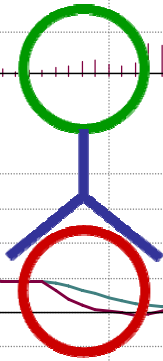




**L**eading  
**E**dge  
**A**nalytics &  
**P**rogramming  
**F**or  
**R**isk and  
**O**ppportunity  
**G**eneration



*the wind beneath  
your trading wings*

from Technical Forecasts Ltd

**Intelligence for Decisions**

## AN OVERVIEW OF LEAPFROG

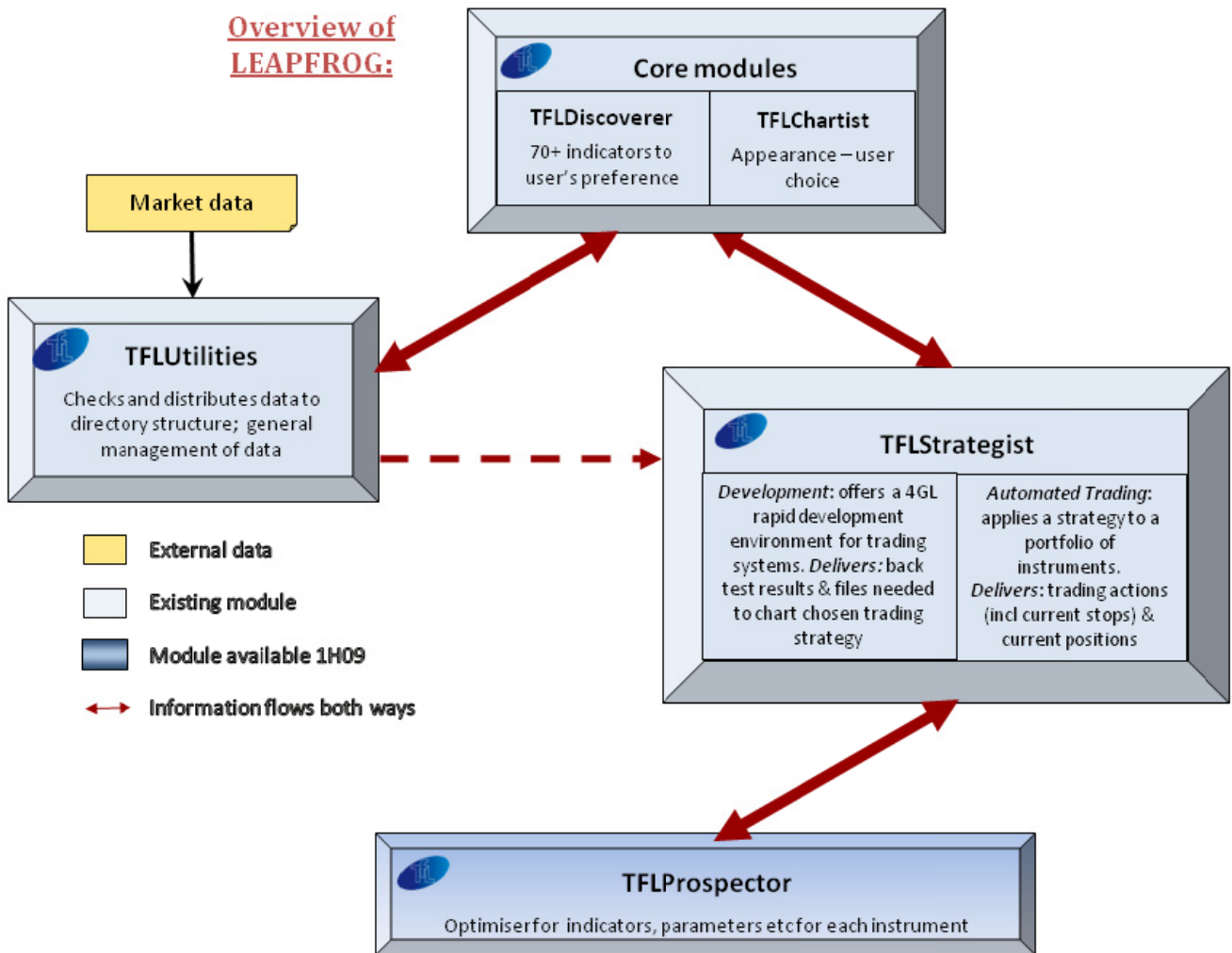
- A fully integrated suite of programs covering trading needs from downloaded data to market orders, with unparalleled facility for developing and back testing trading strategies in minutes, rather than weeks or months
- Offers more than 70 indicators, many of which are little-traded, and exclusive to LEAPFROG, for highly efficient trading. LEAPFROG-exclusive indicators minimize lag and maximize smoothness. Externally-supplied indicators can easily be incorporated
- Flexible graphics creates images of any size; eg weekly and daily charts side by side on a single hi-res monitor, with indicators, trading signals and positions
- Satisfies an unmet demand for faster, smoother indicators, high-quality customisable graphics to view them, and a means to implement clients' own trading strategies, evaluated and applied automatically across an arbitrary number of financial instruments
- Key requirements are standard PC skill sets, a source of market data, and knowledge of markets and trading techniques. LEAPFROG uses transparent files in structured directories, avoiding the need for database skills
- Current version works from daily data, with the option of daily or weekly trading
- Early version of LEAPFROG's core modules have routinely been used to assist trading \$millions

## LEAPFROG COMPONENTS

LEAPFROG (Leading Edge Analytics and Programming For Risk and Opportunity Generation) is a suite of modular programs, designed around the day-to-day needs of hedgers and speculators; typically helping discretionary traders to overcome the practical limitations of conventional analysis tools and manage more funds. Currently, it offers capabilities for daily or weekly trading.

- **TFLDiscoverer:** offers more than 70 high-quality indicators based on both simple and not-so-simple mathematical skill sets, with a bias towards indicators neither commonly known nor used. Novel filtering and smoothing technologies produce indicators which are fast, smooth, easy to relate to price movements, and relatively unknown.
- **TFLChartist:** highly customisable high-resolution graphics, enabling a choice of (multiple) indicators to be plotted in a timely fashion against conventional bar or candle charts with trading signals. Use of high-resolution screens, fewer charts to examine, and the ability to see charts side by side on a single screen, offers traders a much better experience through their working day. Charts can be exported as printable files, as used throughout this document.

### Overview of LEAPFROG:



- **TFLStrategist:** (1) a development environment for traders' strategies, and (2) an ability to execute those strategies on specified portfolios.

Deliverables include files defining new orders, current positions, and an early-warning facility to manage chart viewing lists on the basis of trader-definable criteria. For discretionary trading, fewer charts need be examined, enabling more funds to be managed in less time. Traders can rapidly define (via a point-and-click interface) their own trading logic, and receive back-tested results on a defined portfolio.

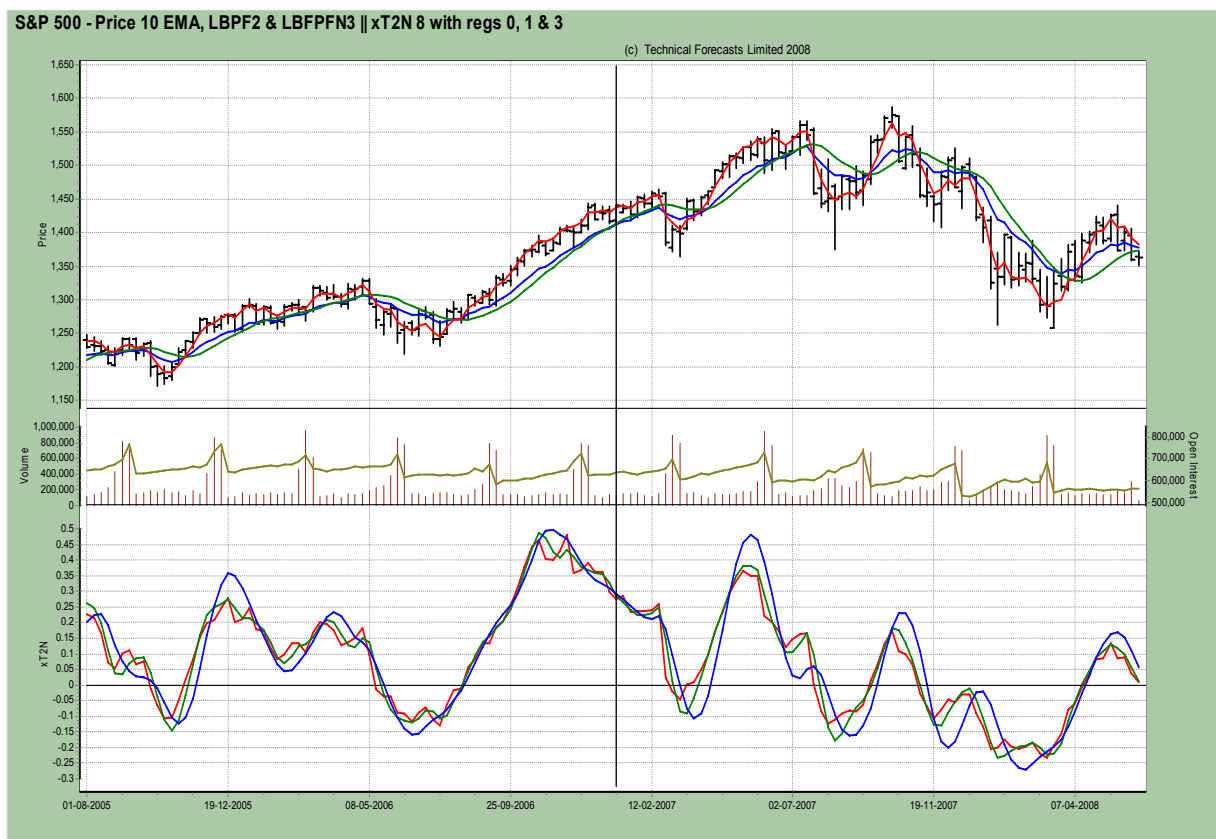
- **TFLUtilities:** tools to facilitate trading house-keeping tasks: setting up the initial directory structure, defining instrument portfolios, checking supplier's data, reporting exceptions or suspicious data, and distributing raw data into a logical data structure, accessible to users and other Leapfrog programs.
- **TFLProspector** (due in 1H09): for a loosely-defined trading strategy, optimises parameters for specific instruments, delivering both raw and statistically-inferred estimates of optimal trading performance based on past history.

## INDICATORS, OPERATORS AND OPERANDS: TFLDISCOVERER

As standard, there are currently over **70 indicators and operators** available in TFLDiscoverer, several of which are commonly used, and easily recognizable to analysts. However, there are many which have been devised by TFL using both original and published research into mathematical modelling methodologies (“bespoke indicators”). These are not commonly used, nor are many users aware of their existence. Further details of these indicators can be found in TFL’s Trading System Designers Guide, which can be downloaded from [www.tfl.biz/technology/downloads.htm](http://www.tfl.biz/technology/downloads.htm).

Well-known and commonly-used indicators show the same signals to all their users – with the result that they suffer from over-use and a progressive decline in efficacy. It is an obvious advantage to traders to be in a position to use combinations of smooth, fast indicators, especially those used by few others.

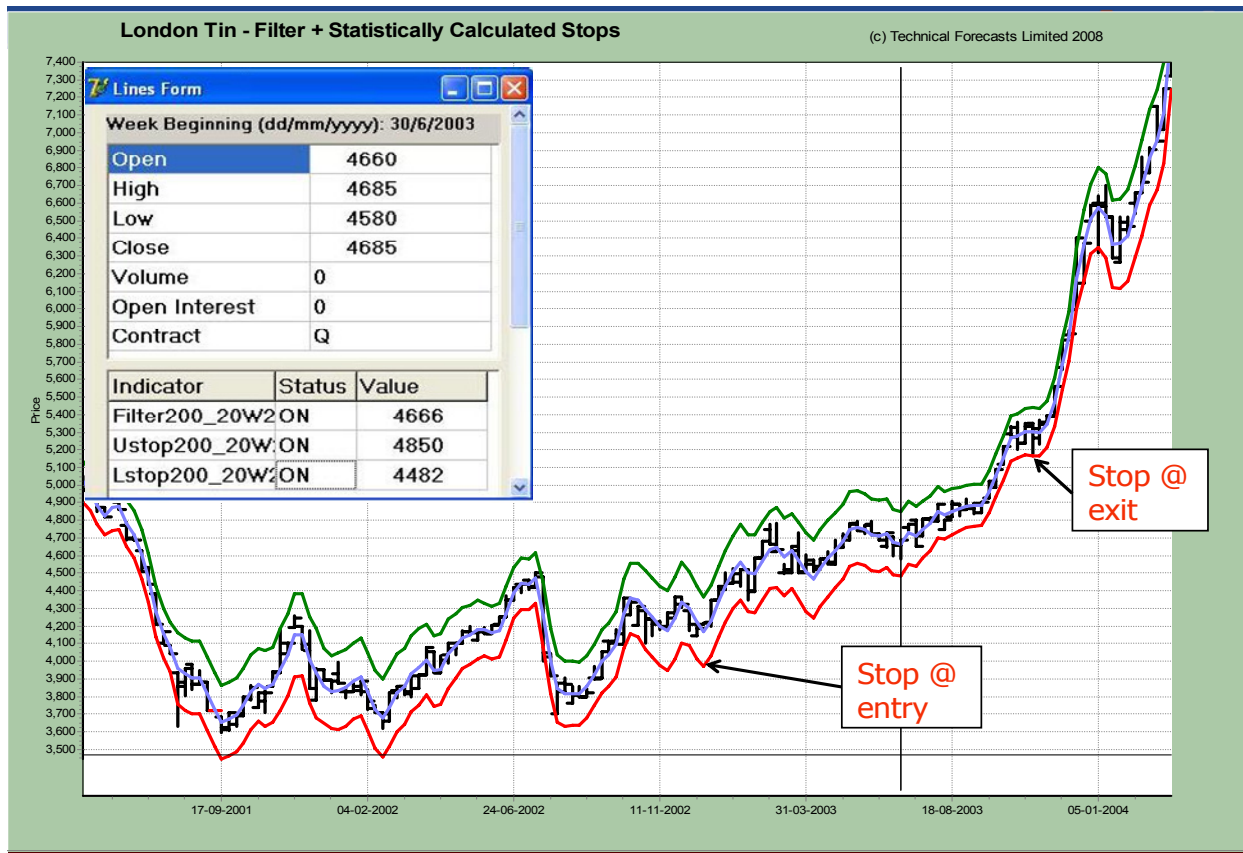
Fast filtering and smoothing (also known as regularisation) of indicators, as provided within LEAPFROG, assists traders to find **earlier and more consistent trading signals**.



For illustration, all three lines on the Price chart are based on the same length (10) but the order of the filter is progressively raised from 1 (green line, an EMA or exponential moving average) up to 3 (red line, one of LEAPFROG’s fast bespoke filters). The lower chart shows a new momentum indicator with three different degrees of smoothing. This particular LEAPFROG-bespoke indicator can be tuned to produce small absolute values in sideways markets for use in strategies to avoid whipsaw trades.

**Operators and operands**, eg exponential moving average (operator) and price (operand), form the basis of most indicators. These are separable in many of LEAPFROG’s options - to offer traders a capability to mix and match the two to create new types of indicator. Many ideas which may not work well with older operators (such as exponential moving averages) become more usable with the faster, smoother operators offered by LEAPFROG. This feature in particular offers traders an opportunity to exercise their creativity to develop new indicators.

**Stops**, although highly significant for most traders, are rarely featured in market literature. LEAPFROG's stops are based on a fast-filtered price indicator, a measure of price fluctuations around that line and a user-definable stop width. An example is shown below:



Stops need to be wide enough to allow for normal fluctuations around the true price, but not so wide that they are never triggered. Additionally, they need to be altered over time, to follow price movement and to lock-in profit. This is an area where the user-definable stop width becomes useful.

#### EXAMPLES OF INDICATORS & OPERATORS AVAILABLE TO LEAPFROG USERS

##### Conventional

- Moving average MA
- Exponential moving average EMA
- Moving average convergence / divergence MACD
- Stochastic oscillators
- Momentum
- Trend-to-noise
- Standard Deviation SD ... and so on

##### Bespoke, LEAPFROG-specific

- Regularization on various conventional indicators
- Probability-based filters
- Regularized moving averages
- Buying/Selling-power-based operands
- Minimal-lag regularized filters
- Stops based on probability
- Ultra-fast  $n^{\text{th}}$ -order filters ... and many more

TFLDiscoverer has a "batch" mode whereby a selection of indicators with previously-saved parameters can be calculated for the latest data of a pre-defined portfolio of instruments. In routine use, this can be executed with a single click.

**TFL's continuing research maximizes the chances of our users having a continuing supply of lesser-used, more effective indicators to aid their trading.**

## DEVELOPMENT AND EXECUTION OF TRADING STRATEGIES: TFLSTRATEGIST

In order to create or develop a trading strategy, a designer needs feedback in the form of a graphical display of a chart, trading signals and positions, and a measure of trading efficacy. Additionally, when strategy design is split between a trader and a programmer, difficulties often arise of which the following are typical:

- Communication of a trading idea to a programmer;
- Communication of information acquired during development back to the trader;
- Unpredictable and protracted development timescales;
- High initial costs with uncertain outcomes;
- Availability of indicators which can easily be related to impending price moves.

LEAPFROG's TFLStrategist program offers **traders themselves** a simple means of implementing and executing their **own** trading ideas, and seeing for themselves how they perform. This is achieved with a combination of a generic trading system "framework" program and a new fourth generation language (4GL) to define the trading logic to be used. TFLStrategist offers a development environment to apply trading logic to indicators (either created with TFLDiscoverer or from external sources). The key input required from the trader is the trading logic – hence TFLStrategist offers:

- A high level trading-specific logic language to express ideas briefly in pseudo-English;
- A point and click interface to help create logical propositions to express trading ideas;
- An embedded program to trade the logic and rapidly deliver simple back-test results;
- Simple checks for the most likely errors.

Hence traders' "programming" is restricted to what they are best at (trading logic), with other elements provided by TFLDiscoverer, external programs or other parts of TFLStrategist. Visual feedback of trading signals and positions is provided by TFLChartist. Outputs can include an "Action File" for new orders, a "Monitor File" to check current positions, and a "Viewing Portfolio" to include only those instruments which have passed through a Strategist-based technical screening process. A typical chart produced through TFLStrategist, complete with signals, is shown on the front of this brochure.

## OPTIMISING PARAMETERS & PERFORMANCE: TFLPROSPECTOR (DUE 1<sup>ST</sup> HALF 09)

Earlier components of LEAPFROG (including TFLChartist) enable indicators to be created, charts to be viewed, trading ideas formed and those ideas tested iteratively, in order to improve logic and parameters. This process is necessary to gain experience of a proposed trading methodology, but two major problems remain:

- Parameters used in ideas developed with TFLStrategist are unlikely to be optimal;
- There are generic problems with conventional back-testing in that results are heavily affected by noise originating from price. For optimization or performance estimation purposes, a repeatable "signal", consistent with the idea that back-test results are a credible function of the parameters, needs to be inferred on a statistical basis.

TFLProspector will address these issues. It will explore a defined parameter space to the extent that data allows, it will infer what needs to be inferred, and deliver a population of near-optimal parameters together with noise-free expectations of performance based on past experience.

## CHARTS : TFLCHARTIST

TFLChartist is designed to be as flexible in appearance and content as is feasible, without total customisation of the package. It also has a compatible “batch” mode to that of TFLDiscoverer, which allows a template chart for a portfolio instrument to be created with just a single click. When experimenting, charts can be created with just a few clicks. Charts available as standard include:

- Price only
- Price with volume and open interest
- Price with volume, open interest, and selectable number, type and combination of indicator charts
- Pairs of similar daily and weekly charts presented side by side (high-resolution screens only)

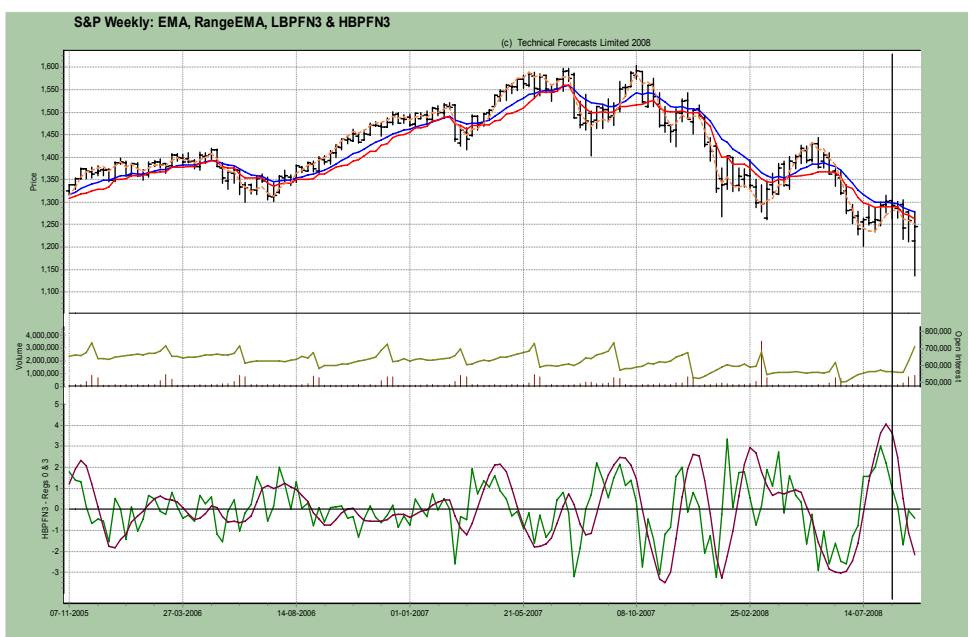
Charts can be built with whatever combination of indicators and image sizes traders need. Initially, this may require some experimentation, but once your chart format is decided, it can be saved as a template to show your new data as required. The net result is easy chart viewing with unusually helpful indicators.

TFLStrategist may also be used to screen a portfolio for technically “interesting” situations, or exclude “un-interesting” ones, in order to create a shortened chart viewing list, and hence to offer a trader a more productive and satisfying working day.

Inclusion of long/short signal pointers to a chart, and coloured bars to show separate long/short/flat trading positions, enables you to appraise your trading strategies. The chart on the front cover of this brochure shows an example.

Charts are stacked vertically, to simplify temporal comparisons of signals. A movement in price can be tracked at the same time as movements in indicators and oscillators. Hence, you may combine your customised indicator charts with your price/volume/open interest charts, to enlighten your trading decisions. You can scroll back and forth through the period covered by your charts, to view ‘what happened then’ in comparison to ‘what is happening now’, to find parallels in past market behaviour.

Running LEAPFROG in batch mode will create user-defined indicators for a user-defined portfolio which discretionary traders can view at their leisure, on charts as below.

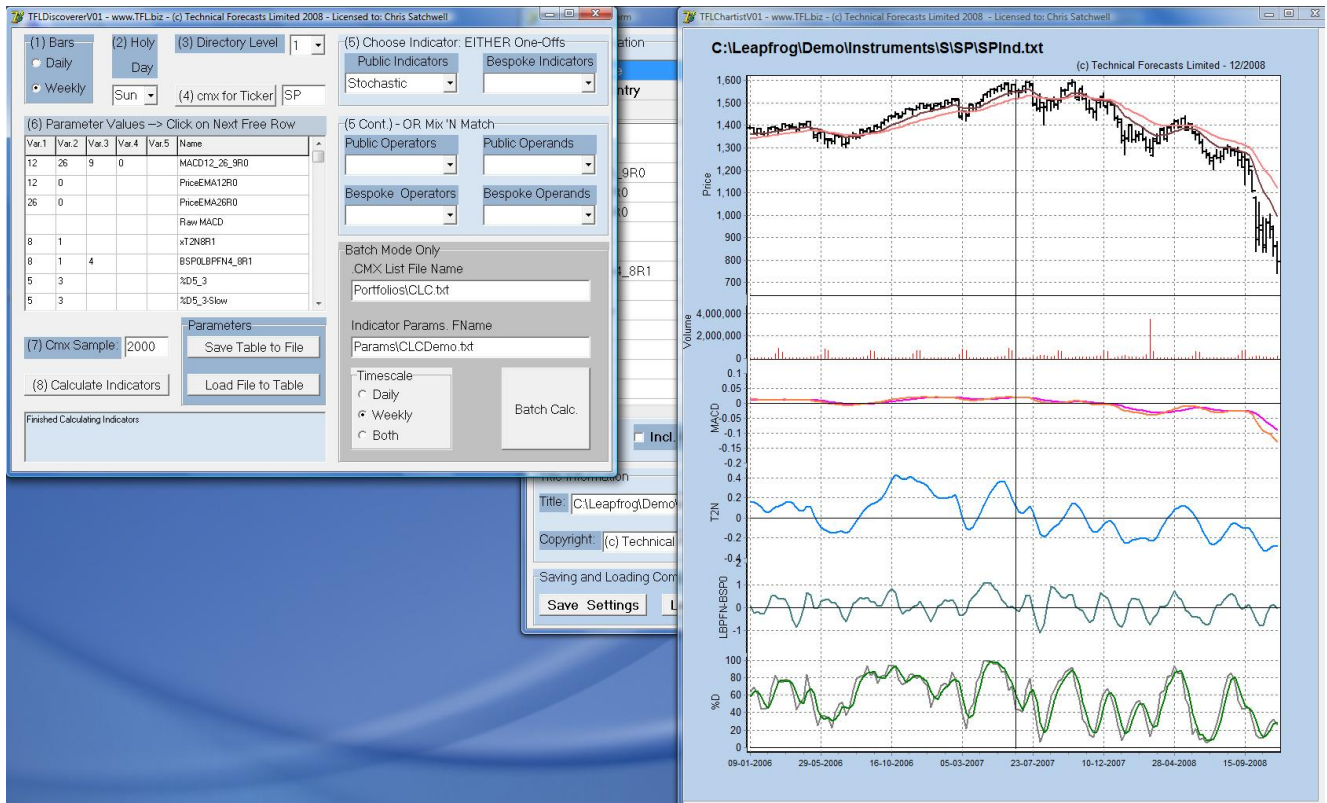


This weekly S&P 500 chart includes a number of novel indicators: on the price axis there is a conventional 12-week EMA (blue), a similar EMA but with length adjusted by price range (red) and a third order low by-pass filter (orange dashed line).

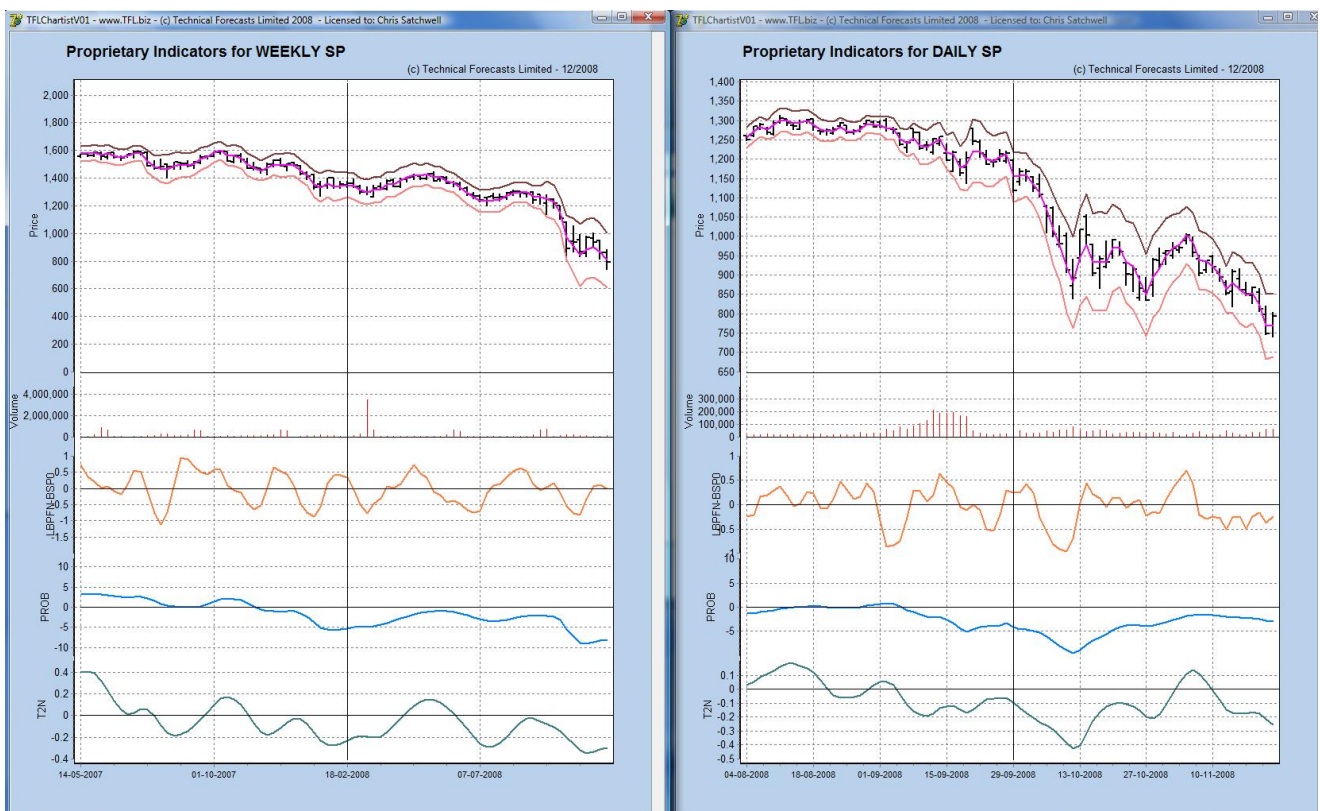
On the lower axis there is a complementary high by-pass filter (green line) which on its own is effectively unusable, but which

becomes much more helpful when smoothed (magenta line) with turning points usually coinciding with, or slightly preceding, those of price.

## SAMPLE HIGH-RESOLUTION (1680X1050) SCREEN SHOTS



TFLDiscoverer (left side) controlling TFLChartist (right side)



TFLChartist (weekly chart) on left; TFLChartist (daily chart for comparison) on right

## INSTALLATION, TRAINING, SUPPORT AND CONFIDENTIAL CONSULTANCY

Initial installation of LEAPFROG software is best combined with a TFL training session to explain the directory structure and market data file formats required.

TFL offers two levels of training: firstly, use of the software for traders; and secondly, for a nominated internal expert (or experts) to maintain data files and LEAPFROG's file structures, provide traders with front line support and TFL with descriptions of any problems they cannot resolve. We advise the use of an internal support structure wherever possible, as this develops internal expertise, which should lead to a better return on a client's investment in LEAPFROG. TFL also offers email support via the nominated internal expert.

Consultancy on use of LEAPFROG for specific non-trivial tasks is offered by TFL at standard daily rates.

## ABOUT TFL

TFL is a technology boutique specialising in data modelling and forecasting. It has been trading continuously for more than 20 years, and has a number of well-known blue-chip clients such as Motorola, Thomson Directories, Cheltenham & Gloucester (part of Lloyds Banking Group), and CB Richard Ellis – Hamptons International; and in the financial markets, Criterium Capital Management.

TFL has been providing forecasts to the UK Government's Valuation Office Agency for several years, to assist the VOA in forecasting asset values for public sector accounting and budgeting purposes.

TFL's locally-oriented property price forecasting website for England and Wales, [www.PropertyForecasts.co.uk](http://www.PropertyForecasts.co.uk), is usually at or near #1 worldwide in a Google search on terms such as "property price forecasts" or "house price forecasts".

TFL's core capabilities include:

- Statistics
- Time series forecasting
- Non-linear data modelling
- Charting graphics
- Software solutions

TFL's Leading-Edge Analytics and Programming For Risk and Opportunity Generation, "LEAPFROG", is designed to enable market decisions to be taken with greater efficacy (main modules available; TFLProspector currently under development).

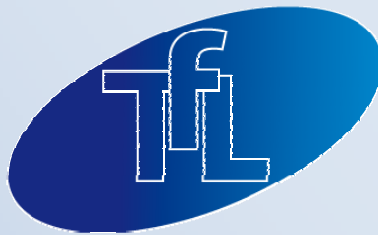
## SCIENTIFIC PEDIGREE

TFL's Chief Scientist, Dr Chris Satchwell, was originally responsible (with others) for creating one of the early intelligent trading systems, and (on behalf of Recognia Inc) has developed algorithms and software to recognize trading patterns. That software is currently applied to markets throughout the world on a daily basis, and its results delivered to a variety of clients, principally brokers, for publication on their web sites. In late 2004, his book "Pattern Recognition and Trading Decisions" was commissioned and published by McGraw-Hill.

He also created the data modelling and forecasting software used so successfully by TFL over the last eight years in property price forecasting, market modelling and media mix optimisation, and has developed TFL's unique technology for forecasting a time series with mathematically-valid error-bars.



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