

1. INTRODUCTION

On GMT 2026-03-13 (Day 072), the International Space Station (ISS) underwent a reboost using the docked Progress 93P vehicle. Based on results computed from measurements by seven Space Acceleration Measurement System (SAMS) sensor heads, the reboost produced a clear station-wide +X rigid-body acceleration step beginning near GMT 16:58:17 and lasting about 10m 18s. Across the distributed SAMS sensor heads in the U.S. Laboratory, Japanese Experiment Module, and Columbus module, the measured +X step clusters tightly around 103.4 μg , which corresponds to an empirical ΔV of about 0.63 m/s from the interval-average products. Flight controllers cited a planned TIG of 16:58:00, a planned duration of 10m 34s, and a reported ΔV of 0.61 m/s.

The March package now includes the companion Columbus-endcone spectrogram together with the seven uploaded 5-second interval-average PDFs. Those measurement products are sufficient to populate the event summary table and to support the main qualitative and quantitative conclusions for this March 13 reboost.

2. QUALIFY

Figure 1 on page 3 is based on Space Acceleration Measurement System (SAMS) sensor 121f02 measurements acquired in the Columbus (COL) module, with the sensor mounted at the starboard endcone. The resulting ~4-hour, 6 Hz spectrogram provides the broader low-frequency structural context from about 15:00 to 19:00 GMT, with Russian Segment attitude-control activity bracketing the main reboost from about 15:58 through 17:43 on 2026-03-13.

As seen in Figure 1, the main reboost near GMT 16:58 appears within that longer activity window as a conspicuous low-frequency intensification superimposed on the background spectral structure. The seven interval-average plots then establish the strongest qualitative result: exceptional station-wide coherence of the +X step. Despite being located in different parts of the station, all seven independent SAMS sensor heads register the same abrupt +X “kick” in close time alignment, indicating a common whole-body response of the station.

The measured +X step magnitudes span 102.5 to 105.2 μg , and the measured durations span 10m 15s to 10m 19s. In the interval-average figures discussed below, the +X component dominates the event while the Y and Z components remain comparatively small, aside from secondary structural motion riding on top of the reboost interval. The uploaded March plots also show the expected sharp rise into the step/plateau and a comparably sharp return toward baseline at thrust completion,

which is exactly the signature expected for a reboost-driven rigid-body acceleration event.

3. QUANTIFY

Figures 2–5 provide a straightforward way to quantify the reboost response seen by SAMS across the station. Together, these four figures present the seven 5-second interval-average acceleration plots, grouped where practical by common ISS module location: two LAB plots in Figure 2, the remaining LAB plot in Figure 3, two COL plots in Figure 4, and two JEM plots in Figure 5. Table 1 summarizes, for each sensor, the measured +X step, the visually indicated event time, the measured burn duration, and the empirical ΔV reported directly on the plots. The +X step values are reported in micro-g (μg) throughout this section.

The timing agreement across the seven sensors is tight: the plot-indicated event times cluster from 16:58:16 to 16:58:19 GMT, while the measured durations differ by only 4 seconds from one sensor to the next. The average plotted event time, 16:58:17, lags the ATL TIG of 16:58:00 by about 17 seconds, which is reasonable for this derived interval-average product and should not be interpreted as disagreement in the underlying event chronology. The corresponding station-average +X step is 103.4 μg , and the mean plot-derived ΔV is about 0.63 m/s, modestly above the ATL-reported 0.61 m/s.

Table 1. +X-axis Steps (μg) During the Reboost Event for 7 SAMS Sensors.

Sensor Rack	Sensor	Step (μg)	TIG (hh:mm:ss)	Duration (mm:ss)	DeltaV (m/s)
LAB1S2 (MSG)	es20	105.2	16:58:17	10:17	0.64
JPM1F6 (ER4)	es19	104.0	16:58:17	10:18	0.63
LAB1O4 (ER6)	es18	103.4	16:58:17	10:17	0.63
LAB1O1 (ER2)	121f03	102.5	16:58:16	10:19	0.62
COL1A3 (EPM)	121f08	103.0	16:58:16	10:18	0.62
JPM1F1 (ER5)	121f05	102.6	16:58:16	10:19	0.62
COL Endcone	121f02	103.0	16:58:19	10:15	0.62
Average		103.4	16:58:17	10:18	0.63

Note that interval averaging effectively low-pass filters the data and therefore emphasizes the rigid-body acceleration step that occurs primarily along the ISS

+X axis during such a reboost. In addition, each axis is inverted in the plotted March products to correct for intrinsic SAMS transducer polarity so that the plotted directions align with the ISS body axes. Within the accuracy of the available figures, the distributed SAMS measurements are mutually consistent and provide a robust station-wide estimate of the event strength.

In general, an empirical reboost ΔV estimate is obtained from the discretized 5-second interval-average products by first identifying, for each sensor, the time span corresponding to the +X burn plateau and then computing the mean +X interval-average value over that span. That mean value, expressed in micro-g, is converted to m/s^2 using standard gravity and multiplied by the measured burn duration in seconds. Here we treat the pre-burn baseline as sufficiently close to zero that the mean +X level over the burn plateau can be used directly as the step magnitude. For sensor i , this is

$$\Delta V_i = \left(\frac{\Delta a_{x,i}}{10^6} \right) g \Delta t_{\text{burn}},$$

where $\Delta a_{x,i}$ is the observed mean +X level during the burn from the 5-second interval-average product, expressed in micro-g, $g = 9.81 \text{ m/s}^2$, and Δt_{burn} is the measured burn duration in seconds. That gives one sensor-specific engineering estimate of the rigid-body ΔV . The station-wide value quoted here is then formed as the simple arithmetic average of those seven sensor-specific ΔV estimates.

4. CONCLUSION

SAMS measurements from seven distributed sensor heads across the U.S. Lab, JEM, and Columbus modules were reviewed for the Progress 93P reboost on GMT 2026-03-13. The uploaded 5-second interval-average PDFs show a clear, coherent +X acceleration step across the station beginning near GMT 16:58:17. The mean measured step magnitude is about $103.4 \mu\text{g}$, the mean measured duration is about 10m 18s, and the corresponding empirical station-average ΔV is about 0.63 m/s.

Those plot-derived values compare well with the ATL/planning metadata, which list a planned TIG of 16:58:00, a planned duration of 10m 34s, and a reported ΔV of 0.61 m/s. With the 121f02 spectrogram now included, the March package captures both the broader low-frequency context and the distributed interval-average response for all seven sensors. Together, these figures show that this reboost was a strong rigid-body/global event at these low frequencies, and that SAMS captured the response consistently across all three major ISS laboratory modules.

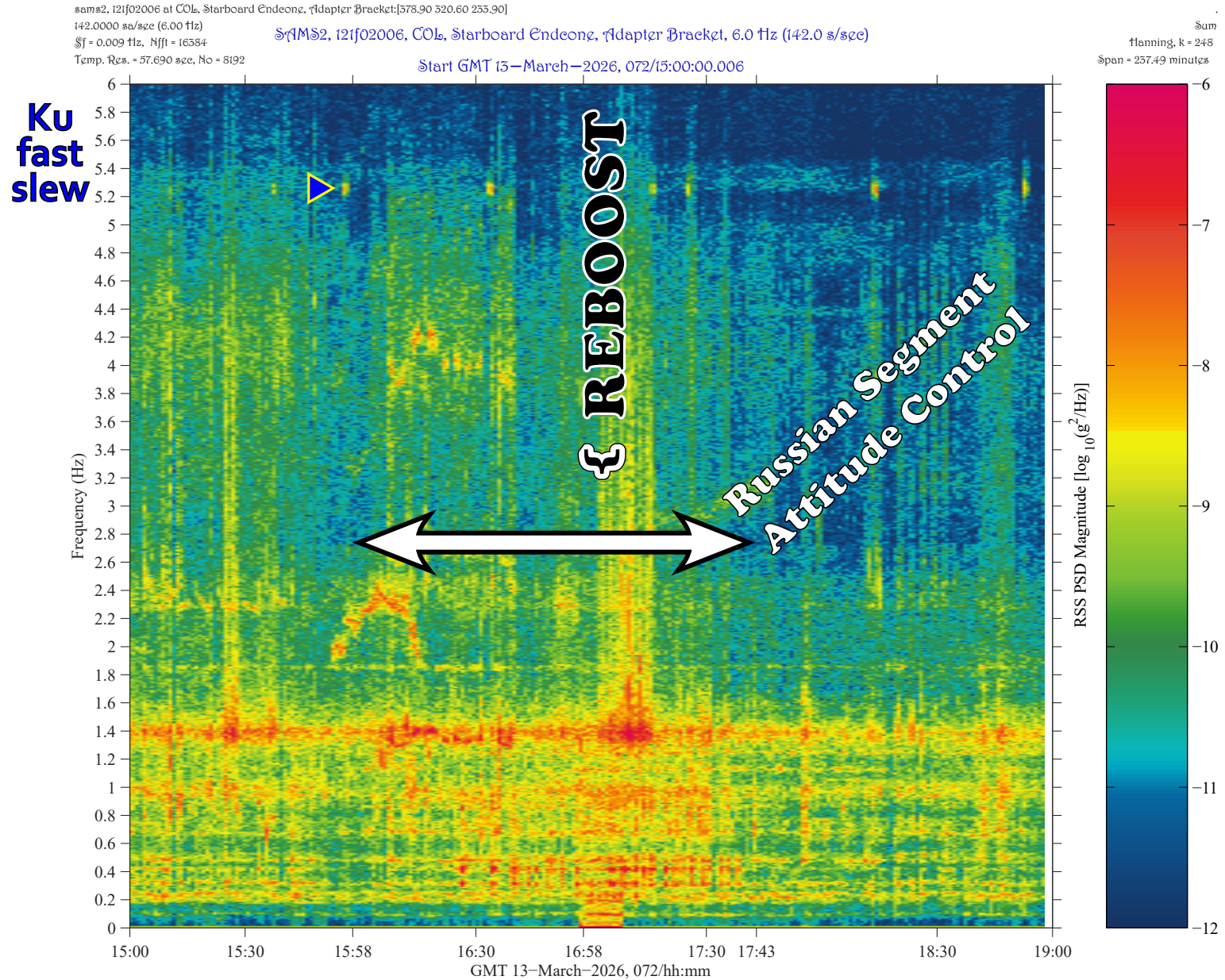


Fig. 1: ~4-hour, 6 Hz spectrogram shows Progress 93P reboost on GMT 2026-03-13, SAMS Sensor 121f02 on COL Endcone.

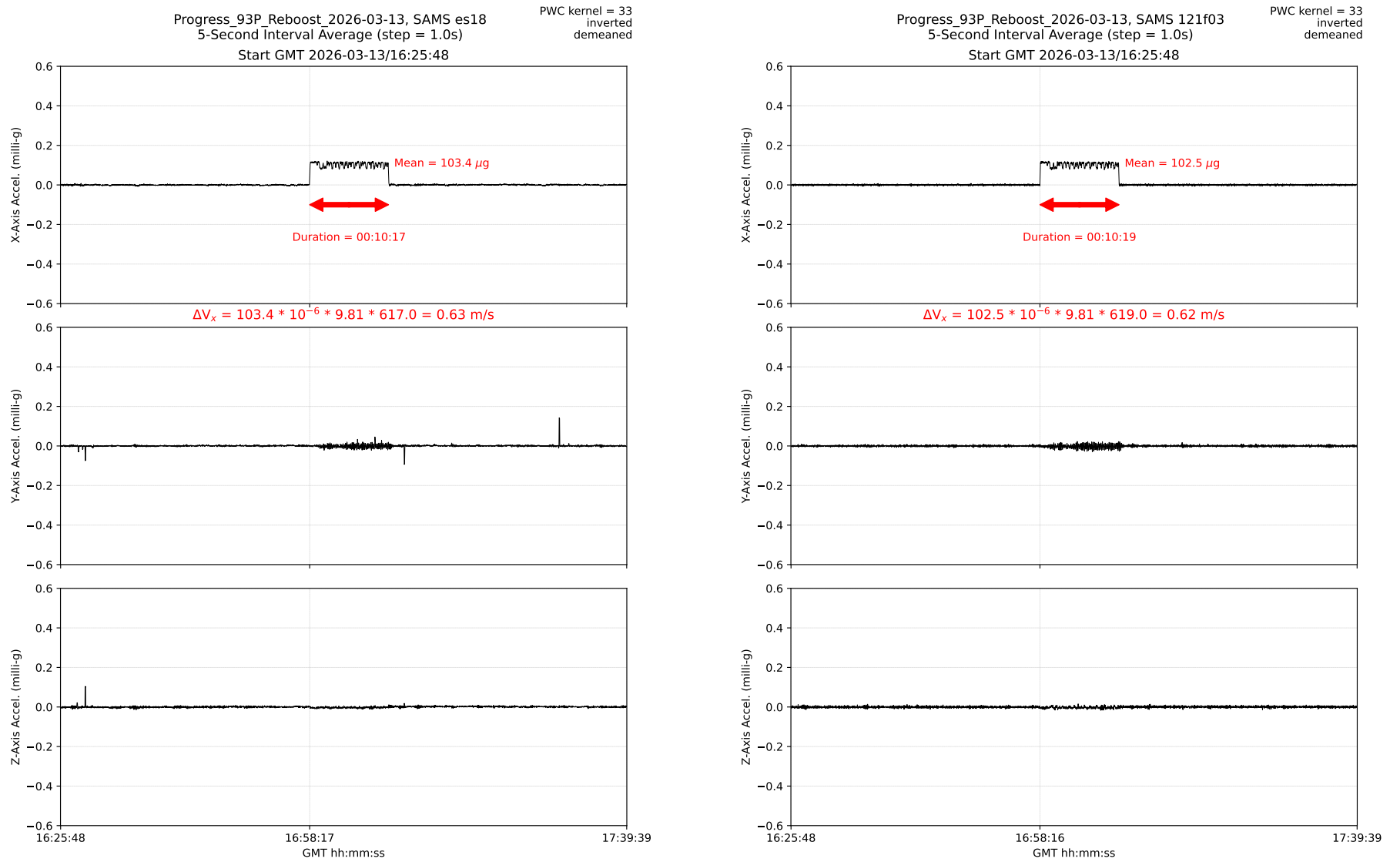


Fig. 2: 5-sec interval-average plots for two LAB-located SAMS sensors: (left) es18 at LAB104 (ER6) and (right) 121f03 at LAB101 (ER2).

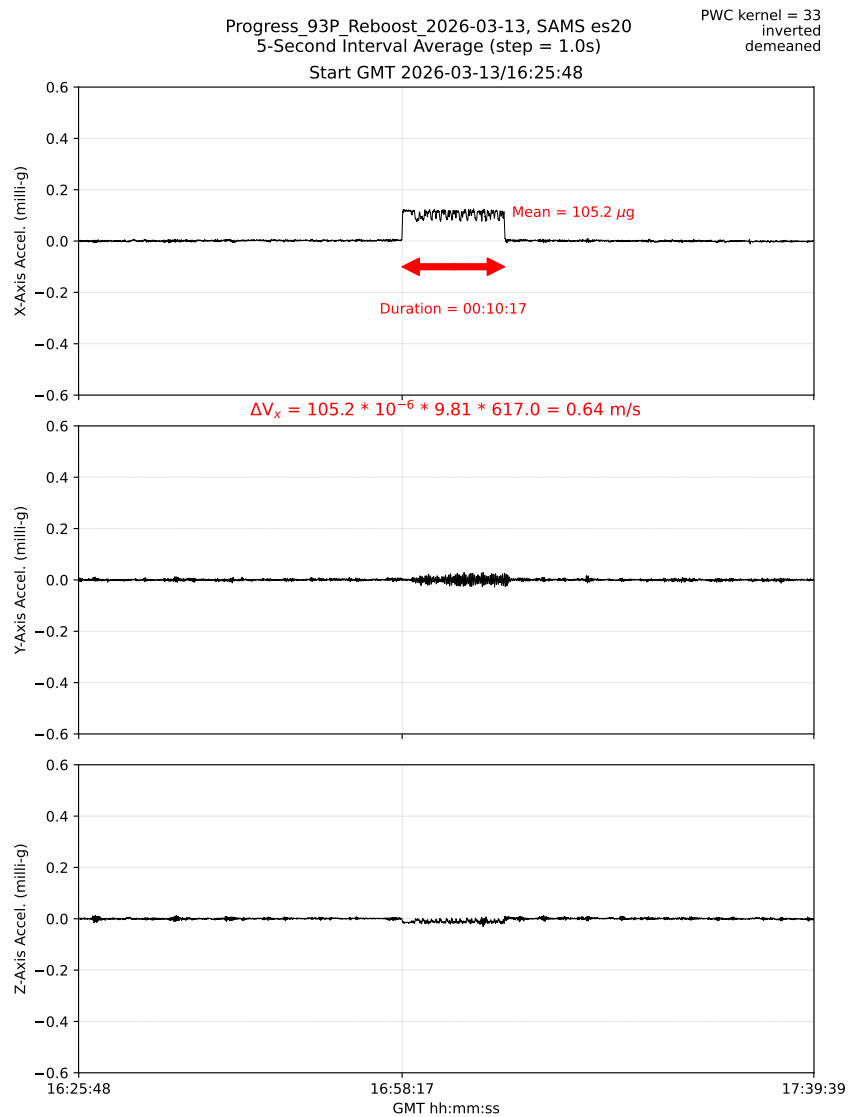


Fig. 3: 5-sec interval-average plot for the third LAB-located SAMS sensor, es20 at LAB1S2 (MSG).

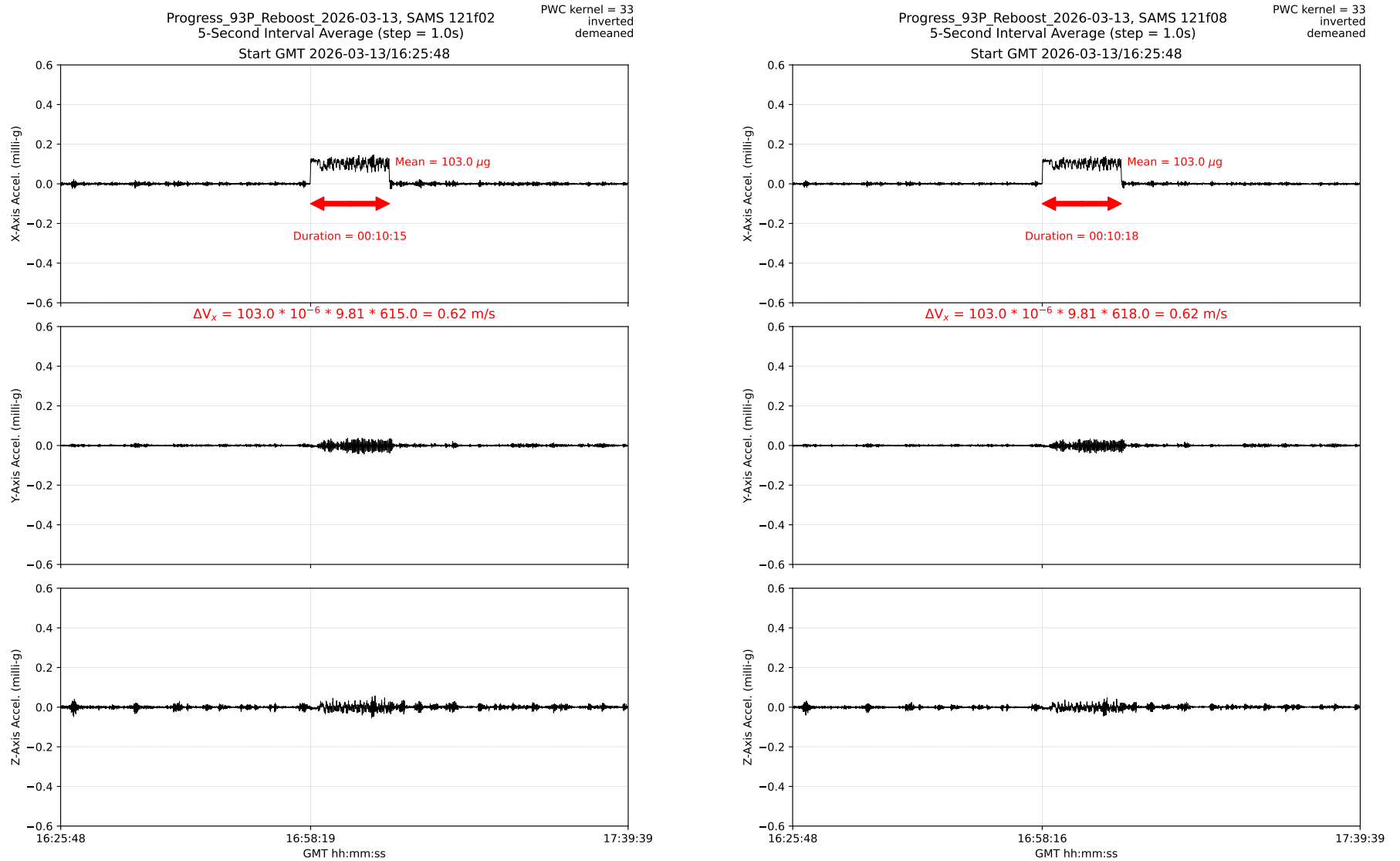


Fig. 4: 5-sec interval-average plots for the two COL-located SAMS sensors: (left) 121f02 on the COL Endcone and (right) 121f08 at COL1A3 (EPM).

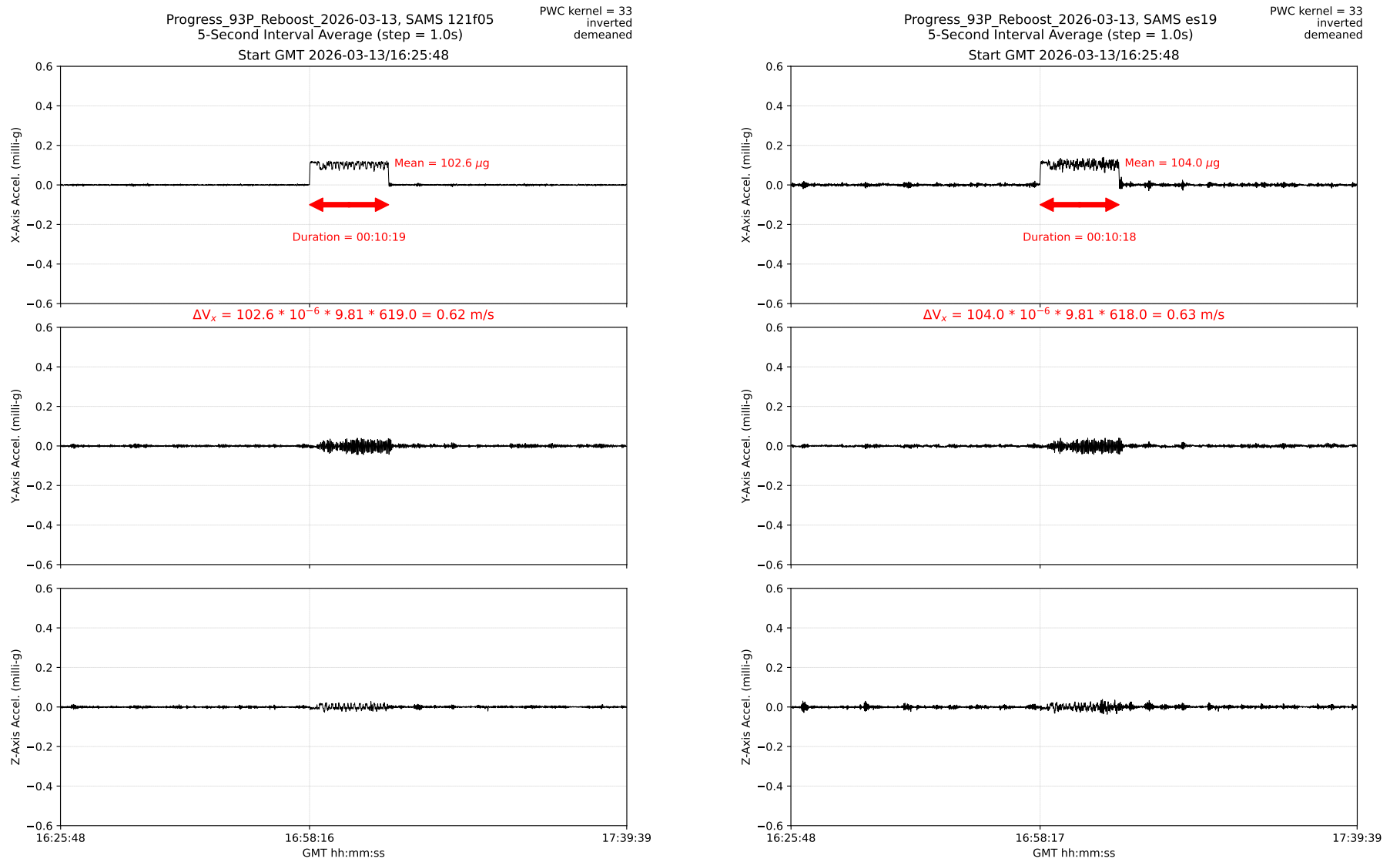


Fig. 5: 5-sec interval-average plots for the two JEM-located SAMS sensors: (left) 121f05 at JPM1F1 (ER5) and (right) es19 at JPM1F6 (ER4).