BIRKET ENGINEERING NEWS

Warner Brothers Movie World Madrid

BIRKET ENGINEERING Prepares Lethal Weapon Stunt Show

Spring finds a **Birket** installation team at Warner Bros. Movie World Madrid. **Birket** and other vendors have worked through the winter with Renaissance Entertainment to prepare the *Lethal Weapon Stunt Show* and the *Night-time Spectacular* productions for their 2002 opening. Both shows are staged on and around the water of the park's central lagoon.

Birket's contributions to this show include the electrical hardware and software of the main show and safety controllers, the pyrotechnic sub-systems, and the animation of what may be the world's tallest show-action element.

The main controllers wave the baton for audio, video, laser, lighting, and fountain sub-systems, plus mechanical effects (by A.E.T.) and gas-flame effects (by A.S.I.). The show's control architecture is based on the OPREG interface developed by **Birket** in 1992 and adopted by major effect vendors and parks. Brian Kuhar, **Birket**'s principal show programmer in Spain, weaves the elements of 12 sub-systems into a executable script interpreting the written scripts created by Renaissance. The show computers follow this script, triggering more than thirty effects and nearly 500 pyrotechnic charges under the supervision of the system's safety controller and the technical director.

The shows' pyrotechnic devices are controlled by an advanced pyro control system developed by **Birket** to meet the demanding safety requirements of a live action show. The pyrotechnic system includes 15 floating modules, 7 land-based boxes, and one remote radio controlled module used to launch rockets from the back of the park. Among the safety features protecting the people moving among the shows' hundreds of explosive charges are the electronics that detect hazardous "ground faults" that plague wet environments like this one. This unique ability prevents crossfires due to wet wires or mis-wires.

Six Flags International Opens New Warner Bros. Park in 2002

Warner Bros. Movie World Madrid, Madrid, Spain, is a direct result of the strength of the **Warner Bros.** brand. Visitors will enjoy the best attractions and shows based on some of Warner Bros. movies (**L.A. Confidential, Lethal Weapon, Wild Wild West**…) and the world famous **Looney Tunes** cartoon characters (**Bugs Bunny, Tweety**) and **Cartoon Network** and **DC Comics** characters (**The Flintstones**, **Batman**, **Super-man**, etc.).

The **Warner Bros. Movie World** themed environment will reproduce the appearance, emotions and fantasy of Hollywood, combining a mixture of lush gardens, impressive attractions and incredible shows, restaurants and shops, in five major areas: Hollywood Blvd, Cartoon Village, The Wild West, **DC Super Heroes World**, and **Warner Bros**. Studio.

The park will feature the most thrilling rides and attractions of the continent for all guests. Having a fun time on **Wild Wild West Coaster** or dropping into thin air from the perilous height of 300 feet on **The Riddler's Revenge** will be some of the many attractions provided.

Source: www.sixflags.com

ALSO NOW AT BIRKET ENGINEERING

IN PRODUCTION
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- controls design for live show enhancement.
- show control assembly and installation for two new attractions.

For **BIRKET** *Engineering, Inc.*:
- Pyro controller product development.
- Strobe controller product development.

IN PROPOSAL
For a world-class Asian theme park:
- Life-safety controls design and installation for a moving live-show pyrotechnic display.

This Issue

Wolf! – Meaningful Messages and Alarming Alarms

Synopsis

A poorly designed fault message system can desensitize operators to real problems. This document discusses control systems that cry "Wolf!" and presents techniques to help keep messages meaningful.

Ancient Wisdom

Control systems depend on their human operators to handle problems beyond the computer's capabilities. While a control system is usually very good at managing the details of complex equipment, it falls far short of the ability to handle every problem that may (and eventually will) occur. System designers close the gap between the expected, designed-for situations and the rest of the universe of possible situations by designing the system to yell for help with alarm messages. But yelling for help too often can lead to trouble.

Aesop's fable of "The Shepherd's Boy" teaches that people will eventually ignore a false alarm. Control systems that demand the operator's attention too often or for too little reason tend to lose the operator's attention instead.

When the operator begins to treat alarm messages as a nuisance, the ability of the message to help insure safety is impaired or lost. If slapping the [Silence Alarm] button has become a Pavlovian response to the sound of the alarm buzzer, the alarm system is no longer effective – and no one will respond when the Wolf really comes.

Don't be a Nuisance

A nuisance message is the most common way that a system cries "Wolf!" Any message that the operator feels is a waste of time is a "nuisance". Frequent nuisance messages will quickly train the operator to slap the [Silence Alarm] button without investigating. A message may be labeled a nuisance for several reasons:

- **False Trigger**: The message appears in response to an event other than the intended trigger. For example: A "Sensor Failure" message triggered by turning a subsystem on or off.
- **Hair Trigger**: The message appears when the system is operating outside its nominal range, but still within its tolerance limits. For example: A "Response Failure" message when the response was merely a little slower than usual.
- **Poor Trigger**: The parameters that trigger the message don't consider all pertinent conditions. For example, a "Water Level Too Low" alarm that doesn't matter if the water pumps are not running.
- **Misunderstood Messaging**: Sometimes "nuisance messages" are poorly worded or not explained well. If the message doesn't mean anything to the operator and doesn't seem to affect anything, it may be regarded as a nuisance.

Consequences

One good rule-of-thumb for message systems is "If the system stops, its important to explain the problem with a message." Sometimes this leads operators to believe the converse too – "If the system doesn't stop, the message isn't important." This can lead to trouble when the system displays a warning message, but leaves it up the operator to deal with the problem.

This problem can be managed through the careful assignment of *consequences* to each message. Most messages should have a reasonable, measurable, and known impact on operation. A warning message that complains, "Train is too fast exiting slowdown brake" might not receive attention for some time. A fault message that announces, "Auto Mode is disabled. Train is too fast exiting slowdown brake. Use supervisor's key." will get the immediate attention of a supervisor.

Wachusay?

One way to help insure the long-term effectiveness of a messaging system is to write clear, easy to understand messages. Some control systems report messages with extremely short messages (perhaps due to a character limit), numeric codes alone, or even just a light. This is common and acceptable in simple systems, but more complex systems require more explanation.

Cryptic messages are harder to understand than "plain English" and may get the wrong response or no response from an operator. Consider these two messages:

- **Fault: LEL sensor 4 high**
- **EMERGENCY STOP: A flammable gas leak has been detected in the Southeast corner of the facility services room in the basement. Notify security immediately at x7911 and start the evacuation procedure. (LEL gas detector 4)**

Both are possible messages describing a signal from a lower-explosion-limit gas detector, but only one is guaranteed to elicit a timely and appropriate reaction from the operator.

With a modern messaging system, the system designer can include all of the following information in a message:

- **When?** The date and time of the fault. Advanced systems can record all messages in a searchable database for easy recall and analysis days or months later.
- **What?** The complete identification of the faulted device or subsystem. The name should match the name used in the system's manuals and drawings. Advanced systems can show a picture of the device and access the appropriate manual or drawings. Park-wide messaging systems will specify the attraction and system in addition to the device.
- **Where?** The exact location of the faulted device or subsystem. Advanced systems can locate the device on an architectural drawing, map, or aerial view.
- **Why?** The exact cause of the fault with as much explanation as is required. Advanced systems can display the program logic that triggered the alarm.
- **Who?** The people required to respond to the fault: operations supervisor, maintenance crew, or the security department. Advanced systems can notify these people directly via email, pager, or other means.
- **How?** The appropriate response and troubleshooting procedure for this problem. Advanced systems can display help files containing almost any necessary material, including manufacturer's manuals and

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Who Does What?

JET ZALESKI
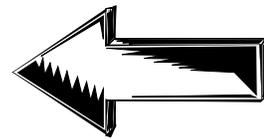
Jet's Resume at BIRKET Engineering, Inc.

The Amazing Adventures of Spiderman[SM]
Universal's Islands of Adventure[SM]
Block Zone System Design and Installation

The Eighth Voyage of Sindbad[®]
Universal's Islands of Adventure[SM]
Show Programming Support

Jurassic Park River Adventure[SM]
Universal's Islands of Adventure[SM]
Ride Engineering Support

WaterWorld[TM]
Universal Studios Japan[TM©]
Pyro System Design and Installation

The Wild Wild Wild West Stunt Show[®]
Universal Studios Japan[TM©]
Pyro System Design and Installation

Hollywood Magic[®]
Universal Studios Japan[TM©]
Pyro System Design and Installation

Universal Monsters Live Rock And Roll Show[TM]
Universal Studios Japan[TM©]
Pyro System Design and Installation

Animal Actors Stage[®]
Universal Studios Japan[TM©]
RSS Software Design and Installation

Pyro Conductor[TM]
Birket Engineering, Inc.
Electrical & Software Design

Strobe Controller
Birket Engineering, Inc.
Electrical & Software Design

Look in the dictionary under Zaleski and it reads "possessing exceptional ability in diverse areas". With **Birket** since 1996, Jet continues to be a tremendous asset.

As a student, Jet graduated from the University of Central Florida with the electrical engineering college's highest distinction, summa cum laude.

As an engineer, Jet was responsible for designing and installing the life-safety control systems for five of Universal Studios Japan's shows in an impossible six months. Using non show-specific system architecture, Jet was able to design the safeties, diagnostics, power buses and other requirements that are generic to life-safety projects and preserve them across attractions. Later, at installation, he applied the specifics and timing unique to each show to expedite the completed design.

As a designer, Jet is responsible for the development and realization of two **Birket** product systems. Recently debuted, the Pyro Conductor[TM] provides integrated safety features not available to the pyrotechnic industry. Available this summer, a versatile architectural strobe system offers DMX compatibility to control a limitless number of 32-shot boards. The 24vdc system provides strobe and ground fault detection and variable strobe intensity.

As a musician, Jet is lead singer and bass player for Aura Djinn (pronounced Origin). Formed in 1993, Aura Djinn is one of the highest energy, musician-oriented bands in the Orlando area. Self-described by Jet to be "loud, obnoxious music", their live performance is a whirlwind of styles and sounds combining rock, funk, progressive and Martian music. In August 1998, the band released their all original CD "Say Goodbye to Mars" to their Orlando Hard Rock Café audience.

Jet in Japan doing his best Steven Seagal

- Dobie Gilas at Pointe Orlando, March 22-23.
- Universal City Walk, Orlando, April 2.

See www.auradjinn.com.

Another remarkable element of this show is the full-scale construction crane that dominates the set. Once used to move construction materials around the site, the crane now transports actors high above the park for heart-stopping stunts. **Birket**'s engineers worked with Spanish crane experts to transform this standard construction crane into an enormous animated prop.

The resulting hybrid system senses the crane's movements and controls its four massive motors to follow choreography created by the show's stunt coordinator. Three on-stage crewmembers and the system's safety controller stand ready to react if the stuntmen have any difficulty.

Contact: danielb@birket.com

Lethal Weapon Stunt Show Control System Stats

Show Controller	Anitech Media Pro 4000
Safety Controller	Allen Bradley PLC/5
Pyro Subsystem	32 Briknet/8 and 15 Briknet/16 modules
Main Console	2 AB PanelView 1400e displays
Crane Console	AB PanelView 600 display
Networks	Two 230K RIO nets, one 56K DH+ net, and a 230K DH+ net
Primary Actor Safety System	Hard-wired effect-enable buttons: mechanical, pyro, flame, crane, and water
Secondary Actor Safety System	Micrologic-monitored on-set photo-eye sensors

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drawings.

News and Trivia

Messaging systems must take care to separate important news from trivial information. Some systems use the same alarm mechanism (perhaps a pop-up window) to announce all events regardless of their importance. If a system beeps and posts a message every time a minor event happens, any important message will be lost in the sea of trivial messages.

One way to avoid loosing important messages in the crowd is to separate messages into classes by severity. Colorizing the severity classes is one way to help the operator to distinguish the classes and react appropriately. Some major severity classes are:

- **FAULT** (red text) - A problem that prevents continued normal operation
- **WARNING** (yellow text) - A problem that requires operator attention, but normal operation can continue at the operator's discretion.
- **NOTICE** (green text) - Information the operator may need at the moment.
- **LOG** (grey text) - Information that should be recorded for possible later review.

The FAULT and WARNING classes require operator attention and should ring the buzzer and/or blink the trouble light. The FAULT class of message reports problems that stop equipment. For example: "RIDE STOP: Segment 2 of slowdown zone brakes failed to engage. Call maintenance at x7611 and make Ride Stop announcement". WARNING messages don't affect operation, perhaps because there is no clearly appropriate response to the trouble. For example: "WARNING: Unusually high average train speed from lift exit to slowdown brake entrance. Adjust lift chain exit speed?"

NOTICE messages should only be sent when the operator clearly needs coaching. For example, if the operator presses the [Dispatch] button on a roller coaster without effect, the system might provide this help: "Close the queue gates before dispatching the train." The alarm sound should *not* be used with NOTICE messages.

The system designer must take care to avoid using the lower levels unnecessarily. In particular, LOG messages should not be presented to the operator at all. For example: "2002-02-22 14:22:00 Train 2 dispatched". These messages are only useful for reconstructing the events that led up to a problem.

… and Nothing but the Truth

It's also possible for a system to lose the trust of the operator by being *too* helpful. Systems are typically able to *detect* more problems than they can accurately *diagnose*. A system may be able to detect that a motor is no longer running, but can't know if it has stopped because of lack of power, overheat, overload, relay failure, mechanical failure, or something else. If the system reports "Motor 1 overloaded" every time someone turns off the manual breaker, people will not trust the system's diagnosis. Instead the system should only report what it actually knows, in this case: "Motor 1 has stopped unexpectedly. Check switch, overload, overheat, & rotation".

Conclusion

Large systems require well-designed message systems to help manage their complexity. Simply ringing the bell and printing a cryptic line of text for every event is not enough. Poorly thought-out messages may fail to communicate their meaning or their importance. A pattern of "nuisance" messages will erode the operator's confidence in the system. If the attention of the operator is lost, the alarm will no longer serves its purpose of enlisting human aid – and no help will come to deal with the Wolf.

Source: Daniel Birket, see www.birket.com for complete text.

BIRKET PYRO CONDUCTOR™ AND PYRO BRIK™ SYSTEM DEBUTED FOR PYROTECHNIC INDUSTRY

Lake Buena Vista, FL- A small collection of pyrotechnic professionals were on hand February 6 for a reception marking the debut of BIRKET's **Pyro Conductor™** system. Based on over 10 years of pyrotechnic system design and installation experience gained from Las Vegas and overseas live shows, the Birket system offers standard pyrotechnic system attributes together with those not available anywhere in the pyrotechnic controller marketplace.

Using integrated safety elements, the **Pyro Conductor™** simplifies the task of assembling medium to large pyrotechnic installations. Beginning with the accepted safety features of shunting, cross-connected shot tests, ground fault checking and firing power isolation, the **Pyro Conductor™** adds graphical configuration and graphical system diagnostics via touchscreen interface.

Pyrotechnic show designers appreciate the intuitive interface provided by the LCD

Marcial Godoy (r) discusses the Pyro Conductor™.

touchscreen during show commissioning and rehearsal. Technical Directors benefit from detailed diagnostics before and after the show. Everyone breathes easier knowing that hooks for actor enable circuits are available on an individual or group shot basis. Shot enables allow for Actor Enable pushbuttons or a summary contact closure to be inserted as a permissive requirement. Enable circuit integrity is tested each and every show.

*Complete **Pyro Conductor™** system information is available by contacting Marcial Godoy at (407) 290-2000, marcialg@birket.com or www.birket.com.*

Twenty-four industry representatives attended the Pyro Conductor™ presentation and lunch.