}}{V_{S,K_{straight}}}} \tag{3.4.4}$$

The thermal updraft speed at radius r is calculated as follows:

$$V_{thermal}(r) = a + r * b^2 \tag{3.4.5}$$

The radius while circling depends on the bank angle. The speed for flying in the thermal at the straight flight polar is calculated to the circling speed, which is higher because of the higher wingloading due to radial accelaration while circling, depending on bank angle. For this the coefficents are used and the lift coefficent can be calculated to the circling speed, shown in [5]:

$$V_K(\phi) = \sqrt{\frac{2}{\rho}\frac{W}{S}\frac{1}{C_{L_K}\cos\phi}} \tag{3.4.6}$$

According to the lift coefficent, the drag coefficent can be used to calculate the sinking speed while circling, shown in [5]:

$$V_{S,K}(\phi) = \sqrt{\frac{2}{\rho}\frac{W}{S}}\frac{C_{D_K}}{C_{L_K}^{3/2}\cos\phi^{3/2}} \tag{3.4.7}$$

The relation of the bank angle and the circling radius is as follows:

$$\phi = \arctan\frac{V_K^2}{g * r} \tag{3.4.8}$$

From this calculation into coefficents and the relation of bank angle and cirling radius, the sinking speed while circling and the thermal updraft speed are depending on the radius. Now the optimal climb speed can be iterative calculated.

$$V_{climb}(r) = V_{thermal}(r) + V_{S,K}(r) \tag{3.4.9}$$

The optimal bank angle is calculated, which gives the best climb speed for the local thermal updraft and the corresponding sinking speed.

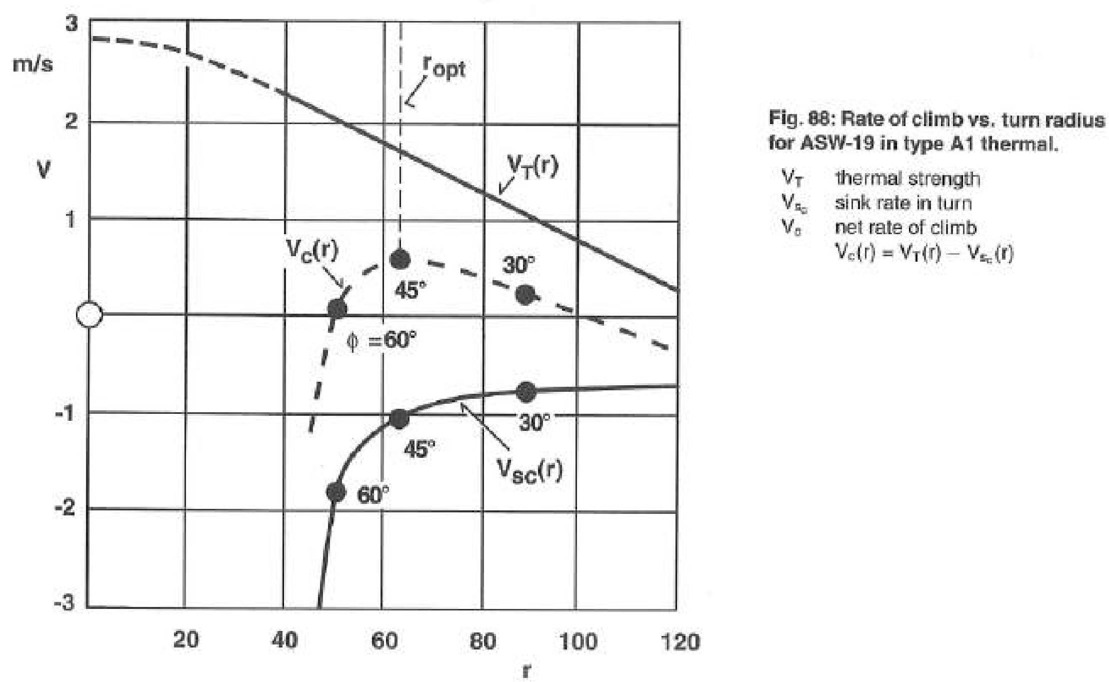

Fig. 3.4: Rate of climb vs. turn radius and bank angle for ASW19, ref. Thomas [5]

This is the optimal climb speed at the given wingloading in this thermal part and is used to calculate the McCready cruising speed in the next chapter.

3.4.2 Cruising Speed Calculation

The calculation of the cruising speed is based on climb speed for the respective thermal. As a restriction, only 80 percent of the optimal climb speed is used to calculate the cruising speed. This is well discussed in [1] and corresponds with experience. The so calculated crusing speeds are at reasonable values lower than 200km/h.
The solution is calculated, based on the graphic method given at [7], p.270. The measured polar is calcuated to the actual wingloading and the tangent is determined. The tangent point gives the cruising speed depending to the calculated climb speed.
With this climb speed, the time can be calculated, which is needed for the part of the track. The lost altitude, corresponding on the sink speed at crusing speed, is used to calculate the time, needed at circling with the climb speed, to get the altitude back.

$$t_{thermal} = \frac{\frac{part*ED}{\frac{L}{D}_g}}{V_{climb}} \tag{3.4.10}$$

The crusing speed is calculated for 80% of the optimal climb speed in the thermal according to McCready. With this crusing speed and the percentage of the track, the time to fly this part of the track is calculated:

$$t_{crusing} = \frac{part * ED}{V_g} \tag{3.4.11}$$

This calculation of time is done for each thermal and respective part of the track and the sum is representing the time, needed for the thermal parts of the weather model:

$$t_X = t_{climb,X} + t_{cruise,X} \tag{3.4.12}$$

3.4.3 Level Flight Calculation

The straight level flight was implemented from S. Ronig in [1]. This is representing the final glide and longer straight flights without circling, like cloudstreets or at convergence lines. This straight level flight is defined to low speeds, no gain in altitude and the updraft at level flight is 0.8m/s. Because of this definition, the speed on the sink speed polar is used, which gives 0.8m/s sink speed. despite the higher cruising speeds in this weather model, this part represents speeds near to the best glide ratio. In formulas, the speed on the speed polar at 0.8m/s sink speed and the respective part of the track gives the time, needed to fly this part.

$$V_{Gl} = V_S(0.8m/s) \tag{3.4.13}$$

$$t_{Gl} = \frac{part_{Gl} * ED}{V_{Gl}} \tag{3.4.14}$$

3.4.4 Cross-Country Speed Calculation

To calculate the averaged cross country speed, the time of all parts is summed up. The total distance of the track is devided by the sum of time to get the averaged cross country speed:

$$V_C = \frac{ED}{t_{A1} + t_{A2} + t_{B1} + t_{B2} + t_{Gl}} \quad (3.4.15)$$

To take the wingloading effect from chapter 3.2 into account, the averaged cross country speed is multiplied with the factor from 3.2. For example, the averaged cross country speed of the ASW19B is multiplied with the WL-Factor of 1.0037181. Therfor the result is a cross country speed of 96.89km/h with the values in the table:

Thermal	A1	A2	B1	B2	GL	Unit
Climb rate	1.21	2.0	3.39	4.33	0.8	$[m/s]$
Circling radius	85.75	79.41	77.97	76.73	-	$[m]$
Bank angle	36.09	39.5	40.38	41.17	-	$[degree]$
Crusing speed	125.47	134.1	159.1	168.1	106.7	$[km/h]$
Flight time	26.68	42.96	34.54	31.65	50.62	$[minutes]$

For comparison only, the values of the ASW24 with a averaged cross country speed of 106.28km/h and a WL-Factor of 1.014315:

Thermal	A1	A2	B1	B2	GL	Unit
Climb rate	1.234	2.01	3.39	4.33	0.8	$[m/s]$
Circling radius	89.51	83.22	81.79	80.58	-	$[m]$
Bank angle	38.15	41.64	42.53	43.33	-	$[degree]$
Crusing speed	124.0	161.65	180.04	186.22	116.465	$[km/h]$
flight time	25.22	39.41	31.72	29.08	46.37	$[minutes]$

4 New Handicap Factors

The calculations in the previous chapters were carried out for all gliders in the clubclass. A few gliders without measured polars were implemented in the handicap list by hand. To find out which gliders are meant, the measured gliders are marked in the list. The calculated handicap factor is normed to the ASW19/B, wherefore the handicap factor of the ASW19/B is 1.00.

4.1 Comparison of Old and New Handicap Factors

The new handicap factors with the used values are shown in the following list.

new Handicap	Glider Type	Flaps	Max. mass of non lifting Parts [kg]	Wing area [m²]	Reference Mass [kg]	WL [kg/m²]	Old Handicap	measured polar
1,055	ASW20 15m	f	338	10,5	372	35,4	1,08	x
1,05	ASW24		346	10	366	36,6	1,07	x
1,045	Discus a,b,CS		340	10,58	372	34,7	1,07	x
1,045	Mosquito ,B	f	290	9,86	368	37,3	1,07	x
1,045	LS3 , a	f	320	10,5	367	35	1,07	x
1,04	DG200 15m	f	350	10	380	38	1,07	x
1,04	Mini Nimbus	f	290	9,86	368	37,3	1,07	x
1,04	Genesis 2		341	11,15	366	32,8	1,07	-
1,04	Speed Astir II,IIb	f	360	11,47	400	34,9	1,06	x
1,03	LS7		330	9,8	353	36	1,06	x
1,025	Glasflügel 304, B, / HPH 304 CZ 15m	f	340	9,9	369	37,3	1,07	x / -
1,025	PIK 20 A	f	350	10	380	38	1,03	x
1,025	LS4, a, b		330	10,5	356	33,9	1,04	x
1,02	PIK 20 B	f	340	10	370	37	1,03	x
1,02	SZD 55-1		348	9,6	363	37,8	1,06	x
1,02	CB-15 CRYSTAL		340	9,77	350	35,8	1,05	-
1,02	SZD 59 ACRO		348	9,6	363	37,8	1,02	-
1,02	H301 Libelle	f	300	9,8	316	32,1	1,02	x
1,02	HPH 304 C		340	8,9	359	36,2	1,04	x
1,015	DG300 Elan		346	10,27	369	35,9	1,04	x
1,015	PEGASE 101 A,B,C,D,P,AP		225-235	10,5	361	34,4	1,05	x
1,015	PIK 20 D	f	325	10	355	35,5	1,05	-
1,01	Jantar Std. 3		346	10,66	373	35	1,01	x
1,01	SZD-48-3M		340	10,9	360	33	1,01	-
1,01	SZD-48-3MI		340	10,66	365	34,2	1,01	-
1,005	Jantar Std. 2, 2M		345	10,66	373	35	1,01	x
1,005	Std. Cirrus B 16m		220-233	10,36	350	33,8	1,02	x
1,005	Hornet C		326	9,8	343	35	1	x
1,005	LS 1f, LS 1f(45)		230	9,75	347	35,6	1,02	x
1	ASW19 , B		225-230	11	362	32,9	1,01	x
1	DG 100, G, Elan, G		265	11	385	35	1	x
1	Jantar Std.		336	10,66	364	34,1	1	x
1	Std. Cirrus, CS11-75, G		220-240	10,04	361	36	1	x
0,995	ASW 15, B		320	11	352	32	0,98	x
0,99	LS 1 0,a,b,c,d		212	9,74	312	32	0,98	x
0,985	Std. Libelle , 201B, 202, 203		210	9,8	328	33,5	0,98	x

Fig. 4.1: List of new and old handicap factors

Every glider, which has a measured polar, was calculated. A change in position compared to the previous list can have following reasons:

- Different behaviour in the new weather model
- Calculation and shift of the polare due to actual wingloading or reference weight
- New measurement data
- Repositioned due to missing measurement data

For this calculation, the past values for adjustments by deviations of masses or due to addition of winglets prescribed in [8] are the same. For addition of Winglets 0.005 will be addet to the handicap factor. For deviations from reference mass, 0.005 per 10kg will be added to the handicap factor, and it will be reduced by 0.004 per 10kg if the takeoff mass is less than reference weight.
For the exact wording please refer to [8].

4.2 Adjustment of Handicap Factors in the Future

The issue, that gliders are prefered because of their handicap factor given, should be avoided in the future.
No handicap factor can be completely fair. For this reason, the handicap factor should be reviewed and adjusted based on competition results and pilot statements. It should be noted, that this should only be applied to avoid having a special type of aircraft dominate the clubclass.

5 Influence to Competition Results

To show the influence of the new handicap factors at competition and to avoid unintended or unsportsmanlike effects, a complete competition was recalculated with the new handicap factors. It should be noted, that this is a theoretically calculation. The results at competitions are strongly influenced by psychological effects, especially the top positions are flying in a tactic way due to their position. This calculation is only used to examine the effects to competitions due to a change of the handicap factors.

5.1 EM Rieti 2015

The influence of the new handicap factors is relatively low. The positions are not changed very much. As might be expected, due to the reduced spread of the handicap factors the score difference from first to last position is reduced. Especially the more modern planes get more points, but they are not totally advantaged. The first places are changed, but the score difference between them is still vey low.

			Handicap		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 8		Day 9		Day 10		Overall			
	Name	Glider	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	Points Delta	Position new
1	D.	Std. Cirrus	1	1	885	893	884	910	880	889	904	919	786	789	572	571	1000	1000	667	668	703	702	7281	7341	-60	2
2	L.	Std. Cirrus	1	1	883	890	877	903	887	896	922	937	789	793	574	573	942	943	664	664	704	703	7241	7302	-61	3
3	K.	LS1f	1,005	1,01	887	887	907	925	908	908	892	898	900	896	595	575	896	873	691	686	615	608	7292	7256	36	1
4	D.	Std. Libelle	0,99	0,99	923	931	796	820	912	922	985	1000	994	998	558	560	742	759	573	573	554	554	7037	7117	-80	4
5	G.	Std. Cirrus	1	1	869	877	847	873	962	971	814	828	844	847	601	600	964	937	678	678	448	447	7027	7058	-31	5
6	S.	Pik20A	1,025	1,03	1000	1000	861	878	1000	1000	969	975	552	549	531	521	891	865	533	530	672	665	7009	6983	26	6
7	S.	ASW15b	0,995	0,98	810	841	717	766	904	943	818	859	853	878	572	585	806	852	646	661	550	571	6676	6956	-280	7
8	Z.	Std. Cirrus	1	1	889	897	931	958	935	945	946	961	763	766	574	573	331	331	702	702	595	595	6666	6728	-62	9
9	N.	Cirrus G	1	1	841	848	888	914	957	957	848	853	854	858	550	550	530	530	681	681	525	525	6674	6716	-42	8
10	M.	Std. Cirrus	1	1	889	897	970	998	909	918	930	945	806	809	553	553	515	515	372	366	695	695	6640	6696	-56	10
11	J.	H301	1,02	1,02	781	788	681	704	939	948	786	800	784	787	548	544	835	855	646	647	514	514	6514	6587	-73	11
12	K.	Std. Libelle	0,99	0,99	337	334	656	678	806	815	875	890	996	1000	591	586	878	850	479	479	692	692	6310	6324	-14	12
13	S.	Std. Cirrus CS	1	1	890	898	886	912	714	723	942	957	291	288	601	601	452	452	675	676	808	808	6259	6315	-56	15
14	U.	Std. Cirrus	1	1	883	891	921	947	792	801	864	878	277	274	567	554	928	888	240	237	806	806	6278	6276	2	13
15	M.	LS4	1,025	1,04	321	313	1000	1000	993	974	964	951	1000	981	565	530	707	703	299	290	429	411	6278	6153	125	13
16	B.	LS4	1,025	1,04	804	790	813	813	763	746	940	928	666	651	473	458	899	853	298	289	610	589	6267	6117	150	14
17	D.	ASW19b	1	1,01	843	835	720	727	774	765	1000	996	698	688	542	537	318	315	297	290	654	639	5846	5792	54	16
18	S.	LS1f	1,01	1,02	859	852	355	350	927	898	849	845	274	269	516	504	845	821	683	673	586	566	5894	5778	116	17
19	R.	ASW19b	1	1,01	335	328	643	650	815	806	860	856	974	962	594	575	450	446	493	486	663	648	5827	5757	70	18
20	P.	LS7	1,03	1,06	810	775	734	711	996	949	0	0	235	226	524	492	315	307	241	231	687	644	4543	4335	208	19

Fig. 5.1: Recalculation of competition results at Rieti 2015

6 Summary

A new weather model is presented and explained. Die previous weather model simulates the weather on a daylong flight in a decentralised competition like the DMSt or OLC classic. Due to that, the weather model was changed and adjusted to a good competition day. The modelling of the thermals was changed to a quadratic function for more realistic thermal profiles, because of optimization problems ref. to [6].
To adjust the actual handicap factors in the clubclass, a new list was calculated with the new weather model. Care was taken on the actual allowed reference mass in [8] and the influence of wingloading to performance. The previous calculation of the actual handicap factors was not done at reference weight. A wingloading factor was introduced, to take the performance change into account due to wingloading and the corresponding reynolds-number effect.
The new calculated handicap-factors were standardised to the ASW19/B. Due to the higher climb rates in the thermals, the spread of the handicaps was reduced by a factor. The spread of the new handicap factors is smaller than with the old handicap factors.
To show the influence of the new handicap factors to competition results, a competition was recalculated. The new results show, that more modern glider get more points than before, but the positions are not completly changed. The incentive, to fly competitions with more modern gliders should be provided with those new handicap factors.

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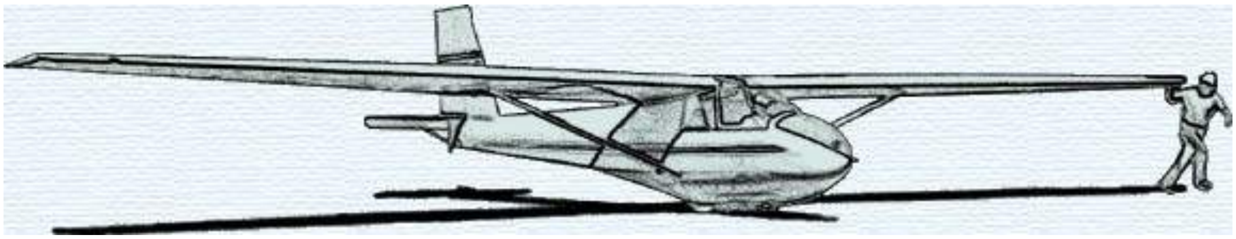

KSA Meeting

November 11th 6:00 PM

Hutchinson Community College

Science Center Room 103

Adjacent to Cosmosphere

Brian Bird - Landing Out

SSA Calendars - $10