Land Information New Zealand
Toitū te whenua

positioNZ

Report for the GNSS/GPS Customer Survey 2018

Location Information

Published: 29 October 2018

Contents

1 Introduction

1.1 Aim of Survey

The aim of the survey was to gauge how our customers are using GNSS/GPS technologies and perceptions of the products and services provided by the PositioNZ network. The results of the survey will aid decisions on how the network may be developed to cater for customer needs now and into the future.

1.2 Background

The PositioNZ network was commissioned by LINZ and developed in partnership with GNS Science (GeoNet) from 2002. The network's primary purpose is to monitor NZGD2000's relationship to international reference frames and monitor land deformation at a national level across New Zealand. Static data in the form of RINEX is collected for use by LINZ but is made freely available to the GNSS/GPS community. In 2010, LINZ commissioned the PositioNZ Real Time Service (PositioNZ-RT). This service provides real time multi-GNSS data from 35 PositioNZ stations in New Zealand as well as Chatham Island. PositioNZ post processing service (PositioNZ-PP) was also released in late 2014.

GNSS/GPS customer surveys provide insight into how the network is used and what our customers' perceptions are of the products and services available from the network. A baseline GNSS/GPS survey was completed in 2012 and 2015 with 110 and 118 respondents respectively. This follow up survey asked a number of the same questions as well as a few more specific questions related to the development and use of PositioNZ products and services. Since the network was commissioned there has been an uptake of multi-GNSS technologies and LINZ is looking at how it might develop the network to include these new constellations.

1.3 Key Findings

- There were 249 responses to the GNSS/GPS Survey 2018, compared to the 118 responses received in 2015. This shows more people are aware of or engaged with GNSS/GPS technologies.
- Surveyors are by far the largest user group with 63% of responders. Engineers are the next largest group with 6%.
- There are a variety of GNSS/GPS users including government, infrastructure, GIS consultants, developers, resellers and those in marine/fisheries.
- Users are located all over New Zealand, there was at least one respondent from each province
- 3% of the respondents are located outside of New Zealand
- 70% of respondents now use GNSS/GPS technologies on a daily basis, this is compared to 56% from the 2015 survey.
- 58% of respondents currently use multi-GNSS with another 18% intending to use it within the next 18 months.
- 10% of respondents don't have equipment capable of tracking multi-GNSS constellations
- Of the users of PositioNZ-RT, 66% complete a site calibration every time do a survey, 23% do not complete a site calibration at all and rely on streamed coordinates.
- Overall, respondents are satisfied with PositioNZ-RT, especially email notifications, data completeness, network uptime and latency of real time data. The only question that showed a high level of dissatisfaction was related to network coverage where 30% of respondents said they would like more coverage.

- 53% of respondents are happy with the information on the LINZ website about the PositioNZ network. 15% find the PositioNZ network webpages unclear and hard to follow.
- 76% of RINEX users said that RINEX3 from the PositioNZ network would be useful and 60% would like easier access to the 1 second RINEX2.

1.4 Survey Overview

The survey was open for about one month between 9 July – 13 August 2018 and was available online utilising the Qualtrics survey tool.

Emails or articles promoting the survey were sent through the following:

- All customers subscribed to PositioNZ mailchimp account (257 users)
- Email to registered PositioNZ-RT users – those not registered for mailchimp notifications (approx. 150 users)
- Notice in Landwrap
- Notice in the NZIS Newslink
- Posted on the Positioning Stream group on LinkedIn
- Link available on LINZ website through PositioNZ and Geodetic Database pages

248 respondents completed the survey out of 341. The remaining 93 responses were considered incomplete and not used within the analysis.

1.5 Acknowledgement

Thank you to all those who took the time to respond to this survey. The feedback received has been of value and will assist in future decisions relating to the PositioNZ network.

1.6 Disclaimer

This report compiles responses from our customers. This is informative only and LINZ is not obligated to act upon any of the suggestions. The majority of respondents are LINZ customers and as a result the conclusions drawn may not be reflective of the wider GNSS/GPS user community.

Additional feedback remains unchanged except for minor grammatical and spelling errors. Some comments have been removed where they refer to third party services or software.

2 Detailed findings and analysis

This section analyses each question within the survey.

2.1 Profiles of GNSS/GPS users (Questions 1 and 2)

Figure 1 shows that LINZ's major customer base is still surveying with 63% of the respondents identifying as surveyors. The next largest area is engineering with 6%. There has been an increase in non-surveyor respondents since the 2015 survey.

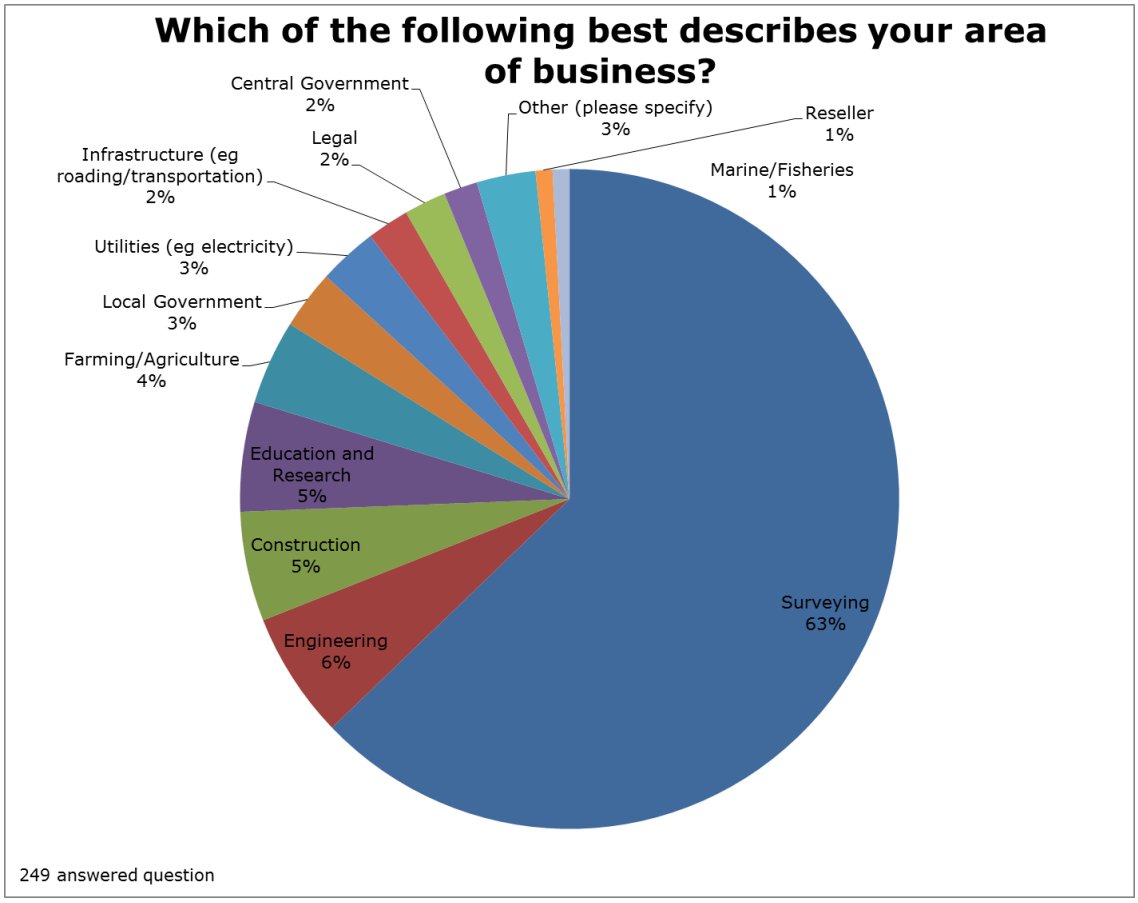

Figure 1: Respondent profiles by area of business (Question 1)

"Other" 3% areas of business include artists, developer, GIS consultants, aerial surveying, dataset verification, forestry and mapping.

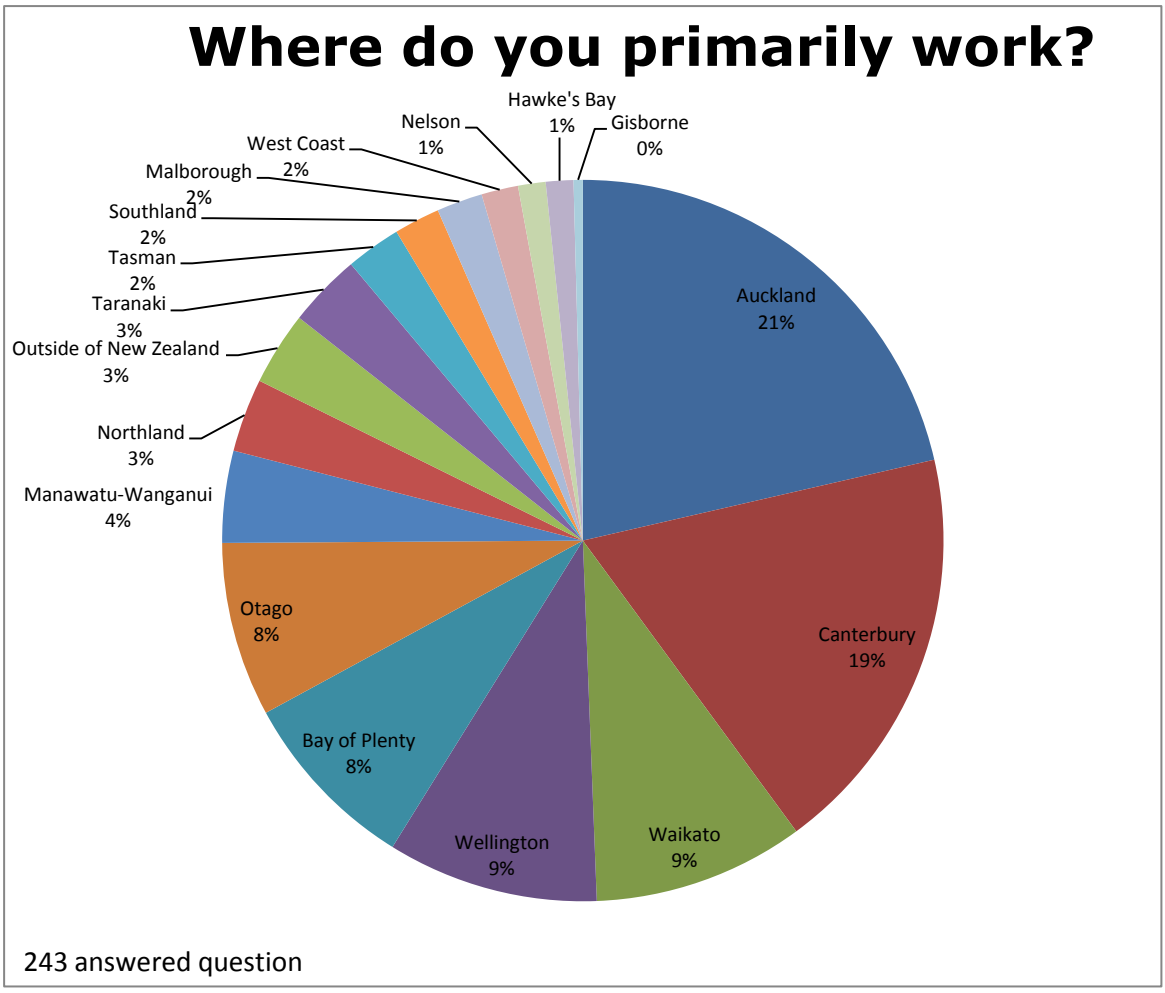

Figure 2: Respondent profiles by region (Question 2)

From the 2015 to 2018 surveys the number of respondents increased from 93 to 243. Unlike the 2015 survey, the current survey was answered by at least one person in each region as well as international users. International users increased from 1% (2015) to 3% (2018) of respondents.

Auckland and Christchurch remain the regions with the highest number of users of GNSS technology.

The results from Question 2 (Figure 2) show that LINZ GNSS/GPS customers are located all over the country with the largest customer bases located in Auckland (21%) and Canterbury (19%).

Note: The nationwide category was unintentionally omitted from the survey.

2.2 Frequency of use for GNSS/GPS technology (Question 3)

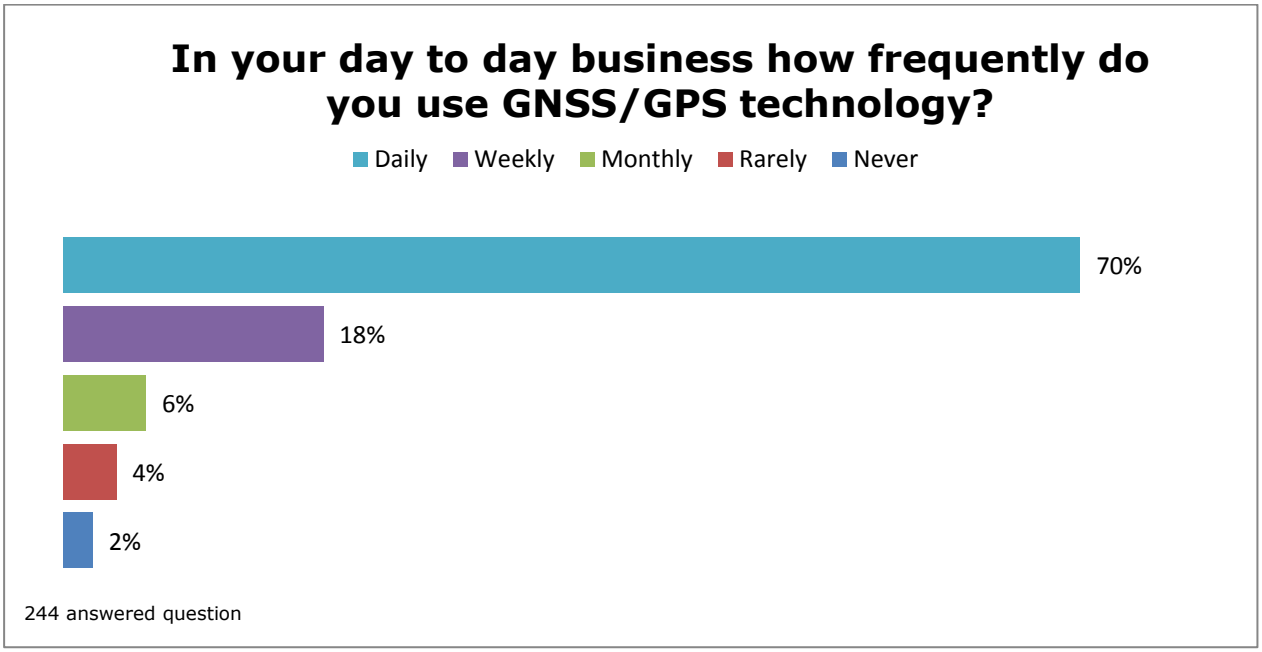

Figure 3: Frequency of use (Question 3)

88% of respondents use GNSS/GPS technologies at least weekly, this is up from 84% in 2015. This is up from 2012 where 80% used GNSS/GPS at least weekly (daily + weekly).

Daily usage has increased from 42% (2012) to 56% (2015) to 70% (2018). While weekly usage has decreased from 43% (2012) to 28% (2015) to 18% (2018). This suggests that GNSS/GPS technology is being used on a more regular basis than it was in 2012 and 2015.

2.3 LINZ products and services (Question 10)

LINZ has a range of GNSS related products and services. The following graph (figure 4) shows the variety of ways in which the respondent uses these products.

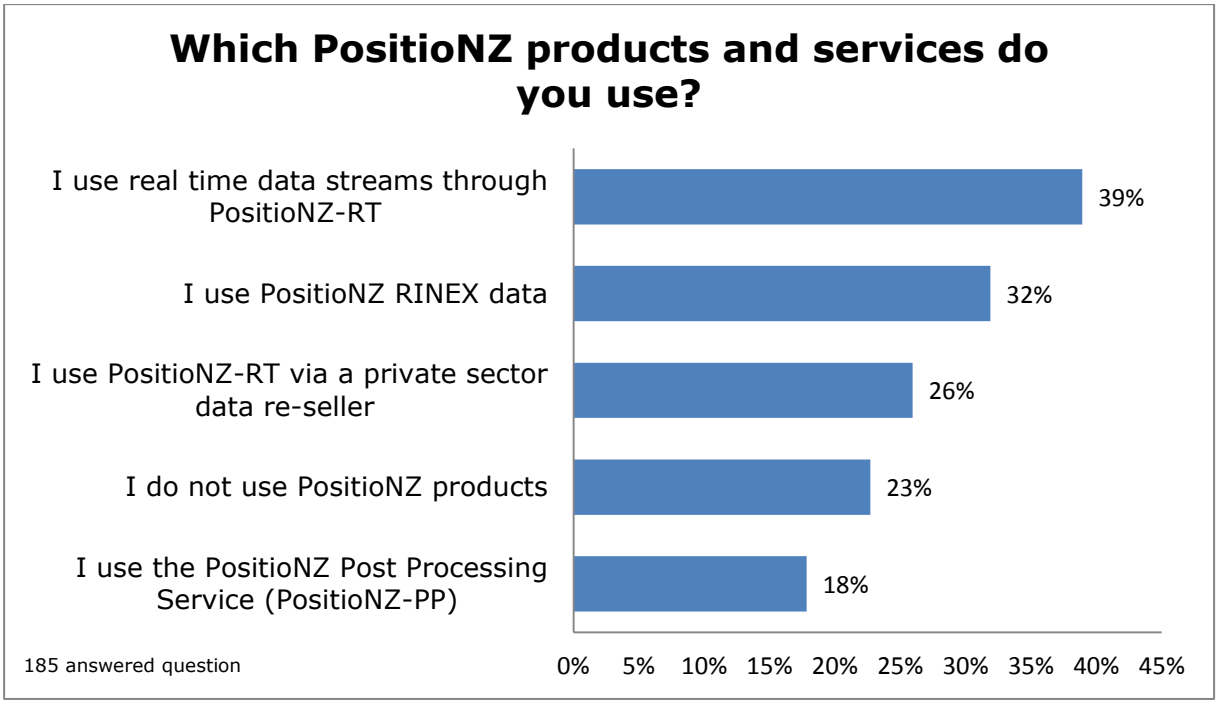

Figure 4: Usage of PositioNZ products and services (Question 10)

The most utilised product/service is the PositioNZ-RT service with 39% (72) stating that they use it. A number of respondents use multiple products/services.

23% (42) stated that they do not use PositioNZ products. It is interesting to note that a number of respondents say they were not aware of or are currently investigating the PositioNZ products and services.

If you do not use specific products and services, are you able to provide details on why this is (Question 11)?

A selection of responses that reflect the range of views:

At present, no GNSS instruments

Haven't got around to it

I want to but there's no one locally to get me started

Insufficient reference stations in our region

Not aware of them

NRTK in NZ is not much use out of AKL or CHC (downright terrible in TGA) seems both a geometry/base spacing issue and data latency in NZ. PositioNZ-PP is good but the observation times are long and typically don't work in a surveying day workflow.

NRTK CQ's 0.02-0.03hz and much worse V, whereas base/rover is 0.01-0.02HZ and 0.03ishV; this pretty much limits NRTK to rough topo but no use for control or cadastral

Only looking into it now

Poor accuracy/repeatability results in Tauranga Area

RTK corrections not available in enough of the rural locations we work, ie poor phone coverage.

Still getting there hardware wise

The base station is too far north to be of any use. I pay for a subscription to a private company which I believe also uses PositioNZ

There are not enough stations for us. We have to set up our stations

Unsure on how to, I am keen to learn more.

We have always used Smartfix, denser coverage of base stations for Auckland.

To be honest I wasn't aware there was a live streaming service and thought it was static only. I hadn't really investigated until now

We use base and rover RTK for our work as the PPM corrections from the single local zero order, TRNG, add up to quickly.

We use Global Surveys Smartfix network for RTK and haven't quite found ourselves in the 'position' of requiring the PP service yet. Although I'm always on the lookout for a job that it would come in handy on.We use base and rover RTK for our work as the PPM corrections from the single local zero order, TRNG, add up too quickly.

2.4 Level of agreement of RINEX data statements (Question 12)

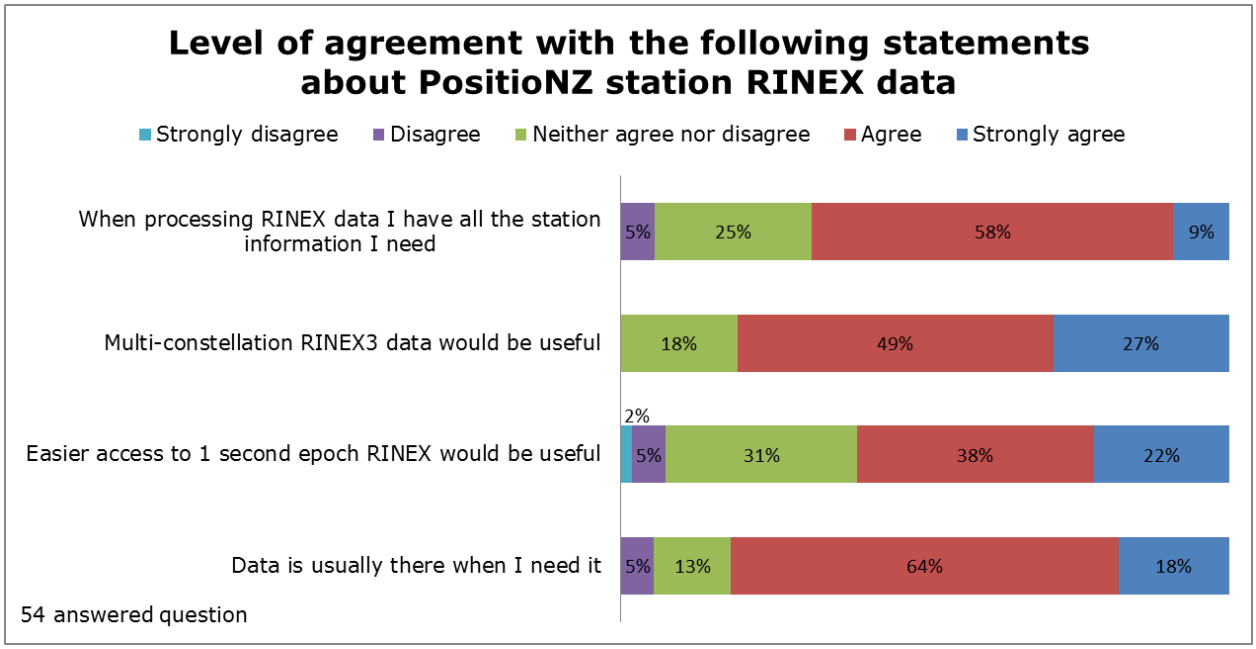

Figure 5: Level of agreement with RINEX data products and data quality (Question 12)

2.4.1.1 STATION INFORMATION

The majority of RINEX users (66%) have all the station information they need for processing. 5% state they do not.

Over the last 12 months LINZ has been working on a site manager for CORS stations in New Zealand. Additional metadata can be found at https://gnss-site-manager.geodesy.linz.govt.nz

2.4.1.2 MULTI-CONSTELLATION DATA

75% of respondents would like multi-GNSS RINEX3 data from our PositioNZ network. LINZ is working with GNS Science to ensure RINEX3 data will be available from the network in the near future. We are limited by the quality control tools that are compatible with current systems.

2.4.1.3 1 SECOND RINEX

60% of respondents would like easier access to 1 sec RINEX.

It is interesting that 7% of respondents disagree with this statement

2.4.1.4 DATA AVAILABLITY

5% of our customers find that data is not usually there when they require it, while 82% find that it is.

For those that do not find data this available it would be interesting to know what their desired timeframe is. Our hourly RINEX files are available within 2 hours of data collection (95% of the time), most are available within 15 minutes. Our daily files are usually available within 24 hrs.

2.5 Satisfaction of PositioNZ-RT (Question 13)

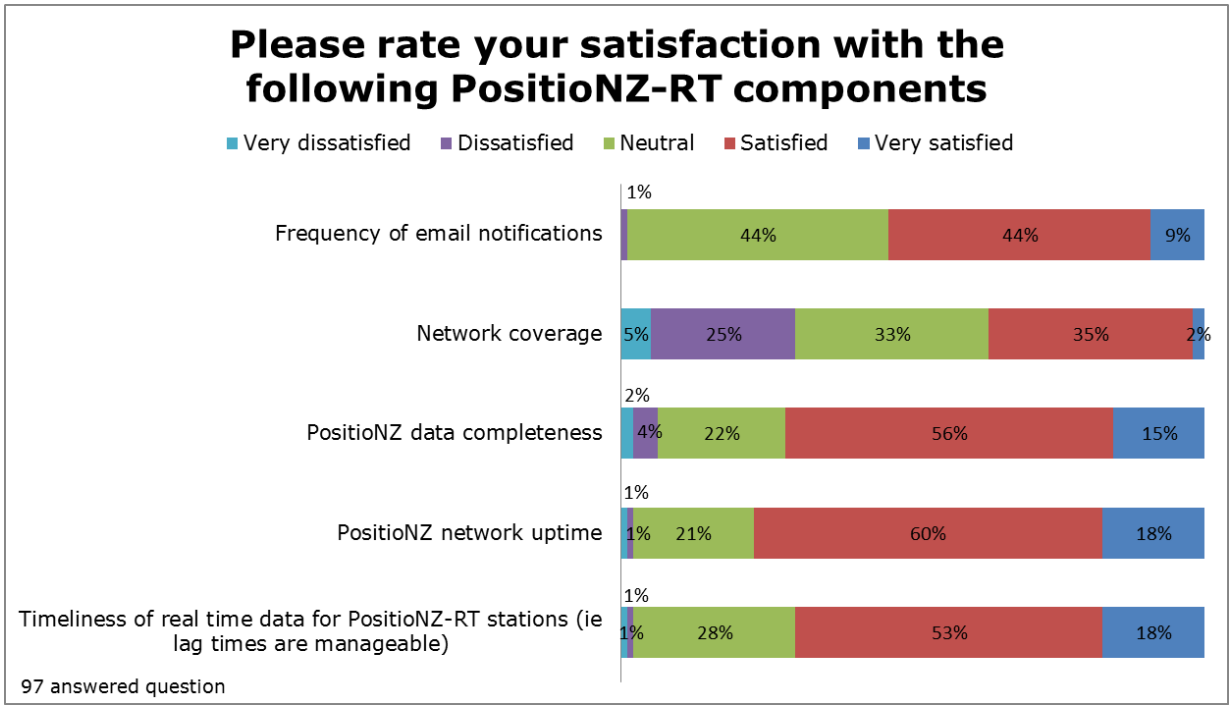

Figure 6: Satisatiation PositioNZ-RT (Question 13)

It is recognised that the PositioNZ network is sparse and the network does not provide New Zealand-wide coverage, and this is reflected in the results presented in Figure 6 and within the comments. This network was purpose built to monitor the datum and LINZ leverages this network to provide real time streams to New Zealanders, however this can only be done only where we have stations.

2.5.1.1 FREQUENCY OF EMAIL NOTIFICATIONS

Based on the 2015 GNSS/GPS Survey results LINZ started an email notification service. 53% of respondents are satisfied with the notification frequency and only 1% are dissatisfied.

2.5.1.2 NETWORK COVERAGE

By providing a real time service LINZ may have created a perception/expectation that we are supporting a national real time infrastructure. Unsurprisingly this means that we receive a lower satisfaction rating in this area. The PositioNZ network was built for long term monitoring of plate tectonics and NZGD2000 and stations are spaced 80km to 100km apart. LINZ and GeoNet are streaming real time data where there is existing infrastructure; this does not necessary meet all user needs. 30% of PositioNZ-RT users are dissatisfied to very dissatisfied with the network coverage, 37% of PositioNZ-RT users are satisfied to very satisfied with the network coverage.

2.5.1.3 POSITIONZ NETWORK UPTIME

67% of respondents are satisfied with the uptime and data completeness of PositioNZ-RT. For the majority of users the network's performance is meeting their needs. However, there are specific stations that could be improved, for example WHNG is currently surrounded by wilding pines which are obstructing satellite visibility. Other performance issues related to other stations are being addressed as infrastructure is upgraded.

2.5.1.4 TIMELINESS FOR REAL TIME DATA

71% of respondents are satisfied with the timeliness of real time data which is up from 65% in 2015.

In December 2017 the PositioNZ-RT service was upgraded and saw a significant reduction to the latencies (increase in timeliness) of the real time streams. These improvements yielded minor improvements to the overall user satisfaction. In 2015 7% were dissatisfied with the timeliness compared to 2% from this survey.

General Comments about PositioNZ-RT

More rural coverage on PositioNZ or network solution would be good

This free service is amazing. I worked in overseas for 6 years and there is nothing free like this.

Coverage means cost but if LINZ or the government want to see development in the Rural Communities then it is time they invested.

Why are you streaming RTCM 3.2. OK if you are a government organisation with the latest equipment but useless for older equipment. Everyone else around the world streams 3.0 or earlier so ALL systems can use correction streams.

There should be better coverage in main centres such as Auckland, Christchurch and Rotorua

Operating in close proximity (<20km) to a PositioNZ-RT station has been a tremendous boost to our efficiency and productivity. It would be great to see the density of stations increased and ultimately a nationwide network solution if possible.

If possible, I think that it would be advantageous to have an additional station situated centrally in the Auckland area as the distance to the 3 nearest stations is so great (Whangaparaoa, Corromandel & Hamilton). When connecting to a single station the ideal base line length should be no greater than 15km.

There is a big hole in the network. It would be good to have an additional station around Huntersville

We do rural work where there is no mobile coverage - I guess that is outside your control"

Closest correction station to the Manawatu is Dannevirke. A local correction station would reduce the baseline for better accuracy around here.

A base station in mid northland - Kerikeri/Kaikohe would be very much appreciated

http://apps.linz.govt.nz/positionz/index.aspx not updated to show LEVN

No PositioNZ streaming data site close to Palmerston North (distance = accuracy!)

https://geodesy.noaa.gov/ANTCAL/ show instruments do not always "measure" to where factory indicates. It would help to show this offset.

Two base stations over all of Northland is pretty poor, particularly with large amounts of survey/development coming from Auckland.

More LINZ coverage in Taranaki would be appreciated. Annoying to have to buy into equipment supplier licences for base station data in populated areas ie New Plymouth and Hawera to really achieve repeatable accuracy by using 1 RTK receiver.

We find the single NPLY base station being generally 14-18km from town and in a place with quite different (changeable mountain) weather means especially the height component of the RTK GNSS observations using it are not as accurate or repeatable as you'd like.

Most of my work centres on Rotorua. The distance to the nearest PostioNZ-RT stations mean we are unable to use the real time service. It would be great if one of the Geonet receivers could be upgraded so that it could become part of the PositioNZ-RT service.

PositioNZ sites need to be of a greater density.

Cellphone coverage/reliability prevents this service from being more useful in our area (Taupo).

We have a huge network coverage gap in south Canterbury area

A new base at either Hinds or Ealing would be great

More coastal stations would be useful for marine operations, but accept there must be logistical and economic limits.

Correction over LoRaWAN or RF broadcast for areas with patchy comms. Would encourage low-cost, high population IoT applications as no cellular link required.

It is annoying that updates are completed during the day as it does interrupt the work i am doing, albeit for a short time.

2.6 Connection to the PositioNZ-RT Services (Question 5 and 15)

LINZ and GeoNet want to disable the fixed IP address and move every user over to a url. This will enable the service to be managed more effectively in the event of an outage. The purpose of this question is to gauge how many users of PositioNZ-RT are capable of connecting to the network via the url and how many people would be affected if the connection via IP is no longer available.

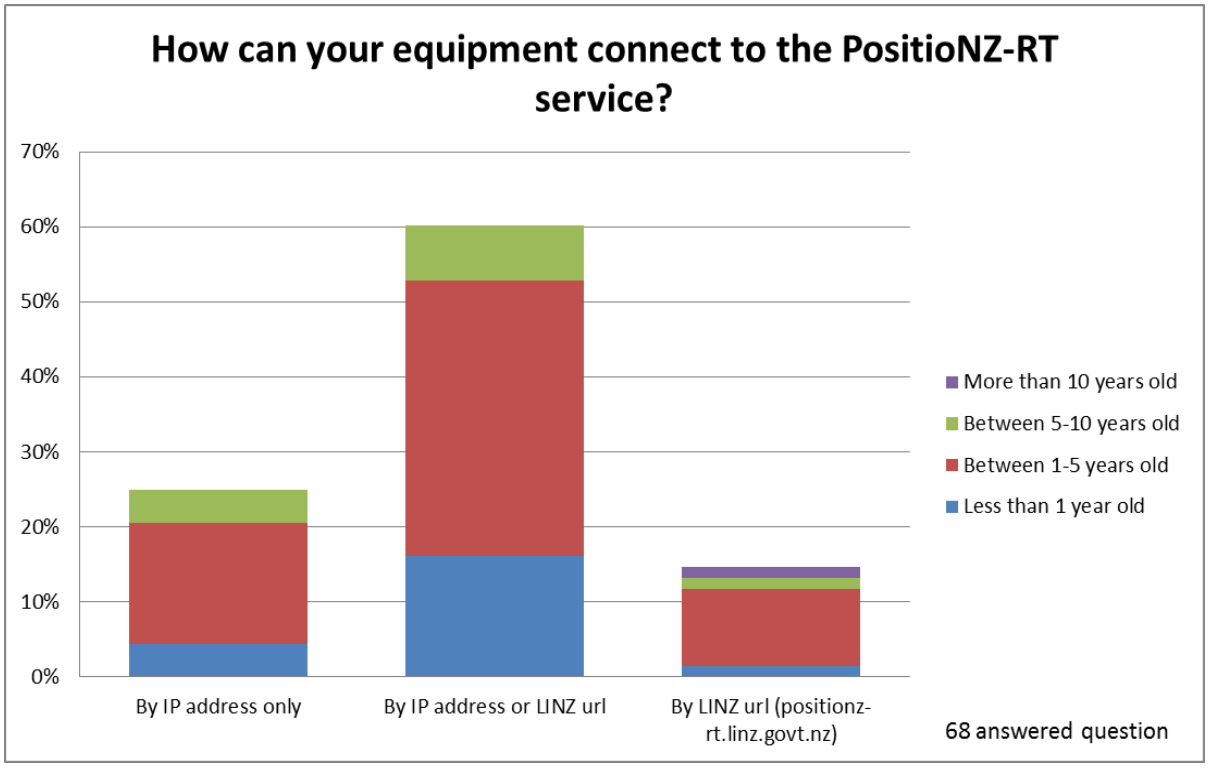

Figure 7: Connection to PositioNZ-RT(Question 5 and 15)

The ages of equipment are plotted with the connection method to assess if there is a correlation between them. It appears that equipment age does not influence connection method used by GNSS equipment.

- 25% of respondents are not able to contact via the url.
- 75% of respondents would not be affected by this change.

2.7 Frequency of site calibrations (Question 9)

The PositioNZ-RT streams NZGD2000 coordinates. This question was added to gauge how actively LINZ need to maintain the coordinates streamed from the service or what the impact it might be if ITRF coordinates were streamed instead.

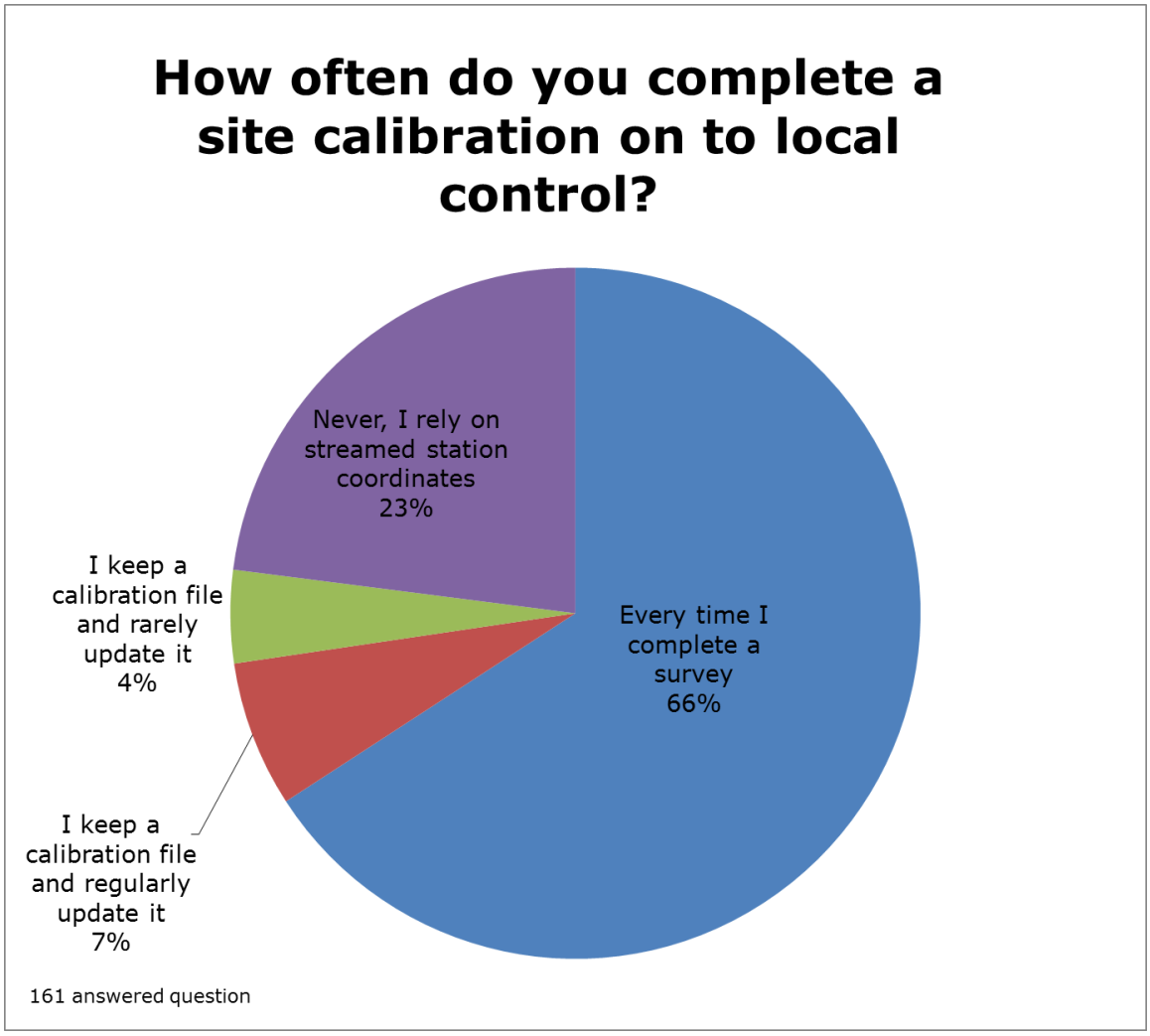

Figure 8: Results from question 9

	Every time I complete a survey	I keep a calibration file and regularly update it	I keep a calibration file and rarely update it	Never, I rely on streamed station coordinates
All	106	11	7	37
Surveying	91	7	2	17
Engineering	2	0	3	5
Construction	5	1	1	2
Education and Research	0	1	0	1
Farming/Agriculture	1	0	0	4
Local Government	2	1	0	1
Utilities (eg electricity)	1	0	0	5
Infrastructure (eg roading/transportation)	1	1	1	0
Central Government	2	0	0	0
Other (please specify)	0	0	0	1
Reseller	0	0	0	1

Table 1: Main area of business and frequency of calibration (Questions 1 and 9)

It is interesting to see how many surveyors do not complete a site calibration on to local geodetic marks. An explanation might be that surveyors validate streamed coordinates

on local control marks without actually completing a calibration. For other users of the network (eg. asset management) the streamed coordinate may be fit for purpose without the need for a calibration.

This presents an opportunity for LINZ to provide more education / clarification.

This question is new to the GNSS/GPS Survey 2018.

General Comments:

I undertake a single point calibration using data from LOL XML, check onto another mark, and if agree. I carry on with survey. Then download date into 3rd party software to check data reliability using measured vectors between two observation sets.

Maybe the way I use GPS, but I've never seen another way to use my GPS except do a local site calibration.

2.8 Use of real time data (Question 16)

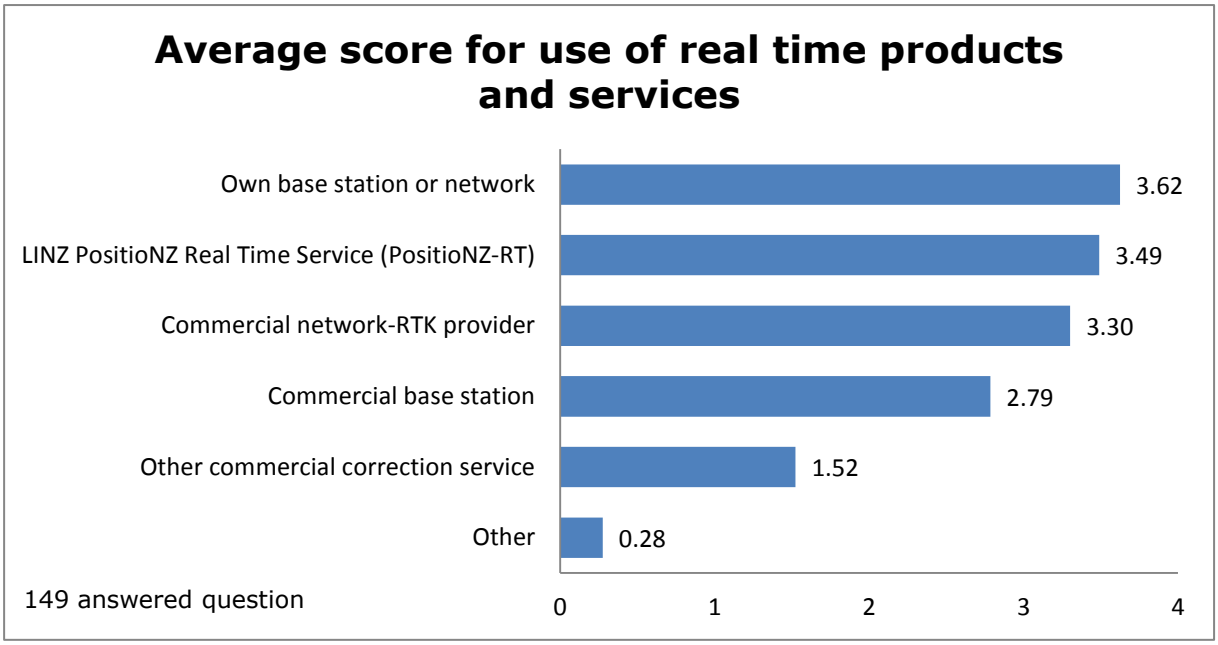

Figure 9: Usage of real time products and services (Question 16)

The responses to Question 16 show that real time users have a slight preference for using their own base over using PositioNZ-RT, which is slightly ahead of commercial network-RTK providers. This result suggests that users of a real time service prefer a single base solution over a network solution. This might be due to cost or accessibility to network solutions.

Note: Data was collected by a ranking method; scores ranked 1st were given a value of 5, scores ranked 2nd were given a value of 4 etc. The sum of values for each item was then divided by the number of responses to give a score out of 5.

2.9 Multi-GNSS usage and uptake (Question 4)

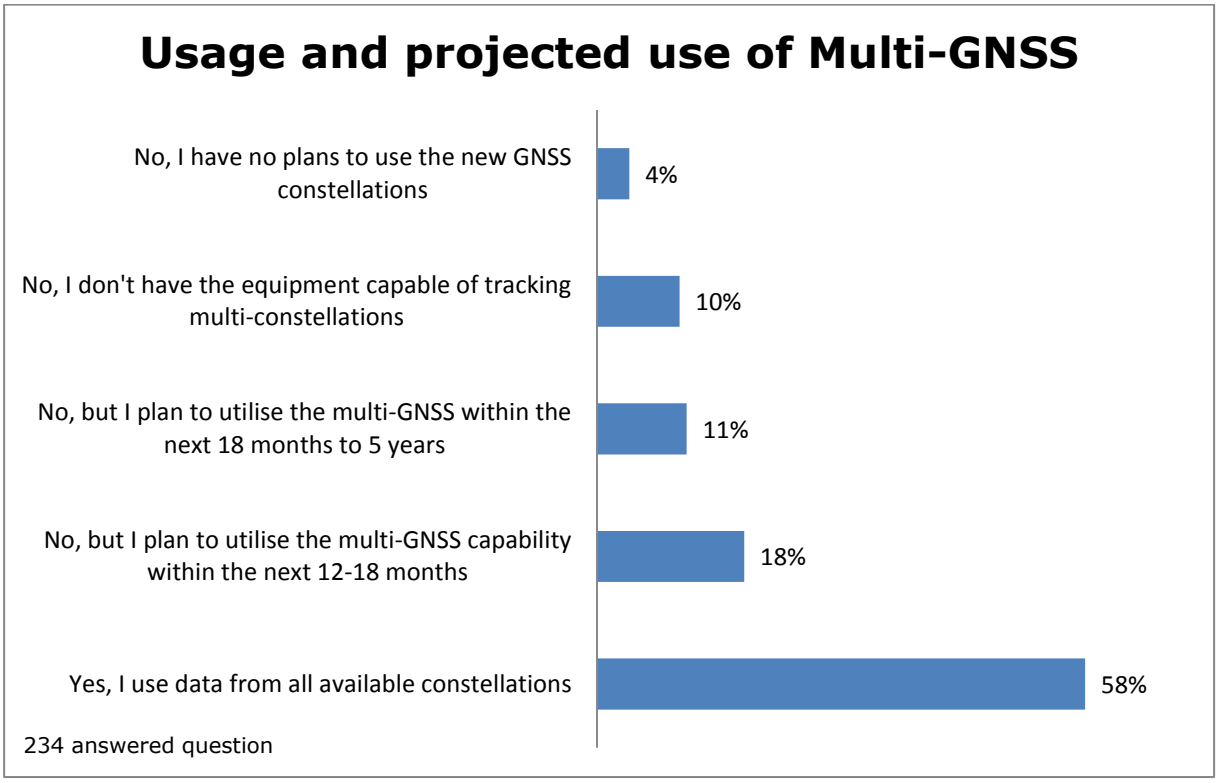

Figure 10: Usage of Multi-GNSS (Question 4)

58% of respondents observe all available constellations (multi-GNSS), this is up from 31% of the 2015 respondents.

According to this survey over the next 5 years 87% will be utilising multi-constellation data.

2.10 Website content and communication (Question 7)

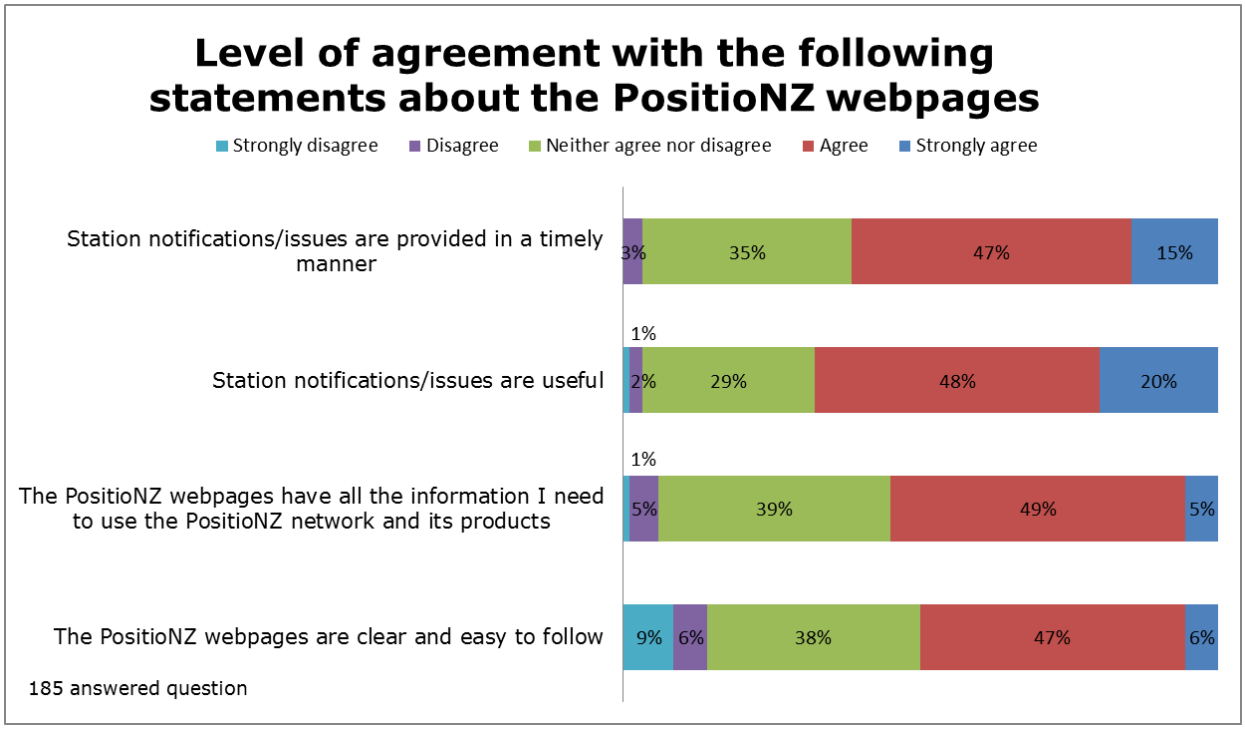

Figure 7: Level of agreement information about PositioNZ network (Question 7)

Common themes:

There are some improvements LINZ can make across the PositioNZ communications and webpages.

3% of respondents do not think the notifications are useful or provided in a timely manner.

6% of respondents do not have all the information they require.

15% of respondents do not find the PositioNZ webpages clear and easy to follow.

Respondents' feedback for PositioNZ webpage or notifications regarding what could be improved (Question 8)

Occasionally the website doesn't work depending on what browser you are using.

The LINZ website used to be very user friendly, but with the new site (18months or so) it's very hard to find things and in fact only just getting used to it now

For the last three weeks I've been trying to use PositioNZ with no joy. I've been told that my 5 year old data recorder could be too old. I have used it with Ibase and used some of the LINZ stations successfully. So my gear must be okay, therefore PositioNZ has a challenge.

Want to quickly access from main page what stations are where, their access details and their health

Searching for information regarding PositioNZ was somewhat circular and I couldn't immediately find what I was looking for.

I find the LINZ webpage pretty confusing, i.e. difficult to navigate (the last time I used it).

"The links for station details have the stream name in the URL which points to an error page ""Mark details unavailable, Incorrect geodetic code AUCK_RTCM-MSM""

The correct link should have only the station name in the URL

http://apps.linz.govt.nz/positionz/index.aspx?page=mark&code=AUCK

I have to manually edit the URL every time I click on the link :)"

A set-up troubleshoot guide

It would probably help a lot to have a tech centre / tech hub for users to share ideas on technology pertinent to NZ (ie absence of SBAS and BeiDou, local equipment, local anomalies, industry data interchange, data sharing, federated RTCM sources, etc).

For example, we're currently looking for an alternative workflow to the ageing Pathfinder Office. It would've been good to see what others are using.

Also we're considering adding correction stations to our zone substations as multi-function devices as we need accurate clock sources there anyway and starting to see the benefit of having high-accuracy correction sources for technology evolution trials (remotely operated drones, etc). Having somewhere for people to discuss new correction sites would be great.

Market it, I was not aware of its breadth of functionality. That could just be me though

Only use PositioNZ data through Leica Smartfix network

Better coverage!

Haven't used PositioNZ yet - keen to learn more

Didn't know it existed

Make a more obvious link from the LINZ homepage - if I'm away from my own desktop it takes a couple of searches to get to the right place. And put more historical station 'reliability' data up - often its good to know what happened in the last week as well as just in the last 24hrs - not all fieldwork is immediately processed.

I haven't used it as the Auckland base is too far north to be of any use

I have never used the PositioNZ webpage

I very rarely use the PositioNZ webpage

I have only used it once so I'm not that familiar with the notifications.

Site velocities

Historical antenna/receiver metadata

If you are familiar with GNSS concepts it is quite straight forwards but it can be intimidating to new operators in the organisation. Many more sources of RINEX data are becoming available (e.g. off UAVs or uBLOX, tablets and other receivers that allow you to store the raw data) and so I anticipate the post-processing site could use a few more examples and perhaps a bit more detail on the procedures. Might it be worth working some examples with things like RTKLIB for users to follow?

Let me know when new sites are proposed

Web page and notifications are fine thanks

For us we have a huge data gap around the South Canterbury area

Another base around the hinds or Ealing Areas would be great if it is possible

It's a pretty good service and can't complain

A better station map with tool to find nearest to user would be nice. A more obvious link to the map too.

Better access to technical information, Q and A's. For example, documented problems of GNSS firmware interpretation of PositioNZ RTCM 3.X data.

Use of NZVD2016 to reduce RTK ellipsoid heights. Is there a LL version of 2016 Geoid available?

LINZ should establish a NZ wide, proper network RTK solution like VRS or spiderweb & that works with all modern GNSS products from all manufacturers and manage it properly instead of the poorly tested & implemented solutions.

2.11 PositioNZ-PP enhancements (Question 17)

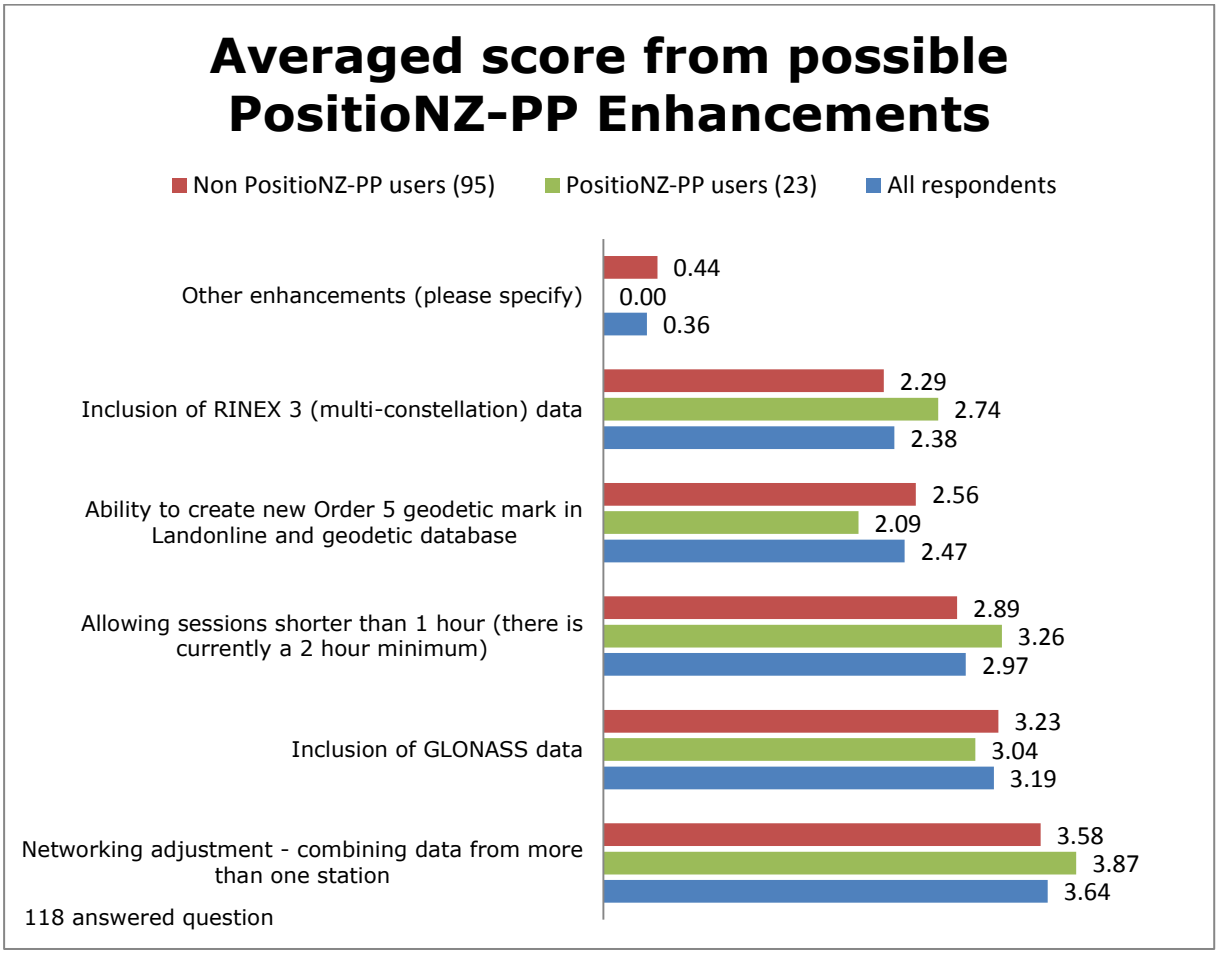

Figure 12: Potential enhancements for PositioNZ-PP (Question 17)

Of the 33 PositioNZ users from question 17, 23 of them ranked the enhancements. None of these PositioNZ users suggested any alternative enhancements.

Network adjustment within PositioNZ-PP is the highest rating enhancement over all respondents with "Inclusion of GLONASS" and "Allowing shorter sessions" coming in at second and third. It is worth noting that current users of the service would prefer shorter sessions over inclusion of GLONASS.

A sample of comments from respondents:

Get someone from a non technical background to design a guide on how to use PositioNZ and list the benefits

Amend it to also process L1 only dat file

Range of instruments. Sokkia GRX1 not supported last time I tried

More base stations

STRENGTHEN CORS NETWORK IN Northern NI

Better base location in Whangarei

Clear up the problem that often makes us wait over 24 hours for results from the PositioNZ post processing service.

Wasn't aware PositioNZ had a post processing service

Note: Data was collected by a ranking method; scores ranked 1st were given a value of 6, scores ranked 2nd were given a value of 4 etc. The sum of values for each item was then divided by the number of responses and the value of 1 was subtracted to give a score out of 5.

2.12 General comments and feedback (Question 18)

Common themes:

The PositioNZ network would be utilised more if it had more coverage, especially in rural areas.

Additional stations in the following areas were specifically mentioned:

- Northland (Kaikohe/Kerikeri/Whangarei)
- Main centres (Auckland/Christchurch/Rotorua/Palmerston North)
- South Canterbury (Ealing/Hinds)
- Manawatu and Taranaki (Whanganui)
- Rural areas

Include more GeoNet stations into PositioNZ-PP and PositioNZ-RT

Actively promote PositioNZ, a number of respondents stated they were not aware of the range products and services available.

A technical guide/website to the network and GNSS would be useful to customers for trouble shooting and knowledge sharing.

It would be preferable (to PositioNZ users) to complete maintenance before 6am or after 6pm.

The PositioNZ webpages are somewhat circular and can be difficult to navigate.

Selection of additional comments:

More CORS sites in Northland.

More accurate/up-to-date orthometric marks (in local datum)

Accuracy only good under 15km from base station so need multiple stations across Auckland

Add ability to deliver PPK output

Complete coverage of country 70km baselines

Enable another base for RT surveying between Palmerston North and Wanganui

Intensified coverage of PositioNZ RTK stations would improve the system. Current coverage / baseline length in the region means unlikely to use this method standalone for cadastral work unless very close.

Use LINZ CORS Rinex data without problems. It's a bit clunky to retrieve older data (when you have to input a UTC date etc).

Have tried the post processing service and found that at the time because it only processed back to LINZ marks rather than between your surveyed marks it wasn't going to be much use.

I doubt whether there would be sufficient demand for enhancement of the LINZ products and services without a) LINZ charging for them; and/or b) the commercial providers getting the pip.

I suggest like with the private sector you need to engage your customer. They will use a personal visit or at least phone call to problem solve. Email solutions do not work and suggesting web based solutions to technical matters is a last resort. I realise this comes down to resourcing. LINZ has improved the customer service however it cannot compete with the private sector until it learns the simple technique of engaging your customer.

Improve the density of the network

Incorporate GeoNet sites into the PositioNZ-PP network.

Is there a simple access to RTD via GNSS on Android, that is bluetoothed to a survey grade receiver

LoRaWAN or other RF broadcast directly from the correction stations would be a game-changer for many industries. No IP comms would mean low-cost, high population IoT roving sensors would be feasible.

More stations around main centres such as Auckland, Christchurch and Rotorua.

News page on relevant GNSS technical developments

Phone app to show systems status / ref stations / notices / warnings

Recommendations on any free baseline processing software to enable network analysis.

Maybe a SNAP for dummies tutorial for processing STATIC GNSS, RTK GNSS, Terrestrial (Total Station) and Level Data. This would help construction companies and consultants setup strong control networks without relying on (expensive) software eg TBC or Infinity."

RGUT in Rotorua would be great to have added to the PositioNZ network. I'm sure if LINZ passed the hat around the local spatial professionals and local authorities should be able to get the data link sorted?

Send information about PositioNZ RT. I had never heard of it until I did this survey.

The Portland base in Whangarei has large pine trees on one side and a mound on the other so a poor location for GNSS/GPS.

The PositioNZ infrastructure is a fantastic and valuable service to New Zealand. It would be great to see more emphasis on GNSS services and education within LINZ as the use and precision of GNSS continues to grow. In particular things like facilitating access to the SBAS, support and assistance around the Galileo constellation as it approaches operational status and perhaps an increased focus on users other than surveyors. Keep up the great work!

"We have major problems when maintenance is being performed over the midday period especially in winter when, due to sun angle we are flying our surveys when the sun is at its highest.

It would be far better to do the maintenance very early in the day (prior to 6am) or late (after 6pm)"

"WHNG (Whangarei Base station at Portland) is poorly located due to tall pine trees located next to it and the other side has an earth bund limiting sky view.

More Northland base stations required as currently they are too far apart. Needs to cover central/north Whangarei city and Kaikohe/Kerikeri.

Would be good to understand why we typically have a 0.1m height difference with orthometric vertical height marks.

Maybe the wrong place for this comment but the height conversions are error prone.

The origin coordinates (especially height) that are to be transformed need to be encoded with the source and that source printed out with the transformed coordinates and its datum.

3 Proposed Future Actions

The following are proposed actions related to specific survey questions

Website Content and Communication (Question 7)	
1	Review all PositioNZ related webpages
PositioNZ-PP (Post Processing Service) Enhancements (Question 17)	
2	LINZ is currently working to update the backend of PositioNZ-PP. Recommendations from Question 17 will be used to prioritise enhancements.
PositioNZ-RT (Question 5, 13 and15)	
3	Understand the equipment limitations for connecting to service via url. Potentially obtain a list of incompatible equipment or a troubleshooting guide so specific equipment.
4	LINZ will continue to work with GNS Science to encourage GeoNet to move to a real time network.
RINEX Provision Enhancements (Question 12)	
5	Investigate data provision for 1 sec RINEX2 files on the LINZ website
6	Investigate whether LINZ is able to provide RINEX3 data on the LINZ website

Appendix A Survey Questions

Land Information New Zealand (LINZ) operates the PositioNZ network, which provides GNSS/GPS products and services.

LINZ is seeking your input as to your current use and perceptions of the products and services provided and how we might cater for your needs in the future.

Your anonymous feedback will be used to drive our work programme.

Thank you for your time and input.

Q1 Which of the following best describes your area of business?

- ○ Central Government (1)
- ○ Construction (2)
- ○ Education and Research (3)
- ○ Emergency Services (4)
- ○ Engineering (5)
- ○ Farming/Agriculture (6)
- ○ Infrastructure (eg roading/transportation) (7)
- ○ Local Government (8)
- ○ Utilities (eg electricity) (9)
- ○ Surveying (10)
- ○ Other (please specify) (11) _____

Page Break

Q2 Where do you primarily work?

- Northland (1)
- Auckland (2)
- Waikato (3)
- Bay of Plenty (4)
- Gisborne (5)
- Hawke's Bay (6)
- Taranaki (7)
- Manawatu-Wanganui (8)
- Wellington (9)
- Tasman (10)
- Nelson (11)
- Malborough (12)
- West Coast (13)
- Canterbury (14)
- Otago (15)
- Southland (16)
- Nationwide (18)
- Outside of New Zealand (17)

Page Break

Q3 How often does your organisation use GNSS/GPS technology?

- Daily (1)
- Weekly (2)
- Monthly (3)
- Rarely (4)
- Never (5)

Page Break

Q4 Have you enabled multi-constellation GNSS capability (more than GPS and GLONASS)?

- Yes, I use data from all available constellations (1)
- No, but I plan to utilise the multi-GNSS capability within the next 12-18 months (2)
- No, but I plan to utilise the multi-GNSS within the next 18 months to 5 years (3)
- No, I have no plans to use the new GNSS constellations (4)
- No, I don't have the equipment capable of tracking multi-constellations (5)

Page Break

Q5 How old is your GNSS equipment?

- Less than 1 year old (1)
- Between 1-5 years old (2)
- Between 5-10 years old (4)
- More than 10 years old (5)
- Not applicable (6)

Page Break

Q6 How often do you generally replace or upgrade your GNSS equipment (hardware)?

- ○ Before it is 5 years old (1)
- ○ Between 5 and 10 years old (2)
- ○ When it is more than 10 years old (4)
- ○ Not applicable (5)

Page Break

Q7 How much do you agree or disagree with the following statements about the PositioNZ webpages

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
The PositioNZ webpages are clear and easy to follow (1)	○	○	○	○	○
The PositioNZ webpages have all the information I need to use the PositioNZ network and its products (2)	○	○	○	○	○
Station notifications/issues are useful (3)	○	○	○	○	○
Station notifications/issues are provided in a timely manner (4)	○	○	○	○	○

Q8 Please share with us a few things the PositioNZ webpage or notifications could do better.

_____

_____

_____

_____

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Page Break

Q9 How often do you complete a site calibration on to local control?

- ○ Every time I complete a survey (1)
- ○ I keep a calibration file and regularly update it (2)
- ○ I keep a calibration file and rarely update it (3)
- ○ Never, I rely on streamed station coordinates (4)
- ○ Not applicable (5)

Page Break

Q10 Do you use data and services provided by PositioNZ?
Please select one or more of the following:

- ☐ Yes, I use PositioNZ RINEX data (1)
- ☐ Yes, I use real time data streams through PositioNZ-RT (2)
- ☐ Yes, I use PositioNZ-RT data streams via a private sector data reseller (5)
- ☐ Yes, I use the PositioNZ Post Processing Service (PositioNZ-PP) (3)
- ☐ No, I do not use PositioNZ products (4)

Display This Question:

If Q10 = No, I do not use PositioNZ products

Q11 If you do not use specific products and services, are you able to provide details on why this is?

_____

_____

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Display This Question:

If Q10 = Yes, I use PositioNZ RINEX data

Q12 How much do you agree or disagree with the following statements about PositioNZ station RINEX data?

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
Data is usually there when I need it (1)	○	○	○	○	○
Easier access to 1 second epoch RINEX would be useful (2)	○	○	○	○	○
Multi-constellation RINEX3 data would be useful (3)	○	○	○	○	○
When processing RINEX data I have all the station information I need (4)	○	○	○	○	○

Page Break

Display This Question:

If Q10 = Yes, I use real time data streams through PositioNZ-RT

Or Q10 = Yes, I use PositioNZ-RT data streams via a private sector data reseller

Q13 Please rate your satisfaction with the following PositioNZ-RT components

	Very dissatisfied (1)	Dissatisfied (2)	Neutral (3)	Satisfied (4)	Very satisfied (5)
Timeliness of real time data for PositioNZ-RT stations (ie lag times are manageable) (1)	○	○	○	○	○
PositioNZ network uptime (2)	○	○	○	○	○
PositioNZ data completeness (3)	○	○	○	○	○
Network coverage (4)	○	○	○	○	○
Frequency of email notifications (5)	○	○	○	○	○

Display This Question:

If Q10 = Yes, I use real time data streams through PositioNZ-RT

Q14 Please include any additional comments on your above answers

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Display This Question:

If Q10 = Yes, I use real time data streams through PositioNZ-RT

Q15 How can your equipment connect to the PositioNZ-RT service?

- ○ By IP address only (1)
- ○ By LINZ url (positionz-rt.linz.govt.nz) (2)
- ○ By IP address or LINZ url (3)

Page Break

Q16 If you use real time GNSS data or services, please rank by dragging the following in order of use from most used to least used.

_____ LINZ PositioNZ Real Time Service (PositioNZ-RT) (1)
_____ Commercial base station (2)
_____ Commercial network-RTK provider (3)
_____ Other commercial correction service (4)
_____ Own base station or network (5)
_____ Other (6)

Page Break

Q17 Please rank the potential enhancements that would make the PositioNZ-PP Service more useful to you. Drag the most useful to the top to least useful at the bottom.

_____ Networking adjustment - combining data from more than one station (1)
_____ Allowing sessions shorter than 1 hour (there is currently a 2 hour minimum) (2)
_____ Ability to create new Order 5 geodetic mark in Landonline and geodetic database (3)
_____ Inclusion of RINEX 3 (multi-constellation) data (4)
_____ Inclusion of GLONASS data (5)
_____ Other enhancements (please specify) (6)

Page Break

Q19 Please share any other suggestions on how LINZ could improve its GNSS/GPS products and services.

_____

_____

_____

_____

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If you would like LINZ to contact you regarding your feedback, please add your details below

- ☐ Name (1) _____
- ☐ Position (2) _____
- ☐ Organisation (3) _____
- ☐ Email address (4) _____

Thank you for providing us with your feedback.

To submit your responses, please click the right hand arrow.

For more information please email us at positionz@linz.govt.nz, or follow us on Twitter: @LINZ_Geodesy

http://www.linz.govt.nz/positionz-network