TRADERS´

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Dmitry Bourtov

From Missiles to Markets

A true child of the former Soviet Union, Dmitry Yakovlevich Bourtov would have probably become a senior scientist in the echelons of the USSR's mighty military machine had it not been for the collapse of the Soviet empire. Instead of continuing with military science, Dmitry started trading in the wild Russian markets of the 1990's, and now runs a successful US based private Hedge Fund called Solaris Market Neutral. He still lives in Moscow with his wife and two children. Out of his sumptuous Moscow offices he operates his 100 plus fully automated proprietary electronic trading systems that execute 2000 plus orders, 24 hours a day in over 30 Western markets. Dmitry's company, Unimarket Corporation, also engages in market making on US Treasury Bond Options, and his options hedge fund is one of the top rated by performance in the world by The Barclay Research Group, Ltd. We caught up with Mr Bourtov in a series of interviews and trace his remarkable story from Russia's Deep South to his creation of a top-performing fund today.

TRADERS´: Tell us about your background.
Bourtov: I was born in December 1970 and grew up in the south of Russia in a region near the Black Sea called Krasnodar. There I studied in a special school for physics and maths. I was very interested in electronics and computing and I built my own Z80 machine when I was 16.

Both my parents worked in the Military Scientific establishment of the former Soviet Union and I was destined to follow in their footsteps. My father was an electronic engineer. In later years he was head of one of the research divisions at a pretty big Soviet military research institute. In 1994 I graduated from the Moscow Institute of Electronic Engineering with a Master in Computer Science and Applied Mathematics. During the last two years of studying for computer science it was quite a difficult time in Russia in the middle of the Gorbachev changes. So the chances of getting a good place to work with a Computer Science degree were extremely low. At the same time I took some classes in accounting, as jobs in the scientific establishment were scarce.

TRADERS´: How did you come to the markets?
Bourtov: When I graduated I started working as an accountant. This led me to an interest in economics.

A friend of mine started working for an investment company, and I became quite interested in opening an investment account for myself. This was in late '94. The company, North Brokers, doesn´t exist anymore. It operated on the local Moscow Central Stock Exchange. I traded primarily on the Ruble/Dollar exchange rate.

I started doing quite well but six months later the exchange blew up. No one had a segregated account at the time and there was no separation between the exchange and the clearinghouse. It was a pretty wild environment for traders. But it was a good lesson. I learnt a great deal from the overall experience.

TRADERS´: How much money did you lose when the exchange ceased trading?
Bourtov: I started with the equivalent of maybe seven or eight thousand bucks. When the exchange shut down I had built it up to forty or forty-five. On a certain day there was a public announcement that the exchange had stopped any sort of operation. I lost all the money. The whole exchange went out of business.

TRADERS´: Why did the exchange fail?
Bourtov: Actually a classical story of a lack of regulation. The exchange had a very criminal way, I should say, of validating margins. For

example, they sometimes accepted debt instruments issued by local banks without checking that the documents were actually worth more than the paper they were printed on. There were other local exchanges at the time like the Moscow Board of Trade. It had the same destiny as Moscow Central. In Russia we didn´t have very strict rules in the beginning.

TRADERS´: Do you still trade in Russia?
Bourtov: Since my losses in 1995 I have primarily focused on the Western markets.

TRADERS´: Are things better regulated now in Russia?
Bourtov: It´s much better now. We have a requirement for a segregated and a sort of physical separation between exchange and clearinghouse. The last major disaster was in '98 with the Government Bonds story. Many exchanges had difficulties at that time.

TRADERS´: Do you think you will ever trade on Russian markets again?
Bourtov: Very unlikely. The market is still small and relatively under regulated compared with the United States - despite vast improvements.

TRADERS´: What techniques did you use back then?
Bourtov: Real time data, which in those days came from Reuters, was extremely expensive. Reuters Money 2000 cost 6000 bucks a month here in those days.

So initially I simply relied on daily data imported into an Excel spreadsheet to do my analysis in a very basic way. In the end there was a lot of classical emotional trading versus a more systematic approach. Very much discretionary as opposed to what I do now.

TRADERS´: Were you trading full time?
Bourtov: Not at that stage. I was still working as an accountant at that time whilst trading in my spare time.

TRADERS´: When and how did you start trading again?
Bourtov: I started trading again in late 1995, a few months after the collapse of the Moscow Central Stock Exchange – this time with Prudential Securities in the United States. Trading mainly on the Chicago Mercantile Exchange and Chicago Board of Trade contracts.

In mid 1997 I started Unimarket Corporation. This has become the vehicle through which I have conducted most of my trading ever since.

In 1999 Unimarket applied to register as a CTA (Commodity Trading Advisor) with the CFTC in the United States enabling me to take in client monies to trade in a regulated market. I physically passed the exams in 2000 and our CTA status was granted.

TRADERS´: How did you come to your current trading philosophy?
Bourtov: I was quite interested in trading techniques that did not involve human judgement. So I worked on a way to apply historical back testing to market data series.

In late 1994 I was spending about 3000 dollars a month on Dow Jones Teletrac in order to do my technical analysis. One day someone sent me a fax with a chart printed from a CQG (Commodity Quote Graphics) screen. So I contacted CQG and bought a system for myself instead of Teletrac. I was their third customer in Russia. It was half the cost of Teletrac for much better quality. CQG did all the data collection automatically. It was a huge help for me in my technical analysis.

CQG´s Director of European Marketing contacted me with regard to making some contacts in Russia. Six months later, after helping to organise some local events for CQG here in Russia, I became their Russian agent. That was in January 1996. At the time, the market was very bullish in Russia and in 1997 I became CQG´s European Salesman of the year, creating more revenue than any other salesman in Europe for that year.

I continued to trade and do research on trading more systematically through that time. In '98 CQG decided to take advantage of the local talent here and open a small Developers Group in Russia. By '99 I had completely switched to software development from sales. My old background in software and applied mathematics had taken me back to my original roots.

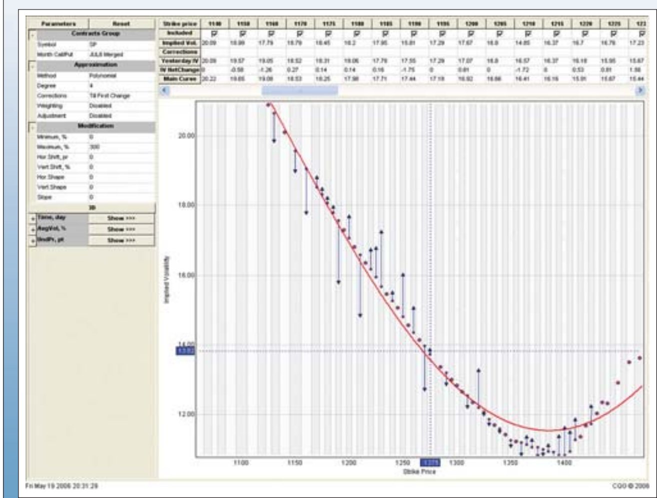
TRADERS´: So your trading progress went hand in hand with CQG?
Bourtov: Yes. I was developing the software and trading for myself at that time. I did some general development for CQG for Windows at that time and later on the CQG Net Application but we also did many developmental things exclusively for our own use. Later on I was deeply involved in the development of the CQG Advanced Options Package.

The gentleman who owns CQG (Tim Mather) does a lot of his own trading so we developed a number of proprietary tools for use by ourselves.

TRADERS´: Could you enlighten us on some of the principles or techniques you are using in general terms?
Bourtov: One of the projects we were working on was using neural network technology. I developed a product called NND (Neural Network Designer), which allows the user to build, train and test sophisticated neural networks in real time.

We also used Genetic Algorithms to develop a predictive Pattern Recognition Project, which we still use now.

F1) Options Skew



TRADERS´: How about the options project?
Bourtov: I was quite a fan of options at that time. Late in 1998 CQG released an options model in my name, called the Bourtov Model.

It´s a special options model primarily designed for use on stock index options, where the volatility skew is enormous. It adaptively captures the current and previous day´s implied volatility for a more accurate calculation of Greeks and theoretical price.

TRADERS´: Has this model been widely adapted now?
Bourtov: At this moment it´s available exclusively on the standard CQG Net application. So if you use the Advanced Options Package, which is taken by a few hundred people worldwide right now, you get my model.

TRADERS´: Do you still trade options now?
Bourtov: Yes. Afterward, I started trading options more and more and by 1999 stock index futures options trading accounted for 99% of my portfolio. This is not true for today. These day´s options account for around 25-30% my overall trading volume and the rest is futures based activity.

TRADERS´: What kinds of options strategies do you like to use?
Bourtov: I primarily do delta-neutral strategies, but I use my model because it produces more accurate results. It evaluates what was under and over priced, whilst keeping the overall position delta neutral. It´s very systematic and the concept itself is simple enough but to go deeply into why this or why that is very under or overpriced does involve a lot of math. CQG has the model as standard in its Advanced Options Package and although the formula isn´t published you can get the Greeks and see how they are different. Most of my options trading is based on it and I found a way to balance my portfolio and do a sort of arbitrage operation on stock index futures options.

TRADERS´: How well did you do using your options strategies?
Bourtov: In 1999 I finally moved my account to Refco and I had several hundred percent return on my trading. That year I took an account from around a hundred and fifty thousand dollars to a seven digit value.

After a couple of up and down periods after that I have decided not to work on the return itself but on the Sharpe Ratio instead. It´s much more important to work with a Risk Adjusted Return.

TRADERS´: Were you trading mainly intra day or position trading at that time?
Bourtov: It was position trading.

Concept of The Bourtov Options Model

Though we do not reveal the formula, below I will describe the basic operational principles of The Bourtov Options Model.

The majority of classical analytical options models assume that market price distribution is normal or lognormal if the said instrument has only positive prices. As a result all the classical models can't explain the fact there are different implied volatility values for the different options strikes for the same underlying instrument. According to Black, Black-Sholes, Merton, Whaley and many other models different options listed for the same underlying instrument should have same implied volatility (IV) values equal to the historical volatility of the underlying instrument.

However in the real world this is simply not true. To illustrate that fact we will use the Volatility Workshop Module from the CQG product. I have taken, as an illustrated example, the July 2006 put and call options series on S&P 500 futures. The graph has different strike prices on X axis and correspondent IV on the Y axis. We might see that for different options IV value might be 2 times different. This graph is often called Options Skew or IV smile (figure 1).

The practical task that fazes options traders is to find a fair price for each option and its Greek values. Direct use of any classical options model is impossible since the options price is very dependent on IV values which might vary from option to option. However if we analyse IV values based on historical data from the past few decades we might note that shape of the IV skew depends on how many days the option has to expiry and the historical volatility for the underlying instrument.

All other factors have a far smaller impact on the shape of the IV skew. Analysis of historical information reveals an analytical equation describing shape of the IV curve for an individual market. *This concept is the core of the Bourtov options model.*

In practical life this means that as soon as a market opens for trading we might provide excellent analysis regarding options fair value and its Greeks based on an analytically reconstructed IV shape. As soon as just three or four trades are reported for any given option for this instrument we can normally very accurately adjust the IV shape and provide more accurate expectations for the correct fair options premium.

To illustrate this fact on figure 2 you may see the Greeks display for Jun 2006 S&P 500 options. Let's look on the 1200 Put. According to the Black model we will get a theoretical premium of $2.38. The real market at that time offered it at $5.10 in the previous minute and had been bid in the previous hour at $5.50. Delta for this option according to Black model is -8.77%. You may have noticed for many other options that the difference between the theoretical and real market might be two times or more. And as far as you go out of the money the bigger difference.

However if we apply the Bourtov model for the same options series on figure 3 you will see that same option was priced at $4.82. A few minutes later that option traded 4.55 bid and 5.20 offer. Delta value for the same option is -13.76 which is more than 50% different when compared with the classical Black model.

Using the Bourtov model with various dynamic hedging algorithms you may significantly improve your ability to make your portfolio "real neutral" and more accurately priced.

TRADERS´: Have you used tools like Trade Station?
Bourtov: No. I have stuck primarily with CQG. Also developing my own tools and I have used Microsoft Excel quite heavily.

TRADERS´: Tell us about your futures trading?
Bourtov: In 2000 CQG started to work on a front-end electronic order entry system. A few months before this project started we completed a back testing and optimisation module on CQG.

So the whole idea was to develop something that took the back tested system and trade it forward automatically without any human involvement. So today all one does is just switch it on and monitor it. This removes the often-damaging human emotional input I try to get away from. In 2001 we went live with real money and we traded a multiple portfolio multiple market system. As of now I have more than 100 automatic trading systems that trade across most electronically executed futures markets across the world in a variety of portfolios.

For example in Europe we trade DAX, EuroSTOXX, EuroBobl, FTSE and CAC 40 futures. We trade all the liquid electronic futures markets such as T Bonds, e-mini S&P´s and Eurodollars in the States. Our current trading software tool was released in May 2004 - at this point only for our internal use. The product, called Odyssey, doesn´t just trade futures but trades any kind of a portfolio combination in a much faster way.

TRADERS´: For example?
Bourtov: It not only trades options on futures but futures themselves in combination. We also use it for options market making and arbitrage. So we are able to make prices on Treasury Bonds, and e-mini´s on Globex with tight spreads.

For example, there is no technical problem for us to make two tick spreads across the board on T Bond Options. We are not covering all the boards now due to some bandwidth and regulatory issues, but we are working to resolve that and get market maker recognition.

TRADERS´: That sounds like a total technology revolution at your end. To have 100 plus electronic trading 2000 plus times on over 30 electronic markets 24 hours a day is a fair load – even if it´s automated. How big is the team that takes care of it all?
Bourtov: Altogether there are seven of us at this point, including myself. Some of us work on R&D, whilst others monitor trades and deal with back office and/or regulatory compliance.

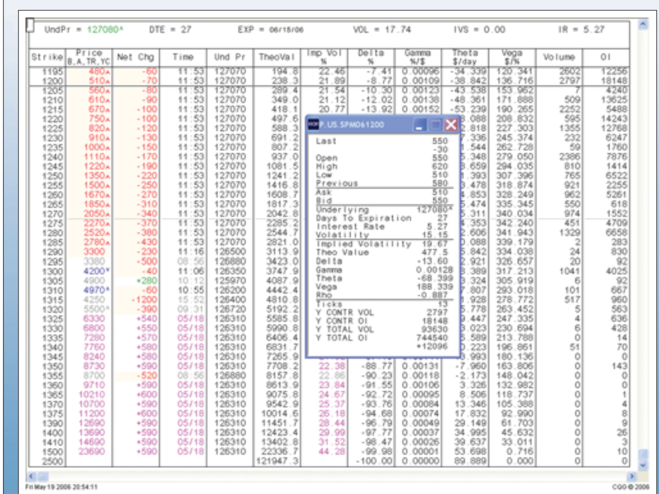
TRADERS´: Can you give away any of your systems to us?
Bourtov: Many of the systems we use are actually extremely simple. Some of the stuff we are using is not rocket science. The actual art is how you manage the risk within the trades within the total portfolio picture.

To illustrate this, I made a system several years ago as an example with a random based entry point. By controlling the number of contracts and managing the exit the system was positive. So money management is far more important than trade selection. By applying the system, say 70 - 100 times you can get the system profitable around 80% of the time on a two year time frame. If the system, for example, is applied on the portfolio of 20 US futures markets and traded using daily data, the probability of seeing a losing year is less than one percent. Actually we use this random system as a benchmark while constructing new systems. Statistically I would wish to beat the random test results as a minimum benchmark! Money management is much more important than decision making used in selecting the trade.

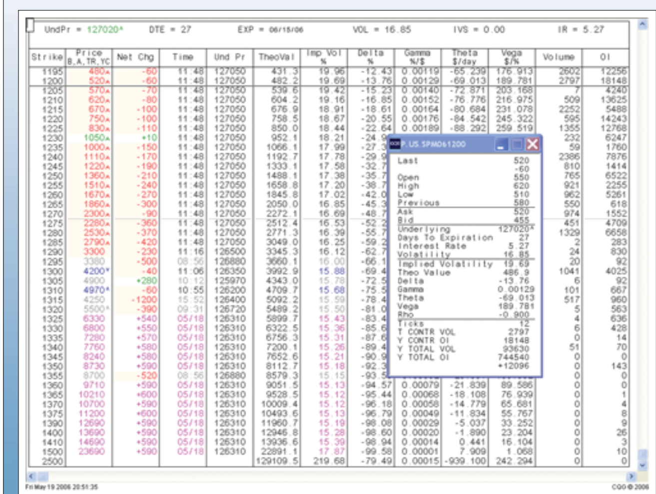
TRADERS´: How can we learn more about these money management techniques?
Bourtov: If you look around there are tons of books dealing with the different kinds of indicators around. You may find just a few dealing with building robust risk control systems.

TRADERS´: Which books do you recommend for this?
Bourtov: I recommend books written by Thomas Stridsman. He´s got a very good conceptual idea of stable risk and a systematic approach to managing risk. One book is called Trading Systems and Money

F2) Greeks Display



F3) Bourtov Model



Management and the second book is called Trading Systems that Work, both published by McGraw Hill. Also Quantitative Trading Strategies written by Lars Kestner.

TRADERS´: And other books?
Bourtov: On options my favourite one is called Buying and Selling Volatility by Kevin Connolly. Another book I like is called Dynamic Hedging by Nassim Taleb.

TRADERS´: Whose money do you trade?
Bourtov: I trade my own money as well as having a hedge fund in The States called Solaris Market Neutral. This trades various options strategies with my model.

TRADERS´: Can one invest in your fund?
Bourtov: Yes, it´s open. Qualified investors can participate. The performance numbers are available on the Barclay Trading Group website at *www.barclaygrp.com.* In the past year, on a rolling 36 month performance table we were rated consistently as between number two and number seven in the overall rankings. Based on Barclay Group´s calculations, over the past 36 months our average real annualised return, after all fees and commissions, is around 28%.

TRADERS´: What is the minimum account size you can accept?
Bourtov: For the funds it´s $100,000. This is a requirement. For a proprietary account I would manage outside of the fund it´s around one million dollars.

TRADERS´: Could you run through your fund´s annual performance figures please?
Bourtov: We started the fund in 2001 and made 18.80%. 2002 was our only losing year at -24.30%. We don´t try to cover up what happened but we have taken steps to try our level best to prevent such an event from occurring again. In 2003 we returned +20.54%, in 2004 we returned +59.18% and in 2005 it was +26.4%. Officially, we are up +3.97% at the end of April 2006.

TRADERS´: Besides being systemised and automated, what would you say constitutes the essence of your trading philosophy?
Bourtov: We use a lot of unique statistical arbitrage methods with a systematic portfolio risk management algorithm. Also maintaining a very diversified approach: In other words trading as wide a range of liquid markets as possible with as wide a range of different time frames and trading systems as possible. We are primarily focused on risk rather than performance in any individual market.

TRADERS´: How do you think being an accountant, software engineer and scientist affects your trading perspective?
Bourtov: It helps a lot. Many times whilst working on a model I am employing the same techniques that are used in engineering and electronics. My maths background helps as well.

The accounting background helps too, but not as much as the engineering and maths background. It´s the reason I have ended up trading as I have. It´s essentially an engineering approach.

TRADERS´: Do you ever get errors, like spikes in the price of the data feed generating an erroneous trade signal, for example?
Bourtov: Yes, sometimes. Some spikes are filtered out by the trading system logic and some affect our fills. For example, sometimes orders might be rejected or delayed in delivery to the exchange. All of these issues can cause potential errors in terms of the strict system logic. Typically we have between two to five erroneous orders a day on a total volume of around 2000. To protect against such errors we use independent software run on a separate server which checks our real time position based on the fills vs. theoretical position based on the model and reconciles the two in a very short time.

TRADERS´: So effectively your order entry system is self-monitoring for errors?
Bourtov: Yes, it´s a very important requirement.

TRADERS´: What has been your best and worst trade or trading period?
Bourtov: In late November 2000 Natural Gas became crazy. I was holding a big position in Natural Gas options and on a single night the market made seven and a half times its annual standard deviation. I could not exit from the position for about three days. I was gradually squeezed out. That taught me a lesson about trading illiquid markets.

TRADERS´: How much did you lose?
Bourtov: Altogether across several portfolios it added up to a seven digit value.

TRADERS´: Can you say how much?
Bourtov: I prefer not to. But the loss was pretty significant and did affect overall performance.

TRADERS´: Let´s move onto your best trade.
Bourtov: If your system just trades correctly that´s a great trading day. There is no "best trade ever" scenario for me as such as I don´t see things in terms of individual trades. My best period was when I made 596% on my overall portfolio in 1999 on a starting capital of around US$150,000.

TRADERS´: Why do you trade other people´s money? Why don´t you just trade your own money?
Bourtov: Primarily for two reasons:

Firstly, when you run a fund, it forces you to be more systematic and thorough. Also, it´s a completely different personal feeling trading with investors. You can´t say "I just don´t feel like trading today or this week."

Secondly, when you develop a model, there is no reason, for example, that you should not trade ten million on it instead of one million. So why not manage money?

There are fixed costs associated with trading, and they are not low. I maintain a team of several developers besides myself. Trading and making more money from trading other peoples money helps to spread the costs and makes more money overall.

TRADERS´: Any comments about the markets we are seeing now and in particular the spectacular rises in certain commodities?
Bourtov: No, because everything I do is purely systematic. Every single year something happens. If you follow the right procedures, on a practical level it doesn´t really matter what happens. We follow set

models. It´s quite difficult to predict what commodity will have a big move next. So our models are designed to cope with the next big move in any one market, as long as the market is liquid. And we try to stay out of illiquid markets.

TRADERS´: How much back data do you use? Have you tested back over twenty years of back data, for example?
Bourtov: It really depends on what kind of model we are using. For our long term stuff we start our testing back from 1970. These portfolios are based on weekly data.

TRADERS´: How do you determine when you are wrong in a trade?
Bourtov: What is really important is that you do not lose more than you are allowed to lose based on your per trade risk allocation.

TRADERS´: How much of your equity do you risk per trade?
Bourtov: Typically, it´s not more than half a percent of the value of a portfolio on a single trade.

TRADERS´: What is the relationship between your winning and your losing trades?
Bourtov: It varies greatly from system to system. For example, on our futures trading, typically we have more losers than winners, but the winners are much bigger than the losers. In general, our winners are two to three times the size of our losers.

TRADERS´: What do you find most frustrating about trading?
Bourtov: Waiting. You design a system, test it and then you have to wait a long while in the market to see whether it actually works as expected. And another thing. Nobody likes losing money, though losing is part of the game of overall winning. You can´t win every single trade every single week every single day. So it´s part of the business. But it´s nevertheless still frustrating to sit through losing periods.

Another huge frustration is that less than 5% of the original fresh trading ideas are converted into actual real systems. 95% of the ideas, after much hard labour, end up in the bin.

TRADERS´: What do you find most rewarding about trading?
Bourtov: If you come up with an idea and you are right about it you don´t have to find too many people who you wish to sell it to. It´s not an issue like having a brilliant idea or product but you can´t bring it to the market because there is no one willing to buy your idea. The market is always ready to accept your idea willingly. I find this most rewarding.

TRADERS´: What do you think is the difference between successful traders and unsuccessful traders?
Bourtov: It´s all about stability. Successful traders are able to make money year after year after year.

TRADERS´: Do you do seminars and training?
Bourtov: I do not do any external seminars but sometimes I give seminars for the internal development team. I may talk a little bit about general concepts but it´s always a trade off. If you have something extremely good you could charge $100,000 for a lecture but the idea may be worth much more than that.

TRADERS´: Please describe the basic principle of your position trading strategy?
Bourtov: In a word, diversification. Taking as many different principles and factors as possible into consideration.

TRADERS´: What are your favourite indicators?
Bourtov: We use many different indicators but you may get good results with various types of moving averages and standard deviation studies, which we use quite a bit.

We also like Digital Data Processing, digital filters and many other techniques including neural networks and genetic algorithms.

TRADERS´: Do you tend to favour a trailing stop or a price target for your trade exit?
Bourtov: Directly we use neither. Primarily we exit using signals. But sometimes we use standard deviations for exit targets. We might use a trailing stop based, for example on market volatility. I suppose you could call it a dynamic trailing stop.

TRADERS´: What time frames and intervals do you use in your trading?
Bourtov: We use models based on time frames all the way from weekly data to intra day tick data.

TRADERS´: Would you ever stop trading your systems because there are figures coming out or other fundamental news?
Bourtov: No. For example, we traded through 9/11.

TRADERS´: Do you ever trade on a whim or take a non-mechanical trade?
Bourtov: Very unusual. Practically never. Perhaps once or twice a year purely for my own account.

TRADERS´: How does your own account trading differ from the fund account?
Bourtov: I tend to use my own account to prove concepts or do live tests on new systems. I like to prove them in my own account and conduct any sort of experimentation without putting client funds at risk.

TRADERS´: How have you performed in the past month or two?
Bourtov: At the end of April 2006 Solaris Market Neutral fund was up 3.97% on the year.

TRADERS´: What about the stress and fatigue of trading?
Bourtov: I sleep quite well and I don´t have problems there. I know the system behaviour so there is nothing unexpected. I am not a monitor addict.

I am a fairly relaxed person. When I travel I always carry a notebook and I am always prepared to connect within a half an hour, wherever I am on the planet. You always have to be ready for a computer or comms issue. Sometimes the exchange gives a problem, so you always have to be ready to sort out the glitches.

TRADERS´: How long do your typical trades last?
Bourtov: This varies from system to system. Arbitrage trades can last from a couple of milliseconds to a few minutes.

One options strategy I have is still open from 1999. I have been rolling my positions since then. The trade just keeps making money.

Futures trades are the same. Systems using weekly data can take more than a year but arbitrage trades can take less than a second or so. Just to match all the sides electronically.

TRADERS´: Do you trade stocks?
Bourtov: Not much. I started doing some for myself to educate myself. Perhaps in the future.

TRADERS´: What proportion of your trading is intra-day trading and what proportion is position trading?
Bourtov: In terms of allocation intra-day trading is around 40%, but intra-day accounts for 80% of trading volume.

TRADERS´: What´s your worst draw down in the past two to three years?
Bourtov: Since the beginning of 2003 our worst draw down has been just under 7%. This is crucial for me. In the old days it was different.

TRADERS´: What do you mean?
Bourtov: In 2002 the Solaris Market Neutral Fund suffered a large mid year draw down of 59.3% – even though we ended up the year down just 24%.

A number of markets started to explode in terms of volatility and we suffered losses combined with some investors pulling their money out which forced us to liquidate our positions in very unfavourable market conditions.

This led to a fundamental change in the way we trade the fund. We no longer take positions in illiquid markets. And we have benefited from that approach ever since. We take a far more diversified approach now as well so that our risk is lowered even further.

TRADERS´: Obviously all these years of profitable trading must have led to a significant increase in your personal wealth...
Bourtov: Yes.

TRADERS´: What do you love to do?
Bourtov: Besides trading, I love to spend time with family and friends.

Design is my hobby. Architectural things. I have taken an active part in the design of my apartment. Sometimes one has to just forget about work related things.

Primarily we love to spend time in the city. I also travel quite a lot and enjoy skiing holidays.

TRADERS´: Who is your favourite Architect?
Bourtov: Antonio Gaudi.

TRADERS´: Do you have any targets and goals for the future?
Bourtov: I will continue to technically develop my systems focusing on trade routing, systematic execution and model development. I just like this sort of thing.