

Memo



Date: October 3, 2007
To: Kevin Stewart and Chad Kudym
From: Markus Ritsch
Subject: September 2007 ALERT Data Analysis

I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's Nova Star 4.0 base station (ALERT 2) were analyzed for the period September 1 through September 30, 2007.

II. General System Analysis Summary

A total of 233,501 individual data records were analyzed from the ALERT 2 base station. Meteorological sensors account for 61 percent, water level sensors 10 percent, and rain sensors 5 percent of the total monthly transmissions.

Ninety-nine percent of the received data reports were flagged as "good" by the Nova Star validation process. Roughly 1,001 reports were flagged as "bad". Of these "bad" reports, 196 originated from Squaw Mountain (ID 2189), 76 originated from Squaw Mountain (ID 2187) and 35 originated from Louisville Lake (ID 4744).

The system-wide radio traffic loading this month was 7,532 reports per day with an average hourly loading of 314 reports. The peak hourly traffic loading was 622 reports, which occurred on September 5th between 2:00 PM and 3:00 PM. A plot of monthly average and peak hourly traffic loading is provided.

A total of 1,239 reports were received from the Hayman gages this month.

The sensors reporting most frequently this month include:

1. Salisbury Park (ID 2727 – ALERT wind) with 3,524 reports,
2. Castle Rock (ID 2747 - ALERT wind) with 2,968 reports,
3. Stapleton (ID 1467 - ALERT wind) with 2,855 reports, and
4. Green Ditch (ID 4593 – water level) with 2,849 reports.

The reports from the above sensors are distributed evenly throughout the month.

The sensors reporting infrequently this month include:

1. Englewood Dam (ID 1605-battery and ID 1600-rain) with 3 reports,
2. Iliff Pond (ID 654-water level) with 1 report,
3. Stapleton (ID 1463-barometric pressure and 1469-solar power) with 8 reports,
4. SPR at Dartmouth (ID 1626-Handar 585 Alarm Status) with 6 reports,
5. Maple Grove Reservoir (ID 1005-battery) with 11 reports, and
6. Blue Mountain (ID 8001-repeater pass list) with 22 reports.

III. Rain Sensor Timer Reporting Summary

The following analysis assumes that each rain sensor has a 12-hour timer reporting interval. System-wide the ALERT 2 base station received approximately 84 percent of the non-incrementing timer reports. The 5 worst-performing rain sensors for the month are summarized (Table 1).

Table 1. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| 750 | 1330 | 2310 | 1810 | 1810 | 1810 | 1810 | 1600 | 1330 | | | |
| 4470 | 1460 | 1710 | 540 | 310 | 1710 | 4560 | 410 | 1340 | | | |
| 4560 | 2330 | 2350 | 310 | 540 | 4470 | 2350 | 1350 | 1360 | | | |
| 4240 | 4170 | 2240 | 850 | 850 | 1500 | 2250 | 2190 | 1370 | | | |
| 4510 | 4470 | 2250 | 1710 | 1710 | 4290 | 4200 | 4820 | 2310 | | | |
| | | | | 900 | 540 | 4240 | 4830 | 1030 | | | |

Sensors identified as having poor timer performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

Sensor ID 1460 has a 24-hour timer reporting interval and is not included in the timer reporting analysis.

Sensor ID 1810 has an 18-hour timer reporting interval and is not included in the timer reporting analysis after the month of July.

IV. Rain Sensor Event Reporting Summary

A. District-Wide Total Tip/Count Statistics

The incrementing reports from all 1-mm rain sensors (excluding Hayman sensors) that reported for the entire month were analyzed to quantify the District-wide statistical total monthly tip summary (Table 2).

Table 2. District-Wide Total Tip/Count Statistical Summary

| Statistical Parameter | Value | Comments |
|-------------------------------------|-------|--|
| Mean | 22.13 | Only the 1-mm rain sensors were included in the analysis |
| Median | 19 | Only the 1-mm rain sensors were included in the analysis |
| Standard deviation | 13.96 | Only the 1-mm rain sensors were included in the analysis |
| Mean plus three standard deviations | 64.00 | Only the 1-mm rain sensors were included in the analysis |
| Minimum total count | 2 | Guy Hill Ranch (ID 310) |
| Maximum total count | 107 | Temple Pond DTC (ID 630) |

A monthly summary of the District-wide mean total tip/count is presented (Table 3).

Table 3. Monthly Summary of District-Wide Mean Total 1-mm Tip/Count

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Ave |
|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|
| 2006 | 4.62 | 5.92 | 18.39 | 20.47 | 19.44 | 13.75 | 74.03 | 46.89 | 24.17 | 41.13 | 5.04 | 16.45 | 24.19 |
| 2007 | 11.56 | 5.40 | 29.75 | 65.03 | 68.30 | 15.87 | 36.20 | 46.38 | 22.13 | | | | |

The average precipitation experienced district-wide in September was decreased from the previous month of July. The District-wide precipitation experienced in September of 2007 was close to that experienced in the same month in 2006.

The rain sensor with the lowest tip count total for the month was Guy Hill Ranch (ID 310).

The rain sensor with the highest tip count total for the month was Temple Pond DTC (ID 630). This sensor also had the only sensor reporting more than the system-wide mean plus 3 standard deviations.

B. Sensors with a Jump of Six or More in the Sequential Count

Only one rain sensor experienced a jump in the sequential tip count of more than six. The tip count series for this sensor was manually inspected and summarized below.

Table 4. Sensor 1710 Large Jump in Count (Shop Creek)

| Date/Time | Sensor ID | Count | Data Type |
|----------------------|-----------|-------|-----------|
| 9/4/2007 4:32:48 AM | 1710 | 276 | 0 |
| 9/4/2007 4:32:49 PM | 1710 | 276 | 0 |
| 9/5/2007 4:32:49 AM | 1710 | 276 | 0 |
| 9/5/2007 11:12:57 AM | 1710 | 2047 | 1 |
| 9/5/2007 11:13:28 AM | 1710 | 0 | 0 |
| 9/5/2007 11:13:41 AM | 1710 | 1 | 0 |
| 9/5/2007 4:00:18 PM | 1710 | 4 | 0 |
| 9/5/2007 4:24:18 PM | 1710 | 5 | 0 |
| 9/5/2007 4:30:50 PM | 1710 | 5 | 0 |
| 9/5/2007 4:50:08 PM | 1710 | 6 | 0 |
| 9/5/2007 5:04:08 PM | 1710 | 7 | 0 |
| 9/5/2007 5:34:18 PM | 1710 | 8 | 0 |
| 9/5/2007 8:16:09 PM | 1710 | 9 | 0 |
| 9/5/2007 8:51:09 PM | 1710 | 10 | 0 |

On September 5, the sensor count jumped from 276 to 2047. The reason for this is not known and may be due to field maintenance.

C. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm, tip reports for the month was approximately 93 percent. A total of 3,051 incrementing reports were received and a total of 3,297 were expected. The total loss of incrementing reports for the month was approximately 7 percent. Those sensors with the worst rain event transmission performance characteristics are summarized (Table 5).

Table 5. Monthly Summary of Sensors with the Most Missed Tips

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug* | Sep | Oct | Nov | Dec |
|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| 2320 | 1330 | 540 | 1350 | 860 | 1710 | 2370 | 1350 | 1810 | | | |
| 2190 | 4080 | 310 | 310 | 4710 | 1350 | 150 | 2310 | 520 | | | |
| 4710 | 1640 | 4470 | 1100 | 1810 | 310 | 1700 | 540 | 1360 | | | |
| 4090 | 4050 | 850 | 860 | 1350 | 1700 | 1350 | 1300 | 1700 | | | |
| 4820 | 4180 | 4570 | 540 | 400 | 210 | 850 | 1920 | 1710 | | | |
| | | | | 4570 | 110 | 2340 | 840 | 1350 | | | |

* Note that the outage of the Blue Mountain repeater caused a large data gap in the sequential count series for many sensors and thus the incrementing tip report performance statistics are skewed this month.

Sensors identified as having poor event performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

The incrementing data series for each sensor is inspected to identify periods of missing data.

a. Chatfield COE (ID 1350)

This sensor experienced a large jump in count on September 2 between 5:55:27 PM and 7:20:32 PM.

b. Sand Creek at Mouth (ID 1810)

This sensor experienced several jumps in the count series on September 2 between 6:10:43 PM and 7:00:13 PM.

c. Jewell Detention (ID 520)

This sensor experienced several jumps in the count series on September 5 between 3:43:48 PM and 8:25:36 PM.

d. Denver Zoo (ID 1360)

This sensor experienced several jumps in the count series on September 2 between 8:41:18 AM and 8:41:14 PM.

e. Cherry Creek at Champa (ID 1700)

This sensor experienced several jumps in the count series on September 2 between 2:01:29 PM and 6:30:29 PM.

f. Shop Creek (ID 1710)

This sensor experienced several jumps in the count series on September 5 between 4:32:49 AM and 4:00:18 PM.

V. Heavy Radio Traffic Analysis

Periods exceeding 600 messages per hour are analyzed independently in an attempt to identify rain gage sequences where 3 or more, sequential messages were lost.

A. September 5, 2007

The heaviest radio traffic for the month occurred in the afternoon of September 5th, between 2:00 PM and 3:00 PM.

The distribution of hourly reports for the period is as follows:

- 9/5/2007 from 12:00 pm to 1:00 pm (369 reports)
- 9/5/2007 from 1:00 pm to 2:00 pm (429 reports)
- 9/5/2007 from 2:00 pm to 3:00 pm (622 reports)
- 9/5/2007 from 3:00 pm to 4:00 pm (487 reports)
- 9/5/2007 from 4:00 pm to 5:00 pm (487 reports)

The peak hour of traffic occurred from 2:00 PM to 3:00 PM when 622 reports were received. The period of heaviest traffic was generally a period from 1:00 PM to 5:00 PM. The ALERT data for this period was examined more closely to characterize the distribution of sensor traffic (Table 6). During this time the radio traffic was dominated by rain and meteorological sensor reports.

Table 6. Peak Traffic Period Sensor Report Distribution

| Sensor Group | Reports | Percent |
|------------------------------|---------|---------|
| Precipitation | 420 | 18% |
| None-ALERT-ID | 362 | 15% |
| Relative Humidity | 284 | 12% |
| Temperature | 274 | 11% |
| Wind Gust | 254 | 11% |
| Water Level PT-HSE | 222 | 9% |
| Wind Speed Average & Azimuth | 157 | 7% |

| | | |
|-------------------------|-------------|-------------|
| Wind Direction | 95 | 4% |
| Wind Speed Average | 79 | 3% |
| Hayman Precipitation | 45 | 2% |
| Battery Voltage HSE | 41 | 2% |
| Battery Voltage Digital | 32 | 1% |
| Precipitation - Mean | 30 | 1% |
| Water Level PT | 21 | 1% |
| Solar Radiation | 18 | 1% |
| Barometric Pressure | 17 | 1% |
| Handar 585 ALARM Status | 8 | 0% |
| Battery Voltage Analog | 6 | 0% |
| Water Level Float | 6 | 0% |
| Fuel Moisture | 5 | 0% |
| Fuel Temperature | 5 | 0% |
| Repeater Status Report | 4 | 0% |
| 12Hr Status Report | 3 | 0% |
| Repeater Pass List | 3 | 0% |
| Battery | 2 | 0% |
| Soil Moisture | 1 | 0% |
| Total | 2394 | 100% |

Incrementing rain records from the 1-mm gages for the heavy radio traffic period were examined to characterize the loss of sequential incrementing tip transmissions (Table 7). Overall, approximately 7.33% of the incrementing tip reports were lost for this period.

Table 7. Peak Traffic Analysis - Loss of Incrementing Tip Reports

| Heavy Traffic Period (Sep 5, 2007) | Occurrences of loss of sequential tip reports during period | | | |
|---------------------------------------|---|----------------|----------------|----------------|
| | Loss of 2 tips | Loss of 3 tips | Loss of 4 tips | Loss of 5 tips |
| 12:00 pm to 5:00 pm | 3 | 0 | 0 | 0 |

The majority of lost reports include single and double tip reports. The loss of 3 or more sequential tip reports was not observed during this heavy traffic period.

B. September 2, 2007

A second period of heavy radio traffic for the month occurred in the afternoon of September 2nd, between 6:00 PM and 8:00 PM

The distribution of hourly reports for the period is as follows:

- 9/2/2007 from 4:00 pm to 5:00 pm (389 reports)
- 9/2/2007 from 5:00 pm to 6:00 pm (490 reports)
- 9/2/2007 from 6:00 pm to 7:00 pm (581 reports)
- 9/2/2007 from 7:00 pm to 8:00 pm (539 reports)
- 9/2/2007 from 8:00 pm to 9:00 pm (448 reports)
- 9/2/2007 from 9:00 pm to 10:00 pm (357 reports)

The peak hour of traffic occurred from 6:00 PM to 7:00 PM when 581 reports were received. The period of heaviest traffic was generally a period from 4:00 PM to 10:00 PM. The ALERT data for this period was examined more closely to characterize the distribution of sensor traffic (Table 6). During this time the radio traffic was dominated by water level and meteorological sensor reports.

Table 8. Peak Traffic Period Sensor Report Distribution

| Sensor Group | Reports | Percent |
|------------------------------|-------------|-------------|
| Water Level PT-HSE | 615 | 22% |
| None-ALERT-ID | 382 | 14% |
| Relative Humidity | 304 | 11% |
| Precipitation | 301 | 11% |
| Wind Gust | 273 | 10% |
| Temperature | 259 | 9% |
| Wind Speed Average & Azimuth | 189 | 7% |
| Wind Direction | 110 | 4% |
| Wind Speed Average | 87 | 3% |
| Precipitation - Mean | 50 | 2% |
| Water Level Float | 44 | 2% |
| Hayman Precipitation | 43 | 2% |
| Water Level PT | 41 | 1% |
| Battery Voltage HSE | 30 | 1% |
| Barometric Pressure | 21 | 1% |
| Battery Voltage Digital | 14 | 0% |
| Solar Radiation | 13 | 0% |
| Fuel Moisture | 6 | 0% |
| Fuel Temperature | 6 | 0% |
| Handar 585 ALARM Status | 5 | 0% |
| Battery Voltage Analog | 3 | 0% |
| Repeater Status Report | 3 | 0% |
| Repeater Pass List | 2 | 0% |
| Battery | 1 | 0% |
| Soil Moisture | 1 | 0% |
| Total | 2803 | 100% |

Incrementing rain records from the 1-mm gages for the heavy radio traffic period were examined to characterize the loss of sequential incrementing tip transmissions (Table 9). Overall, approximately 15.42% of the incrementing tip reports were lost for this period.

Table 9. Peak Traffic Analysis - Loss of Incrementing Tip Reports

| Heavy Traffic Period (Sep 2, 2007) | Occurrences of loss of sequential tip reports during period | | | |
|---------------------------------------|---|----------------|----------------|----------------|
| | Loss of 2 tips | Loss of 3 tips | Loss of 4 tips | Loss of 5 tips |
| 4:00 pm to 10:00 pm | 2 | 3 | 1 | 0 |

The majority of lost reports include single, double, and triple tip reports.

What is interesting to note is that a far greater number of reports were lost on September 2 than were lost on September 5 even though the radio traffic loading was higher on September 5th. Also, interesting is the fact that the high traffic period on September 2 was dominated by water level sensor reports where the September 5 period was dominated by rain reports.

VI. Unknown Device Analysis – Received Data Log

The ALERT IDs present in the audio signal received by the decoder are compared against a list of “active” device IDs that are defined within NovaStar. Those IDs received by the decoder that are not defined within NovaStar are considered to be “unknown” and may be the result of radio noise or problems with the telemetry system. The reception of “unknown” device reports for the month is summarized (Table 10).

Table 10. Summary of Unknown IDs

| Description | Quantity |
|--|----------|
| Total number of unknown IDs (IDs without a device definition) | 313 |
| Total reports from unknown IDs | 585 |
| Unknown IDs with only a single received report (potential noise) | 242 |
| Total reports from all IDs – RecData Log entire month | 203,448 |
| Unknown reports as a fraction of total reports | 0.29% |

The total number of reports from unknown sensor IDs is small relative to the total reports received for the month.

A number of “unknown” sensors had multiple reports which may indicate the existence of a transmitter that is sending information on an ID that is not currently defined within NovaStar. The unknown IDs with multiple reports including the number of reports received by each are quantified (Table 11).

Table 11. Reports Received by Unknown IDs

| Unknown Sensor ID | Number of Reports |
|-------------------|-------------------|
| 2239 | 60 |
| 4013 | 58 |
| 1177 | 14 |
| 1427 | 12 |
| 1457 | 10 |
| 4238 | 8 |

| Unknown Sensor ID | Number of Reports |
|-------------------|-------------------|
| 1510 | 7 |
| 1458 | 7 |
| 1456 | 6 |
| 1336 | 5 |
| 1470 | 5 |
| 4087 | 4 |
| 1431 | 4 |

The “unknown” device reports were analyzed temporally to understand when they were received during the day (Table 12). The goal of this analysis is to determine a pattern of occurrence that may correspond to a source of noise in the system, such as the use of a wireless microphone nearby.

Table 12. Temporal Distribution of Unknown Reports

| Hour (AM) | Reports | Hour (PM) | Reports |
|-------------|---------|-------------|---------|
| 0:00-0:59 | 35 | 12:00-12:59 | 31 |
| 1:00-1:59 | 37 | 1:00-1:59 | 20 |
| 2:00-2:59 | 20 | 2:00-2:59 | 10 |
| 3:00-3:59 | 17 | 3:00-3:59 | 14 |
| 4:00-4:59 | 26 | 4:00-4:59 | 12 |
| 5:00-5:59 | 21 | 5:00-5:59 | 27 |
| 6:00-6:59 | 28 | 6:00-6:59 | 18 |
| 7:00-7:59 | 21 | 7:00-7:59 | 17 |
| 8:00-8:59 | 21 | 8:00-8:59 | 16 |
| 9:00-9:59 | 21 | 9:00-9:59 | 23 |
| 10:00-10:59 | 23 | 10:00-10:59 | 23 |
| 11:00-11:59 | 48 | 11:00-11:59 | 56 |

Unknown reports were received during each hour and their distribution throughout the day is shown (Figure 1).

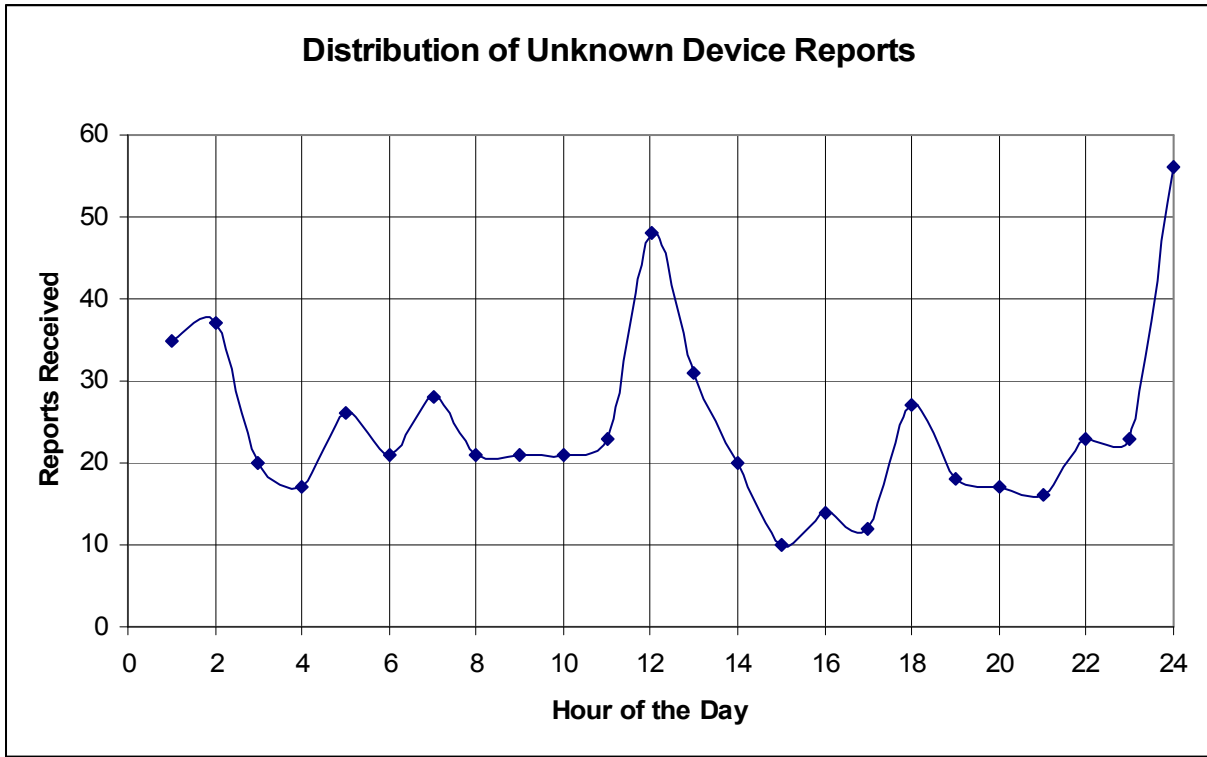


Figure 1. Daily Distribution of Unknown Device Reports

The reception of unknown device IDs peaks each day at 12:00 noon and at midnight.

The total number of reports received each minute from unknown devices are plotted for the month to see if there was any one hour that was noisier than another (Figure 2). There do seem to be periods later in the month where more unknown device reports were decoded than in the beginning of the month. There was one minute on September 19th where three unknown device reports were received.

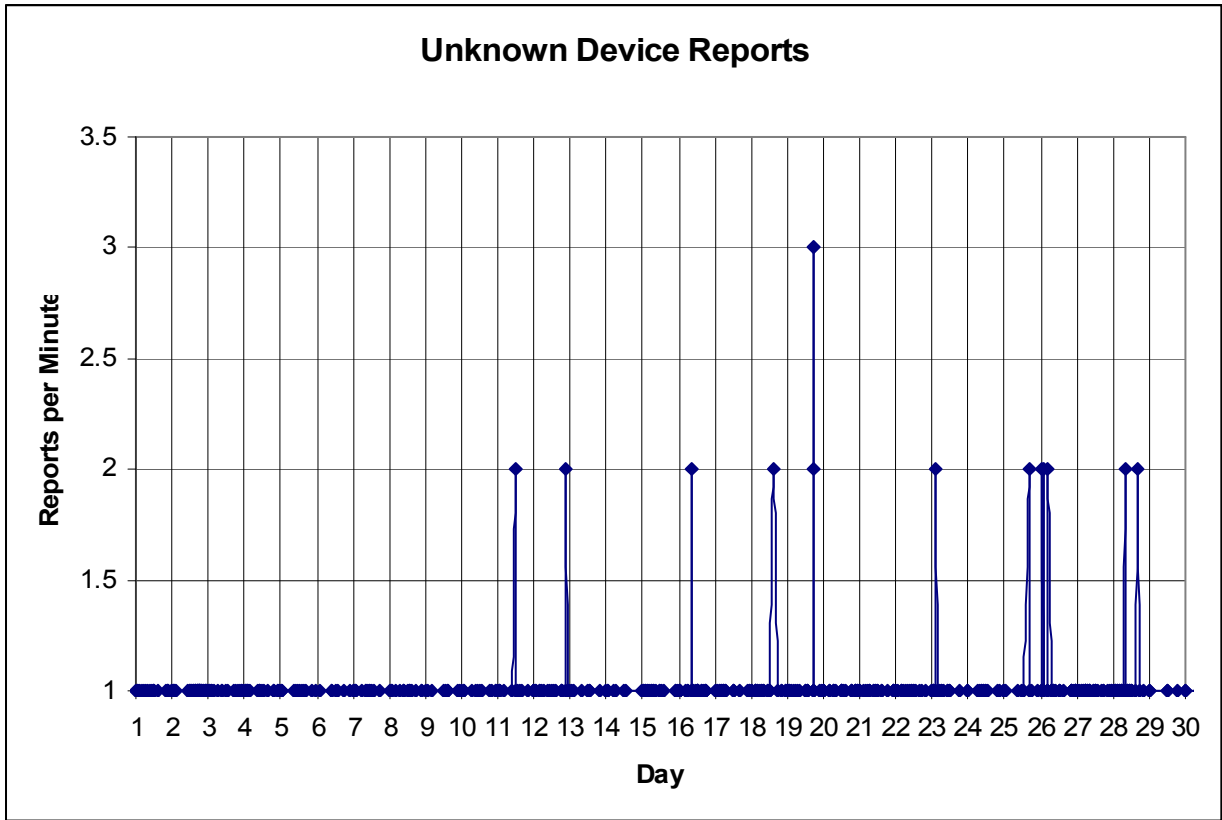


Figure 2. Unknown Device Reports Received Each Minute

VII. Issues Continued from Previous Month

The following issues were identified last month.

1. **Sand Cr at Mouth (ID 1810), Parker/Mississippi (ID 540), Shop Creek (ID 1710) and Little Narrows (ID 4470):** These sensors all had poor timer performance for the past several months.
2. **Shop Creek (1710), Chatfield COE (1350), Guy Hill Ranch (310), Cherry Creek at Champa (1700), Leyden Confluence (210), Ralston Reservoir (110):** These sensors all exhibited poor event performance for the past several months.

VIII. Issues Identified this Month

Sensors reporting frequently:

1. Salisbury Park (ID 2727 – ALERT wind) with 3,524 reports,
2. Castle Rock (ID 2747 - ALERT wind) with 2,968 reports,
3. Stapleton (ID 1467 - ALERT wind) with 2,855 reports, and
4. Green Ditch (ID 4593 – water level) with 2,849 reports.

Sensors reporting infrequently (under reporting):

1. Englewood Dam (ID 1605-battery and ID 1600-rain) with 3 reports,
2. Iliff Pond (ID 654-water level) with 1 report,
3. Stapleton (ID 1463-barometric pressure and 1469-solar power) with 8 reports,
4. SPR at Dartmouth (ID 1626-Handar 585 Alarm Status) with 6 reports,
5. Maple Grove Reservoir (ID 1005-battery) with 11 reports, and
6. Blue Mountain (ID 8001-repeater pass list) with 22 reports.

Poor timer reporting:

The poor timer performance for some of the following stations may be attributable to winterization of gages.

1. **Roslyn (ID 1330)** – Received only 35 timer reports for the month. Data was not received for this station after 9/28/2007.
2. **Sanderson at Xavier (ID 1340)** – Received only 35 timer reports for the month. Data was not received for this station after 9/27/2007.
3. **Denver Zoo (ID 1360)** – Received only 36 timer reports for the month. Data was not received for this station after 9/28/2007.
4. **West Metro FS13 (ID 1370)** – Received only 40 timer reports for the month. Data was not received for this station after 9/27/2007.
5. **Genesee Village (ID 2310)** – Received only 42 timer reports for the month.

Low rain total:

1. **Guy Hill Ranch (ID 310)** – This sensor recorded only 2 tips for the month. Nothing suspicious in the data series. Surrounding stations recorded only 5 tips.

High rain total:

1. **Temple Pond at DTC (ID 630)** – This sensor transmitted almost 40 more tips than the next highest reporting rain sensor. Possible influence by nearby irrigation sprinklers.

Large Jump in Sequential Count Value:

1. **Shop Creek (ID 1710)** - On September 5, the sensor count jumped from 276 to 2047. The reason for this large jump in count is not known and may be due to field maintenance.
2. **September 2, 2007 from 4:00 PM to 10:00 PM** – A large percentage of reports were lost during this period. The traffic loading was not particularly high.

Invalid Data:

1. **Blue Mountain (ID 142)** – This temperature sensor had 64 invalid reports for the month.
2. **Louisville Lake (ID 4744)** – This wind gust sensor had 35 invalid data reports.
3. **Fire Station #7 (ID 440)** – This rain sensor had 6 invalid reports during the month.
4. **Stapleton (ID 1460)** - This rain sensor had 6 invalid reports during the month.
5. **Choke Cherry Reservoir (ID 2320)** – This rain sensor had 4 invalid reports during the month.

Reports from “Unknown Sensors”

1. Of interest this month is the fact that the total reports from unknown sensors increased from August by approximately 57%.
2. The following table shows the “unknown” sensor IDs and the total number of reports received during the month for these IDs. These reports indicate the existence of a transmitter that is sending information on an ID that is not currently defined within NovaStar.

| Unknown Sensor ID | Number of Reports |
|--------------------------|--------------------------|
| 2239 | 60 |
| 4013 | 58 |
| 1177 | 14 |
| 1427 | 12 |
| 1457 | 10 |
| 4238 | 8 |
| 1510 | 7 |
| 1458 | 7 |
| 1456 | 6 |
| 1336 | 5 |
| 1470 | 5 |
| 4087 | 4 |
| 1431 | 4 |

General System Analysis

Database Name P:\A207-UDFCD-Data-Analysis\2007_Sep\Novastar_extract_2007Sep.mdb

| | | | |
|-------------------------------|------------------|--------------------|-------|
| First Date in Database | 9/1/07 12:00 AM | Total Days | 30.0 |
| Last Date in Database | 10/1/07 12:00 AM | Total Hours | 720.0 |

Total Records Analyzed 233501

Records by Group

| | | |
|------------------------------|---------------|-----|
| None-ALERT-ID | 40833 | 17% |
| Wind Gust | 33548 | 14% |
| Relative Humidity | 31074 | 13% |
| Temperature | 29281 | 13% |
| Wind Speed Average & Azimuth | 17672 | 8% |
| Water Level PT-HSE | 17570 | 8% |
| Wind Direction | 15424 | 7% |
| Precipitation | 11665 | 5% |
| Wind Speed Average | 11161 | 5% |
| Battery Voltage HSE | 5990 | 3% |
| Battery Voltage Digital | 3330 | 1% |
| Water Level PT | 3209 | 1% |
| Solar Radiation | 2213 | 1% |
| Barometric Pressure | 2147 | 1% |
| Water Level Float | 1472 | 1% |
| Precipitation - Mean | 1373 | 1% |
| Hayman Precipitation | 1239 | 1% |
| Handar 585 ALARM Status | 886 | 0% |
| Fuel Temperature | 714 | 0% |
| Fuel Moisture | 713 | 0% |
| Battery Voltage Analog | 517 | 0% |
| Repeater Status Report | 460 | 0% |
| Repeater Pass List | 368 | 0% |
| 12Hr Status Report | 218 | 0% |
| Battery | 112 | 0% |
| Longmont Flow Gage | 111 | 0% |
| Soil Moisture | 67 | 0% |
| Longmont Water Level PT | 52 | 0% |
| Precipitation - Test | 21 | 0% |
| Solar Power | 3 | 0% |
| Total | 233443 | |

Records by Major Group

| | | |
|-----------------------------|---------------|-----|
| Meteorologic Sensors | 142520 | 61% |
| Water Level Sensors | 22414 | 10% |
| Sensor Status Transmissions | 11772 | 5% |
| Rain Sensors | 11665 | 5% |
| Soil and Fuel Sensors | 1494 | 1% |
| Total | 189865 | |

Records by Validation Type

| | | | |
|--------------|---|---------------|------|
| Good | 0 | 232500 | 100% |
| Questionable | 1 | 1001 | 0% |
| Total | | 233501 | |

Sensors With Most Invalid Data

| Description | Sensor | Reports |
|------------------|--------|---------|
| Squaw Mountain | 2189 | 196 |
| Squaw Mountain | 2187 | 76 |
| Blue Mountain | 142 | 64 |
| Louisville Lake | 4744 | 35 |
| Leyden Reservoir | 203 | 31 |

Traffic Loading Summary

| | | |
|------------------------|--------|------------------|
| Alert Reports | 233501 | |
| Average Daily Traffic | 7532 | |
| Average Hourly Traffic | 314 | |
| Median Hourly Traffic | 320 | hour beginning |
| Peak Hourly Traffic | 622 | 9/5/07 2:00 PM |
| 2nd Max | 619 | 9/24/07 9:00 AM |
| 3rd Max | 581 | 9/2/07 6:00 PM |
| 4th Max | 552 | 9/5/07 8:00 PM |
| 5th Max | 540 | 9/24/07 10:00 AM |

Rain Timer Performance

Analyze Rain Sensors

systemwide average (days)
0.5298

Systemwide Average
84%

| Rain Sensors | Description | Received | Interval | Expected | Performance |
|--------------|----------------------|----------|----------|----------|-------------|
| 100 | Carr Street | 49 | 14:07 | 62.00 | 79% |
| 110 | Ralston Reservoir | 51 | 13:43 | 62.00 | 82% |
| 120 | West Woods | 50 | 14:36 | 62.00 | 81% |
| 140 | Blue Mountain | 49 | 13:54 | 62.00 | 79% |
| 150 | Nott Creek | 44 | 16:06 | 62.00 | 71% |
| 200 | Leyden Reservoir | 48 | 15:01 | 62.00 | 77% |
| 210 | Leyden Confluence | 47 | 14:24 | 62.00 | 76% |
| 220 | Upper Leyden | 45 | 15:48 | 62.00 | 73% |
| 300 | Van Bibber Park | 49 | 14:24 | 62.00 | 79% |
| 310 | Guy Hill Ranch | 48 | 14:52 | 62.00 | 77% |
| 320 | Sports Complex | 47 | 15:17 | 62.00 | 76% |
| 330 | Van Bibber @ Hwy 93 | 47 | 15:25 | 62.00 | 76% |
| 400 | Montview Park | 55 | 12:42 | 62.00 | 89% |
| 410 | Kelly Dam | 47 | 12:50 | 62.00 | 76% |
| 420 | Expo Park | 55 | 12:29 | 62.00 | 89% |
| 440 | Fire Station #7 | 58 | 12:25 | 62.00 | 94% |
| 500 | Havana Park | 55 | 12:34 | 62.00 | 89% |
| 510 | Virginia Court | 56 | 12:32 | 62.00 | 90% |
| 520 | Jewell Detention | 57 | 12:23 | 62.00 | 92% |
| 530 | Fire Station #19 | 57 | 12:26 | 62.00 | 92% |
| 540 | Parker/Mississippi | 56 | 12:25 | 62.00 | 90% |
| 600 | Harvard Gulch Park | 58 | 12:29 | 62.00 | 94% |
| 610 | Harvard @ Jackson | 57 | 12:12 | 62.00 | 92% |
| 620 | Quincy/Highline | 56 | 12:11 | 62.00 | 90% |
| 630 | Temple Pond at DTC | 53 | 12:34 | 62.00 | 85% |
| 640 | Goldsmith @ Eastman | 54 | 12:31 | 62.00 | 87% |
| 650 | Iliff Pond | 53 | 12:45 | 62.00 | 85% |
| 700 | Toll Gate @ 6th | 55 | 12:29 | 62.00 | 89% |
| 710 | Horseshoe Park Drop | 57 | 11:57 | 62.00 | 92% |
| 720 | Confluence Pond | 54 | 12:46 | 62.00 | 87% |
| 730 | No Name @ Quincy | 55 | 12:57 | 62.00 | 89% |
| 740 | Smoky Hill | 55 | 11:59 | 62.00 | 89% |
| 750 | Quincy Reservoir | 59 | 12:00 | 62.00 | 95% |
| 760 | Mission Viejo Park | 53 | 12:41 | 62.00 | 85% |
| 800 | Sable Ditch @ 18th | 55 | 12:56 | 62.00 | 89% |
| 810 | Granby Ditch @ 6th | 57 | 12:44 | 62.00 | 92% |
| 820 | ETG @ Buckley | 57 | 12:39 | 62.00 | 92% |
| 830 | Side Creek Park | 57 | 12:25 | 62.00 | 92% |
| 840 | Fire Station 12 | 51 | 14:05 | 62.00 | 82% |
| 850 | Flying J | 54 | 12:00 | 62.00 | 87% |
| 860 | Sand Cr at Colfax | 110 | 6:31 | 62.00 | 177% |
| 870 | Murphy Creek GC | 57 | 12:28 | 62.00 | 92% |
| 900 | Aurora Reservoir | 59 | 12:00 | 62.00 | 95% |
| 1000 | Maple Grove Resv. | 56 | 12:25 | 62.00 | 90% |
| 1010 | Denver West | 44 | 16:08 | 62.00 | 71% |
| 1020 | Lena @ Nolte Pond | 48 | 14:32 | 62.00 | 77% |
| 1030 | NREL/S. Table Mtn. | 43 | 16:03 | 62.00 | 69% |
| 1040 | Lena @ U.S. Hwy 6 | 47 | 14:30 | 62.00 | 76% |
| 1050 | Jeffco Fairgrounds | 51 | 13:15 | 62.00 | 82% |
| 1060 | Heritage Square | 50 | 13:48 | 62.00 | 81% |
| 1100 | Louisville Rec Ctr | 52 | 13:03 | 62.00 | 84% |
| 1110 | Gunbarrel | 49 | 13:21 | 62.00 | 79% |
| 1200 | Broomfield 3207 | 54 | 12:41 | 62.00 | 87% |
| 1300 | Hidden Lake | 51 | 13:33 | 62.00 | 82% |
| 1310 | LDC at 64th | 48 | 15:21 | 62.00 | 77% |
| 1320 | SPR at 3rd Ave | 48 | 12:51 | 62.00 | 77% |
| 1330 | Roslyn | 35 | 16:42 | 62.00 | 56% |
| 1340 | Sanderson at Xavier | 35 | 16:08 | 62.00 | 56% |
| 1350 | Chatfield COE | 46 | 13:50 | 62.00 | 74% |
| 1360 | Denver Zoo | 36 | 15:51 | 62.00 | 58% |
| 1370 | West Metro FS13 | 40 | 15:22 | 62.00 | 65% |
| 1400 | Upper Sloan Det. | 48 | 15:00 | 62.00 | 77% |
| 1420 | Diamond Hill | 48 | 14:02 | 62.00 | 77% |
| 1440 | Elbert | 52 | 13:02 | 62.00 | 84% |
| 1460 | Stapleton | 18 | 9:13 | 62.00 | 29% |
| 1480 | Third Creek at DIA | 58 | 12:13 | 62.00 | 94% |
| 1500 | Powers Park | 45 | 13:36 | 62.00 | 73% |
| 1520 | Marston Lake North | 55 | 11:10 | 62.00 | 89% |
| 1530 | Bear Creek @ Lowell | 46 | 13:56 | 62.00 | 74% |
| 1540 | Sanderson at Xavier | 57 | 12:26 | 62.00 | 92% |
| 1610 | Holly Dam | 59 | 12:10 | 62.00 | 95% |
| 1620 | Slaughterhouse Glich | 55 | 12:28 | 62.00 | 89% |
| 1640 | SPR at Union Ave. | 54 | 12:46 | 62.00 | 87% |
| 1660 | SPR at Henderson | 55 | 12:28 | 62.00 | 89% |
| 1700 | Cherry Cr @ Champa | 44 | 16:00 | 62.00 | 71% |
| 1710 | Shop Creek | 55 | 12:44 | 62.00 | 89% |
| 1720 | Cherry Cr @ Steele | 57 | 12:29 | 62.00 | 92% |
| 1800 | Sand Creek Park | 57 | 12:25 | 62.00 | 92% |

| | | | | | |
|------|-----------------------------|-----|-------|-------|-----|
| 1810 | Sand Creek at mouth | 35 | 19:52 | 62.00 | 56% |
| 1900 | Niver Detention | 55 | 12:40 | 62.00 | 89% |
| 1920 | Brighton | 57 | 12:14 | 62.00 | 92% |
| 2190 | Squaw Mountain | 57 | 12:00 | 62.00 | 92% |
| 2210 | Hiwan G.C. | 44 | 13:34 | 62.00 | 71% |
| 2220 | Evergreen Lake | 58 | 12:23 | 62.00 | 94% |
| 2230 | Bear Cr below Cub | 53 | 12:29 | 62.00 | 85% |
| 2240 | Cold Sprg Glch conf | 58 | 12:00 | 62.00 | 94% |
| 2250 | Rosedale | 58 | 12:00 | 62.00 | 94% |
| 2260 | Brook Forest | 59 | 12:00 | 62.00 | 95% |
| 2270 | Cub Cr below Blue | 53 | 12:31 | 62.00 | 85% |
| 2280 | Kinney Peak | 43 | 13:00 | 62.00 | 69% |
| 2310 | Genesee Village | 42 | 16:00 | 62.00 | 68% |
| 2320 | Choke Cherry Resvr | 207 | | 62.00 | |
| 2330 | Morrison | 57 | 12:25 | 62.00 | 92% |
| 2340 | El Rancho | 51 | 13:12 | 62.00 | 82% |
| 2350 | Idledale | 47 | 14:20 | 62.00 | 76% |
| 2360 | Indian Hills | 49 | 14:00 | 62.00 | 79% |
| 2370 | Red Rocks Park | 44 | 14:46 | 62.00 | 71% |
| 2710 | Highlands Ranch WTP | 56 | 12:43 | 62.00 | 90% |
| 2730 | Salisbury Park | 56 | 12:44 | 62.00 | 90% |
| 2750 | Castle Rock | 56 | 12:41 | 62.00 | 90% |
| 2810 | Pine Cliff Road | 54 | 12:43 | 62.00 | 87% |
| 2820 | Haskins Gulch Conf | 50 | 13:56 | 62.00 | 81% |
| 2840 | Sulphur Gulch | 47 | 13:44 | 62.00 | 76% |
| 2930 | Spring Valley Rd - DougCnty | 56 | 12:28 | 62.00 | 90% |
| 2940 | Willow Creek - DougCnty | 57 | 12:27 | 62.00 | 92% |
| 4010 | Crescent | 56 | 12:41 | 62.00 | 90% |
| 4020 | Rio Grande | 57 | 12:26 | 62.00 | 92% |
| 4030 | Red Garden | 59 | 12:11 | 62.00 | 95% |
| 4040 | Martin Gulch | 59 | 11:58 | 62.00 | 95% |
| 4050 | Walker Ranch | 55 | 12:56 | 62.00 | 89% |
| 4060 | Lakeshore | 51 | 13:01 | 62.00 | 82% |
| 4070 | Bear Peak | 54 | 12:43 | 62.00 | 87% |
| 4080 | Twin Sisters | 53 | 13:01 | 62.00 | 85% |
| 4090 | Magnolia | 51 | 13:03 | 62.00 | 82% |
| 4100 | Filter Plant | 56 | 12:14 | 62.00 | 90% |
| 4110 | Betasso | 58 | 11:59 | 62.00 | 94% |
| 4130 | Swiss Peaks | 51 | 12:52 | 62.00 | 82% |
| 4140 | Logan Mill | 51 | 13:49 | 62.00 | 82% |
| 4150 | Gold Hill | 51 | 12:51 | 62.00 | 82% |
| 4160 | Sunshine | 56 | 12:13 | 62.00 | 90% |
| 4170 | Pine Brook | 55 | 12:43 | 62.00 | 89% |
| 4180 | Gold Lake | 49 | 14:13 | 62.00 | 79% |
| 4190 | Slaughterhouse | 56 | 12:29 | 62.00 | 90% |
| 4200 | Lazy Acres | 55 | 12:29 | 62.00 | 89% |
| 4220 | Fling's | 55 | 12:13 | 62.00 | 89% |
| 4230 | Golden Age | 55 | 12:59 | 62.00 | 89% |
| 4240 | Sunset | 47 | 13:48 | 62.00 | 76% |
| 4250 | Geer Canyon | 54 | 12:42 | 62.00 | 87% |
| 4260 | Taylor Mountain | 58 | 12:28 | 62.00 | 94% |
| 4270 | Cannon Mountain | 57 | 11:57 | 62.00 | 92% |
| 4290 | Red Hill | 48 | 14:00 | 62.00 | 77% |
| 4300 | Big Elk Park | 58 | 11:57 | 62.00 | 94% |
| 4310 | Johnny Park | 58 | 12:12 | 62.00 | 94% |
| 4330 | Indian Ruins | 58 | 12:12 | 62.00 | 94% |
| 4340 | Riverside | 57 | 12:13 | 62.00 | 92% |
| 4350 | Conifer Hill | 53 | 13:21 | 62.00 | 85% |
| 4360 | Justice Center | 58 | 12:12 | 62.00 | 94% |
| 4470 | Little Narrows | 52 | 13:15 | 62.00 | 84% |
| 4490 | Apple Valley | 56 | 12:39 | 62.00 | 90% |
| 4510 | Pinewood Springs | 51 | 13:49 | 62.00 | 82% |
| 4520 | Eagle Ridge | 59 | 12:00 | 62.00 | 95% |
| 4530 | Winiger Ridge | 52 | 13:33 | 62.00 | 84% |
| 4560 | Lyons Diversion NSV | 49 | 14:12 | 62.00 | 79% |
| 4570 | St. Antons | 47 | 13:53 | 62.00 | 76% |
| 4710 | Ward C-1 | 56 | 12:15 | 62.00 | 90% |
| 4730 | Sugarloaf | 58 | 12:15 | 62.00 | 94% |
| 4750 | Louisville Lake | 54 | 12:32 | 62.00 | 87% |
| 4770 | Cal-Wood Ranch | 58 | 11:47 | 62.00 | 94% |
| 4790 | Button Rock | 56 | 12:44 | 62.00 | 90% |
| 4810 | Shanahan Ridge | 55 | 12:27 | 62.00 | 89% |
| 4820 | Doudy Draw | 50 | 13:54 | 62.00 | 81% |
| 4830 | SBC @ San Souci | 54 | 12:43 | 62.00 | 87% |
| 4840 | SBC@S Boulder Ditch | 56 | 12:26 | 62.00 | 90% |
| 4850 | Porphory Mtn | 50 | 13:42 | 62.00 | 81% |
| 4860 | Fairview Peak | 53 | 11:59 | 62.00 | 85% |

| Rain Event Performance | | Reports Received | 3051 | Analyze Rain Sensors | | | | | | | | | | |
|------------------------|----------------|------------------|--------|----------------------|--------|--------|--------|---------|-------|--------|------|---------|-----------|--|
| | Systemwide Avg | Total Tips | 3297 | | | | | | | | | | | |
| | 93% | Data Loss | 7.46% | | | | | | | | | | | |
| Rain Sensor | Performance | 1-tips | 2-tips | 3-tips | 4-tips | 5-tips | 6-tips | >6-tips | Recvd | Expect | Miss | Holdoff | Bucket | |
| 1810 | 58% | 9 | 3 | 0 | 1 | 1 | 0 | 0 | 14 | 24 | 10 | 0 | 0.0393701 | |
| 520 | 67% | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 6 | 9 | 3 | 0 | 0.0393701 | |
| 1360 | 71% | 13 | 0 | 1 | 0 | 1 | 0 | 0 | 15 | 21 | 6 | 0 | 0.0393701 | |
| 1700 | 72% | 10 | 1 | 2 | 0 | 0 | 0 | 0 | 13 | 18 | 5 | 0 | 0.0393701 | |
| 1710 | 75% | 10 | 0 | 2 | 0 | 0 | 0 | 1 | 12 | 17 | 4 | 0 | 0.0393701 | |
| 4010 | 75% | 12 | 2 | 0 | 1 | 0 | 0 | 0 | 15 | 20 | 5 | 0 | 0.0393701 | |
| 1100 | 76% | 25 | 4 | 3 | 0 | 0 | 0 | 0 | 32 | 42 | 10 | 0 | 0.0393701 | |
| 1350 | 79% | 13 | 1 | 0 | 1 | 0 | 0 | 0 | 15 | 19 | 4 | 0 | 0.0393701 | |
| 1330 | 79% | 19 | 3 | 0 | 1 | 0 | 0 | 0 | 23 | 29 | 6 | 0 | 0.0393701 | |
| 1110 | 81% | 37 | 11 | 0 | 0 | 0 | 0 | 0 | 48 | 59 | 11 | 0 | 0.0393701 | |
| 1040 | 82% | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 9 | 11 | 2 | 0 | 0.0393701 | |
| 1340 | 82% | 8 | 0 | 1 | 0 | 0 | 0 | 0 | 9 | 11 | 2 | 0 | 0.0393701 | |
| 1520 | 82% | 12 | 1 | 1 | 0 | 0 | 0 | 0 | 14 | 17 | 3 | 0 | 0.0393701 | |
| 2230 | 83% | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 1 | 0 | 0.0393701 | |
| 4820 | 83% | 30 | 4 | 0 | 1 | 0 | 0 | 0 | 35 | 42 | 7 | 0 | 0.0393701 | |
| 4090 | 83% | 33 | 6 | 1 | 0 | 0 | 0 | 0 | 40 | 48 | 8 | 0 | 0.0393701 | |
| 1010 | 85% | 10 | 0 | 1 | 0 | 0 | 0 | 0 | 11 | 13 | 2 | 0 | 0.0393701 | |
| 2350 | 86% | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 7 | 1 | 0 | 0.0393701 | |
| 730 | 86% | 15 | 3 | 0 | 0 | 0 | 0 | 0 | 18 | 21 | 3 | 0 | 0.0393701 | |
| 4150 | 86% | 26 | 3 | 1 | 0 | 0 | 0 | 0 | 30 | 35 | 5 | 0 | 0.0393701 | |
| 4180 | 87% | 23 | 2 | 1 | 0 | 0 | 0 | 0 | 26 | 30 | 4 | 0 | 0.0393701 | |
| 1530 | 87% | 17 | 3 | 0 | 0 | 0 | 0 | 0 | 20 | 23 | 3 | 1 | 0.0393701 | |
| 4710 | 87% | 29 | 5 | 0 | 0 | 0 | 0 | 0 | 34 | 39 | 5 | 0 | 0.0393701 | |
| 300 | 88% | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 7 | 8 | 1 | 0 | 0.0393701 | |
| 2320 | 88% | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 7 | 8 | 1 | 0 | 0.0393701 | |
| 4050 | 88% | 18 | 3 | 0 | 0 | 0 | 0 | 0 | 21 | 24 | 3 | 0 | 0.0393701 | |
| 4170 | 88% | 31 | 3 | 1 | 0 | 0 | 0 | 0 | 35 | 40 | 5 | 0 | 0.0393701 | |
| 4570 | 88% | 19 | 3 | 0 | 0 | 0 | 0 | 0 | 22 | 25 | 3 | 0 | 0.0393701 | |
| 540 | 88% | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 15 | 17 | 2 | 0 | 0.0393701 | |
| 1200 | 88% | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 15 | 17 | 2 | 0 | 0.0393701 | |
| 1500 | 88% | 54 | 6 | 1 | 0 | 0 | 0 | 0 | 61 | 69 | 8 | 0 | 0.0393701 | |
| 2820 | 88% | 21 | 1 | 1 | 0 | 0 | 0 | 0 | 23 | 26 | 3 | 0 | 0.0393701 | |
| 2250 | 89% | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 8 | 9 | 1 | 0 | 0.0393701 | |
| 1050 | 89% | 15 | 0 | 1 | 0 | 0 | 0 | 0 | 16 | 18 | 2 | 0 | 0.0393701 | |
| 4360 | 89% | 38 | 2 | 0 | 1 | 0 | 0 | 0 | 41 | 46 | 5 | 0 | 0.0393701 | |
| 1640 | 89% | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 17 | 19 | 2 | 0 | 0.0393701 | |
| 4470 | 90% | 24 | 1 | 1 | 0 | 0 | 0 | 0 | 26 | 29 | 3 | 1 | 0.0393701 | |
| 110 | 90% | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 9 | 10 | 1 | 0 | 0.0393701 | |
| 1920 | 90% | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 9 | 10 | 1 | 0 | 0.0393701 | |
| 2260 | 90% | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 9 | 10 | 1 | 0 | 0.0393701 | |
| 140 | 90% | 17 | 2 | 0 | 0 | 0 | 0 | 0 | 19 | 21 | 2 | 1 | 0.0393701 | |
| 1370 | 90% | 18 | 0 | 1 | 0 | 0 | 0 | 0 | 19 | 21 | 2 | 0 | 0.0393701 | |
| 420 | 91% | 26 | 3 | 0 | 0 | 0 | 0 | 0 | 29 | 32 | 3 | 0 | 0.0393701 | |
| 410 | 91% | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 10 | 11 | 1 | 0 | 0.0393701 | |
| 4260 | 91% | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 20 | 22 | 2 | 0 | 0.0393701 | |
| 4130 | 91% | 19 | 2 | 0 | 0 | 0 | 0 | 0 | 21 | 23 | 2 | 0 | 0.0393701 | |
| 4840 | 91% | 29 | 3 | 0 | 0 | 0 | 0 | 0 | 32 | 35 | 3 | 0 | 0.0393701 | |
| 320 | 92% | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 11 | 12 | 1 | 0 | 0.0393701 | |
| 1300 | 92% | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 11 | 12 | 1 | 0 | 0.0393701 | |
| 4140 | 92% | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 22 | 24 | 2 | 0 | 0.0393701 | |
| 4730 | 92% | 21 | 2 | 0 | 0 | 0 | 0 | 0 | 23 | 25 | 2 | 0 | 0.0393701 | |
| 710 | 92% | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 13 | 1 | 0 | 0.0393701 | |
| 860 | 92% | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 13 | 1 | 0 | 0.0393701 | |
| 1320 | 92% | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 13 | 1 | 0 | 0.0393701 | |
| 1660 | 92% | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 13 | 1 | 0 | 0.0393701 | |
| 4290 | 92% | 34 | 1 | 1 | 0 | 0 | 0 | 0 | 36 | 39 | 3 | 0 | 0.0393701 | |
| 610 | 93% | 23 | 2 | 0 | 0 | 0 | 0 | 0 | 25 | 27 | 2 | 0 | 0.0393701 | |
| 440 | 93% | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 13 | 14 | 1 | 0 | 0.0393701 | |
| 2710 | 93% | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 13 | 14 | 1 | 0 | 0.0393701 | |
| 4770 | 93% | 37 | 1 | 1 | 0 | 0 | 0 | 0 | 39 | 42 | 3 | 0 | 0.0393701 | |
| 4220 | 93% | 25 | 2 | 0 | 0 | 0 | 0 | 0 | 27 | 29 | 2 | 0 | 0.0393701 | |
| 820 | 93% | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 14 | 15 | 1 | 0 | 0.0393701 | |
| 4040 | 93% | 27 | 0 | 1 | 0 | 0 | 0 | 0 | 28 | 30 | 2 | 0 | 0.0393701 | |
| 630 | 93% | 93 | 7 | 0 | 0 | 0 | 0 | 0 | 100 | 107 | 7 | 0 | 0.0393701 | |
| 100 | 94% | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 15 | 16 | 1 | 0 | 0.0393701 | |
| 150 | 94% | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 15 | 16 | 1 | 0 | 0.0393701 | |
| 2280 | 94% | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 15 | 16 | 1 | 4 | 0.0393701 | |
| 4300 | 94% | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 15 | 16 | 1 | 0 | 0.0393701 | |
| 4490 | 94% | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 15 | 16 | 1 | 0 | 0.0393701 | |
| 2730 | 94% | 28 | 2 | 0 | 0 | 0 | 0 | 0 | 30 | 32 | 2 | 0 | 0.0393701 | |
| 330 | 94% | 15 | 1 | 0 | 0 | 0 | 0 | 0 | 16 | 17 | 1 | 0 | 0.0393701 | |
| 4020 | 94% | 30 | 2 | 0 | 0 | 0 | 0 | 0 | 32 | 34 | 2 | 0 | 0.0393701 | |
| 4810 | 94% | 31 | 2 | 0 | 0 | 0 | 0 | 0 | 33 | 35 | 2 | 0 | 0.0393701 | |
| 900 | 94% | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 17 | 18 | 1 | 0 | 0.0393699 | |

| | | | | | | | | | | | | | | |
|-------------------|------|-------------|------------|-----------|----------|----------|----------|----------|-------------|-------------|------------|-----------|---|-----------|
| 4100 | 94% | 32 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 36 | 2 | 0 | 0.0393701 |
| 4750 | 95% | 33 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 37 | 2 | 0 | 0.0393701 |
| 1620 | 95% | 17 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 19 | 1 | 0 | 0.0393701 |
| 4200 | 95% | 34 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 38 | 2 | 0 | 0.0393701 |
| 4310 | 95% | 18 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 20 | 1 | 0 | 0.0393701 |
| 620 | 95% | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 21 | 1 | 0 | 0.0393701 |
| 870 | 95% | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 21 | 1 | 0 | 0.0393701 |
| 120 | 95% | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 22 | 1 | 0 | 0.0393701 |
| 4110 | 96% | 61 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 67 | 3 | 0 | 0.0393701 |
| 4790 | 96% | 21 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 23 | 1 | 0 | 0.0393701 |
| 740 | 96% | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 25 | 1 | 1 | 0.0393701 |
| 4270 | 96% | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 25 | 1 | 0 | 0.0393701 |
| 1540 | 96% | 24 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 26 | 1 | 0 | 0.0393701 |
| 2840 | 96% | 24 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 26 | 1 | 0 | 0.0393701 |
| 4510 | 96% | 24 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 26 | 1 | 0 | 0.0393701 |
| 510 | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.0393701 |
| 4520 | 96% | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 28 | 1 | 0 | 0.0393701 |
| 4350 | 97% | 28 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 30 | 1 | 0 | 0.0393701 |
| 720 | 97% | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 31 | 1 | 0 | 0.0393701 |
| 4070 | 97% | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 31 | 1 | 0 | 0.0393701 |
| 4080 | 97% | 33 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 35 | 1 | 0 | 0.0393701 |
| 4830 | 97% | 33 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 35 | 1 | 0 | 0.0393701 |
| 760 | 97% | 37 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 39 | 1 | 0 | 0.0393701 |
| 4330 | 97% | 37 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 39 | 1 | 0 | 0.0393701 |
| 200 | 98% | 40 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 42 | 1 | 1 | 0.0393701 |
| 4250 | 98% | 42 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 44 | 1 | 0 | 0.0393701 |
| 310 | 100% | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0.0393701 |
| 2190 | 100% | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0.0393701 |
| 2310 | 100% | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0.0393701 |
| 1030 | 100% | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 0 | 0 | 0.0393701 |
| 2340 | 100% | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 0 | 0 | 0.0393701 |
| 2930 | 100% | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 0 | 0 | 0.0393701 |
| 840 | 100% | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 | 0 | 0 | 0.0393701 |
| 850 | 100% | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 8 | 0 | 0 | 0.0393701 |
| 2240 | 100% | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 8 | 0 | 0 | 0.0393701 |
| 800 | 100% | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0.0393701 |
| 1060 | 100% | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0.0393701 |
| 1800 | 100% | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0.0393701 |
| 1900 | 100% | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 1 | 0.0393701 |
| 2210 | 100% | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0.0393701 |
| 4060 | 100% | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | 0.0393701 |
| 700 | 100% | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 0.0393701 |
| 2330 | 100% | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 0.0393701 |
| 1310 | 100% | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 0 | 0 | 0.0393701 |
| 2810 | 100% | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 0 | 0 | 0.0393701 |
| 1000 | 100% | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 0 | 0 | 0.0393701 |
| 1400 | 100% | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 0 | 0 | 0.0393701 |
| 1480 | 100% | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 0 | 0 | 0.0393701 |
| 2360 | 100% | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 0 | 0 | 0.0393701 |
| 210 | 100% | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 13 | 0 | 0 | 0.0393701 |
| 1440 | 100% | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 13 | 0 | 0 | 0.0393701 |
| 750 | 100% | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 0.0393701 |
| 2270 | 100% | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 0.0393701 |
| 2750 | 100% | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 0.0393701 |
| 4530 | 100% | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 0 | 0.0393701 |
| 1460 | 100% | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 | 0 | 0 | 0.0393701 |
| 2370 | 100% | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 | 0 | 0 | 0.0393701 |
| 220 | 100% | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0.0393701 |
| 600 | 100% | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0.0393701 |
| 1720 | 100% | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 17 | 0 | 1 | 0.0393701 |
| 400 | 100% | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 0 | 0 | 0.0393701 |
| 530 | 100% | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 0 | 0 | 0.0393701 |
| 650 | 100% | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 0 | 0 | 0.0393701 |
| 810 | 100% | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 0 | 0 | 0.0393701 |
| 830 | 100% | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 0 | 0 | 0.0393701 |
| 640 | 100% | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 0 | 0 | 0.0393701 |
| 2940 | 100% | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 22 | 0 | 0 | 0.0393701 |
| 1420 | 100% | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23 | 0 | 0 | 0.0393701 |
| 4340 | 100% | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23 | 0 | 0 | 0.0393701 |
| 4240 | 100% | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 24 | 0 | 0 | 0.0393701 |
| 4160 | 100% | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 0 | 0 | 0.0393701 |
| 4190 | 100% | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 26 | 0 | 0 | 0.0393701 |
| 4230 | 100% | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 27 | 0 | 0 | 0.0393701 |
| 4030 | 100% | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 29 | 0 | 0 | 0.0393701 |
| 500 | 100% | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 41 | 0 | 0 | 0.0393701 |
| Total Tips | | 2848 | 171 | 24 | 6 | 2 | 0 | 1 | 3051 | 3297 | 245 | 11 | | |

