√Check Fund Manager Background Investigation 05/10/2012

Michael David Mundt

Revolution Capital Management LLC
520 Zang Street, Suite 209
Broomfield, Colorado 80021

Executive Summary

Michael David Mundt is 44 years old. He is likely married to Heather Mundt, with whom he owns a home at 815 Vireo Court in Longmont, Colorado. They purchased the property in May 2001 for $349,100. Michael Mundt graduated from the University of Colorado on May 12, 1989 with a Bachelor of Science degree in Aerospace Engineering. He went on to earn two additional Aerospace Engineering degrees from the University – a Master of Science (awarded on May 17, 1991) and a PhD (awarded on August 14, 1993). Michael Mundt is registered with the NFA, and his record shows past employment with Analytic Investments LLC, as well as his current employment with Revolution Capital Management LLC. Business records list him as an officer with Revolution Capital Management LLC and Revolution Capital Management Alpha Fund LP. A patent record found during media research confirms his past employment with Seagate Technology.

Regulatory and Litigation Summary

No suits or disclosures found for Michael/Mike Mundt.

Media Releases

No detrimental information found.

Michael Mundt, a principal with Revolution Capital Management, wrote a 2011 article titled, "The DNA of a diversified portfolio: building a diversified managed futures portfolio takes more than cobbling together a bunch of non-correlated strategies." He wrote an earlier 2011 article titled, "The short-term dilemma: short-term trading programs are in great demand but add additional hurdles for the designer. Building a successful short-term strategy takes more than simply applying trend-following strategies to a shorter time frame."

Several articles list Michael Mundt as principal and founder of Revolution Capital. He reportedly founded Revolution Capital Management in 2004 along with partners Mark Chapin and Rob Olson. A 2009 article lists him as a former principal at Analytic Investments.

According to a March 2007 patent document, Michael David Mundt and Craig William Miller developed an air bearing slider which includes a raised bearing surface or surfaces contoured to limit off nodal pressurization.

According to a January 2006 patent document, Michael D. Mundt and Anthony P. Sannino developed a head slider with tilted protrusions for ramp load-unload applications.

According to an October 2005 patent document, Michael David Mundt and James Morgan Murphy developed a disc head slider that supports a transducer relative to a moving media in a data storage system.

According to an October 2005 patent document, Gary E. Bement, James M. Murphy, Michael D. Mundt, and Brian D. Denker developed a suspension assembly which can be energized to provide in-situs fly height adjustment for a head of a disc drive or energizable to adjust preload force for contact starts and stops.

Several additional patents were found for Michael Mundt, including: "Disc stabilization system" (issued in 2005; inventors: Gary Edwin Bement, Michael David Mundt, Paul Smith and Mark Andrew Chapin), "Data storage device operated for reduced sliding contact" (issued in 2004; inventors: Gary Edwin Bement, Mark Andrew Chapin and Michael David Mundt), and "Apparatus and method for passive adaptive flying height control in a disc drive" (issued in 2002; inventors: Gary Edwin Bement, Mark Andrew Chapin, Michael David Mundt, Jason Wayne Riddering; assignee: Seagate Technology).

Michael Mundt's 1993 thesis, Nonlinear Dynamics In a Two-Layer Model of Baroclinic Instability and The Effects of Varying Sidewall Boundary Conditions, can be viewed at http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA343187.

In 1990, Michael Mundt – along with W. Bruce Maguire II and Robert R. P. Chase – wrote an article for the *Journal of Geophysical Research* titled "Chaos in the Sunspot Cycle: Analysis and Prediction." In the article, "The variability of solar activity over long time scales, given semi-quantitatively by measurements of sunspot numbers, is examined as a nonlinear dynamical system."

See http://www.checkfundmanager.com/ir.html for an explanation of the type of information we are looking for.

Subject Biography

Michael's tasks primarily consist of model development, business/marketing, and coordinating RCM's overall business and trading strategy. Michael's background is in engineering and applied science. He received his Bachelor of Science degree in Aerospace Engineering from the

University of Colorado in 1989. He was awarded a Ph.D. in Aerospace Engineering in 1993, also from the University of Colorado; his thesis involved the exploration of chaos and turbulence in simple weather/climate models. After the completion of his academic studies, Michael transitioned into the technology industry. He was employed by Seagate Technology (a hard-disk-drive company) as an engineer specializing in computational fluid mechanics between March 1998 and July 2007. He currently holds nineteen U.S. patents in the area of disk-drive head/disk mechanics. Michael has been registered with the NFA as an Associated Person since 12/27/2004 and has been a listed Principal of RCM since 12/27/2004.

Details

Education & Credentials Verification

This section of the report indicates the education degree verification reported by the candidate or found in his biography. Typically the name, date of birth, and/or SSN is used for verification. When possible, other credentials may also be verified.

University of Colorado
Bachelor of Science - Aerospace Engineering
Awarded on May 12, 1989

Name On School's Records: MICHAEL DAVID MUNDT
Date Awarded: 05/12/1989
Degree Title: BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING
Official Name of School: UNIVERSITY OF COLORADO AT BOULDER
Major Course(s) of Study: AEROSPACE ENGINEERING SCIENCES
Dates of Attendance: 09/01/1985 to 04/01/1989

University of Colorado
Master of Science - Aerospace Engineering
Awarded on May 17, 1991

Name On School's Records: MICHAEL DAVID MUNDT
Date Awarded: 05/17/1991
Degree Title: MASTER OF SCIENCE
Official Name of School: UNIVERSITY OF COLORADO AT BOULDER
Major Course(s) of Study: AEROSPACE ENGINEERING SCIENCES
Dates of Attendance: 09/01/1989 to 05/01/1991

University of Colorado
Ph.D. – Applied Sciences Engineering
Awarded on August 14, 1993

Name On School's Records: MICHAEL DAVID MUNDT
Date Awarded: 08/14/1993
Degree Title: PHD
Official Name of School: UNIVERSITY OF COLORADO AT DENVER HEALTH SCIENCES
Major Course(s) of Study: APPLIED SCIENCES ENGINEERING
Dates of Attendance: 08/31/1988 to 08/14/1993

Personal Regulatory Registrations

Our investigator conducted an investigation of the federally regulated agencies known regulated by the Securities & Exchange Commission and the Financial Industry Regulatory Authority, as well as the National Futures Association to look for sanctions, fines or improprieties filed against the subject. We also conducted an investigation of the Stock Exchange Disciplinary Decisions

going back to 1972; NASD Arbitration back to 1981 & Disciplinary actions back to 1990. It also includes Commodity Futures Trading Commission decisions dating back to 1976. This data is not available to the public at large and is available to us through a special arrangement. Information found here might not be available through the standard inquiries to these agencies as the records may have been expunged or erased.

NFA:

MICHAEL DAVID MUNDT NFA ID: 0292483

Current Status

REVOLUTION CAPITAL MANAGEMENT LLC
• NFA ASSOCIATE MEMBER APPROVED
• ASSOCIATED PERSON REGISTERED
• PRINCIPAL APPROVED

Regulatory Actions

Agency	Number
NFA	0
CFTC	0
Exchanges	0

NFA Arbitration Awards

Role	Number
Claimant	0
Respondent	0

CFTC Reparations Cases

Total	0

Formerly Known As

No other names

Security Futures Proficiency Training

No proficiency information available

Doing Business As

No other names

History

Status	Effective Date
ANALYTIC INVESTMENTS LLC	
• ASSOCIATED PERSON WITHDRAWN	08/29/2003
• NFA ASSOCIATE MEMBER WITHDRAWN	08/29/2003
• PRINCIPAL WITHDRAWN	08/29/2003
• ASSOCIATED PERSON REGISTERED	04/13/1999
• NFA ASSOCIATE MEMBER APPROVED	04/13/1999
• PRINCIPAL APPROVED	04/13/1999
• ASSOCIATED PERSON PENDING	01/12/1999
• NFA ASSOCIATE MEMBER PENDING	01/12/1999
• PRINCIPAL PENDING	01/12/1999
REVOLUTION CAPITAL MANAGEMENT LLC	
• NFA ASSOCIATE MEMBER APPROVED	12/27/2004
• ASSOCIATED PERSON REGISTERED	12/27/2004

• PRINCIPAL APPROVED	12/27/2004
• NFA ASSOCIATE MEMBER PENDING	11/20/2004
• ASSOCIATED PERSON PENDING	11/20/2004
• PRINCIPAL PENDING	11/20/2004

FINRA:
No relevant records found for Mundt.

INVESTMENT ADVISOR FORM ADV SEARCH:
No relevant records found for Revolution.
No relevant records found for Mundt.

SEC Disciplinary Action & NASD Arbitration Archives:
No relevant records found for Michael /2 Mundt.
No records found for Mike /2 Mundt.

Corporate Records

Our researchers searched a nationwide database for any company that Mr. Mundt has been affiliated with, either as a director, or resident agent.

Manager Name Search

Source #1:
Two relevant records found for Michael w/2 Mundt.
No relevant records found for Mike w/2 Mundt.

Colorado Secretary of State

Corporate Filing	
Business Information	
Filing Number:	20041370340
Name:	REVOLUTION CAPITAL MANAGEMENT ALPHA FUND LP
Name Type:	LEGAL
standard business address:	520 ZANG ST STE 209 BROOMFIELD, CO 80021-8224
original business address:	520 ZANG STREET STE 209 BROOMFIELD CO 80021
Business Type:	FOREIGN LIMITED PARTNERSHIP
Status:	CONVERTED
Foreign State of Incorporation:	DELAWARE
Place Incorporated:	COLORADO

Corporate Filing	
Foreign Incorporation Date:	10/22/2004
Registered Agent	
Name:	MUNDT, MICHAEL D
registered agent address	815 VIREO CT LONGMONT, CO 80504-2691

Filing History

Filing Date	Filing Type	Number	Description	Misc.
04/02/2012			DELAYED EFFECTIVE DATE TRANSACTION ACTIVATED.;DELAYED EFFECTIVE TRANSACTION, 04/02/2012	
03/13/2012		Ref No.: 20121153413	STATEMENT OF CONVERSION CONVERTING A DOMESTIC ENTITY INTO A;CONVERTED FROM DOMESTIC LIMITED PARTNERSHIP TO FOREIGN LIMITED PARTNERSHIP.	
10/23/2004			DELAYED EFFECTIVE DATE TRANSACTION ACTIVATED.;DELAYED EFFECTIVE TRANSACTION, 10/23/2004	
10/21/2004		Ref No.: 20041370340	FORM A LIMITED PARTNERSHIP	

Colorado Secretary of State

Corporate Filing

Corporate Filing	
Business Information	
Filing Number:	20041078933
Name:	REVOLUTION CAPITAL MANAGEMENT LLC
Name Type:	LEGAL
standard business address:	520 ZANG ST STE 209 BROOMFIELD, CO 80021-8224
original business address:	520 ZANG ST STE 209 BROOMFIELD CO 80021
Business Type:	DOMESTIC LIMITED LIABILITY COMPANY
Status:	GOOD STANDING
Place Incorporated:	COLORADO
Date Incorporated:	03/03/2004
Terms:	PERPETUAL
Registered Agent	
Name:	MUNDT, MICHAEL
registered agent address	520 ZANG ST STE 209 BROOMFIELD, CO 80021-8224
Annual Report Filings	
Filing 1	
Filing Year:	2007
Filed Date:	04/22/2007
Filing Number:	20071194318
Filing 2	
Filing Year:	2006
Filed Date:	03/16/2006
Filing Number:	20061115382
Filing 3	
Filing Year:	2005
Filed Date:	05/01/2005
Filing Number:	20051176328
Filing 4	
Filed Date:	02/23/2012
Comments:	PERIODIC REPORT DUE; PERIODIC REPORT DUE BY: 05/31/2012

Annual Report Filings	
Filing 5	
Filed Date:	02/23/2012
Comments:	PERIODIC REPORT DUE; PERIODIC REPORT DUE BY: 05/31/2012
Filing 6	
Filed Date:	02/23/2011
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2011 TO BE MAILED 03/01/2011; PERIODIC REPORT DUE: 05/31/2011
Filing 7	
Filed Date:	02/23/2011
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2011 TO BE MAILED 03/01/2011; PERIODIC REPORT DUE: 05/31/2011
Filing 8	
Filed Date:	05/31/2010
Filing Number:	20101310204
Comments:	FILE ANNUAL REPORT; CHANGE OF REGISTERED AGENT ADDRESS
Filing 9	
Filed Date:	02/23/2010
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2010 TO BE MAILED 03/01/2010; ANNUAL REPORT DUE: 05/31/2010
Filing 10	
Filed Date:	02/23/2010
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2010 TO BE MAILED 03/01/2010; ANNUAL REPORT DUE: 05/31/2010
Filing 11	
Filed Date:	04/27/2009
Filing Number:	20091234458
Comments:	FILE ANNUAL REPORT; CHANGE OF REGISTERED AGENT ADDRESS
Filing 12	
Filed Date:	02/23/2009
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2009 TO BE MAILED 03/01/2009; ANNUAL REPORT DUE: 05/31/2009
Filing 13	
Filed Date:	02/23/2009

Annual Report Filings	
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2009 TO BE MAILED 03/01/2009; ANNUAL REPORT DUE: 05/31/2009
Filing 14	
Filed Date:	04/22/2008
Filing Number:	20081222267
Comments:	FILE ANNUAL REPORT; CHANGE OF ENTITY ADDRESS
Filing 15	
Filed Date:	02/23/2008
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2008 TO BE MAILED 03/01/2008; ANNUAL REPORT DUE: 05/31/2008
Filing 16	
Filed Date:	02/23/2008
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2008 TO BE MAILED 03/01/2008; ANNUAL REPORT DUE: 05/31/2008
Filing 17	
Filed Date:	04/22/2007
Filing Number:	20071194318
Comments:	FILE ANNUAL REPORT
Filing 18	
Filed Date:	02/23/2007
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2007 TO BE MAILED 03/01/2007; ANNUAL REPORT DUE: 05/31/2007
Filing 19	
Filed Date:	02/23/2007
Comments:	POSTCARD NOTIFICATION PRINTED 02/23/2007 TO BE MAILED 03/01/2007; ANNUAL REPORT DUE: 05/31/2007
Filing 20	
Filed Date:	03/16/2006
Filing Number:	20061115382
Comments:	FILE ANNUAL REPORT
Filing 21	
Filed Date:	02/21/2006
Comments:	POSTCARD NOTIFICATION PRINTED 02/21/2006 TO BE MAILED 03/01/2006; ANNUAL REPORT DUE: 05/31/2006

Annual Report Filings

Filing 22	
Filed Date:	02/21/2006
Comments:	POSTCARD NOTIFICATION PRINTED 02/21/2006 TO BE MAILED 03/01/2006; ANNUAL REPORT DUE: 05/31/2006
Filing 23	
Filed Date:	05/01/2005
Filing Number:	20051176328
Comments:	FILE ANNUAL REPORT
Filing 24	
Filed Date:	02/20/2005
Comments:	POSTCARD NOTIFICATION PRINTED 02/20/2005 TO BE MAILED 03/01/2005; ANNUAL REPORT DUE: 05/31/2005
Filing 25	
Filed Date:	02/20/2005
Comments:	POSTCARD NOTIFICATION PRINTED 02/20/2005 TO BE MAILED 03/01/2005; ANNUAL REPORT DUE: 05/31/2005

Filing History

Filing Date	Filing Type	Number	Description	Misc.
02/23/2012		Ref No.: 20121112533	FILE REPORT	
04/26/2011		Ref No.: 20111249441	FILE REPORT	
05/31/2010		Ref No.: 20101310204	FILE REPORT;CHANGE OF REGISTERED AGENT ADDRESS	
10/30/2009		Ref No.: 20091575392	STATEMENT OF CHANGE CHANGING THE PRINCIPAL OFFICE ADDRESS;PRINCIPAL ADDRESS CHANGED;	
04/27/2009		Ref No.: 20091234458	FILE REPORT;CHANGE OF REGISTERED AGENT ADDRESS	
04/22/2008		Ref No.: 20081222267	FILE REPORT;CHANGE OF ENTITY ADDRESS	
04/22/2007		Ref No.: 20071194318	FILE REPORT	
02/23/2007			POSTCARD NOTIFICATION PRINTED 02/23/2007 TO BE MAILED 03/01/;ANNUAL	

Filing History				
			REPORT DUE: 05/31/2007	
03/16/2006		Ref No.: 20061115382	FILE REPORT	
02/21/2006			POSTCARD NOTIFICATION PRINTED 02/21/2006 TO BE MAILED 03/01/;ANNUAL REPORT DUE: 05/31/2006	
05/01/2005		Ref No.: 20051176328	FILE REPORT	
02/20/2005			POSTCARD NOTIFICATION PRINTED 02/20/2005 TO BE MAILED 03/01/;ANNUAL REPORT DUE: 05/31/2005	
03/03/2004		Ref No.: 20041078933	ARTICLES OF INCORPORATION;REVOLUTION CAPITAL MANAGEMENT LLC	

Source #2:

Possible Employers

- Business Name: **REVOLUTION CAPITAL MANAGEMENT (05/11/2000 to 03/05/2012)**
- Phone: **(303) 774-1829 (MT) REVOLUTION CAPITAL MANAGEMENT**
- Address: **815 VIREO CT, LONGMONT, CO 80504 (Weld COUNTY)**

US Business Affiliations

- Business Details
- **REVOLUTION CAPITAL MANAGEMENT (Primary)**
- **REVOLUTION CAPITAL MANAGEMENT ALPHA FUND LP (Primary)**
- **REVOLUTION CAPITAL MANAGEMENT LLC (Primary)**
- Link Number: 834694860

- 520 ZANG ST STE 209, BROOMFIELD, CO 80021-8224 (Broomfield COUNTY) (2004 to 03/05/2012)

  Current Other Phone at address

  - **(303) 774-1829 (MT)**
- 815 VIREO CT, LONGMONT, CO 80504-2691 (Weld COUNTY) (2004 to 03/05/2012)

  Current Other Phone at address

- **(303) 774-1829 (MT)**

US Corporate Affiliations

- Incorporation State: **DE**
- **REVOLUTION CAPITAL MANAGEMENT ALPHA FUND LP (Primary)**
- Address: **520 ZANG ST STE 209, BROOMFIELD, CO 80021-8224 (JEFFERSON COUNTY)**
- Corp Id: **0013546655709**
- Filing Number: **20041370340**
- Link Number: 834694860
- Filing Office Link Number: 782384980
- Corporation Type: **Corporation**
- Address Type: **Business**
- Registration Type: **Foreign Limited Partnership**
- Verification Date: **04/02/2012**
- Filing Date: **10/22/2004**
- Date First Seen: **02/20/2005**
- Date Last Seen: **04/05/2012**
- Received Date: **04/04/2012**
- Minimum Requirement Met Flag: **N**
- Perpetual Indicator: **N**
- Filing Office Name: **DEPT OF STATE/DIVISION OF COMMERCIAL RECORDINGS**
- Filing Office Address: **1560 BROADWAY, DENVER, CO 80202-5125 (DENVER COUNTY)**
- File Date: **04/06/2012**
- Sec Status: **Converted**

- **Corporate Officers and Directors**
- **MICHAEL D MUNDT**, Title: **Registered Agent**
- 815 VIREO CT, LONGMONT, CO 80504-2691 (Weld COUNTY)

- **Corporate Amendments**
- Filing Date: **04/02/2012**
- Reason: **Miscellaneous**
- Description: **DELAYED EFFECTIVE DATE TRANSACTION ACTIVATED.;DELAYED EFFECTIVE TRANSACTION, 04/02/2012**
-
- Filing Date: **04/01/2012**
- Reason: **Miscellaneous**
- Description: **STATEMENT OF CONVERSION CONVERTING A DOMESTIC ENTITY INTO A FOREIGN ENTITY (CONVERTING ENTITY ON REC**
-
- Filing Date: **10/23/2004**
- Reason: **Miscellaneous**
- Description: **DELAYED EFFECTIVE DATE TRANSACTION ACTIVATED.;DELAYED EFFECTIVE TRANSACTION, 10/23/2004**
-
- Filing Date: **10/22/2004**
- Reason: **Miscellaneous**
- Description: **FORM A LIMITED PARTNERSHIP**

-
- Incorporation State: **CO**
- **REVOLUTION CAPITAL MANAGEMENT LLC (Primary)**
- Address: **520 ZANG ST STE 209, BROOMFIELD, CO 80021-8224 (JEFFERSON COUNTY)**
- Corp Id: **0013240220857**
- Filing Number: **20041078933**
- Link Number: 834694860
- Filing Office Link Number: 782384980
- Corporation Type: **Corporation**
- Address Type: **Business**
- Registration Type: **Limited Liability Company**
- Verification Date: **02/24/2012**
- Filing Date: **03/03/2004**
- Date First Seen: **03/25/2004**
- Date Last Seen: **03/05/2012**
- Received Date: **02/28/2012**
- Minimum Requirement Met Flag: **N**
- Perpetual Indicator: **Y**
- Filing Office Name: **DEPT OF STATE/DIVISION OF COMMERCIAL RECORDINGS**
- Filing Office Address: **1560 BROADWAY, DENVER, CO 80202-5125 (DENVER COUNTY)**
- File Date: **03/06/2012**
- Sec Status: **Good Standing**

- **Corporate Officers and Directors**
- **MICHAEL MUNDT**, Title: **Registered Agent**
- 520 ZANG ST STE 209, BROOMFIELD, CO 80021-8224 (Broomfield COUNTY)

- **Corporate Amendments**
- Filing Date: **02/23/2012**
- Reason: **Miscellaneous**
- Description: **FILE REPORT**
-
- Filing Date: **04/26/2011**
- Reason: **Miscellaneous**
- Description: **FILE REPORT**
-
- Filing Date: **02/23/2011**
- Reason: **Miscellaneous**
- Description: **POSTCARD NOTIFICATION PRINTED 02/23/2011 TO BE MAILED 03/01/2011;PERIODIC REPORT DUE: 05/31/2011**
-
- Filing Date: **05/31/2010**
- Reason: **Miscellaneous**
- Description: **FILE REPORT;CHANGE OF REGISTERED AGENT ADDRESS**
-
- Filing Date: **02/23/2010**

- Reason: **Miscellaneous**
- Description: **POSTCARD NOTIFICATION PRINTED 02/23/2010 TO BE MAILED 03/01/2010;ANNUAL REPORT DUE: 05/31/2010**
-
- Filing Date: **10/30/2009**
- Reason: **Miscellaneous**
- Description: **STATEMENT OF CHANGE CHANGING THE PRINCIPAL OFFICE ADDRESS;PRINCIPAL ADDRESS CHANGED;**
-
- Filing Date: **04/27/2009**
- Reason: **Miscellaneous**
- Description: **FILE REPORT;CHANGE OF REGISTERED AGENT ADDRESS**
-
- Filing Date: **02/23/2009**
- Reason: **Miscellaneous**
- Description: **POSTCARD NOTIFICATION PRINTED 02/23/2009 TO BE MAILED 03/01/2009;ANNUAL REPORT DUE: 05/31/2009**
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- Filing Date: **04/22/2008**
- Reason: **Miscellaneous**
- Description: **FILE REPORT;CHANGE OF ENTITY ADDRESS**
-
- Filing Date: **02/23/2008**
- Reason: **Miscellaneous**
- Description: **POSTCARD NOTIFICATION PRINTED 02/23/2008 TO BE MAILED 03/01/2008;ANNUAL REPORT DUE: 05/31/2008**
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- Filing Date: **04/22/2007**
- Reason: **Miscellaneous**
- Description: **FILE REPORT**
-
- Filing Date: **02/23/2007**
- Reason: **Miscellaneous**
- Description: **POSTCARD NOTIFICATION PRINTED 02/23/2007 TO BE MAILED 03/01/2007;ANNUAL REPORT DUE: 05/31/2007**
-
- Filing Date: **03/16/2006**
- Reason: **Miscellaneous**
- Description: **FILE REPORT**
-
- Filing Date: **02/21/2006**
- Reason: **Miscellaneous**
- Description: **POSTCARD NOTIFICATION PRINTED 02/21/2006 TO BE MAILED 03/01/2006;ANNUAL REPORT DUE: 05/31/2006**
-
- Filing Date: **05/01/2005**
- Reason: **Miscellaneous**
- Description: **FILE REPORT**

-
- Filing Date: **02/20/2005**
- Reason: **Miscellaneous**
- Description: **POSTCARD NOTIFICATION PRINTED 02/20/2005 TO BE MAILED 03/01/2005;ANNUAL REPORT DUE: 05/31/2005**
-
- Filing Date: **03/03/2004**
- Reason: **Miscellaneous**
- Description: **ARTICLES OF INCORPORATION;REVOLUTION CAPITAL MANAGEMENT LLC**

Media Searches

This section of the report contains references to the person being investigated in news services and business publications. Publications specific to the alternative investment community to which we subscribe are researched, as are Dow Jones news sources, including the Wall Street Journal, business wires, and a variety of newspapers, magazines, journals, newsletters, government press releases, and transcripts of television and radio shows and congressional testimony. Insider trading documents are examined. Internet pages using name matches on search engines are thoroughly examined. SEC Edgar filings research including schedules D's E's and G's may be examined. To avoid redundancy, we may select representative articles for inclusion. The Internet research performed will also be edited with the reader in mind, and will also include active links to the pages found. See http://www.checkfundmanager.com/ir.html for an explanation of the type of information we are looking for.

From Investment Publications

Publications specific to the alternative investment community to which we subscribe are researched.

There were 0 matches for your search: Mundt.

Internet Search

Internet pages using name matches on search engines are thoroughly examined. See http://www.checkfundmanager.com/ir.html for an explanation of the type of information we are looking for.

"Michael David Mundt" ➔
"Michael D Mundt" ➔
"Michael Mundt" & Revolution ➔
"Michael Mundt" & "Analytic Investments" ➔

"Mike David Mundt" ➔
"Mike D Mundt" ➔
"Mike Mundt" & Revolution ➔
"Mike Mundt" & "Analytic Investments" ➔

http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA343187

NONLINEAR DYNAMICS IN A TWO-LAYER MODEL OF BAROCLINIC INSTABILITY

AND THE EFFECTS OF VARYING SIDEWALL BOUNDARY CONDITIONS, by MICHAEL DAVID MUNDT.

A thesis submitted to the Faculty of the Graduate School of the University of Colorado in partial fulfillment of the requirements for the degree of Doctor of Philosophy Department of Aerospace Engineering 1993

http://www.google.com/patents/US20020063983

Application number: 09/919,236
Publication number: US 2002/0063983 A1
Filing date: Jul 31, 2001
Issued patent: US6714377 (Issue date Mar 30, 2004)

Data storage device operated for reduced sliding contact

A data storage device includes a disc stack, a rotary actuator having an arm coupled to a transducer head, and support structure for receiving the arm with a reduced incidence of sliding contact therewith. The arm is separated from the support means, and then moved so that the head is above a disc surface for storing data. After the disc stack reaches its nominal rotation speed, the head is loaded so that it can transfer data. During periods of non-activity, the head is raised (unloaded) again and the arm is placed on the support means. This reduces a risk of damage in the presence of shocks while minimizing particle generation induced by friction.

Inventors: Gary Edwin Bement, Mark Andrew Chapin, Michael David Mundt
Current U.S. Classification: 360/31; 360/53; 360/75; G9B/5.187
International Classification: G11B027/36; G11B021/02; G11B005/09

http://www.google.com/patents/US6961209

Disc stabilization system

Patent number: 6961209
Filing date: Aug 21, 2003
Issue date: Nov 1, 2005
Application number: 10/647,190

A disc stabilization system comprises a spinning disc with a disc surface deflectable by shock. The disc surface is in contact with a gas layer adjacent the disc surface. When the suspension system is subjected to a mechanical shock, the disc can deflect. The amplitude and duration of the deflection due to mechanical shock is limited by a wing feature. The wing feature includes an aerodynamic surface that interacts with the gas layer to generate an aerodynamic force on the disc surface. A strut supports the wing feature over the disc surface in a position such that the aerodynamic force increases as the disc surface deflects toward the aerodynamic surface.

Inventors: Gary Edwin Bement, Michael David Mundt, Paul Smith, Mark Andrew Chapin
Original Assignee: Seagate Technology LLC
Primary Examiner: Jefferson Evans
Attorney: Westman, Champlin & Kelly
Current U.S. Classification: 360/97.15; G9B/5.23; G9B/33.024; G9B/33.047
International Classification: G11B033/14; G11B005/60

http://www.agu.org/pubs/crossref/1991/90JA02150.shtml

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Chaos in the Sunspot Cycle: Analysis and Prediction

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The variability of solar activity over long time scales, given semiquantitatively by measurements of sunspot numbers, is examined as a nonlinear dynamical system. First, a discussion of the data set used and the techniques utilized to reduce the noise and capture the long-term dynamics inherent in the data is presented. Subsequently, an attractor is reconstructed from the data set using the method of time delays. The reconstructed attractor is then used to determine both the dimension of the underlying system and also the largest Lyapunov exponent, which together indicate that the sunspot cycle is indeed chaotic and also low dimensional. In addition, recent techniques of exploiting chaotic dynamics to provide accurate, short-term predictions are utilized in order to improve upon current forecasting methods and also to place theoretical limits on predictability extent. Finally, we compare the results to chaotic solar-dynamo models as a possible physically motivated source of this chaotic behavior.

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http://www.hfmweek.com/news/264727/revolution-offers-lowvolatility-mosaic-option.thtml

04/11/2009 Author: Elana Margulies

Revolution offers low-volatility Mosaic option
Revolution Capital Management, a $660m Denver-based managed futures manager, has launched a lower volatility version of its Mosaic programme.

Michael Mundt, managing partner, said the new offering, Mosaic Institutional programme, was launched due to investor demand.

“Most of the institutions were de-levering and from a due diligence point of view, it made more sense to offer the lower volatility programme to them,” he said. “It seems to fit better with the institutions’ needs.”

The programme, a systematic short-term trading strategy, has a portfolio that is diversified across all futures markets. It debuted with approximately $500m and has a capacity of several billion dollars.

Mundt, previously a principal at Analytic Investments, co-manages the programme with Mark

Chapin and Robert Olson.

Since Revolution has a strategic partnership with Dunn Capital Management, a Florida-based managed futures trading advisor, Dunn will manage the operational aspects of the Mosaic programme.

The Mosaic Institutional programme returned 0.75% last month, in its first month of trading.

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Mike w/2 Mundt ➔ No relevant records found.
Michael w/1 David w/1 Mundt ➔ Two records found.
Michael w/1 D w/1 Mundt ➔ Two relevant records found.
Michael w/1 Mundt ➔ Few relevant records found.

Futures (Cedar Falls, Iowa)

December 1, 2011

The DNA of a diversified portfolio: building a diversified managed futures portfolio takes more than cobbling together a bunch of non-correlated strategies;
MANAGED MONEY

BYLINE: **Mundt, Michael**

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DNA is life; it contains the blueprint for the creation of virtually all known living organisms. Genes are segments of DNA that act as fundamental building blocks, and hence maintaining the integrity of such genetic instruction sets is paramount to the health of an organism (or "fitness"). In much the same way that inbreeding can reduce genetic robustness and, thereby, increase susceptibility to illness and disease, an insufficiently diversified portfolio may be subject to anincreased likelihood of uncharacteristically poor performance under a particular set of market conditions. Market environments that are stressful for one type of trading program, however, may be beneficial to another. It is exactly this type of divergent behavior that we wish to identify systematically and combine in order to construct a robust, resilient portfolio that bends but does not break.

Alpha vs. beta Optimization trade-offs

Too often, portfolios are constructed with a single goal in mind: To maximize Sharpe ratio. Even when the portfolio engineer considers multiple objectives, many of those goals can be mutually exclusive, and improper attention to such constraints may compromise the fitness of the portfolio. Here we first discuss the variety of objectives that often are mandated for a portfolio of trading programs. We then consider how to prioritize objectives and understand the necessary tradeoffs. Finally, we compare and contrast our portfolio construction process

with more traditional techniques. We argue that novel, non-classical approaches are needed to systematically generate a high-fitness portfolio.

Defining objectives

Before starting, we must define an end goal. Commonly, the initial, singular objective is to maximize performance. This answer is legitimate but raises additional questions.

The first question involves consistency of performance. Certain strategies such as trend-following have desirable risk properties but are intermittent in their returns, while strategies such as option selling may tend to produce consistent returns over most periods but occasionally experience large, sudden drawdowns. Optimizing for performance typically implies that you are optimizing for the average performance over the sample period, but this metric doesn't account for the year-to-year variability around the average. The importance of consistency depends largely on the time horizons of both the portfolio designer and the investors. Shorter time horizons demand greater consistency of returns.

Another question is that of style, or desired correlation to a benchmark. Alternatively, you may wish to minimize correlation specifically to a particular benchmark. Many portfolio designers seek to replicate the style of trend-followers, yet also improve on the risk-adjusted performance, i.e., they seek "alpha" as well as "beta" (see "Manager lingo," right). Other portfolios have become popular. For example, an index comprising short-term traders has been developed to reflect a uncorrelated return stream to standard trend-following benchmarks.

Additional and often overlooked objectives include optimizing for various return statistics, including skewness, kurtosis and drawdown measures. Such objectives can be difficult to incorporate into the optimization process accurately. For instance, even though many believethat drawdowns can be bounded a priori and that risk-management methodologies can be separated from the trading program itself, two primary determinants of drawdown magnitude are program style and time. Longer-lived programs generally will have experienced larger peak-to-valley drawdowns, reinforcing the adage: "Your worst drawdown is always ahead of you." Hence, optimizing for maximum drawdown is an exercise in futility.

Additionally, trend-following programs tend to have shallower drawdowns than other investment styles given equal Sharpe ratios. Generally speaking, return skewness, kurtosis and other statistical properties are linked inextricably to the program style and, therefore, cannot be optimized independently.

Trade-offs

Portfolio construction is largely an exercise in compromise. Further complicating matters is that critical decisions often need to be made based on limited data. Before the 2008 financial crisis, for example, equity-based hedge fund strategies often touted themselves as having low correlation to long-only equity indices. In the low-volatility markets of the mid-2000s, this often was true. But what wasn't realized at the time is that this was based on a placid global environment. When market conditions became turbulent, a different relationshipwas exposed: These strategies were all predicated on being short volatility, meaning that any panic would be short-lived in time and bounded in magnitude.

In a short volatility world, mean reversion would restore order soon and, thereby (in a self-fulfilling feedback loop), reward the strategies whose profitability depended on its existence.

In 2008, however, disorder became the rule. As a result, long volatility strategies, such as trend-following, were the only programs toprofit systematically because they were the only strategies that were able to short the global economy (see "Diversify with crisis alpha," February 2011).

The designer truly needs to understand the component strategies inthe portfolio. But most track records are too short to have experienced the gamut of possible macro-economic conditions. Hence, the portfolio engineer must have sufficient knowledge of the portfolio's constituent strategies. Once armed with this knowledge, the engineer can make the necessary trade-offs and maximize portfolio fitness.

However, not all trade-offs are created equally. Idiosyncratic risk is a rare example of an objective with a fairly painless tradeoff. We define idiosyncratic risk as the potential for performance dispersion by a single program or small set of programs. For instance, within trend-following, most trend-followers' monthly returns are correlated. There are times, though, where certain trend-followers do significantly better or worse than average. The root causes are often slightdifferences in time scales, sector allocations and the trade entry/exit directives. Also, many trend-followers have introduced modifications to their systems. As a result, CTAs have added features to their systems (sometimes unknowingly) that are actually counter-trend in nature or at least are non-correlated with the space. By understanding the finer details of the systems under consideration, a portfolio engineer can diversify away this idiosyncratic risk and arrive at a truer representation of the dynamics the portfolio is designed to exploit. The only downside is the cost to implement a sufficiently wide gamut of managers within the same basic style.

But sometimes the trade-off is intractable; mutually exclusive goals are, oftentimes, unknowingly chosen as distinct primary objectivesby the portfolio engineers. "Hitting a triple" (page 52) shows threecommon objectives: Trend-following de-correlation, risk-adjusted performance and a positive skew of returns. In high-tech product engineering, there are three factors that are highly desirable: Low cost, high reliability and a speedy development time. The historical rule is that one can choose any two of these but never all three simultaneously.

For the portfolio engineer, the three-factor trade-off acts in an analogous manner. Numerous CTAs have proven empirically that solid risk-adjusted performance and good drawdown properties can be achieved with trend-following. In addition, a number of CTAs have achieved lowcorrelations to trend-following along with good risk-adjusted, long-term performance. However, rigorous analysis reveals that such systems periodically experience larger drawdowns than trend-followers, owing to the system architecture needed to remove the trend-following correlation. Finally, systems can be constructed that offer both low correlations to trend-following and also positive return skew. But thesesystems tend to have very poor (even negative) risk-adjusted performance over long time scales.

Statistical analyses show that markets, on average, exhibit "trendy" behavior over 50-day (and greater) time scales. In other words, prices move more than that predicted by a random walk, even after allowing for the non-Gaussian distribution of daily returns. This explainswhy trend-following is profitable, but not why markets trend.

[ILLUSTRATION OMITTED]

Programs exploiting such trends effectively are rowing downstream.By increasing portfolio risk after profits accrue (i.e., cut your losses and let your profits grow), positive return skew and reduced drawdown magnitudes follow as natural consequences. Conversely, constructing a program that is de-correlated to trend-following requires one to selectively take positions that oppose the prevailing long-term price movement. The inherent risk properties of such systems are less optimal; specifically, they tend to lack positive skew of returns and have higher kurtosis on multi-day time scales.

Optimize robustly

Over half a century ago, Harry Markowitz pioneered a cornerstone of modern portfolio theory. Markowitz, who in 1990 won a Nobel Prize for his efforts, developed the concept of

the "efficient frontier." The efficient frontier provides a way to determine the mix of a set of investment choices such that the mean return is maximized for a givenvariance. It maximizes the returns of two or more programs by assigning optimal weights.

Markowitz's mean-variance optimization is both a useful tool and also one that is overused unwittingly by many portfolio engineers. A natural, intuitive and practical approach is to choose a core program or set of programs that offers a strong historical record, then add peripheral programs in smaller percentages to complement the core. To measure the "goodness" of the overall mix, the risk-adjusted performance, or Sharpe ratio, often is used, and by maximizing this metric you immediately arrive at the efficient frontier.

In practice, this methodology is a useful starting point but may be sub-optimal when used in isolation. Considering the objectives pondered earlier, it may be critical to consider the depth and/or length of eventual drawdowns. It also may be important to minimize the correlation to trend-following strategies. In such situations, multiple objectives now must be satisfied simultaneously; the best com promise likely implies a portfolio mix that does not lie on the efficient frontier.

Still other potential pitfalls lurk. We have observed real portfolio optimizations fall prey to what we term inbreeding. For example, perhaps the designer decides he would like to build a robust portfoliothat simultaneously maximizes Sharpe ratio, minimizes drawdowns and has a positive skew of returns. Thus, optimization software is built that measures all three variables as it churns through various combinations of the candidate programs. In the end, based on numerical computations, an optimal set of program weights is found, and this portfolio subsequently is deployed. Invariably the day arrives where all the portfolio constituents simultaneously perform poorly and render theprogram with a larger drawdown than would be expected based on backtesting.

So what happened? Essentially, the optimizer inadvertently was asked to find a set of correlated programs. As discussed in the previoussection, trend-following strategies tend to satisfy all three of thestated metrics. By asking for a portfolio that satisfies these constraints, you essentially are forcing the optimizer to heavily weight programs that are substantially similar. Inbreeding occurs and the portfolio is now at risk because of its lack of fitness.

The combination of multi-objective optimization, the need to understand the candidate strategies and the requirement to understand the possible connections between various objectives renders fitness-basedoptimization difficult. There is no easy method to make this task a purely algorithmic exercise. However, we can provide a set of useful guidelines to assist with the process:

* Define the objectives: The portfolio engineer needs to articulate the portfolio requirements and differentiate want from need. Based on the objectives, determine the trade-offs that likely will be required. Be realistic about drawdowns and performance, and use statistical analyses to underpin expectations. Endeavor to understand which types of strategies are consistent with the portfolio objectives. Chooseportfolio constituents accordingly.

* Attempt to minimize idiosyncratic risk: Be aware that trying to choose the best program of any one style may be impossible. The idiosyncrasy that worked well one year may be detrimental the next.

* Be aware of the "inbreeding" potential from correlated metrics: Develop multiple methods to generate optimal portfolio weights. Because of the complex nature of the problem, there likely are no methods by which to get a true optimal solution; every solution only will be approximately optimal. Therefore, as long as the objective remains the same, you should be able to generate similar results with a varietyof methods.

Conclusion

Navigating beyond the efficient frontier is a challenging proposition because fitness-based optimization simply cannot be reduced solely to numerical computations. Rather, the heavy lifting must first be done in the mind of the portfolio engineer. The necessary pre-requisites are an understanding of each candidate program; a knowledge of how each candidate program has responded or is expected to respond to various stressors that the portfolio engineer deems important; and a concrete metric or set of metrics for which the portfolio should be optimized. However, once armed with a solid goal and a sufficiently diverse set of candidates, the process can proceed in a fairly systematic manner. And the potential payoff in terms of portfolio consistency and stability may well be worth the voyage.

Michael Mundt is a principal with Revolution Capital Management. He has built successful long-term and short-term trading strategies.

MANAGER LINGO

Many terms roll off of investment managers' tongues and we don't always question them. Here are working definitions of common terms.

ALPHA: In it most basic form, alpha is return above the risk-free rate. In portfolio construction "beta" represents your benchmark and alpha is return above that benchmark.

BETA: Refers to the expected return of a particular benchmark. If a manager is tied to the performance of the S&P 500, he is expected to match that return. While beta is a simple concept when talking about fixed income investments and basic long-only equity strategies, many analysts now are attempting to measure beta for active strategies.

SKEWNESS: A statistic that is used in analyzing the distribution of a set of data. Skewness measures the asymmetry of those returns. A normally distributed dataset would have a skewness of zero. Returns, however, do not usually show a normal distribution. For example, reversion to mean-type strategies that produce consistent returns but areliable to rare yet dangerous drawdowns display negative skewness.

KURTOSIS: Kurtosis measures whether the data in a bell curve is sharp or flat relative to a normal distribution. A kurtosis coefficientof three indicates a normal distribution. Kurtosis of less than three indicates a low peak with a fat midrange and is called platykurtic;greater than three indicates a sharp/high peak with a thin midrange and fat tails, and is called leptokurtic.

Futures (Cedar Falls, Iowa)

September 1, 2011

The short-term dilemma: short-term trading programs are in great demand but add additional hurdles for the designer. Building a successful short-term strategy takes more than simply applying trend-following strategies to a shorter time frame;
MANAGED MONEY

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Short-term trading has no ironclad definition, though there are some fairly clear differentiating properties between short-term tradersand their more common, long-term counterparts. Typically, short-termtrading is defined by strategies that hold positions for 10 days or less. More recently, some short-term trading systems have begun to consist partially or entirely of intra-day strategies.

We want to point out that short-term trading has not, historically, included the so-called high-frequency strategies that recently havegained attention (most notably in the context of the May 2010 "flashcrash"). High-frequency strategies, in our view, are those employed by electronic market-makers, and consist primarily of quasi-arbitragestrategies that allow someone to profit off the bid/ask spread. Moreover, while there well may be significant strategy development underlying such strategies, an additional and necessary condition for theirsuccess is speed of execution--so much so, in fact, that it appears to be more of a technological arms race than a search for new and profitable trading patterns. Hence, for this discussion we will exclude high-frequency trading and focus on strategies that do not depend primarily on ultra-low-latency execution to be profitable.

The case for short-term traders

The goal of short-term systems is simple: Provide diversification.Specifically, short-term traders try to provide diversification to the dominant managed futures strategy of trend-following.

The following thought experiment makes clear the potential benefitof such diversification. Imagine a bucket of systems, each with equal risk-adjusted performance. For simplicity, as the measure of risk-adjusted performance, we can use the annualized Sharpe ratio ([S.sub.Y]) as the corresponding metric ([S.sub.Y] = [[mu].sub.M]/[[sigma].sub.M] x [square root of 12]) and ignore the effect of higher-order statistics such as skewness, kurtosis, etc. The annualized Sharpe ratio of each of the systems will be denoted simply as S. Further, assume that each of these systems has a correlation of C to each system in thebucket. In other words, for any two systems that we might pick out of the bucket, we find that their mutual correlation is C.

This would at first appear to be an oversimplification. But some numerical experimentation can show that the following conclusions still are valid for real-world portfolio construction as long as the chosen value of C equals the average value that would be obtained by picking many such pairs from the bucket, thus relaxing the condition thateach value need be equal to C. What we find is that, if we are allowed to populate the bucket with as many systems as we want, with the goal of maximizing the risk-adjusted performance (i.e., Sharpe ratio) of our ensemble, our diversification factor will asymptote as 1/[square root of C]. Mathematically:

[PHI] [right arrow] 1/[square root of C] as N [right arrow] [infinity]

where [PHI] is our diversification factor and N is the number of systems chosen from the bucket. In terms of our overall portfolio, itsSharpe ratio Sp is given as:

[S.sub.p] = [PHI] x S

A quick check using our minimum and maximum values of C shows thatthese equations make sense. (Note that the equation holds only for 0[less than or equal to] C [less than or equal to] 1; if C is negative, then in theory we can generate an infinite Sharpe ratio with a finite number of systems.) If C = 0, then all strategies are uncorrelated to all others, and our diversification ratio [PHI] approaches infinity as we add more and more strategies. In this case, our portfolio Sharpe ratio Sp continues to increase without bound. If this generallywere the case, it would make the lives of allocators and fund-of-funds managers much easier.

The other extreme, and one closer to reality, is when all strategies are completely correlated and C = 1. In this case, no matter how many strategies we add, the pure overlap between them gives us an asymptotic diversification factor of [PHI] = 1, which is to say we haven't added any additional risk-adjusted performance to the portfolio by adding more strategies.

More realistically, what we see with a typical basket of long-termstrategies is that the average cross-correlation between strategies is between 0.7 and 0.8. This suggests that we can achieve diversification

factors between 1.12 and 1.20. In other words, if each system can achieve a Sharpe ratio of 0.75, then by adding a bunch of these systems, we can achieve a Sharpe ratio between 0.84 and 0.90. This is certainly a net benefit, but the somewhat-sobering conclusion is that it is a mathematical certainty that we can't improve on this unless wecan pick a basket of programs with better baseline Sharpe ratios. Otherwise, at some point more is not better. Diversification may be theonly proverbial free lunch, but even in this case it's not an all-you-can-eat buffet.

Now consider a different situation. Assume that we have two buckets of systems from which to choose. The systems in bucket A have mutual correlations of 0.8 to each other but mutual correlations of 0 to all the systems in bucket B. Similarly, the systems in bucket B have mutual correlations of 0.8 to each other but mutual correlations of 0 to the bucket A strategies. What we are describing now is an idealized case in which one can choose half of the portfolio from long-term strategies and the other half from short-term strategies that are assumed to be decorrelated from trend-following.

In this case, we effectively can consider our portfolio to be constructed using C=0.4, which is the average mutual correlation value. Returning to our equation, we find that we can achieve a diversification factor of f=1.58 if C=0.4. The implications of this are profound. Again assuming that each program independently can produce a Sharpe ratio of 0.75, we now find that our portfolio will produce an overall Sharpe ratio of 1.19, a substantial improvement from the previous range of 0.84 to 0.90. "Building a diverse team," (above) summarizes theeffect of different diversification factors on the final portfolio Sharpe ratio Sp. The diversification factor increases rapidly as the average correlation decreases.

In real portfolio construction, other factors also must be considered. But the most important ingredient in the recipe is still a set of diversified strategies with which to start, and short-term systems provide at least one way in which to acquire this all-important ingredient.

Challenges of short-term trading

As with most things, even this proverbial free lunch comes with costs. Primary among those is that short-term systems incur higher trading costs and are, hence, somewhat capacity-constrained. Consider a trend-following system that achieves about a 12% annualized volatility. This typically is measured by taking the standard deviation of monthly returns and multiplying by [square root of 12] or directly computing the standard deviation of yearly returns. A 12% annualized volatility roughly corresponds to a one-sigma deviation of 0.75% in the daily returns, i.e., most of the time the daily return will lie between -0.75% and +0.75%. For such a system, a typical trading frequency is about 1,000 round-turn trades per year, per million dollars traded. The true cost of these trades must account both for explicit costs such as commissions, exchange fees, etc., but also must estimate the hidden slippage cost that trading incurs. The slippage cost commonly is taken to be proportional to the difference between a particular trade's fill price and the volume-weighted average price of all trades during that period. If buying, this difference is typically positive, and if selling it is typically negative. Considering the most commonly traded futures markets, we estimate that the sum of explicit and hidden costs is about $20 per round-turn on average. This implies a yearly cost of $20,000 per million dollars traded for the trend-following example above, or 2% of the portfolio value. This is not an insignificant amount of frictional loss because of trading costs, but neither is it excessively onerous.

Now consider a short-term trading system that also achieves 12% annualized volatility. Owing to the shorter holding period, this systemmust trade more often to facilitate its frequent trade entries and exits. For this system, a typical trading frequency is about 3,000 round-turn trades per year per million dollars traded, or three times that of the trend-following system. A similar analysis to that above implies a yearly trading cost of $60,000 per million dollars traded, or6% of the portfolio value. To achieve a net return equal to that of the trend-following system, the gross performance of this system must, therefore, be 4% larger to compensate for the additional trading costs.

If we subsequently migrate to an even shorter-term system that nowtrades twice as frequently, we would pay 12% per year in trading costs alone! At our 12% annualized volatility, in this case we are effectively "spending" a Sharpe ratio of 1 in trading costs (i.e., 12% in costs for a program with 12% annualized volatility), whereas the original trend-following system only had to "spend" a Sharpe ratio of 1/6(2% in costs for a 12% annualized volatility) to achieve its returns. Some short-term systems will trade as many as 10,000 round turns per million.

"Cost of trading" (above) summarizes the total cost estimates for various styles of trading programs.

Clearly, short-term trading is expensive. Every time the trading frequency is doubled, so is the trading cost. There is an additional, fuzzier and more insidious "cost," and that is capacity. If we doublethe trading frequency, that simply means we are trading twice the number of contracts per day than previously. Directional traders generally want to avoid having a noticeable footprint in any given market, as they fear others front-running them or arbitraging away their informational advantage. To maintain a constant footprint at a trader's comfort level of market participation, this requires halving traded assets under management (AUM) every time a trader-doubles the system trading frequency. In other words, if one believes that $9 billion is areasonable upper bound for a trend following system (again at a 12% annualized volatility), then a typical short-term system would need to cap its trading level at $3 billion to maintain the same trading footprint. A higher-frequency, short-term system that holds positions only for hours would see its capacity limited to somewhere around $250million-$750 million (again at 12% annualized volatility). Cleverer execution strategies, better diversification across markets and other"engineering" feats can alleviate the constraints to some extent. But the scaling laws outlined above are as unavoidable as death and taxes.

Another considerable challenge with short-term systems is risk management. Trend-following, by definition, is a loss-limiting strategy.With trend-following, positions that move in a trader's favor are maintained or even strengthened, while unprofitable positions are neutralized in fairly short order. This typically gives rise to a positiveskew of returns. On the downside, positively-skewed return profiles are necessarily intermittent; much of the overall portfolio return comes in bursts of performance represented by the positive tail. On theupside, the drawdowns generally are less deep than for a non-skewed strategy with the same Sharpe ratio. Trend-following systems can choparound for a long time, but eventually they tend to pay off in brilliant bursts of positive performance.

Most short-term systems, in contrast, look for anomalies. Althoughthey aren't necessarily mean-reverting by design, they often share features exhibited by the so-called "relative-value" strategies commonin the equity space. These are strategies that, for example, seek toexploit price anomalies between over-valued and under-valued stocks (statistical arbitrage); stock prices between buyers and sellers in amerger (merger arbitrage) or more-obscure debt/equity relationships within a stock (convertible arbitrage). A quick glance at the performance of these strategies over the past 10 years reveals long periods of consistent performance punctuated by briefer periods of significant drawdowns. Short-term systems in the futures space generally exploit completely different dynamics than these equity-based strategies, but systems that exploit price anomalies sometimes can be very wrong and thus, a sophisticated risk-management ideology is necessary to ensure that overall performance stays within reasonable boundaries.

Final remarks

Too often in the managed futures space, programs are bucketed intobroad categories such as medium- to long-term trend following and short-term strategies or simply everything else. In reality, strategiesfall into various spots along a larger spectrum. That being said, short-term systems can be hugely beneficial to a portfolio. But you need to understand that, even though diversification truly may be a "free lunch" for the recipient, someone ultimately bears a cost. In this case, it is paid by the system developer(s). Untold hours must be spent in areas such as trading-signal development, the development of sophisticated risk-management tools and the generation of maximal-efficiency execution algorithms. All of these pieces are needed to deploy a system that offers reasonable risk/reward tradeoffs yet also manages to provide a return stream that is largely decorrelated from standard trend-following systems. If these tasks are done well, however, customers ultimately are rewarded with a powerful tool for diversifyingtheir portfolios and improving their overall risk/reward balances.

Michael Mundt is a principal with Revolution capital Management. He has built successful long-term and short-term trading strategies.

BUILDING A DIVERSE TEAM

Total portfolio Sharpe ratio as a function of average correlation C between systems. Each system has a stand-alone Sharpe ratio of S=0.75.

Average correlation C between systems	diversification factor	portfolio Sharpe ratio Sp
1	1.00	0.75
0.9	1.05	0.79
0.8	1.12	0.84
0.7	1.20	0.90
0.6	1.29	0.97
0.5	1.41	1.06
0.4	1.58	1.19
0.3	1.83	1.37
0.2	2.24	1.68
0.1	3.16	2.37

COST OF TRADING

Trading cost and capacity estimates as a function of trade frequency. These values assume a 12% annualized volatility and a $20 cost per round-turn trade on average.

System type	Round turns per $1 million AUM per year	Cost in percent of portfolio value	Cost in Sharpe ratio	Capacity estimate
Long-term trend following	1000	2%	0.167	$9 billion
Medium-term trend following	2000	4%	0.333	$4.5 billion
Short-term (3-5 day holding period)	3000	6%	0.500	$3 billion
intra-day (few hour holding period)	15000	30%	2.500	$600 million

Futures (Cedar Falls, Iowa)

May 1, 2011

New world but similar headaches: a trading system must provide a consistent edge in the markets it trades to succeed; that's a no-brainer. But if a manager can't execute those signals efficiently and avoid slippage, the system is just a paper tiger;
MANAGED MONEY;
Column

BYLINE: Collins, Daniel P.

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Trading is the ultimate competitive enterprise and all traders, whether they are scalping ticks, long-term trend followers, short-term traders or day traders, want to get their price. For commodity trading advisors (CTAs), being able to consistently execute at or near their price is key and, for some, can be the difference between success and failure.

Icebergs

Avoiding slippage

Ensuring quality execution is a little more complex in a world of high-frequency trading. While electronic trading made life easier forCTAs and improved the overall liquidity of markets, it added an element of anonymity to market making and fewer players feel comfortable showing their size. This has led to an increased use of "iceberg" orders (orders that only show to the market a small fraction of the total order) and high-frequency trading algorithms that, at times, attempt to identify icebergs and exploit them.

[ILLUSTRATION OMITTED]

"That is problematic if that is what you are relying on," says Michael Geismar, principal with Quantitative Investment Management (QIM). "Those are the ones--iceberg orders--that bots [algorithms] can detect and that is when you can get taken advantage of. If somebody knows that there is additional size behind that 10-lot order that keeps popping up, people keep moving away from that trade. If I place an iceberg order and it shows 10, but there is really 500 behind it, if I hit 10 and I see another 10 pop up, then I know or can guess that there is more behind that. Then people are going to stop hitting and theymove away from you, and you are going to incur more slippage."

Bradford Paskewitz, founding principal of Paskewitz Asset Management, uses the iceberg concept, but has created his own proprietary method. "We have developed our own execution systems with a FIX engine and we use our own algorithms to split up orders," Paskewitz says. "Wedo break our orders up into smaller pieces and execute them algorithmically; it is an iceberg-like idea. You want to get it done in pieces and you don't want to show size along the way."

That is easier said than done, as Paskewitz says the high-frequency traders (HFT) are looking for those orders. "The whole reason people don't show size is because of those high-frequency traders," Paskewitz says. "You want to randomize your orders because if you keep putting out exactly the same order in smaller increments, it is easier torecognize the signature and people say 'oh look, this same guy is doing all these orders' and they will monitor you more; if you randomize your sizes and your times, it is harder to tell it is all one person."

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DePetris, chief operating officer at Portware, a softwarefirm that designs execution algorithms.

DePetris says he has seen the effect of HFT traders play out, first in equities and now in futures. "We are seeing eerily similar market structure behavior. Spreads are fairly tight in the more liquid listed derivatives space, but the visible liquidity has decreased, a lotof it is hidden like [iceberg] orders," DePetris says.

And it shows in his business, as 50% comes from futures compared to just 15% three years earlier, when most HFTs concentrated on equities and options.

"If you are showing a bid or an offer of size, the high-frequency strategies are digesting that and skewing the market, and you need tobe cognizant of it. There are a lot of strategies that are looking for that information and moving the markets," DePetris adds.

Not everyone sees HFTs as a threat, though. "High-frequency traders benefit us," Geismar says. "We find ourselves, more often than not,on the other side of those trades, so we like to see more high-frequency traders. A lot of them are playing both sides of the market; they're providing more liquidity to the marketplace."

Geismar says that because QIM's pattern recognition approach is sounique, he doesn't think their entries can be detected, but they still need to be careful because of their size. "For us, years ago we realized that we can't execute as quickly as we would like. If we were managing $20 million instead of $5 billion, our execution style wouldbe much different. There is inherent slippage with every additional dollar that you manage and with us at $5 billion now our most important goal with execution is to execute as quietly as possible. So we have to spread our trades out throughout the majority of the day."

[GRAPHIC OMITTED]

Of course traders always have tried to mask their size, but the proliferation of HFTs has forced managers to vary their entries more often.

Paskewitz does not change his entry strategies all the time, but does look at factors besides size. "It is not like HFT where your halflife is a few months. Some of the strategies haven't been changed inyears, but they get changed when and if they need it," he adds.

QIM has been successful in limiting their slippage despite their dramatic increase in money under management. "It is an ongoing battle,but we think over the years we have done a pretty good job of minimizing the amount of money we lose to slippage," Geismar says, while adding, "There is no real way to measure slippage because there is no way to know what the market would have done if you were not participating."

Paskewitz agrees that defining slippage is not a perfect science. "I look at the price right before we start trading and compare that to our average fill price and that is my definition of our slippage."

He adds that it is more of an issue, the shorter your time horizon. "You have to be more diligent the shorter-term you are trading, andin the spectrum we are shorter-term. I would say we have modest pressure compared to a high-frequency trader," he adds.

The more things change

Geismar is not the only one who does not view HFTs as a new and evil influence. Robert Moss, chairman and president of Ram Management Group, says, "The execution has become easier now because the markets are more transparent. The volume has to be placed on the platforms."

While Moss acknowledges that pockets of illiquidity develop, he attributes it to traders not using limits and adds it isn't anything new. "The markets can go into a vacuum. But that is not anything that wouldn't happen on the trading floor either," he says.

Moss has the benefit of years of experience executing large sized orders on the trading floor. To him, HFTs are not some evil monolith attempting to ruin his day and make a living reverse engineering his program; they are simply traders doing electronically what traders always have tried to do, and that is to get an edge.

"There are programs on both sides of the market. It is a free market, and I think it is good. There is a lot of liquidity there. What we are trying to do is get a trade on in a certain area. I don't find it to be very difficult at all," he says

Roger Show is principal of Livestock CTA, LLC and executes his livestock strategy through the same

floor broker he has used for 25 years, but says that the onset of electronic trading has helped improve execution. "You have people arbing between the pit and electronic markets, so that adds liquidity to the markets. It is easier to move a 1,000-lot order than it was a few years ago. Even if you don't use electronic trading, it still adds volume into the pit," he says.

For Show, HFTs are not as much of a nuisance as the long-only indexes. They can provide opportunity, you just need to prepare for them."They have been around for a while, and you try and find out when they do it and try and take advantage of that situation when you can. You have to be aware of it," he says. "Everyone knows that if you are going to move 10,000 from the front month to the next, everyone is going to front-run you. There are ways to take advantage of the ETFs aswell."

The positive thing about the long-only indexes is that they are transparent; you know roughly when they have to roll their positions.

That obviously is not the case with HFTs, but a trained eye can help. While some complain that no one shows size, Moss doesn't see thatas a problem. "It is there. The only thing you have to do is put an order in and buy it (see "A bigger pie," page 51). My question is what is the [HFT] program trying to accomplish and how is it accomplishing it? If they are trying to sniff [stops out], how do you take advantage of it?"

The long and short of it

While the need to reduce slippage is a major problem for short-term traders, even the long-term guys need systems to help them execute."They need, to the extent possible, to be as anonymous and as intelligent as they possibly can in entering and exiting large positions. You can see your entire alpha expectation degrade in a bad execution. They need to be focusing on that," DePetris says.

"As a long-term trend-follower who holds positions for months, it is not as critical," says Scott Hoffman, principal of Red Rock Capital Management. "My program's performance still would be good with slippage [that] a short-term trader could not tolerate. With that being said, getting the best price for execution always helps," Hoffman says.

He points out that, as a long-term trader, he executes roughly 1,000 round turns per million managed and is making more than $100 per trade. "When I look at a short-term system, your average [profit per] trade is $20 and a tick in the E-mini S&P is $12.50; one tick slippage is half of your gross average trade," Hoffman says. "Our average trade can be a couple hundred bucks, so the same $10, $15 or $20 for slippage and commission represents a much smaller percentage of what weare trying to extract from the market."

It is a simple matter of math. "We all are trying to get gross profit/loss out of the market; how much do we have to pay in commission and slippage to get it?" Hoffman says.

This is critical for short-term traders like Revolution Capital Management. "If you look at the advantage that you have without any execution costs, you might have a better advantage with a short-term system," says **Michael Mundt**, a principal with Revolution. "If you look at any long-term system and you just add up how many round turns they are doing--assuming 2,000 round turns--they are going to pay approximately $20 a round turn, that would be $40,000 per year in execution cost per million. If you look at someone doing 10,000 round turns per million per year, if you don't do it well that is 20% per year. So you just erased probably all of your advantage in trading costs," Mundtsays (see "It is all in the numbers," above).

Revolution had developed a successful long-term trend-following system prior to launching their short-term system. The latter took muchlonger to develop, which Mundt attributes partly to the difficulty of execution.

Revolution's short-term Mosaic program is trading four times as frequently as most longer-term managers. "With us, the potential downside is huge if we don't make the trading efficient; it is simple arithmetic," Mundt says.

That is true for traders who trade more frequently and for those who have large size to execute. "We try and place as many passive orders as we can, and try and get filled in a passive manner. If we are buying, we are not [lifting] the offers because that can give you away," Geismar says.

And that seems to be key. Execute as quietly as possible and the size will be there, but no one is going to show the size so you have to exercise some patience. "It does seem like a constant battle to tryand make sure that we hide what we are doing, randomize what we are doing and make sure we don't send out signals to what we are doing inadvertently," Mundt says. "There is a trade-off that has to be made. Ideally

you execute as quickly as you can, but if you do that with big orders, it is self defeating. There has to be some balance between speed of execution and minimizing your footprint in the market."

It may be difficult, but it is good to remember the basics, and what HFTs are trying to do is nothing new. "For every one side of the market that is doing that, there is another program that is doing thaton the opposite side," Moss says. "These programs become effective initially, but over the long-run they lose their productivity and profitability. After a while there is the next new trading program that is taking advantage of what they are doing, if they are giving up too much of an edge."

IT IS ALL IN THE NUMBERS

This table shows how critical limiting slippage is to short-term traders who roughly will trade four times as frequently as long-term trend followers.

Round Turns per million	Slippage & Commission $20	Percentage	Slippage & Commission $30	Percentage
1,000	$20,000	2%	$30,000	3%
2,000	$40,000	4%	$60,000	6%
5,000	$100,000	10%	$150,000	15%
10,000	$200,000	20%	$300,000	30%

Round Turns per million	Slippage & Commission $40	Percentage
1,000	$40,000	4%
2,000	$80,000	8%
5,000	$200,000	20%
10,000	$400,000	40%

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Managing trade execution in the HFT world

BYLINE: DANIEL P. COLLINS

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Trading is the ultimate competitive enterprise and all traders, whether they are

scalping ticks

, long-term trend followers, short-term traders or day traders, want to get their price. For commodity trading advisors (CTAs), being able to consistently execute at or near their price is key and, for some, can be the difference between success and failure.

Ensuring quality execution is a little more complex in a world of high-frequency trading. While electronic trading made life easier for CTAs and improved the overall liquidity of markets, it added an element of anonymity to market making and fewer players feel comfortable showing their size. This has led to an increased use of "iceberg" orders (orders that only show to the market a small fraction of the total order) and high-frequency trading algorithms that, at times, attempt to identify icebergs and exploit them.

"That is problematic if that is what you are relying on," says Michael Geismar, principal with Quantitative Investment Management (QIM). "Those are the ones -

iceberg orders

- that bots [algorithms] can detect and that is when you can get taken advantage of. If somebody knows that there is additional size behind that 10-lot order that keeps popping up, people keep moving away from that trade. If I place an iceberg order and it shows 10, but there is really 500 behind it, if I hit 10 and I see another 10 pop up, then I know or can guess that there is more behind that. Then people are going to stop hitting and they move away from you, and you are going to incur more slippage."

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the more liquid listed derivatives space, but the visible liquidity has decreased, a lot of it is hidden like [iceberg] orders," DePetris says.

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"If you are showing a bid or an offer of size, the high-frequency strategies are digesting that and skewing the market, and you need to be cognizant of it. There are a lot of strategies that are looking for that information and moving the markets," DePetris adds.

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While the need to reduce slippage is a major problem for short-term traders, even the long-term guys need systems to help them execute. "They need, to the extent possible, to be as anonymous and as intelligent as they possibly can in entering and exiting large positions. You can see your entire alpha expectation degrade in a bad execution. They need to be focusing on that," DePetris says.

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It may be difficult, but it is good to remember the basics, and what HFTs are trying to do is nothing new. "For every one side of the market that is doing that, there is another program that is doing that on the opposite side," Moss says. "These programs become effective initially, but over the long-run they lose their productivity and profitability. After a while there is the next new trading program that is taking advantage of what they are doing, if they are giving up too much of an edge."

Futures

September 2008

Forex traders looking short term

BYLINE: Collins, Daniel P

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When this publication last looked at currency-specific commodity trading advisors, it saw an explosion of new programs that were targeting short-term strategies. Numerous advisors noted that there had been a fundamental shift in the markets that produced an environment that was better suited for short-term strategies. The long-term bear market for the dollar has stalled and while many traders believe the dollar is due for a trend reversal, they are doubtful that will be a boon for long- term trend followers. They noted increased volatility and the fact that many of the long-term strategies struggled despite a sustained bear move in the dollar. It is difficult to predict what types of programs will outperform in the future, but it is clear that there is a greater demand for short-term programs and the factors that allow those programs to exist and thrive are relatively new so we are just seeing the beginning of what they can do.

FULL TEXT:

Recent struggles in forex-specific trading programs have favored the short-term manager who can take quick profits out of volatile markets without relying on the reemergence of long-term trends.

When we last looked at currency-specific commodity trading advisors, we saw an explosion of new programs that were targeting short-term strategies. Numerous advisors noted that there had been a fundamental shift in the markets that produced an environment that was better suited for short-term strategies.

If anything, that has continued though the sector has underperformed of late. The long-term bear market for the dollar has stalled and while many traders believe the dollar is due for a trend reversal, they are doubtful that will be a boon for longterm trend followers. They noted increased volatility and the fact that many of the long-term strategies struggled despite a sustained bear move in the dollar. "For some reason long-term guys did not take advantage of the large move in the dollar," says Marek Chelkowski, a CTA who uses a mix of technicals and fundamentals in his short-term strategy.

"The market has been short-term oriented," Chelkowski says. "Part of it is the participation of retail. We have become an instant gratification world."

Joe Gelet, principal of Elite E services, says short-term intelligent algorithmic systems are the trend of the future in forex trading. "Long-term trend followers are going to have a lot of trouble because of the volatility. There are going to be more 'black swan' events like the subprime crisis and 9/11," Gelet says.

The expectation of immediate profit is something Chelkowski sees beyond forex trading. "The Dow just rallied 450 points in two days and then reversed 200 points (in late July)," after doing the same thing two weeks prior.

Chelkowski is not complaining. "It is a good trading market. That doesn't mean all short-term traders will succeed, just that there is the volatility that can allow short-term profits and being in the market for a shorter period can reduce your risk. Many of the moves will be quite violent," Chelkowski says, adding, "The market is behaving jittery."

Others traders are seeing it too. Mark Coe, president of Coe Capital Advisors, says "I am trading shorterterm. We are seeing a lot of whipsaws."

Coe runs medium to long-term trend following programs with a carry overlay and has noticed that his trades are getting shorter because of the volatility. For example, he pointed out that when two news items came out of Europe on July 31, one pushed the Euro higher and the other caused it to tank (see "You're in and you're stopped out," right). He says moves like this are becoming more common. "Even shortterm traders may have been caught with that volatility," Coe adds.

Tom Trimmer, third-party marketer and co-founder of Trimmer Capital Management, says the short-term managers have been performing better. Trimmer, who raises capital for 12 currency programs and analyzes many more, says, "It seems that the shortterm guys seem to be cleaning up."

Emmanuel Acar, CEO of Directional Trading Ltd, attributes this to survivorship bias. "There were shortterm programs in the 1990s but many did not survive. Time will tell if the newer versions fade away or are answers to today's markets," Acar says.

While there is an element of survivorship bias, a perusal of the Barclay database shows that managers identifying themselves as short-term traders are outperforming the overall universe of forex-specific managers. Technical short-term currency programs have returned 8.77% in the last year and have a compound annual return of 14% as opposed to 5.45% and 12.61% for the entire universe of technical currency programs. Fundamental short-term currency programs have returned 16.42% over the last 12 months with a CAR of 25.29% as opposed to 5.29% and a CAR of 13.56% for the universe of fundamental currency programs.

They also appear to be in greater demand. "There is a huge interest in short-term traders," says Sol Waksman president of Barclay Hedge. "There is a tremendous advantage to adding shortterm traders to a portfolio because they tend to be less correlated as a group than long-term traders."

That has been backed up by a study by Newedge. The paper, "Correlations and holding periods," states, "Our ongoing conversations with managers and investors have produced a mountain of anecdotal evidence that short-term traders' returns should exhibit low correlations - not only with the returns of nearly any other investment alternative but with one another's returns."

So basically you have to choose which long-term trader is best for your portfolio, but you can include several short-term traders without your portfolio becoming less diversified.

"There is a lot of money looking for good currency managers, so it makes sense to be in that space," Trimmer says.

While the Newedge study is the basis for its Short-Term Traders Index (STTI) and deals with diversified short-term traders, its finding is particularly relevant for the forex sector. Because forex is the largest market sector and makes up a large portion of the allocations of many long-term trend followers, there has always been a strong correlation between currency programs and the overall CTA universe. Of the 144 currency specific programs listed in the Barclay database, 70 are listed as using short-term strategies. Of the forex-specific programs with less than a four-year track record, 59.67% list themselves as short-term traders; of the managers with more than a fouryear track record only 40.24% list themselves as short-term traders (see "Gaining separation," below).

SECTOR STRUGGLES

The Barclay Currency Traders Index has produced a CAR of 0.66% since January 2005. That is much less than the CAR for the Barclay CTA Index, 6.56%, in that same time period and much lower than the overall CAR of the currency index of 8.16% since 1987.

YOU'RE IN AND YOU'RE STOPPED OUT

GAINING SEPARATION

And many managers are falling by the wayside. "We added five new currency programs in the last update [June] and deleted 10," Waksman says. "It was the second month in a row

that we deleted more currency programs than we added. It is the poorest performing of all the CTA indexes. It has been a difficult time."

While there seems to be more currency specific programs, many of them have struggled in recent years. The number of currency specific programs in the Barclay database has dropped since we looked at the sector in February. The total number of 144 through June of 2008 is less than the total of 158 through 2007 (see "Manager atrophy," above). Interestingly, a lot of the deletions are of programs that had a substantial track record dating back four years or more.

MANAGER ATROPHY

DOLLAR TROUBLE

If long-term traders struggled with volatility during a pretty consistent bearish dollar trend, what will happen if the dollar continues to scuffle around ?

Gelet points out that for 50 years the dollar has been the reserve currency of the world and there seems to be no plan B. "Right now the dollar's position as reserve currency is being questioned, but there is no alternative. The void is creating volatility," Gelet says. He does not see the Euro stepping in because of the problems in Europe.

If we stay in a period where the dollar struggles but other currencies are not strong enough or the central banks of the countries will not allow the currency to appreciate further against the dollar, we could be stuck in a range.

"Because of the weakening economy and large deficit, the world does not have the dollar to lean on. There will be more problems before solutions," Gelet says. That all adds up to greater volatility and fewer long-term trends.

Because of this he says intelligent trading systems that can act quickly will be the most successful. He believes short-term momentum models that can take quick profits and have good risk management will do best. "Long term it is getting too difficult to forecast."

Coe says there are two sides to it and favors a dollar recovery. "The dollar has had every chance to fall off the cliff but it hasn't. You have to ask what is the better option. We are in the process of a dollar bottom. My models have moved long the dollar. It is a battle over the worst currency, where are you going to run to," Coe says. "I think the dollar will strengthen in the next 12 to 24 months."

WHY IS IT SO HARD

The Newedge study asks the question, "If short-term has such desirable properties for portfolio management, why have more traders not been attracted to the space?" (The Newedge methodology pulls out sector specific managers.)

For one, the factors that have allowed even the contemplation of creating extremely short-term strategies as the basis for managing money are relatively new. These strategies used to be the exclusive purview of institutions and large proprietary traders, but the affordability of complex trading technology coupled with the reduction in brokerage costs have allowed these techniques to be used by emerging managers. This is particularly true in the forex arena where the barriers to entry are lower.

Forex managers can offer programs with lower minimums because they do not have to trade a minimum number of contracts for each customer. They can offer the benefits of managed accounts with the lower minimum investment levels of a fund.

Another reason there aren't more short-term strategies is simply the degree of difficulty. To be truly non correlated with long-term trend followers, short-term traders must not only be short-term but also something other than trend following. Most long-term trend followers will tell you that their systems are based on simple technical indicators and where they earn their keep is with risk management. Longterm trends are easy to find whereas countertrend and momentum plays are more difficult.

Revolution Capital Management (see Trader Profile, page 90) set out to create a diversified strategy utilizing multiple time frames. They launched their long-term trend following program - which has been quite successful - in short order but took an additional two years to perfect their shortterm approach. Revolution founder **Michael Mundt** says it was "simply harder" to do and took the help of an established manager's operation to perfect.

It is difficult to predict what types of programs will outperform in the future, but it is clear that there is a greater demand for short-term programs and the factors that allow those programs to exist and thrive are relatively new so we are just seeing the beginning of what they can do.

Futures & FuturesBreakingNews

August 2008

RCM: A short-term **revolution**

BYLINE: DANIEL P. COLLINS

SECTION: ISSUES No. 9

LENGTH: 801 words

What do you get when you combine the resources of several bright investment engineers with a managed futures legend and the resources of his 35-year old institution? Something special.

Even before **Michael Mundt** founded **Revolution** Capital Management in 2004 along with partners Mark Chapin and Rob Olson, he approached managed futures legend Bill Dunn about developing trading systems.

"We thought he was a bright guy," was Dunn's initial reaction to Mundt. "He bounced ideas off us, he was giving us some real time trades and we gave him help and told him we would be a lot more interested if you concentrate on the short term, so that is where it went," says Dunn, who has an exclusive deal to market **Revolution's** Mosaic program.

Mosaic launched in October 2006, nearly two years after the launch of **Revolution's** initial Alpha program and has returned 107.2% in that time. The Alpha program started out as a long-term trend following program and has produced a compound annual return of 20.78% since January 2005. Mundt has added medium and short-term strategies to the program while working on the more aggressive and shorter term Mosaic program.

Revolution's goal - with encouragement from Dunn -always was to create the shorter-term strategies, but getting it right was more difficult than creating the longer-term strategy, even for a couple of rocket scientists, which Mundt and Olson qualify as with degrees in aerospace engineering.

Mosaic is a systematic pattern recognition strategy that trades 56 markets and has an average holding period of 3.6 days. Signals are generated following the close. Each market receives a score between -1 and 1. The strength of that signal determines the size of each trade. A score of 0.2 might initiate a small position and if that score rises the next day, **Revolution** would add to that position.

Positions will usually be put on at the open, but traders have discretion based on how liquid a market is at the time.

Creating successful short-term trading strategies that are non-correlated with trend following is difficult and involves more than simply applying the same principles to a shorter time frame. "We had the right ideas but we were looking at it from a purely black box point of view. That was a detriment," Mundt says. "It was when Dunn started to point out the impact of trading and our realization that what we were finding was great on paper, but the trading cost would have taken up three fourths of the profit [that we worked on changes]. We had one conceptual breakthrough as far as how to keep the basic idea but reduce the trading cost and from there it all kind of fell into place."

The breakthrough involved making the system more responsive to events. "Instead of telling the system to work all the time, looking at those times when it is going to work and not to try and force it to be in a market that doesn't have any predictability," Mundt says.

From 2004-06, when times were difficult for long-term trend followers, many short-term strategies marketed as a diversification to trend following failed. Dunn says that Mosaic tested "very well" in this period. "It really was [non-correlated] and some of the other [programs] that claimed they were, weren't." **Revolution** had strong returns during the reversals in February and July 2007. "There were periods where trend followers got just creamed in the last two years and Mosaic was off the charts great," Mundt says, "Most important, it proved the non correlation with trend followers. When we are having negative months, trend followers are doing well and that is exactly what we hoped would be the case."

Also critical is the computing power to test such approaches on numerous markets and a world class execution desk. Olson says due to the short-term nature of Mosaic, Dunn's sophisticated and experienced trading desk is critical. "Without that model, this would not be possible," Olson says. Mundt adds, "Dunn's stable of traders and 24-hour desk has been a necessity in deploying Mosaic. Execution is a huge part of a system that trades this fast. You need to minimize slippage."

Revolution still operates Alpha independently from Dunn but focuses most of its energies on Mosaic, which has grown to $111 million under management and has a capacity of $1 billion without any changes according to Mundt.

"Alpha was grown more organically. It is aimed at the high net worth investor whereas Mosaic is aimed at the institutional investor interested in building their own mix," he says.

When asked to describe the relationship, Dunn says, "It is a mutual admiration society." He plans on creating a fund with a 50/50 allocation between Mosaic and Dunn's long-term approach. "This is pretty effective on its own but it is much better in conjunction with us. It will be special," Dunn says.

US Fed News

March 17, 2007 Saturday 4:44 AM EST

Colorado Inventors Develop Air Bearing Slider

BYLINE: US Fed News

LENGTH: 229 words

DATELINE: Alexandria, Va.

ALEXANDRIA, Va., March 17 -- **Michael David Mundt** of Longmont, Colo., and Craig William Miller of Loveland, Colo., have developed an air bearing slider which includes a raised bearing surface or surfaces contoured to limit off nodal pressurization.

According to the U.S. Patent & Trademark Office: "The air bearing surfaces are located proximate to nodal regions of a height field or profile between the slider and disc surface to limit off-nodal pressurization. The air bearing slider includes a narrow raised bearing surface profile proximate to the trailing edge of the slider body and an expanded intermediate profile along an intermediate portion to provide lift and roll stability proximate to an intermediate nodal region of the slider body to limit off nodal pressurization."

The inventors were issued U.S. Patent No. 7,190,550 on March 13.

The patent has been assigned to Seagate Technology LLC, Scotts Valley, Calif.

US Fed News

January 31, 2006 Tuesday 3:45 PM EST

Colorado Inventors Develop Head Slider

BYLINE: US Fed News

LENGTH: 229 words

DATELINE: Alexandria, Va.

ALEXANDRIA, Va., Jan. 31 -- **Michael D. Mundt** and Anthony P. Sannino, both of Longmont, Colo., have developed a head slider with tilted protrusions for ramp load-unload applications.

According to the U.S. Patent & Trademark Office: "A slider includes a slider body having a leading edge, a trailing edge, a first side edge, a second side edge and a center line extending between the leading edge and the trailing edge, which define a disc-facing surface having a bearing plane."

An abstract of the invention, released by the Patent Office, said: "A protrusion is positioned on the disc-facing surface along the first side edge and has a protrusion surface. The protrusion surface is tilted with respect to the bearing plane about the center line and towards the first side edge."

The inventors were issued U.S. Patent No. 6,989,965 on Jan. 24.

The patent has been assigned to Seagate Technology LLC, Scotts Valley, Calif.

US Fed News

October 20, 2005 Thursday 10:02 AM EST

Colorado Inventors Develop Disc Head Slider

BYLINE: US Fed News

LENGTH: 299 words

DATELINE: Alexandria, Va.

ALEXANDRIA, Va., Oct. 20 -- **Michael David Mundt** of Longmont, Colo., and James Morgan Murphy of Boulder, Colo., have developed a disc head slider that supports a transducer relative to a moving media in a data storage system.

According to the U.S. Patent & Trademark Office: "The slider includes a slider body having a media opposing face with a leading slider edge, a trailing slider edge, a recessed area and a bearing surface formed by at least one positive pressurization area.

The pressurization area is raised relative to the recessed area."

An abstract of the invention, released by the Patent Office, said: "A wearable airflow-blocking pad is positioned upstream of the positive pressurization area, between the positive pressurization area and the recessed area. The pad is wearable from a first height to a second, lower height relative to the positive pressurization area during normal operation of the data storage system. The airflow-blocking pad substantially disrupts fluid flow from reaching the positive pressurization area when at the first height and allows progressively increasing fluid flow to reach the positive pressurization area as the pad wears toward the second height."

The inventors were issued U.S. Patent No. 6,956,719 on Oct. 18.

The patent has been assigned to Seagate Technology LLC, Scotts Valley, Calif.

US Fed News

October 12, 2005 Wednesday 2:23 PM EST

Colorado, Minnesota Inventors Develop Suspension Assembly

BYLINE: US Fed News

LENGTH: 242 words

DATELINE: Alexandria, Va.

ALEXANDRIA, Va., Oct. 12 -- Gary E. Bement of Frederic, Colo., James M. Murphy of Boulder, Colo., **Michael D. Mundt** of Longmont, Colo., and Brian D. Denker of Rogers, Minn., have developed a suspension assembly which can be energized to provide in-situs fly height adjustment for a head of a disc drive or energizable to adjust preload force for contact starts and stops.

According to the U.S. Patent & Trademark Office: "The suspension assembly includes a shape memory flexure element having an energizable length differential.

In one aspect, the flexure element is integrated with a flexible suspension circuit which provides advantages for manufacture and assembly. In another aspect, the flexure element is coupled to a bending portion of the head suspension assembly and energized to adjust flexure of the suspension assembly relative to the bending portion."

The inventors were issued U.S. Patent No. 6,954,339 on Oct. 11.

The patent has been assigned to Seagate Technology LLC, Scotts Valley, Calif.

SEC National Non-Public Documents

We have also made a written inquiry to our contacts at the SEC who will research unpublished documents that are not made available to the general public.

Search requested. You will be contacted if any records are found for Michael David Mundt.

National Bankruptcies, Liens, Judgments

We searched a national listing of Bankruptcies, Liens and Judgments using the name of the subject and/or his Social Security Number.

Source #1:
No records found matching Mr. Mundt's SSN.
No relevant records found for Michael Mundt.
No relevant records found for Mike Mundt.

Source #2:
[None Found]

Federal Criminal, Civil, Appellate Court Records

Our researchers performed a search of the US Federal District Courts for records of litigation.

0 Relevant Total Party matches for selection Mundt, Michael for ALL COURTS.
0 Relevant Total Party matches for selection Mundt, Mike for ALL COURTS.

State/County Felony/Misdemeanor, Criminal, Parole, Probation, Corrections

The Multi-State criminal search we conducted covered criminal cases in all 50 states and the District of Columbia unless otherwise indicated. We may also conduct one or more county level felony & misdemeanor searches based upon the residential address history of the subject. For multi-state coverage and jurisdictional details, please see http://www.checkfundmanager.com/info_state.html.

Source #1:

No records found for Michael Mundt.
No records found for Mike Mundt.

Source #2:

[None Found]

Statewide/County-Level Searches:

No relevant records found for Michael/Mike Mundt in a CO-based statewide search.
No records found for MUNDT, MICHAEL DAVID in SANTA CRUZ, CA.

State/County Civil Court Records

The Civil records multiple state search we conducted included all judgments, liens, bankruptcies, and civil suits in all 50 states and the District of Columbia unless otherwise indicated.

Source #1:

No relevant records found for Michael /2 Mundt.
No relevant records found for Mike /2 Mundt.

Source #2:

No relevant records found for Michael /2 Mundt.
No records found for Mike /2 Mundt.

Source #3:

[None Found]

Statewide/County-Level Searches:

No relevant records found for Michael/Mike Mundt in a CO-based statewide search.
No relevant records found for Michael/Mike Mundt in a Santa Cruz County, CA-based search.

SSN Validation, Addresses

We first examined our database of manager research to obtain the manager's date of birth, residential addresses, and SSN (not disclosed), or we utilized our People Search expertise to identify the subject. We may utilize other proprietary identification resources available to us to obtain this information as well. This section will contain an address trace using the name, date of birth and/or social security number of the subject.

Name: MICHAEL D MUNDT (03/01/1987 to 03/01/2012)
Date of Birth: 11/12/1967, Born 44 years ago
SSN: xxx-xx-xxxx issued in COLORADO between 1973-1974

Address Summary
815 VIREO CT, LONGMONT, CO 80504-2691 (WELD COUNTY) (09/2002 to 04/2012)
520 ZANG ST STE 209, BROOMFIELD, CO 80021-8224 (JEFFERSON COUNTY) (12/12/2009 to 04/2011)
10955 WESTMOOR DR STE 400, BROOMFIELD, CO 80021-2717 (JEFFERSON COUNTY) (10/29/2009 to 10/29/2009)
2682 S KENTON CT, AURORA, CO 80014-1719 (ARAPAHOE COUNTY) (01/1987 to 10/17/2003)
414 EMELINE AVE, SANTA CRUZ, CA 95060-2245 (SANTA CRUZ COUNTY) (10/1994 to 06/2002)
805 ARROWOOD ST, LONGMONT, CO 80503-7530 (BOULDER COUNTY) (06/1997 to 12/22/2001)
1705 SPRUCE ST, BOULDER, CO 80302-4322 (BOULDER COUNTY) (05/1996 to 12/1997)
4860 MEREDITH WAY, BOULDER, CO 80303-9106 (BOULDER COUNTY) (10/1996 to 12/1996)
2695 COLORADO AVE, BOULDER, CO 80302-6808 (BOULDER COUNTY) (12/1992 to 12/1995)
8309 ALLISON CT, ARVADA, CO 80005-2508 (JEFFERSON COUNTY) (09/1993 to 06/1994)

Cities History
LONGMONT, CO (WELD COUNTY) (06/1997 to 03/2012)
BROOMFIELD, CO (JEFFERSON COUNTY) (10/29/2009 to 04/2011)
AURORA, CO (ARAPAHOE COUNTY) (01/1987 to 10/17/2003)
SANTA CRUZ, CA (SANTA CRUZ COUNTY) (10/1994 to 06/2002)
BOULDER, CO (BOULDER COUNTY) (12/1992 to 12/1997)
ARVADA, CO (JEFFERSON COUNTY) (09/1993 to 06/1994)

Counties History
WELD, CO (06/1997 to 03/2012)
JEFFERSON, CO (09/1993 to 04/2011)
ARAPAHOE, CO (01/1987 to 10/17/2003)
SANTA CRUZ, CA (10/1994 to 06/2002)
BOULDER, CO (12/1992 to 12/1997)

Property Records

We have performed a nationwide search of any property the subject was associated with. The first section list all the properties that the person occupied, the next section lists properties that the subject purchased or sold and assessment information. Property information is obtained from sales, tax, and assessment information.

Source #1:

815 VIREO CT, LONGMONT, CO 80504-2691 (BOULDER COUNTY)
APN: R0148616
APN Sequence Number: 001
Account Number: 0148616
Date Subject First Seen as Owner: 08/30/2002
Date Subject Last Seen as Owner: 2011
Subdivision Name: FOX MEADOWS FILING 01

Legal Description: LOT 16 BLK 4 FOX MEADOW FLG 1 PROPERTY ADDRESS: 000815 VIREO CT LONGMONT
Building Square Feet: 4,678
Living Square Feet: 3,749
Land Square Feet: 6,329
Year Built: 2002
Latest Tax Roll/Assessment Information
Tax Year: 2010
Tax Amount: $2,507.68
Assessed Year: 2011
Assessed Value: $26,507
Sale Date: 08/30/2002
Sale Amount: $349,100
Document Number: 2330023
Total Value: $333,000
Land Value: $63,500
Improvement Value: $269,500
Bedrooms: 4
Baths: 3
Most Current Ownership Information - 08/30/2002
Owner: MICHAEL D MUNDT
Owner: HEATHER C MUNDT
Mailing Address: 815 VIREO CT, LONGMONT, CO 80504-2691 (Weld COUNTY)
Seller: ENGLE HOMES OF COLORADO INC
815 VIREO CT, LONGMONT, CO 80504-2691 (BOULDER COUNTY)
Owner Ownership Rights: Joint Tenant
Owner Relationship Type: Husband And Wife
Sale Date: 08/30/2002
Sale Amount: $349,100
Absentee Indicator: Owner Occupied
Deed Sec Cat: New Structure Sale, Mortgaged Purchase, Residential (Modeled)
Universal Land Use: SFR
Property Indicator: Single Family Residence
Resale New Construction: New Construction
Residential Model Indicator: Property is Residential
Mortgage
Lender: PREFERRED HM MTG CO
Mortgage Amount: $279,250
Mortgage Loan Type: Conventional
Mortgage Deed Type: Deed of Trust
Mortgage Term: 30 Years
Mortgage Date: 08/30/2002
Mtg Sec Cat: CNV, Fixed, Conforming
Mortgage Interest Rate Type: Fixed

Source #2:

Assessment Record For BOULDER County

Estimated Roll Certification Date: 08/25/2010
Owner Information
Original Name: MUNDT MICHAEL D & HEATHER C (OWNER OCCUPIED)
Standardized Name: MUNDT, MICHAEL D MUNDT, HEATHER C

Estimated Roll Certification Date: 08/25/2010

Original Address: 815 VIREO CT
LONGMONT, CO 80501

Standardized Address: 815 VIREO CT
LONGMONT, CO 80504-2691
BOULDER COUNTY

Property Information

Original Property Address: 815 VIREO CT
LONGMONT, CO 80501

Standardized Property Address: 815 VIREO CT
LONGMONT, CO 80504-2691
BOULDER COUNTY

Land Use: SINGLE FAMILY RESIDENTIAL

Data Source: B

Legal Information

Assessor's Parcel Number: 1315-01-1-03-016

Recording Date: 08/30/2002

Brief Description: LOT 16 BLK 4 FOX MEADOW FLG 1

Legal Description: LOT NUMBER: 16; SUBDIVISION: FOX MEADOWS FLG 1; BLOCK: 4; SEC/TWN/RNG/MER: SEC 01 TWN 02N RNG 69W

Sale Information

Recording Date: 08/30/2002

Prior Recording Date: 05/31/2001

Sale Price: $349,100 - FULL AMOUNT

Document Number: 2330023

Document Type: WJ

Assessment Information

Market Value Year: 2011

Market Land Value: $63,500

Market Improvement Value: $269,500

Total Market Value: $333,000

Assessment Year: 2011

Tax Information

Estimated Roll Certification Date: 08/25/2010

Tax Rate Code: 000684
Tax Amount: $2,507.68
Tax Year: 2010

Property Characteristics

Year Built: 2002
Bedrooms: 4
Baths: 2
Partial Baths: 1
Total Rooms: 10
Garage Type: ATTACHED
Garage Size: 2 CAR(S)
Building Area: 2,633 LIVING
1,473 1ST FLOOR
1,116 LOWER/BASEMENT - FINISHED
357 LOWER/BASEMENT - UNFINISHED
572 GARAGE
Air Conditioning: YES
Heating: FORCED AIR UNIT
Construction: FRAME
Basement: YES
Exterior Walls: WOOD SHINGLE
Effective Year: 2002
Square Footage: 6328 SF

NOTE: Mr. Mundt no longer owns the following property.

805 ARROWOOD ST, LONGMONT, CO 80503-7530 (BOULDER COUNTY)
APN: R0122197
APN Sequence Number: 001
Account Number: 0122197
Date Subject First Seen as Owner: 06/27/1997
Date Subject Last Seen as Owner: 08/30/2002
Subdivision Name: MEADOWVIEW FILING 04
Legal Description: LOT 95 MEADOWVIEW FLG 4 PROPER TY ADDRESS: 000805 ARROWWOOD S T LONGMONT
Building Square Feet: 1,780
Living Square Feet: 1,500
Land Square Feet: 4,024
Year Built: 1997
Latest Tax Roll/Assessment Information
Tax Year: 2010
Tax Amount: $1,531.48
Assessed Year: 2011
Assessed Value: $18,228

Sale Date: 08/30/2002
Sale Amount: $225,000
Document Number: 2330129
Total Value: $229,000
Land Value: $62,000
Improvement Value: $167,000
Bedrooms: 3
Baths: 2
Most Current Ownership Information - 08/30/2002
Owner: CHRISTA FORSYTHE
Mailing Address: 805 ARROWOOD ST, LONGMONT, CO 80503-7530 (Boulder COUNTY)
Seller: HEATHER MUNDT
Seller: MICHAEL MUNDT
805 ARROWOOD ST, LONGMONT, CO 80503-7530 (BOULDER COUNTY)
Sale Date: 08/30/2002
Sale Amount: $225,000
Absentee Indicator: Owner Occupied
Deed Sec Cat: Resale, Mortgaged Purchase, Residential (Modeled)
Universal Land Use: SFR
Property Indicator: Single Family Residence
Resale New Construction: Resale
Residential Model Indicator: Property is Residential
Mortgage
Lender: GREENCO FIN'L
Mortgage Amount: $172,500
Mortgage Loan Type: Conventional
Mortgage Deed Type: Deed of Trust
Mortgage Term: 30 Years
Mortgage Date: 08/30/2002
Mtg Sec Cat: CNV, Fixed, Conforming
Mortgage Interest Rate Type: Fixed
Previous Ownership Information - 06/27/1997
Owner: MICHAEL MUNDT
Mailing Address: 805 ARROWOOD ST, LONGMONT, CO 80503-7530 (Boulder COUNTY)
Seller: MCSTAIN ENTERPRISES INC
805 ARROWOOD ST, LONGMONT, CO 80503-7530 (BOULDER COUNTY)
Owner Relationship Type: Single
Sale Date: 06/27/1997
Sale Code: Sale Price (Full)
Sale Amount: $142,700
Absentee Indicator: Situs Address Taken From Sales Transaction - Determined Owner Occupied
Deed Sec Cat: Resale, Mortgaged Purchase, Residential (Modeled)
Universal Land Use: Single Family Residence
Property Indicator: Single Family Residence/Townhouse
Resale New Construction: Resale
Residential Model Indicator: Based On Zip Code and Value Property is Residential
Mortgage
Lender: WESTLAND MTG SVC
Mortgage Amount: $139,816
Mortgage Loan Type: Federal Housing Authority
Mortgage Deed Type: Deed of Trust
Mortgage Date: 06/30/1997
Mtg Sec Cat: FHA, Adjustable
Mortgage Interest Rate Type: Adjustable

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End of Report