Australian Paragliding GAP - 2020

The version of GAP used for Australian Paragliding Competitions for the 2020 season is derived directly from the CIVL Section 7F – XC Scoring (https://www.fai.org/sites/default/files/civl/documents/sporting_code_s7_f_-_xc_scoring_2019.pdf). The following sections detail the local changes applied to the paragliding scoring in that Annex.

Kilometre Leading Out Points (KLO)

Leadout points in GAP 2019 entirely removed and replaced by KLO. The philosophy of KLO is to meaningfully reward pilots that are leading out. KLO makes leadout points available based upon a fixed-percentage (20%) of the day quality (rather than a percentage of the speed points of the day). KLO may be turned on/off for a task. The maximum points awarded for any pilot will not exceed the amount of available KLO point for the task. e.g. 200pts on a fully valid task scoring 1000pts.

Time and Distance points are split, as per GAP 2019, from the remaining available points.

For each kilometre of the *leadout section* a portion of the task KLO points will be awarded to the pilot leading the race relative to the remaining distance to goal. The *leadout section* is from the start of the speed section until, the greater of, 10km or (0.15 * speed section distance) prior the end of the speed section. KLO points are awarded regardless of whether or not the pilot makes goal.

At the same kilometre boundary, where the KLO points are calculated, any pilot within 10 minutes of the leading pilot will receive a portion of those KLO points based on a steeply declining curve based on their time behind the leading pilot. The formulae for KLO points is given below:

$$ELS_{dist} = SpeedSection_{distkm} - max(10_{km}, 0.15 * SpeedSection_{distkm})$$

$$x = max(0, 1 - \frac{(max(0, (PilotsTime_{@km} - PilotTime_{FirstPilot@km}))}{600})$$

$$KLOCoeff_p = 1.25 * \sum_{km=SSS}^{km=(SSS+ELS)} 0.2 + 0.037 * x + 0.13 * x^2 + 0.633 * x^3$$

$$KLO_p = min(KLO_{available}, \frac{KLOCoeff_p * KLO_{available}}{\lfloor ELS_{dist} \rfloor})$$

Where:
- $KLO_{available} = 0.20 * TaskQuality$
- $KLOCoeff_p$ - the Pilot's leading coefficient, the sum of leadout points calculated at each kilometre boundary within the leadout section
- KLO_p - the Pilots total leading points awarded
- SSS - the start of speed section distance

Pilots who jump the start by do not count towards the determination of the $PilotTime_{FirstTime}$ **at any kilometre boundary and will not score any leading out points**.

EXAMPLE 1
A task with a 30KM speed section which scores 1000 points:

I.   200 points will be allocated to KLO (20% of 1000 points)
II. At each kilometre there would be 12.50 points available for the pilot leading at that kilometre boundary for the first twenty kilometre after the start of speed section (= 200 points / 20km * 1.25)
III. Any pilot within 10 mins of that leading pilot at that km. mark would receive a portion of those KLO points.

EXAMPLE 2
A task with 117.646km speed section which scores 1000 points:

I.   200 points will be allocated to KLO (20% of 1000 points)
II. For each km in the leadout section. there would be 2.50 points available for the pilot leading at that km. mark (200 points / 100km * 1.25)
III. Any pilot within 10 mins of that leading pilot at that km. mark would receive a portion of those KLO points.

Time Points

The formula for calculating a Pilot's Time Points shall be:

$$TimePoints_p = max(0, AvailableTimePoints * (1 - (\frac{(Time_p - Time_{min}) * (\frac{Time_{min}}{1800})^{-0.5}}{3600})^{\frac{47}{80}})$$

Where:
- $Time_p$ - the Pilot's Speed Section Time (in seconds)
- $Time_{min}$ - fastest Pilot's Speed Section Time (in seconds)

This formula change has the effect of increasing the time after the first pilot arrives in which speed points will be awarded, while still maintaining the initial steep drop-off for leading pilots. This should enable pilots on slower wings to be better differentiated by their speed.

EXAMPLE 3

The fastest Pilot Time on a task is 90 minutes (5400 seconds), the table below shows the GAP2019 time points vs Aus PG time points for a series of Pilot Times:

PILOT TIME	GAP 2017 (ORIG) PTS	AUS PG GAP 2019 PTS
5400	500	500
5700	416	415
6000	367	373
6300	326	339
8100	139	194
9300	39	120
10500	0	55
11400	0	11

Final Glide Decelerator

The final glide decelerators as described in GAP 2019 will not be used.

Height Bonus End of Speed Section (HBESS)

The philosophy of HBESS is to reward pilots that use best speed to fly rather than maximum speed when approaching and crossing the end of speed section (ESS). When a pilot crosses the ESS they will be awarded a time bonus based upon the height above the goal with which they cross the ESS. This may be turned on/off for a task and will be used instead of AATB.

HBESS maybe used with, or without, an ESS separate from the goal cylinder. The time bonus subtracted from the Pilot's speed section time when calculated Time Points. The bonus time is given by the following formula:

$$HBESS_{secs} = 20.0 * ((min(400,(Altitude_{p@ESS} - Altitude_{goal})) - 50.0)^{0.40})$$

The time bonus starts at 50m above the goal height taken at the ESS, at 100m above a pilot will receive a ~100 seconds time bonus (so their SS time will be reduced by 100 seconds for calculating their Time Points). A pilot continues to receive extra time bonus up to 400m above the goal height (at the ESS) on a steadily degrading curve.

Distance Measurement and Validity

Distance Validity will be calculated using the median distance flown on the day (rather than the average distance).

$$DistanceValidity = min(1.0, \frac{Distance_{median}}{Distance_{nominal}})$$

The WGS84 ellipsoid and Haversine distance measurement will be used for scoring purposes.

Nominal Goal shall have no impact upon distance validity and is not required for the competition parameters.

For stopped tasks the glide ratio used for calculating the distance bonus shall be **5.0**.

Error margins

Error margins on cylinders will be calculated at **0.05%** or 5m, whichever is larger.

Altitude

Altitude shall be determined using GPS altitude.