

The Problem of Optimal Starting Time on Soaring Competitions, Taking into Account the Meteorological Conditions

Attempt of an analysis based on the results of Waikerie 1974, Bayreuth 1975 and Tocumwal 1976

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Abstract:

Correlation of the starting time differences and the normalized speed of the first ten glider pilots of each class in comparison to the starting time and the speed of the best pilot in that class can show a significant distribution in case of equal chances to all pilots during a competition flight ("Pilot's Day") or in case of meteorological events influencing and deciding such a flight ("Meteorological Day").

Introduction

If we try to compare the overall skill of competition pilots in major gliding events like Nationals or World Championships one possible method can be to normalize the achieved speeds on the racing days and to analyze this parameter as a function of the starting time of the best pilot of the day. That means for the ordinate of a diagram:

$V =$ Normalized Speed, where

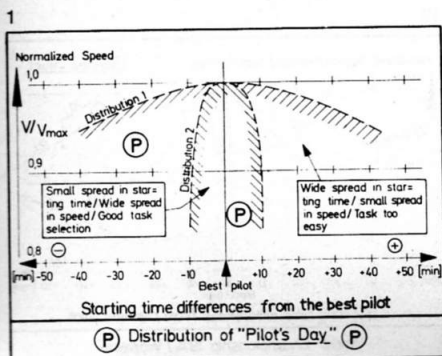
V_{max}

$V =$ Speed of the selected pilot

$V_{max} =$ Speed of the best pilot of the day

and for the abscissa of this diagram: Starting time of the best pilot of the day plus or minus Δt (min).

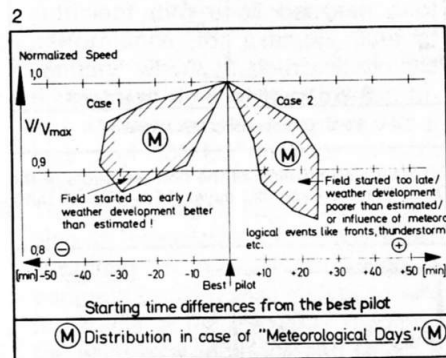
Fig. 1 shows what distributions we should expect on a normal day with equal chances for all pilots, who started in the specific class. If the distribution is a symmetric one, we refer to it as a "Pilot's Day (P)".



General evaluation diagram of "Starting Time Differences" against "Normalized Speed", here distribution of "Pilot's Day (P)".

Fig. 2 shows the unsymmetric case, when meteorological events have influenced the estimated normal development of the weather situation. In this case we call it a "Meteorological Day (M)".

Of course all other distributions in between these two clear cases can be expected. Therefore in some figures we used also the term "M/2", that means we suspect a meteorological influence but do not give full meteorological weight to it in the final result.



General evaluation diagram like Fig. 1, here distribution of "Meteorological Days (M)".

General distributions

What distributions do we really find in analyzing high standard competitions as National or World Championships? We look at 3 competitions of the last 5 years, where the starting times have been available:

1. World Championships 1974 in Waikerie/Australia
2. German Nationals 1975 in Bayreuth
3. Australian Nationals 1976 in Tocumwal

For the distributions in each class only the first ten pilots have been selected. All days with speed points are in one drawing. Figures 3 to 8 show the distributions.

Only a few conclusions can be drawn from the general distributions:

- the grouping of Waikerie Open Class (Fig. 3) is more compact than Waikerie Standard Class (Fig. 4). The cause of this fact has to be analyzed separately because the groupings are asymmetric in opposite directions;

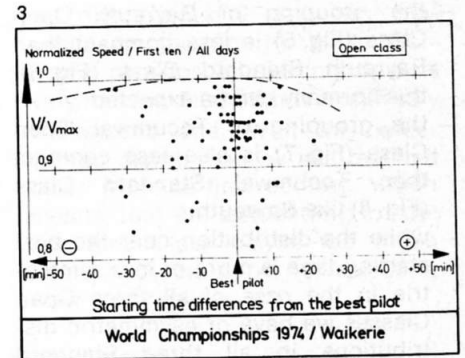
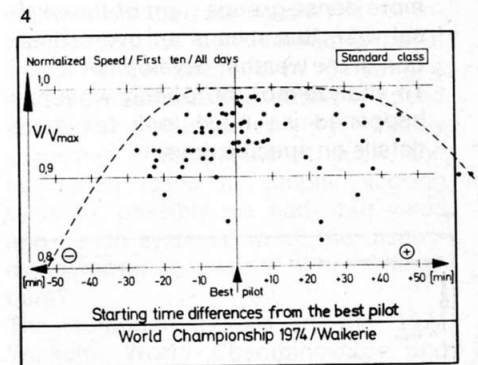
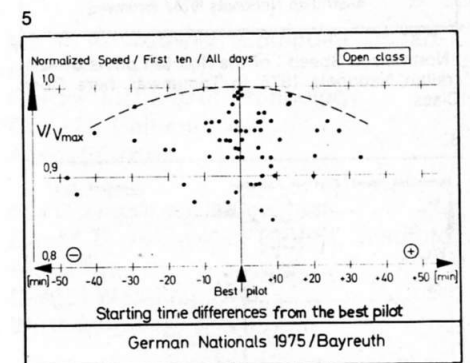


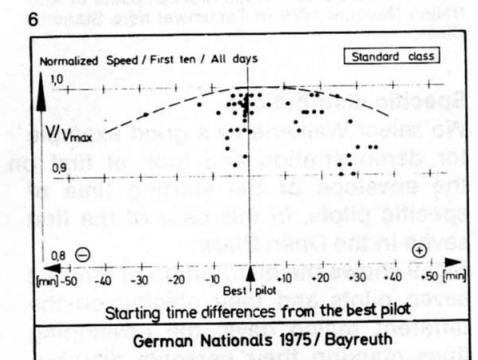
Diagram of "Starting Time Differences" against "Normalized Speed" of the first ten pilots of World Championships 1974 in Waikerie, Australia, here Open Class.



"Normalized Speed" of the first ten pilots of World Gliding Championships 1974 in Waikerie, Australia, here Standard Class.



"Normalized Speed" of the first ten pilots of German Nationals 1975 in Bayreuth, here Open Class.

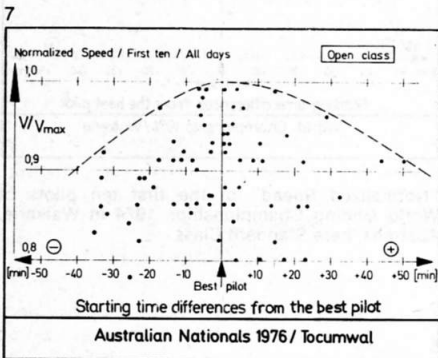


"Normalized Speed" of the first ten pilots of German Nationals 1975 in Bayreuth, here Standard Class.

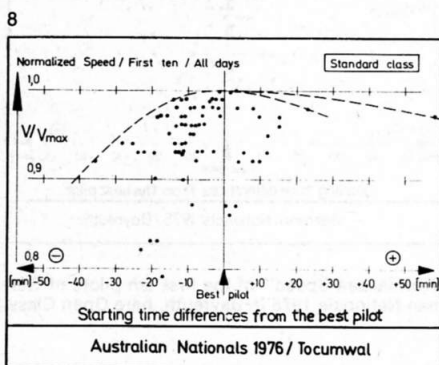
- the grouping of Bayreuth Open Class (Fig. 5) is less compact than Bayreuth Standard Class (Fig. 6); this normally can be expected;
- the grouping of Tocumwal Open Class (Fig. 7) is also less compact than Tocumwal Standard Class (Fig. 8) like Bayreuth;
- while the distribution near the best starting time is more or less symmetric in the case of all three Open Classes we have or asymmetric distributions in all three Standard Classes.

Tocumwal is shifted left of the vertical axis of best starting time, that means a underestimation of the weather development; Waikerie and Bayreuth Standard Class have some more dense groups right of the vertical axis, that means an overestimation of the weather development.

To analyze mor thoroughly what has happened we must look for more details on specific days.



"Normalized Speed" of the first ten pilots of Australian Nationals 1976 in Tocumwal, here Open Class.



"Normalized Speed" of the first ten pilots of Australian National 1976 in Tocumwal here Standard Class.

Specific distributions

We select Waikerie as a good example for demonstration and look at first on the envelope of the starting time of specific pilots, in this case of the first seven in the Open Class.

Fig. 9 shows the distribution of the first seven pilots of a specific day. Fig. 10 and 11 demonstrate how the distributions are; we have one case of a full Meteorological Day "M", like the 18th of January (Fig. 10) and two cases of "Meteorological Day M/2", like the 20th or 23rd of January (Fig. 10 and Fig. 11).

1. Moffat, 2. Zegels, 3. Grosse, 4. Cartry, 5. Holighaus, 6. Ragot, 7. Ax! Moffat, of course, has the smallest field, Zegels follows as next and so on.

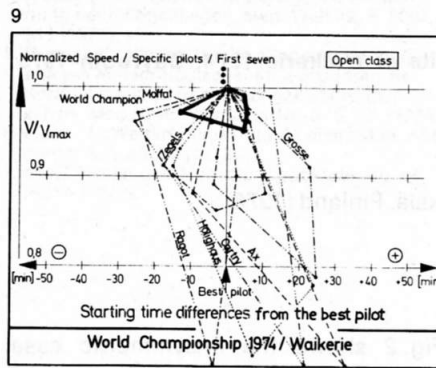


Diagram "Starting Time Differences" against "Normalized Speed" with envelop of the first seven pilots in Open Class of World Championships 1974, Waikerie, Australia. (means the 3 daily best flights of George Moffat).

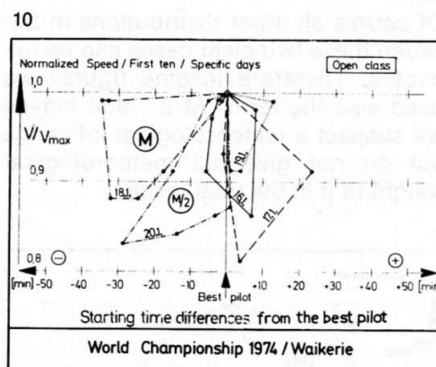


Diagram with envelop of the first ten pilots in the Open Class on specific days: (16th-20th of Jan.).

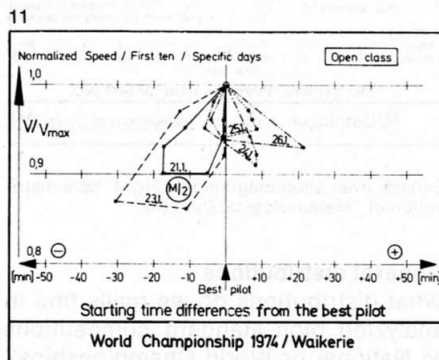


Diagram with envelop of the first ten pilots in the Open Class on specific days: (21st-26th of Jan.).

It is obvious, that Grosse, Cartry, Holighaus, Ragot and Ax have had at least one bad day, so missing higher places in final scoring. It is also obvious, that the first seven have started in a relatively small corridor of starting time in regard to the best starting time, namely plus or minus 25 minutes. This indicates also a good task setting from the side of the organizers.

The next step for analyzing the results is to look at the distribution of the first ten pilots of a specific day. Fig. 10 and 11 demonstrate how the distributions are; we have one case of a full Meteorological Day "M", like the 18th of January (Fig. 10) and two cases of "Meteorological Day M/2", like the 20th or 23rd of January (Fig. 10 and Fig. 11).

A more detailed analysis is tried in Fig. 12 by marking the extreme starting time differences of the first ten pilots of the Standard Class in the final result with the date of the specific competition days. We remember here also the final placing of the Standard Class: 1. Reichmann, 2. Renner, 3. Kepka, 4. Fitchett, 5. Gordon, 6. Mercier, 7. Cameron, 8. Wujczak, 9. Greene, 10. Ahrens. Looking especially for the values shifted to later starting times e.g. of Reichmann, Renner, Kepka and Fitchett we realize for all these the date of the 17th of January. On this day the four best pilots apparently estimated the weather to develop better with time and started up to 1 hour later than the best pilot of this day.

Looking on Fig. 13 we see, that the starting time area of the ten best of that day is "polarized" to later starting times as a result of the above mentioned overestimation of weather development. The next day, the 18th of January, seems to have a counter effect, the first ten pilots of that day started earlier or near the best pilots of that day. This happened, for example, also for the ten first pilots of the Open Class (see Fig. 10).

We note also another "Meteorological Day" on January 20th (Fig. 13), while the other competition days (Fig. 14) show a more or less symmetric distribution.

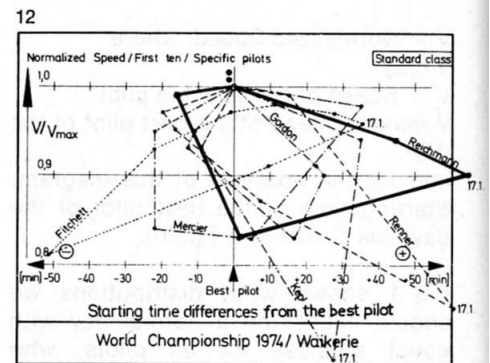


Diagram "Starting Time Differences" against "Normalized Speed" with envelop of the first ten pilots in Standard Class of World Championships 1974, Waikerie, Australia (means the 2 daily best flights of Helmut Reichmann).

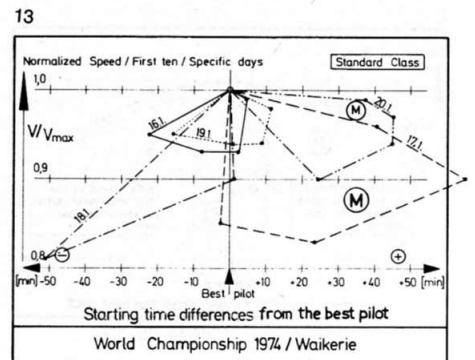


Diagram with envelop of the first ten pilots in the Standard Class on specific days: (16th-20th of Jan.).

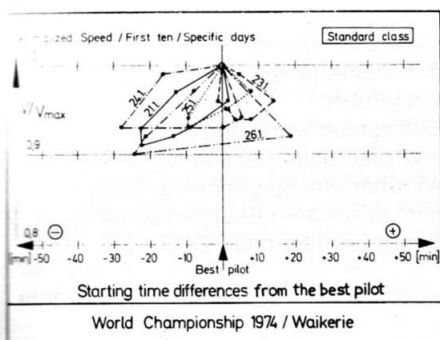


Diagram with envelop of the first ten pilots in the Standard Class on specific days: (21st-26th of Jan.).

We now can try to analyze, what has happened for example on the 17th of January. What significant meteorological changes have influenced the results of that day?

In the morning it appeared, that there would be a gradual development of thermal soaring conditions, which would last until late afternoon. However, the light southerly airstream feeding in slightly moister and more stable air ment that the afternoon's thermal conditions gradually weakened. Thus, several pilots found a progress slower than expected in the afternoon. This particularly affected the late starters and produced the "meteorological" distribution.

Observations and conclusions

With limited available space in this publication not all cases can be discussed in full detail. But some observations and conclusions should be given as a résumé to the problem of Optimal Starting Time.

1. The grouping of Open Class is in general less compact than the grouping of Standard Class (Waikerie is masked by the values of the 17th and 20th of January)!

Standard Class is characterised by gaggles of fibre glass; Open Class

shows a more well distributed starting Time area.

Results also in the detailed analysis of Bayreuth and Tocumwal—that are not discussed here—show that this is due to the strategic concept, whether a pilot benefits by flying with a gaggle of a fibre glass ahead of him to mark the air or alternatively "put him off" what he would otherwise do from his own judgement. The elimination of the Start Gate radio would enable a pilot to start without other pilots following him through, and would surely produce a better "individual" pilot assessment and show also a more well distributed starting time diagram.

Flying in groups or pairs may produce faster speeds, but the object of competitions is to isolate the best pilot.

2. Though such distributions as shown can only be produced *after* a task, task setters could benefit by noting the relationship between meteorological conditions and grouping of pilots on days, where the pilot shows "to short a task" or insufficient difference between pilot performance, for example 25th of January, where in both classes the distribution field of the first ten pilots are very small, though it was a task over 500 km distance in both classes.
3. The distributions could be of use also in evaluation of a pilot's assessment of conditions during a competition day, that means to test his ability of consistently "reading" the weather conditions and select a start time resulting in a best flight time. The best example is George Moffat (Fig. 9), who has the smallest field, regarding also his 3 daily first places (: on the figure). Reichmann's distribution field (Fig. 12) is a relatively wide one, but

we must regard 2 daily first places (i on the figure). While Gordon's corridor of starting time is very narrow, Fitchett has a relatively widespread one. With this widespread distribution he has reached place 4 in the final scoring, which means, that the task setting for the Standard Class leaves too much freedom th the pilots for selecting their starting time.

Final remarks

It is obvious, that a number of conclusions can be drawn by a thorough post-analysis of the main competitions. We need only the tables of starting times and speeds for evaluation and comparison. Competitions with mainly distance scoring are not yet included into our considerations, but it seems to be possible by defining a suitable interface line between speed scoring and distance scoring. Possibly a further development of such and evaluation leads to simpler scoring systems; possibly we had—but years ago—such systems, in all the discussions round the world. Who remembers?

The computer results of the 1974 Waikerie World Championships and the 1976 Tocumwal Australian Nationals are saved on punched paper tapes and computer plotting of all pilots would be possible. Please address any requests concerning there results or further exchanges in this field to:

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