

Mail Stop 0306

March 1, 2005

Via Facsimile and U.S. Mail

Robert E. Hult
Senior Vice President and Chief Financial Officer
Mercury Computer Systems, Inc.
199 Riverneck Road
Chelmsford, MA 01824

Re: Mercury Computer Systems, Inc.
Form 10-K for the fiscal year ended June 30, 2004
Filed September 10, 2004
Form 10-Q for the quarter ended December 31, 2004
File No. 0-23599

Dear Mr. Hult:

We have reviewed your filings and have the following comments. We have limited our review to only your financial statements and related disclosures and will make no further review of your documents. Where indicated, we think you should revise your documents in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with supplemental information so we may better understand your disclosure. After reviewing this information, we may or may not raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comment or on any other aspects of our review. Feel free to call us at the telephone numbers listed at the end of this letter.
Form 10-K as of June 30, 2004

Note G - Acquisitions - Page 53

1. We note your disclosure that you believe the acquisition of TGS "will expand the breadth of the Company's product offerings in the Image and Visualization Solutions Group markets." We also note your disclosure on page 55 that the pro forma results of operations assuming TGS had been acquired July 1, 2003 would not differ materially from your operating results as reported. We note you have similar disclosures relating to your acquisition of Advanced Radio Corporation in this Form 10-K and relating to your acquisition of Momentum Computer Group in your December 31, 2004 Form 10-Q. Given these statements, it is unclear why these purchases resulted in relatively minor amounts being allocated to intangible assets, with relatively large amounts recorded to goodwill. Based on your disclosures, it appears that the value of these acquisitions rest with the product offerings of the acquired companies and therefore you should have allocated a greater amount allocated to intangible assets in accordance with paragraphs 37(e) and 39 of SFAS 141. Please supplementally tell us why you did not allocate a greater amount to any intangible assets, including those listed in

Appendix

A14 of SFAS 14. Tell us why the purchase resulted in such a significant amount being recorded to goodwill.

Supplementary Information (Unaudited) - Page 67

2. Please supplementally describe the factors responsible for the 30% increase in revenues in the fourth quarter of 2004.

Item 9A. Controls and Procedures - Page 68

3. We note management's conclusion that as of June 30, 2004, the disclosure controls and procedures are effective "to ensure that material information relating to the Company, including its consolidated subsidiaries, is made known to [the CEO and CFO] by others within the Company and its consolidated subsidiaries."

This conclusion contains an inappropriate qualification as to the effectiveness of your disclosure controls and procedures. Please revise your filing to limit your conclusion to state simply whether the disclosure controls and procedures were effective. However, if you elect to retain qualifying language in your disclosure, revise so that the language is fully consistent with the definition of disclosure controls and procedures contained in Rule 13a-15(e).

Form 10-Q as of December 31, 2004

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

Results of Operations - Page 14

4. We note that revenues declined from \$59.1 million in the fourth quarter of 2004 to \$55.0 million in the first quarter of 2005.

More specifically, we note revenues in your Defense Electronics Group declined from \$42.8 million in the fourth quarter of 2004 to \$31.0 million in the first quarter of 2005, while revenues in your OEM Solutions group increased from \$7.4 million in the fourth quarter of 2004 to \$13.5 million in the first quarter of 2005. Given the significance of these changes, we believe they should be addressed in Management's Discussion and Analysis. Specifically, you should discuss any material trends that may exist in the business. For example, is the decline in revenues for DEG indicative of a trend that may also impact your future results? Please respond supplementally and revise future filings to include discussion of such changes as appropriate.

Item 4. Controls and Procedures - Page 29

Changes in Internal Control over Financial Reporting - Page 29

5. We note your disclosure that "there was no change in [your] internal control over financial reporting during [your] first fiscal quarter that has materially affected, or is reasonably likely to materially affect, [your] internal control over financial reporting."

You do not indicate if there were any changes to your internal controls over financial reporting that occurred with your evaluation during your most recent fiscal quarter. Please revise to disclose if you had any changes occur in your internal controls over financial reporting that occurred during your second fiscal quarter of 2005. Refer to Item 308(c) of Regulation S-K.

6. We note your statement that a "control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the internal control system are met." Please revise to state clearly, if true, that your disclosure

controls and procedures are designed to provide reasonable assurance of achieving their objectives and that your principal executive officer and principal financial officer concluded that your disclosure controls and procedures are effective at that reasonable assurance level. In the alternative, remove the reference to the level of assurance of your disclosure controls and procedures. Please refer to Section II.F.4 of Management's Reports on Internal Control Over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports, SEC Release No. 33-8238, available on our website at .

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As appropriate, please amend your June 30, 2004 Form 10-K and your December 31, 2004 Form 10-Q and respond to these comments within 10 business days or tell us when you will provide us with a response. You may wish to provide us with marked copies of the amendment to expedite our review. Please furnish a cover letter with your amendment that keys your responses to our comments and provides any requested supplemental information. Detailed cover letters greatly facilitate our review. Please file your cover letter on EDGAR. Please understand that we may have additional comments after reviewing your amendment and responses to our comments.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filings reviewed by the staff to be certain that they have provided all information investors require. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In connection with responding to our comments, please provide, in writing, a statement from the company acknowledging that

- * The company is responsible for the adequacy and accuracy of the disclosure in the filings;
- * Staff comments or changes to disclosure in response to staff comments in the filings reviewed by the staff do not foreclose the Commission from taking any action with respect to the filing; and
- * The company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

In addition, please be advised that the Division of Enforcement has access to all information you provide to the staff of the Division of Corporation Finance in our review of your filing or in response to our comments on your filing.

You may contact Kevin Vaughn, Staff Accountant, at (202) 824-5387 or me at (202) 942-2813 if you have questions regarding these comments. In this regard, do not hesitate to contact Martin James, the Senior Assistant Chief Accountant, at (202) 942-1984.

Sincerely,

Daniel Gordon
Branch Chief

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Mr. Robert E. Hult
Mercury Computer Systems, Inc.
March 1, 2005
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