

ENC 2-Liners - Experience with 2-Linertechnology in the sports class



Survey results, accident data,
opinions and analysis

1.1.2024 M. Lindenstruth, Herisau/Schweiz



What can be said about **ENC 2-liners** after one year of practical experience...

Findings and a picture of the mood on the topic of **ENC 2-liners** as of december 2023

Hello Pilot*

Are you interested in a C-wing or even a C2-line? Then you are exactly from the group of people for whom I have put together this study in the first place. I would like to provide you with support through information, experience and analysis and hope to be able to contribute something to safety in paragliding.

I wish you a lot of fun in our fascinating world of «vol libre» and allways happy landings!

Melchior Lindenstruth



Selfie after Homelanding -

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* In the following, by "pilot" I mean all pilots



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Objectives and Approach

A brief overview of the objectives and procedures for compiling the results and the analysis.

My goals:

Since the CEN changed the regulations of the EN standard 926.2 in February 2022, paragliders with 2-line technology can also be homologated as ENC (see [article](#) at LuGlidz). In January 2023, I released my first [video](#) on the subject. In the fall of 2023, after a short season with ENC two-liners here in Europe, I came up with the idea for a new video - now with the experiences of the first season. This required a survey... (more on this at [STORY](#)).

Even if my personal experiences have been taken from time to time in this report (it's probably unavoidable), the report is primarily intended to reflect representative pictures of the experience of the group of ENC 2-line pilots! A discussion could follow – I'll come back to that at the end.

Procedure regarding the feedback:

Pilots (hereinafter referred to as «pilots») who fly an ENC 2 liner or have at least tested it or are still testing it were invited to participate. In total, I received **over 300** responses via my website. I sorted out those who were double or had not given any feedback at all on the subject of ENC 2-liners (quasi to say: "I don't fly an ENC 2-line").

If discrepancies occurred (e.g. obviously misunderstood questions, hints in the free text, etc.), I contacted the pilot in a few cases (if an e-mail was provided) and clarified the discrepancy.

Classification:

The database now contains a total of **288** responses. Thanks to the great support of [XContest](#), it is possible to roughly rank the number of survey participants (UT) in the total number of pilots. For the 2023 season, XContest counted **732** pilots (average age 44 years) who completed at least **50%** of the submitted flights on an ENC 2-liner. At the same time, XContest counts a total of **5,820** pilots on an ENC. The number of "ENC 2-line pilots" determined in this way is thus **12.6%** of all ENC pilots for the XContest platform.*

The number of **1,500** pilots who uploaded at least one flight with a C2 line on the XContest platform shows that in reality about half of all pilots who tested a C2 subsequently used it for the majority of their flights during season 2023.

In total, around 27,000 pilots recorded flights on this platform in the 2023 season – worldwide.

Analyze:

For the analysis of the database, I used filters to find out differences/similarities between e.g. age groups, pilot groups, etc., or on a case-by-case basis to make certain comparisons (e.g. for graphics).

In addition, I read through all the free text messages and examined them for similarities or particularly interesting remarks. These are then included in the overall assessment on a textual base.

Additional information (see also [STORY](#)) serves to provide additional support or classification of the survey results.

Hints:

- This report treats "the ENC 2-liners" as if there were only one model. In reality, however, there are of course various models from different manufacturers, and there are certainly some not inconsiderable differences! However, it was deliberately refrained from asking for statements about concrete models and no statements are reproduced within this report, even if such statements were made in free text. On the one hand, I refer to test reports in the media (e.g. Thermik magazine, Flybubble on youtube, etc.), to the study of certifications and, last but not least, to independent testing. As the survey shows, this opportunity is only used to a fairly limited extent.
- The anonymized database is available to you and may be used - with reference to the data origin. This report may also be quoted or published in parts with reference to its authorship.
- The data has been handled and analyzed to the best of our ability.

* XContest was only able to include flights where the glider type was declared correctly, which applies to the vast majority of flights.



What can be said about ENC 2-liners after one year of practical experience...

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Summary

For a quick overview - you can also skip to the chapter "[Survey results](#)"

The survey was conducted from September to December 2023. With selection questions and respective free text fields, the participants were asked about themselves and their experiences with ENC 2 liners. In the [appendix](#) you will find links to the database, some evaluations and additional information.

With around 290 responses, the survey offers (in my view) sufficient "depth" to be considered representative. In particular, the comparison with the figures from XContest shows that quite a large number of ENC 2-line testers and pilots must have taken part in the survey!

About 2/3 of the pilots participating in the survey (i.e. 200) definitely opted for an ENC 2-line. Of the remaining third, more than half are undecided. The remaining pilots fly ENB, ENC 3-liner or an END again.

The approximately 200 C2-liner pilots that I focus on in this report show a "feel-good rate" of 92.5% and the rating of «super», or «exciting» with around 96.9% - a very high level of satisfaction and acceptance! Only 1.5% of these pilots state that **they have experienced more frequent hang-ups** than before and 92.9% **deny the more frequent occurrence of malfunctions**. Very often it is even mentioned that with the 2-line system there are fewer disturbances.

A look at the **European Accident Database** * shows virtually no change in the number of accidents in the ENC sector between 2022 and 2023. In the area of C-wings, the share of 2-liners in accident reports across Europe in 2023 was around 14.0%.

My conclusion:

I interpret the above mood in such a way that the introduction of the 2-line technology in the ENC sportsclass can be seen as positive. This technical development is fun for some sport pilots and has opened up new performance options. The market has shown itself to be "cautiously interested" in terms of the number of pilots detected. An evaluation by XContest (the world's largest database for paragliding) shows that 1,500 pilots have practically dealt with a C2 line (with at least 1 flight).

In terms of stability and safety, the 200 C2 pilots gave positive feedback to this survey. At the same time, their assessment of the pilot's demands shows that C2 are rather demanding sport-class paragliders. This is also shown by the rather high value of 1/3 of the survey participants who have not or have not yet decided on a C2 liner. The change to an ENC 2 line is sometimes perceived as too demanding by the critical pilots, but also described as "disappointing" or "unnecessary".

A very valuable finding is that the C2 pilots have been paragliding for (on average) 18 years and complete an average of 100 flights per year with 134 flight hours. This can be seen as an indication that especially sport-oriented and experienced frequent flyers will feel comfortable on a C2 line. Only 4% of these pilots describe themselves as pleasure pilots!

About 13.9% of pilots stated that they had a problem with the ENC 2-line during the rapid descent (16.8% felt unsafe about this). Big ears is also often described as "difficult" or "impossible" in the free text messages. Why is that? The survey does not provide any further insights into this.

Finally, the statement of a professional safety trainer shows that the topic should not be treated too lightly. He says: "Half of the participants with a C2 line end up in the water with me!" (Quote: Dani Loritz)

It is therefore worthwhile to take a look at the report and the evaluations in full if you are interested in the topic!

* Due to the extremely poor data available, this value can only be regarded as an approximate "direction". In addition, 8 out of 103 reports lacked specific information on the paraglider flown, so that although an ENC can be assumed, it cannot be assessed on "C2" or "no C2". It was not possible to go into the nature of the disturbance, i.e. the real reason for the report, as these descriptions cannot be made public throughout Europe for data protection reasons. I therefore refrain from linking anything as an attachment in this regard, except for direct [access to the CH database](#).



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The results of the survey and an initial analysis (along the questions of the survey)

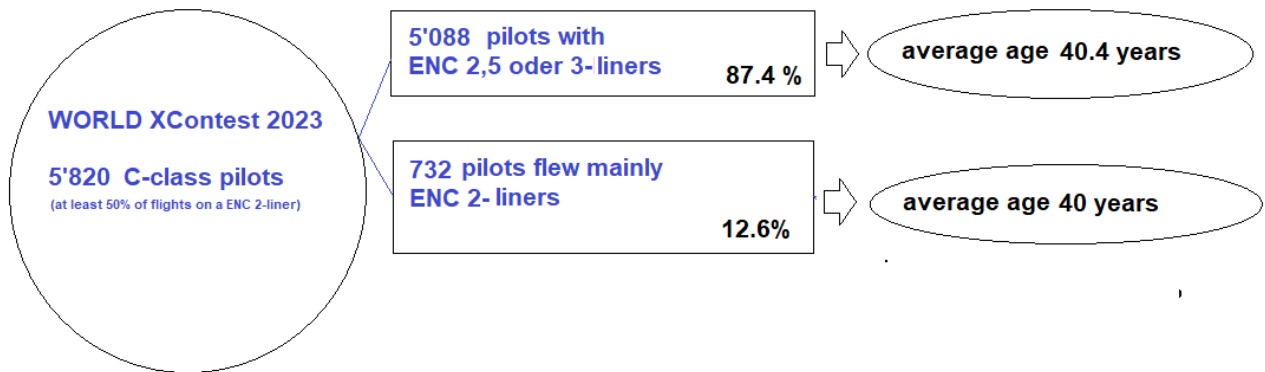
1. Experience counts...

The average age of all survey participants (hereinafter: UT) is **48.4** years and that was a real surprise for me at first. Only **26** out of **288** participants are in the 18-30 age group and even in the 18-40 age group there are only 89. **This means that around 200 (approx. 69.2%) of the UTs are older than 40 years.**

It gets interesting, and I think this is a major reason for this age structure, if we take a look at the topic of flying experience. While the average flight experience for those up to 30 years of age is **6 years**, **this increases only slightly to 8 years** for those up to 40 years of age, *whereas it is a whopping 22 years* for those over 40 years of age. The average age of all participants is **17** years.

A restriction to those pilots who have definitely decided to switch to an ENC 2-liner (hereinafter: C2 pilots) shows that they have an average of **18** years of flight experience with around **100** flights and **134** flight hours per year. Their average age is **48** years.

Note: Due to the surprisingly high average age, I asked XContest for a database analysis of all C-Class pilots (WORLD XContest – Season 2023) and in particular the C2 pilots. The graph below shows the result:



Quantity distribution XContest season 2023: Ratio of C2 paragliders to other C-class paragliders at XContest 2023

So you can see a difference in the age structure compared to my survey. Personally, I don't consider the difference to be significant. Nevertheless, it is fair to say that the younger pilots were less likely to engage with the survey than older pilots. It remains unclear whether and how this could have influenced the poll result.

It is not age that seems to be the benchmark for ENC 2-line pilots, but rather the question of flight experience. The ENC 2-line pilots are mostly "long-times pilots" and also frequent flyers.

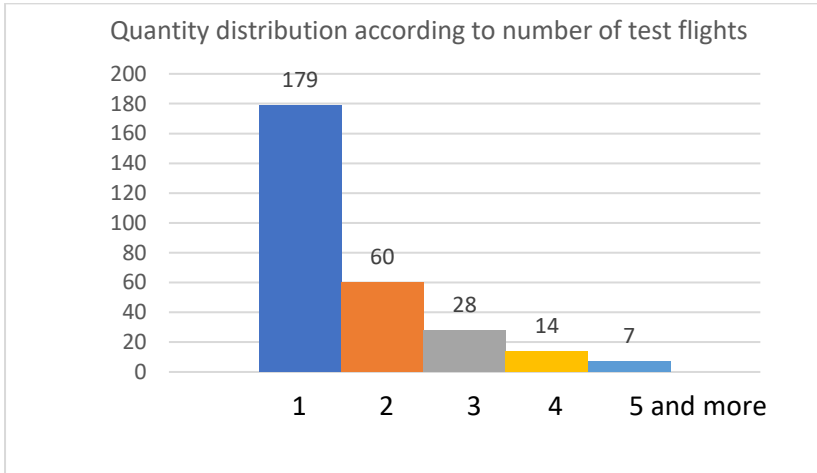


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2. Brand loyalty versus «your own opinion»

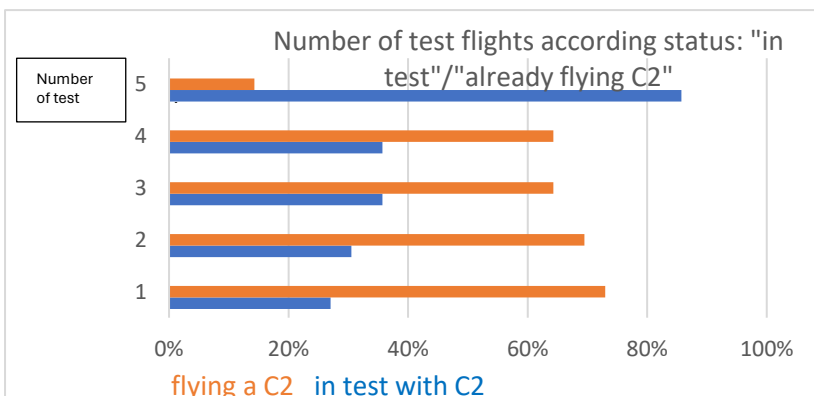
Brand loyalty, reviews, recommendations or your own opinion... What counts more? On average, 1.7 different models were tested. 178 participants or 62.1% stated that they had flown only a single ENC 2-liner. This means that it was mainly external factors that were believed and trusted. The number of pilots who have tested 3 or more paragliders themselves is surprisingly low at 51, I think.



Distribution of quantities according to the number of test flights: Only a few test intensively and broadly

I also found it exciting that the more a pilot tests, the less he/she states that he/she has decided on a C2. With a number of 2 wings tested, the distribution corresponds to the survey ratio (1/3 "in the test" and 2/3 "decided"). If there are more than 2 wings, the pilots who are «in test» are disproportionately represented. Conversely, it can be said that the pilots who have already opted for the C2 line are usually less keen to test. Another interpretation also seems possible to me, namely that these pilots are typically willing to fly a wing as it is. I'll take myself as an example: Certainly more than 90% of all paragliders in the last 33 years I simply bought and flew with them, without testing, etc. However, a few wings were also "gone" pretty quickly.... Behind this is also the conviction that you only understand a grand piano after a while...

It is not clear why certain pilots apparently carry out a more elaborate evaluation procedure. In any case, intensive testing goes hand in hand with a later decision for or against a specific wing.



Number of tests in connection with status "Test" or "Fix": Interesting correlation – the broader the test, the more indecisive!

The number of gliders tested and the number of flight hours also correlate quite clearly. This means that frequent flyers tend to test more broadly than pilots with fewer flights (without graphics).



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3. The self-assessment and motivation for C2-liners

What is your self-assessment as a pilot?

When asked where the participants would classify themselves (*pleasure pilot, sports pilot, pilot with sporting goals, competition pilot*), only **5.9%** described themselves as pleasure pilots. Among the approximately 200 C2 pilots, the figure is only **4.5%**. Quite exciting, because that certainly doesn't correspond to the overall picture of paraglider pilots, right? It says that C2 pilots consider paragliding to be a sport. Among other things, I associate **sport** with ambition, but also with the "willingness to suffer" (or in other words, "to go to the pain threshold"). From my point of view, this would mean a willingness to fly attentively and actively and the willingness to deal with and master critical situations.

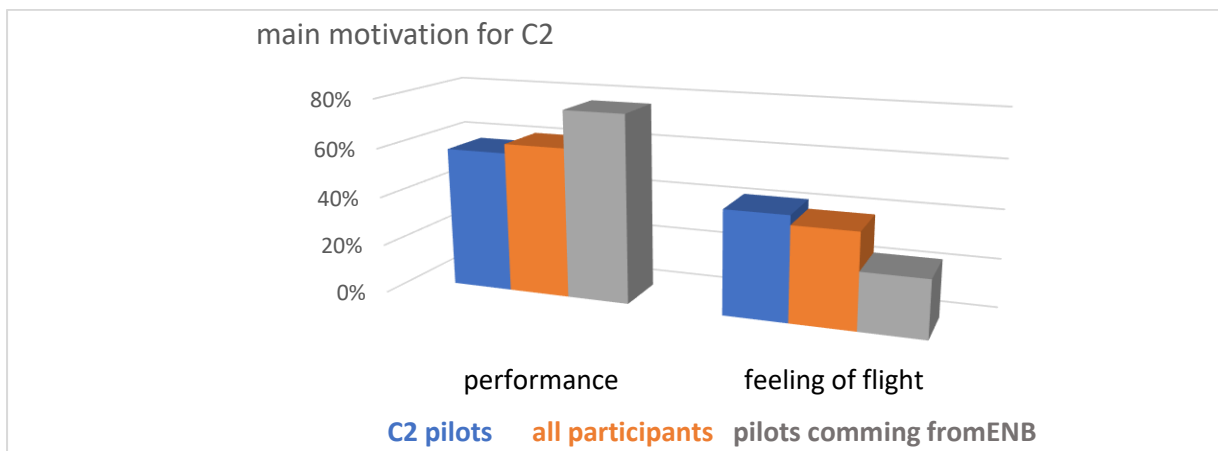


Pure "connoisseurs" are rarely found among the C2 pilots!

What is your motivation for C2?

It is actually fitting that **57.5% of C2 pilots** cite performance as the most important motivation for flying with an ENC 2-liner. Nevertheless – the feeling of flying is the **most important for 42.5%** of C2 pilots and is often cited as a secondary motivator.

However, if you look at the graph below, it becomes clear that performance is an important aspect of why C2 pilots switch to a 2-line C-Class wing! So the group of C2 line pilots is not really doggedly trimmed for performance.



Different groups and their main motivators: Performance seems to be less important for C2 pilots than it is for other groups

By the way, the following motivators were mentioned as further motivators:

- better B-control/pitch control (23)
- Speed and Glide (17)
- more safety (11)
- Handling (4)



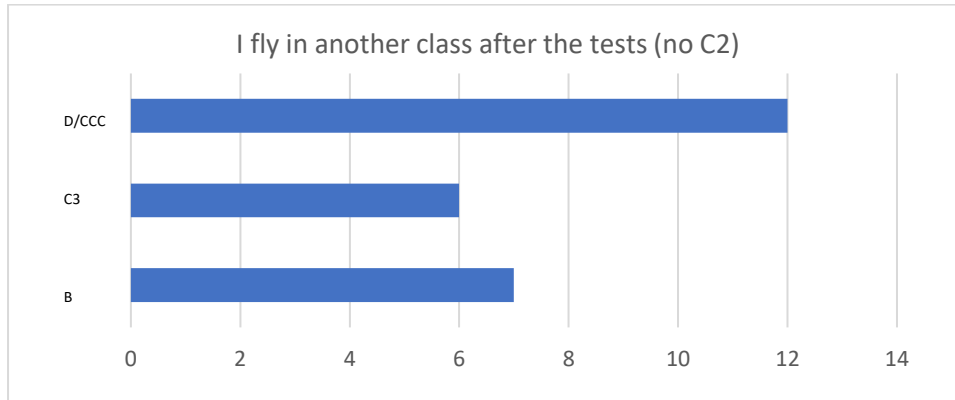
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4. How did the test flights affect the decision for or against C2 lines?

I don't fly an ENC 2-liner anymore...

Before the survey was really about the ENC 2 lines, the above question gave us the opportunity to say which class you will fly again after testing the C2 lines. 9.7% of participants chose one of the given choices.



Not convinced by the C2? And then...?: Where did the relatively few "C2 disappointed" pilots turn?

I think we have to note here that the C2-liner technique is still young. Another 62 participants are still in test mode. Some of them will probably join the 25 pilots above. Let's listen to the text messages for a moment:

- Jonas** "Got the... tested for some time. But I wasn't convinced by the additional performance compared to the lower security."
- Patrik** "I had an incident with C2 in the Jura, whose violent reaction surprised me compared to my high-B. I'm not convinced that the performance is really better, but the security is worse."
- Scott** "Got the ... and... tested in several flights. I decided against it because of the difficulty of training in the SIKU (who has folding lines?) and reduced descent possibilities (only spiral)."
- Until** "If I use the current two-liners with my ... (high B-2.5 lines), I don't see any relevant advantages."
- Camillo** "Can't decide on a C2 yet, because putting on ears didn't work with both of the gliders I tested..."
- NoName** "Because of the lack of dynamics compared to a D-wing."



All text messages regarding this question can be found in COLUMN V of the [database!](#)



What can be said about ENC 2-liners after one year of practical experience...

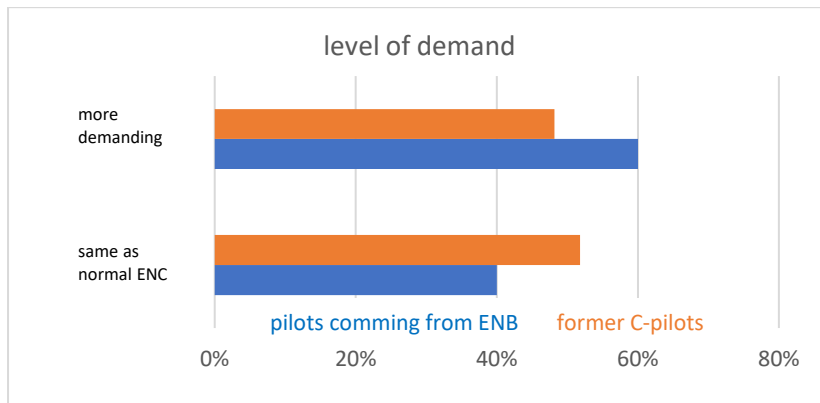
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5. Let's get down to business – how is the level of sophistication on the C-2 liner assessed?

How do you rate the level of demand of the ENC-2 line (compared to a C 3 line)?

The pilots' assessment of the level of demand is an important aspect of our main topic, the 2-line C-Class wings.

51.0% of participants and 47.4% of C-2 pilots consider the C2 lines to be more challenging! So there is a good chance that you will find a C2 line more demanding than its C3 predecessor! If the pilot comes from the ENB, for example, this is even more pronounced! However, the ENC is likely to be judged as "more demanding" by B-climbers in general. It is therefore much more meaningful and clear that even seasoned ENC pilots rate the C2 line as 49.7% more demanding!



Assessment of pilot's entitlement in connection with "origin": Newcomers from the ENB rate the level of ambition of an ENC 2-liner more highly

What about the others? Well, 49.0% of the participants rate the C 2 line as *equally demanding* and there are even various text reports that the selection is insufficient, because the C 2 lines are *less demanding*!

The participants do not paint a homogeneous picture at all. What could be the reason for this?

I think we have to take into account the fact that there are various factors influencing this question, on which we do not get sufficient information here:

- Pilot skills
- Perception
- Concrete paraglider model
- Which three-liner is being compared against?
- Differences in aspect ratio, etc.

A quote from Alex Robé (winner of the XContest Sport and Serial classification 2023 World) fits especially to the latter point (stretching). He writes: *"I consider the overall higher demands of a 2-liners with same aspect ratio to be a real humbug."*

At this point, it should be pointed out once again that the range of the C 2 lines in the designed aspect ratio currently ranges from 6.25 to 6.9. I consider this wide range of stretch to be one of the important reasons why the participants disagree on the level of demand of a C2 liner. In addition: Only the GIN Bonanza 3 has a slightly lower aspect ratio than its 3-line predecessor as a C 2 line! (See: [Comparison of certifications](#)). With e.g. NIVIUK, OZONE and SWING, the aspect ratio is slightly to significantly higher. Even if the experiences and opinions on individual paragliders were deliberately not asked in this survey - the range in the topic C2 seems to be very large and leads (a little later) almost inevitably to the question of whether it would make sense to divide the C-gliders into e.g. low, mid and high analogous to the procedure at ENB.

It seems to me that another hint from Dani Loritz (safety coach) fits well at this point. He said: *"The range of rattles is much wider – we are experiencing increasing complexity."* Afterwards, he adds: *"I see the pilots as clearly more challenged."*

Daniel Loritz thus supports the aspect of "demanding" - especially in the case of faults or massive disturbances - i.e. when the clearly perceived high stability is over!



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Let's take a look at a few selected free text messages:

Steve / England

Jörg / Switzerland

Pilot / France

Ferdinand / Germany

Ariel / United States

Robin / England

Mariusz

Jörg / Germany

"Ground handling and take-off are more challenging"

"Very stable cap, therefore comparatively less rattle. Relievers can be seen early on in the B-handles."

"You can't compare the wings or lump them all together. They are very different in their level of ambition «

"Usually more extension. More aggressive start-up from the stable and after collapsing...»"

"For me personally, I don't think the 2-liner is more difficult to fly than my 3-line High-B gliders that I had before"

«feels really C-like compared to an EN-D«

"I found my previous 3-line even more difficult"

"An active flying style is an absolute prerequisite. The umbrella is forgiving a lot, but not everything. Rattles or canopy deformations occur less frequently/ later than with 3-liners. But if the 2-line should collapse, the effects are more dynamic and violent and the risk of snagging is higher than with 3-liners. The 2-liner gives you the feeling of being "unfoldable", but you shouldn't be too confident."

"This question is too sweeping... that depends on the respective model and cannot be answered in this way."

"Less demanding than my D 3-liner"

"Lightning-fast collapses that surprised me more than once, including a reserve exit"

"It's different. I had 6 aspect ratio, now 6.5. It needs to be managed a little more. I find it easier to fly."

Thomas / Germany

noname / France

Hans / Norway?

Noname / Englishland



All text messages regarding this question can be found in the AI COLUMN of the [database](#)

The answer to the question of whether a C2 is more demanding is judged very controversially. A French pilot might put it in a nutshell when he writes: "Wings more solid, disturbance more massive!"

One reason for the inconsistent assessment could be whether a pilot has only experienced the higher stability, or also the potentially higher "aggressiveness" himself...

But let's not lose sight of the fact that the C2 lines are usually higher a.r. wings than their C3 predecessors!

The most important finding for me is that around 50% of the pilots generally classify the C2 as more demanding!



What can be said about ENC 2-liners after one year of practical experience...

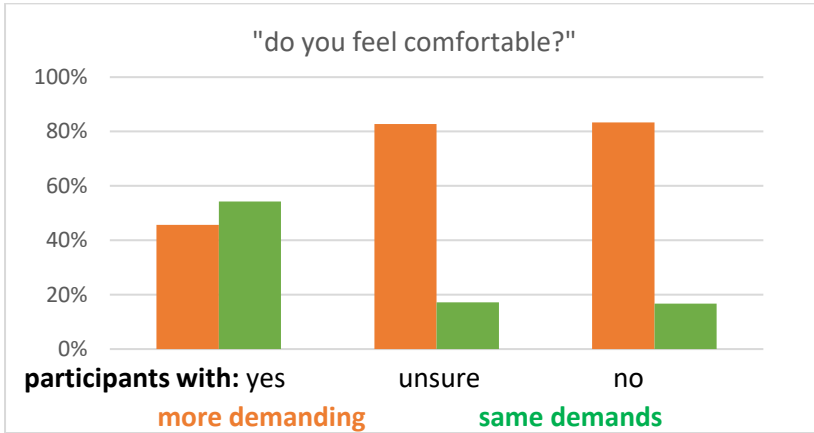
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6. The gut feeling

Do you feel comfortable on the ENC-2 liner? - that was the next question.

83.1% of participants say yes. Only 2.8% answered a resounding "no". If we look at the 200 C-2 pilots, 92.5% of this group feel very comfortable at the C2!

After all, 14.1% of participants are undecided on this issue. A full 82.8% of these pilots consider the C 2 line to be more demanding at the same time. Here we feel how emotions and the "gut feeling" of the pilots are noticeable in the answers.



Assessment of the feeling of well-being: Among the undecided and those who have decided against a C2, the proportion of "more demanding" is significantly higher!



close to being overwhelmed, the fun usually ends...

How does flying with the C2 line feel for you?

96.9% of C-2 pilots find the C2 "super or exciting". One might assume that certain groups of pilots voted less enthusiastically here, but no. Across the board, these two responses achieve very high percentages.



The fascination of 2-line flying is clearly "audible" - *only*
Whether you feel comfortable with it is another matter!



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7. Are there any problems with the ENC 2-liner?

How do you assess the frequency of hang-ups (parts of the wing getting stuck)?

With this question, I had actually expected a somewhat different mood. **79.5%** say that there are no hang-ups and **17.6%** mention "few". Just **2.9%** of the participants think that they have more hangers on the ENC 2-line than before. The C2 pilots are exactly the same. In the free text messages, rods are occasionally mentioned in preparation and take-off – in flight, however, snagging does not seem to be a conspicuous issue with the ENC 2 line.

A very specific question: Do you have a problem with the rapid descent?

From my own experience, I have asked this question very concretely and in anticipation of affirmatives. In fact, **11.5%** of participants answer this question in the affirmative and **16.5%** express uncertainty about rapid descent. In the free text messages, you can hear big ears is a problem with many models – with some even «impossible». So this is an aspect to pay attention to when testing!

In this context, a personal note!

In an article, I read a "bizarre" instruction on how to handle this shortcoming alternatively – with the side remark that the manoeuvre (one-sided rattle and counter-turning) is difficult to initiate with the two-liner. Wow – but that takes nerves when it sucks you into the cloud (e.g.) and you then have to perform difficult maneuvers correctly. I wonder if a normal steep spiral - combined with an anti-G - is not much easier, faster to implement and thus ultimately safer? After all, about **25%** of the participants have an anti-G.

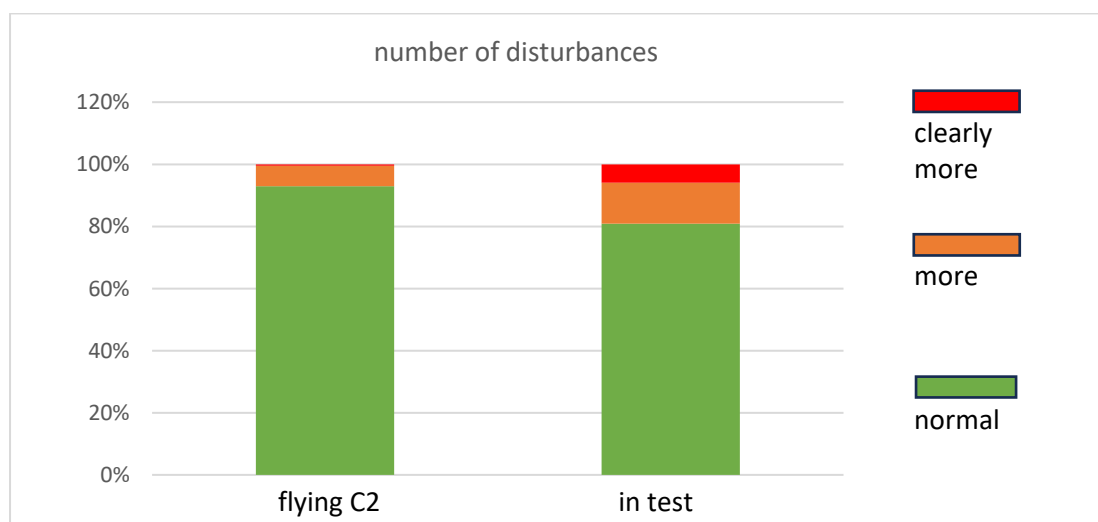
Mark Hayman writes in the free text: "Spirals are too aggressive without anti-G, as is normal with two-line wings. Big ears are almost impossible, they are very difficult to hold on to and the wing is unstable when you get them in! The only solution is to take advantage of the superior performance to avoid problems or anti-G..."

But you don't have to avoid an anti-G – it doesn't cost much and can probably still be stowed in any harness in a small side compartment. For a quick descent, it offers relief in an emergency by significantly reducing centrifugal forces. Activating the Anti-G and quickly initiating a steep spiral is the most trouble-free way to immediately reduce height with a high sink rate and without extreme physical strain.

Are there more frequent malfunctions on the ENC 2-line?

89.6% of participants and **92.9%** of C2 pilots answer this question in the negative. In this context, there are often free text messages that there are even "fewer" than before with the C3 line.

However, there is a small gap between the C2 pilots and the group that has not yet decided "for" or even "against" the C2 line.



Frequency of disorders: More frequent disorders (= experienced disorders) as a reason for further testing or a negative decision?



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In the free text reports, I find the opinions of Roger Aeschbacher and Walter Nesper interesting. Roger says briefly: "Less, because more control over the B" and Walter specifies: "You need a "less than before" compared to some C-threes! I found the C2 leash to be more resistant, especially when accelerating!"



I can offer you the following text messages on these topics in the [database](#) :

- Topic Hanger – Column AT
- Topic Descent Assistance – Column AZ
- Topic Faults - Column BL



Hangs are apparently no more of an issue with the C2 line than with a C 3 line.

Problems with big ears should be expected. You should definitely try this out during the test flight.

For a safe steep spiral, an anti-G brake parachute is recommended.

The C2 lines are described as basically very robust. The avoidance of interference is apparently possible in principle for experienced pilots when they are actively on the road and use the B-control for active pitch control, but it is not a matter of course.



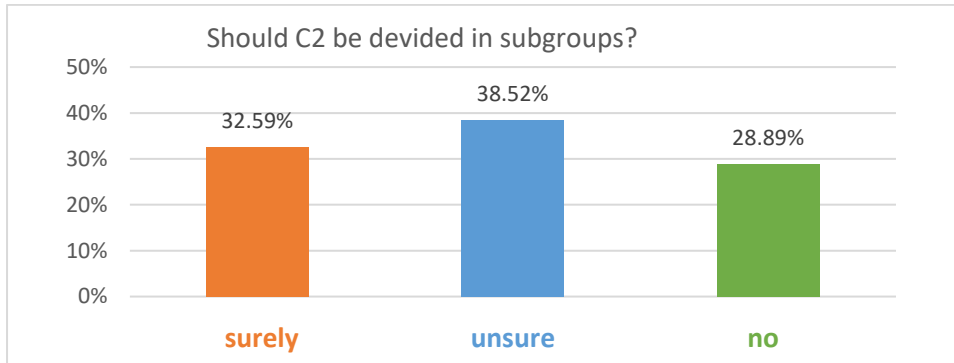
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8. What's next for the 2-line technology?

Should the C2 lines be divided into subcategories?

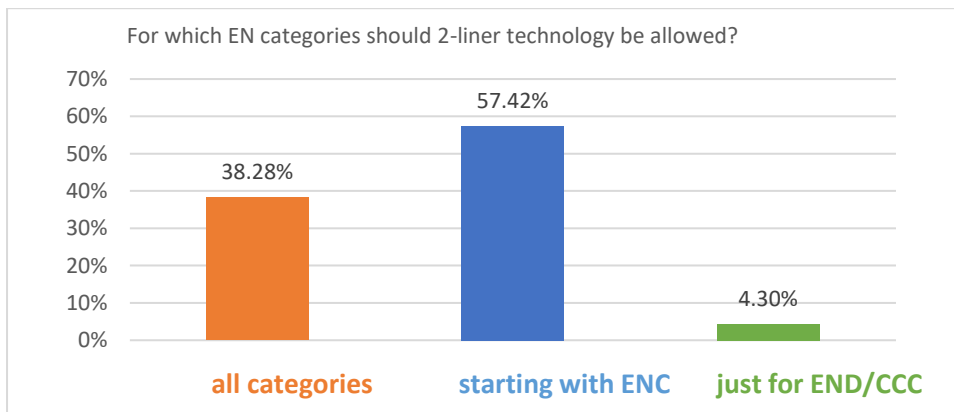
Again, this question covers a wide spectrum – it was not asked to get information about the ENC 2 line from the answers, but simply out of interest.



Should ENCs be divided into subgroups?

From which class should the 2-line technology be able to be used?

In this question, **38.3%** of the participants are very enthusiastic and would apply the 2-line technique to all categories.



Expansion of the 2-line technology: 40% of the participants see the further spread of the 2-line technology as useful...

With this last graph, my report on the survey and the comments and analysis of the survey results ends.

Even though we might like to hear more details and many connections remain in the dark... In my opinion, there is nothing more to be gained from the survey. Jörg Bonderer wrote to me in his feedback on the preliminary draft: "Actually, (at least) as much time should be invested in the design of a survey as in the evaluation. The questions cannot be changed afterwards and they are decisive for the significance of the results." From this point of view, this is the consequence of my spontaneous approach at the beginning. However, you also have to keep in mind that the more time it would have taken to fill out the survey, the fewer pilots would have been willing to invest that time. Jörg therefore said that it was a good thing and that I should make a point.

That's what I'm doing now .

Nevertheless, I don't put the issue to rest just yet! It continues...



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Accident statistics?

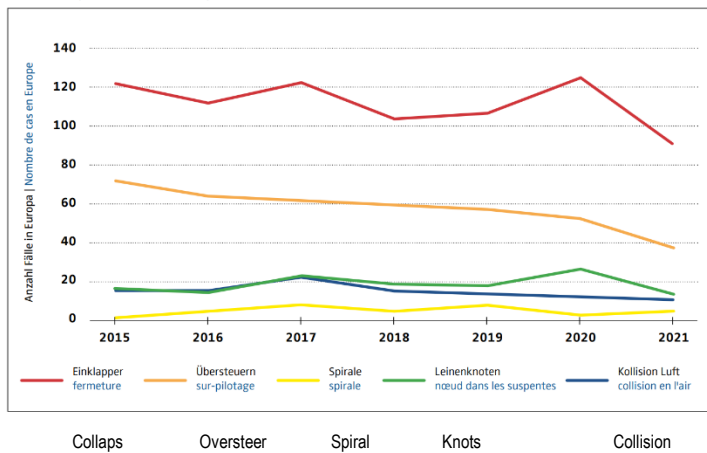
As I described in the [STORY](#), as the survey progressed, it became clear to me that I would like to clarify further topics in order to support or supplement the results from the survey. Of course, accidents are also such an issue. In general, there are simply too many accidents that come to my mind in my "environment" here in Appenzellerland and that's why the accidents are the **dark side** of our sport for me!

Of course, as in life, we can't avoid accidents in general! This is also the case in paragliding. However, it is important that we are always aware of the potential risk of accidents in every situation, that we do not "fade out" it in our eagerness and that we are also aware of where exactly dangers lurk.

Beni Stocker from the Swiss Hang Gliding Association has written an exciting article on this topic ([Link](#)).

In the following graph, we can see the breakdown of initial **disorders** into causal groups. This study is based on data prior to the time of the C2 liners. However, I do see a reference to the C2 liner, which is generally attested to have a fundamentally more stable cap. This would mean that rattles may play a smaller role in the frequency of C2 leashes, but rather not in terms of severity and further progression. Beni Stocker's study shows that a rescuer's throw has the greatest chance of surviving the incident without serious injury. In the event of massive malfunctions and a problematic course of troubleshooting, the use of a rescuer is recommended. We have to internalize this deeply so that this "saving" opportunity is not forgotten in the stress!

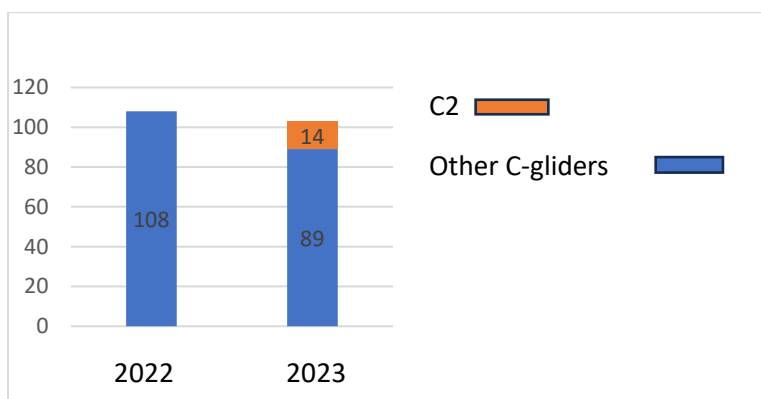
Aufteilung nach Erststörungen | Répartition par premier dysfonctionnement



Graphic from the article by Beni Stocker ([see appendix](#)): Examination after initial malfunctions (copy from german article)

Yes, and what about the ENC 2 lines? Of course, I searched for accident data and first checked the Swiss accident database. I quickly realized that two emergency parachute exits with C2 lines that I knew of were not included. This is due to the fact that the accident reports are voluntary and thus - to an unknown extent - incomplete. The same applies to the European accident database. But it also applies to all types of gliders, so that at the moment one simply has to hope that the gaps are balanced in some way due to the lack of better data...

Then the following approximate picture emerges for 2023



Graphic: Accident statistics in Europe in the area of ENC 2022 and 2023 (statistically weakly supported)



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Accordingly, (regardless of severity and cause) there were approximately as many accidents with C2 lines (**13.5%**) as the approximate proportion of C-Class gliders (**12.6%** according to XContest).

We cannot in any way assume that these figures are reliable data and at best consider them as an approximation. However – there is nothing better and that has to change! As I will list later, I see considerable room for improvement here!

I would like to thank Urs Lötscher for his willingness to support, which at least helps to shed some light on the topic «accidents».



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Cognitions

Thoughts on development and optimization

In this short section, I'll just make a few suggestions...

- A **division into subclasses**, e.g. according to low/mid/high as usual in the ENB, could be a certain support for the selection of only the wings that you want to test or not. Of course, this would never be completely objective and the question arises as to who should ultimately make this division?
- **Putting on ears** is indeed an issue with the C2 leash. Knowing in the middle of summer in strong conditions that you might struggle if you are drawn into a cloud gives a very bad feeling (experienced it myself). The hints about problematic behavior or the optimal procedure for putting on ears belong first and foremost in every operating manual and not behind all these "disclaimers" and useless hints...
- **In my opinion, folding lines** belong in the basic equipment of an ENC 2 line. The additional costs for this are significantly lower (compared to a repeat order) and the process is much simpler. Above all, however, you no longer have to decide whether you should make this effort... Dani Loritz's statement that practically no one comes to SIKU with folding lines because they are not available shows that something has to change here. After all, the goal must be for ENC pilots to take part in a SIKU with their sports equipment if possible, where they can test and learn how to control the rattle and front stall.
- **In principle, EN certifications** can only be compared with each other with some effort, because the various test bodies create the protocols according to their own template. At the DHV, the test sub-points are not given a grade, but it is important to see whether the folding line or the actual behavior of the paraglider has led to the grade C. You have to explain it to yourself from the textual description. If the associations, and in my opinion they are called upon here, are interested in us pilots being able to understand certifications quickly and correctly and using them as a selection criterion, the standardisation of the test protocols must be pushed forward and their easy comprehensibility must be optimised.
- From my point of view, the protocols of AIR TOURQUOISE are the ones that give us pilots the clearest information about what came out of the tests. In this context, I noticed that the test protocol of the OZONE Photon (Lab. AEROTEST) was inadequate. (Missing: test standard, reference to folding lines, behaviour at test point 12: "Return to normal flight from large angles of attack").
- The **occurrence of accidents must become more transparent** so that we do not have to continue to grope in the dark about this. It is incomprehensible to me that:
 - o The European accident database is not freely accessible, although no personal information is available
 - o For example, the Swiss league does not have a reporting obligation for accidents of league pilots

Work should be done towards "complete" accident reports.




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The STORY of the survey

A brief outline of how the survey came about and how it went...


How it came about


"What would it be like if I could pick up the pilot's mood at the end of the first season with ENC 2 lines?" This thought came to me in September during my camper holidays in Italy. Of course, I also thought about being able to create a new video on the topic with the collected material. Maybe you know that I published a first video on this topic on my  YouTube channel back in January 2023 ? So from that point of view, this was about the sequel, the update, for which I hoped to get material with the survey...

But how is that supposed to work? To my astonishment, I found a widget for surveys in the webdesign program of my homepage (zeta producer). "Cool – I wouldn't have thought!" – and I began to design a survey on my laptop in the middle of Italy – to develop questions and questions. From this point of view, I can be glad that the spontaneously implemented idea for a survey (from my point of view) was nevertheless quite sensible and well structured. However, it would have been worthwhile to formulate the questions and selection fields even more precisely and sensibly. For example, when asked, "More interference with the ENC 2-line?", I had only asked "NO – A little more – Significantly more". Thus, there was no possibility to tick "less", which of course could also be true. Luckily, in addition to the selection fields, I also had free text fields for each topic, so that there was always the possibility to record personal comments. Since the ENC 2-line caps are actually rather stable and harder than those of 2.5 or 3-lines, there were quite a lot of text messages in this sense.... In retrospect, I see it that way, but when I started doing it, I had no idea what dimension it would actually take... I am very happy that it went so well and that I came to this final result with a lot of support ([see](#)) and my own persistence!

How much feedback do I need?


After the survey was created, I started to interest my fellow pilots in the survey and the first feedbacks came in. I manually transferred the survey results from mail to an Excel sheet... Well, I had gotten myself a nice job

In the further course of the event, after the initial joy, the realization arose that 30, 50, even 100 answers were probably simply too few to be able to draw conclusions from it. But how could I get more pilots interested in my project? So I sought contact and support from various agencies one after the other and at different times. First at the German paragliding blog of Lucian Haas. His NEWS  info immediately triggered a wave of feedback, which really motivated me a lot.

Various sources seemed to take a rather critical view of the fact that I dared to tackle such a topic. Was it because I also run a small goods business, or because I simply didn't have any proven competence? In any case, I liked the people who simply decided with their hearts – e.g. Brigitta from the DHV . She immediately supported my request with a note on the DHV homepage and a mention in the DHV news-mail. And again came a wave of answers...

I am very grateful to Roger Aeschbacher for making my survey known as part of the CH XC-League. I also wrote to individual C2-line pilots via XContest, which resulted in further feedback. However, the number of feedbacks was still too low for me!

With a French-language version (translation corrected by Bertrand Fontaine – merci to Belgium!) I tried to pick up the "French" pilots, but it didn't work. I didn't get any reaction from England at first – I found it fascinating how different the reactions were!

This was followed by a lengthy e-mail correspondence with the French association.  After all, they dealt with my concerns! In the end, I had to make the survey completely anonymous (no fields for name and mail). Soon there was a lot of feedback in French. Transferring this feedback – *uiuiui*, that was quite time-consuming for me and the GOOGLE translator, but I really enjoyed the quite varied descriptions of the French pilots!

Finally, Cross Country Magazine came to mind, which was also  quick to support my cause. This led to the last wave with over 70 responses from all over the world. As of 12/20/2023 = 288 actionable feedbacks. I was there! Or at least almost there!

Additional information is attracting attention

It was indeed the case that the topic fascinated me more and more and it seemed to me that more information was needed to understand it better and to be able to classify the results. I had various conversations with professionals from the scene. I found an article in [the SWISS GLIDER](#) that said that, according to initial findings, there had been an increase in emergency parachute departures. (SWISS GLIDER 11/12-23, "To accelerate or not to accelerate, that's the question!", author Beni Kälin). I wanted to get to the bottom of this, but quickly realized that the available database is miserable. The information on the number of accidents and the course of accidents is based on voluntary and therefore random "voluntary disclosures" and is therefore incomplete. The Swiss league has also not collected any figures so far (from league flights and competitions), but this should improve in the future. Well, with the help of Beni Stocker from the Swiss Hang Gliding Association, I was able to triage the figures from the European accident database into "C2 and other C-wings" – at least an approximate statement about the accident is possible.

In order to shed some more light on the safety aspect, I finally sought contact with Daniel Loritz, a professional Swiss safety instructor. I was able to have a very interesting conversation with him.



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Finally, and this is by no means a minor aspect, I wondered how widespread the C2 lines are already. That's when I came up with the idea of asking XContest for a database analysis. As with my work with XCTrack, I found open ears and hearts among the people at XContest! Now, on the basis of the current prevalence, a relation to the accident reports can be established, which is absolutely necessary for classification.

With a (not fully detailed) overview of the certification results of the current C2 liners and their C3 counterparts, I would like to provide another and final piece of information, especially for all those who are really interested in a deeper look.

Wonderful – I had a lot of fun! I am very grateful to all well-meaning supporters!

Many thanks to my supporters !

Lucian for the mention in the *blogspot* LuGlidz

Brigitta from the German Hang Gliding Association

Bettina and Thomas from the Fédération Française Vol Libre

Ed from Cross Country Magazine

Beni from the Swiss Hang Gliding Association

Dani from X-DREAM FLY

Jakub from XContest for your mega support!

Also: Roger Aeschbacher, Hans-Jürg Schmid, Jörg Bonderer,

Markus Brunner et al.



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Born in 1959 in Neunkirchen/Saar as the son of a Swiss mother and a German father. First model aircraft experience at the "tender" age of 12. From the age of 20, I was an enthusiastic "model crash pilot". In 1978 i graduated from high school, in 1982 i completed an apprenticeship in banking. In 1983 i moved to Switzerland. Summer 1991 – I'm standing on the practice slope – my flying life finally begins. Flight certification March 1992. Flight instructor certification 1994. 1996 Return to my traditional profession and soon my first daughter was born... Cross-country flying has remained the passion of my life - to this day.

*I dedicate this work to my wife Ariane, who never reproached me when I was drawn to my "feathered friends" in the air!
Thank you for your generosity and understanding!*



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View

What could follow...

I would like to see the survey results picked up by the media, commented on and made available to a wider audience.

I would also like to be able to discuss the topic of ENC 2-Leiner in a panel of experts on the basis of the survey results. Many other questions could be discussed, on which we have not yet received enough clarity from the survey itself, and in particular try to shed light on the topics on which there were strongly contradictory statements. Let's see....

I also plan to publish the survey in a YouTube video. Then – at least my project – would be completed

Thank you for your interest.

If you have any inputs, feedback or suggestions, please feel free to send to: info@myparaworld.ch



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Appendix

Links to underlying or supplemental data

- [Database: Survey ENC 2-Leiner](#)
- [Evaluation 1: complete survey \(german\)](#)
- [Evaluation 2: Pilots coming from the ENB \(german\)](#)
- [Evaluation 3: Pilots coming from the ENC or higher \(german\)](#)
- Results of the data analysis at XContest (no file is available)
- Results of the study of the European Accident Database (no file available)
- [Link to the Swiss Accident Database](#)
- [Overview of certification results \(as of January 2024\) \(german\)](#)
- Article: [Accidents 2021_europaweit \(german\)](#)

Might be that some of these will be translated lateron, but that takes some time...

Just have a look to where you would find it [MyParaworld](#)