

SNIGG Confidential: Wormhole Probing Manual

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Abstract

Pandemic Legion is full of lazy faggots spoiled by Titan bridges. Wormholes are basically Titan bridges with infinite range. If they can be properly exploited, we'll get more fights with less effort.

As well, EVE game mechanics have moved forward in big leaps but our strategy for skirmish warfare hasn't changed much.

Wormholes have a bad rap because they're poorly understood. I've found that even a little knowledge on how to find them efficiently, drastically increases their usefulness.

Contents

1	Scanning	2
1.1	General Technique	2
1.2	Probe Arrangement	3
1.3	Heuristics	3
1.3.1	Spawn Distance from Celestials	3
1.3.2	Signature Radius	4
1.4	Finding Wormholes in K-Space	4
1.5	Finding Wormholes in W-Space	5
2	Mechanics	6
2.1	Sensor Strength	6
2.2	Ships and Fittings	6
2.2.1	Roles	6
2.3	Session Change Mechanics	7
3	Untested	8
3.1	Techniques With >4 Probes	8
3.2	Using Different Probe Radii Together	8
3.3	Partial Probe Selection	8
3.4	Significance of Sig Size	8
3.5	Wormhole Space Regions	9

Chapter 1

Scanning

1.1 General Technique

From simplest, to more complex: an overview of game mechanics.

- Wormholes are common. Some dev blog said that you'll probably find one after scanning 3 systems, which seems about right.
- All wormholes are Signatures. Filter out everything but Cosmic Signatures.
- The probes work by measuring range. If less than 4 are in range, the possible positions of your target will be marked in red. See Table 1.1 for an overview.
- Wormholes, along with complexes, are identified as an Unknown (rather than Ladar/Radar/Magnetometric) Group once you get > 25% signal strength. Getting > 75% (?) conclusively identifies it as a wormhole.
- 4 probes give up to 2x the Signal Strength 1 gives, if placed in optimal geometric configuration. (Tetrahedron.)
- Right click → "ignore result" is important while pruning non-wormhole sigs, but when you exit the system the ignore list gets cleared. It is a good idea to include signature ID (KZR-752, YUC-654, etc) in your bookmark names in case you do a partial scan then decide to come back.
- Holding down Shift makes an action work on all probes at once. To save time, always shift-drag the entire group, or probe edges to adjust size.
- Stuff in wormholes spawns slowly. A system that hasn't been touched for ages is flooded with signatures - one that people live in tends to be bare except for the mandatory wormholes.

# probes in range of target	possible target positions
1	sphere
2	circle
3	two points
4+	single point

Table 1.1: Localization of a target via spread out rangefinding sensors

1.2 Probe Arrangement

Your goal is to minimize time spent. Dragging the probes around is a bitch, so you want an arrangement that gives you the most information and coverage, while being the easiest to manipulate. All such arrangements are coplanar - arranging them in 3 dimensions makes you waste a lot of time while you're resizing the group.

The configuration I use is a 2D cross. To make one, launch 4 probes. Grabbing one of the arrows, drag a probe half a radius away from the group. Repeat for the other 3 probes, in the other cardinal directions.

This configuration is convenient, because after resizing you only need to move each probe in one dimension to get them to overlap nicely again.

It provides a nice group of overlaps, with a sizeable region in the center with x4 overlap, surrounded by clear regions with 3, 2, or no overlap. When you get a partial hit, it's usually obvious which direction you must move in to get a x4 hit.

The downside is a lack of 'vertical' coverage. Some wormholes are high above or below the main orbital plane and can cause confusion when you can't seem to get a x4 hit no matter where you move your spheres. If this happens, it's because your probes have more vertical coverage at the edges than in the very center of the arrangement: move the whole group up or down, and the confusion should resolve itself.

1.3 Heuristics

These are tricks to greatly speed up finding wormholes, at the cost of possibly missing some.

1.3.1 Spawn Distance from Celestials

Complexes and stuff spawn $< 4\text{AU}$ (?) away from celestial objects. (Does this include gates and suns, or just planets?) Wormholes have no such restriction. If a signature is more than 4AU away from a celestial, odds are it's a wormhole.

There are two uses of this, mostly in sig-flooded or very large systems.

First, you can center smaller radius probes on celestials to prune out high-sig radius complexes you know will be there.

Second, you can do 4AU scans on all celestials and ignore anything there - if something is left over, it's practically guaranteed to be a wormhole. This works very well in untouched w-space systems.

The smaller the system, the higher the risk of missing a wormhole. The less signatures in the system, the less point there is in doing it.

1.3.2 Signature Radius

Probable objects, like ships, have signature radiuses. Ghetto anomalies have huge ones, 10/10 plexes have tiny ones, the smaller it is the lower % results you'll get, and the smaller you'll have to make your probes.

It is possible to know the sig size of a wormhole, just by dropping a single probe and scanning, then crossreferencing the result with an Excel table. (TODO: details!)

In my testing, so far, I have found that all wormholes have 5 or 10 sig radius. (Out of a possible 1.25, 1.67, 2.5, 4, 5, 6.67, 10, and 20.) This may not always be true, especially for wormholes I haven't seen much (nullsec to nullsec, wormholes inside wormhole space).

This is not set in stone, and NEEDS MORE TESTING. Puppies on EVE-O mention smaller wormholes, but they're dumb and probably don't get how the probes work when a signature's close to the edge of its' range. (TODO: explain this.) I recommend scanning systems thoroughly, if only to disprove the theory: however, if you're in a hurry this is one hell of a heuristic!

1.4 Finding Wormholes in K-Space

You jumped into a system. Drop a probe, and while dropping 3 more set it to 32AU and do a quick scan. This will cover 100% of most systems, and let you quickly move on if no signatures are found. You could use deep space probes to cover 100% of all systems, but swapping probe types would probably lose you time. (And deep space probes require Astrometrics V.)

Once signatures have been found, move your probes into formation and start scanning around planets. Most non-wormhole signatures spawn within a few AU of planets, while wormholes can spawn anywhere. Your goal at first is to narrow down obvious non-wormholes (high sig radius sites) first then move on to the lower-sig ones.

The process consists of getting a x4 hit (point) with a large probe radius, then going to a lower radius (go down by a factor of 4 or 8 to save time). Once you've identified a result as non-wormhole, ignore it by right clicking, then move on to others.

If you find a wormhole, you may want to just bookmark it (including the signature id in the name) and keep scanning until no unidentified results are left. If you jump the gun and enter the hole, your list of ignored signatures will be wiped.

Use an online service, or an offline application like 'WormholeThingie.exe' to get details about the wormhole or system. Wormholes called K162 contain no detailed information except duration, destination, and stability in the decription - you must jump through and check the linked hole to find out mass limits.

1.5 Finding Wormholes in W-Space

Wormholes seem to slowly spawn stuff over a period of days, maybe weeks. You can tell if a wormhole hasn't been touched, if it has a *lot* of signatures.

Rather than scan down every last one like you do in normal space (which is a pain in the ass if there's a lot, especially with small ones) there's an awesome trick you can use in large systems.

Wormholes spawn anywhere in the system, while other signatures are usually less than 4AU from a celestial. Drop 4AU probes on the celestials and ignore any scan results you get - anything that remains is probably a wormhole. ' You might miss some wormholes, but this works wonders for large, signature-crammed systems.

Chapter 2

Mechanics

2.1 Sensor Strength

Higher sensor strength lets you identify signature types with larger probe radii. Not having to drop to lower probe radii saves a lot of time moving the probes around.

With low sensor strength, some especially small objects may be unscannable. Wormholes, however, seem mostly to be medium in size and even low-strength ships should be able to find or at least identify them.

2.2 Ships and Fittings

Rigs give a 21% bonus and small ones are dirt cheap. T2 have steep fitting requirements so you can only fit one, not two, on all ships I checked. As such, two T1s are most likely better than a single T2.

There are faction probes and probe launchers - Sister stuff gives 5% bonus, RSS 10%. The probes are cheap, 5% ones especially, and almost impossible to lose. The launchers are expensive, and RSS stuff in general seems low in supply.

There are hardwirings (Hardwiring - Poteque Pharmaceuticals 'Prospector' PPH-?) that give from 2% to 10% scan strength bonus. There are also one or two other, less important hardwirings.

There is a low-grade scan strength implant set. I assume it is low in supply, and high in demand.

Astrometric frigates give a 5% bonus per level, covert ops 10%, and T3s can have subsystems that are identical to covert ops.

2.2.1 Roles

The wide range in price and specific requirements of scanning mean that there is a range of roles the setups may fill.

- Dedicated scanner cov ops that never tackles or puts the expensive ship and clone in danger.
- Flexible cov ops which can probe well but is kept reasonably cheap since it dies a lot.
- Specialized bomber or recon with scan rigs.
- Ship with a utility high that's fitted with an online, or offline, probe launcher.

2.3 Session Change Mechanics

Wormholes function like gates, except you re-appear quite close to it. Also, if you jump from A to B, then back from B to A, you can't jump from A to B for 2 minutes. (Guess they put that in to make collapsing them harder, but it can get you killed if you're not aware of the timer.)

It looks like this timer is triggered during the A to B jump (the first one). Not totally certain of that though.

Chapter 3

Untested

3.1 Techniques With >4 Probes

I've gotten decent with 4. Haven't explored using 5 or more - it may have potential for speeding things up.

3.2 Using Different Probe Radii Together

If you can overlap three large probes with one small one on a signature, the signal strength should be at worst 50% of four overlapping small probes.

Such a technique could produce results faster since much less time would be spent resizing the probe formation!

3.3 Partial Probe Selection

You can deselect probes in the scan window, and only work with a subset. This might be powerful when combined with the previous untested techniques.

3.4 Significance of Sig Size

Objects scannable with probes have a signature radius. Easy shit has large sigs, really hard complexes have small sigs. Where do wormholes fit? My testing suggested a correlation between wormhole destination (empire/0.0/wormhole/lowsec) and sig size. Can this be used to reduce time needed to find them?

There's a really nice spreadsheet for calculating signature size from the % you get when scanning it with a certain size probe... It should be attached alongside this PDF.

3.5 Wormhole Space Regions

Highsec tends to link to low class holes, nullsec links to high class holes, and the two meet through lowsec. What determines all this? I saw a map once, (see Figure 3.5) what was that about? Are there regions that are better for 0.0 wormholes than others?

Edit: wait, I get it now, this is just an oldschool way of figuring out which hole leads to what kind of system. The adjacent maps of wh and known space are interesting though. There may be a correlation between wormhole locations and real space locations?

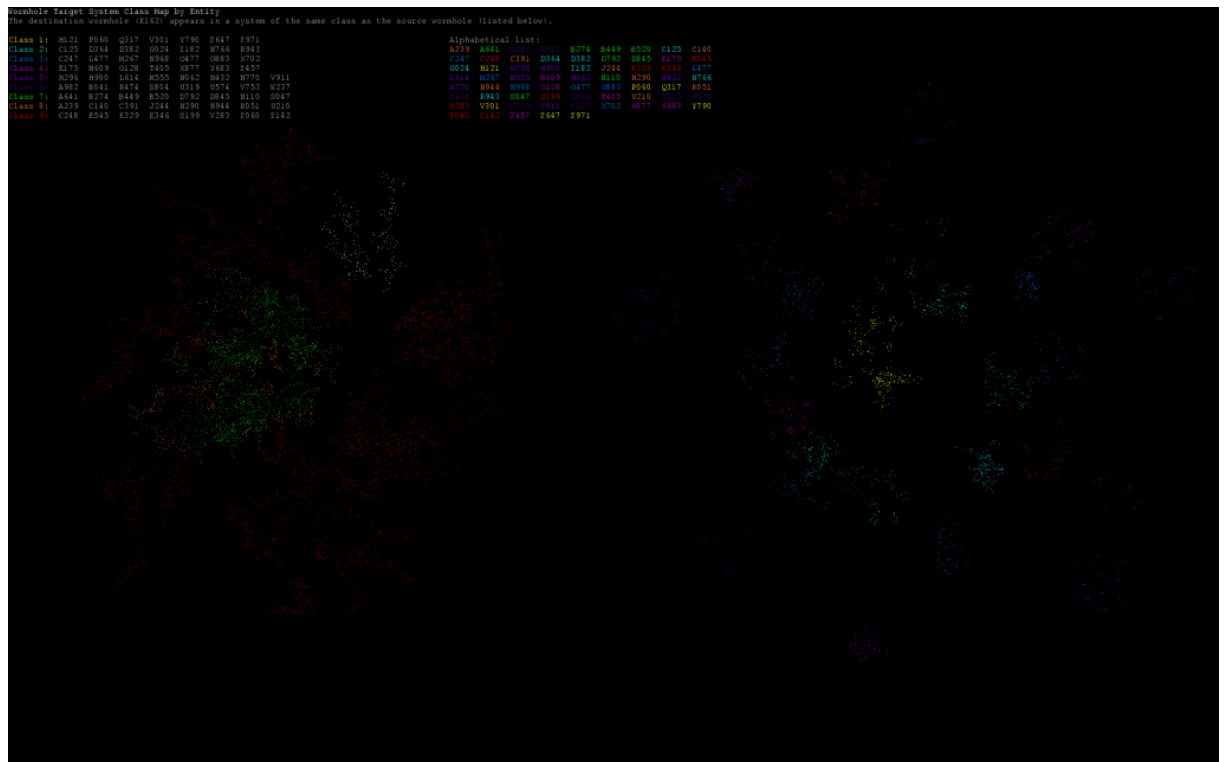


Figure 3.1: What the fuck is this shit