PROPOSAL TO IGC PLENARY 2006

Proposed by DAEC / German Aero Club

It is proposed that:

DAeC now proposes the creation of a **World Best Performance** for gliders with and without engine for:

1) General (or absolute) Performances for which all kinds of lift can be used;

2) World Best Performance flown in thermal convection only, following the framework defined by Carsten Lindemann and Joerg Hacker.

3.) That world records should only be confirmed by the FAI in the future, if the flight logs are available in the OLC or a similar service recognised by the IGC.)

This Proposal affects:

Sporting Code
Public Relation for gliding
Scientific Research

Reasons supporting the Proposal:

Thor Johanssen reported in IGC Discuss that only the lack of a watertight definition is preventing the creation of a class of world records for thermal flight.

A framework for such a definition has now been defined by two worldwide recognised meteorologists.

Both have spent thousands of research flight hours studying the structure of the atmosphere and, in particular, thermal convection. Carsten Lindemann has just achieved the best distance of 1120km on the Northern Hemisphere for the 100 year anniversary of the FAI, while Joerg was instrumental in re-building the D36V2 and has participated in world record gliding flights in his current homeland Australia.

Both scientists have indicated their willingness to act as advisors in case of doubtful claims.

Apart from being Best Performances in themselves, world best performances also should promote the capabilities and achievements of the sport of gliding. Therefore, such record flights must be publicised accordingly.

To ensure this, the DAeC proposes that world records should only be confirmed by the FAI in the future, if the flight logs are available in the OLC or a similar service recognised by the IGC.

Supporting documents from Mr.Carsten Lindemann and Mr. Hacker

Mr.Lindemann

Gliding World Records

World records in gliding grew from just a few kilometres shortly after gliding was invented to a bit more than 3,000km today, and will probably grow further in the future. At first, slope soaring was the primary means of cross country flights, but was quickly replaced by using thermals. Most recently, based on

research of mountain waves in the European Alps, the Andes and increasingly also in the Rocky Mountains and the Sierra Nevada in the USA, the use of waves has enabled soaring flights over unprecedented distances. Provided one allows flights during day light hours only, these flights are limited only by the geographical extent of the mountain ranges, the intensity of the wave lift, the performance of the glider and the personal endurance and experience of the pilots.

In this sense, cross country soaring flights using primarily thermals have to cope with much more restrictive limits.

One should therefore ask the question, whether distance records flown in mountain waves and records flown using primarily thermals should not be listed in different categories.

What would be the advantages of such a split ?

The current maximum distance of approximately 1,400km for soaring flights using primarily thermals most certainly does not set an absolute limit for this type of flight, especially in the well-know ideal geographical areas such as the dry regions of Africa, Australia and America. New regions are increasingly being investigated, such as in Central Asia and in North Africa (Morocco) which, with their high cloud bases, have a rather high potential to achieve longer distances using the latest technology. This is an exciting and real research task.

The introduction of a category of distance records for flights using primarily thermals would most certainly strengthen this research and enrich the many facets of gliding.

To introduce a category for distance flights using primary thermals would obviously require a set of objective criteria to distinguish them from flights in waves. Several such criteria immediately spring to mind: the terrain, the weather conditions, in particular the onset of convection. Thermals enabling sustained soaring flight rarely start to form earlier than about three hours after sunrise. Wave flying, in contrast, as well as slope soaring, is possible independent of the time of day or night. However, the development of thermals can weaken or even destroy wave patterns.

Flights using thermal waves which can even form over flat terrain under certain wind shear and vertical stratification conditions, have been proven not to cover much longer distances when compared to normal thermal flight, but lead “only” to more excitement and often great visual pleasure for the pilot.

Thermal flight is also possible in mountainous regions. Such flights are somewhat more difficult to analyse, but their nature can also be recognised.

I feel strongly that the FAI/IGC should seriously consider the introduction of distance records flown using thermals, with the aim to give incentive to further study and investigate this most common type of lift in the atmosphere.

Carsten Lindemann, Berlin

Jorg M. Hacker

Why separate World Record categories for soaring flights in waves in flights primarily using thermals should be introduced and how one can distinguish between the two

In the early days of gliding (and in some very special recent cases), most distance records were flown using slope lift. Later, and until just a few years ago, most gliding distance records were flown using primarily thermals. Recently, unprecedented distances were flown using exclusively mountain waves. Most of these flights were carried out over mountain ranges such as the Southern Alps in New Zealand, the Rocky Mountains in North America and, particularly, the Andes in South America.

Distances achieved by using slope lift alone were of the order of a few tens of kilometers (with the exception of Karl Striedieck's impressive flights along the Appalachian mountains in the USA). Maximum

distances achieved by using primarily thermals reached approximately 1,400km, with most flights taking place in the dry and hot climates of Southern Africa, Australia and, to a leers degree, Spain and other locations. Flights using nearly exclusively mountain waves reached distances of more than 3,000km, a distance which until recently was thought to be impossible to achieve by soaring flight.

Nevertheless, thermals are still (and will most probably remain) the by far most common means of cross country soaring.

Records, and in particular world records, are an unmatched incentive for individual pilots to try to push the performance of the glider and also their own capabilities to the limits. It is therefore of high value to the gliding community as a whole to offer this incentive to as many pilots as possible.

Extreme mountain wave flying, as is required to achieve the impressive record distances flown in the Andes, not only requires a very high and special level of skill and experience , but also very high levels of investment and, in some cases preparedness for risk taking, which is simply out of reach for the vast majority of glider pilots. This assessment does by no means diminish the achievements of the few individuals involved in this type of gliding, rather the opposite, but at the same time, it excludes most pilots from the pool of potential record holders. And this cannot be the idea of a record system.

Furthermore, wave lift is meteorologically totally different from thermal convection. In fact, the two are basically the opposite phenomenon of each other, as all glider pilots know. Mountain waves can occur at any time of day or night lasting from hours to many days, depending on the geographical features of the landscape (mountains and hills), they can extend for thousands of kilometers along long mountain ranges such as the Andes and they can reach altitudes of more than 12 km reaching well into the Stratosphere. Thermals (suitable for gliding) , on the other hand, can (in most cases) only occur during daytime and over land. The most dramatic restriction of thermals in terms of their usefulness is the height of the cloud base which is determined to a large degree by the incoming solar radiation and the stratification of the atmosphere.

The style and strategy of soaring in mountain waves is nearly totally different from that of soaring in thermals. While wave soaring consists of long and very fast straight flight legs, thermal cross country gliding contains (nearly by definition) sections of circling and gaining altitude in thermals. Also, thermal flight cannot commence until usable thermals actually have started to form in the atmosphere and this is normally not much earlier than about three hours after sunrise, and often much later.

The synoptic conditions required for long distance thermalling cross county flight are usually totally different from conditions favouring mountain waves. In fact, strong thermals often prevent mountain waves from occurring at all.

Because of all of these differences, it is appropriate to consider the question whether it might be perhaps time to distinguish between records flown using different means of achieving the goal. This is nothing new in other sports. For instance, in athletics, a difference is made between running and power walking, although both disciplines use the same tools (the human legs) to achieve the goals. Many other examples can be found, for instance in horse racing, skiing and automobile sports.

To be able to have different categories of gliding records, it is obviously essential that the two modes of soaring flight can clearly be distinguished without ambiguity. Although this might look on first glance like a very difficult, or nearly impossible problem, it is in fact not that hard, if appropriate techniques are applied for the analysis of flight records. In some doubtful cases, it might require to use the services of an experiences atmospheric scientist (who preferably should also be an experience glider pilot), but in most cases, some basic framework of analysis can be used. Cornerstones of such a framework would be the synoptic conditions of the day; a simple analysis of the convective conditions of the day (fro instance by using a readily available computer model such as AlpTherm by Bruno Neininger); or even simpler the percentage of lift gained during straight flight versus that gained during circling. Other rather simple criteria could be the mean altitude of the flight or even the mean wind speed. I have no doubts that a framework can be developed which clearly determines in which category a flight has taken place.

I am sure that a group of experienced atmospheric scientists who are also glider pilots can be found in the world-wide soaring community to come up with such a framework and I would certainly be willing to participate in such an effort.

In fact, if two categories of distance records exist, it should be expected that pilots would submit their flights in the appropriate category anyway and that an independent assessment would only be necessary in a few cases.

Opponents of this proposal might put forward the argument that thermal waves could "blur" the difference between wave soari9ng and thermal flight. The counter argument is, that thermal waves have in no case known to me led to longer distances flown under thermal conditions. Thermal waves are a phantastic means to get above the cloud base and lead to great flights, but not in the sense of achieving longer distances, because too much time is "lost" in using them.

Perhaps one of the most important arguments for the introduction of the proposed two categories is that to "give up" thermal soaring for record flying would remove(or at least diminish) one of the great incentives for furthering research and investigation of thermals for gliding. It would also diminish the relevance of distance (and actually speed) records for the vast majority of the gliding community, because extreme mountain wave gliding is a very long way removed from the type of gliding they are doing.

In summary, I would like to propose to the FAI to very serious consider the introduction of two different categories of distance and speed-over-distance gliding records one category which covers soaring flights which use primarily thermals to achieve the goal, and (2) another category which has no restrictions at all.

Dr. Jorg M. Hacker, Director/Chief Scientist