



## GPS FAILURE Survey

### 1. Do you fly primarily in the United States or Canada?

Answer Options	Response Percent	Response Count
United States	23.0%	118
Canada	77.0%	395
<i>answered question</i>		<b>513</b>
<i>skipped question</i>		<b>0</b>

### 2. Do you fly primarily IFR or VFR?

Answer Options	Response Percent	Response Count
IFR	15.3%	78
VFR	67.8%	345
Both equally	16.9%	86
<i>answered question</i>		<b>509</b>
<i>skipped question</i>		<b>4</b>

### 3. How many hours a year do you fly IFR?

Answer Options	Response Percent	Response Count
0	28.2%	136
1-20	20.5%	99
21-50	22.4%	108
51 or more	28.8%	139
<i>answered question</i>		<b>482</b>
<i>skipped question</i>		<b>31</b>

### 4. How often do you use an IFR-certified GPS as your primary method of navigation?

Answer Options	Response Percent	Response Count
Always	38.1%	181
Often	13.3%	63
Sometimes	5.9%	28
Rarely	5.1%	24
Never	37.7%	179
<i>answered question</i>		<b>475</b>
<i>skipped question</i>		<b>38</b>

### 5. Have you experienced a complete loss or partial loss of RNAV capability while utilizing

Answer Options	Response Percent	Response Count
No (if no, please jump to question 6)	78.6%	334
Yes (if yes, please answer the following questions)	21.4%	91
<i>answered question</i>		<b>425</b>
<i>skipped question</i>		<b>88</b>

**a) Approximately how many times have you experienced loss of GPS Signal in the last**

Answer Options	Response Percent	Response Count
1	43.6%	41
2-3	33.0%	31
4-5	13.8%	13
6-10	3.2%	3
11 or more times	6.4%	6
<i>answered question</i>		<b>94</b>
<i>skipped question</i>		<b>419</b>

**Question: Duration of the outage, short or long, how many minutes?**

Time in Minutes	Amount of People
0 to 5 minutes	47
6 to 10 minutes	10
11 to 30 minutes	9
31 minutes and up	9
Varies	3
Periodic	1

**Question: Was the outage enroute or during approach?**

Responses	Number of people	
No Outages	7	9%
Enroute	50	61%
Approach	16	20%
Both	8	10%
N/A	1	1%

**d) Has this problem re-occurred in the same location or has every incident occurred in a**

Answer Options	Response Percent	Response Count
Re-occurred in same geographic area	36.9%	31
Unique area each time	63.1%	53
<i>answered question</i>		<b>84</b>
<i>skipped question</i>		<b>429</b>

**e) How did you know you had lost some or all RNAV capability?**

Answer Options	Response Percent	Response Count
System provided a warning or alarm	69.2%	72
I recognized that there was a navigational error	18.3%	19
Other (please specify)	12.5%	13
<i>answered question</i>		<b>104</b>
<i>skipped question</i>		<b>409</b>

**Other (please specify) Categories**

GPS would not lock onto satellites  
 reference to map showed deviation from intended track  
 GPS , shut down,  
 Tower was giving vectors and GPS was not recognizing position  
 Mileage along route "tumbled" and reset to zero. The hardware did remember the destination.  
 GPS went offline/quit updating  
 All GPS functions stopped  
 Instrument indicated NO GPS Signal received. ==> Blank screen  
 Garmin GNS430W display screen had streaks and was unreadable  
 Use Foreflight with Cdn VNC's exclusively - GPS dot (position) lost temporarily

**h) Was more than one GPS unit impacted, whether IFR-certified or not?**

Answer Options	Response Percent	Response Count
No	62.8%	54
Yes (please answer the following questions)	37.2%	32
<i>answered question</i>		<b>86</b>
<i>skipped question</i>		<b>427</b>

**i) Were all GPS receivers affected at the same time?**

Answer Options	Response Percent	Response Count
No	38.1%	24
Yes	61.9%	39
<i>answered question</i>		<b>63</b>
<i>skipped question</i>		<b>450</b>

**ii) Was the loss of capability the same across all units?**

Answer Options	Response Percent	Response Count
They were affected the same	60.4%	32
One was worse	39.6%	21
<i>answered question</i>		<b>53</b>
<i>skipped question</i>		<b>460</b>

**i) Were you on an IFR flight plan at the time of the loss of capability?**

Answer Options	Response Percent	Response Count
No	50.5%	46
Yes	49.5%	45
<i>answered question</i>		<b>91</b>
<i>skipped question</i>		<b>422</b>

**k) To the best of your knowledge, what caused the loss(es) of GPS signal? Please tick all**

Answer Options	Response Percent	Response Count
Solar weather	2.0%	2
Solar flares	2.0%	2

Satellite failure	8.8%	9
Receiver failure	14.7%	15
Local interference (accidental)	17.6%	18
Deliberate GPS jamming	15.7%	16
GPS spoofing	2.9%	3
Not sure	63.7%	65
Other (please specify)	18.6%	19
<b>answered question</b>		<b>102</b>
<b>skipped question</b>		<b>411</b>

**l) Did you file a report or notify air traffic control?**

Answer Options	Response Percent	Response Count
I filed a report and informed ATC	1.0%	1
I only filed a report	1.0%	1
I only informed ATC	23.7%	23
I did nothing	74.2%	72
<b>answered question</b>		<b>97</b>
<b>skipped question</b>		<b>416</b>

**m) Did the loss(es) of GPS signal affect your flight in anyway? (please tick all that apply)**

Answer Options	Response Percent	Response Count
Late arrival	4.0%	4
Increased work load	37.0%	37
Safety concern	21.0%	21
Inability to continue flight as planned i.e. diversion or	7.0%	7
It did not impact the flight(s)	49.0%	49
Not sure	6.0%	6
Other (please specify)	18.0%	18
<b>answered question</b>		<b>100</b>
<b>skipped question</b>		<b>413</b>

**n) If applicable, what alternate navigation method did you use after losing RNAV**

Answer Options	Response Percent	Response Count
Air traffic control radar vectors	5.9%	4
VOR	66.2%	45
ADF	14.7%	10
ILS	13.2%	9
Other (please specify)		42
<b>answered question</b>		<b>68</b>
<b>skipped question</b>		<b>445</b>

**6. Are you concerned about the effect a significant GPS outage may have on your flight(s)**

Answer Options	Response Percent	Response Count
No	41.6%	181
Yes	58.4%	254
<b>answered question</b>		<b>435</b>
<b>skipped question</b>		<b>78</b>

7. Do you always check GPS NOTAMs before flight when you plan on using GPS		
Answer Options	Response Percent	Response Count
No	61.6%	265
Yes	38.4%	165
<i>answered question</i>		<b>430</b>
<i>skipped question</i>		<b>83</b>

8. Do you believe the GPS NOTAM system is effective at notifying pilots of outages or		
Answer Options	Response Percent	Response Count
No	49.0%	176
Yes	51.0%	183
Other (please specify)		96
<i>answered question</i>		<b>359</b>
<i>skipped question</i>		<b>154</b>

9. If the GPS system was known to be unavailable during your flight, would that influence		
Answer Options	Response Percent	Response Count
Yes - I would fly VFR only	47.2%	197
Yes - I wouldn't fly	10.3%	43
No - I can still fly IFR or VFR	42.4%	177
<i>answered question</i>		<b>417</b>
<i>skipped question</i>		<b>96</b>

10. The proposed backup system should there be a sustained GPS outage in the United		
Answer Options	Response Percent	Response Count
Single VOR only	16.1%	68
Dual VOR only	36.0%	152
Single or dual VOR and DME/DME	25.8%	109
DME/DME only	0.2%	1
I have neither VOR or DME/DME	21.8%	92
<i>answered question</i>		<b>422</b>
<i>skipped question</i>		<b>91</b>

11. Should there be a prolonged GPS outage and VOR or DME/DME be required to fly IFR,		
Answer Options	Response Percent	Response Count
I would want to fly IFR even without GPS	31.3%	132
I would not fly	8.1%	34
I would fly VFR	60.7%	256
<i>answered question</i>		<b>422</b>