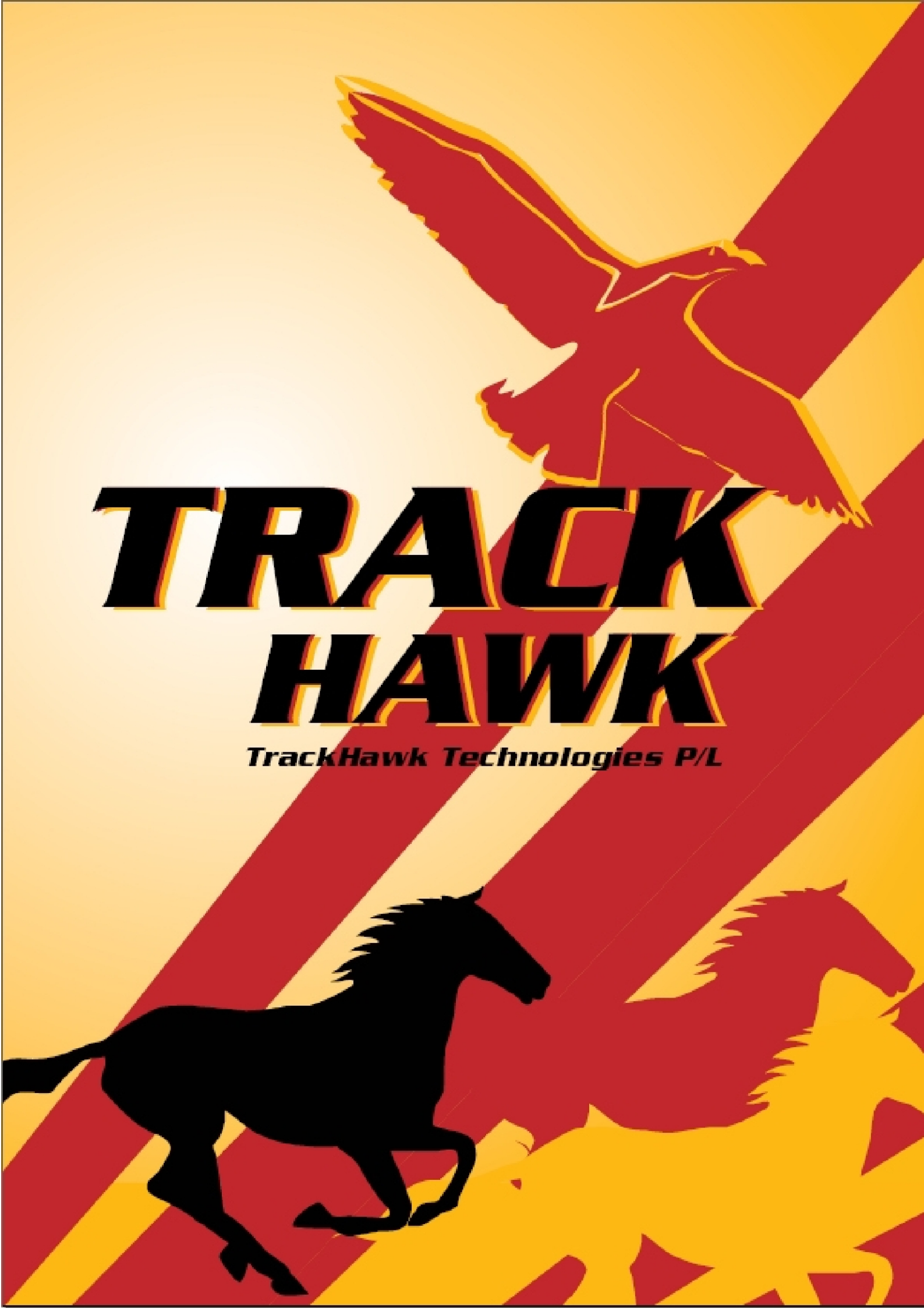

TRACK
HAWK
TrackHawk Technologies P/L

FOLLOW THE LEADER...

TRACKHAWK

TRACKHAWK
TECHNOLOGIES P/L

PUBLIC RELATIONS

TECHNICAL ENQUIRIES

Introducing TrackHawk

- Technically, we live in three parallel universes - Games, Virtual-Reality, and Real World. TrackHawk makes a serious attempt to bring all these together for the benefit of the racing enthusiast.
- By bringing a new level of interaction to the user, there are opportunities to involve them much more than just providing video-feed with static web-pages. Only recently have supporting technologies converged to a point where we can achieve acceptable levels of performance. And things will only improve from here.
- TrackHawk Technologies is the leader in this all new media format, built from the ground up utilising emerging technologies which can only now enable the sports punter to experience their favourite racing sport in a way never before enabled.
- TrackHawk sometimes appears to have computer-game qualities. However, it is very important to retain the strong connect with the live racing, particularly in simulation-mode.
- The technology we have developed over the past year enables a live or archived race-view to be interactively presented to clients and users in a web-browser i.e. across the Internet.
- Have you ever watched a race and wondered where your entity of interest was positioned in the field? Or relied on television broadcasters to keep you informed of the current position and statistics of the team you were following in a race? The reality is that television crews cannot continuously cover all competitors. This is where TrackHawk comes in.
- How nice would it be to have total control over the way in which a race is viewed?
- Statistics and Graphs can be selected to focus on the various competitors of interest.
- Separate panels in the Presentation-Layer can be set and viewed as desired. The manner in which the information can be displayed is very much dependant on the device used. In the most common mode of viewing, the Internet, a number of panels can be viewed simultaneously.
- A TrackHawk Race View is able to show the whole race, or any part of it. Control buttons allow step-by-step or continuous replay from any point. There is also the ability to zoom the action in or out.

The belief in this project was not based solely on the fact that there was a need for a better way to present circuit-racing data. It was also a judgement made with full consideration of the available technologies. The "Convergence of Technologies" has been a major enabling factor.

About TrackHawk

DEVELOPMENT

- Internationally developed through Australian connections
- TrackHawk Technologies was founded with the aim of creating new and exciting perspectives for race events.
- There was a better way to present information related to circuit-racing than had currently been publicly demonstrated, either on television or on the Internet.
- Although the system was first intended to apply to car-racing, a fortuitous connection with Hong Kong Jockey Club meant we had an opportunity to test the TrackHawk presentation- layer against actual data captured during several race-meetings. The result was way above our expectations, confirming our belief in the underlying technology.

MARKET POSITIONING AND SPECIALISATION

- Specialised Interface - We have produced something unique in the way of "Data Visualization".
- No known competition at this time - TrackHawk offers something no one else is providing - a close up, animated aerial view of a race. The technology is just becoming available to run light-weight client-server applications across the Internet.
- Global opportunity
- Unparalleled technology – ability to grab media attention, hence raising product profile.
- Specialists in "Spatial Dynamics"

APPLICATION

- Our technology is relevant for real-time display of an event as it occurs, or for archival replay of past racing events. The latter can be used as an extremely powerful tool for intensive analysis. We plan to enhance the user-experience by providing the ability to control various parameters for a given race, which can be quite beneficial to anyone with an interest in predicting and testing possible scenarios.
- Environments
    - *Internet*
    - *Mobile Devices*
    - *Television*
    - *Gaming Window (for betting)*
    - *Pre-Race Preview based on user selected criteria*
- The system would apply to all situations where there are multiple competitors running a predetermined course. An animated aerial view is provided by the TrackHawk Presentation-Layer and gives a clear perspective on the relative positions of each of the competitors.

The TrackHawk Technology

TRACKHAWK: HOW DOES IT WORK?

- The TrackHawk Engine captures data from appropriately placed transceivers around a race track, and translates that data for interpretation by the Presentation-Layer. The Presentation-Layer then provides the system user with a very flexible viewing environment for Race-Views and Statistics.
- We have currently a demonstration involving REAL data from actual races fed across the Internet for interested parties.
- The Presentation-Layer runs on the latest versions of Firefox and Internet Explorer Browsers.

TRACKHAWK: WHAT DOES IT DO?

- The TrackHawk Presentation-Layer provides a bird's-eye view of a race. It is not streamed-video, but it could be used in conjunction. It is a real-time representation of the race that displays far more information than any video could hope to show. With TrackHawk, you can view a race as closely or as broadly as you like, with flags to indicate exactly where your selected participant is placed at any instant.
- The TrackHawk System collects positional data from any entities involved in competitive, repetitive motion and stores that information for live presentation, replay of an event, or the simulated run of a future event.
- In a very real sense, the TrackHawk application is an extensible presentation layer. Many forms of plug-in can be added for entertainment, or purely to cater to the on-line punter. The user-interface has been designed in a modular fashion. One of the specific goals we set was to be able to adapt our software for portable devices.
- The interface looks simple [that's one of the most important rules when designing user-interfaces].
- Internet enabled application running in a modern Browser, connected at medium broadband speed.
- On-demand replay for any of the archived races.
- In-depth graphical analysis available for every point throughout each race.

TRACKHAWK: WHAT IS IT FOR?

- TrackHawk is a system that can be customised to suit any form of sports racing, with the same basic backbone. This backbone provides the infrastructure by which the spectator may follow a real-time bird's-eye view of any race, complete with appropriate statistics and commentary. The engine also allows many different methods of presenting a race to the punter, including Television, Internet, Mobile Phones and Pocket PC style devices.
- The first Internet Application to fully support user-interaction in a circuit-racing environment, bringing an entirely new dimension to the user experience. TrackHawk is suitable for Horse-Racing, Car-Racing and any form of track event.
- Live views of sports races like you have never seen before
- Live information that has never been accessible before
- Downloadable statistics via the internet
- Television, internet, mobile (cell) phone & hand-held computer capability

WHAT MAKES IT SPECIAL?

- Intellectual property - In the process of analysing the data, we have developed an elegant technique for mapping coordinates to track-distance [and rail-distance in the case of horses]. This generic solution can be easily extended to cope with complex track layouts.
- Mathematical modelling for the 'future races' component . This is considered another important part of our intellectual property.
- We have achieved a technical breakthrough in implementing this live-action across the web.
- The software we have developed over the last twelve months has, of necessity, gone beyond proof-of-concept and demonstrated that we have a fully-fledged Internet-application. [This is an important issue as we could not gain credibility just by saying we could do such-and-such without backing it up with hard evidence.]
- Several other companies have attempted various methods of data capture for sports events. None of them appear, at this time, to have utilized that data in a publicly accessible manner. [Perhaps our product is unique in that respect.]

COMPONENTS

- Hardware Component – the TrackHawk back-end comprises the physical data-capture system and the web-server component.
- Software Component – includes the Presentation-Layer on the client machine and the processing software on the server.
- In essence the TrackHawk Engine provides an information channel between the Race Track and the Racing Enthusiast.
- Provision for real-time playback when compatible data-capture hardware / software is installed at the track, with the option for user-diagnosis as soon as a race is archived

Key Features

MODES OF USE

- Pre Race Mode: Given enough data on the previous performances of all the competitors, TrackHawk can run a simulation of a race in advance, giving an educated estimated outcome of the race. You can even tweak parameters to alter the predicted outcome.
- Live Race View and Call
- Post Race Play and Analysis

INTEGRATED EXTENSIONS

- Additional Graphs
- Statistical Reports
- Statistical Download

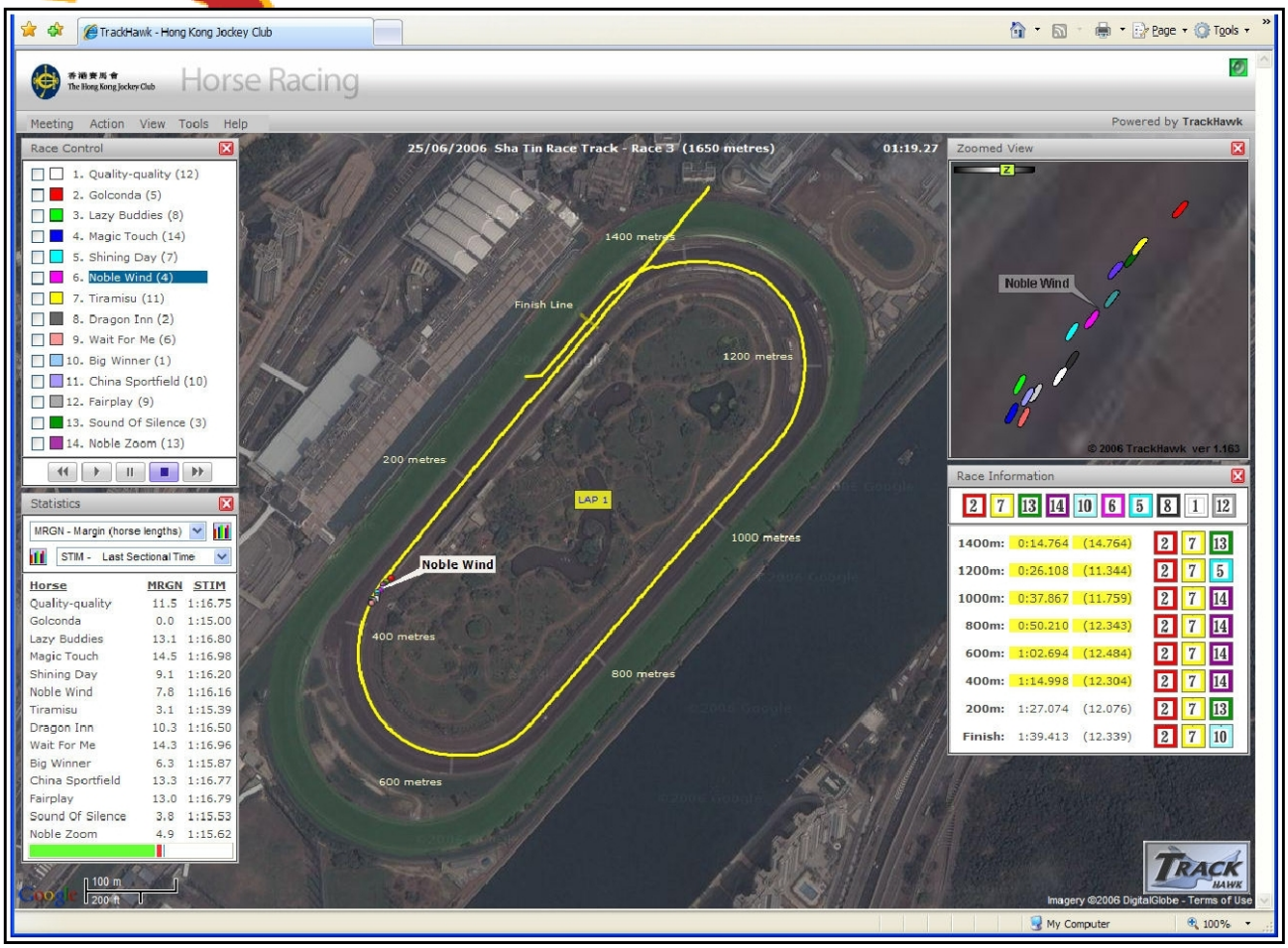
INBUILT UTILITIES

- Browser Performance can be assessed and parameters set automatically to obtain the best run-time display.
- Additional Paths can be drawn on the map. An example for horse-racing is the inside path, illustrating the horse-position nearest to the rail for each point on the track.
- The infrastructure is in place to implement a fully fledged Help System, much the same as would be expected with a stand-alone executable. Content will be tailored to suit a particular environment as required.

PRESENTATION LAYER

- The original application for TrackHawk Technology has focused on horse-racing. Further development has enabled TrackHawk technology to be relevant for all forms of circuit-racing. The following section provides detail on the user-interface for the horse-racing version of the Presentation Layer.
- State-of-the-art user-interface.
- The Race-Call audio is integrated and will start, stop and sync as appropriate for any chosen situation.
- Another of the following sections describe examples of the extra information integrated into the presentation layer – Speed Graph and Energy Graph.
- Option to highlight paths taken by selected competitors - a valuable tool in both horse-racing and motor-racing.

Presentation Layer
Horse Racing



Illustrated here is the main panel for the track of interest, in this case, Sha Tin. The background will be recognisable as a Google Map. There are advantages to using the Google API – markers can be added to highlight track features, and support advertisements if desirable. Certain markers have been added to the map dynamically, e.g. distance-markers.

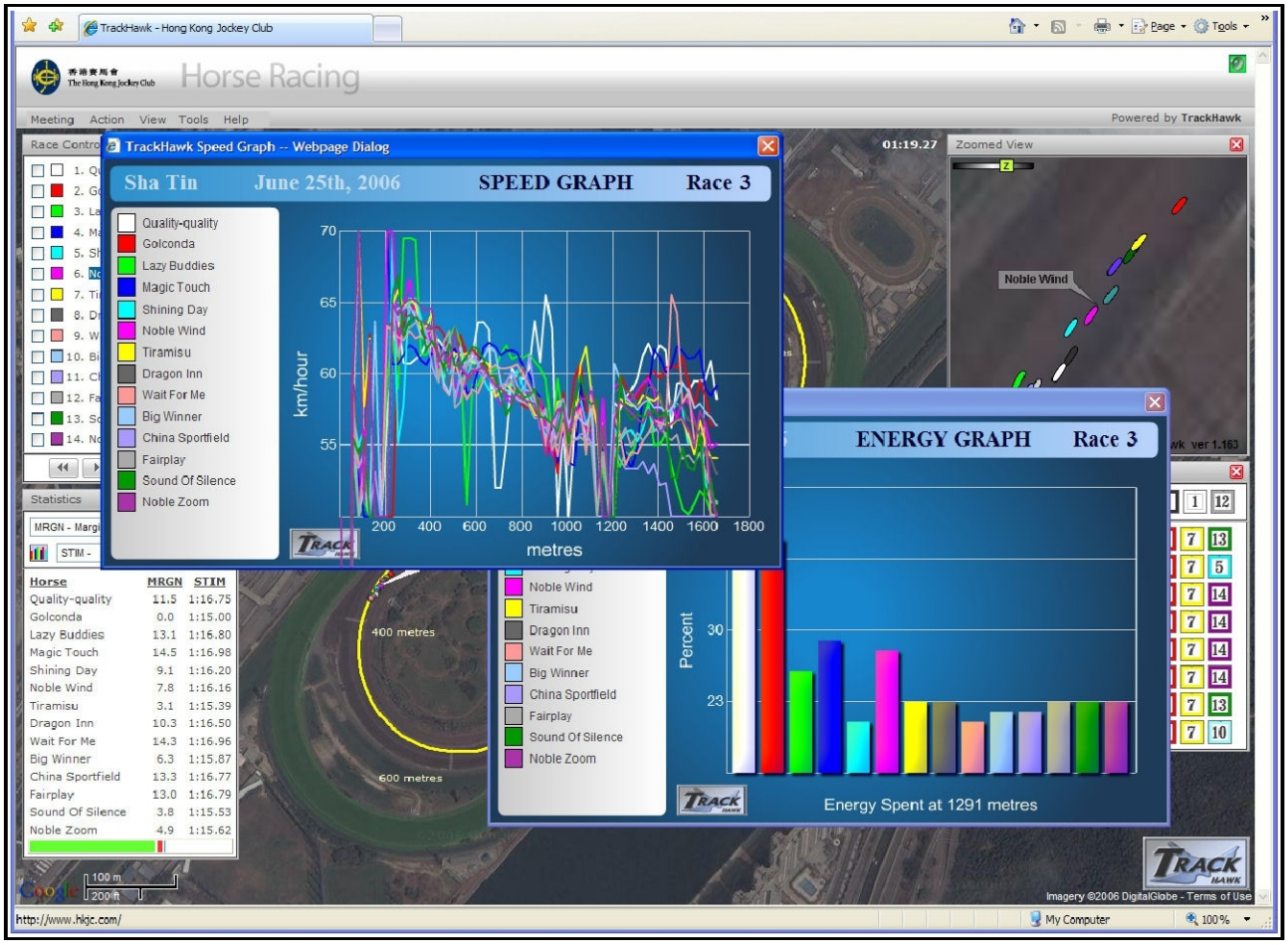
The zoom-window at top right is a Flash component that we have developed in-house. We required more functionality than Google was able to provide at this point in time.

The four panels surrounding the track provide statistical and diagnostic details and can be minimised as desired.

All information is updated dynamically as the race is played. When not in 'play' mode, a click on either the main-map or the zoom-map will position the horses appropriately. To illustrate the point – if one wanted a close-up view of the situation when horse X hit the 400 metre-mark, simply select horse X (the name-tag will show) and click on either map at the point of interest.

The yellow-line around the inner-track highlights the path taken by the selected horse. Multiple selections can be made for comparison. In the statistics-panel, lower left, various options are selectable from two drop-downs at the top of the panel. Options include Speed, Margin, Split-times, Sectional-lag, etc.

Built-In Graphical Components



In a very real sense, the TrackHawk application is an extensible presentation layer. Many forms of plug-in can be added for entertainment, or purely to cater to the on-line punter. The user-interface has been designed in a modular fashion. One of the specific goals we set was to be able to adapt our software for portable devices. This is very much a work in progress.

Shown above are two examples of the extra information integrated into the presentation layer – Speed Graph and Energy Graph. These graphs update automatically as the situation changes on the main panel. A check of the specific race will show that this speed-graph is absolutely real – these are actual screen-shots of the application running across the Internet.

The Energy Graph is another 'work in progress'. There are quite complex algorithms involved here and much testing with good data will be required before a useful quantitative measure of energy can be defined.

Potential Clients & Target Market

RACE TRACK OPERATORS

- TrackHawk is a web-based application that targets Racing-Circuit operators and their patrons.
- A horse race track would require permanently positioned transceivers and mobile transmitters whereas a triathlon could use temporary transceivers and mobile transmitters or take advantage of GPS technology. The exact configuration will depend on the level of accuracy, statistical information required and budget available.
- Our electronics team can configure a data collection system to suit your specific requirements.
- Once the Data Collection system has been commissioned the TrackHawk Engine can receive, analyse and transform the data ready for real-time broadcasting.

MEDIA INTEGRATORS

- Companies, like cable-TV operators, are desperate to find new and exciting ways to involve patrons in the media experience. This could be a real opportunity for TrackHawk

VALUE-ADD FOR GAMBLING SITES

- On-line gaming and gambling sites are seeking ways to differentiate their offerings from each other. TrackHawk could fit well here, once there were sufficient track installations.

PUNTER INVOLVEMENT

- Track operators are keenly interested in developing an ongoing relationship with the punters. A possible implementation could be to issue numbered tokens at the track that punters would then use to access the on-line TrackHawk application. This would draw them into an extended relationship and involve the punter at a much greater level than provided just by visiting the track or the web-site.

RETURN ON INVESTMENT

- For race-track operators, TrackHawk should increase interest in the sport and the venue, thereby adding to the funds generated.
- Added revenue could be generated by providing access to extra TrackHawk features on a subscription basis.
- Another possibility to broaden the user-base is to offer some form of profit-sharing arrangement whereby on-line gambling sites could link in.
- Depending on the media arrangements for a particular track, it might be possible to incorporate components of the TrackHawk application in live-broadcasts.
- Because of the structure of the TrackHawk interface, there is ample space available to include paid advertising.

Investing in the Future

Potential Investors

The company is seeking expressions of interest from investors willing to participate in further development of this exciting, innovative venture.

HARDWARE - RESEARCH AND DEVELOPMENT

- Investment is required to further develop the various types of data-capture hardware under consideration.
- As TrackHawk Technology is applied more broadly, we fully expect to offer different hardware implementations for various situations.

SOFTWARE - RACE-SIMULATION

- Archived races to allow users to try modelling various scenarios and replaying races with parameters of their choosing.
- We are currently working on extending the system to allow users to access a database of horse-profiles and run a simulated race of their choosing.

The Future

WELL POSITIONED TO...?

- Possible to position for a huge opportunity when live data-feeds become a reality for small racing-clubs.
- Our aim is to enhance the punter experience.
- We have remained acutely aware of the relevance of our product to portable devices. In the near future, we plan to demonstrate how effectively this technology can enhance involvement and enjoyment at live events.
- We see a merging of the technologies in these environments (PC, Web & Mobile Devices) over the next few years and believe that as time progresses the consumer will begin to lose the concept of the three environments being separate.

TrackHawk – Follow the Leader

The TrackHawk System

MOBILE TRANSCEIVERS

Currently under investigation are several different types of electronic devices capable of accurately identifying relative x-y coordinates over a limited area For horse-racing, the hope is that the device can be built small and light enough so as to sit comfortably on a horse's nose. The benefit in having the detectors mounted there is that the nose is the only part of the horse that is relevant when considering winning position in a race.

For car-racing, GPS devices provide sufficient accuracy and these devices are available off-the-shelf. There may be an opportunity to develop a cheaper solution that will apply over a limited range.

FIXED TRANSCEIVERS

It is possible we may be able to cover an area the size of a race-track with a pair of fixed transceivers that simultaneously communicate with all the mobile devices. One of the technologies being considered uses a single fixed transceiver. This arrangement would probably be the most cost effective and could also be set up quickly for temporary race-meetings. Extra transceivers would likely be deployed to allow redundancy in the case of equipment failure.

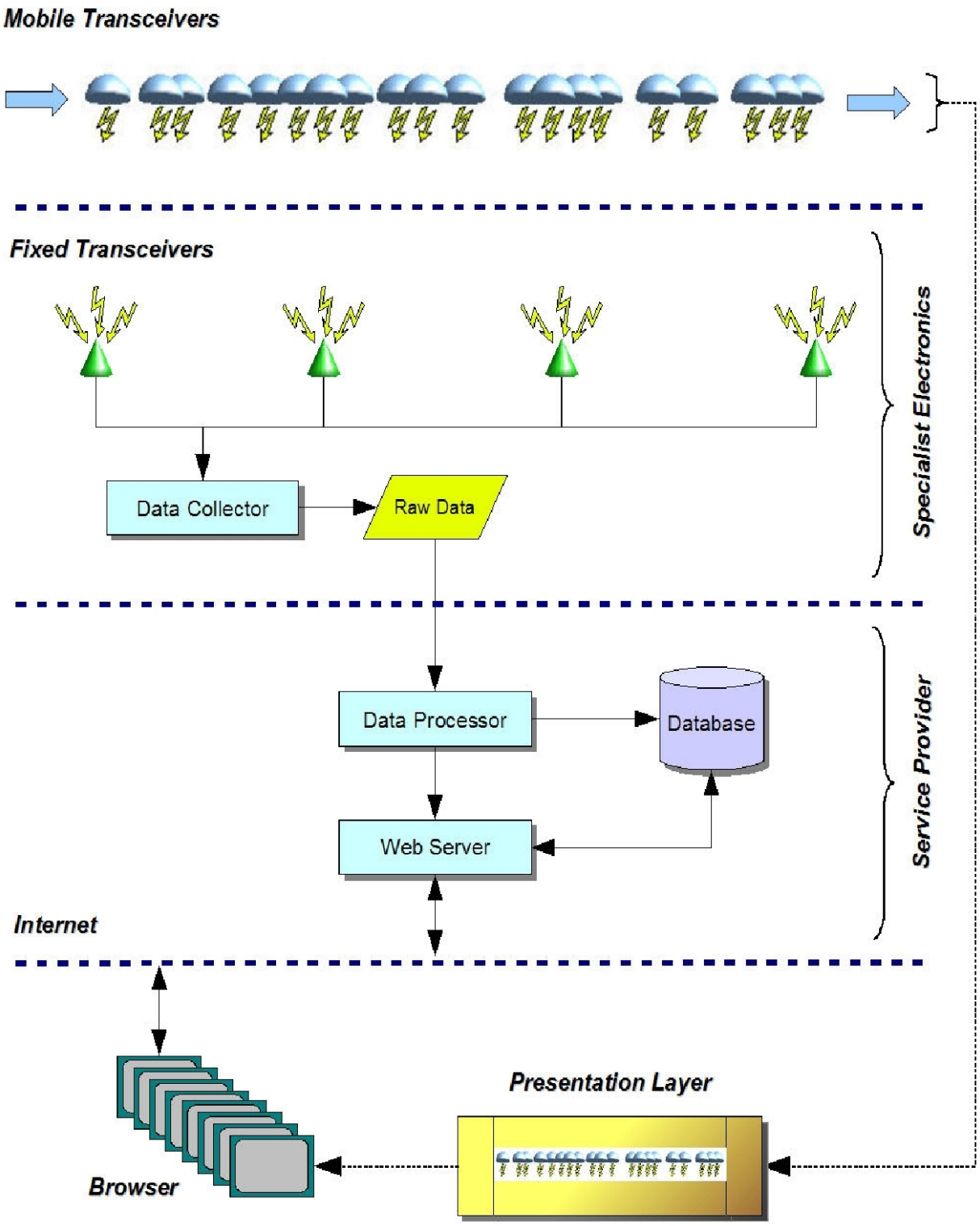
DATA COLLECTOR

Whatever the technology and electronics employed to capture the coordinate data, the end result will be the same – a data-set [Raw Data] containing x-y values at regular intervals for each of the competitors. This data-set is then fed to the Server where data is stored, analysed and made available to the Internet [see next section, The TrackHawk Server].

PRESENTATION LAYER

The centre-piece of the TrackHawk application is the user-interface. This provides users with the ability to view the race with complete control. To the punter, book-maker or even handicapping-officials, this will be an invaluable tool allowing easy access to information that previously required meticulous examination of video footage and massive manual calculation.

An important aspect of the Presentation Layer is that it is entertaining – people will WANT to use it, even though they may not have previously been serious punters.



The TrackHawk Server

PHYSICAL INPUTS

Data from the position-logging hardware is translated into a standard format. Audio from the race-call is captured separately. Depending on the facilities at a particular track, video may also be available to feed into the system.

This information is then split to accommodate the live feed and also for storage in the database for later analysis.

LIVE FEED

This part of the system is very dependent on existing track facilities. If desired, video-feed could be slightly delayed to provide time for processing and the insertion of extra information into the video stream.

BATCH PROCESSING

Data not associated with the live feed can be processed post race. Some statistics are not available until after a race has completed. This post-race analysis then divides into two parts - firstly to format the data for on-demand feed across the Internet to the TrackHawk Presentation Layer, and secondly, to add horse-specific details into the Horse Database.

HORSE DATABASE

From each race, data about the performance of each horse is extracted and a profile built. In response to a request from the Presentation Layer, profiles for the chosen set of horses are delivered. Code running in the browser then builds the Simulated Race Data, a file with exactly the same format as the file used to drive the Archival Replay.

RACE SIMULATION

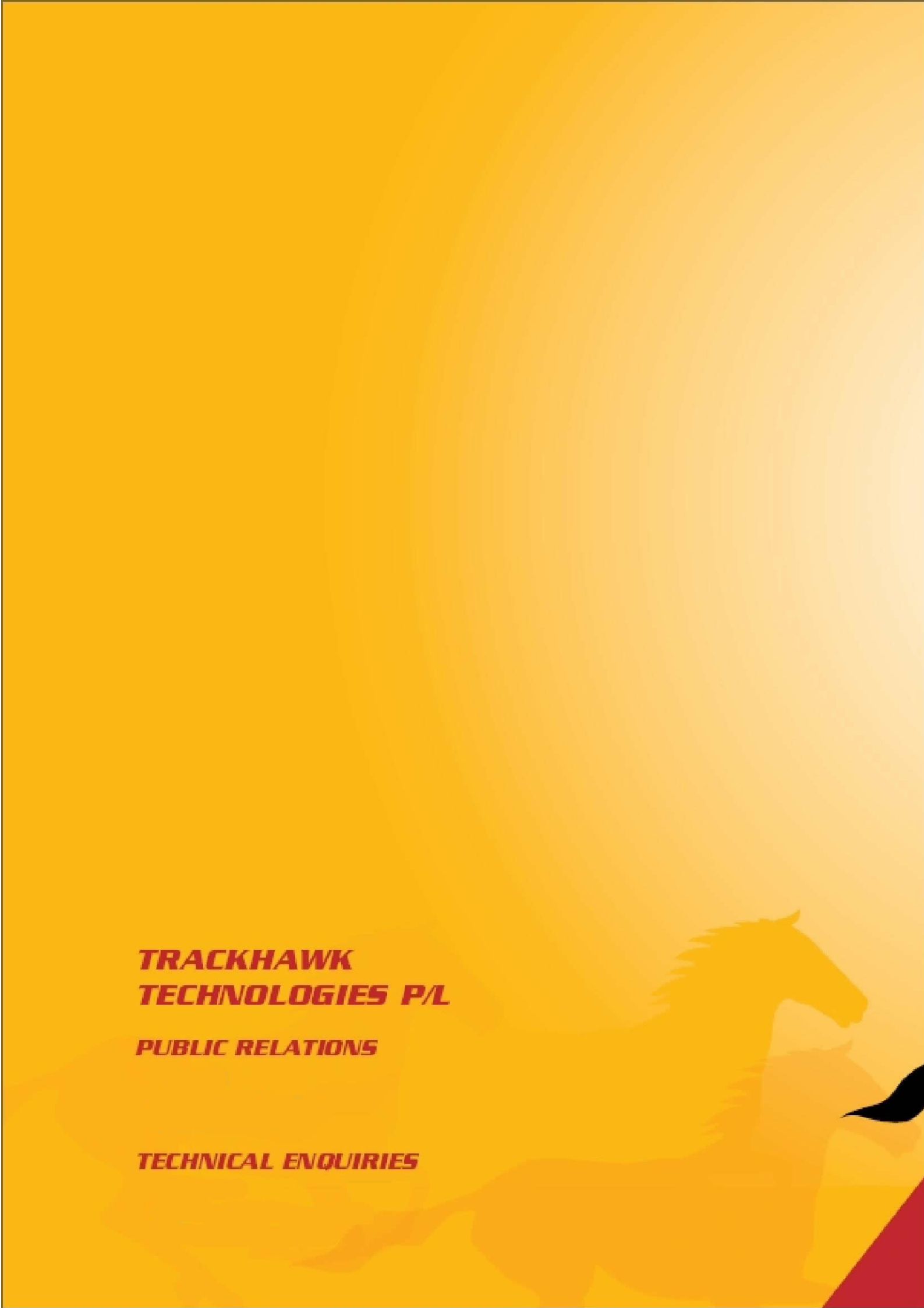
At the browser, the user can select horses and choose various parameters that may affect race outcomes. Over time, as more data is accumulated and the profiles are refined, these simulated races will have increasing relevance to real races that could be run in the future.

DATA ARCHIVING

Using information from both the Race Database and the Horse Database, the Data Archiver builds a race-specific data-set that can be sent to the Presentation Layer upon request. The browser will then display the race with the full-function capabilities described earlier.

EXTRA-DATA GENERATOR

This module calculates various complex statistics and adds them back into the Race Database. It works in concert with the Integrity Checker that ensures that all data captured by the hardware is consistent.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