ISAN - Integrated System for Autonomous Navigation

Collective Public Transmission

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<< PUBLIC RELEASE >>

Collective Public Document: For the review of both Collective and non-Collective Endokids.

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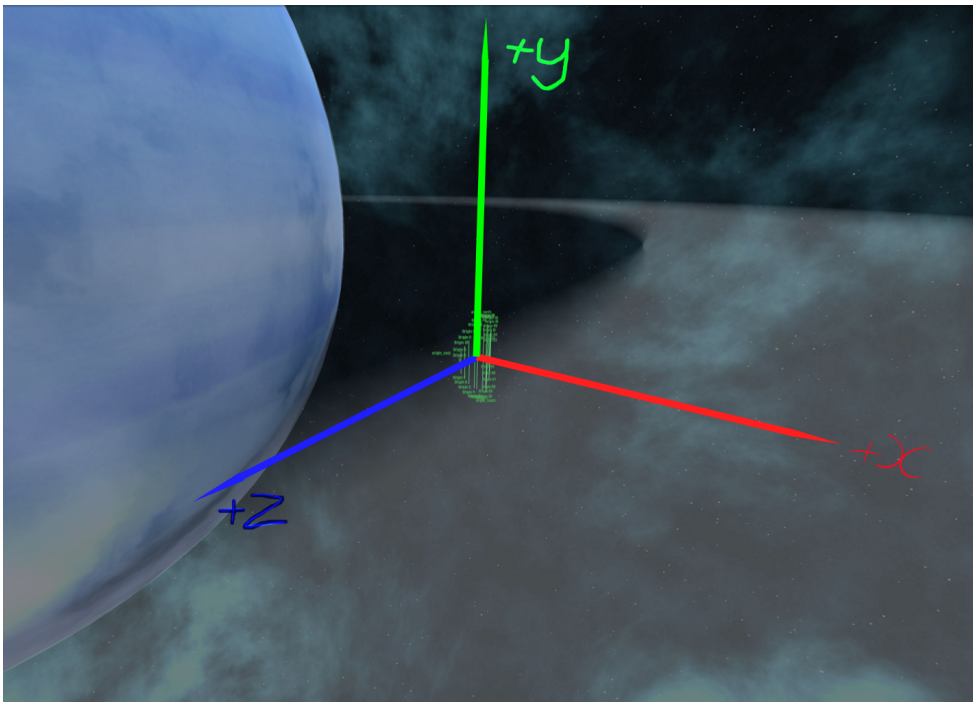
>> INTRODUCTION

ISAN is a **navigation system** within Starbase, developed by Collective. When installed on a ship, it **calculates your X, Y, and Z coordinates in space** relative to the Origin 'ringle'. Below is a diagram of the coordinate axes.



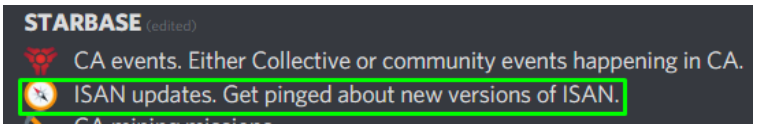
As shown in this Diagram *(these break down the further you move from origin)*:

- Positive **X** is -> ***toward the belt***
- Positive **Y** is -> ***toward the hemisphere the sun orbits, in the direction of origin_north***
- Positive **Z** is -> ***across the belt, in the direction of origin_east***

Technical note: In the SSC test region, the position of the transmitters is shifted:

- SSC **+X** = ISAN **+X**
- SSC **+Y** = ISAN **+Z**
- SSC **+Z** = ISAN **-Y**

From everyone here at **Collective R&D**, particularly the **ISAN development team**, we **hope you enjoy ISAN**. Subscribe to updates in the **#notifications** channel in the Collective Discord to get notified when a new version of ISAN is released.



>> THE MODES

ISAN has two modes, **MONO** and **QUAD**

- **QUAD** is better, but takes more space and materials (4 recievers)
    - *In case of damage, **QUAD** will fail over to **MONO***
- **MONO** is less expensive but has reduced accuracy while moving (1 reciever)

ISAN MODE	**Mono**	**Quad**
MODE CODE *(displayed on ISAN POS screen)*	**M**	**Q**
YOLOL Chips	**1**	**1**
YOLOL Chip Quality	**Basic****	**Basic****
Radio Receivers	**1**	**4**
Refresh rate	**0.6 seconds**	**0.6 seconds**
Accuracy while moving	**±100m***	**±50m**
Accuracy while stationary	**±1m**	**±5m**
Max range from Origin	**~1,000,000 meters**	**~1,000,000 meters**

Notes on refresh rate:

- **When prediction is enabled. Mono will **take 0.8 seconds to refresh,** prediction **improves straight line accuracy** in return for adding an increase in refresh rate.*
- *When speed is enabled. This adds an **additional 0.2 seconds** to refresh on either mode. Note, on MONO, this compounds with prediction.*

***To enable speed, an advanced chip is **required** in either mode.*

>> SETTING UP ISAN

You need a **receiver** (either size is fine), placed anywhere on your ship, a **basic** quality or better **YOLOL chip,** and a **text panel**. Make sure they are all connected to the same cable network.

Rename these fields in the **receiver**:

- “SignalStrength” to **A**
- “TargetMessage” to **AT**

Set the value of:

- “ListenAngle” to **180**

Open the device fields of the **text panel** and rename:

- “PanelValue” to **_**

It should end up looking something like this

>> SETTING UP ISAN QUAD

You need **four receivers** (either size is fine), placed as **close together as possible** anywhere on your ship (*see this picture for an example*), a **basic** quality or better **YOLOL chip**, and a **text panel**. Make sure they are all connected to the same cable network.

Rename these fields in each of your **receivers** (**A** through **D**, replacing **#** with the receiver letter):

- “SignalStrength” to **#**
- “TargetMessage” to **#T**

Set the value of:

- “ListenAngle” to **180**

Open the device fields of the **text panel** and rename:

- “PanelValue” to **_**

Next **open the YOLOL chip** and, **one line at a time**, paste in the code below. **Once done press enter to save, and you're all set!**

```
1  Ai=1000 w=1000 po=1 so=1 COLLECTIVE+=ISAN sv=(1-so)*18 ds=so sq=0.5
2  z="origin_" a=z+"north" f=z+"south" g=z+"east" z+="west" ms=""
3  up=" POS  :_\n     " :at=a :bt=f :ct=g :dt=z :_=up+"\nBooting\nISAN"
4  ri=:_ mx=up+"Q\nX: " my="\nY: " mz="\nZ: " ss="" x/=so-1 ms="\n\nS: "
5  e=1279116.788 j=1279315.653 k=295462.833 ll=-202102.766 p=60 mo="M"
6  t=-218955.76 n=319959.864 o=1386614.499 pp=1387810.136 vv=15+po
7  h=-159981.854 r=-159995.737 s=159977.118 tt=160000.474 v=1000000
8  i=v-:a b=v-:b c=v-:c d=v-:d i*=i b*=b c*=c d*=d u/=:a u=8 mm=mx goto16
9  :at=f i=v-:a i*=i ar=(i-la)/4 la=i u/=:a u=10 mm=up+mo+"\nX: " gotovv
10 :at=g b=v-:a b*=b br=(b-lb)/4 lb=b u/=:a u=11 gotovv
11 :at=z c=v-:a c*=c cr=(c-lc)/4 lc=c u/=:a u=12 gotovv
12 :at=a d=v-:a d*=d dr=(d-ld)/4 ld=d u/=:a u=9  gotovv
13 :_=up+"\n   Loss\n    Of\n  Signal!" goto 13-10*(:a>0)
14 x=:_ :_=up+"\nReceiver(s) damaged." goto 14-14*(x=="")
15 i+=ar b+=br c+=cr d+=dr
16 xx=i/e+b/j+c/k+d/ll yy=i/t+b/n+c/o+d/pp zz=i/h+b/r+c/s+d/tt ww=u*ds
17 xy=:_=="" :_=mm+xx/Ai*w+my+yy/Ai*w+mz+zz/Ai*w+ms+ss gotosv+ww+v*xy
18 l+=xx ay+=yy az+=zz x=l-px y=ay-py q=az-m sv+=(ii++%3)>1 gotou
19 ss=(x*x+y*y+q*q)^sq/(p-3*vv) px=l py=ay m=az l=0 ay=0 az=0 sv=18 gotou
20 xy=:_ :_=up+"\n\n  Streamer\n    Mode" goto 20-20*(xy=="")
```

The **ISAN code includes 'flags'** which enable additional features. You can find the flags on the **first line of the code.** (**1 disables features, 0 enables them**)

- **PO:** Controls prediction, giving **better straight line accuracy on MONO setups.** *(adds 0.2 to processing delay when enabled)*
- **SO*:** Controls speed, giving you a **readout of your ship's speed.** *(adds 0.2 to processing delay when enabled)*

*(*Speed requires an advanced chip to function!)*

>> STREAMER MODE & REBOOTING ISAN

ISAN comes equipped with a **streamer mode.** You can access this by **pressing U on your ISAN display, then deleting the field value (including the " "),** this can be made faster by using the CTRL+A keyboard shortcut to select everything to delete.

To **exit streamer mode,** and **reboot your ISAN system,** just press **U on the display and delete the field value (again including the " ").**

>> ENABLING ISAN MODULES

ISAN, by default, has **no external memory fields outside the direct POS display.** This is to remove the requirement of a memory chip. If you wish to enable modules, either made by the ISAN team or others. **You must edit the code, and install a memory chip as follows:**

- On lines **16, 17 & 18,** prefix **'XX'**, **'YY'** & **'ZZ'** with a **':'**
- Install a **memory chip** containing the **'XX'**, **'YY'** and **'ZZ'** fields.

>> CREDITS & Commentary

ISAN began as a small project I made public on a whim, but has grown to be a main-stay of many Starbase ships. I've encountered hundreds of people on this journey, ranging from interested YOLOL developers to faction repersentatives, each a brighter spark than the last. It's a rollercoaster, but one I plan on staying on. Thank you reader for using ISAN, your kind words, support and exaltation have been a bright 'lighthouse' in the darkness.

- *Solon, Kernel of Collective R&D and ISAN Project Leader*

Current Version:

- **Solon** - *Project Leader*
- ***Azurethi*** - *Lead Developer*
- ***CYLON members*** - *Yolol debugging assistance*

Previous Versions:

- **Solon** - *Development of ISAN v0*
- **Lumi Virtual** - *Development of ISAN v1*
- **Strikeeaglechase** - *Development of offsets and ISAN code*
- **MuNk** - *Code consultation*
- **Nordwolf** - *Development of ISAN 0.5*
- **Battle_Wrath** - *Various design ideas and general help*
- **Archduke** - *Invaluable support and document writeup*
- **Zaff** - *Security and usability consultation, documentation*
- **Meboy100** - *Le rubber duck*