



June 12, 2024

Via Electronic Mail

Massachusetts Institute of Technology
c/o Professor Kerri Cahoy
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RE: In the Matter of Massachusetts Institute of Technology; Incident Number CRSRA230012
Appeal of Written Warning

Dear Dr. Cahoy:

This appeal concerns a Written Warning issued to the Massachusetts Institute of Technology (MIT or Respondent), through Dr. Kerri Cahoy, Associate Department Head, Professor of Aeronautics and Astronautics and co-Director, Small Satellite Collaborative. The Written Warning, which contained three counts, notified MIT that it had violated the Land Remote Sensing Policy Act of 1992 (LRSPA) and corresponding regulations by violating a condition to its private remote sensing space system license. The Written Warning was transmitted to you and other MIT officials, by certified mail, on January 10, 2024, from the National Oceanic and Atmospheric Administration (NOAA), Office of General Counsel, Enforcement Section (GCES). Respondent submitted a timely appeal of Count One and Count Two of the Written Warning.

Specifically, Count One charges Respondent with failing to timely submit a written notification of an anomaly affecting its BeaverCube remote sensing system within seven days of detection in violation of 51 U.S.C. § 60123(a)(3), 15 C.F.R. § 960.16(b) and its NOAA Remote Sensing License for the BeaverCube system. Count Two charges Respondent for failing to timely submit a written notification of the disposal of an on-orbit component of the BeaverCube remote sensing system no later than seven days after the disposal in violation of 51 U.S.C. § 60123(a)(3), 15 C.F.R. § 960.16(b) and its NOAA Remote Sensing License for the BeaverCube system.

For the reasons set forth below, I vacate Counts One and Two of MIT's Written Warning.

I. Standard of Review

NOAA regulations provide that a respondent may seek review of a written warning by submitting an appeal to the NOAA Deputy General Counsel within sixty days of receipt of the written warning. 15 C.F.R. § 904.403(b). An appeal from a written warning “must be in writing and must present the facts and circumstances that explain or deny the violation described in the written warning.” 15 C.F.R. § 904.403(b)(1). On appeal, the NOAA Deputy General Counsel “may, in his or her discretion, affirm, vacate, or modify the written warning[.]” 15 CFR § 904.403(c). The NOAA Deputy General Counsel's determination constitutes final agency action for purposes of judicial review. *Id.*



II. Legal Framework

Section 3 of the LRSPA, 51 U.S.C. § 60123(a)(3) & (4), authorizes the Secretary of Commerce to “provide penalties for noncompliance with the requirements of licenses or regulations issued under [the LRSPA], including civil penalties not to exceed \$10,000 (each day of operation in violation of such licenses or regulations constituting a separate violation)” and “compromise, modify, or remit any such civil penalty.” The LRSPA’s implementing regulations require that any person who operates a space system from the United States and any person who is a U.S. person shall not, *inter alia*, violate the LRSPA, its regulations, or any license condition. 15 C.F.R. § 960.16(b).

III. Factual Background

MIT holds two Tier 1 licenses for the BeaverCube remote sensing system. CRSRA Case Package: CRSRA230006.MIT (hereinafter CP) at 1. The BeaverCube I remote sensing system license was first issued on August 28, 2000, and was modified on August 30, 2022, and the BeaverCube II remote sensing system license was issued on October 17, 2023. *Id.* The Written Warning addresses violations of compliance with the BeaverCube I license, which, *inter alia*, requires four annual compliance certifications (ACC). Written Warning at 1-2; CP at 1-2.

On October 14, 2022, the NOAA Office of Space Commerce, Commercial Remote Sensing Regulatory Affairs Office (CRSRA), issued Dr. Kerri Cahoy, the point of contact for the BeaverCube license, a reminder to submit the system’s 2022 ACC. CP at 1. That same day, Dr. Cahoy submitted the 2022 BeaverCube ACC, but noted that, “the spacecraft has not been responsive for two weeks and even the BlackBox beacon suddenly stopped working. . . so we are considering that it may have been hit by debris or a micrometeoroid and permanently disabled. We are continuing to try to contact it but no luck yet.” CP at 1, 30, 63-64. On March 9, 2023, Dr. Cahoy notified CRSRA that contacts with BeaverCube I continued to be unsuccessful and that it was “ok to close the BeaverCube-1 license” because the system “is about to de-orbit and we do not think it will respond.” CP at 29. In response, CRSRA provided guidance to MIT to, “Please submit a signed request on university letterhead explaining why you want to close the license.” *Id.* No such request was received by CRSRA at that time. CP at 1.

On September 15, 2023, CRSRA issued MIT, through Dr. Cahoy, a reminder and instructions pertaining to the 2023 ACC. CP at 33-34. On September 21, 2023, MIT asked for further guidance: “Since BeaverCube I deorbited earlier this year, do we need to submit this form for it still, or is that license considered no longer active?” CP at 33. On September 22, 2023, CRSRA asked “When did the BeaverCube deorbit?” and reminded MIT that, “The license is active until we receive a request to close it and process the closure request.” *Id.* Further email communications between MIT and CRSRA as well as documentation for MIT’s 2023 ACC show that the BeaverCube I deorbited in mid-April 2023. CP at 43; 53-54.

On October 27, 2023, CRSRA again instructed MIT to “submit a signed request on the university letterhead explaining why you want to close the license.” CP at 43. MIT submitted its request to close the license on letterhead the next day, October 28, 2023, and represented that BeaverCube I was “non-responsive on orbit and was never operated.” CP at 36; *see also* CP at 45.

GCES issued a Written Warning to MIT on January 10, 2024, for three counts of violating the LRSPA, 51 U.S.C. § 60123(a)(3); 15 C.F.R. § 960.16(a) & (b); and conditions of the NOAA Remote Sensing License for the BeaverCube I system. Two of the Tier I License Conditions GCES cited are to “Notify the Secretary in writing of each of the following events, no later than seven days after the event: . . . (ii) Each disposal of an on-orbit component of the system; [and] (iii) The detection of an anomaly.” CP at 8-9. Respondent MIT, through Dr. Cahoy, timely appealed the Written Warning’s Counts One and Two, by letter dated February 28, 2024, which was received by NOAA via email on March 3, 2024.

Count One documents October 1, 2022, as the approximate date of the anomaly’s occurrence because MIT notified CRSRA on October 14, 2022, that BeaverCube I had been non-responsive for two weeks. MIT Appeal of Written Warning at 1. Respondent MIT argues that it is unreasonable to extrapolate this date because MIT cannot assume that any temporary break in response is itself an anomaly. *Id.* at 2. In support of its argument, MIT proffers that communication delays are common for small satellites such as CubeSats. *Id.* Thus, MIT argues, only after analyzing the continuous non-response by BeaverCube over a period of time was it practicable for MIT to retroactively infer the likelihood of an anomaly and, therefore, the date of notification (October 14) was less than seven days from when MIT concluded an anomaly had occurred. *Id.*

MIT, through Dr. Cahoy, argues that notification of the anomaly affecting BeaverCube I to CRSRA was not untimely. In support of its appeal of Count One, Respondent argues that CubeSats, such as BeaverCube, unlike their larger-scale counterparts, do not continuously communicate with their ground-based operators. MIT Appeal of Written Warning at 1. According to the National Aeronautics and Space Administration (NASA), “It is not uncommon for it to take several weeks to confidently identify all the satellites from a launch.” *Id.* (quoting *CubeSat 101: Basic Concepts for First-Time CubeSat Developers* available at https://www.nasa.gov/wp-content/uploads/2017/03/nasa_csli_cubesat_101_508.pdf at 30 (Oct. 2017)). Respondent further argues that interpreting signals to model a CubeSat’s performance requires gathering multiple data points over time to analyze and extrapolate whether an anomaly has occurred or even if the correct object is being tracked. *Id.* (citing Phillips, Charles, “CubeSats are Challenging,” *The Space Review*, 6 Nov. 2017, available at <https://www.thespacereview.com/article/3364/1>).

Count Two asserts that MIT, beginning on or about April 15, 2023, failed to timely submit a written notification of the disposal of an on-orbit component of the BeaverCube I remote sensing system no later than seven days after disposal. In its appeal to vacate Count Two, Respondent argues that it never intentionally initiated a disposal of BeaverCube I in violation of its license. MIT Appeal of Written Warning at 2. Rather, MIT states that it “postulated” that BeaverCube may have been damaged and/or permanently destroyed in an email it sent to CRSRA on October 14, 2022. *Id.* See also CP at 30, 63-64. The BeaverCube I remote sensing system remained unresponsive and subsequently de-orbited in mid-April 2023. CP at 36-37.

IV. Discussion

Count One concludes that Respondent failed to timely submit notification of an anomaly affecting the BeaverCube I remote sensing system within seven days of detection in violation of 51 U.S.C. § 60123(a)(3), 15 C.F.R. § 960.16(b) and its NOAA Remote Sensing License. An anomaly is defined as “an unexpected event or abnormal characteristic affecting the operations of a system that could indicate a significant technical malfunction or security threat. Anomalies include any significant deviation from the orbit and data collection characteristics of the system.” 15 C.F.R. § 960.4. MIT puts forth a reasonable justification as to why the Respondent did not immediately notify CRSRA. Crediting Respondent’s evidence that CubeSats do not continuously communicate with ground-based operators and that modeling a CubeSat’s performance requires gathering multiple data points over time – as much as several weeks – to determine whether an anomaly has occurred, I conclude that the Written Warning’s extrapolation of October 1, 2022, as the approximate date for the anomaly’s occurrence is arbitrary. Only after a sufficient amount of time had passed without a response from BeaverCube I could the Respondent reasonably conclude that an anomaly, as defined in regulations, had been detected: “[T]he spacecraft has not been responsive for two weeks and even the BlackBox beacon *suddenly* stopped working. . . so we are considering that it may have been hit by debris or a micrometeoroid and permanently disabled.” CP at 1, 30, 63-64 (emphasis added). Respondent, through its October 14 communication to CRSRA, draws a reasonable inference that “an unexpected event or abnormal characteristic affecting the operations of [BeaverCube I]” had occurred. I find that in light of the inherent uncertainty in pinpointing when the anomaly occurred, Respondent’s October 14 communication to CRSRA constituted timely notification under the terms of its license.

Count Two concludes that Respondent failed to timely submit a written notification of the disposal of an on-orbit component no later than seven days after disposal in violation of 51 U.S.C. § 60123(a)(3), 15 C.F.R. §§ 960.14(b) and its remote sensing license. There is no definition of “disposal” in the LRSPA, the regulations or license. When a word in a statute is not defined, it is given its common or ordinary meaning. *Perrin v. United States*, 444 U.S. 37, 42 (1979). The Oxford Dictionary defines “disposal” as “the action or process of throwing away or getting rid of something.” This definition entails action and intention. Such a construction of “disposal” is consistent with the way the term has been used by both NOAA and NASA in the satellite context. The facts do not support a finding that MIT intentionally initiated a “disposal” of the BeaverCube I and then failed to notify NOAA within seven calendar days. MIT communicated with CRSRA on October 14 its postulation that BeaverCube I may have been damaged and/or permanently destroyed since its BlackBox beacon, “had suddenly stopped working so we are *considering* that it *may* have been hit by debris or a micrometeoroid and permanently disabled.” CP at 1, 30, 63-64 (emphasis added). MIT later communicated to CRSRA in March 2023 that continued attempts to contact BeaverCube I were unsuccessful, the system remained unresponsive, and Dr. Cahoy expected that the system would de-orbit. Respondent subsequently informed CRSRA that BeaverCube I had de-orbited in mid-April and that it was “non-responsive on orbit and was never operated.” CP at 36; *see also* CP at 41. Respondent repeatedly relayed to CRSRA its conjecture that a malfunction had unexpectedly occurred that ultimately resulted in the BeaverCube I’s de-orbit; MIT did not state, nor are there facts to support, that MIT caused or intended the de-orbit to happen. Affording the term “disposal” its ordinary meaning, in the absence of a more specific statutory or regulatory

construction, I find that Respondent did not fail to timely submit a written notification of the “disposal” of an on-orbit component because no disposal occurred.

V. Conclusion

Based on the foregoing, I vacate Counts One and Two of MIT’s Written Warning. This determination constitutes final agency action.

Sincerely,

Kristin L. Gustafson
Deputy General Counsel
NOAA, Office of the General Counsel

cc: Mark C. DiVincenzo, Vice President & General Counsel, Massachusetts Institute of Technology
Office of General Counsel

Maria T. Zuber, Vice President for Research, Massachusetts Institute of Technology

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