# GPS SCORING AT MONTAGUE
By John Ellias —

This year at the Montague XC contest, a new scoring system was tested which has the potential to improve the accuracy of our contest scoring. This system is exactly the same as the ones used in full-size soaring contests. The contest was officially scored manually, just as it always has been, but at the same time, a new scoring system was tested using a small GPS logger in each glider. RC cross country soaring has always relied on each team to provide their own time and distance estimates for scoring the contests. While this has generally worked adequately, there have always been inherent errors using this system. Start and finish times are not easy to determine when the glider is at 4,000' agl or higher. Rounding turnpoints can be very difficult and there have been instances where competing teams have felt other teams missed turnpoints. When landing out, we have relied on teams to measure back to the nearest turnpoint using their vehicle's odometer. All these procedures introduce many opportunities for errors. Using GPS, we now have a way to very accurately record each flight and score the entire contest with pinpoint accuracy.

The heart of the system is the small onboard "Skytrace" GPS receiver which logs position and altitude data once per second.
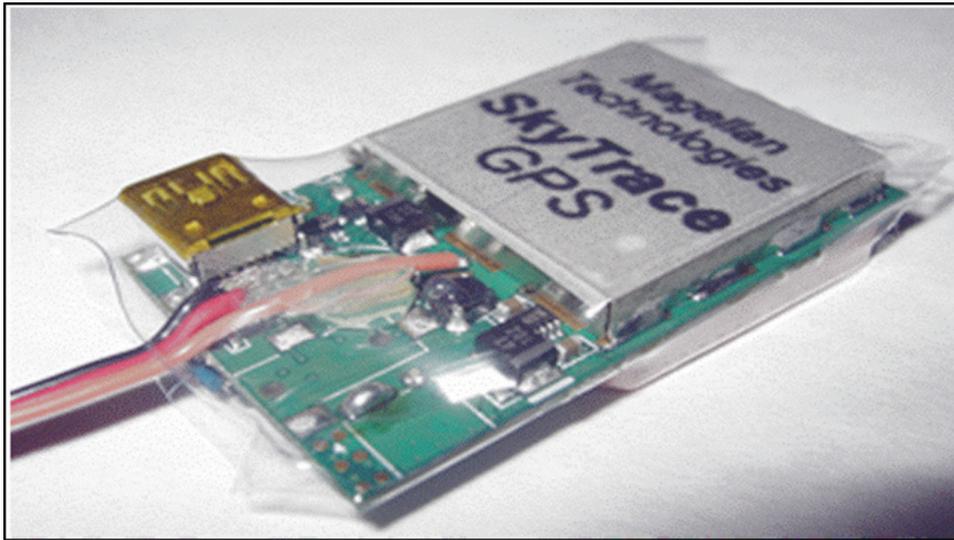
After the flight, the GPS data are downloaded and analyzed by the full-size scoring software "Winscore" developed by Guy Byars.

We first tested the GPS system at the Davis contest in May of this year. We found the system generally worked, but there were a few problems and bugs that arose, mostly because we were using a program that was written for full-size soaring, not RC soaring. Bob Nelson and I systematically worked our way through each of the problems until we were confident that we could actually score the upcoming Montague contest with the new system.

Winscore software uses the 2010 Regional FAI Class Rules for full-size soaring as published on the Soaring Society of America's website. The scoring computations differ somewhat from the FAI scoring that we have used when manually scoring the contest. One difference is Winscore de-values a particular day based on the number of contestants that fail to complete the task. The greater the number of non-finishers the more the day is de-valued. On a de-valued day the winner will get something less than 1000 points. Another difference in the scoring is in the definition of "making a turnpoint". The picture below is a screen shot of a portion of flight as shown by Winscore. It shows that based on the "old" rules, this turnpoint is actually not properly achieved. The glider flew beyond the turnpoint but did not round the turnpoint as the rules call for. However, with Winscore a turnpoint is considered achieved as long as the glider penetrates a .2 mile radius cylinder around the turnpoint. So in the case shown below Winscore considers this an achieved turnpoint.
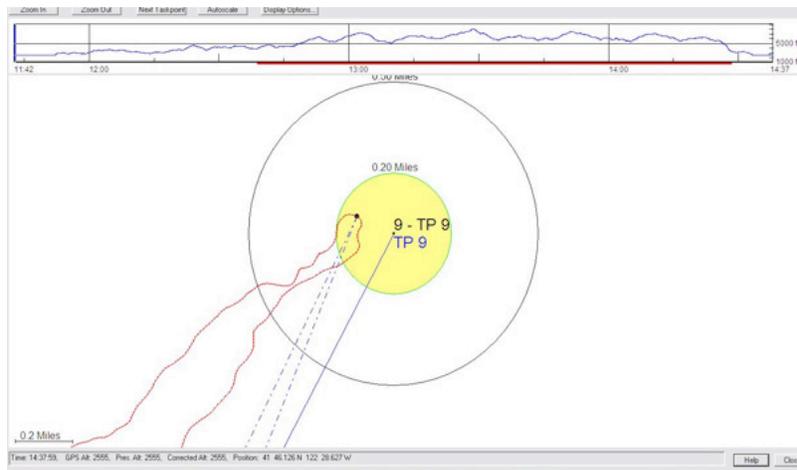
There are many nice features in the Winscore program. Each contestant's flight can be plotted as shown below. Distances can be measured with ease and great accuracy.
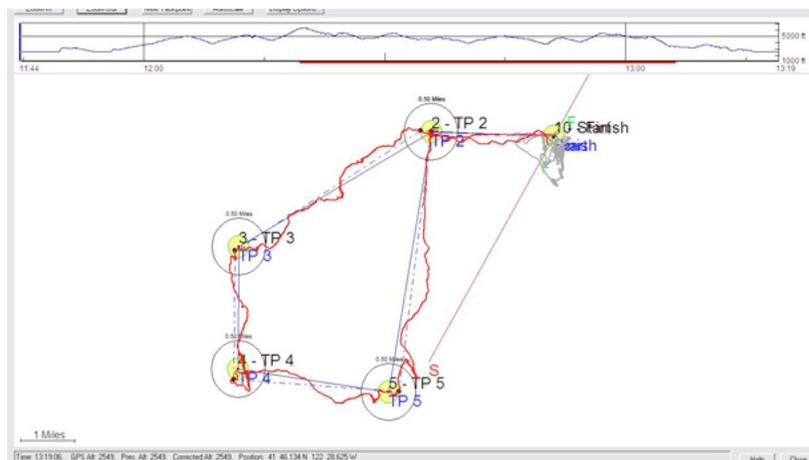
The results of the Montague Cup XC event as scored by Winscore are shown below:

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Montague Cup
Montague, CA
Friday, June 18, 2010

Preliminary
User Defined 1 Class Day 1

Task: Assigned
    ID   Name                    Distance (Miles)
     1   Start                        0.00
     2   TP 2                         2.25
     9   TP 9                         8.30
     2   TP 2                        14.34
     3   TP 3                        18.40
     4   TP 4                        20.54
     5   TP 5                        23.34
     2   TP 2                        27.96
     9   TP 9                        34.00
     2   TP 2                        40.04
    10   Finish                      42.30

  Cumulative                                               Day                                     Remarks
  Rank  Points  ID   Name              Glider        Rank   Points  Speed  Distance  Code    Penalty  Points
  ----  ------  --   ----              ------        ----   ------  -----  --------  ----    -------- ------
    1    820   647   Ellias, John      MXC             1     820    18.00   44.36    SSA
    2    766   461   Norsworthy, Greg  XC #8           2     766    16.81   43.97    SSA
    3    763   273   Gradwell, Dean    MXC             3     763    16.75   43.82    SSA
    4    704   593   Henke, Steve      SBXC            4     704    15.13   44.24    SSA
    5    357   460   Spicer, Rich      MXC             5     357            25.12    SSA
    6    312   424   Rolle, Jim        SBXC            6     312            21.98    SSA
    7    236   561   Beardsely, Rich   MXC             7     236            16.63    SSA
    8    198   039   Brady, Matt       SBXC            8     198            13.90    SSA
    9     61   555   Johnson, Dave     SBXC            9      61             4.29    SSA
   10     46   575   Portwood, David   SBXC           10      46             3.22    SSA

   11      3   015   Stone, Jack       MXC            11       3             0.19    MD, SSA
   12      1   525   Deleo, Mike       Thermic XL     12       1             0.06    MD, SSA

Codes:
  SSA      No SSA number on file for this pilot.
  MD       Flight less than minimum distance of  1 Miles

Created on Monday June 21, 2010 - 12:42 by Winscore  Rev 1,   http://www.gfbyars.com/winscore
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Montague Cup
Montague, CA
Saturday, June 19, 2010

Preliminary
User Defined 1 Class Day 2

Task: Assigned
    ID   Name                    Distance (Miles)
     1   Start                        0.00
     2   TP 2                         2.25
     9   TP 9                         8.30
     2   TP 2                        14.34
     3   TP 3                        18.40
     4   TP 4                        20.54
     5   TP 5                        23.34
     6   TP 6                        27.49
     5   TP 5                        31.64
     4   TP 4                        34.44
     3   TP 3                        36.58
     2   TP 2                        40.64
    10   Finish                      42.90

  Cumulative                                               Day                                     Remarks
  Rank  Points  ID   Name              Glider        Rank   Points  Speed  Distance  Code    Penalty  Points
  ----  ------  --   ----              ------        ----   ------  -----  --------  ----    -------- ------
    1   1498   461   Norsworthy, Greg  XC #8           1     732    24.98   45.53    SSA
    2   1460   647   Ellias, John      MXC             2     640    19.17   44.43    SSA
    3    960   273   Gradwell, Dean    MXC             4     197            15.18    SSA
    4    854   593   Henke, Steve      SBXC            5     150            11.58    SSA
    5    746   561   Beardsely, Rich   MXC             3     510            39.30    SSA
    6    461   424   Rolle, Jim        SBXC            6     149            11.49    SSA
    7    391   460   Spicer, Rich      MXC             8      34             2.59    SSA
    8    198   039   Brady, Matt       SBXC           11       0             0.0     SSA, F
    9     85   575   Portwood, David   SBXC            7      39             2.97    SSA
   10     65   555   Johnson, Dave     SBXC            9       4             0.33    MD, SSA

   11      4   525   Deleo, Mike       Thermic XL     10       3             0.21    MD, SSA
   12      3   015   Stone, Jack       MXC            11       0             0.0     SSA, F

Codes:
  SSA      No SSA number on file for this pilot.
  F        No flight log.
  MD       Flight less than minimum distance of  1 Miles

Created on Monday June 21, 2010 - 12:41 by Winscore  Rev 1,   http://www.gfbyars.com/winscore
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Montague Cup
Montague, CA
Sunday, June 20, 2010

Preliminary
User Defined 1 Class Day 3

Task: Assigned
    ID    Name                    Distance (Miles)
    1     Start                      0.00
    2     TP 2                       2.25
    3     TP 3                       6.32
    4     TP 4                       8.46
    5     TP 5                      11.25
    2     TP 2                      15.87
   10     Finish                   18.13
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Cumulative Rank	Points	ID	Name	Glider	Day Rank	Points	Speed	Distance	Remarks Code	Penalty	Points
1	2498	461	Norsworthy, Greg	XC #8	1	1000	26.56	18.77	SSA		
2	2438	647	Ellias, John	MXC	2	978	25.97	18.76	SSA		
3	1860	273	Gradwell, Dean	MXC	3	900	23.91	18.60	SSA		
4	1572	593	Henke, Steve	SBXC	6	718	14.28	19.37	SSA		
5	1451	561	Beardsely, Rich	MXC	7	705	12.59	18.91	SSA		
6	1206	460	Spicer, Rich	MXC	4	815	21.64	18.59	SSA		
7	1182	424	Rolle, Jim	SBXC	5	721	14.73	18.97	SSA		
8	365	039	Brady, Matt	SBXC	9	167		4.58	SSA		
9	311	575	Portwood, David	SBXC	8	226		6.20	SSA		
10	89	015	Stone, Jack	MXC	10	86		2.36	SSA		
11	65	555	Johnson, Dave	SBXC	11	0		0.0	SSA, F		
12	29	525	Deleo, Mike	Thermic XL	11	0		0.0	SSA, F		

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Codes:
   SSA      No SSA number on file for this pilot.
   F        No flight log.
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Created on Wednesday July 07, 2010 - 19:37 by Winscore Rev 1, http://www.gfbyars.com/winscore

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Montague Cup
Montague, CA
Cumulative Summary
User Defined 1 Class Class
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Cumulative Score Rank	Points	ID	SSA#	Name	Glider	Jun 20, 10 Dist: 18.1 Mi Rank	Points	Jun 19, 10 Dist: 42.9 Mi Rank	Points	Jun 18, 10 Dist: 42.3 Mi Rank	Points
1	2498	461	0	Norsworthy, Greg	XC #8	1	1000	1	732	2	766
2	2438	647	0	Ellias, John	MXC	2	978	2	640	1	820
3	1860	273	0	Gradwell, Dean	MXC	3	900	4	197	3	763
4	1572	593	0	Henke, Steve	SBXC	6	718	5	150	4	704
5	1451	561	0	Beardsely, Rich	MXC	7	705	3	510	7	236
6	1206	460	0	Spicer, Rich	MXC	4	815	8	34	5	357
7	1182	424	0	Rolle, Jim	SBXC	5	721	6	149	6	312
8	365	039	0	Brady, Matt	SBXC	9	167	11	0	8	198
9	311	575	0	Portwood, David	SBXC	8	226	7	39	10	46
10	89	015	0	Stone, Jack	MXC	10	86	11	0	11	3
11	65	555	0	Johnson, Dave	SBXC	11	0	10	4	9	61
12	29	525	0	Deleo, Mike	Thermic XL	11	0	9	28	12	1

Created on Wednesday July 07, 2010 - 19:38 by Winscore Rev 1, http://www.gfbyars.com/winscore

A quick review of the scores as scored by Winscore vs. manual scoring shows very close correlation:

Team ID	Manual Score	Winscore
461	2980	2498
647	2918	2438
273	2183	1860
593	1988	1572
561	1713	1451
424	1392	1182
460	1384.2	1206
015	857.5	89
039	394.1	365
575	323.1	311
555	67.8	65
525	13.2	29

Notice that the Winscore scores are less than the manual scoring. This is because two of the days were de-valued by Winscore since there were many non-finishers on those days. The other discrepancy was with team 015. The reason for the difference between the manual and Winscore scores was that on the Sunday flight, Winscore determined the first turnpoint was never properly achieved by team 015, and therefore the flight was considered to have ended at the first turnpoint.

Based on our experience at Montague we are ready to score the next contest officially with gps using Winscore.