

I had been waiting to get to sail – or fly – the AC72 from the moment I heard of the project to get the polar ready for SOL. My sincere thanks to the SOLers who made this possible!

My anticipation was that a race with this boat would be more difficult and also very different in nature compared to the slower boats, for four main reasons:

1. The speed of the boat would make timing of turns more difficult
2. The speed of the boat would reduce time available to make decisions, especially in shorter “round-the-cans” races
3. Probably due to the nature of the races run with the original boat and subsequent boat design, the polar was pretty much the opposite of e.g. Steinlager, with plenty of polar hops
4. Due to the very high speeds, the performance loss model used would play a very significant role

This in mind I thought at least one practice run would be an absolute necessity if one would like to do a good run in the race. Fortunately I had some spare time and was able to do one run on Tuesday before the better window opening. The practice run confirmed three of the four assumptions above. In my opinion, at least in this race, timing the turns wasn't particularly challenging or important (more on that below).

So what did I do to try to cope with these challenges? First of all, I decided to do my best to control the performance loss. This meant building a couple of new calculators to my SOL-excel to be able to do the necessary calculations quickly enough (see point 2 above). Second of all, to tackle points 2-4 above, I spent about an hour before the run to create a step-by-step plan for the whole run, that means every turn on every leg, so basically making all the major decisions in advance, leaving just the fine adjustments to be done in the race. Well, it seems like this approach wasn't a very bad one;)

A few words on the performance model as I think it played a decisive role in this race, and probably also in similar races run with the AC72 in the future. First and foremost, it is important to remember that the loss in time or distance in tack or gybe is proportional to the fourth power of boat speed. What does this mean in practice? A few of examples (these have been calculated with formulas provided by kroppyer in his excellent document on performance loss, well worth reading, and I have written the following with the assumption that the reader has read the document and knows the basics of SOL performance

model: http://www.sailonline.org/static/var/sphene/sphwiki/attachment/2013/12/21/SOL_performance_loss.pdf):

1. Sailing the Swan 36, gybing at a nice speed of 6 knots: Distance lost due to performance loss: 0,003 nm, time lost: 1,8 sec
2. Sailing a VO70, gybing in the Southern Ocean, at an exhilarating 25 knots: Distance lost due to performance loss: 0,9 nm, time lost: 130 sec!
3. Sailing AC72, gybing in wind of 15 kn, boatspeed 42 kn: Distance lost 7,2 nm, time lost over ten minutes!

I think there is high consensus that the performance model has, at least in high speeds, little to do with reality. Another question is that in boats like VO70 and AC72 it changes the nature of SOL in a very profound way. In the Lisboa race there was little if any significance on how you time your turns or how you take advantage of wind shifts etc. A few of calculations to support this:

1. On the downwind leg, TWS was about 12kn, max VMG (TWA ~142) boatspeed was 34 kn. Loss due to a normal gybe was about 2,4 miles or 4:30 in time
2. Doing the same gybe in two steps, first step being a gybe to TWA 179.9, where boat speed is 15 kn, after which boat performance is 92,5 % and no additional performance loss occurs due to the second step, which is to head up to TWA 142. The resulting loss is 0,5 nm in distance and 60 seconds in time, a gain of 1,9 nm in distance and 3:30 in time! (of course you lose some VMG, but that's insignificant compared to the gain)
3. On the upwind leg, TWS was about 14 kn, max VMG (TWA ~43) boatspeed was 19 kn. Loss due to normal tack was about 0,3 nm or 57 sec in time
4. Applying the 93 % principle (tacking to a TWA with boatspeed of ~15 kn, after which no additional performance loss occurs), would end up in loss of 0,2 nm or 36 seconds (this time the VMG lost is much more important, but still far less than the gain)
5. Taking even more advantage of the performance model, if you tack first to TWA 1, with boatspeed of 0,5 kn, you can reduce the loss to 0,03 nm and time to 7 seconds

Basically we have two courses of action:

1. Continue with the current performance model, accepting that its ability to simulate reality is limited, but at the same time understanding that it is a part of the game mechanics and rules and a part of the game is to understand these mechanics and rules
2. Change the performance model to better simulate reality. One quick fix might be to disable the performance loss model for some races, e.g. the ones raced with the faster boats