

# Multivariate Statistical Process Control Procedures

Marriott Houston Intercontinental Hotel  
June 23 and 24, 2010

InControl Technologies, Inc. is conducting a two day training seminar providing attendees with the necessary training to begin development of Multivariate Statistical Process Control Procedures for their facilities.

## Course Abstract

Multivariate Statistical Process Control (MVSPC) is one of the fastest growing areas of Industrial Quality Control. This is occurring because advances in the methodology and in the accompanying computer software have greatly simplified the application of MVSPC in industrial applications. Most current industrial SPC applications involve the separate charting of a series of variables that are usually related to the quality of the final product. If the program has been in operation for any length of time, the number of charts that are being monitored can become over whelming to operators and production engineers. In contrast, MVSPC procedures allow production personnel to simultaneously observe several variables on one consolidated chart. One of the most popular statistics for monitoring a multivariate process is Hotelling's  $T^2$ . It allows for the informative interpretation of a process signal and can be used under a wide variety of different process conditions that make univariate SPC impracticable and obsolete.

This course focuses on using examples from real world industrial applications to demonstrate the versatility of the  $T^2$  as a control statistic for multivariate processes. The main purpose of the course is to introduce the participant to the capabilities of a multivariate control procedure and to the development of a multivariate control procedure for their production unit or manufacturing process. Specifically, the construction of a clean historical data set will be illustrated. The  $T^2$  charting statistic will be computed and its importance discussed. The decomposition of a  $T^2$  signal and its interpretation will also be discussed in detail through numerous class examples. After completing the course, the participant will be familiar with the benefits of applying the  $T^2$  control procedure to any multivariate process.

## Course Objectives

The objective of the course is to provide the foundation necessary to conduct Multivariate SPC at your facility. You will be instructed on the fundamental differences between univariate and multivariate SPC and shown how to develop a historical data set, identify special causes, and interpret process signals. At the end of this course, the participant will also be able to:

- ✓ create multivariate models of process data (using multiple regression and PCA analysis)
- ✓ understand the usefulness of the  $T^2$  statistic in monitoring a multivariate process,
- ✓ build a clean multivariate historical data set from which to base the multivariate control procedure,
- ✓ data charting techniques including the  $T^2$  charting statistic using appropriate computer software,
- ✓ decompose a multivariate signal using the  $T^2$  decomposition and interpret its elements,
- ✓ use the  $T^2$  statistic to adjust for autocorrelated or decay type data, and
- ✓ apply the  $T^2$  to a set of industrial multivariate process data.

## **Equipment**

A demonstration version of QualStat Multivariate SPC software will be provided to each attendee. A computer will be needed by each participant to view the software and run the examples. A Pentium 4 based computer with Windows XP, Vista or Windows 7 is recommended.

## **Enrollment and Costs**

Enrollment will be limited to 15 persons. The cost of the course is \$895 per person. The discounted rate of \$795 per person would apply when a company has more than one person attending the course. The cost of the course does not include a licensed copy of QualStat; however, a special discount on the software will be offered to each attendee. Please mail the enclosed registration form to:

Angie Marcon  
InControl Technologies, Inc.  
3845 F.M. 1960 W, Suite 195  
Houston, Texas 77068  
(281) 580-8892

or Fax (281) 580-8853

## **Location**

This seminar will be held at the Marriott Houston Intercontinental Hotel in Houston, Tx. The hotel is located at George Bush Intercontinental Airport. Their address is 18700 John F. Kennedy Blvd., Houston, Tx, 77032.

## **Deadline**

The deadline for registration is Tuesday, June 1, 2010. We will mail or fax a confirmation notice. To receive a full refund for the course, you must cancel before June 1, 2010. There will be a \$100 cancellation fee after June 1, 2010 (you may alternately substitute someone in your place free of charge).

## **Method of Payment**

Cash, check, Visa, Mastercard and American Express are acceptable for registration payment. Complete the enclosed registration form and mail to the address on the form or you may fax it to (281) 580-8892.

## **Hotel Reservations**

If you are not in the Houston area, then rooms are available at the Marriott Houston Intercontinental Hotel. For hotel reservations, contact Marriott at (281) 443-2310. Room costs will be paid directly to Marriott.

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**Registration Form**  
**Multivariate SPC Training Seminar**  
**June 23 and 24, 2010**  
**Marriott Houston Intercontinental Hotel**  
**Houston, Tx**

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Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Email: \_\_\_\_\_

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Please enroll me in the Multivariate SPC Course.

I am the only one attending from my company	\$ 895	_____
I am attending with others from my company	\$ 795	_____
I would like to buy a copy of QualStat prior to attending the course. (Note: this price includes the course discount for QualStat)	\$ 595	_____
	Total	_____

Type of payment:

\_\_\_ Check:            Include check payable to: InControl Technologies, Inc.

\_\_\_ Credit Card:

\_\_\_ Visa            \_\_\_ Mastercard            \_\_\_ American Express

Account Number: \_\_\_\_\_

Expiration Date:    \_\_\_ Month.    \_\_\_ Year

Signature: (required if using credit card) \_\_\_\_\_

Cardholder's Name: \_\_\_\_\_

The course is subject to cancellation if minimum number of registrants not met. Mail or fax application to:

InControl Technologies, Inc.            or    Fax to: (281) 580-8853  
3845 FM 1960 W, Suite 195  
Houston, Texas 77068  
Attention: Training Seminars

\_\_\_ Please send me additional information regarding lodging and area attractions.