Gmax Race Point Data Feed Specification

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- The Gmax Race system tracks race horses during real-time. Its minimal infrastructure makes it easy and economical to use, and allows the system to be shared between racecourses where travel times permit.

- Various data feeds are available. This document describes the protocol for a 'Points Data' feed, which allows access to historical data on the the co-ordinates for each tracked horse at regular time intervals during the race.

- The system is under active development. Feedback on possible future improvements is welcome.

- The Gmax Race system provides the following information for each tracked horse that finished the race:

Description	Name	Type	Example	Notes
Timestamp	T	String	2015-06-10T19:41:27.0Z	UTC time in ISO 8601 format
Unique Horse/ Race Identifier	I	String	2720150610204002	String containing numeric identifiers for racecourse, date, race start time and horse number
Longitude	X	Number	-0.4058491	Decimal Longitude using WGS-84
Latitude	Y	Number	51.4189543	Decimal Latitude using WGS-84
Speed	V	Number	17.83	The speed in meters per second of the horse
Progress	P	Number	87.5	Distance remaining to the finish line in meters
Stride Frequency	SF	Number	1.89	Estimated stride frequency in Hz

- Each position update for each horse is formatted as a ECMA-404 JSON object, as in the example below:

```
{"T":"2015-06-10T19:41:27.0Z","I":"2720150610204002","X":-0.4058491,"Y":51.4189543,"V":17.83,"P":87.5}
```

- The data for a particular can be requested using http from the following URL by providing the 'Sharecode' – the unique identifier for each race, and your subscriber license key. E.g.:

http://www.gmaxequine.com/TPD/client/points.ashx?Sharecode=30201801191255&k=[license key]

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- Usage
  - For best efficiency and scalability, we request that the data from this feed is cached by subscribers who are expecting a large number of requests from end users (e.g. consumers using your website or mobile apps).
  - We reserve the right to impose 'fair usage' limits on repetitive requests for the same data.

- Horse/Race identifier
  - This allows unique identification of the horse/race(s), composed as follows:
    [2-digit racecourse ID][scheduled start: YYYYMMdd][HHmm][Horse number]
  - The Racecourse ID value uses the same convention as that used by Weatherbys (e.g. 30 = Lingfield Park)

- Co-ordinate system
  - WGS-84 is a global standard and provides the unambiguous position of the horse on the Earth. If you require advice on the relationship between this and other co-ordinate systems please contact Gmax.

- Progress
  - The distance remaining for each horse is estimated by projecting its position to an 'official' running line. As such, it may not represent the actual distance that the horse runs to reach the finish.

- Stride Frequency
  - Derived measurements of stride length or stride count can be readily estimated by combining stride frequency with speed and time parameters.
  - A value of 'null' will be given where the stride frequency is indeterminate

- Accuracy and availability
  - The timestamp is synchronised to UTC time, with an estimated accuracy of ±0.02s
  - Tracking accuracy, expressed as the sectional timing accuracy for times based on the position data, is approx. ±0.08s (1 sigma)

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- The Gmax Race server will attempt to maintain the feed as reliably as possible. However, we advise end users to consider the following failure modes, some of which may be beyond Gmax's control

Failure Mode	Likely Effect on data feed
System wide failure.	Data feed may be unavailable
Tracker correctly issued, but horse does not carry it*	Data may appear for the issued tracker, but unlikely to be moving along the same path as horses in the race!
Tracker is physically damaged	Data for that tracker may not appear or appear sporadically/incorrectly
Tracker dropped by horse	Horse will appear to stop
Tracker is carried on the wrong horse	Data will appear, but the error may be apparent with reference to other information (such as TV images, official results etc.)

*Note that this would be in contravention of racing rules, and penalties may be applied to trainers – it should therefore be unlikely to occur.

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- Subscribers to this feed will be kept informed of updates, and as far as possible this will be introduced by extending the data feed described herein to ensure backward compatibility. End users should design their applications to be tolerant to additional JSON messages/objects appearing in the data in future.

- Consultation is currently underway on improvements to the horse/racecourse identifier to provide better support for operations globally. This will result in an increased size of racecourse identifier, and possibly the splitting of the current identifier into separate parameters.

- In future we may also consider transport layer encryption (e.g. https)

If this feed does not meet your requirements, please contact Gmax. Other feeds are also available, including:

- Live tracking data feed, similar to the data in the feed described herein but provided as a live low latency data stream

- Live 'Progress' data feed, which summarises the progress of the race as a whole including live running order of the horses, provided as a live low-latency data feed

- By prior arrangement only: a test data feed streaming replays of pre-recorded examples of one or more of the above data feeds, intended for use in final testing by client applications.

- Post-race sectional time data feed, summarising the performance of each horse by section (e.g. at furlong intervals)

- Racecourse 'Routes': files containing a description of the official running line at racecourses, derived from on-site surveys.

- Please let us know your requirements and we can recommend the most suitable data for your needs.

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