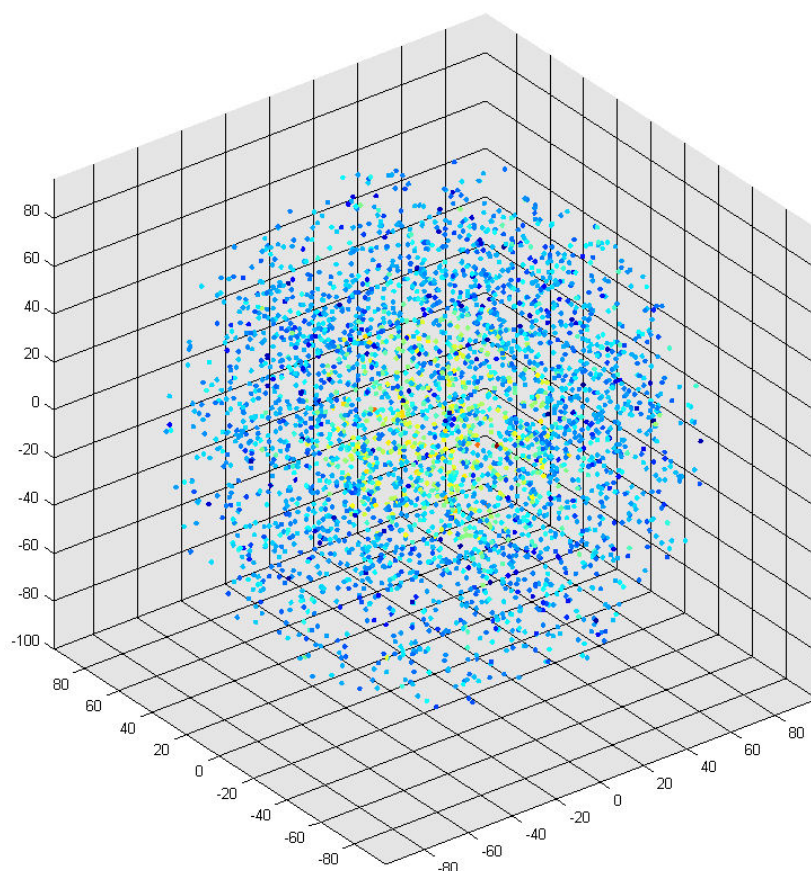


Escape from the Near Star Map

Anders Sandberg



Background

The Near Star Map of 2300AD is one of the best gaming settings ever: based on real (if, now, dated) astronomy and with deceptively simple rules for travel it created a very complex environment. In 2320AD the old 50 lightyear NSM is however beginning to feel crowded. Humans have visited systems far outside the map and even have outposts there; stutterwarp tugs enable exploration of further regions. Hence it would be suitable to extend the map further.

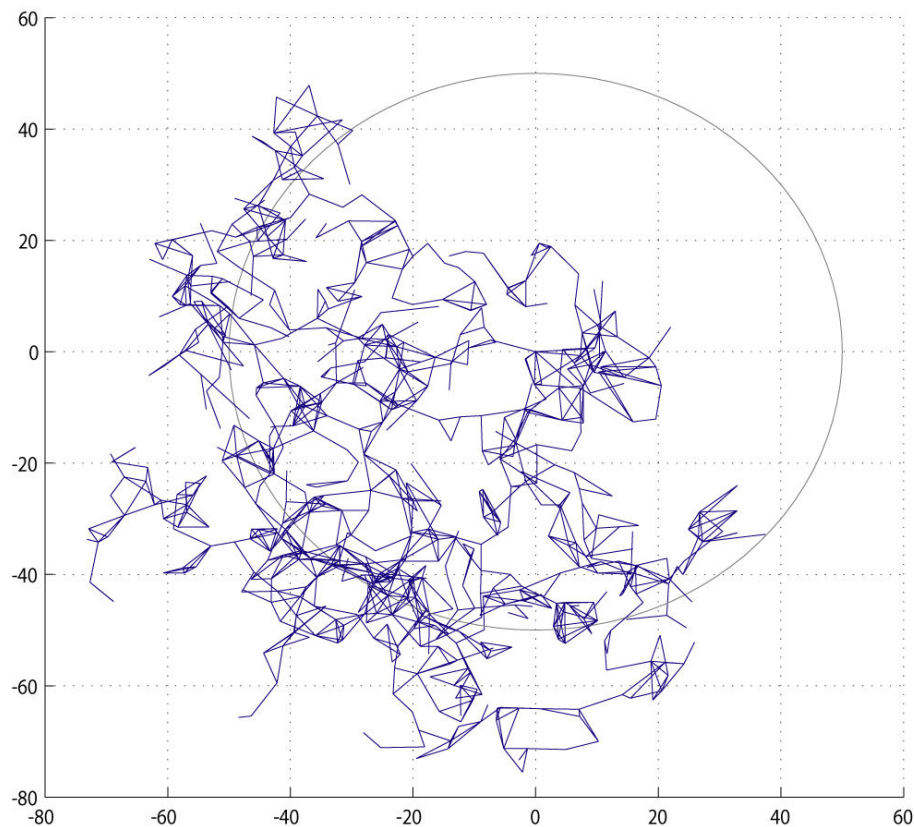
This is an attempt to create a fairly authoritative extended NSM going into the regions more than 50 lightyears away.

To do this I took the HYG database by David Nash, a combination of the 3rd edition Gliese catalogue, the Hipparchos database and the 5th edition Yale bright star catalog (<http://astronexus.com/node/34>). I combined it with the updated version of the NSM by Andy brick. HYG stars are included if they are more than 45 lightyears from Sol (the point where the NSM star density seems to start to drop). All NSM stars are in their canon positions, and counterparts in the HYG are removed.

There are some problems with this. I cannot guarantee that my current version does not contain a few doubles. Distance estimates are notoriously unreliable, so we should expect that new star catalogues *will* give different maps.

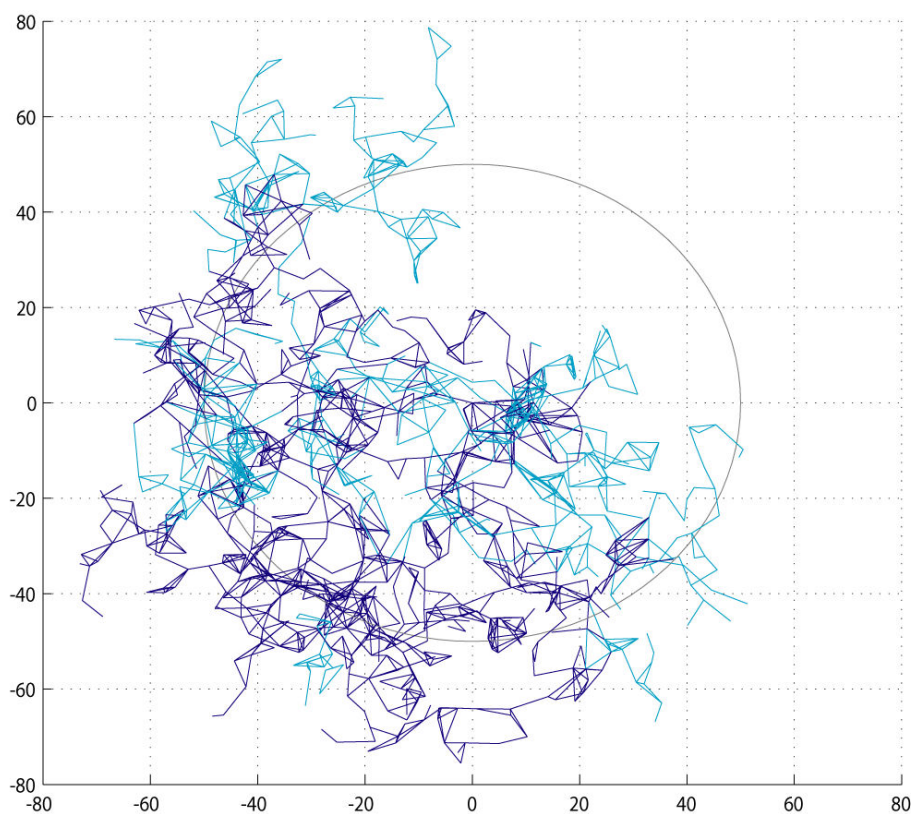
Another major limitation is the lack of red dwarves at further distances. Being faint they are hard to observe and are underrepresented beyond 50 lightyears distance. There is a marked dominance of bright stars in the remote arms, since the red dwarves that are the “glue” of human space are lacking. This means that most of the arms depicted here are going to extend much further and possibly link up but we do not have any current data to tell how and where.

Overview



The systems reachable by 7.7 jumps from Sol form the blue network, the “giant component” of the map. The grey circle marks the 50-lightyear extent of the Near Star Map. Reachable space extends mainly beyond the French and American arm in a broad band.

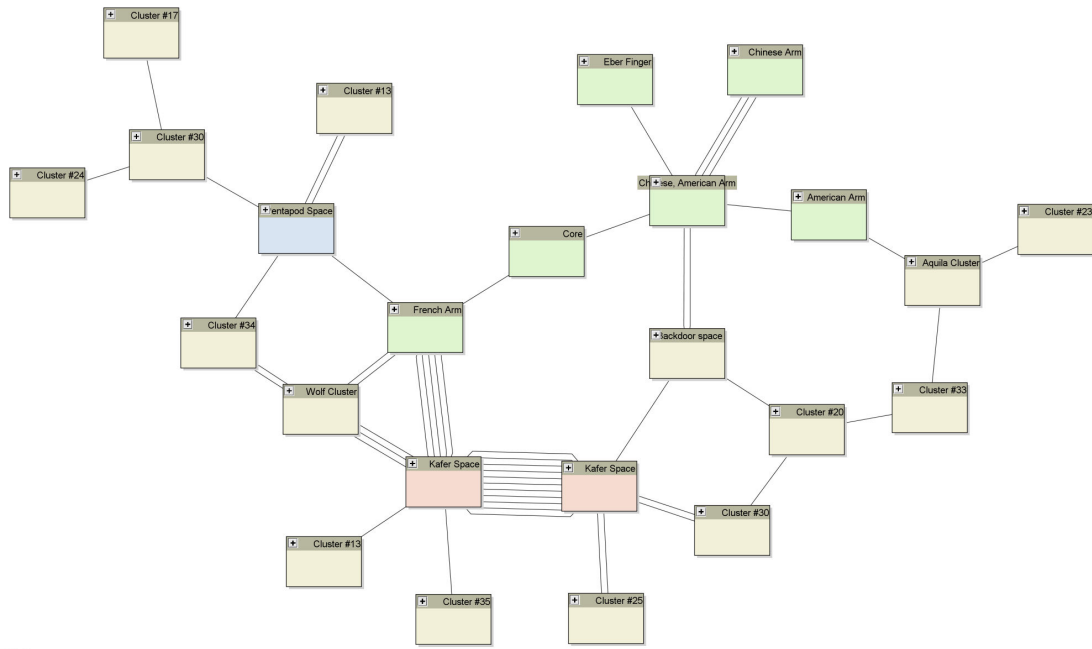
Adding sizeable clusters reachable using one tug-link from the reachable space expands the map further:



Most of the new clusters lie close to the giant component, but some branch much deeper. They allow further exploration of many parts of the outskirts of the classic NSM as well as the stars close to the 50 ly sphere. To make a Bayern-like far trip requires jumping from cluster to cluster, there are few if any “highways” leading straight.

Reachable using 7.7 ly travel

There are 704 stars reachable using normal stutterwarp. A very compressed map, using automatic clustering produces the following overview:



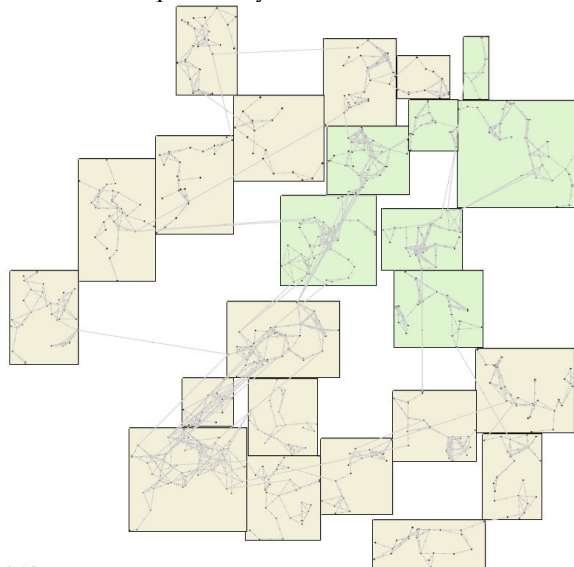
Human space (green) borders to Kafer space (red), Pentapod space (blue), the Wolf Cluster, Backdoor Space and the Aquila cluster. Beyond these there are unknown arms and fingers.

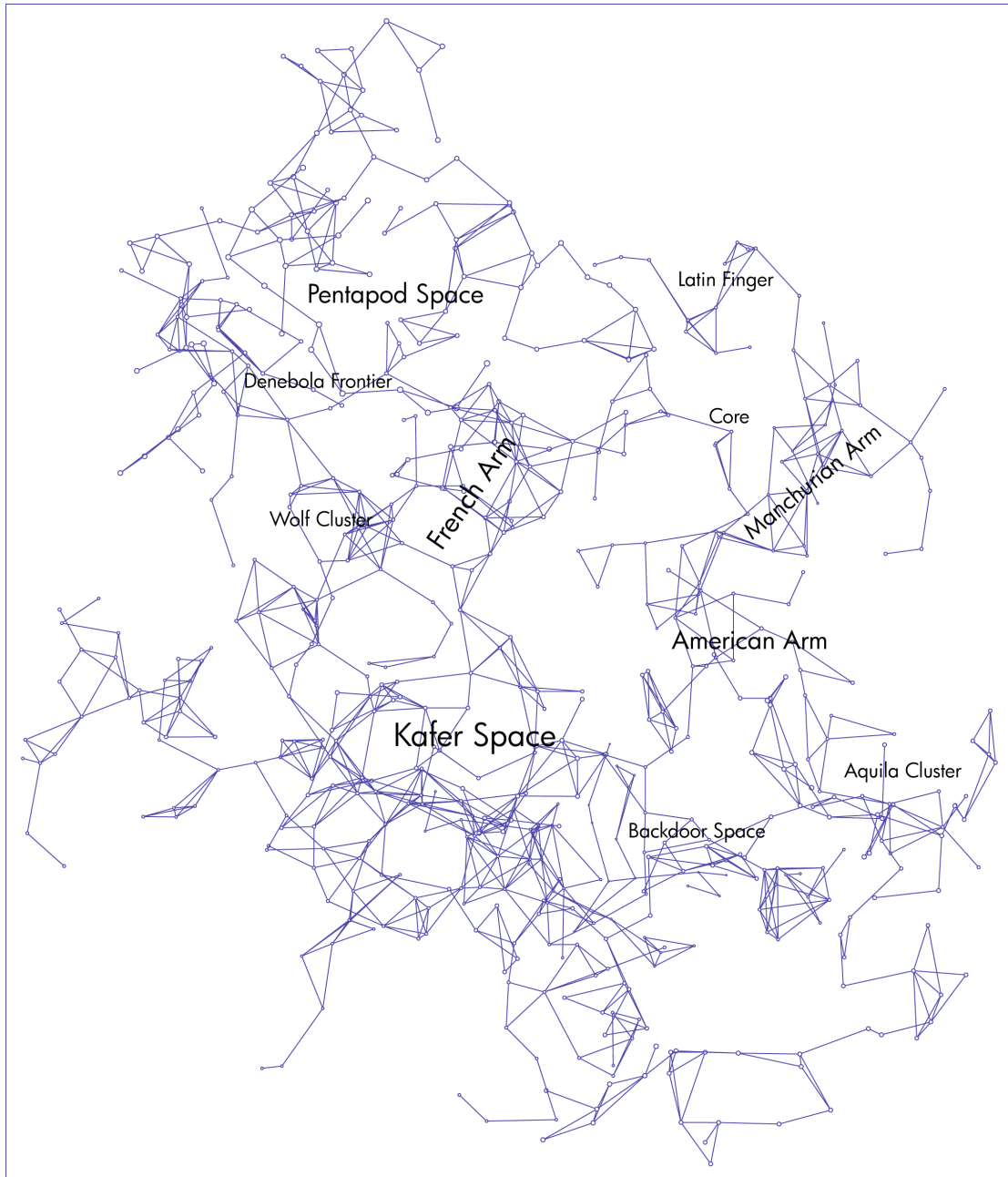
Of the arms, the Manchurian arm is limited: there is no extension beyond the explored sections. This is both limiting and reassuring: all alien species are accounted for.

The American arm extends to the Aquila Cluster, and through that to more remote regions. Backdoor Space enables not just a way to the Ylii, but also into the Aquila regions.

The French arm opens to two major frontiers. Beyond Denebola there is a sizeable cluster. The Wolf Cluster is deeper than shown on Near Star Map, and also has links to Kafer Space and the Denebola cluster. In addition Pentapod space extends beyond Iota Ursae Majoris to a sizeable arm.

Kafer Space is replete with fingers and arms, likely extending much further. How far they have been explored by Kafers is unknown.





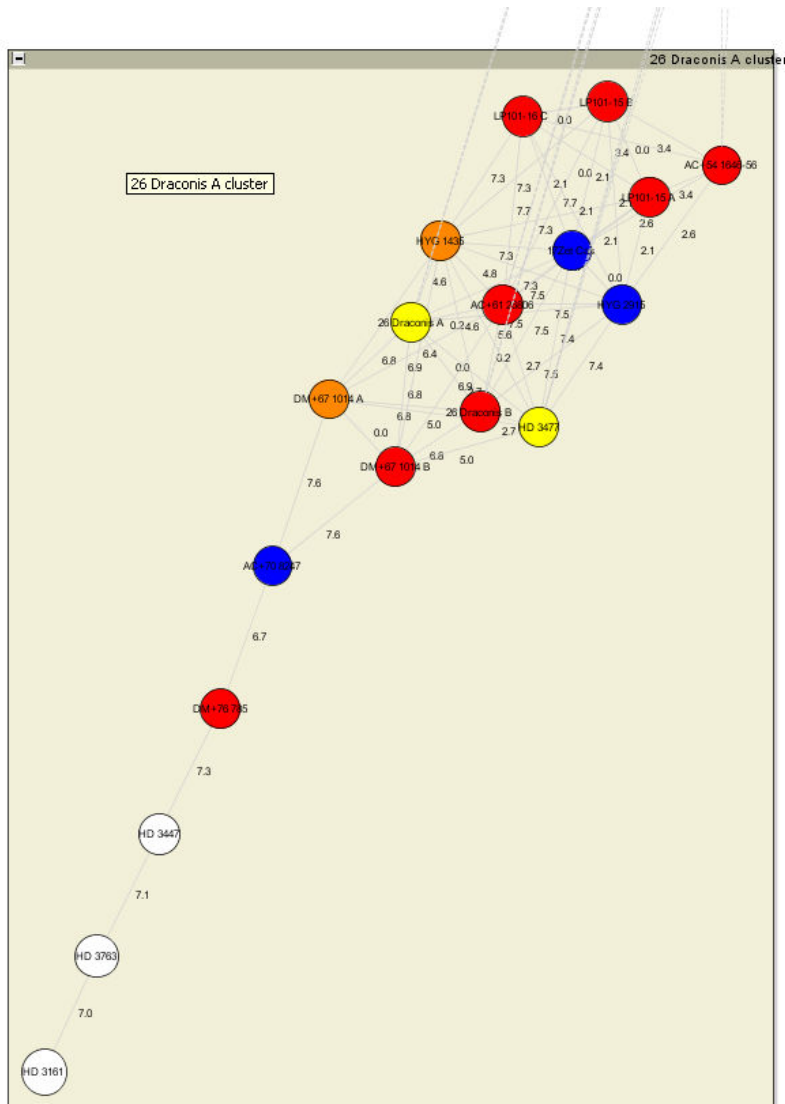
A high-resolution map and a clustered version where the topology of the network is clearer has been prepared as independent PDF files. In these (and following) maps the sizes of stars represent depth.

The Tug-Reachable Clusters

With stutterwarp tug disconnected clusters of stars can be reached. There are 18 clusters of note that can be reached with tug from the network extending from human space. Totally there are 1108 isolated clusters within 100 ly, 477 of which contain more than one star and 109 with more than five stars.

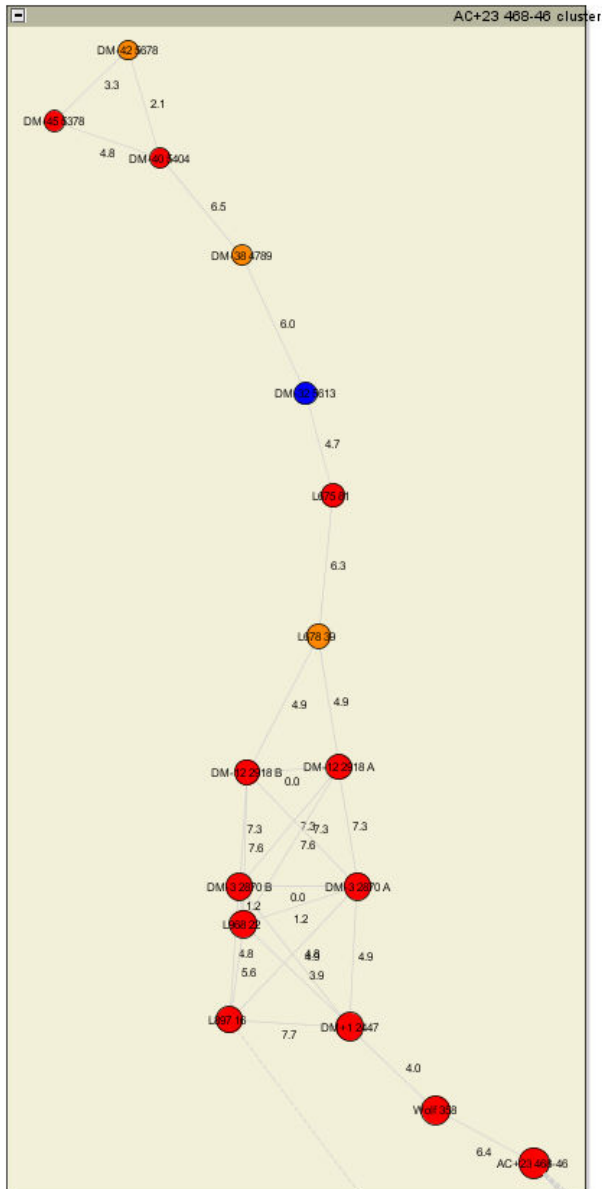
The French arm can reach two clusters via tugs (and one extra via the Wolf Cluster). The American arm can just reach two directly, while the Manchurian arm can reach six clusters.

surrounding Chi Draconis and another cluster around Eta and Mu Cassiopeiae. Beyond this the cluster branches in two thick tails towards HD 2344 and AC+28 111.



The 26 Draconis Cluster, including 26 Draconis, Zeta Cassiopeia, HD 3477, and a tail of the F-stars HD 3447, HD 3763 and HD 3161. It can be reached via DM+51 2402, DM+52 2294, DM+41 2695, HD 3415 and HD 3540, located in Kafer Space or trans-Aquilan space.

The Iota Pegasi Cluster contains many bright stars such as Iota Piscium and Psi Capricorni along a thin branching structure. It can be reached by tug from the systems AC+13 1185 145, HYG 1737, HYG 3085, AC+22 308-605 and AC+24 747 102 in Aquilan space. But there are also possible tug routes from DM-45 13677, DM-36 13940 and DM-36 13950 on the near Manchurian Arm.

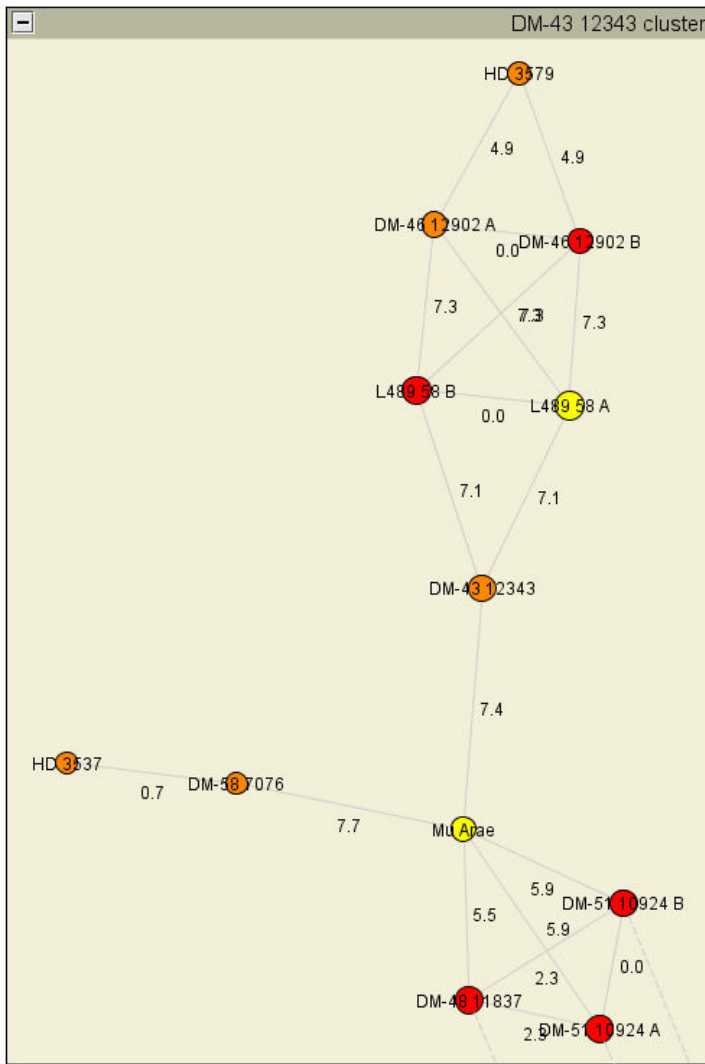


The AC+23 468-46 Cluster is not very large and is mostly red stars, but AC+23 468-46 has tug routes to Joi, Augereau, Crater, Kimanjano, Neubayern, Queen Alice's Star, Kie Yuma and Beta Virginis. It could become a potentially Trilon-exclusive arm.

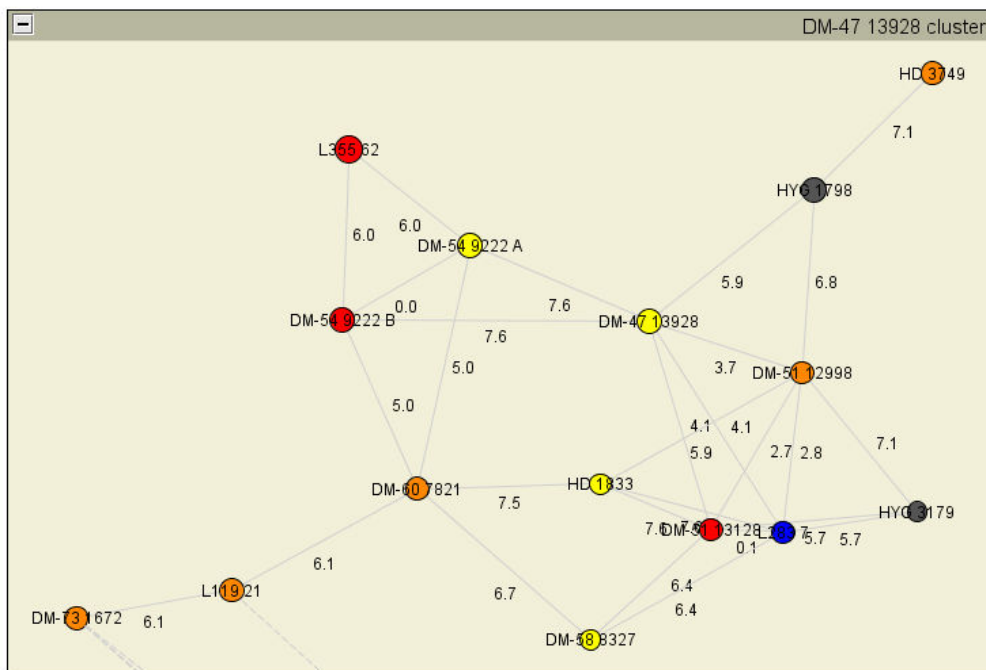
The Castor Cluster is sizeable and contains many promising systems. Unfortunately it can only be reached from trans-Pentapod space via HYG 778, HYG 739, HD 2824, HD 2903 and HD 511.

The Delta Andromeda Cluster has numerous bright stars. It can be reached via HD 3540 and HD 3533, beyond Kafer space.

The 61 Virginis Cluster is fairly sizeable, has many sun-like stars and links up to Gamma Virginis, Wolf 489 and DM-11 3759 in the Wolf cluster, but also has a connection to DM-11 3759 on the American Arm.



The Mu Arae Cluster is reachable through L339 19 on the Manchurian Arm.



The DM-47 13928 Cluster links to the Manchurian Arm close to the Eber Finger via DM-68 47, Gamma Pavonis and L49 19. The Ebers might have visited it.

The 30 Piscium Cluster is sizeable and has many bright stars. It can only be reached via HYG 899 in trans-Pentapod space.

The Beta Tucanae Cluster is widely branching but again only reachable via Pentapod space (51 Piscium, HYG 2544, HD 2937 and HYG 2571).

The Theta Tucanae Cluster can be reached by HYG 2647, yet another trans-Pentapod star.

The Gamma Pegasi Cluster, 53 Piscium and Gliese 11 Cluster have many possible tug-connections to trans-Pentapod space.

The **Iota Sculptor Cluster** lies beyond the Kafer/Aquila regions.

The **Zeta Reticuli Cluster** (the “Eber Cluster”) is small, just Zeta 1 and 2 Reticuli and L127 97. It can be reached by DM-68 47 just off Syuhlahm.

A minor cluster likely of interest to the Sung is the **107 Piscium cluster**, linked to Stark and Haifeng. Although just 6 stars it has two systems that could have habitable planets.

Some speculation

This astrology is publicly known to humans, with the exception of the location of a few brown dwarves. Strategic planning for long-range exploration has been done for a long time. I suspect that the Manchurians and Americans to some extent wanted corners of space they could control more completely than the French, who wanted the big territory. Note that Back Door was found not at the edge of the Australian finger but beyond the tug-link: there was already a push for exploration into backdoor space.

Given the size of the arms the probability of brown dwarf bridges is close to one – there will be numerous secret pathways of immense strategic importance. I bet that most major navies have a few top-secret shortcuts that enable some devious strategies – but if they are used their existence become inferrable even if captains take care to dogleg and delay, so they will only be used in dire circumstances.

Kafers may have expanded much further than suggested in Kafer Sourcebook – renegades and minor suzerains have ample space to expand. Similarly the Ylii have had access to extra fingers, there could be undiscovered remote Ylii colonies. The Aquilans also have ample space; there could be a big thriving Aquilan civilization out there just waiting for someone to stumble into. A possibility: the Aquilans are actually descendants of the old Ylii.

The Ebers could have expanded into not just the Manchurian arm from Zeta Reticuli but also into the DM-47 13928 Cluster. There could be ebers living there still, even having an interstellar civilization.

There is practically no limit to how far the Pentapods could spread or have spread. If they use or buy tugships they have access to several very large clusters. For now humans will not be

able to access their vast spaces, but in the long run humans might want to press outwards – what price will the Pentapods demand?

All in all, space is far from explored. Even if we assume that at least unmanned probes have been sent to every system two or three jumps from an outpost there are enormous unknown volumes.

Future easy human expansion appears likely to go by the French Arm into the Wolf Cluster and Denebola space. If the Aquila cluster can be passed a vast range opens up. Spread of tugships on the other hand will give all powers plenty to do close to home: exploring the 61 Cygni cluster, 44 Bootis cluster, Iota Pegasi cluster, AC+23 468-46 cluster, Mu Arae Cluster, DM-47 13928 and Zeta Reticuli cluster will take many years and contains many prime colonisation candidates. With tugships much of the Manchurian and American arm become nearby to the Core, moving them closer to Core control. The French arm would be left relatively isolated, more likely to become independent.

Tugship links are at least twice as expensive as normal transports, since there has to be at least two specialized ships running them. Hence any deeper colonization will try to minimize tug-links. A connected cluster will be explored and exploited fully before there is a strong drive to make a tug-service to the next.

Some of the nearby clusters have likely been explored to a small extent without tugs: although delaying stutterwarp discharge is risky and does not make sense for any normal activity, there are enough risk-loving people out there and enough rich people willing to risk a starship on a truly heroic journey for this to have been attempted a few times. Several attempts have ended in failure, but there have been a few triumphs too. Especially for the 61 Cygni cluster it is not inconceivable that the initial “head” has been visited a few times over the past 150 years (especially since a few gas giants suitable for discharge outside the star stutterwarp limit may be known astronomically). Such exploration would not enable real colonisation or systematic exploration, but for planting flags, naming worlds and just seeing if there is anything amazingly interesting nearby it works.

The 7.7 stutterwarp distance seems an awfully precise to fit the percolation threshold of stars in the galactic disc. Maybe the properties were *designed* that way? (This is actually the *real* explanation, when you think of it.) It limits civilizations to smaller regions, yet allows expansion. It makes denser parts of the galaxy natural hubs while large regions just above or below the galactic plane are disconnected. Clusters link and disconnect as stars move, providing safe regions and periods for slow evolution. If the distance before discharge is necessary depends on some field in empty space, a really advanced civilization (AGRA and beyond) might be controlling it for their own purposes – and could very well turn off interstellar travel if they wish to.