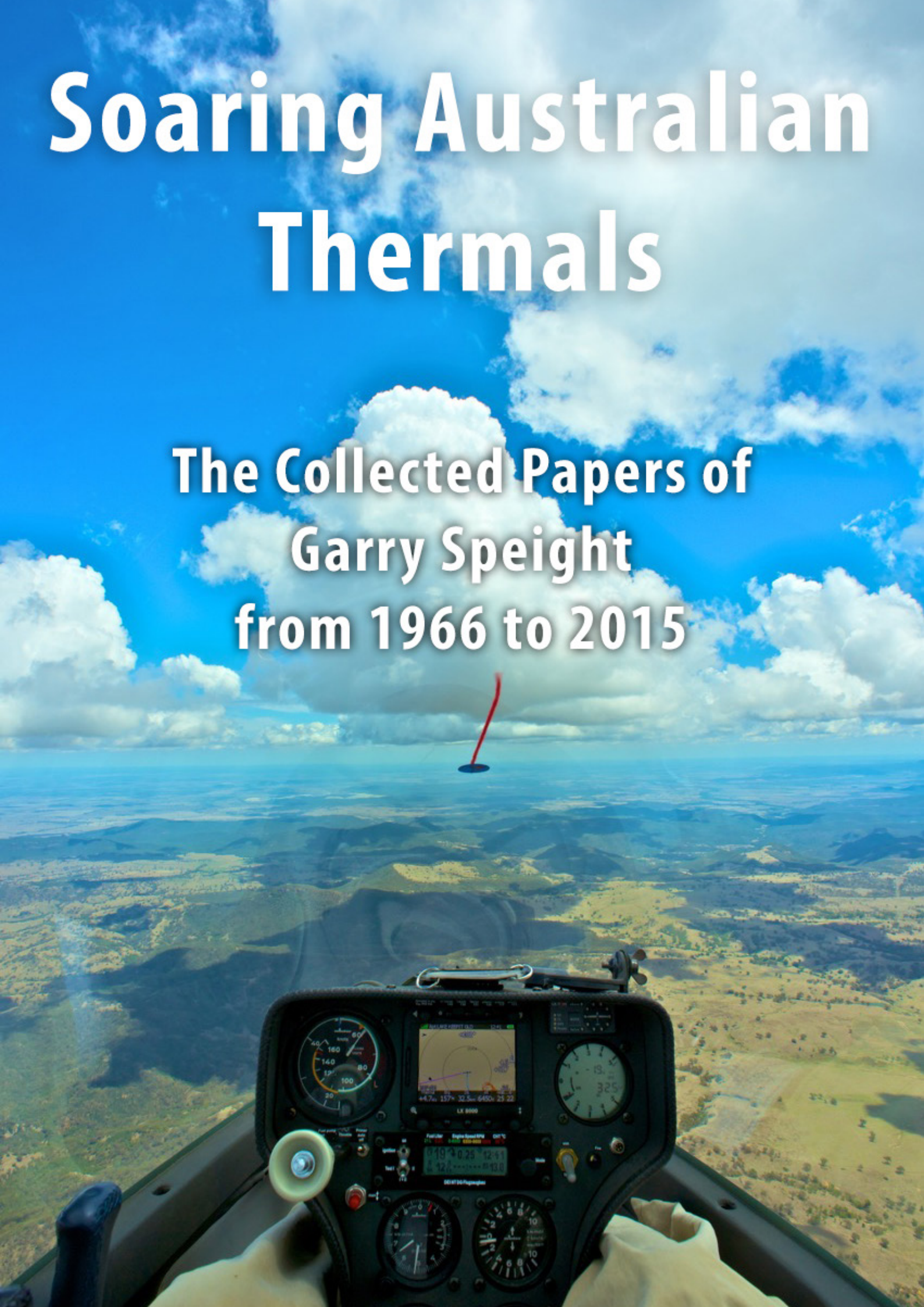
Soaring Australian Thermals

The Collected Papers of Garry Speight from 1966 to 2015



Sheep, Goats, and Water Ballast

By Garry Speight

By 2011, my 1982 article "The use of water ballast" and discussion about it had faded from memory, with hardly anyone convinced. At a regatta at Lake Keepit in 2011 I tried once again to tell people that the usual talk about the benefits of water ballast was not correct. Because I rushed this presentation, I was misunderstood by many people present. I wrote the following letter to "Keep Soaring" and to "Gliding Australia" about it. In response, John Clark, very kindly re-published my 1982 article for the new generation in "Keep Soaring", May-June 2011. I then amended my letter to "Gliding Australia" to acknowledge John's action, as below.

Originally published in Gliding Australia, January/February 2012

John Clark, with his usual sharp wit, described a recent Lake Keepit Regatta in the April 2011 "Soaring Australia" (p. 30-32) in an article "Separating The Sheep From The Goats".

In it he summarised a talk I gave on the effect of water ballast on performance. Unfortunately, he left out the punch line (perhaps I muffed it somehow). This gave the impression that I do not recommend carrying water ballast, when in fact I do. The advantage is simply not what people think it is.

My talk was a brief version of an article I wrote in the distant past: "The Use of Water Ballast", Australian Gliding, September 1982, p.16-22. I am sure that my argument was correct then, and is still correct. Wing loadings are all heavier now, so someone should update the calculations and graphs leading to the conclusions of my article.

John Clark has since earned my gratitude by kindly re-publishing my ancient article where it can be read by a new generation of glider pilots: the Lake Keepit soaring Club on-line magazine "Keep Soaring" for May - June 2011 (see pages 33 to 37): http://www.keepitsoaring.com/LKSC/Downloads/Keep_Soaring/May_June_2011.pdf

To quote John Clark's article (with the points numbered):

"Garry Speight gives a challenging talk on why increasing your wing loading with water ballast

(1) will give you a lower rate of climb

(2) will give you more trouble in narrow thermals and

(3) won't make your speed on the glides any faster.

As usual with Garry's talks, it provoked some amusing arguments and more than a little scratching of heads."

These three points were supposed to lead to the up-beat conclusion:

(4) will stop you from getting too low.

The argument is this:

The advantage of a high wing loading is not directly related to all points on the polar (including best glide) moving to the right. It is related to the fact that a loaded glider sinks less at all the high speeds used for cruising, although it sinks more at all the slow speeds used for climbing.

When thermalling with ballast, the rate of climb is reduced for two separate reasons: the glider sinks more at each speed, and the minimum circling speed is higher, forcing a bigger circle which may be outside the thermal core. The best reason to dump ballast is finding that the glider cannot fly within the core.

The best speed for cruising depends directly on the rate of climb. Pilots carrying ballast will fly at much the same speed as those not carrying ballast. If they experienced the same rate of climb, their better polar would justify a higher speed, but they don't; they experience a much lower rate of climb.

Given that ballasted and un-ballasted gliders should cruise at much the same speed, it is clear that the heavier glider's lower sink rate in cruise is its only advantage.

It is a very great advantage: the flat glide angle brings strong thermals within range, avoids scratching at low altitude, and makes outlanding less likely.

Garry's LS4a in which he won competitions

Garry winning in Queensland, 1991