The popular guide to exploration!

"This cause of exploration and discovery is not an option we choose; it is a desire written in the human heart.

We are that part of creation which seeks to understand all creation..."

By Lance 'Spacecat' D. of Aisling's Angels

Last update: Dec 11th 3304

The purpose of this document

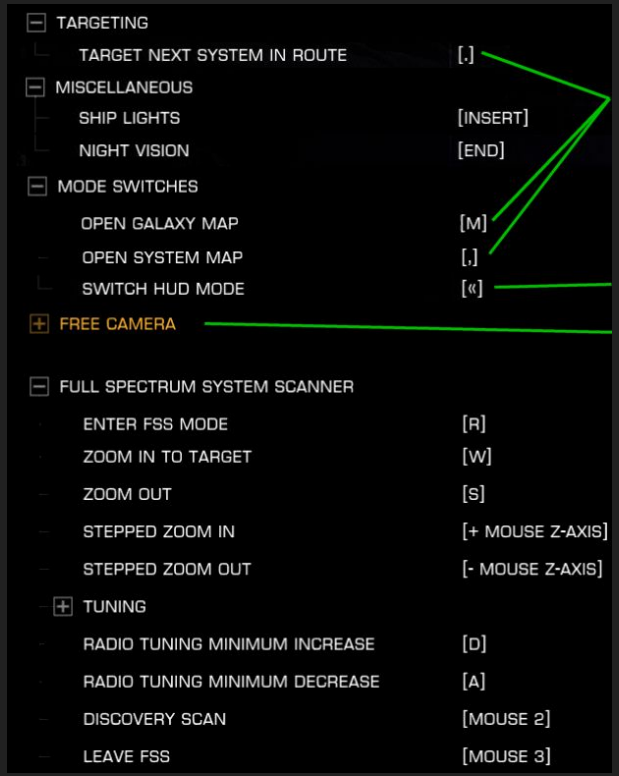
This is a guide intended for players new to exploration, to show them the essentials of going out in the black. An 'ABC' for explorers, if you will.
There's also a few tricks that might help non-explorers, like the use of the FSS.

"Some do it to be first…
First to look upon a place never before seen by another."

Fangs - 05

Setting up your controls-1

A number of controls are useful for all players, but for explorers in particular.



These are generally useful for navigation.

Explorers will mostly use analysis mode.

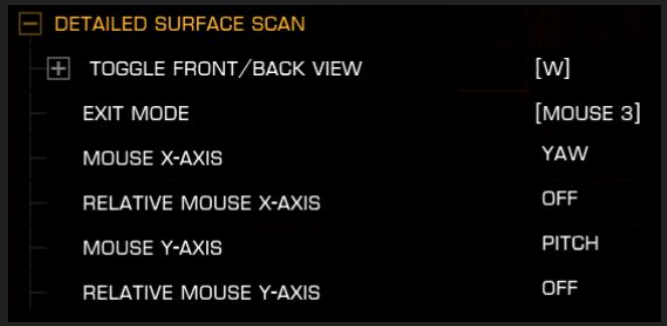
This will help taking better screenshots.

The FSS controls are what will help you scan systems and find planets. It's important to set them up to something comfortable.

(Zoom in, out, tuning increase and decrease will see the most use)

Setting up your controls-2

Detailed Surface Scanners have a few controls as well, these will help you probe planets.



At the time of writing, the game wouldn't let me to double-bind certain keys. Since I use a PC I went around the problem by manually editing a '.binds' file in this directory.

```
%localappdata%\Frontier Developments\Elite Dangerous\Options\Bindings
```

And here are some keys I search for in the file to adjust to my taste…


```
** The two cargo hatches **
 <ToggleCargoScoop>
 <ToggleCargoScoop_Buggy>
** The two free cameras **
 <PhotoCameraToggle>
 <PhotoCameraToggle_Buggy>
** I use a common 'get back to cockpit' key **
 <UI_Back>
 <ExplorationFSSQuit>
 <ExplorationSAAExitThirdPerson>
** Start FSS **
 <ExplorationFSSEnter>
```

Setting up a long-range explorer - 1

You can explore in the bubble without these, but for long-range travel you'll need:

-A good fuel scoop.
-The best frame shift drive you can afford.
-A detailed surface scanner. (Okay, 'absolutely need' isn't exact, but trust me)

A real explorer will also max their ship's jump range:

-Remove all guns.
-D-rated sensors, life support, thrusters and most everything because it's lightest.
-Go without utilities if you can, (maybe just one heat sink) use a light shield if any.
(A good trick is to have a favorite 'port of call' station on the edge of the bubble)
-Reduce the reactor size to minimum needed (Coriolis.io is your friend).
-Carrying a field maintenance unit is recommended for longer trips and neutron jumps.
(Just keep it off most of the time, that way you can make the power plant smaller)
-A planetary vehicle hangar is a definite plus - assuming you have horizons.

Setting up a long-range explorer - 2

The best exploration ships are all about jump range, in order of price here are some designs…
I've made these with a planetary hangar or a passenger cabin. (Except for the hauler, which is minimalist)

- **Hauler** *(The mini-marvel, 29.6 LY on a full tank)*
- **Type-6e** *(29 LY on a full tank, roomy and scoops quick)*
- **Dolphin** *(28.7 LY with the passenger cabin, and does it in style)*
- **Diamondback Explorer** *(amazing 37 LY, cool as ice but slow scooper)*
- **Asp Explorer** *(34.1 LY with a great cockpit, classic go-to explorer ship)*
- **Type-7e** *(29 ly isn't top tier, but this workhorse can carry everything)*
- **Krait Phantom** *(33.8 ly with plenty of room, the AspX's big brother)*
- **Orca** *(30 ly with a heavy cabin, has style, is nicknamed the expl-orca)*
- **Anaconda** *(36.4 LY, the Showoff, I recommend a class 4 fuel tank)*

Optional equipment that is especially useful to explorers:
- *Auto field maintenance units. (weightless, essential for neutron jumping)*
- *Heat sinks are weighty, but help if you run into a star. (useless on a DBX)*
- *Shields for bumps on landing, or the risky spots near the bubble.*

You want these numbers to be big.
Did I mention coriolis.io is your friend?

A word on explorer/landers

Now that planetary landings are possible, explorers that want to hit the ground on faraway planets need to tweak their outfitting a little, bring a buggy!

-Shields are nearly essential, landings can get pretty bumpy.
-Thrusters shouldn't be minimal, though a D-class is still fine.
-If your power distributor can boost, it's a plus.
-A vehicle hangar is needed, obviously.

The designs on the previous page include these trimmings, other than that, I recommend you practice landing in the bubble and in a cheap ship before going out there and risking your explorer craft.

Landing is involved enough that I wrote another guide on the subject, have a look at the Popular guide to planetary landings.

Passenger missions

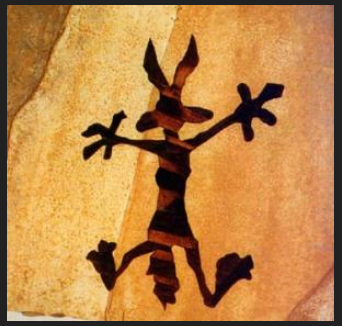
Passenger missions are now closely related to exploration work, two types of missions in particular benefit from ship design comparable to what an explorer ship would use…

-Sightseeing missions involve visiting multiple places within 200 light years (typically, some go further) do benefit from having a great jump range.
-Famous explorers request to visit far-off places, between 1500 and 25 thousand LY away! These missions offer great payouts, but take quite a long time to complete.

Here are a few ship designs suitable for long-range passenger missions

The passenger-style Type-6p (costs 4.2 mCr)
The already-mentioned Dolphin (costs 9.3 mCr)
The Passenger-style AspX (costs 21.8 mCr)
The stylish Expl-Orca (costs 70.8 mCr)
The long-range Beluga with smaller fuel tank (173 mCr)
The passenger-style Anaconda (173 mCr)

Supercruise Safety



Supercruising into a planet hurts.

Supercruising into a star hurts… with fire.

Avoid that and the "Loop of shame" with this simple trick:

When the "ETA" reaches 7 seconds, slow to 75% throttle, the middle of the blue bar; It's a 'Safe Approach Speed'.

(actually, 6 seconds is still safe)

If you supercruise into a star, point directly away from the star. Target a body in the system (to avoid a hyperspace jump) and supercruise towards the escape vector.

You'll heat up frighteningly hot, so it's a good time to use heat sinks.

Fuel scooping - 1

As you jump and jump, you'll start to run out of fuel. So watch that fuel gauge!

You can't scoop from all stars, these are the star classes you can scoop fuel from. Learn these by heart.

(Here's a memory trick)

Oh
Be
A
Fine
Girl
Kiss
Me!

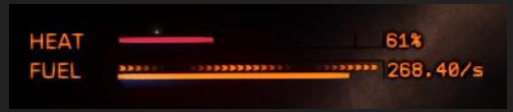
(some folks prefer KGB FOAM)

Out of gas? Call the Fuel Rats.

Fuel scooping - 2

To fuel up, approach a (scoopable) star in supercruise. Don't go too fast since you'll control distance better and don't let the heat get too high.

You can slow to a near-stop, your ship will scoop just as well.



Different ships behave differently in regards to heat, you'll need to learn the quirks of your ship. Practice makes perfect, just find the right 'scooping speed' where your heat doesn't go crazy.

The DBX can supercruise out of a star's corona without overheating.

The Hauler and Imperial courier…
I think they're soaked in gasoline.

Navigating with fuel in mind

On long trips, you don't want to end up jumping your last jump in a system without a scoopable star. Thankfully, the ship's computer gives us two useful tools to avoid that fate...

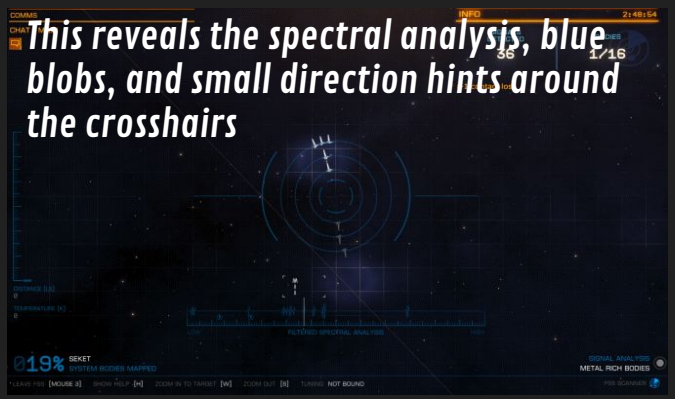
When you start a jump, the upper-right-hand panel will tell you the star class you are about to jump to, in this example a TTS is not one of our OBAFGKM scoopables. And you could cancel the jump to review the galmap.

A more drastic method is to keep your galmap in map-star class mode, adjust to display only scoopables then activate 'Apply filter to route'. Your pathfinder will then avoid non-scoopables entirely.

(I like carbons and non-sequence stars too much to use this technique, myself.)

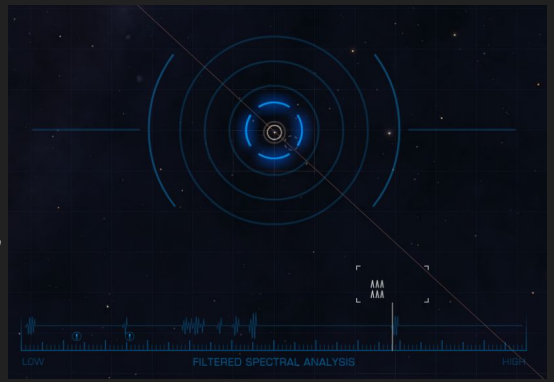
How to use the FSS - 1

When you first arrive in an unknown system, enter the FSS using the controls you set, then...



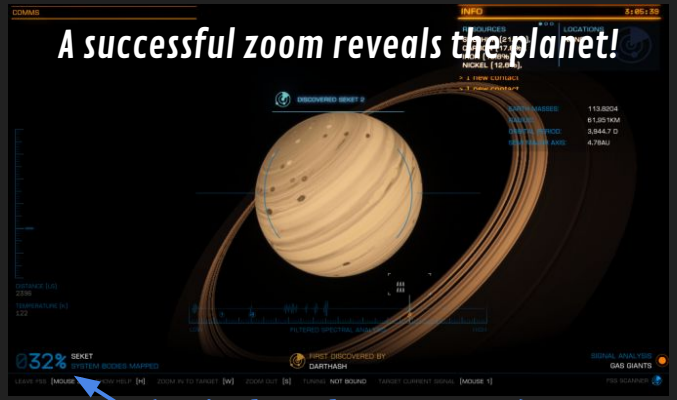
Use your 'radio tuning' controls to focus.
(I suggest you start with Gas Giants, like I did here)

Pan around to find blue blobs, the direction hints will help you find them, a white circle means you got one.



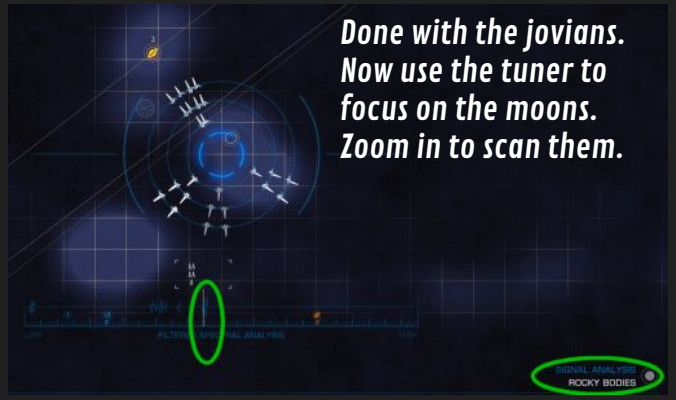
Zoom in!

How to use the FSS - 2



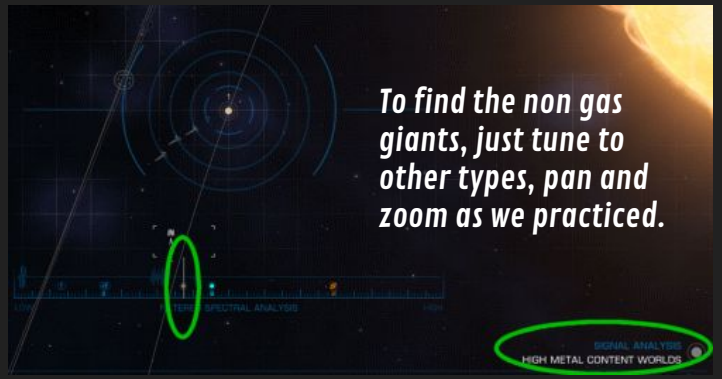
(notice how the % went up)

Zoom out, pan and zoom to find the other gas giants...

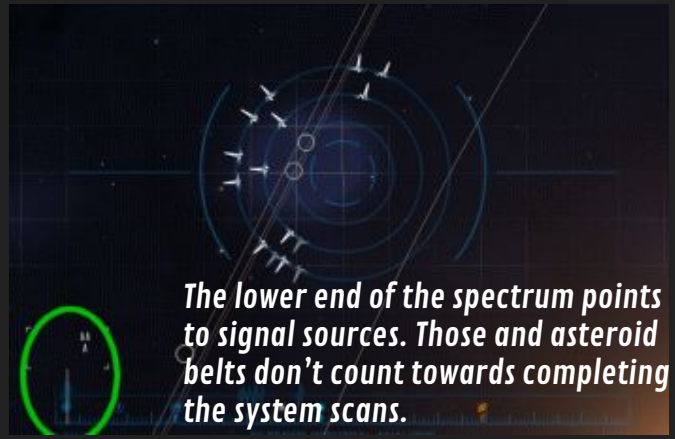


With a little luck, we spot surface locations of interest, like here!

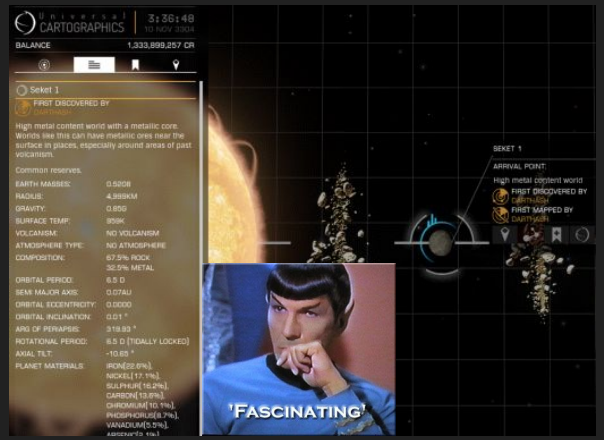
Warning: these include Low orbit things like stations.



How to use the FSS - 3



When done, you now have the data to please your inner scientist!



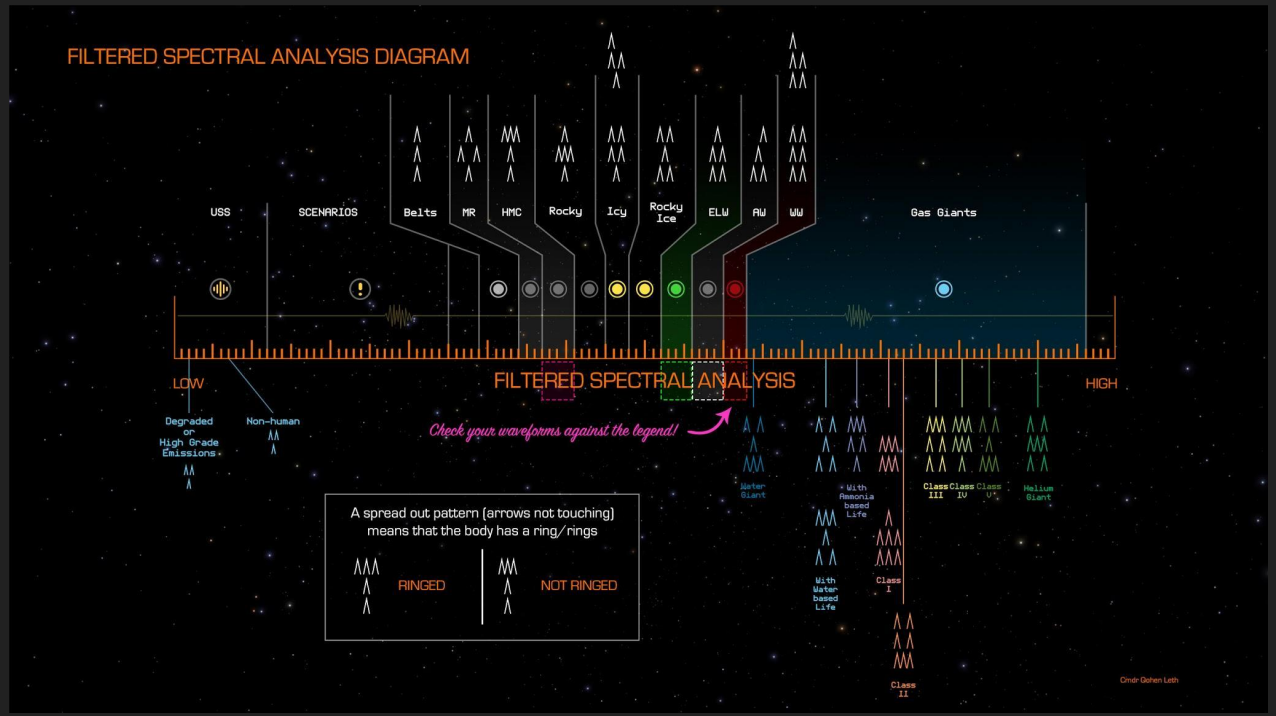
These scans are worth decent credits for Universal Cartographics. You can sell the data anywhere beyond 20ly of where you scanned.

(It doesn't get more valuable further off)

Or we can move on to planet probing! That's where the really valuable data lies.

FSS Frequencies

Cmdr Qohen Leth created this useful chart as a reference for the various frequencies found in the filtered spectral scan.

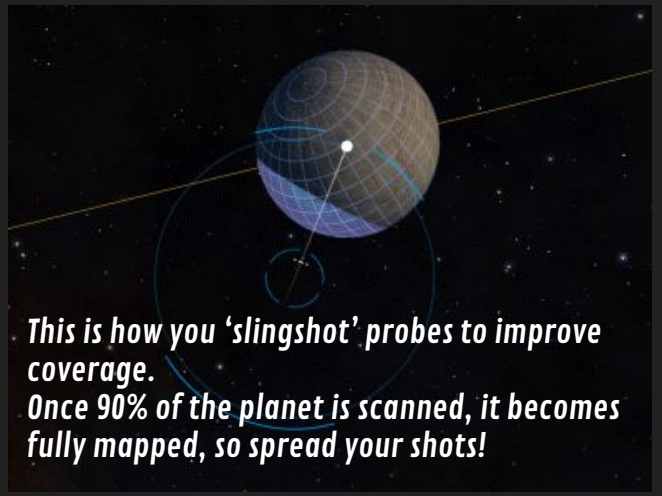


How to map planets

Planet scans are performed with the DSS (Detailed Surface Scanner). Make sure you have one, have a fire key bound and are in analysis mode to use it.

Approach a planet you want to scan (within 0.2 ls or so) aim and fire your DSS...

Just fire the DSS a second time to launch a probe.
Here I show the 'horizon' marker, If you fire at it, the probe will usually hit the planet about 90 degrees off.
(You can aim further off and hit behind the planet)



This is how you 'slingshot' probes to improve coverage.
Once 90% of the planet is scanned, it becomes fully mapped, so spread your shots!

MVPs (Most Valuable Planets)

Universal Cartographics gives good Cr for discoveries, but not all planets are equal in their eyes, certain data is worth more. You also need to keep in mind which scanner you used…

A good scanner is your friend

-Merely doing the 'honk' hardly nets you anything.
-When you use the FSS thoroughly, you'll get an acceptable payday, assuming some worlds are MVPs.
-If you take the time to map a valuable world with probes, now that's where the really valuable data lies.
-If you are the first to scan it, the first to map it, if you use few probes (efficiency bonus) extra bonuses add up.

Remember your MVPs!

-Terraformable High-Metal Content (HMC)
-Metal-rich
-Ammonia Worlds
-Waterworlds (especially terraformable ones)
-Earth-Like worlds

Terraformable waterworld +
first discovery + first mapped + efficiency bonus =
Woah!

Finding planetary features

Remember the geological features we'd spotted on that moon? Once the planet is probed, we can have a closer look. Just make sure the planet is targeted and your HUD is in analysis mode.

I cover landings in more detail in another guide: [The popular guide to planetary landings]

Done with the basics!

Now you know the basics! Get some practice, get out there, scan systems and eventually return to a station to sell the data to Universal Cartographics. But more importantly: have fun, take notes and pictures of your travels.

There's lots of interesting things all over the Elite galaxy. Read up on the science of astronomy, spread your wings!

Read on for more advanced knowledge.

Engineers

If you have Horizon, I cannot stress enough how having an engineer upgrade your frame shift drive range improves your quality of life. This will walk you through the basics.

-First, 'unlock' Elvira and/or Felicity: You can buy 3 soontill relics from Ngurii. You can buy one meta-alloy from Darnielle's progress in Maia, the rest is explained in your cockpit's right-hand engineer page.

-From https://inara.cz/galaxy-blueprint/2/ you will see a need for wake echoes, chemical processors and phosphorus for the first three grades.
-For the wake echoes, equip a wake scanner, go to a high traffic place and scan wakes for a while (Tourism stations are good).
-For the chemical processors, do some bounty hunting with cargo collectors to pick up the pieces left by exploded ships (Or go in anarchy systems to kill mining/trading ships).
-For phosphorus, get a SRV and chase a few rocks on an ice moon or two.

Give the lady what she wants, upgrade your FSD, and that's how you engineer!

"I'm a doctor, not an engineer!"
"Now you're an engineer."

Xenoarchaeology

“The truth is out there”

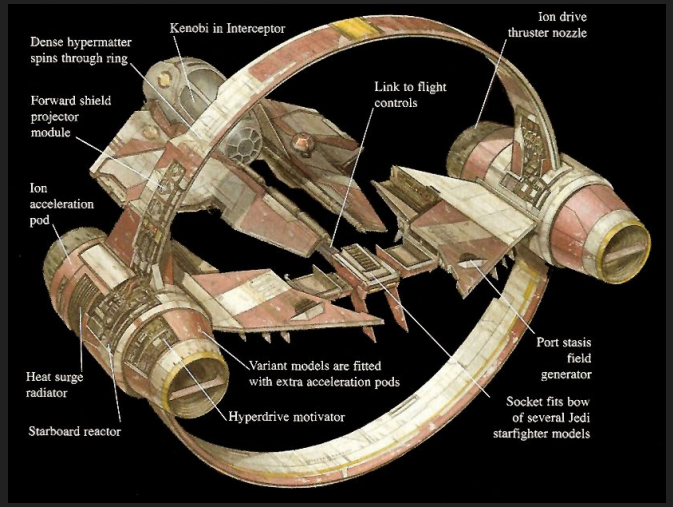
Exploring outside the bubble can result in encounters of the third type:

The Pleiades, Witch Head Nebula and California Nebula are rife with Thargoid activity, on the ground their barnacles and bases can be found.

Counterspin of the bubble one can find ancient ruins of the long-gone ‘Guardians’. Scan obelisks for knowledge or explore structures for blueprint data and face their drone sentinels, hopefully to unlock guardian technology.

There’s a lot of knowledge involved in xenoarchaeology, enough to warrant entire guides. I will recommend a visit to the famous Canonn Research group for information on this subject. They are Elite’s foremost researchers in this field. Do bring them tea and biscuits as a thank you.

The guardian FSD boosters



Of all the guardian-human hybrid technology, the 'guardian FSD booster' is especially of note for explorers. An internal module that can add up to 10 ly per jump to your ship. It takes a bit of work to unlock it…

-You will need a guardian tech broker, many high tech stations have one. This Inara page has a nice listing.
-Then gather the necessary materials to unlock the design. Focus crystals and shock mounts are found in the bubble.

-The guardian materials and blueprints are tricky to get, I wrote a whole guide on that subject, go have a read since I can't summarize in one page.

Once you've given all the materials to the tech broker, it is unlocked for good and you can buy as many as you want in the future.

Heat control!

From scooping a little too tightly, or accidentally running into stars, heat is a notable danger to explorers. Here's a trick to help control heat...

When well outside the bubble, you're unlikely to meet anyone. So go on and turn off modules: Shields, power distributor, cargo scoop, fighter or SRV bays, AFMUs (should always be off until needed, really).

This will help your scooping by reducing heat, and will improve your fuel efficiency over time.

Protip: With minimal modules on, It's possible to supercruise away after a sun-crash without the need for a heat sink!

Danger: Close binaries

Many stars out there are binaries, or trinaries, or more. Some binary pairs are so close together that there's a small chance you'll come out of hyperspace in the corona of the secondary star!

Rule 1: Don't be AFK while jumping.
(Or Bones gets to say "He's dead, Jim.")
Rule 2: Don't panic. You'll have alarms, smoke and sparks but don't panic.
Rule 3: Run away! You're still in supercruise, so go full speed and aim away from the star pair.

As soon as you're at a safe distance, get out of supercruise and put that field maintenance unit to good use. (Told you it's a lifesaver)

Beware the badlands

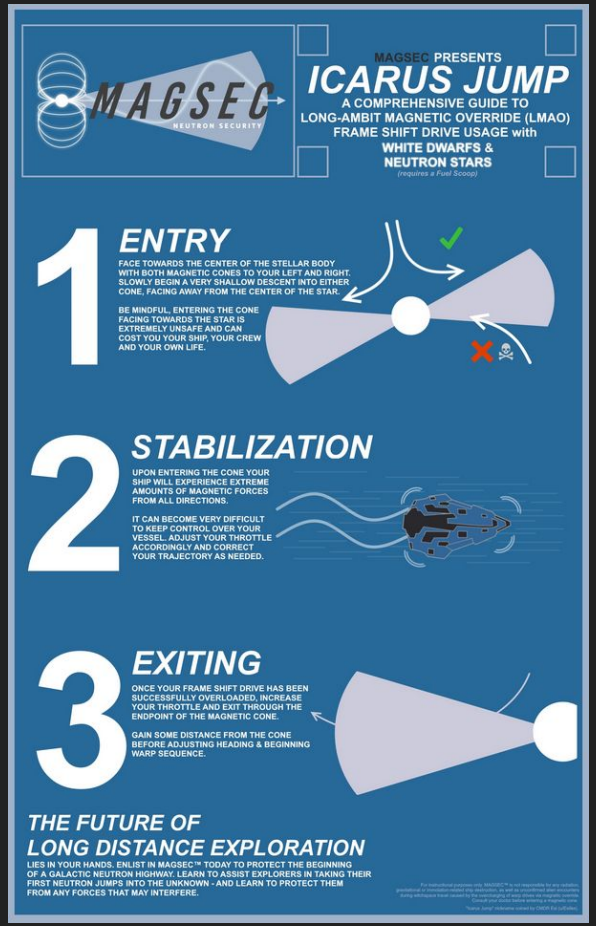
When travelling long-distance, there are sneaky areas of space where there are fewer scoopable stars, and more non scoopable ones. Nicknamed 'badlands' these areas will make long distance trips rather unpleasant, even using the galmap filters.

One such area is easy to find, even in the bubble...

To see it, 'reverse' star class selections in galmap so as to show only nonscoopable stars. Then zoom out a bit and look around the -35 LY altitude (middle number on the grid coordinates)

That striking concentration of nonscoopables is a thin 'badlands' disc present throughout the galaxy, thicker near the galactic core.

Travel above or below that disc to save you some pain. And keep in mind there's other badlands out there.



Boosted jumps

There are two ways to supercharge your FSD to jump further than usual.

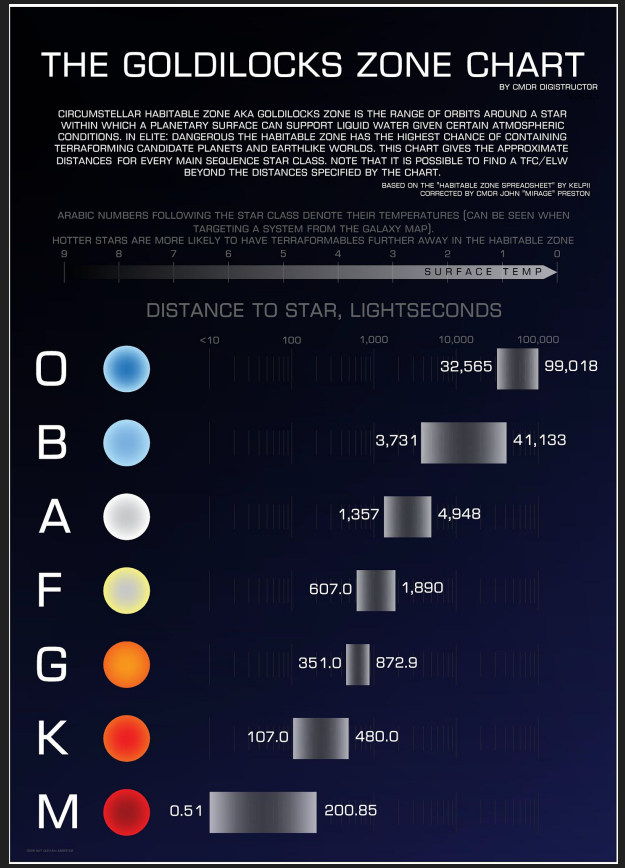
***Jumponium**: Use 'synthesis' in your inventory to activate FSD injection. This uses materials you've gathered.*

***The Icarus jump**: White dwarves and neutron stars have impressive ejecta cones, whose magnetic fields can supercharge a FSD beyond their normal limits. It is dangerous to attempt, but cmdr MackTheHunter gave us an excellent safe-usage infographic.*
***Warning**: even a successful icarus jump will damage your FSD a small amount, an AFMU is essential for running a neutron highway.*

In a word: Keep an even distance from the star, go slowly into the cone, charge up, accelerate to exit and move away before jumping. Neutrons give a remarkable jump boost, making it worthwhile for long trips to use a neutron finder such as the Neutron Router.

(N.B.: You cannot stack both techniques, I tried, it's a waste of jumponium.)

The goldilocks zone



Key knowledge about terraformable worlds is to know where the temperature is adequate, it is the so called 'Goldilocks zone', where it's not too cold nor too hot.

Hotter stars like O, B and A class will have their goldilocks zone further from the star.Colder stars will have a much closer habitable zone.

My thanks to Cmdr DigistructOr for this chart, (click the picture for the reddit post and the bigger picture) users of www.edsm.net will notice when scanning a system star that it gives the various goldilocks zones, including the ones for ammonia worlds.

‘First Discovered by…’

That ‘First discovered by’ mention is the heart’s desire of a great many explorers.

You’ll need to travel pretty far (500-1500LY) or get a stroke of good luck (I found one 100 LY away) in order to find an undiscovered world.

Good luck finding one in/near a nebula, those attract explorers like moths to a flame.

It’s not enough to scan the world, you also have to sell the data to UC for the tag to appear. Credits-wise, it gives a 50% bonus.

‘First mapped by’ is similar, relating to planet probes.

A solemn moment: being the first to lay eyes on a world where the hand of man never set foot!

Star Clusters, and the things out there.

If you think the stars are just randomly-scattered in the shape of the galaxy, think again!

Go into the galaxy map and put it in 'realistic' view.
-Have a good look at the Cocoon nebula.
-Look about 200 LY towards Sol from that nebula, along the line. (A highway of stars!)
-Have a look near the Orion nebula.
-Search for NGC 7822.

These are stellar clusters, fascinating things. There's many of them out there, some impressive and some less so.

There's many other interesting phenomena out there: Planetary nebulae, pulsars, areas of dead stars, neutron fields…

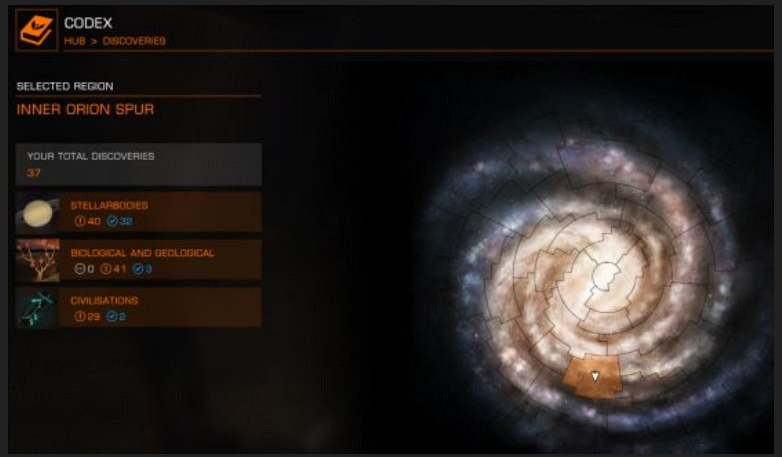
Hard to find, but that's part of the fun of exploring.

The Codex

The right-hand panel's codex offers a wealth of information on 'things to find out there'. It is a database of things found by various commanders, and found by you.
Rule of thumb: When you find something cool, try using your short range composition scanner on it.

The codex discoveries are categorized as 'Rumored', 'Reported' and 'Confirmed'.

-Rumored (...) means mere hints of a discovery were released.
-Reported (!) means another commander found and scanned something (with his short-range composition scanner).
-Confirmed (✔) means you found and scanned it yourself! The blue numbers in the codex represent your findings.



Distant Colonies

Not content to merely set foot farther, mankind ever wished to colonize the far shores. In Elite there is a number of planetary settlements, outposts and asteroid bases outside the bubble…

For instance, close to the bubble we have **Fehu, Aditi, Quince, 17 Draconis, Canopus, HIP 74290** *then the stations of what I call the 'Sirius Relay': Te Kaha, Hip 8396, Takurua, Almagest, Robigo, Ceos and Sothis.*
Fairly famous is the Colonia connection, these installations offering a 'relay' towards the distant Colonia systems:

-Mammon monitoring facility - Mammon
-Hillary Depot – Blu Thua AI-A c14-10
-Amundsen Terminal – Lagoon Sector NI-S b4-10 and Lagoon sector FW-W D1-122.
-The omega and trifid nebulae - Visit one of Trifid Sector IR-W d1-52 or Omega Sector VE-Q b5-15
-Eagle's Landing – Eagle Sector IR-W d1-117 (And a prison colony in Eagle Sector IR-W D1-105)
-Rohini system houses two starports for travellers (one is a smaller space outpost)
-Sacaqawea Space Port – Skaudai CH-B d14-34
-Gigarin Gate – Gru Hypue KS-T d3-31
-Polo Harbour – Boewnst KS-S c20-959

Many, many nebulae near-ish the bubble have an outpost or two, don't hesitate to use EDDB.io to check out nearby stations when you're out there.
I strive to keep a list of fun distant outposts within another guide: The Hitchhiker's Guide to the Frontier.

Exploring in a wing

Exploring in a wing is a little messy, takes good communication, but it's rewarding too.

Benefits: (These need to be re-tested with the changes in 3.3)

-One wingman scans a planet, all nearby wingmen get the data, in theory.
-You can get multiple names on 'First discovered by'.
(I'm rather proud of this extreme example)
This may mean you can 'split the work' and get results faster!
-You can sell the data separately, in an extreme case I sold data 2 months before my wingman, and we still got a double tag.

Be careful though:
-All wingmen have to be in the same system and close enough to 'see' each other in SC, so no more than 2000 Ls apart or so?
-Wings tend to get buggy, so this isn't very reliable. You may need to leave and 'rebuild' the wing.

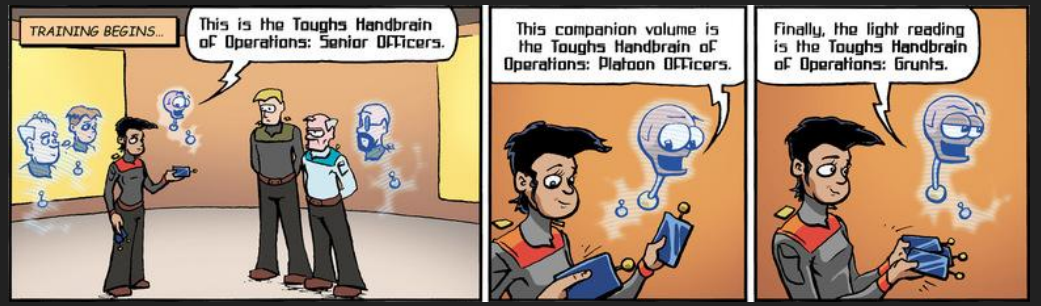
The tools of the trade

Inara, EDSM, Eddb.io… There's a number of websites and tools out there that are useful to Elite players. The best of them are grouped under the banner of the Elite Dangerous Community Developers: https://edcd.github.io/. Here are the key ones of use to explorers…

EDDiscovery is a classic tool to help explorers take notes along their travels, and offers fancy options to see a 2D or 3D map of where one has been. There is some impressive math behind that tool.
Captain's log was designed afterwards, has a fancier UI, a better way to click what star/planet types are insystem, and can easily use multiple databases, say one per big trip? Stylish looks too.
The Market Connector is very lightweight and unintrusive, and useful for in-bubble use to send data on station contents to eddb.io. Though it hasn't any note-taking abilities like the explorer tools do, it -can- link to EDSM to send data to the star map project. (And it automatically updates when you land/jump, so it's a 'fire and forget' tool)

EDSM is 'the giant in the background', a massive project to gather data on all stars in elite, and offers a 3D map of where you've been as well as awesome galmaps of the galactic mapping project.

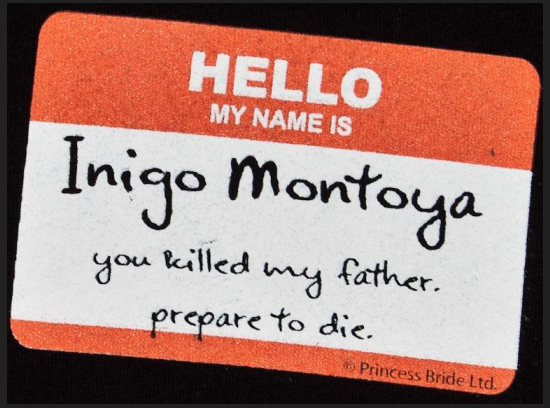
Link it up to your favorite tool and feed it, it will help to make other tools function, such as the Neutron Router.



In the Schlock universe, AIs are smarter and kinder than we are.
(But still love a good wisecrack, especially Ennesby)

What's in a name...

Many systems have names taken from stellar catalogues, this beautiful youtube explains many of them. For those names that were randomly-generated by the Stellar Forge there are a few tricks. You can almost tell the star class from one letter. Almost.



Let's take as an example NGC 752 SECTOR XP-N C7-0.
The 'C' in the last word is the letter that interests us.

'A' usually means a protostar or brown dwarf.
'B' is usually a red dwarf M-type, but might be a T-Tauri, let's say 60% are scoopable.
'C' and 'D' often represent more interesting main sequence K, G, and F-types.
And so on into hotter (or weirder) star types.

Stellar catalogues

It bears repeating: Many, many stars in Elite are taken straight from known stellar catalogues. You'll see the star names start with these words for instance (often followed by a number), look them up! Or hunt down your favorite constellation, and boldly go!

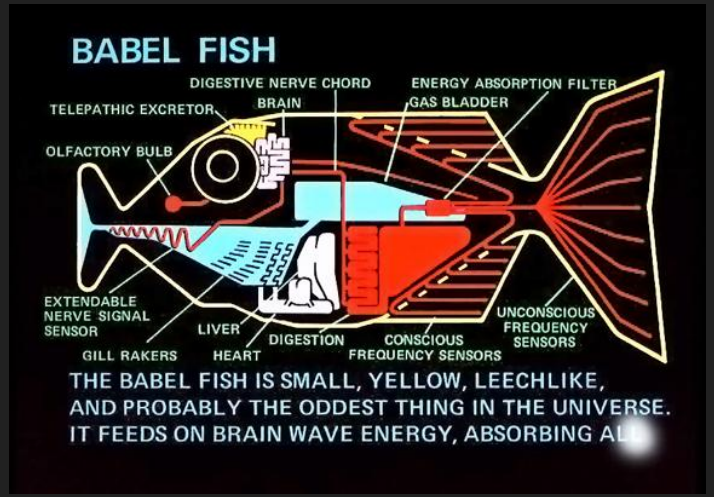
-HIP and HD are fairly ubiquitous

-Lacaille	-Lalande	-Struve	-Groombridge
-Wolf	-Ross	-Gliese	-NGC
-IC	-Luyten	-LPM	-LAWD (White dwarves?)
-LHS	-LFT	-LTT and NLTT	-LDS (Double stars?)
-LP	-2MASS	-WISE	-AC +
-ADS	-AG+	-BD+	-CD-
-CPD	-CPC	-CSI	-DEN
-GCRV	-GSC	-TYC	-KOI (exoplanets search!)
-LS	-MCC	-PLX	-SDSS
-XTE	-PSR (pulsars)	-LBN	-IC
-HR	-NGC	-Messier / M	-Melotte / Mel

Big thanks to Scott Manly for his awesome youtube

Lexicon of explorer slang

'Bubble': *The human sphere, the inhabited area about 300 light years around Sol.*
'Buckyball': *A hyperspace long-range race, or a method to quickly jump from system to system.*
'DBX': *Short for Diamondback Explorer*
'DSS': *Detailed Surface Scanner*
'FSS': *Filtered Spectrum Scan, done by the discovery scanner.*
'Honk': *The noisy main scan from the DSS or FSS.*
'Jovian': *Gas giant*
'Jumponium': *Materials useful for FSD injection synthesis.*
'Kylie': *1000 Light Years (Kilo Light Years)*
'Port of call': *A station on the edge of the bubble, good to land at to minimize interdiction risks.*
'Spare Tire': *An extra fuel tank, coined by the fuel rats.*



There's more at https://forums.frontier.co.uk/showthread.php?t=140924

Thank you for reading

As a parting shot, here's a ~~few~~ lot of links to a variety of exploration and astronomy resources.

The Market Connector, (Or EDDiscovery) are must-have tools to send data to EDSM.net

'Commander Kat's Cosmic Compendium': https://forums.frontier.co.uk/showthread.php?t=210881
Elite Galaxy Online book of records: http://www.elitegalaxyonline.com/news/
Elite Forums exploration go-to: https://forums.frontier.co.uk/forumdisplay.php?f=117 (thanks, cpt. Obvious)
Galactic mapping community project: https://forums.frontier.co.uk/showthread.php?t=116450
Map of local nebulae: https://i.imgur.com/hUna3LU.jpg
The wiki list of astronomy-related lists: https://en.wikipedia.org/wiki/Category:Astronomy-related_lists
Wikis about 'star clusters': Open Clusters and Globular Clusters.
Wiki list of star catalogues: https://en.wikipedia.org/wiki/List_of_astronomical_catalogues
A great site for the Messier catalogue: http://www.seasky.org/astronomy/astronomy-messier.html

Elite Dangerous Community Developers: https://edcd.github.io/
The Neutron router: http://www.spansh.co.uk/
Some funny Elite music: The Great Explorer and Hotel Dalgarmo. (That guy did other good stuff too)
For music I also recommend a search of 'Space age pop' on http://www.shoutcast.com

Elite forums, the various popular guides: The popular guide to powerplay, The popular guide to exploration, The popular guide to planetary landings, The popular guide to mining, The hitchhiker's guide to the frontier, The popular guide to guardian xenoarchaology

This guide was brought to you by: *Lance 'Spacecat' D.*