SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

SCHEDULE TO

(Rule 13e-4)

TENDER OFFER STATEMENT UNDER SECTION 14(d)(1) OR 13(e)(1)

OF THE SECURITIES EXCHANGE ACT OF 1934

MERCURY COMPUTER SYSTEMS, INC.

(Name of Subject Company (Issuer) and Filing Person (Offeror))

Options to Purchase Common Stock, Par Value \$.01 Per Share, of Mercury Computer Systems, Inc.

(Title of Class of Securities)

589378 10 8

(CUSIP Number of Class of Securities (Underlying Common Stock))

Craig Barrows, Esq.

Vice President and General Counsel

Mercury Computer Systems, Inc.

199 Riverneck Road

Chelmsford, Massachusetts 01824

(978) 256-1300

(Name, Address and Telephone Number of Person Authorized to Receive Notices and Communications on Behalf of Filing Person)

Copies of all communications should be sent to:

Anthony J. Medaglia, Jr., P.C.

Goodwin Procter LLP

Exchange Place

Boston, Massachusetts 02109

(617) 570-1000

CALCULATION OF FILING FEE

	Transaction Value* \$15,311,708	Amount of Filing Fee** \$1,638.36				
*	stock of Mercury Computer Systems, Inc., which options ha	This amount assumes that options to purchase 2,188,434 shares of common ave an approximate aggregate value of \$15,311,708, will be exchanged was calculated based on the Black-Scholes option pricing model, as of July 31,				
**	The amount of the filing fee, calculated in accordance with \$107.00 per million dollars of the value of the transaction.	Rule 0-11 under the Securities Exchange Act of 1934, as amended, equals				
		Rule 0-11(a)(2) and identify the filing with which the offsetting fee was statement number, or the Form or Schedule and the date of its filing.				
Amo	ount Previously Paid: Not applicable	Filing Party: Not applicable				
Forr	n or Registration No.: Not applicable	Date Filed: Not applicable				
" Check the box if the filing relates solely to preliminary communications made before the commencement of a tender offer. Check the appropriate boxes below to designate any transactions to which the statement relates:						
	" third party tender offer subject to Rule 14d-1.					
	x issuer tender offer subject to Rule 13e-4.					
	" Going-private transaction subject to Rule 13e-3.					

amendment to Schedule 13D under Rule 13d-2.

Check the following box if the filing is a final amendment reporting the results of the tender offer: "

ITEM 1. SUMMARY TERM SHEET.

The information set forth under the headings Summary of Terms Overview and Summary of Terms Questions and Answers in the Offer to Exchange, dated August 11, 2006 (the Offer to Exchange), attached hereto as Exhibit (a)(1)(A), is incorporated herein by reference.

ITEM 2. SUBJECT COMPANY INFORMATION.

- (a) *Name and Address*. The name of the issuer is Mercury Computer Systems, Inc., a Massachusetts corporation (Mercury). Mercury s principal executive office is located at 199 Riverneck Road, Chelmsford, Massachusetts 01824, and its telephone number is (978) 256-1300.
- (b) Securities. This Tender Offer Statement on Schedule TO relates to an offer (the Offer) by Mercury to eligible option holders to exchange certain outstanding eligible options to purchase shares of Mercury s common stock, par value \$.01 per share (Common Stock), that were originally granted under Mercury s 1997 Stock Option Plan (the 1997 Plan), for restricted stock awards consisting of restricted shares of Common Stock or deferred stock awards consisting of phantom stock units to be settled upon vesting in shares of Common Stock (such restricted shares and phantom stock units being referred to collectively herein as Restricted Stock Rights and the restricted stock awards and deferred stock awards to be granted pursuant to the Offer being collectively referred to as Replacement Awards) that will be granted under Mercury s 2005 Stock Incentive Plan (the 2005 Plan), upon the terms and subject to the conditions set forth in the Offer to Exchange. As of July 31, 2006, options to purchase approximately 2,188,434 shares of Common Stock were eligible for exchange in the Offer. The information set forth in the Offer to Exchange under Summary of Terms Overview, Summary of Terms Questions and Answers, Section 2 (Number of Restricted Stock Rights; Expiration Date), Section 3 (Purpose of the Exchange Program) and Section 9 (Source and Amount of Consideration; Terms of the Replacement Awards) is incorporated herein by reference.
- (c) Trading and Market Price. The information set forth in the Offer to Exchange under Section 8 (Price Range of Our Common Stock) is incorporated herein by reference.

ITEM 3. IDENTITY AND BACKGROUND OF FILING PERSON.

(a) *Name and Address*. The information set forth under Item 2(a) above and in Appendix A of the Offer to Exchange (Information About the Directors and Executive Officers of Mercury Computer Systems, Inc.) is incorporated herein by reference. Mercury is both the subject company (issuer) and filing person (offeror).

ITEM 4. TERMS OF THE TRANSACTION.

(a) *Material Terms*. The information set forth in the Offer to Exchange under Summary of Terms Overview, Summary of Terms Questions and Answers, Certain Risks of Participating in the Exchange Program, Section 1 (Eligibility), Section 2 (Number of Restricted Stock Rights; Expiration Date), Section 3 (Purpose of the Exchange Program), Section 4 (Procedures for Tendering Options for Exchange), Section 5 (Withdrawal Rights), Section 6 (Acceptance of Options for Exchange and Issuance of Replacement Awards), Section 7 (Conditions of the Exchange Program), Section 9 (Source and Amount of Consideration; Terms of the Replacement Awards), Section 12 (Status of Options Accepted by Us in the Exchange Program; Accounting Consequences of the Exchange Program), Section 14 (Material U.S. Federal Income Tax Consequences), Section 15 (Considerations Specific to Eligible Employees Outside the United States), Section 16 (Extension of the Election Period; Termination; Amendment) and Appendix B (Guide to International Issues) is incorporated herein by reference.

(b) *Purchases.* Members of Mercury s Board of Directors and its five most highly compensated executive officers (including the chief executive officer) are not eligible to exchange options pursuant to the Offer. The information set forth in the Offer to Exchange under Section 11 (Interests of Directors and Executive Officers; Transactions and Arrangements Concerning the Options) is incorporated herein by reference.

ITEM 5. PAST CONTACTS, TRANSACTIONS, NEGOTIATIONS AND AGREEMENTS.

(e) Agreements Involving the Subject Company s Securities. The information set forth in the Offer to Exchange under Section 11 (Interests of Directors and Executive Officers; Transactions and Arrangements Concerning the Options) is incorporated herein by reference.

ITEM 6. PURPOSES OF THE TRANSACTION AND PLANS OR PROPOSALS.

- (a) *Purposes*. The information set forth in the Offer to Exchange under Summary of Terms Questions and Answers and Section 3 (Purpose of the Exchange Program) is incorporated herein by reference.
- (b) Use of Securities Acquired. The information set forth in the Offer to Exchange under Section 6 (Acceptance of Options for Exchange and Issuance of Replacement Awards), Section 9 (Source and Amount of Consideration; Terms of the Replacement Awards) and Section 12 (Status of Options Accepted by Us in the Exchange Program; Accounting Consequences of the Exchange Program) is incorporated herein by reference.
- (c) Plans. The information set forth in the Offer to Exchange under Section 10 (Information About Mercury Other) is incorporated herein by reference.

ITEM 7. SOURCE AND AMOUNT OF FUNDS OR OTHER CONSIDERATION.

- (a) Source of Funds. The information set forth in the Offer to Exchange under Section 9 (Source and Amount of Consideration; Terms of the Replacement Awards) and Section 12 (Status of Options Accepted by Us in the Exchange Program; Accounting Consequences of the Exchange Program) is incorporated herein by reference.
- (b) Conditions. The information set forth in the Offer to Exchange under Section 7 (Conditions of the Exchange Program) is incorporated herein by reference.
- (d) Borrowed Funds. Not applicable.

ITEM 8. INTEREST IN SECURITIES OF THE SUBJECT COMPANY.

(a) Securities Ownership. The information set forth in the Offer to Exchange under Section 11 (Interests of Directors and Executive Officers; Transactions and Arrangements Concerning the Options) is incorporated herein by reference.

(b) Securities Transactions. The information set forth in the Offer to Exchange under Section 11 (Interests of Directors and Executive Officers; Transactions and Arrangements Concerning the Options) is incorporated herein by reference.

ITEM 9. PERSONS/ASSETS, RETAINED, EMPLOYED, COMPENSATED OR USED.

(a) Solicitations or Recommendations. Not applicable.

ITEM 10. FINANCIAL STATEMENTS.

- (a) Financial Information. The information set forth in the Offer to Exchange under Section 10 (Information About Mercury) and Section 18 (Additional Information), in Item 8 of Mercury s Annual Report on Form 10-K for the fiscal year ended June 30, 2005, filed with the Securities and Exchange Commission on September 13, 2005, and in Item 1 of Mercury s Quarterly Report on Form 10-Q for the quarter ended March 31, 2006, filed with the Securities and Exchange Commission on May 9, 2006, is incorporated herein by reference. A copy of such Annual Report on Form 10-K and such Quarterly Report on Form 10-Q can be accessed electronically on the Securities and Exchange Commission s website at www.sec.gov.
- (b) Pro Forma Information. Not applicable.

ITEM 11. ADDITIONAL INFORMATION.

- (a) Agreements, Regulatory Requirements and Legal Proceedings. The information set forth in the Offer to Exchange under Section 11 (Interests of Directors and Executive Officers; Transactions and Arrangements Concerning the Options) and Section 13 (Legal Matters; Regulatory Approvals) is incorporated herein by reference.
- (b) Other Material Information. Not applicable.

ITEM 12. EXHIBITS.

The Exhibit Index included in this Schedule TO is incorporated herein by reference.

ITEM 13. INFORMATION REQUIRED BY SCHEDULE 13E-3.

Not applicable.

SIGNATURE

After due inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

MERCURY COMPUTER SYSTEMS, INC.

(Registrant)

Date: August 11, 2006

By: /s/ Robert E. Hult
Robert E. Hult

Senior Vice President,

Chief Financial Officer

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EXHIBIT INDEX

		Incorporated by Reference				
Exhibit Number	Exhibit Description	Form	File No.	Exhibit	Filing Date	Filed Herewith
(a)(1)(A)	Offer to Exchange, dated August 11, 2006, including Transmittal Letter, form of Election to Participate and form of Notice of Withdrawal.					X
(a)(1)(B)	Form of Personnel Grant Status.					X
(a)(1)(C)	Email dated August 11, 2006 announcing the commencement of the election period for the exchange program.					X
(a)(1)(D)	Form of email reminder of option exchange program expiration date.					X
(a)(1)(E)	Preliminary Proxy Statement.	14A	000-23599	N/A	June 27, 2006	
(a)(1)(F)	Definitive Proxy Statement.	14A	000-23599	N/A	July 10, 2006	
(a)(1)(G)	Mercury s 2005 Stock Incentive Plan, amended and restated through August 7, 2006.	8-K	000-23599	10.1	August 8, 2006	
(a)(1)(H)	Form of Restricted Stock Award Agreement under Mercury s 2005 Stock Incentive Plan.	8-K	000-23599	10.3	November 16, 2005	
(a)(1)(I)	Form of Deferred Stock Award Agreement under Mercury s 2005 Stock Incentive Plan.	10-Q	000-23599	10.1	May 9, 2006	
(a)(1)(J)	French Guidelines for Stock Free Awards to employees and corporate officers of Mercury s French subsidiaries.					X
(a)(1)(K)	Mercury s Annual Report on Form 10-K for the fiscal year ended June 30, 2005.	10-K	000-23599	N/A	September 13, 2005	
(a)(1)(L)	Mercury s Quarterly Report on Form 10-Q for the quarter ended September 30, 2005.	10-Q	000-23599	N/A	November 9, 2005	
(a)(1)(M)	Mercury s Quarterly Report on Form 10-Q for the quarter ended December 31, 2005.	10-Q	000-23599	N/A	February 9, 2006	
(a)(1)(N)	Mercury s Quarterly Report on Form 10-Q for the quarter ended March 31, 2006.	10-Q	000-23599	N/A	May 9, 2006	
(b)	Not applicable.					
(d)(1)	Mercury s 1997 Stock Option Plan, as amended and restated.	8-K	000-23599	10.1	November 18, 2004	
(d)(2)	Form of Option Agreement under Mercury s 1997 Stock Option Plan.	10-Q	000-23599	10.1	November 1, 2004	
(d)(3)	Form of Restricted Stock Award Agreement under Mercury s 1997 Stock Option Plan.	8-K	000-23599	10.1	August 17, 2005	

Exhibit		Incorporated by Reference				Filed
Number	Exhibit Description	Form	File No.	Exhibit	Filing Date	Herewith
(d)(4)	Form of Restricted Stock Award Agreement with James R. Bertelli under Mercury s 1997 Stock Option Plan.	10-K	000-23599	10.2.4	September 13, 2005	
(d)(5)	Form of Stock Option Agreement under Mercury s 2005 Stock Incentive Plan.	8-K	000-23599	10.2	November 16, 2005	
(d)(6)	Form of Restricted Stock Award Agreement under Mercury s 2005 Stock Incentive Plan.	8-K	000-23599	10.3	November 16, 2005	
(d)(7)	Form of Restricted Stock Award Agreement with James R. Bertelli under Mercury s 2005 Stock Incentive Plan.	8-K	000-23599	10.4	November 16, 2005	
(d)(8)	Form of Stock Option Agreement under Mercury s 2005 Stock Incentive Plan.	8-K	000-23599	10.1	June 2, 2006	
(d)(10)	Form of Change in Control Severance Agreement.	8-K	000-23599	10.1	February 23, 2006	
(g)	Not applicable.					
(h)	Not applicable.					