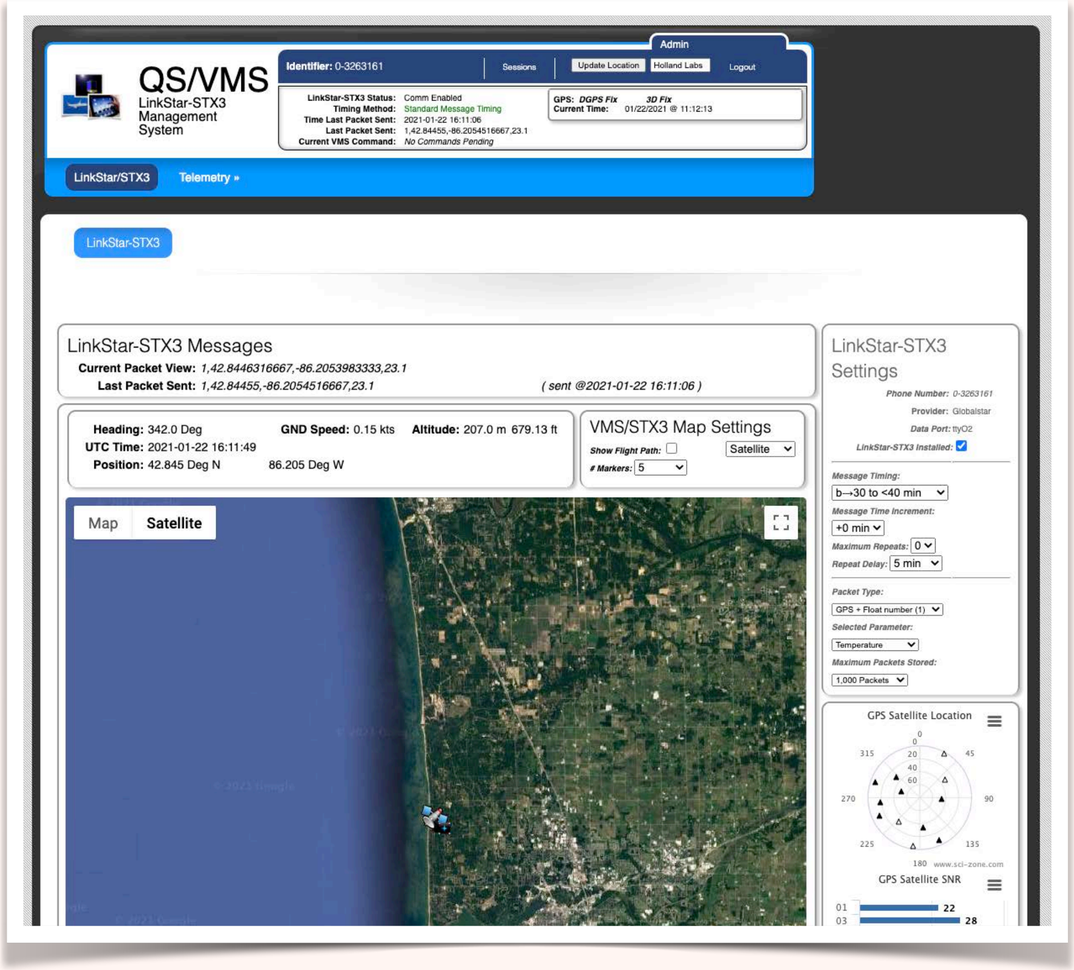
LinkStar-STX3 Radio System Series

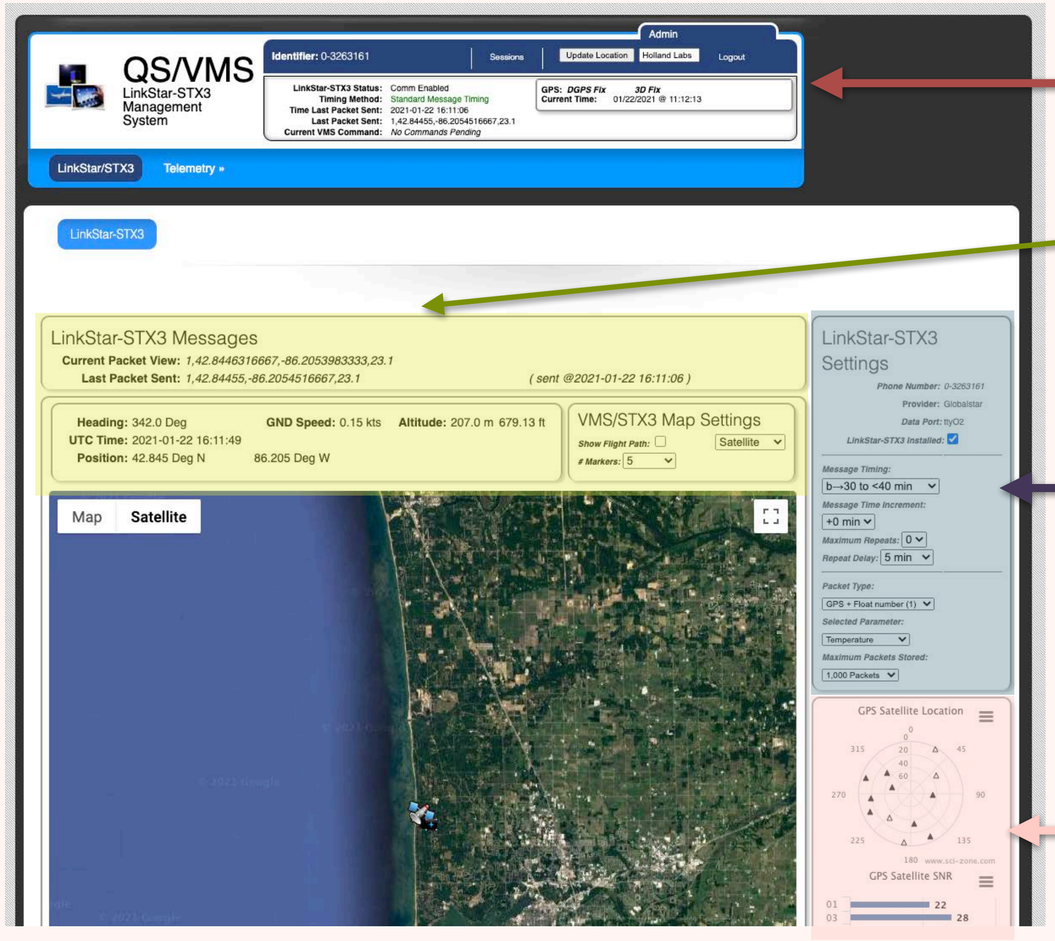
TRANSMITTING DATA

TRANSMITTING DATA - THE BASICS

- Transmitting Data involves four key steps:
  - Adding custom parameters if required
  - Select your “Timing” of the messaging
  - Selecting the packet type to transmit
  - Select the Parameter



THE LINKSTAR-STX3 HOME SCREEN



Common Header

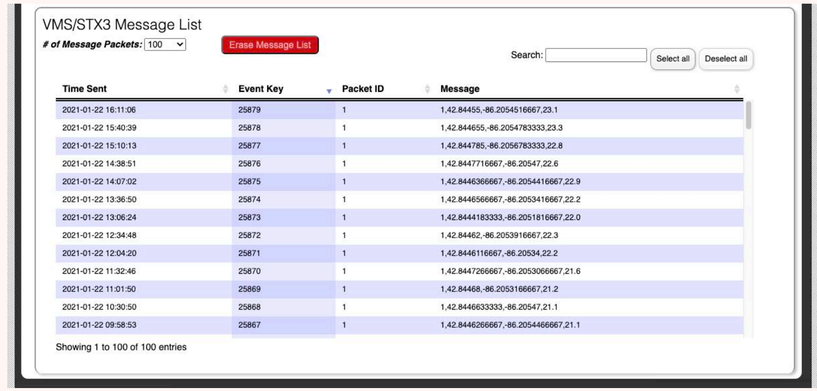
NOTE: LinkStar-STX3 Status MUST be “Comm Enabled” AND must have a GPS fix to transmit a message

Message and GPS Information

Radio Information and Radio Messaging

GPS Signal Quality Information

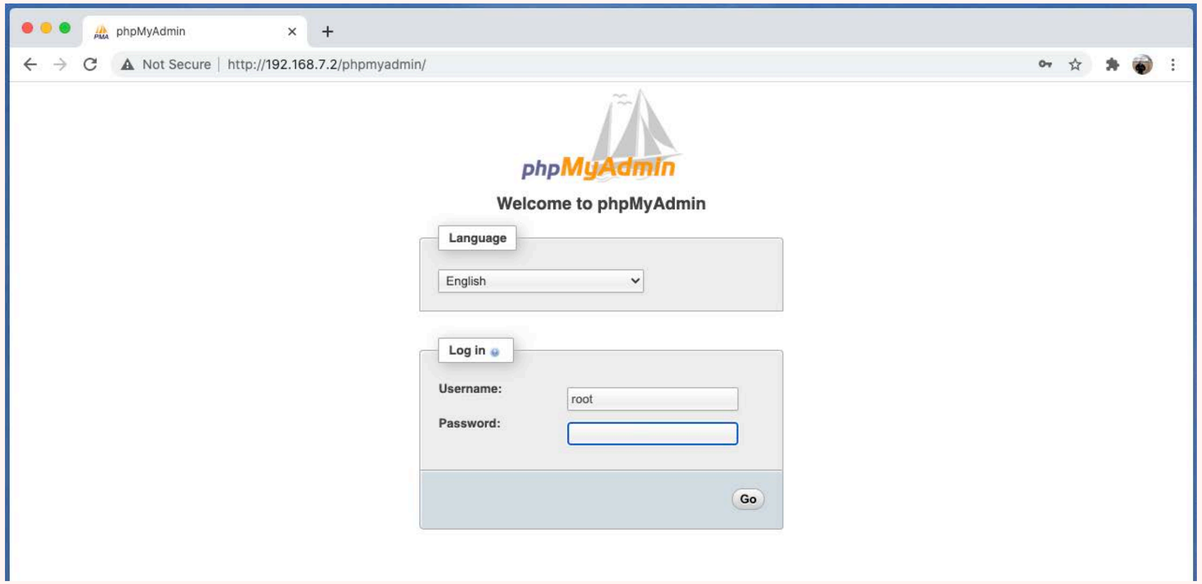
Lower half of the screen presents historical data transmitted to the ground including the *Time Sent* (Universal Time), *Event Key* (unique message key on radio only), *Packet ID* (future feature), and the *Message* itself.

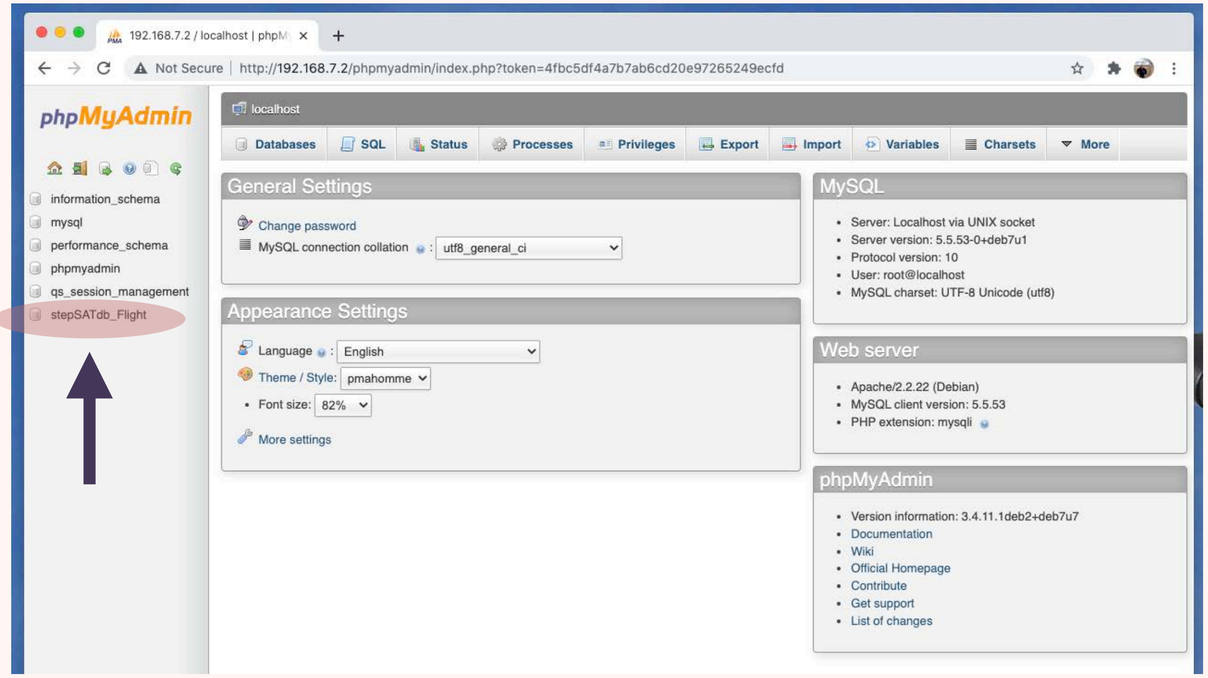


ADDING CUSTOM PARAMETERS…

- **Current Steps:**
  - **Using web browser go to http://192.168.7.2/phpmyadmin**
    - **Login -> Username: root Password: Quicksat!1**
    - **Select *step_SATdb_Flight***

Yes, you CAN CHANGE the username and password for PHPMYADMIN and MYSQL. The user can find how to change these values in the supporting PHPMYADMIN, MySQL and Debian Linux documentation.





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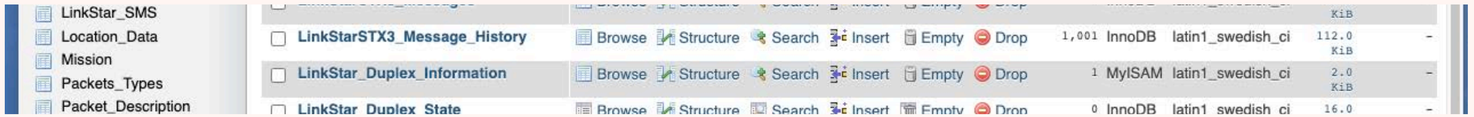
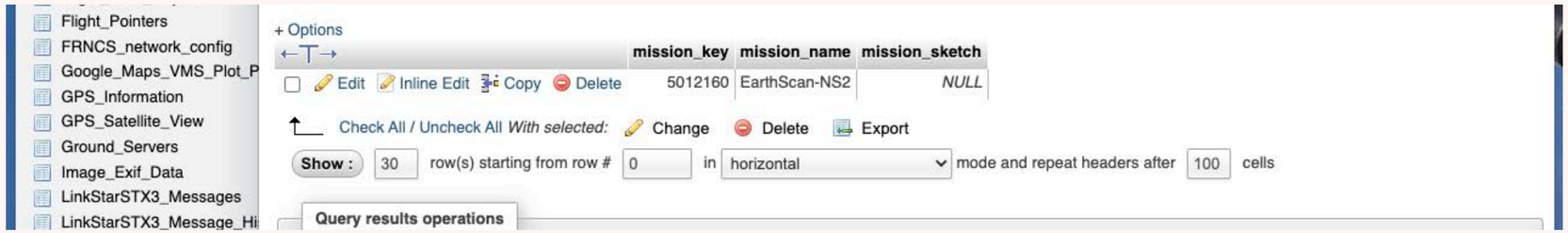
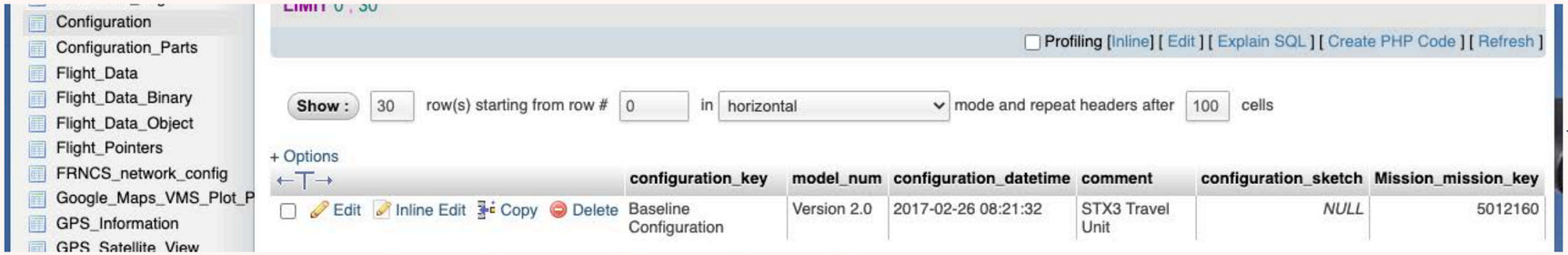


Select the “Mission” Table



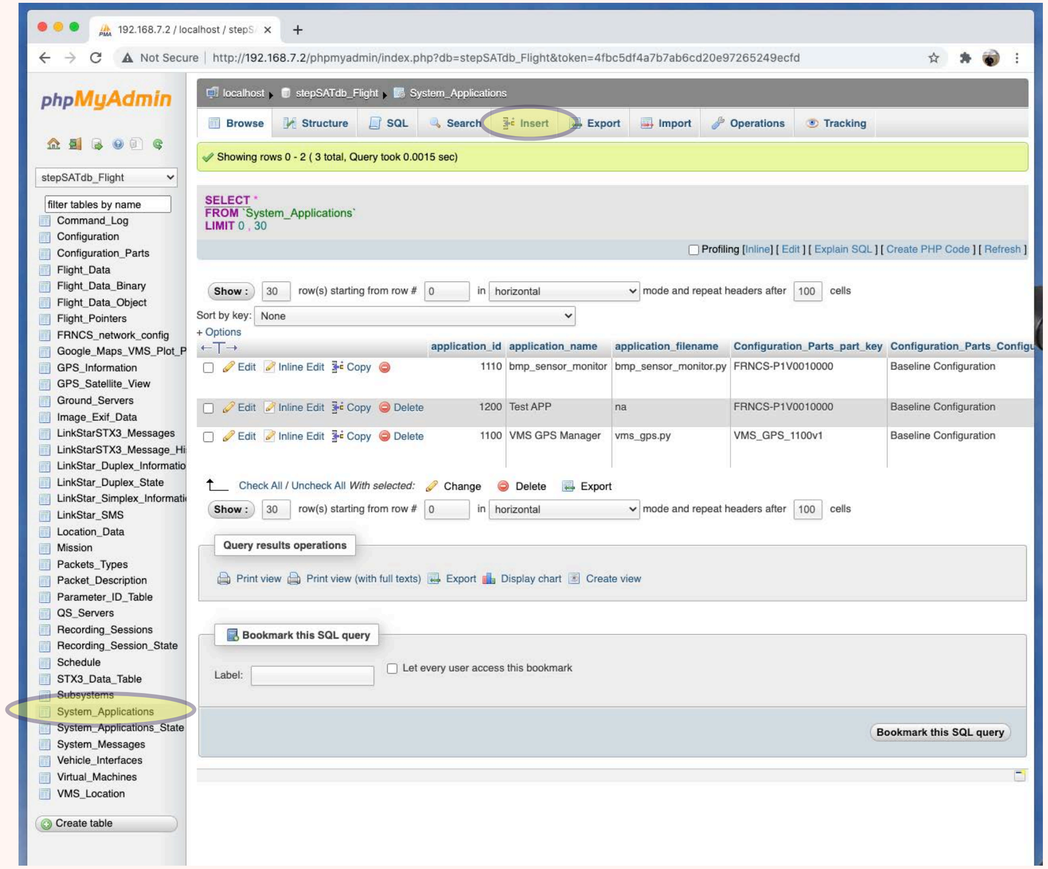
Note the “mission_key”. You will use this to define your parameters. You change this value AND change the “mission_name” using *Edit* or *Inline Edit*, but use the same values consistently that reference these columns.



Next select the “Configuration” Table. Note the “configuration_key” and verify “Mission_mission_key” matches the “mission_key” in the Mission table. If not, *Edit* or *Inline Edit* as needed.

ADDING CUSTOM PARAMETERS…

- **Next step is to define the** *software application* **containing the customer, user defined parameters**
  - **The** *software application* **is referenced to your defined “Configuration”…referenced to the defined “Mission”**
  - *Software applications* **have a set of** *Parameters*
  - **Data generated from the** *software application* **is referenced to a** *Parameter*
- **Select the “System_Applications” Table**
- **Select “Insert” near the top**



ADDING CUSTOM PARAMETERS…

***Insert* the *Software Application* in "System_Applications"**

Insert a custom "application_id" that you define

Give your application a name

Enter the filename of the application
Software applications are to be stored in the directory /opt/qs/bin

Assign a unique "Configuration_Parts_part_key" database key for you application (optional)

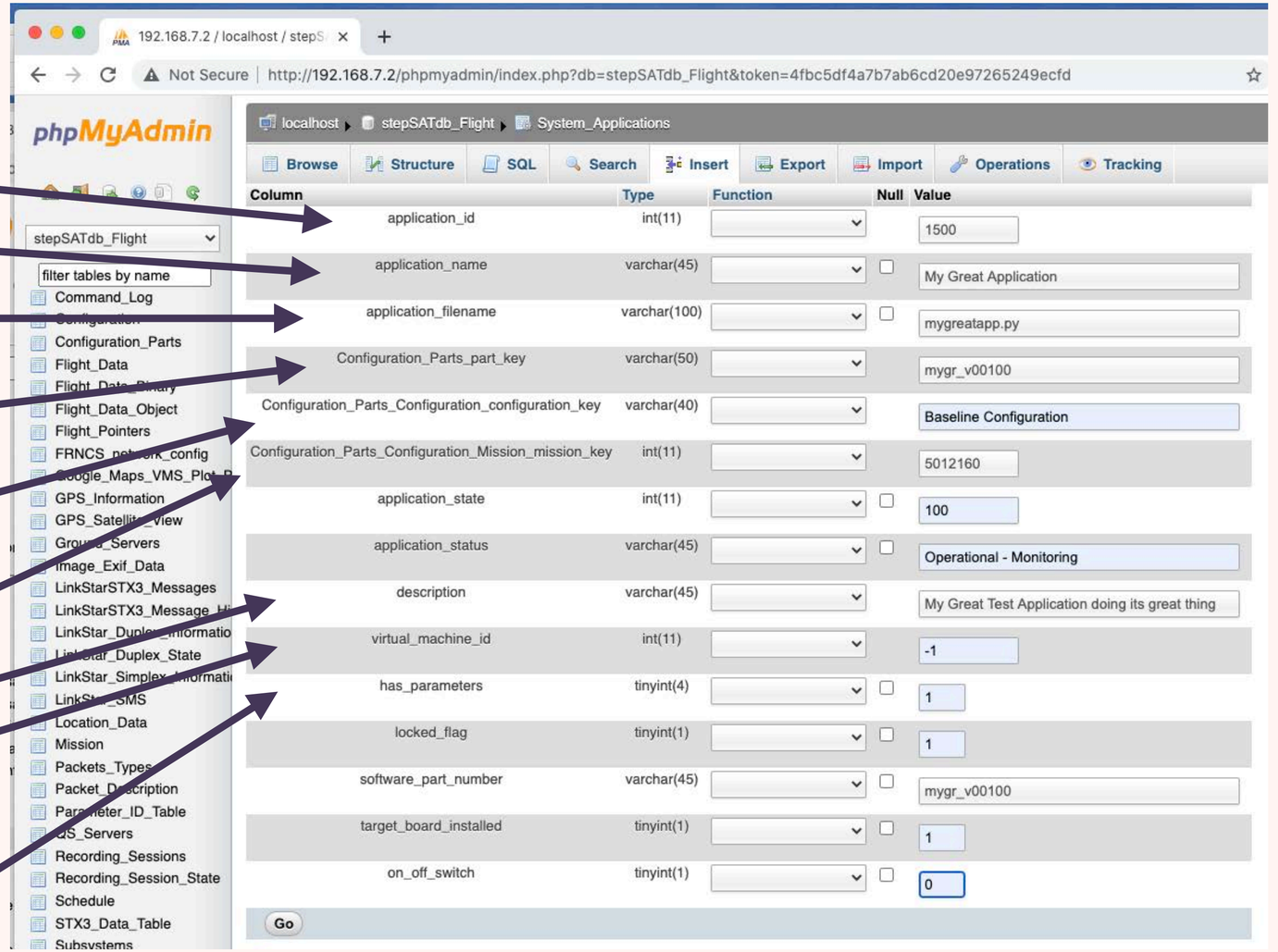
Enter the "configuration_key" in the "Configurations_Parts_Configuration_configuration_key"

Enter the "mission_key" in the "Configuration_Parts_Configuration_Mission_mission_key"

Enter the "description" of the *software application*

Enter **-1** for the "virtual_machine_id"

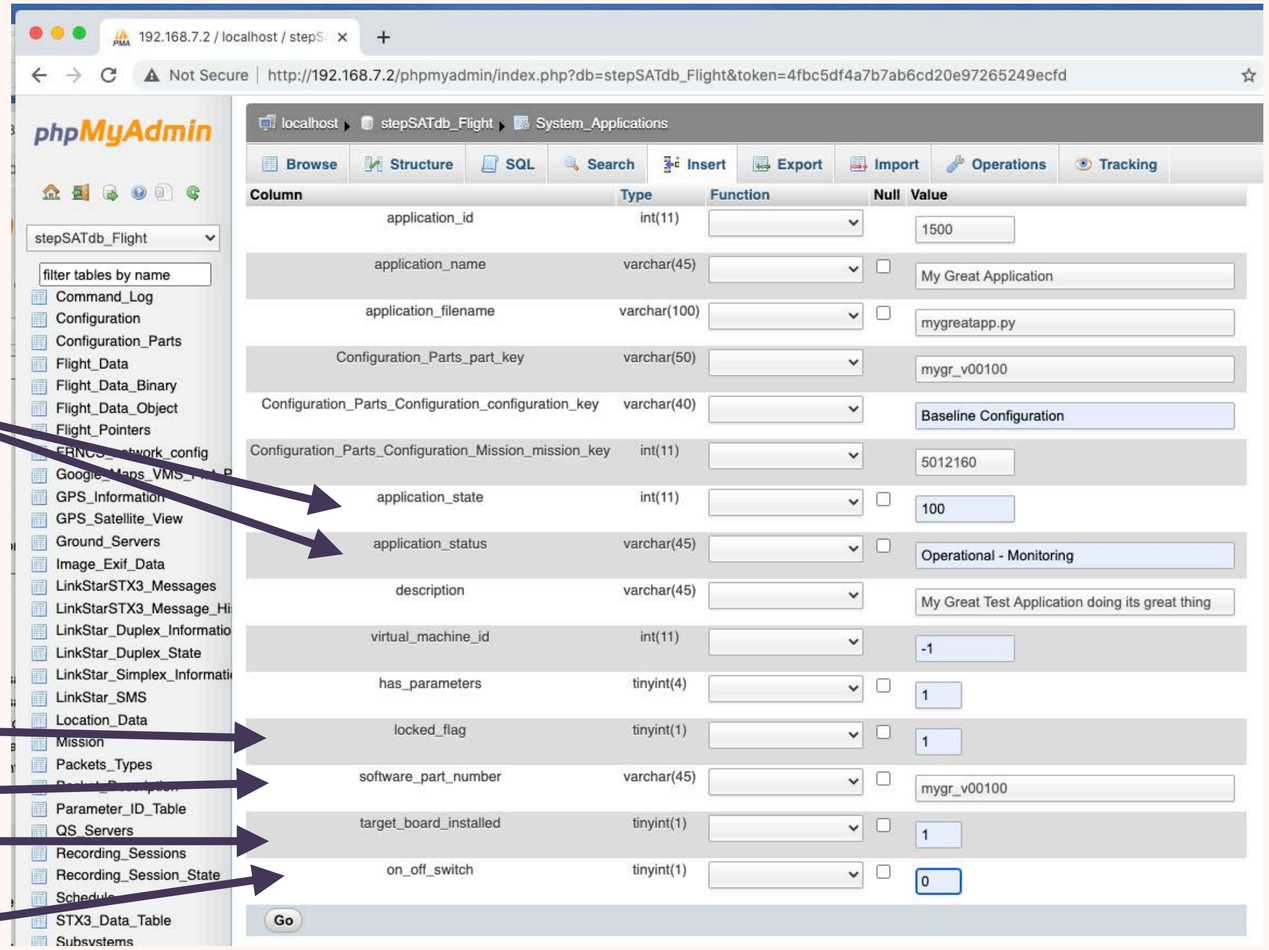
Enter **1** for the "has_parameters"…you telling *QuickSAT/VMS* your *software application has parameters!*



ADDING CUSTOM PARAMETERS...

Define the “application state” and “application_status” - NOTE: your software_application CAN change this value to allow constant monitoring of the status of your software application

application_state	application_status
50	Ground Storage
80	FRNC Storage
100	Operational
110	Paused
190	VM Initializing
195	Installed On Host
150-189, 191-194, 196-199	***Reserved***
200	Off
205	Unable To Start Application
250-299	***Reserved***
300	Error
305	No Contact With Application
350-399	***Reserved***
400-699	*Open to users to define*
700-999	***Reserved***



Future Feature - set the *software application* to locked

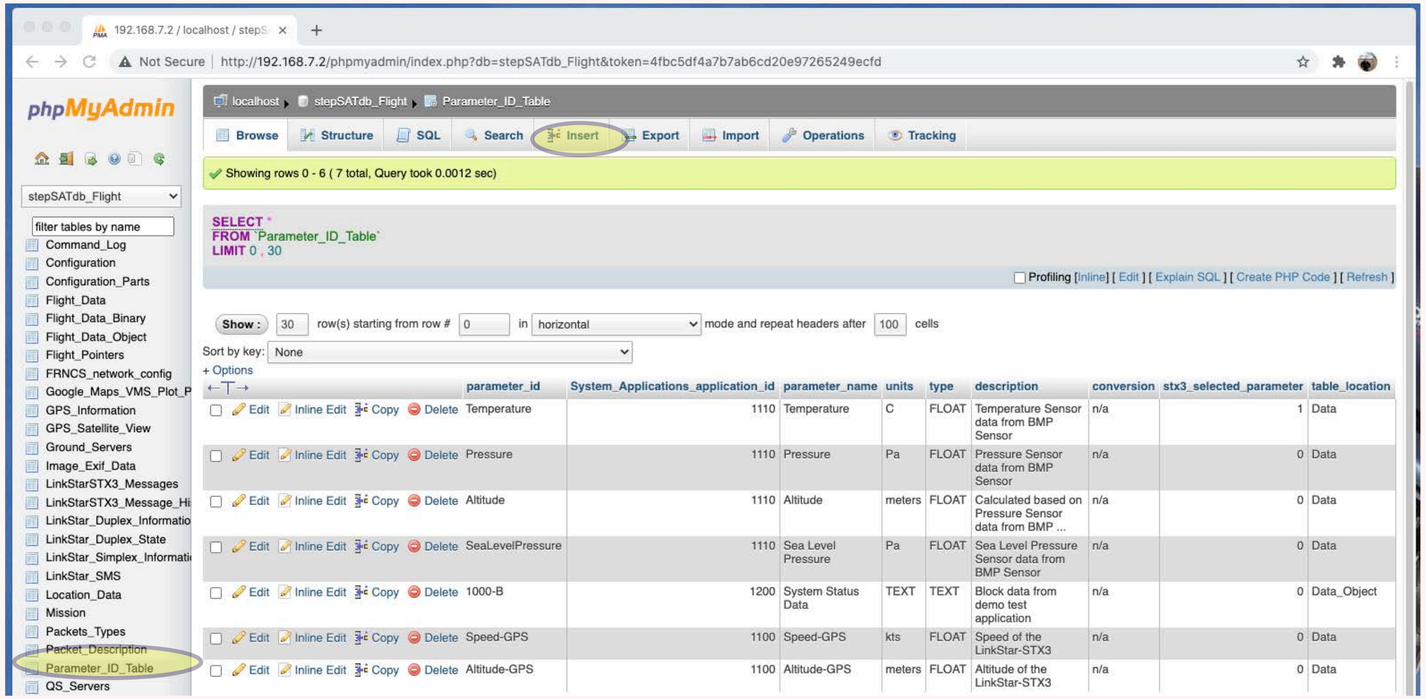
Enter the “software_part_number” of the *software application (optional)*

Enter **1** to tell *QuickSAT/VMS* your software is installed

Future Feature - you can enable an “on/off” switch to start and stop your *software application*.

ADDING CUSTOM PARAMETERS…

- **Once the** *software application* **has been added to “System Applications” you can now add the parameters for the** *system application* **to the table “Parameter_ID_Table”**
  - **Select the table “Parameter_ID_Table”**
  - **Select *Insert* insert the** *parameters*



ADDING CUSTOM PARAMETERS…

Insert the information for the parameter in the "Parameter_ID_Table"

Insert a unique "parameter_id" that you define

Enter the "application_id" of the parameter's *software application*

Enter the name of the parameter

Enter the units of the parameter

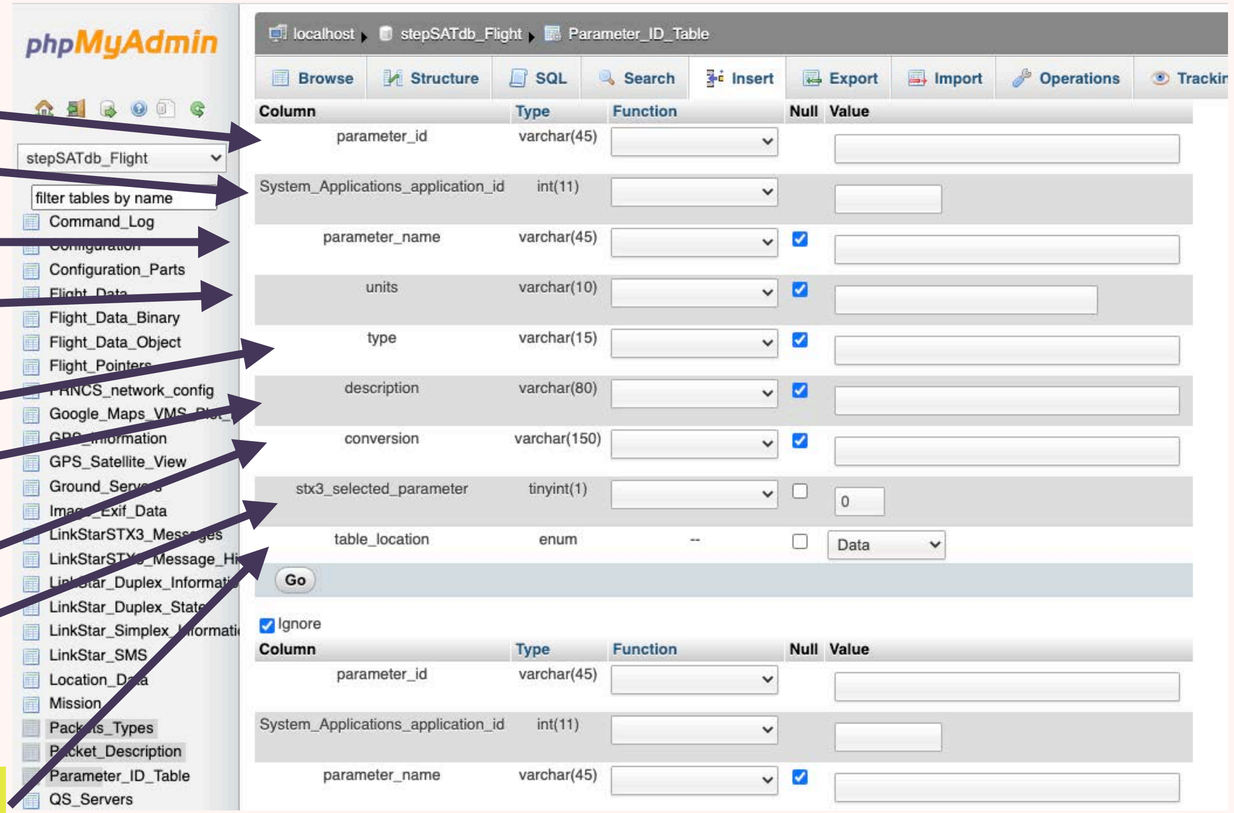
Enter the "type" of the parameter. Types include INTEGER, FLOAT, TEXT; BINARY, TIF, JPG, PNG, RAW can ONLY be used for LinkStar duplex radios.

Enter the "description" of the parameter (optional)

Enter the conversion factor of the parameter (optional). This is a text, pseudo code of the method of conversion your *software application* can use

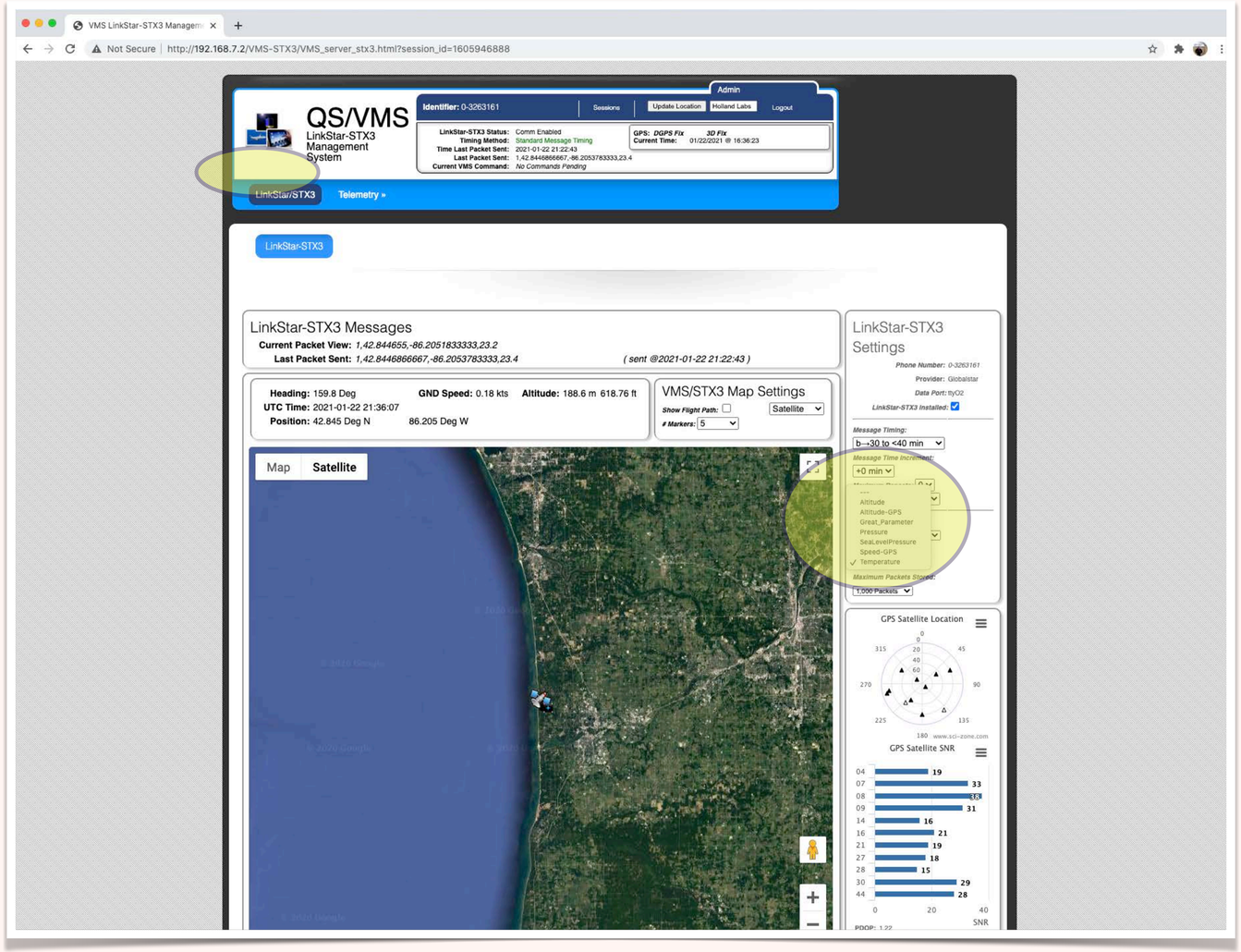
Enter 0 for the "stx3_selected_parameter"

Select which table, or "table_location", where you are writing the value/data of the parameter too. Your options are "Data" for the "Flight_Data" table, "Data_Object" for "Flight_Data_Object"; "Data_Binary" for "Flight_Data_Binary" is only available for LinkStar duplex radios



ADDING CUSTOM PARAMETERS…

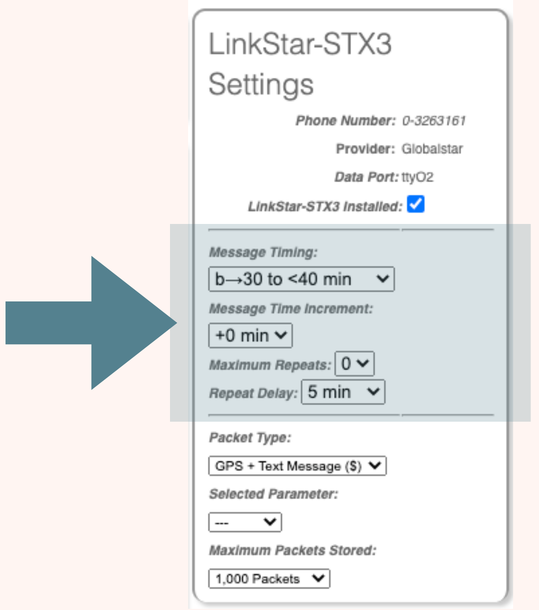
- **Verify your parameter is being tracked by the *QuickSAT/VMS* system**
  - **Go to the LinkStarSTX3 tab (the “Home Screen”**
  - **Under *LinkStar-STX3 Settings* select the *Packet Type* of “GPS+Integer” to view parameters with a “table_location” of *Data*, or “GPS+Text Message” for parameters with “table_location” of *Data_Object*.**
  - **Select the drop down menu under “Selected Parameter” - your new parameter should now be listed there!**



SELECT THE “TIMING” OF YOUR MESSAGE

There are several options on how often you can beacon your message, and how many times it can be repeated. Messaging patterns are per FCC, ITU and Globalstar regulations.

Message Type	Message Timing	Message Time Increment	Maximum Repeats	Repeat Delay
a	40 to 1400 min	+0,1,2,3,4,5,6,7, 8,9 minutes	2	5, 6, 7, 8, 9, 10 minutes
b	30 to <40 min	+0,1,2,3,4,5,6,7, 8,9 minutes	2	5, 6, 7, 8, 9, 10 minutes
c	20 to <30 min	+0,1,2,3,4,5,6,7, 8,9 minutes	1	5, 6, 7, 8, 9, 10 minutes
d	10 to <20 min	+0,1,2,3,4,5,6,7, 8,9 minutes	NONE	NONE
e	ALARM MODE (5 min)	+0,1,2,3,4 minutes	NONE	NONE
f	Balloon MODE (2 min) for 12 hours and then the message is permanently stopped	+0,1,2,3,4 minutes	NONE	NONE



Examples:

- Selecting *Message Type (a)* with a *Message Time Increment* of 4 minutes and *Maximum Repeats* of 2 with a *Repeat Delay* of 5 minutes your message will be broadcasted approximately at **44 minutes** and repeated at **49 minutes** and **54 minutes** from the prior broadcast.

- Selecting *Message Type (c)* with a *Message Time Increment* of 5 minutes and *Maximum Repeats* of 1 with a *Repeat Delay* of 10 minutes your message will be broadcasted approximately at **25 minutes** and repeated at **35 minutes** from the prior broadcast.

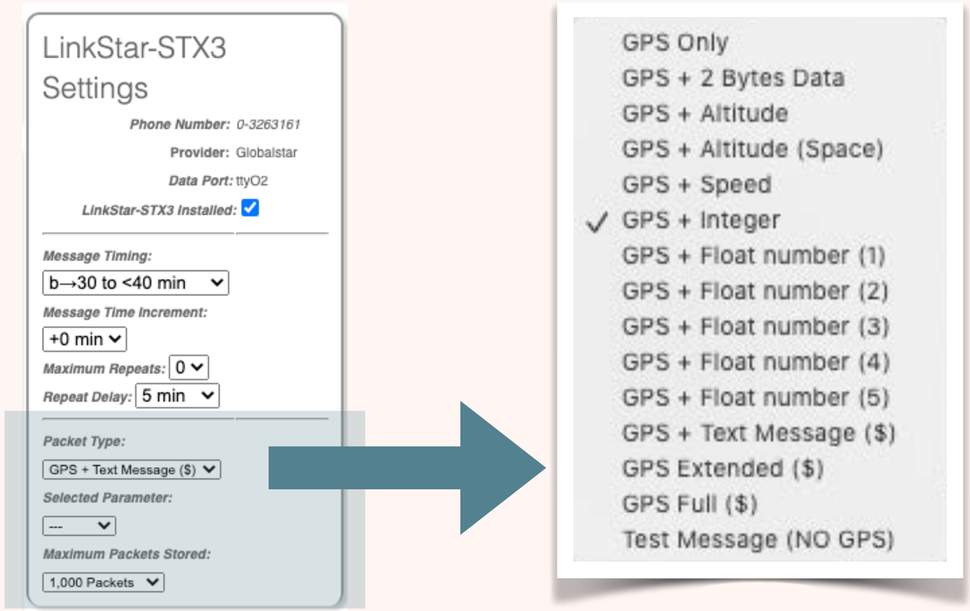
- Selecting *Message Type (d)* with a *Message Time Increment* of 2 minutes your message will be broadcasted approximately at **12 minutes** from the prior broadcast.

- Selecting *Message Type (e)* with a *Message Time Increment* of 0 minutes your message will be broadcasted approximately at **5 minutes** from the prior broadcast.

- Selecting *Message Type (f)* with a *Message Time Increment* of 0 minutes your message will be broadcasted approximately at **2 minutes** from the prior broadcast. The messaging will stop permanently 12 hours from the first broadcast.

SELECT THE “PACKET TYPE” OF YOUR MESSAGE

There are several pre-set packet types to select from. If you think you will be able to recover your LinkStar simplex radio select to broadcast the data you feel is critical to broadcast. The rest of the data can be viewed later connecting your radio to your desktop. Otherwise, broadcast all data you feel is critical to view remotely



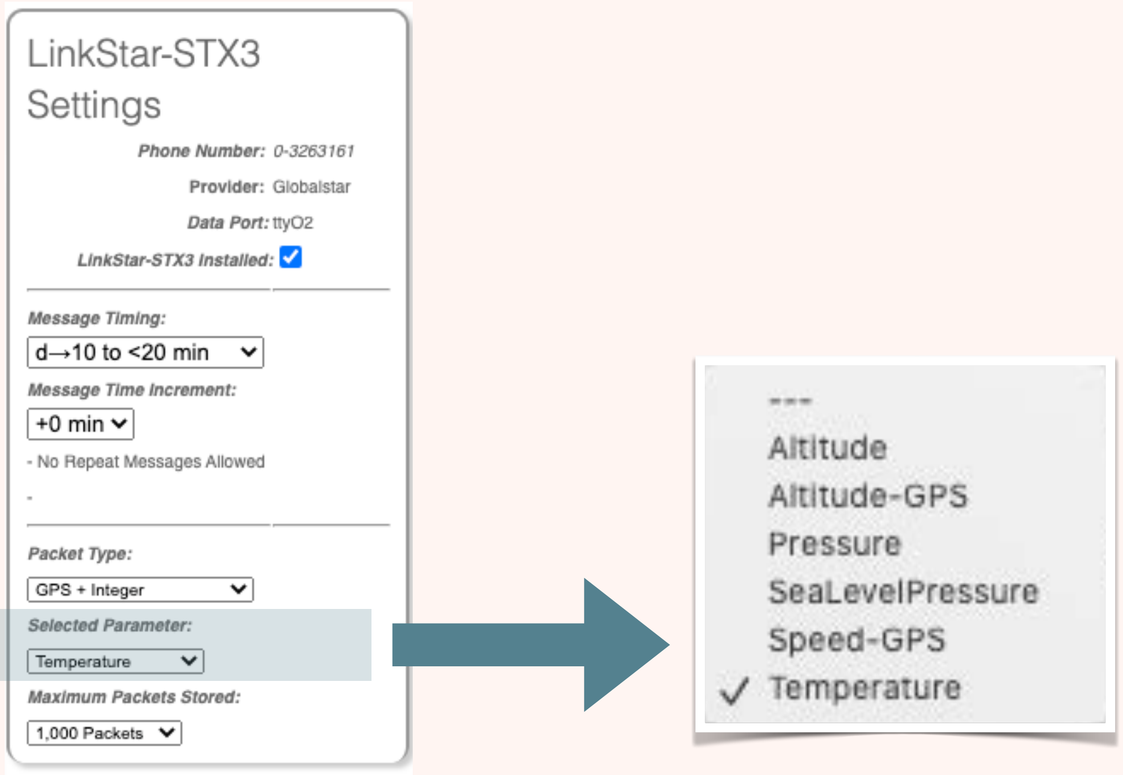
Packet Type	Description
GPS Only	Only Latitude and Longitude
GPS + 2 Bytes Data	Latitude and Longitude plus 2 Bytes of data in character format - can be converted to individual bits to extract
GPS + Altitude	Latitude and Longitude plus Altitude in m up to 65535 m unsigned
GPS + Altitude (Space)	Latitude and Longitude plus Altitude in km up to 1500 km unsigned
GPS + Speed	Latitude and Longitude plus Speed in kts up to 65535 kts unsigned
GPS + Integer	Latitude and Longitude plus an Integer value from the **Selected Parameter, Data,** to ± 65535
GPS + Float Number (1)	Latitude and Longitude plus an Integer value from the **Selected Parameter, Data,** to ± 6553.5
GPS + Float Number (2)	Latitude and Longitude plus an Integer value from the **Selected Parameter, Data,** to ± 655.35
GPS + Float Number (3)	Latitude and Longitude plus an Integer value from the **Selected Parameter, Data,** to ± 65.535
GPS + Float Number (4)	Latitude and Longitude plus an Integer value from the **Selected Parameter, Data,** to ± 6.5535
GPS + Float Number (5)	Latitude and Longitude plus an Integer value from the **Selected Parameter, Data,** to ± 0.65535
GPS + Text Message ($)	Latitude and Longitude plus an Integer value from the **Selected Parameter, Data Object,** up to 137 bytes
GPS + Extended Message ($)	UT Time Stamp, Latitude, Longitude, Speed (kts), Altitude (m)
GPS + Full Message ($)	UT Time Stamp, Latitude, Longitude, Speed (kts), Altitude (m), Heading, Fix Type, Fix Value
Test Message (NO GPS)	UT Time Stamp

SELECT THE PARAMETER

- **Once your *Timing* is set along with the *Packet Type* and you want to broadcast Byte, Integer, or Float Number data you need to select the *Parameter*.**

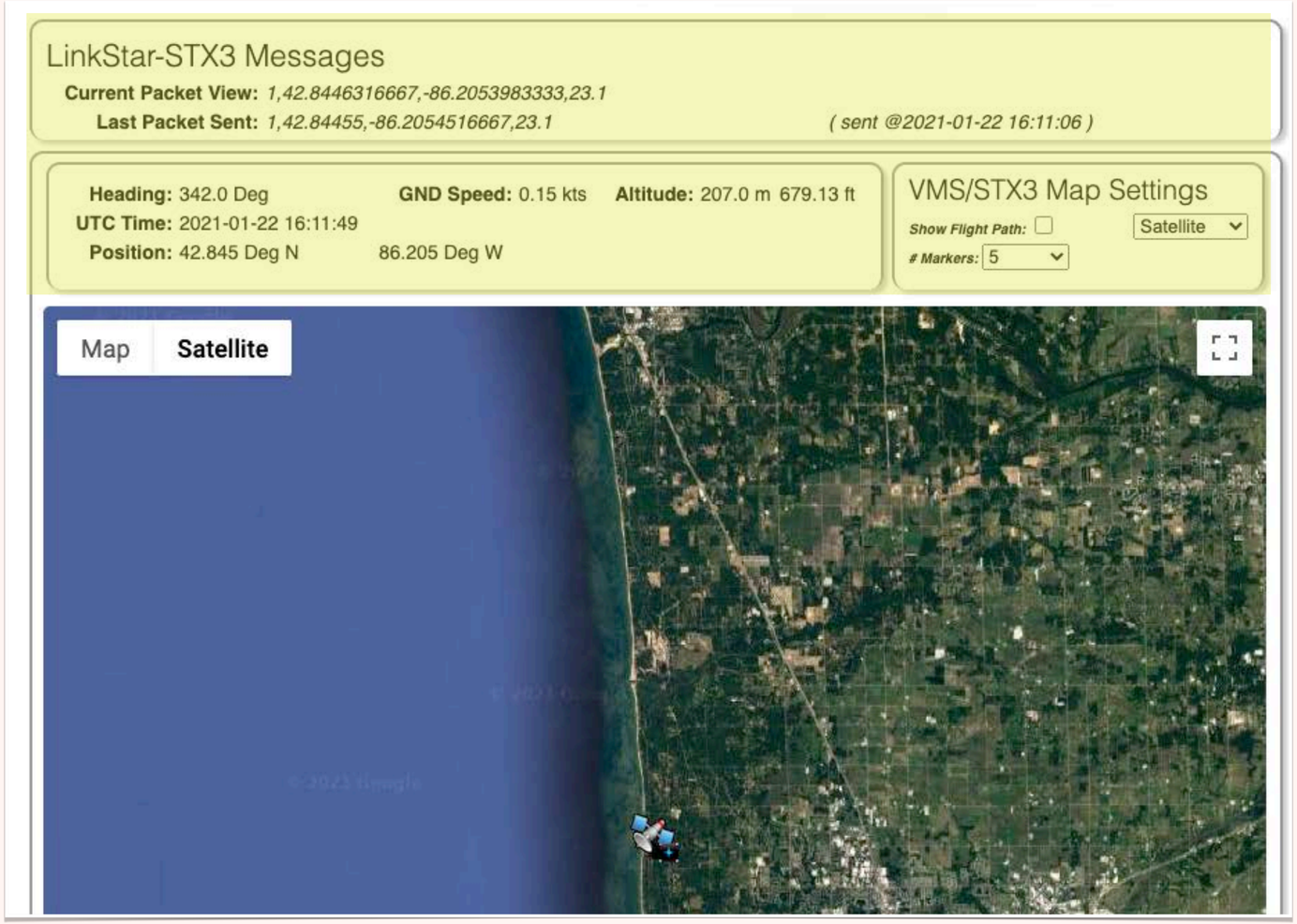
Go to the *Selected Parameter* drop down menu

You can also select the number of prior packets transmitted to be stored on the onboard computer. Messages are deleted “First In/Last Out”



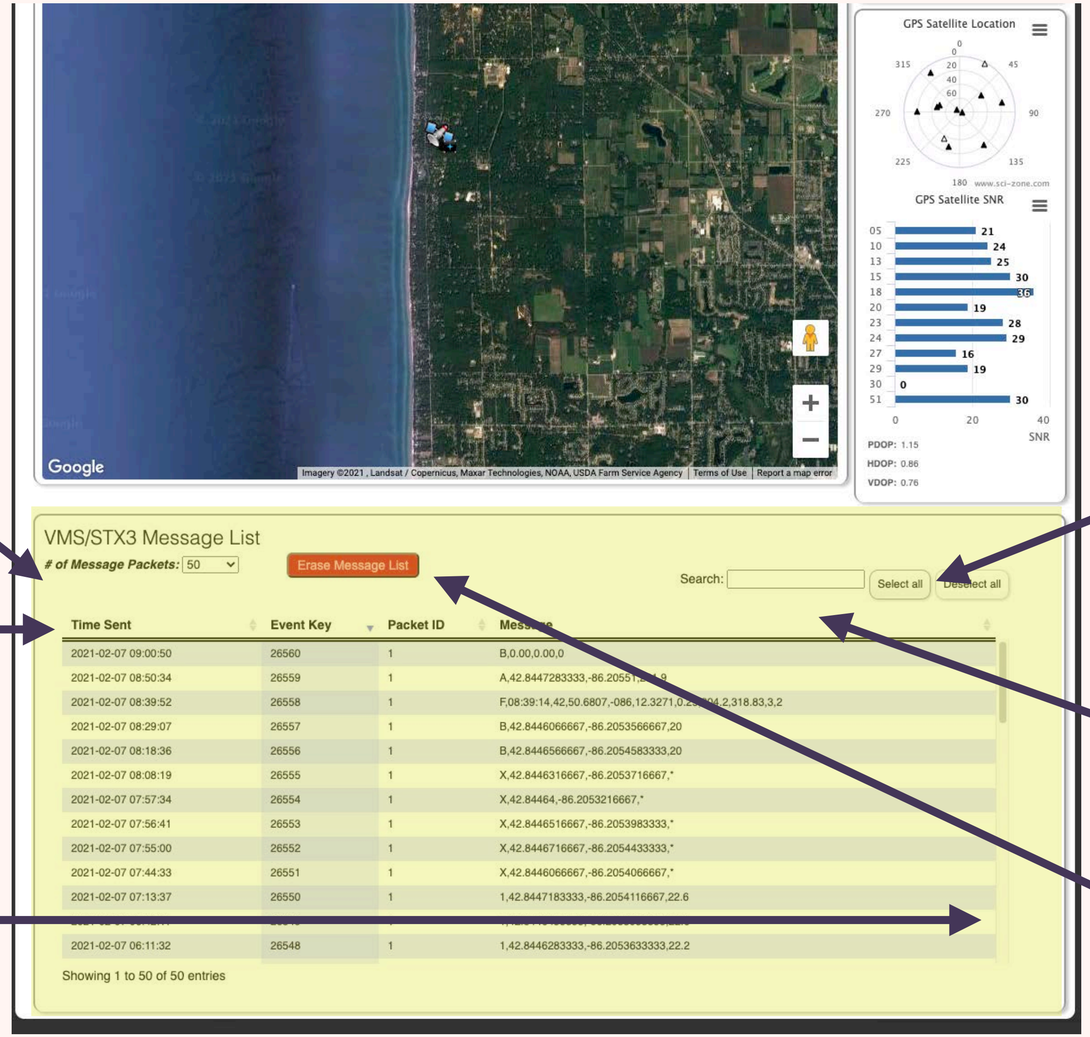
VIEW MESSAGE FORMAT AND STATUS

- To verify your message format look at the “LinkSar-STX3 Messages” area
  - “Current Packet View” shows how the packet will look at that moment (updated every 30 seconds) based on your “Packet Type” and if selected, your Parameter”
  - “Last Packet Sent” shows the exact format of the packet transmitted to the ground.
- GPS Data is also presented underneath the LinkStar-STX3 Messages area.



VIEW THE DATA - MESSAGE HISTORY

- **At the bottom half of the *QuickSAT/ VMS* “home screen” (LinkStar/ STX3) you can view the history of messages transmitted under “VMS/ STX3 Message List”**



You can select the number of packets to view

You can click on the column headings to change the order of the data viewed in ascending or descending order

You can scroll through the table with your mouse.

You can click on a row to select, “Select All”, “Deselect All” rows for copying or export to CSV, Excel or PDF (buttons for the export functions are coming out in the next release)

You can search for a value throughout the entire message list

For security purposes you can erase the entire message list