2008 Tucson Aerobatic Shootout
Invitational Class Scoring Policy
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For the invitational class, each pilot will drop the highest and lowest judge for each sequence. Prior to dropping, normalization of the judges will be done. This is the same policy used at the 2007 Shootout.

The benefits of normalization are well known when sequence scores are dropped. In that case, the goal of normalization is to remove differences in scores due to varying conditions associated with the different sequences. For example, different sequences flown on different days might have dramatically different wind conditions. If normalization were not employed, the sequences from windy days almost always would be the ones dropped.

Similarly, normalization of judges should be performed prior to dropping the highest and lowest. If not, the most stringent and least stringent judge's scores will almost always be the ones dropped. For example, consider the table below, which contains K-factored scores from 5 judges each scoring the same sequence for 6 pilots.

| | Pilot 1 | Pilot 2 | Pilot 3 | Pilot 4 | Pilot 5 | Pilot 6 |
|---|---|---|---|---|---|---|
| Judge 1 | 5090 | 4920 | 5290 | 4500 | 4710 | 4390 |
| Judge 2 | 5390 | 6100 | 5600 | 4790 | 5000 | 4690 |
| Judge 3 | 5690 | 5510 | 5900 | 5110 | 5310 | 5000 |
| Judge 4 | 6000 | 5810 | 5300 | 5400 | 5600 | 5310 |
| Judge 5 | 6290 | 6150 | 6500 | 5700 | 5890 | 5600 |

Examining the K-factored scores, a number of things can be observed. Judge 1 consistently gives the lowest scores. Judge 5 consistently gives the highest scores. Judge 2 normally is the second lowest. However, for Pilot 2, Judge 2 is nearly the highest. Thus, it seems that Judge 2 may be biased in favor of Pilot 2. Judge 4 is normally the second highest. But for Pilot 3, Judge 4 is nearly lowest. Thus, it seems that Judge 4 may be biased against Pilot 3. The two scores that seem to show bias are marked in red.

If not for judging bias, it is clear that the first 3 places should go to Pilot 3, Pilot 1, and Pilot 2, in that order.

Using scores from all five judges in the normal way would result in the following normalized scores.

| Pilot 1 | Pilot 2 | Pilot 3 | Pilot 4 | Pilot 5 | Pilot 6 |
|---|---|---|---|---|---|
| 995.50 | 996.50 | 1000.00 | 892.00 | 927.00 | 874.00 |

Pilot 2 has inappropriately finished ahead of Pilot 1 due to bias by Judge 2.

Consider now simply throwing out the highest and lowest judge scores for each pilot. Treating the remaining three scores in the usual way, the following normalized scores are obtained.

| Pilot 1 | Pilot 2 | Pilot 3 | Pilot 4 | Pilot 5 | Pilot 6 |
|---|---|---|---|---|---|
| 980.50 | 1000.00 | 964.50 | 878.50 | 913.50 | 861.00 |

In this case, Pilot 2 inappropriately finishes ahead of both Pilot 1 and Pilot 3. Additionally, Pilot 3 has inappropriately fallen to 3rd place. It is clear that blindly dropping the highest and lowest scores has actually made matters worse. Even though they were consistent in their scoring, Judge 1 and Judge 5 have been thrown out for every pilot. This makes the biased scores count even more than if no scores had been thrown out.

Consider now, the policy to be employed for the Invitational Class at the Tucson Aerobatic Shootout.

The first step is to normalize the scores for each judge. For six pilots, the scores of each judge are normalized so that they total to 6,000 points (1,000 points per pilot on average). This process results in the following normalized scores.

| | Pilot 1 | Pilot 2 | Pilot 3 | Pilot 4 | Pilot 5 | Pilot 6 |
|---|---|---|---|---|---|---|
| Judge 1 | 1056.75 | 1021.45 | 1098.27 | 934.26 | 977.85 | 911.42 |
| Judge 2 | 1024.39 | 1159.33 | 1064.30 | 910.36 | 950.27 | 891.35 |
| Judge 3 | 1049.82 | 1016.61 | 1088.56 | 942.80 | 979.70 | 922.51 |
| Judge 4 | 1077.20 | 1043.09 | 951.53 | 969.48 | 1005.39 | 953.32 |
| Judge 5 | 1044.56 | 1021.31 | 1079.44 | 946.58 | 978.13 | 929.98 |

The highest and lowest scores are then dropped for each pilot. The highest and lowest scores are indicated above by yellow and green, respectively. The remaining three scores are added to yield the following totals.

| Pilot 1 | Pilot 2 | Pilot 3 | Pilot 4 | Pilot 5 | Pilot 6 |
|---|---|---|---|---|---|
| 3151.12 | 3085.85 | 3232.30 | 2823.64 | 2935.69 | 2763.90 |

Finally, these totals are normalized in the usual way to get the following final scores for the sequence.

| Pilot 1 | Pilot 2 | Pilot 3 | Pilot 4 | Pilot 5 | Pilot 6 |
|---|---|---|---|---|---|
| 975.00 | 954.50 | 1000.00 | 873.50 | 908.00 | 855.00 |

The order of placement is as it should be if the scores of Judge 2 and Judge 4 were not biased for and against Pilot 2 and Pilot 3, respectively.