## New scoring formulas recommended for 2007

For 2007, the SSA Rules Committee is recommending changes to the formulas used to calculate scores in SSA-sanctioned contests. These changes are in part the result of studying the differences between current US scoring and that used in World Gliding Contests.

The actual effects of the differences between US and WGC scoring formulas are complicated. These differences are discussed in a separate document (WGCStrategy.doc) that was originally prepared for the benefit of US Team pilots attending WGC2006 in Sweden.

The Rules Committee has concluded that a full change to the WGC scoring formulas would be undesirable. Problems would include:

- The SSA Pilot Ranking List would no longer be accurate
- Unacceptably large changes to scoring software would be required
- WGC scoring includes a number of unwanted effects:
  - In some cases, WGC scoring gives more points to a finisher who intentionally slows down.
  - The devaluation formulas in WGC scoring can lead to excessive gaggling and "start gate roulette".
  - The complexity of WGC formulas can make it important to carefully tune tactics

WGC rules in part deal with scoring complexities by allowing a pilot to receive tactical advice from a Team Captain. This is not allowed under US Rules, and there is no sentiment among pilots or on the Rules Committee that permitting this would be desirable.

The Rules Committee has concluded that the most attractive difference between US and WGC scoring is found in the way incomplete tasks are scored: under WGC rules, the effective cost of a long landout is less than under US rules. Thus, the changes recommended for 2007 focus on increasing the points awarded for incomplete tasks. This can be accomplished with reasonably small adjustments to current US scoring formulas.

Current US scoring seeks to significantly separate the scores of even very slow finishers: a pilot who achieves 60% of the winner's speed gets the same score advantage over the 50% pilot that the winner gets over the 90% pilot. Preserving these large score differences down to very slow speeds along with the principle that every finisher receives more points than any landout inevitably has the effect of pushing landout scores way down.

The recommended changes do several things:

- Preserve the current differences in scores between reasonably fast finishers

- ? Decrease the differences in scores between slow finishers
- ? Increase maximum distance points (which has the effect of decreasing the relative cost of landouts)

What will be the effect on pilot strategy? If the relative cost of a landout is lower, it makes sense to be somewhat more willing to run the risk of one. The Rules Committee does not wish to see a large increase in the number of contest landouts, but feels this effect will not be strong enough to cause problems.

However, the change can also have beneficial effects on strategy: The relative value of a finish over a long landout will often be meaningfully lower (especially for a slow pilot), so pilots should be more willing to abandon a marginal final glide and land safely just short of home.

It's fair to note that by giving more points for distance, there's one sense in which a short landout is now more costly: it gives up more points to the long landout (though less to a slow finish than was previously the case). On a difficult day, this should make pilots more careful to achieve at least a moderate distance and somewhat less eager to abandon a task.

The proposed changes will slightly reduce the relative value of the 25-point airfield landing bonus. This may make some pilots more willing to press on past an airfield, accepting a field landing as the price of more distance and a slightly better score. Yet experience has shown that most pilots prefer to land at airfields and need only small encouragement to do so.

Most importantly, the Rules Committee feels these changes will improve the measurement function of the scoring system, and enhance the overall contest experience for pilots. An occasional landout (especially when distance is reasonably good) will not so completely destroy a pilot's score and chance of a decent contest placing. The decision as to whether to continue into a turn area or toward another MAT turnpoint, rather than stop early for an undertime finish will not be quite so painful or consequential

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Here are the proposed scoring formulas (important changes are underlined):

11.3 Scoring Nomenclature

SMTD - Standard Minimum Task Distance (Rule 10.3.1.1)
SMTT - Standard Minimum Task Time (Rule 10.3.1.1)
DIST - Scored Distance (Rule 11.2.3)
Contestant - defined in Rule 11.1.1
Finisher - defined in Rule 11.1.2
SCR - Scored Completion Ratio (Rules 11.5.2, 11.6.5)
TOC - Actual Time on Course (Rule 11.4.1) - applies only to a Finisher
STOC - Scored Time on Course (Rule 11.5.3.2) - applies only to a Finisher

TASKDIST - Task Distance - The sum of the lengths of all legs of the task
SPEED - Scored speed (Rules 11.5.1, 11.6.4) - applies only to a Finisher
MINTIME - Minimum Flight Time, as declared by CD
UF - Undertime Finishers - Number of Finishers whose TOC is more than 15 minutes under MINTIME
BESTDIST - Best Distance achieved (Rule 11.6.9)
BESTSPD - Best Speed – Greatest value of SPEED achieved by any Finisher
MSP - Maximum Speed Points (Rules 11.5.3, 11.6.6)
MDP - Maximum Distance Points (Rules 11.5.4, 11.6.7)
STF - Short Task Factor (Rule 11.4.2)
BONUS – Airfield Landing Bonus (Rules 10.10.3, 11.4.3)
POINTS - the calculated score (Rules 11.5.5, 11.5.6, 11.6.8, 11.6.10)

11.4 Scoring Equations - General

11.4.1 Time on course:

TOC = (Scored finish time) - (Scored start time)

11.4.2 Short Task Factor:

If there are no Finishers, STF = 1.0

Otherwise, STF = (TOC of Finisher with BESTSPD) / SMTT (but not greater than 1.0)

11.4.3 Airfield Landing Bonus

For eligible pilots (see 10.10.3), BONUS = 25; otherwise, BONUS = 0.

11.5 Scoring Equations - Assigned Task

11.5.1 Speed:

SPEED = DIST / TOC

11.5.2 Scored completion ratio:

SCR = (Number of Finishers) / (Number of contestants)

11.5.3 Maximum Speed Points:

MSP = STF * $\underline{(600 + 660 * SCR)}$ (but not greater than STF * 1000)

11.5.4 Maximum Distance Points:

MDP = MSP * $\underline{(0.8 - 0.2 * SCR)}$

11.5.5 Points for Finishers:

POINTS shall be equal to the largest of the following three quantities:

MSP * SPEED / BESTSPD

$\underline{MDP + 30 + MSP * 0.2 * ((SPEED/BESTSPD) – 0.4)}$

MDP + 30

11.5.6 Points for Non-Finishers:

POINTS = BONUS + MDP * DIST / TASKDIST

11.6 Scoring Equations - Modified Assigned Task and Turn Area Task

11.6.1 Not Applicable

11.6.2 Not Applicable

11.6.3 Scored Time on Course:

For Finishers whose TOC is less than MINTIME,

STOC = MINTIME - ((MINTIME - TOC) / 10)

For all other Finishers, STOC = TOC

11.6.4 Speed:

SPEED = DIST / STOC

11.6.5 Scored completion ratio:

SCR = ((Number of Finishers) - 0.75 * UF) / (Number of contestants)

11.6.6 Maximum Speed Points:

MSP = STF * (600 + 500 * SCR) (but not greater than STF * 1000)

11.6.7 Maximum Distance Points:

MDP = MSP * (0.8 - 0.2 * SCR)

11.6.8 Points for Finishers:

POINTS shall be equal to the largest of the following three quantities:

MSP * SPEED / BESTSPD

MDP + 30 + MSP * 0.2 * ((SPEED/BESTSPD) – 0.4)

MDP + 30

11.6.9 Best Distance:

If there are no Finishers, BESTDIST is the greatest scored distance achieved by any pilot.

Otherwise, BESTDIST is the larger of the greatest scored distance achieved by any Finisher and (BESTSPD * MINTIME).

11.6.10 Points for Non-Finishers:

POINTS = BONUS + MDP * DIST / BESTDIST

(but not greater than BONUS + MDP)