How To: SAMOS in SCS

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Background:

SAMOS is a **S**hipboard **A**utomated **M**eteorological and **O**ceanographic **S**ystem that can pair with NOAA's SCS software to log continuous recordings of navigational (ship's position, course, speed, and heading), meteorological (winds, air temperature, pressure, moisture, rainfall, and radiation), and near-surface oceanographic (sea temperature, and salinity) parameters while the vessel is at sea.

Measurements are recorded at high-temporal sampling rates, typically 1 minute or less, which allows for more accurate estimates of the turbulent air-sea fluxes to be determined and make SAMOS data ideal for validating flux fields from numerical weather prediction models, oceanic models, and remotely observed satellite data.

Research vessels operating in remote areas, in comparison to normal shipping lanes, increases the value of these data for validation studies.

SAMOS
Shipboard Automated Meteorological and Oceanographic System

Pre-Requisites:

This training assumes that you already have devices set up and are just adding the SAMOS derived sensors

For our example, we are using a Vaisala WXT-510

Sentence Label	Values
$WIXDR	Temperature Pressure Relative Humidity
$WIMWV	Wind Direction Wind Speed

Overview:

- Setting up SCS Configuration File
- Setting up Sensor Configuration File
- Setting up SAMOS Event Template File
- Setting up SAMOS Mailer Configuration Values
- Running the SAMOS Event
- Running the SAMOS Mailer
- Maintaining SAMOS Metadata
- Transforming ELG Files into $SAMOS Format

Credit: WHOI

Credit: Rik Wanninkhof/AOML

Setting up SCS Configuration File:

The SAMOS Mailer uses the mail server configuration variables in the SCS Configuration File (*SCS Menu → → Acquisition → Data Acquisition → SCS Configuration File Editor*) to contact the mail server and do all mailer applications included in the SCS system.

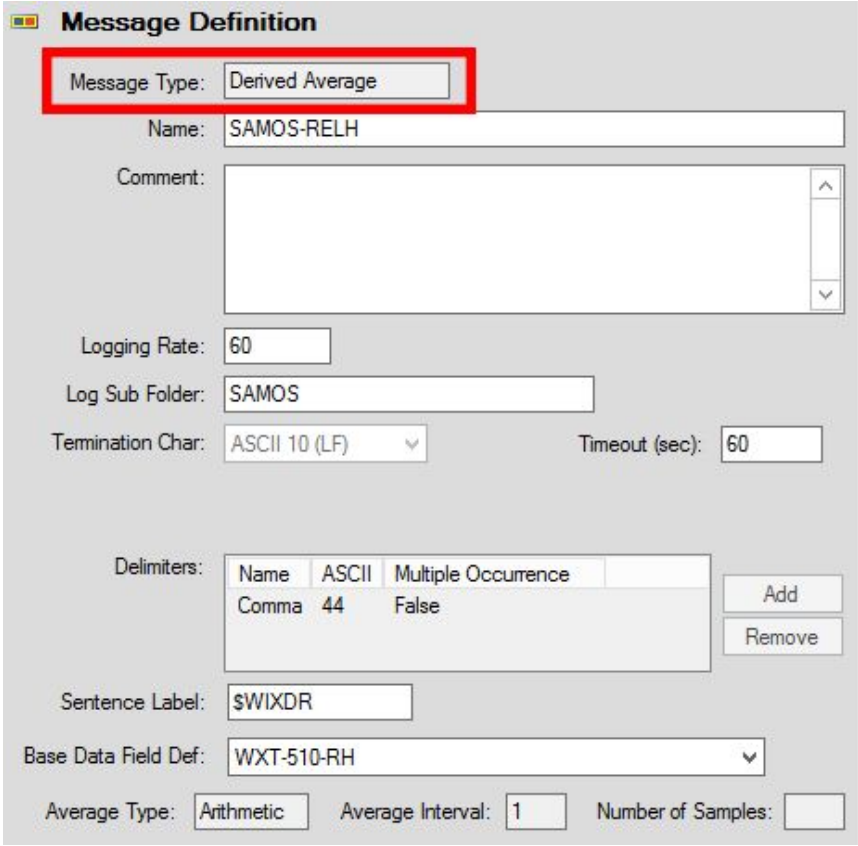
SMTP_SERVER
SMTP_PORT
SMTP_USE_SSL
SMTP_IGNORE_CERT_ERRORS
SMTP_AUTH_CREDENTIALS

SHIP_NAME	SCS	The ship's name (used when sending Ship Tracker messages).
SMTP_AUTH_CREDENTIALS	[redacted]	User credentials for authenticating to the ship's SMTP ser.
SMTP_IGNORE_CERT_ERRORS	1	0: Check server certificate when sending mail (standard be.
SMTP_PORT	25	The port used to access the SMTP server for sending message
SMTP_SERVER	[redacted]	The SMTP server onboard which will send email messages (i..
SMTP_USE_SSL	0	1: Use SSL when sending email. 0: Do not use SSL.
VESSELCODE	SD	Two-letter vessel code to identify source of data in databa

See: Page 20, Section 1.4, SCS User's Guide (v4.9) for more info

Setting up Sensor Configuration File (Overview):

Using the CFE-DB (Configuration File Editor - Database) you must define a set of derived average sensors to compute the average for the previous 60 seconds.



See: Page 330, Section 12.3, SCS User's Guide (v4.9) for more info

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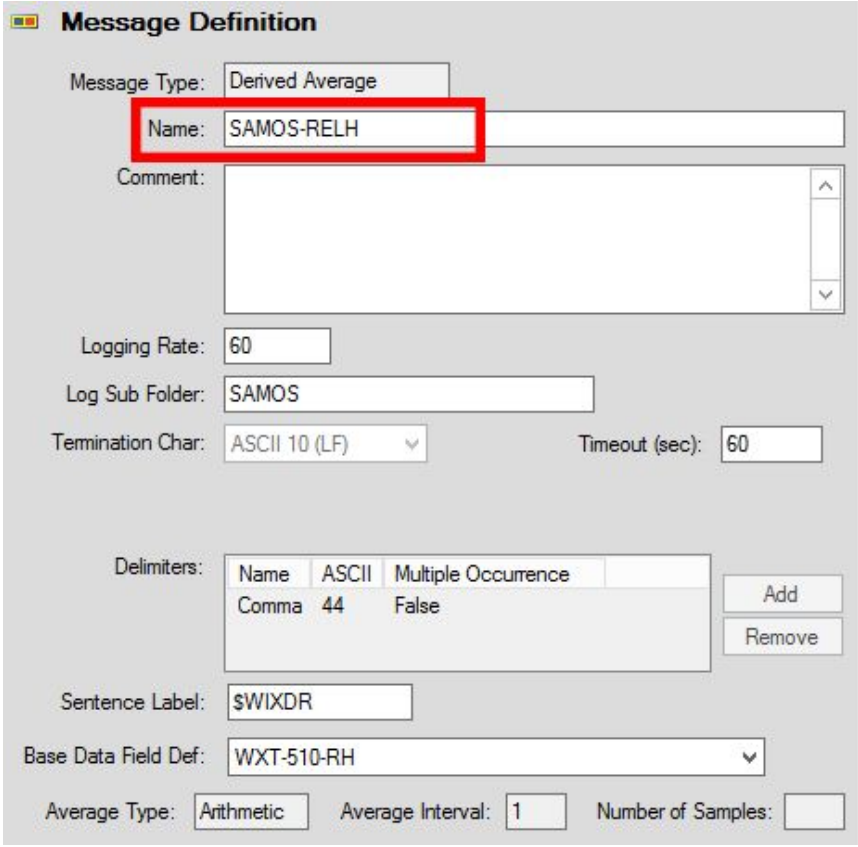
The name of the SAMOS average sensors should start with the word SAMOS to distinguish them easily from other sensors.



See: Page 330, Section 12.3, SCS User's Guide (v4.9) for more info

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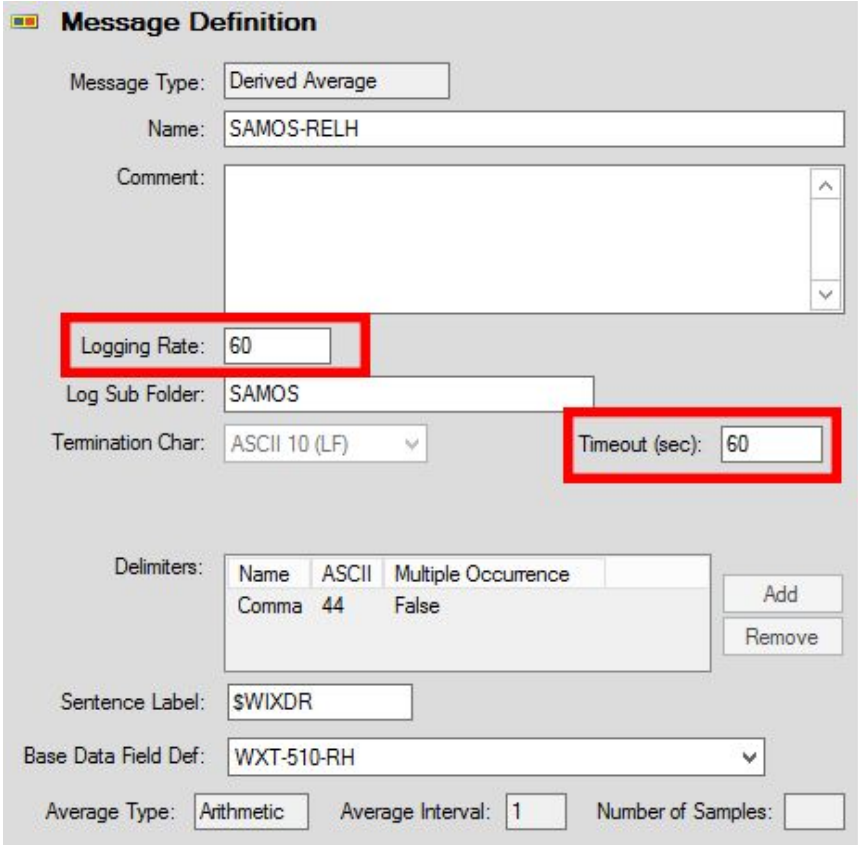
The name of the SAMOS average sensors should start with the word SAMOS to distinguish them easily from other sensors.

The Log Rate for the SAMOS average sensors must be set to 60 seconds, and the Timeout Sensor Parameter must be set to not less than 60 seconds (this is enforced by CFE-DB).



See: Page 330, Section 12.3, SCS User's Guide (v4.9) for more info

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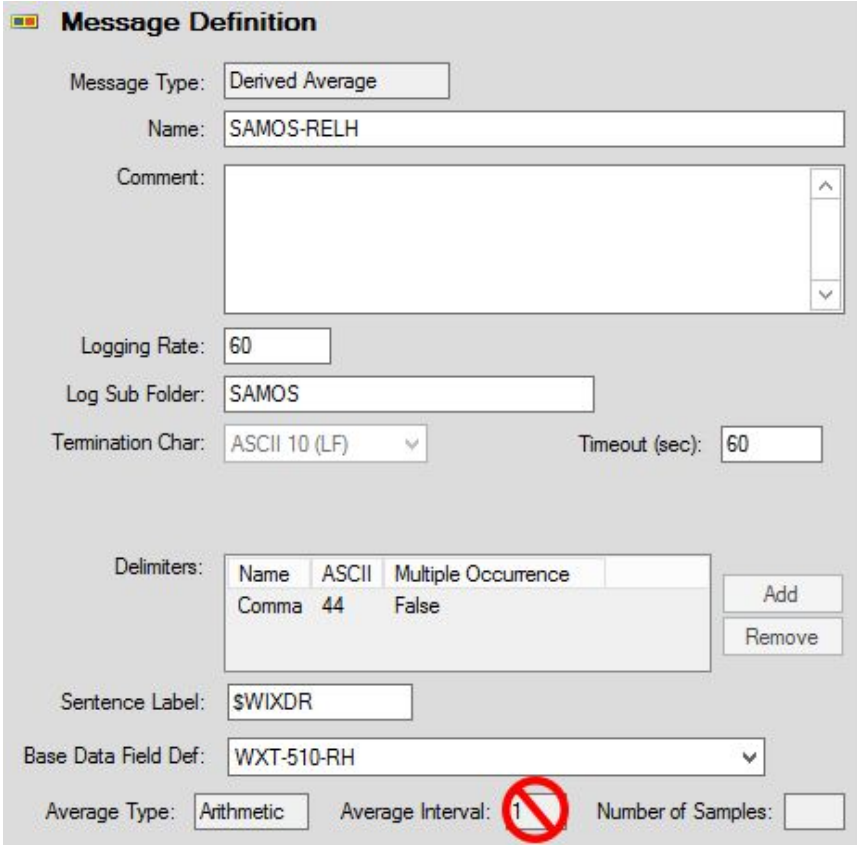
The name of the SAMOS average sensors should start with the word SAMOS to distinguish them easily from other sensors.

The Log Rate for the SAMOS average sensors must be set to 60 seconds, and the Timeout Sensor Parameter must be set to not less than 60 seconds (this is enforced by CFE-DB).

****NOTE: The Average Interval is in seconds and should be set to 60 and not 1, in minutes, like previously thought.****



See: Page 330, Section 12.3, SCS User's Guide (v4.9) for more info

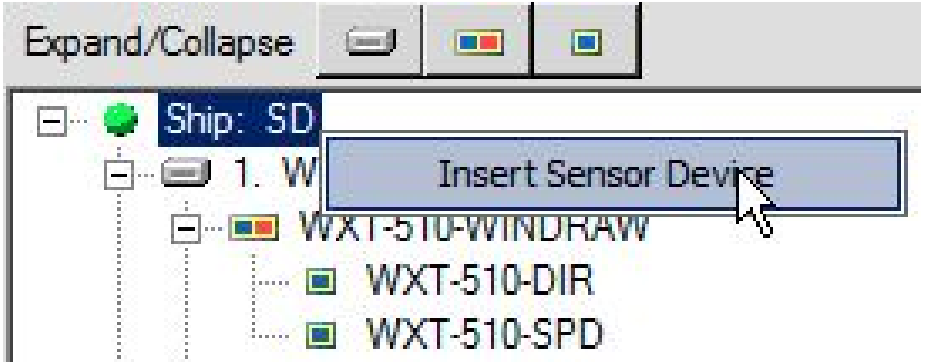
Setting up Sensor Configuration File (Steps):

- From the main SCS Menu, select:
  Acquisition → Data Acquisition →
  Sensor Config Edit (Database)

Setting up Sensor Configuration File (Steps):

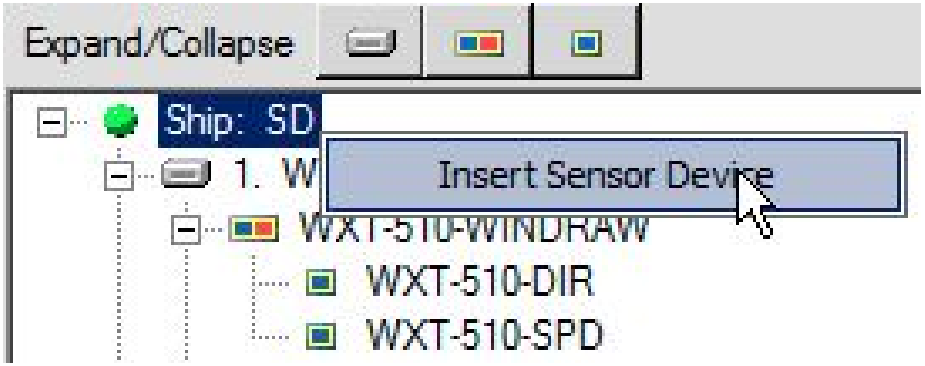
- From the main SCS Menu, select: *Acquisition → Data Acquisition → Sensor Config Edit (Database)*

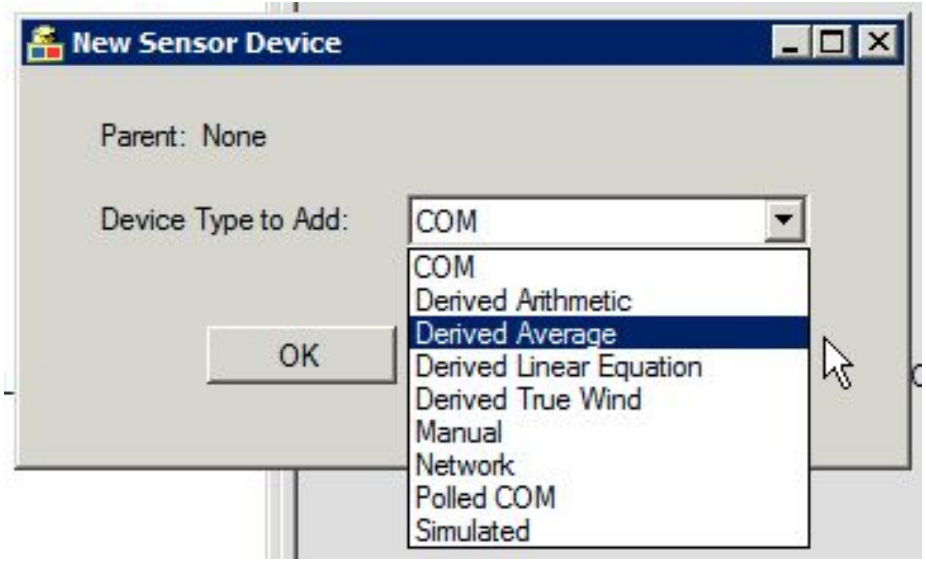
- Right-click the ship name and click *Insert Sensor Device (right)*



Setting up Sensor Configuration File (Steps):

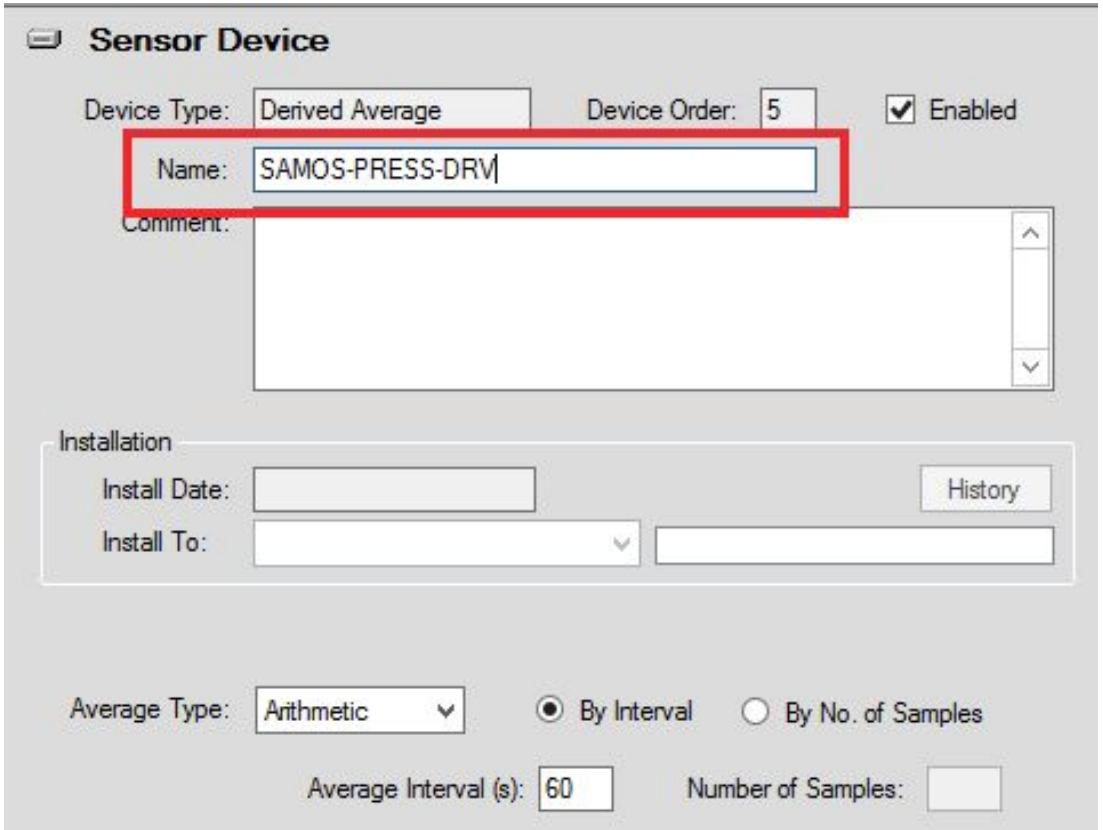
- From the main SCS Menu, select: *Acquisition → Data Acquisition → Sensor Config Edit (Database)*
- Right-click the ship name and click *Insert Sensor Device (right)*
- Pick the appropriate *Derived* device type (*Derived Average* in this case)





Setting up Sensor Configuration File (Steps):

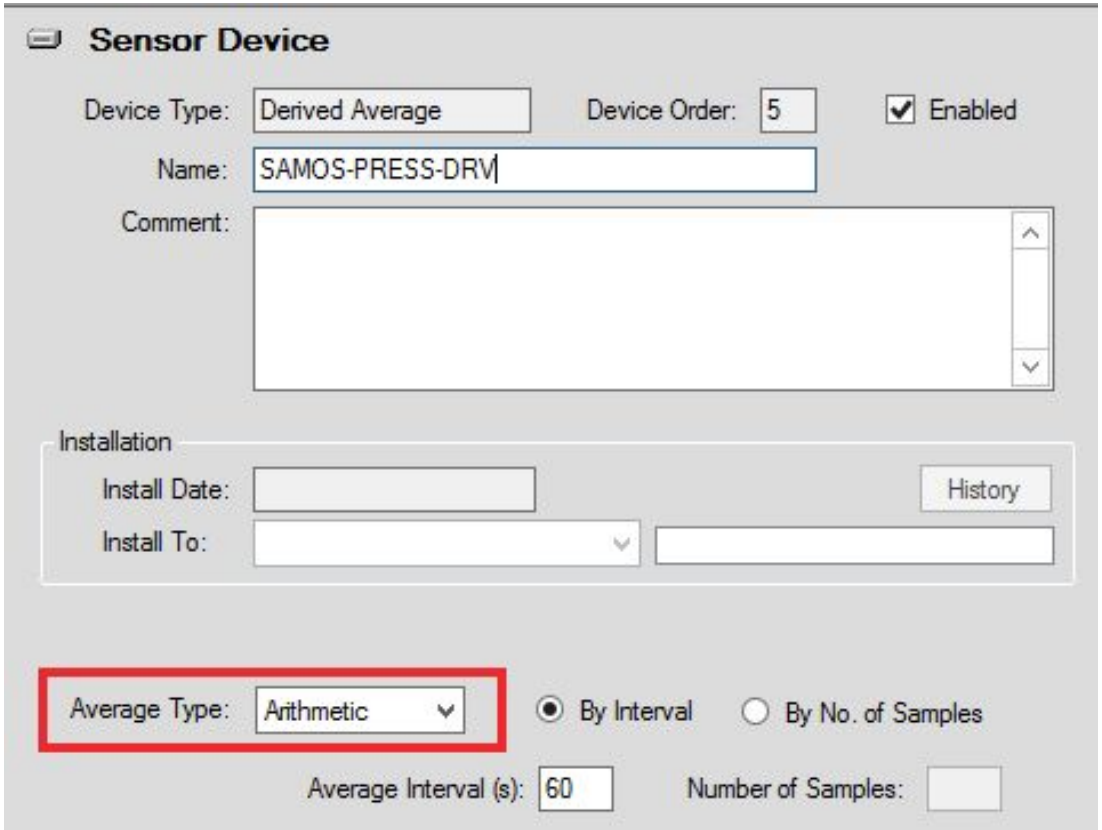
- Give the sensor device a name, remembering to start with SAMOS- *(right)*



Setting up Sensor Configuration File (Steps):

- Give the sensor device a name, remembering to start with SAMOS- *(right)*

- Select the Average Type *(right)*
  - Polar - Used for sensors whose output is in the range of 0 to 360, such as gyros and COG, and Wind Direction
  - Arithmetic - Used for all other sensors

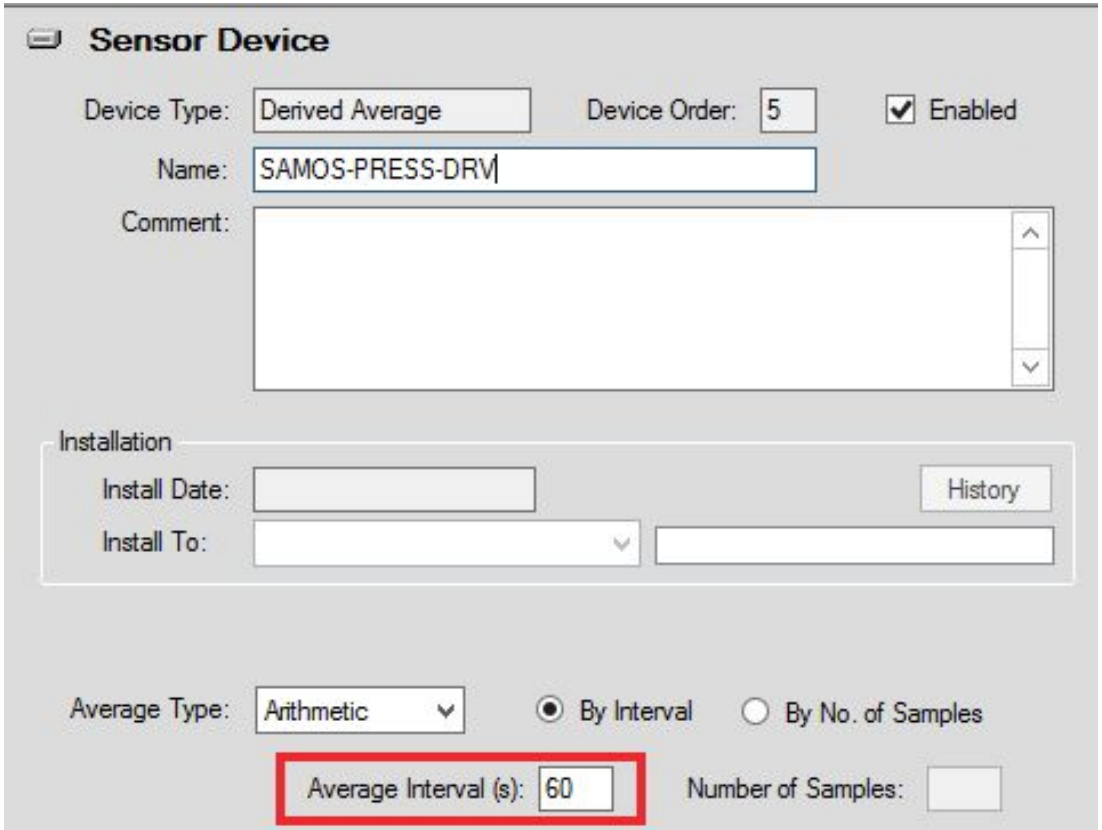


Setting up Sensor Configuration File (Steps):

- Give the sensor device a name, remembering to start with SAMOS- *(right)*

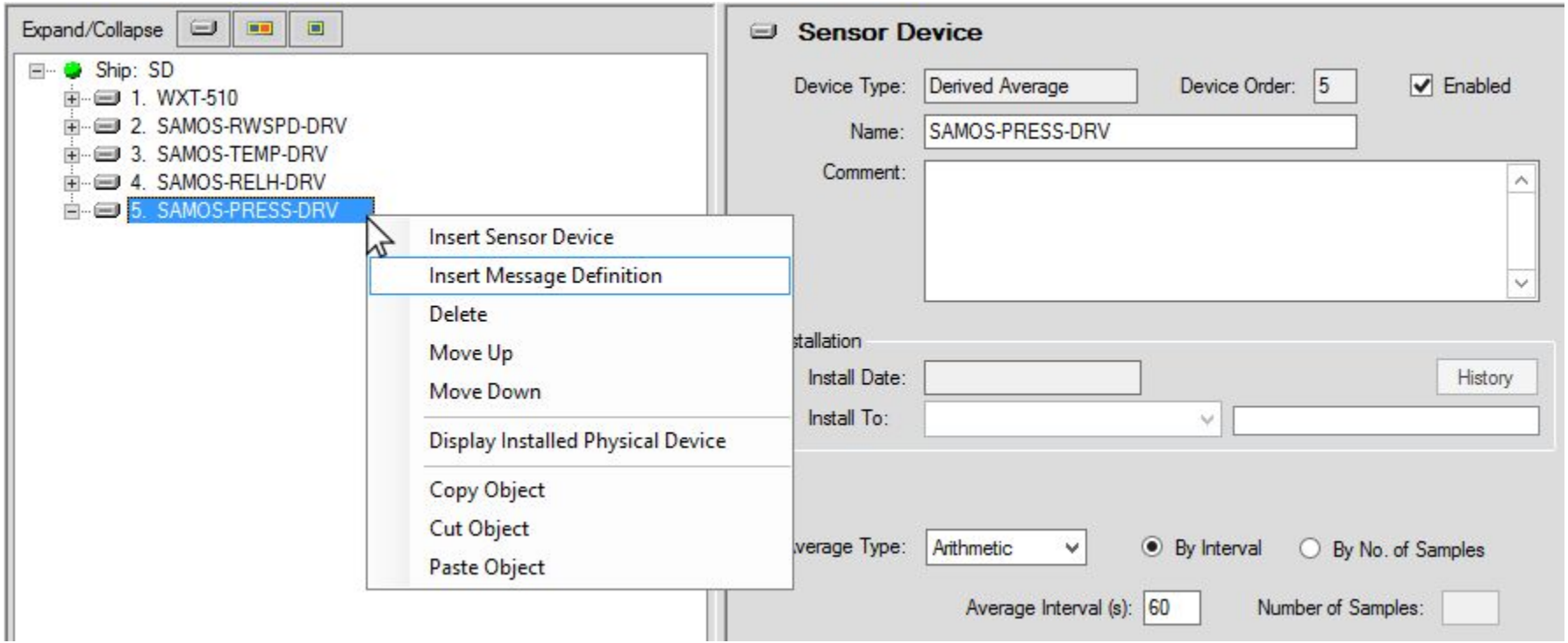
- Select the Average Type *(right)*
  - Polar - Used for sensors whose output is in the range of 0 to 360, such as gyros and COG, and Wind Direction
  - Arithmetic - Used for all other sensors

- Fill in the Average Interval(s) (in **seconds**) *(right)*



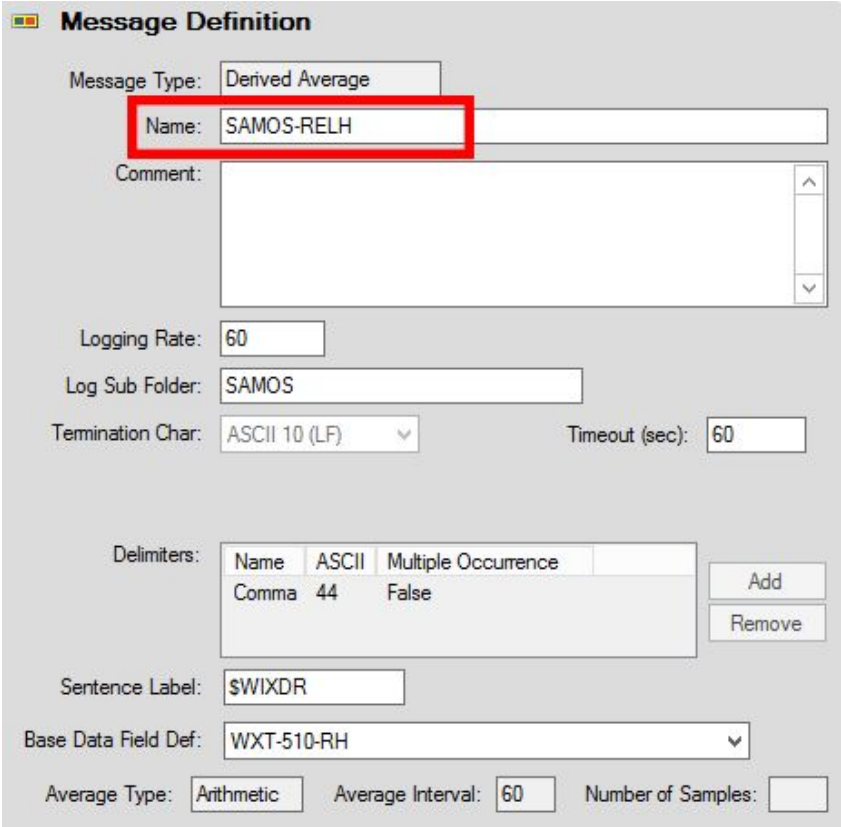
Setting up Sensor Configuration File (Steps):

- Right-click the new Sensor Device and select *Insert Message Definition* *(below)*



Setting up Sensor Configuration File (Steps):

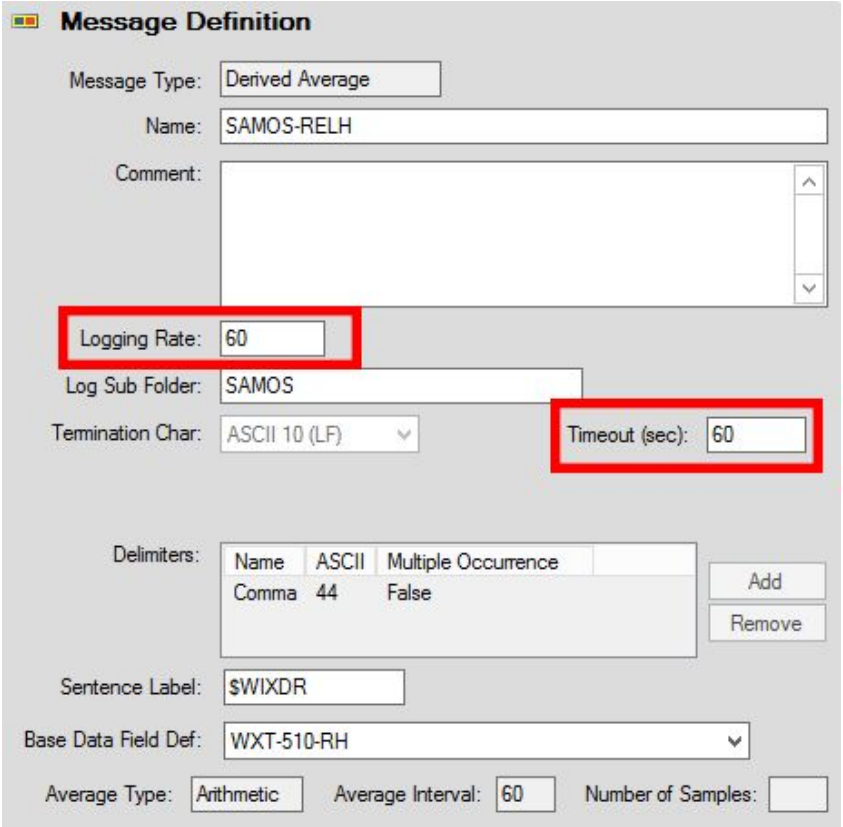
- Give the *Message Definition* a name, remembering to start with SAMOS-



Setting up Sensor Configuration File (Steps):

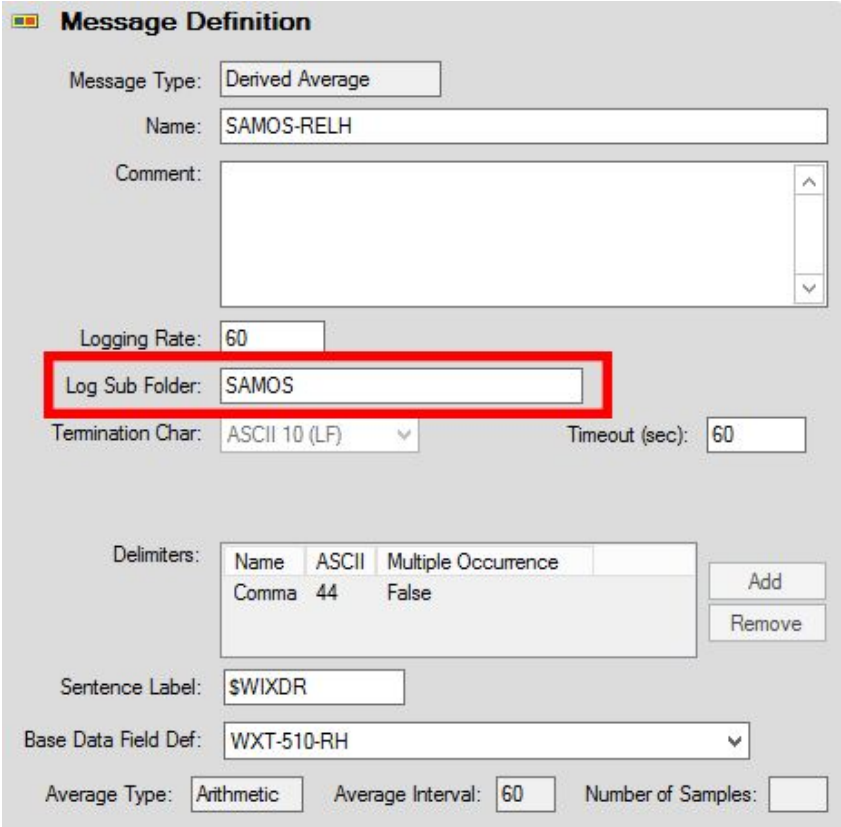
- Give the *Message Definition* a name, remembering to start with SAMOS-

- Set the *Logging Rate* and *Timeout* to 60 (sec)



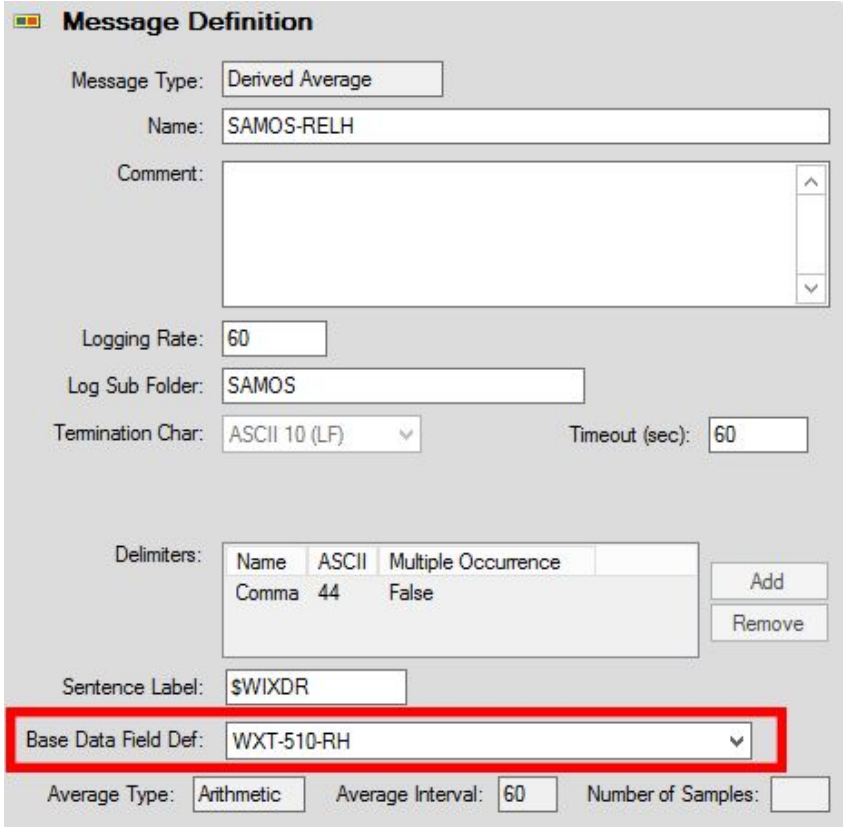
Setting up Sensor Configuration File (Steps):

- Give the *Message Definition* a name, remembering to start with SAMOS-
- Set the *Logging Rate* and *Timeout* to 60 (sec)
- Set the *Log Sub Folder* to SAMOS



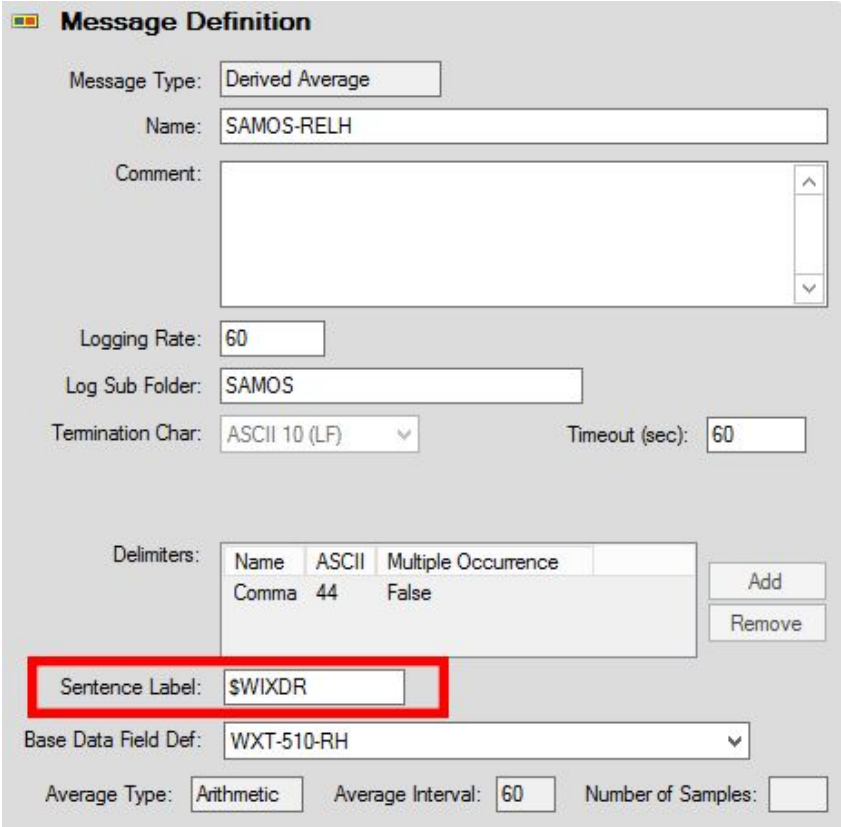
Setting up Sensor Configuration File (Steps):

- Give the *Message Definition* a name, remembering to start with SAMOS-
- Set the *Logging Rate* and *Timeout* to 60 (sec)
- Set the *Log Sub Folder* to SAMOS
- Select the *Base Data Field Def* that you are pulling your derived value from



Setting up Sensor Configuration File (Steps):

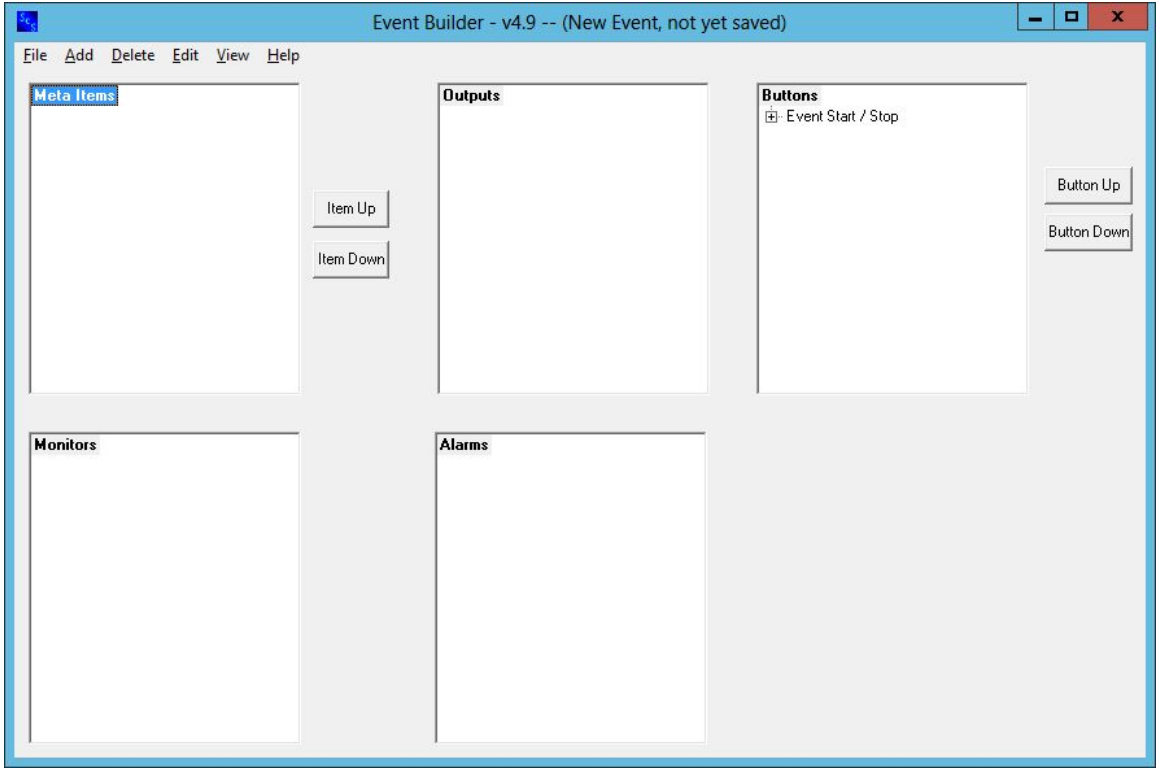
- Give the *Message Definition* a name, remembering to start with SAMOS-
- Set the *Logging Rate* and *Timeout* to 60 (sec)
- Set the *Log Sub Folder* to SAMOS
- Select the *Base Data Field Def* that you are pulling your derived value from
- Use the same *Sentence Label* as the base field



Questions about Sensor Config?

Setting up SAMOS Event Template File:

- From the main SCS Menu, select:
  Acquisition → Events →
  Event Builder Classic



See: Page 121-132, Section 4.3, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- From the main SCS Menu, select:
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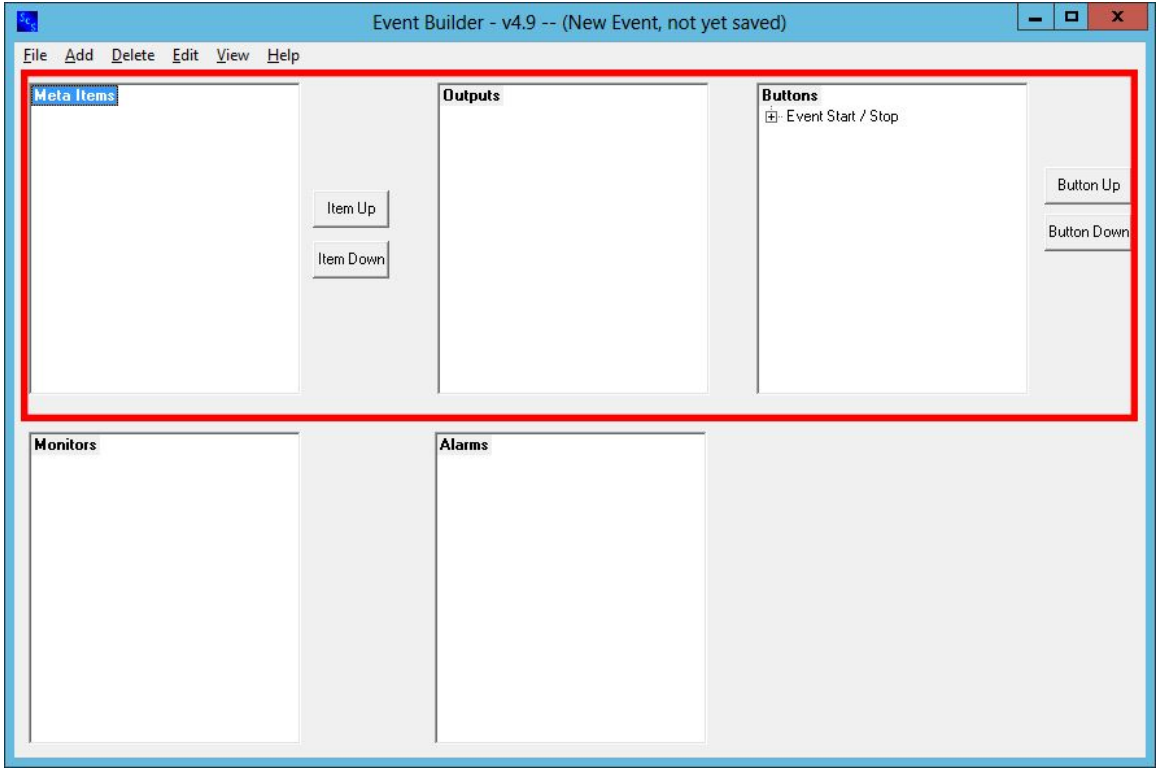
- For the SAMOS Event, we are mainly concerned with the three boxes on the top of the window, *Meta Items*, *Outputs*, & *Buttons*



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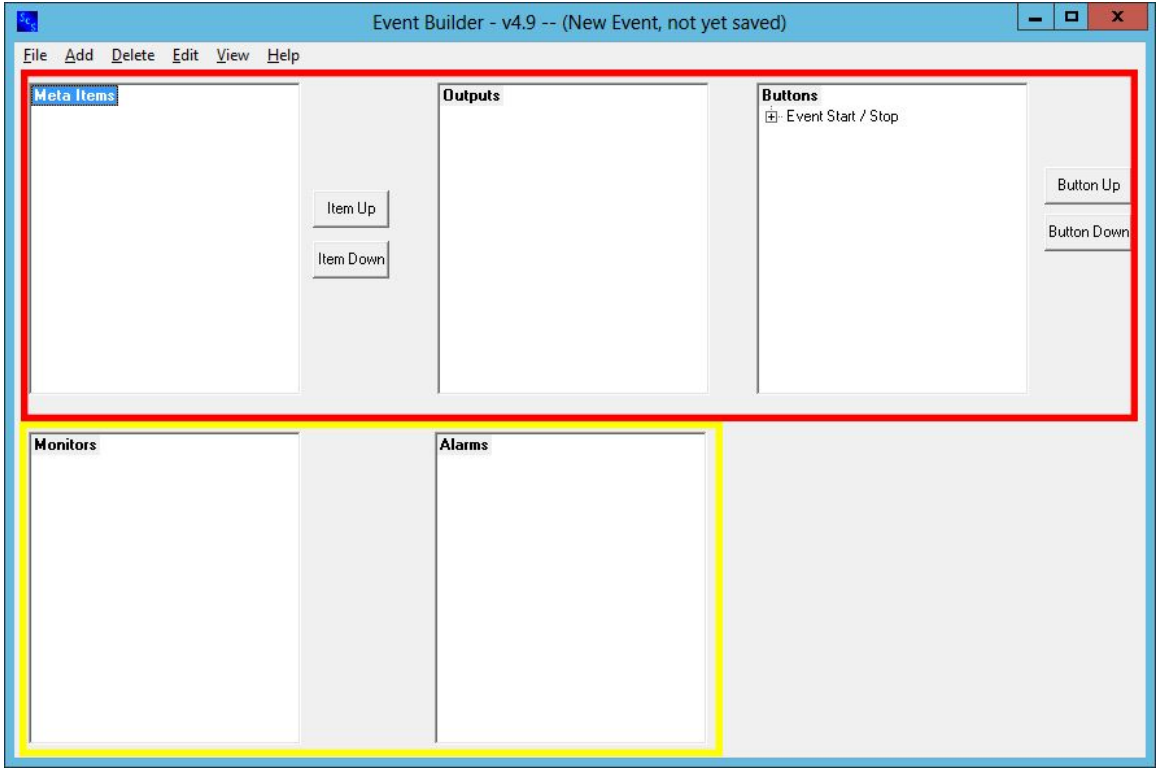
- From the main SCS Menu, select: *Acquisition → Events → Event Builder Classic*

- For the SAMOS Event, we are mainly concerned with the three boxes on the top of the window, *Meta Items*, *Outputs*, & *Buttons*

- You can set *Monitors* and *Alarms* to warn you of things going on if you want, but they are not needed



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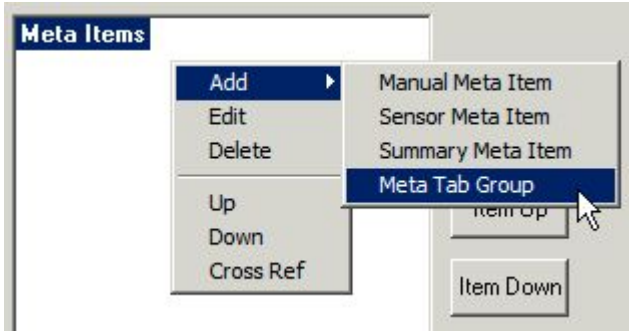
Setting up SAMOS Event Template File:

- *Meta Items*
  - Right-click *Meta Items*, then *Add* → *Meta Tab Group* *(right, top)*



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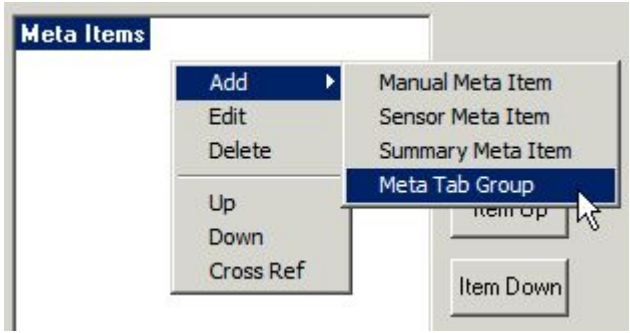
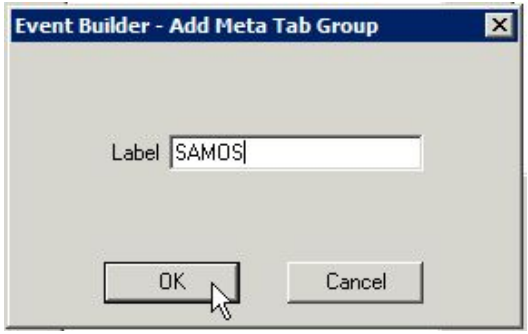
Setting up SAMOS Event Template File:

- *Meta Items*
  - Right-click *Meta Items*, then *Add → Meta Tab Group* *(right, top)*
  - Label the *Meta Tab Group* *(right, bottom)*

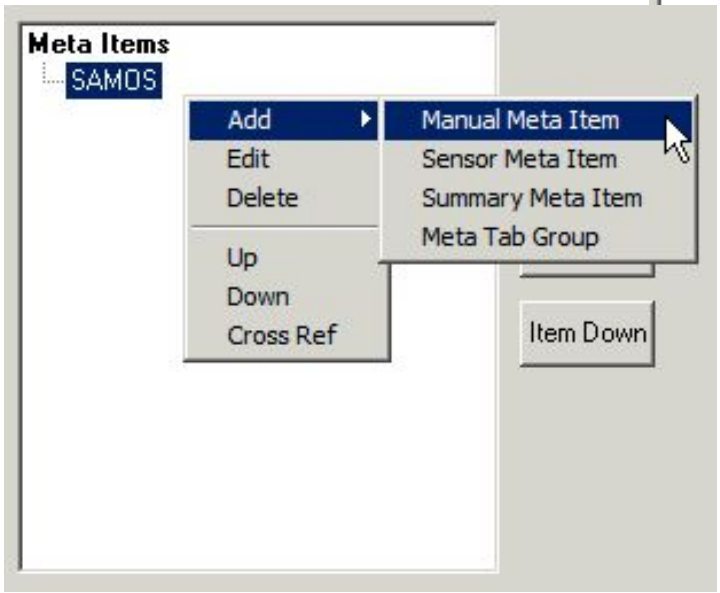


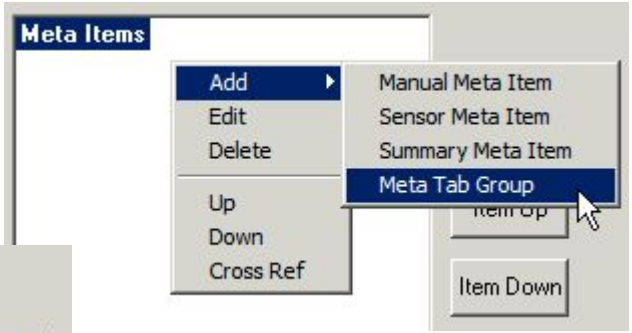


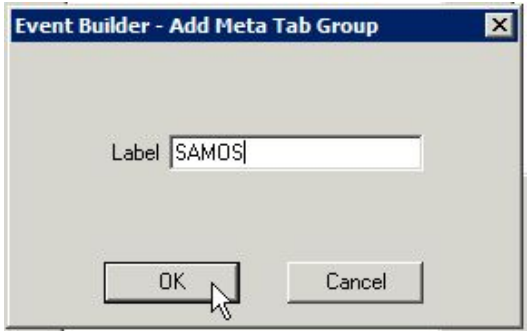
See: Page 121-132, Section 4.3, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- *Meta Items*
  - Right-click *Meta Items*, then *Add → Meta Tab Group* *(right, top)*
  - Label the *Meta Tab Group* *(right, bottom)*
  - To add your ship's call sign, right-click the *Meta Tab Group* and choose *Add → Manual Meta Item* *(center)*



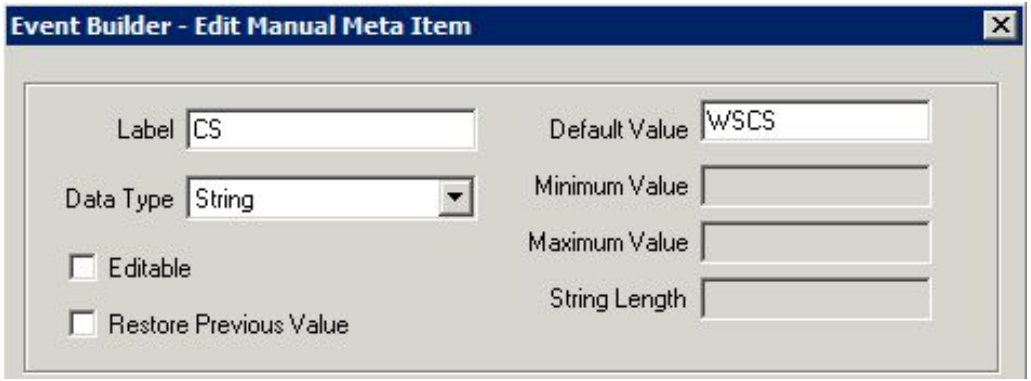




See: Page 121-132, Section 4.3, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- On the *Manual Meta Item* pop-up, enter: *(below)*
  - "CS" (call sign) for the *Label*
  - *String* for the *Data Type*
  - Your ship's call sign for the *Default Value*



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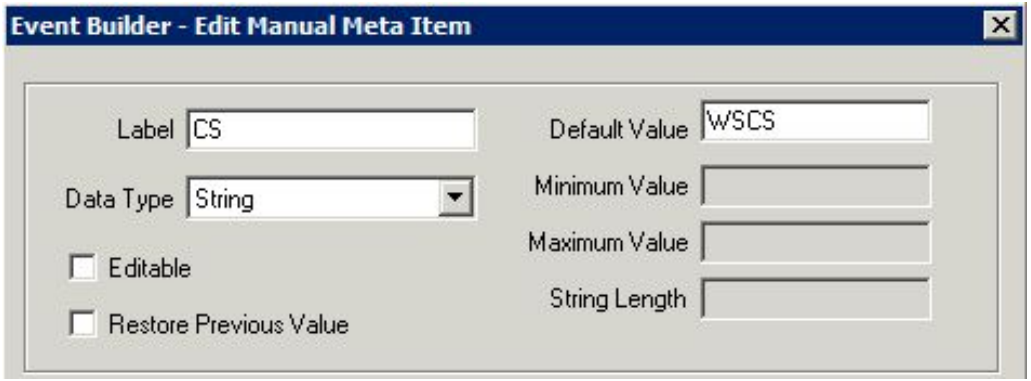
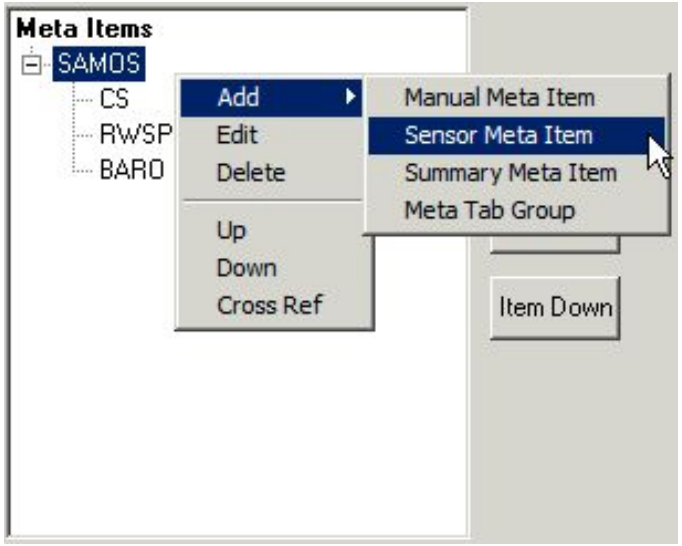




- Next, you will add your SAMOS derived sensors
  - Right-click the Meta Tab Group and select *Add → Sensor Meta Item* *(right)*

See: Page 121-132, Section 4.3, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- Select one of the SAMOS derived sensors from the list *(right)*

- Repeat the process until all SAMOS derived sensors have been added to the *Meta Items* section

See: Page 330, Section 12.2, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- For the *Label*, refer to page 330 of the v4.9 SCS User's Guide for the full suggested designator list *(right)*

- **The designators in the manual are not a Full list and are just suggestions.**

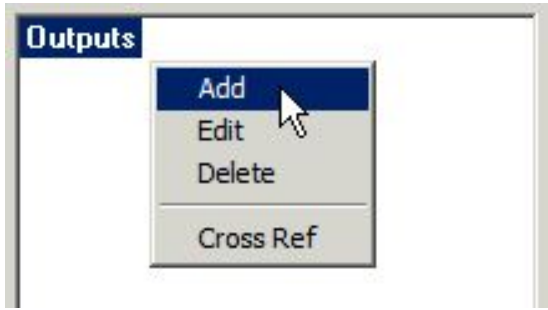
- As long as the designator is known by SAMOS, it can be used in the event and process by SAMOS software.

Designators	Data Type
CS	Ship's Call Sign
LAT	Latitude
LON	Longitude
GYRO	Ship Heading
SOG	Speed Over Ground
COG	Course Over Ground
ATEMP	Air Temperature
BARO	Barometric Pressure
RELH	Relative Humidity
RWSPD	Relative Wind Speed
RWDIR	Relative Wind Direction

See: Page 330, Section 12.2, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

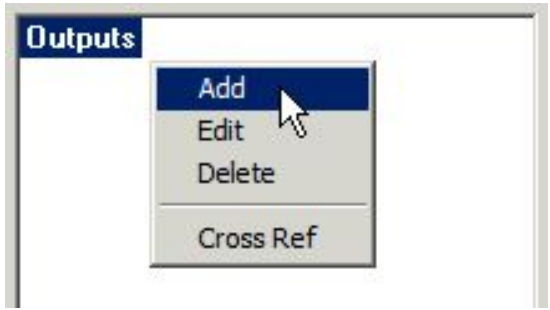
- Right-click on the *Outputs* heading and click *Add* *(right, top)*

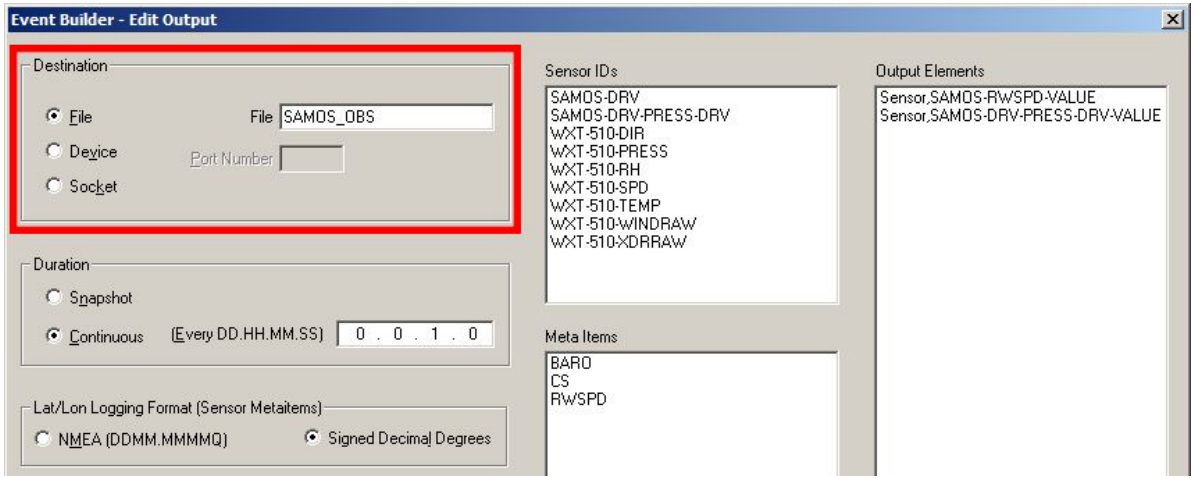


See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- Right-click on the *Outputs* heading and click *Add* *(right, top)*
- You must define a continuous output as follows: *(right, bottom)*
  - *Destination/File* is SAMOS_OBS





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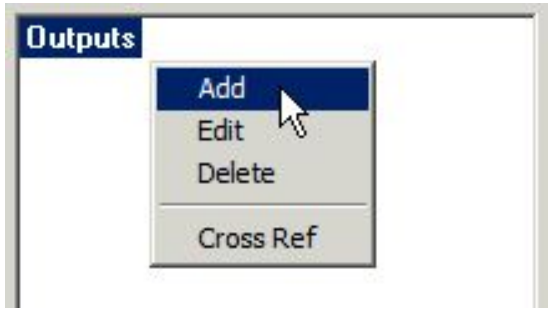
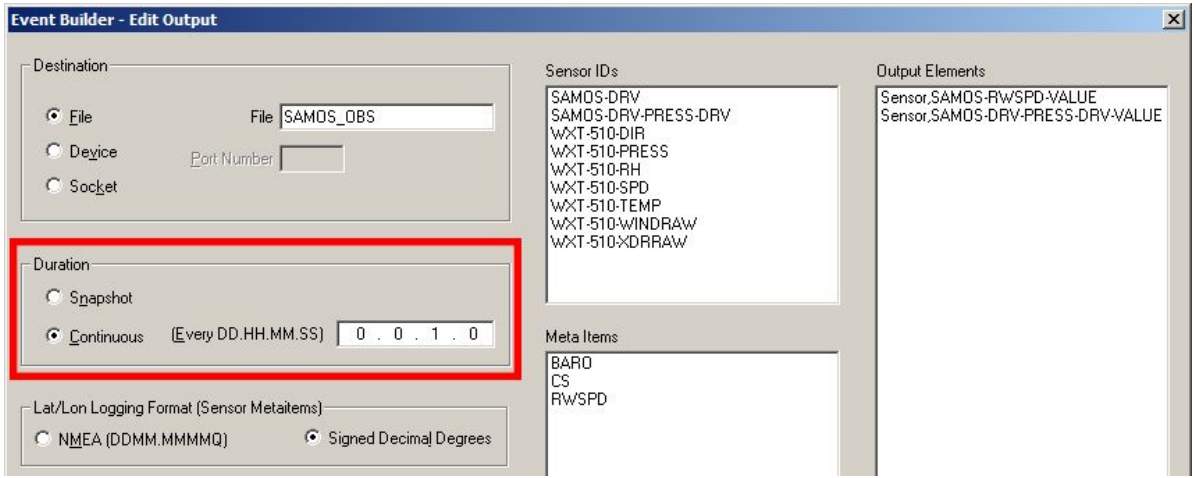
Setting up SAMOS Event Template File:

- Right-click on the *Outputs* heading and click *Add* *(right, top)*

- You must define a continuous output as follows: *(right, bottom)*
  - *Destination/File* is SAMOS_OBS
  - *Duration* type is continuous
    - DD (day) = 0
    - HH (hour) = 0
    - MM (minute) = 1
    - SS (second) = 0





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Setting up SAMOS Event Template File:

- Right-click on the *Outputs* heading and click *Add* *(right, top)*

- You must define a continuous output as follows: *(right, bottom)*
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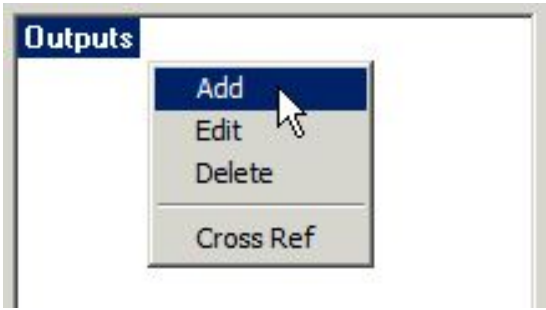
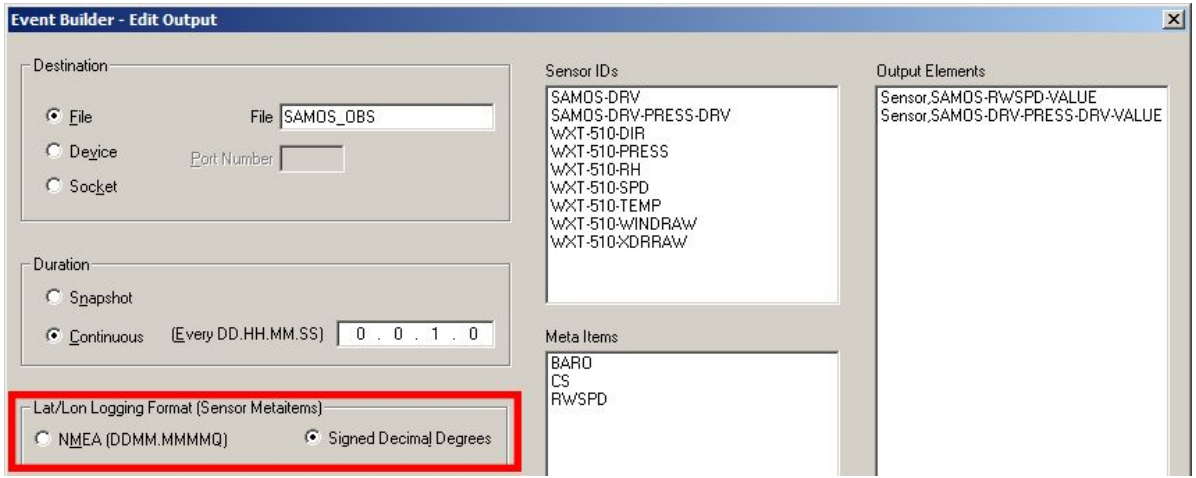
  - *Duration* type is continuous
    - DD (day) = 0
    - HH (hour) = 0
    - MM (minute) = 1
    - SS (second) = 0
  - For *Lat/Lon Logging Format* select the *Signed Decimal Degrees* radio button





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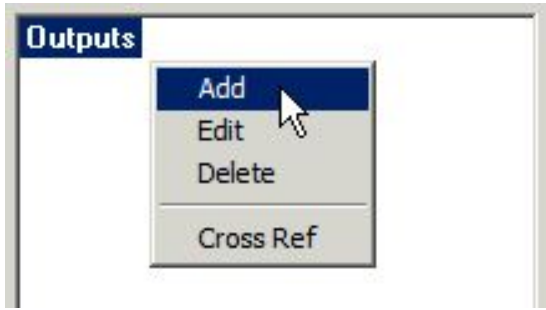
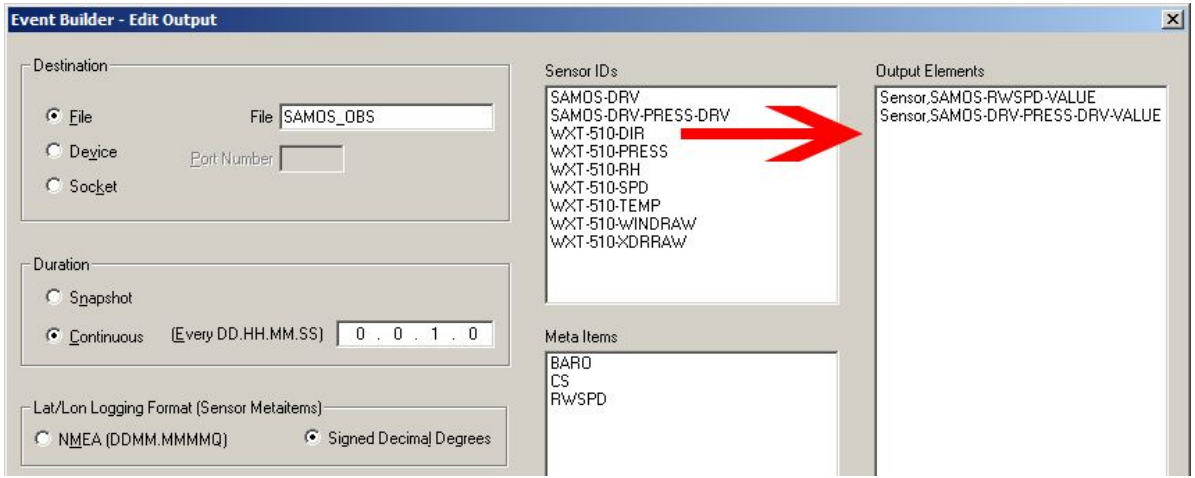
Setting up SAMOS Event Template File:

- Right-click on the *Outputs* heading and click *Add* *(right, top)*

- You must define a continuous output as follows: *(right, bottom)*
  - *Destination/File* is SAMOS_OBS
  - *Duration* type is continuous
    - DD (day) = 0
    - HH (hour) = 0
    - MM (minute) = 1
    - SS (second) = 0
  - For *Lat/Lon Logging Format* select the *Signed Decimal Degrees* radio button
  - The list of selected *Output Elements* should consist of all SAMOS derived average sensors from the *Sensor ID* window





See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

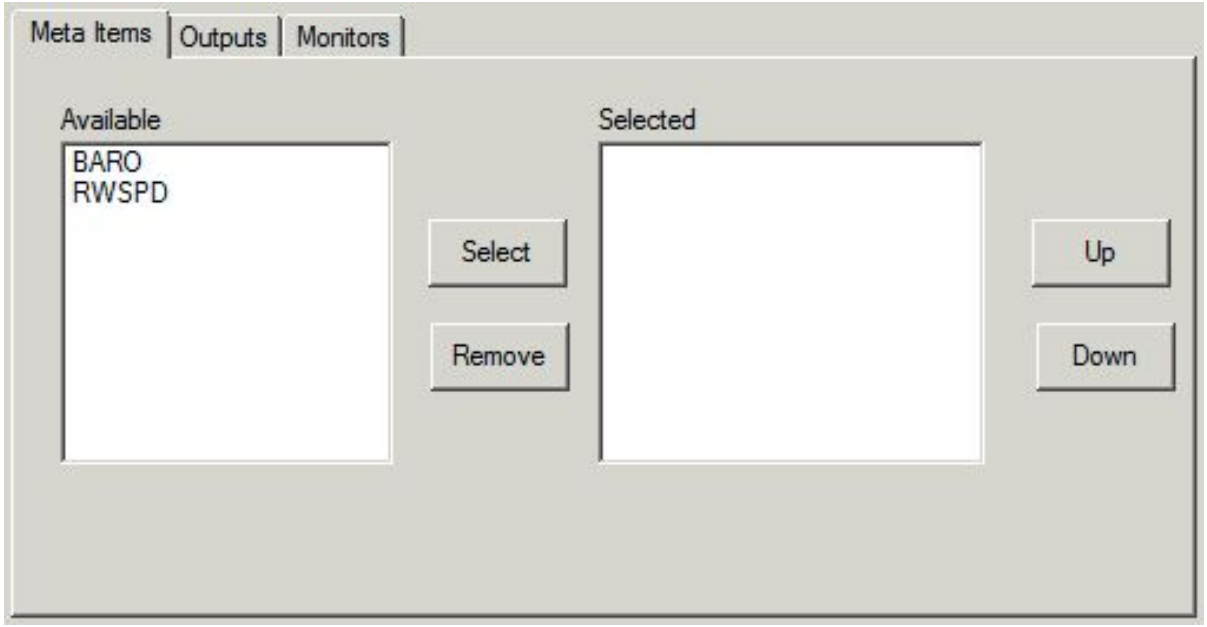
- Under the *Buttons* section, there should already be a *Button Group* labeled *Event Start / Stop* and a button for *Start Event* and *Stop Event*

See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- Under the *Buttons* section, there should already be a *Button Group* labeled *Event Start / Stop* and a button for *Start Event* and *Stop Event*

- Double-click the *Start Event* button
  - Under the *Meta Items* tab, add the SAMOS Derived Meta Items created earlier *(below)*



See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

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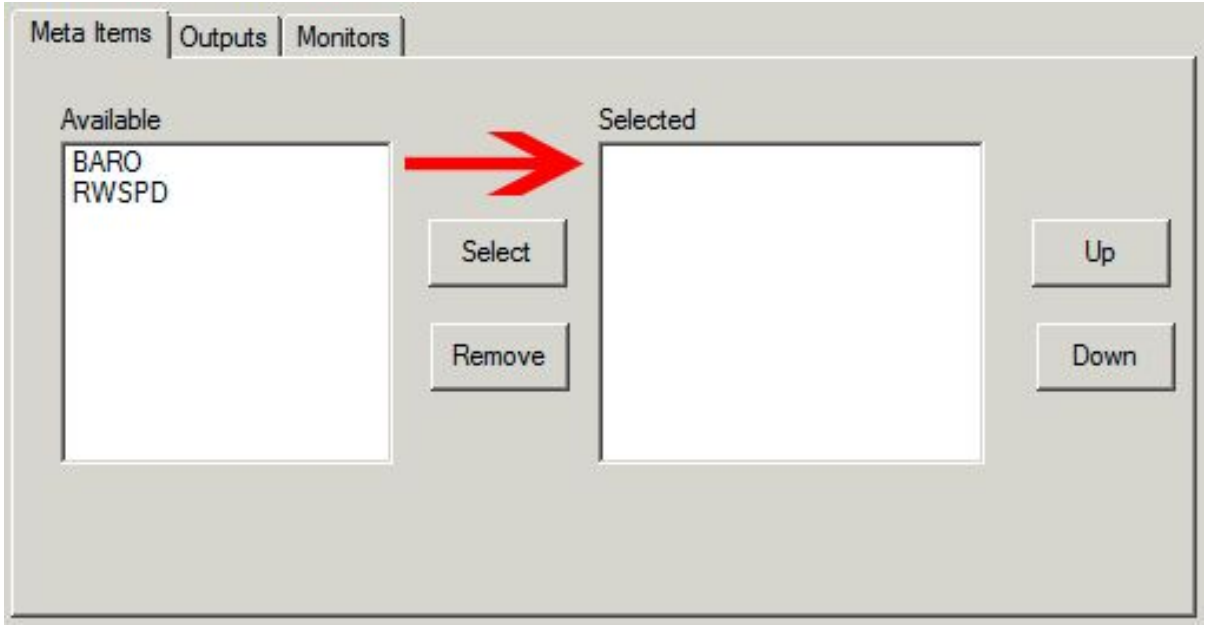

See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

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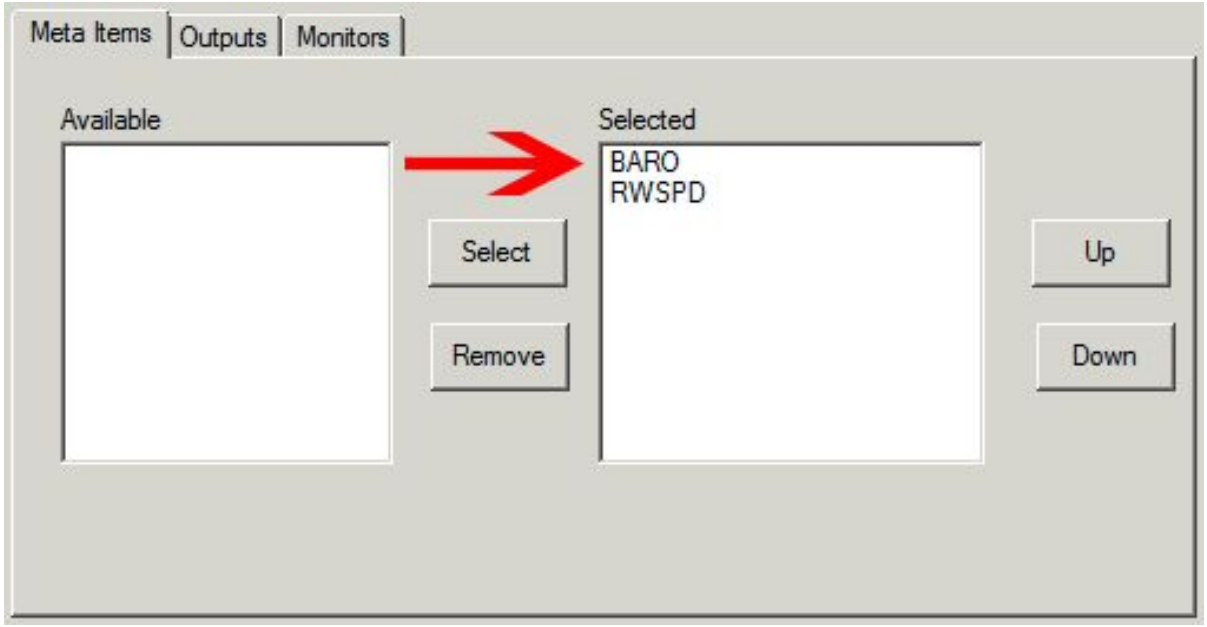
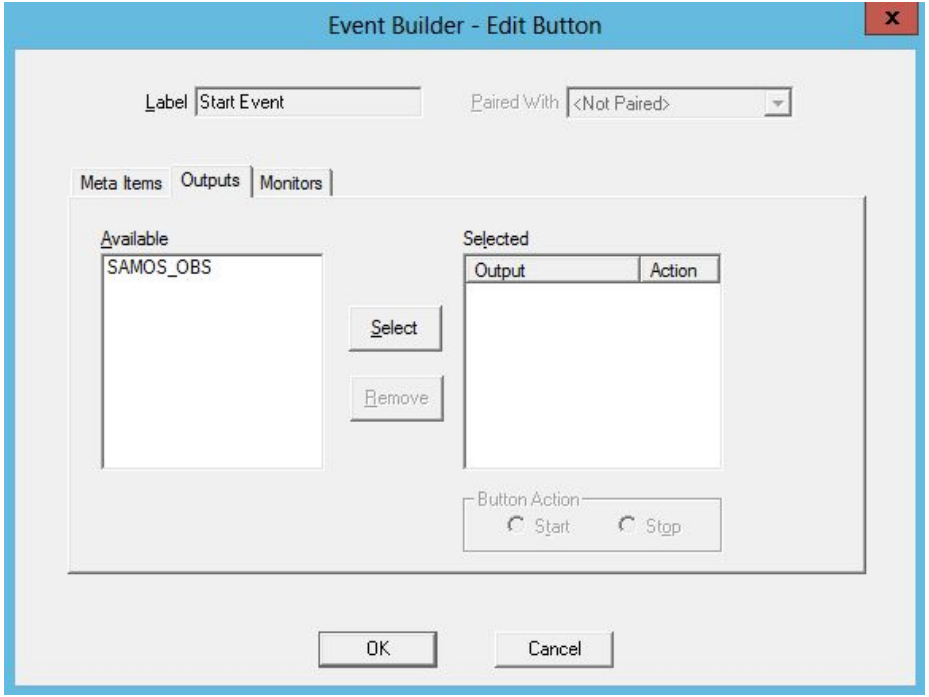


See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- Under the *Outputs* tab, add the *SAMOS_OBS* output created earlier
  - For the *Button Action*, select the *Start* radio button



See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

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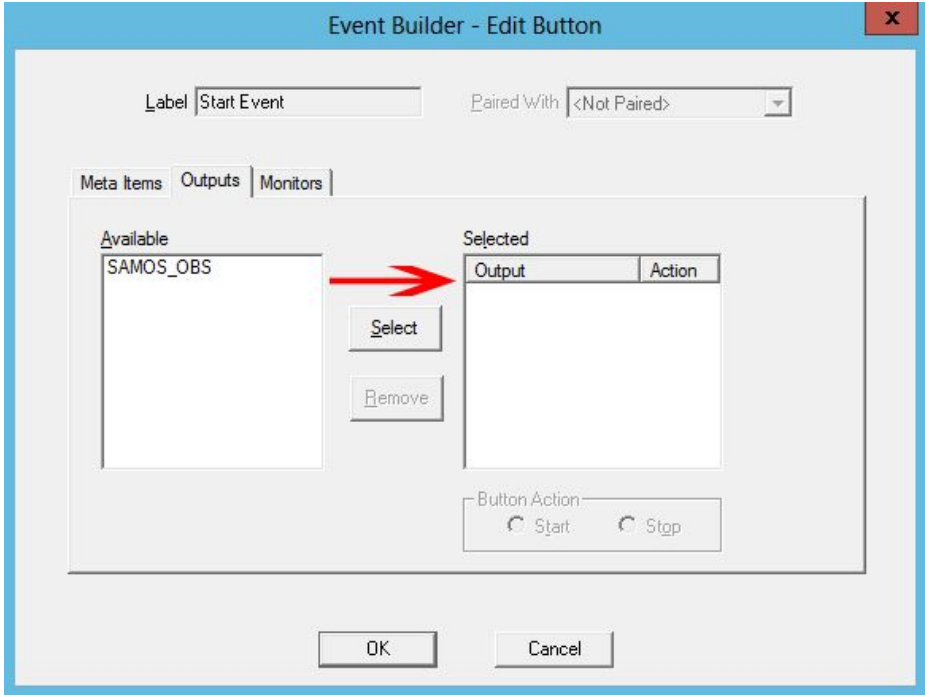

See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

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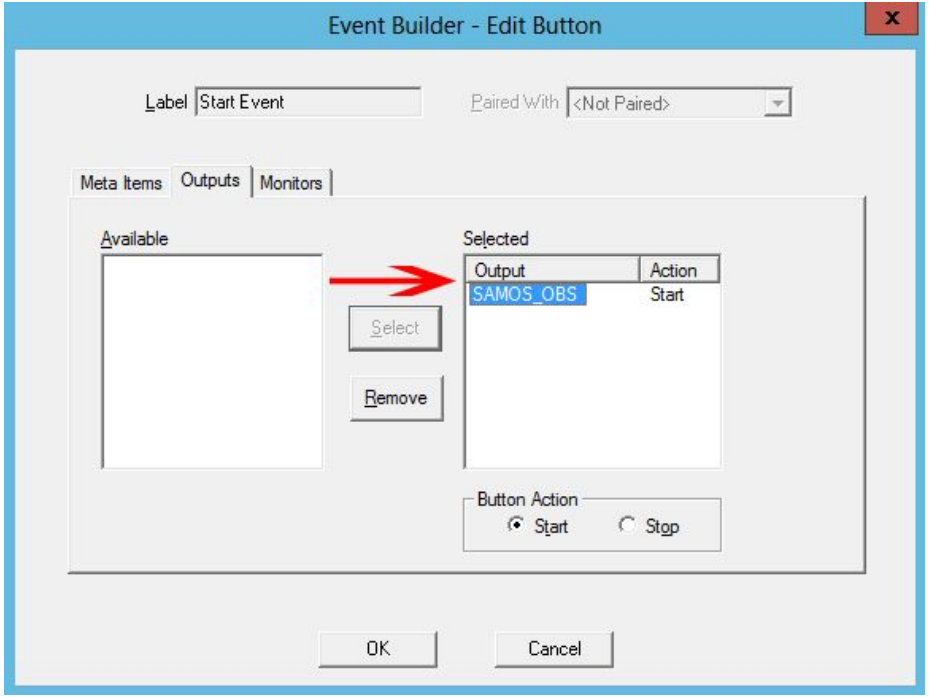
  - For the *Button Action*, select the *Start* radio button

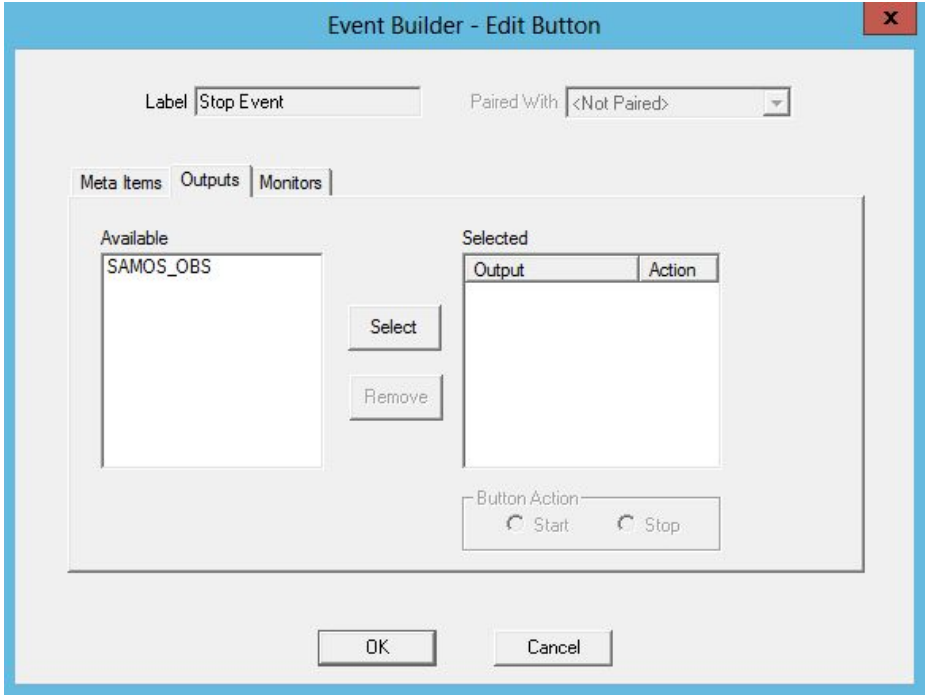


See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- Under the *Outputs* tab, add the *SAMOS_OBS* output created earlier
  - For the *Button Action*, select the *Start* radio button

- Double-click the *Stop Event* button
  - Follow the same steps above, adding the previously created SAMOS Derived Meta Items under the *Meta Items* tab
  - Under the *Outputs* tab, add the *SAMOS_OBS* output and select *Stop* for *Button Action*



See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

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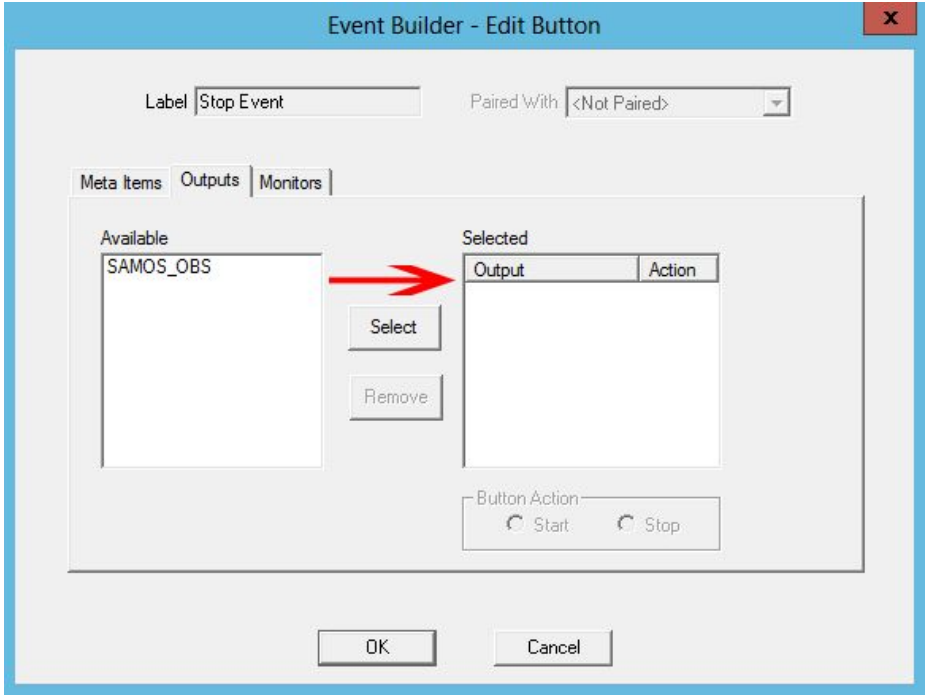

See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

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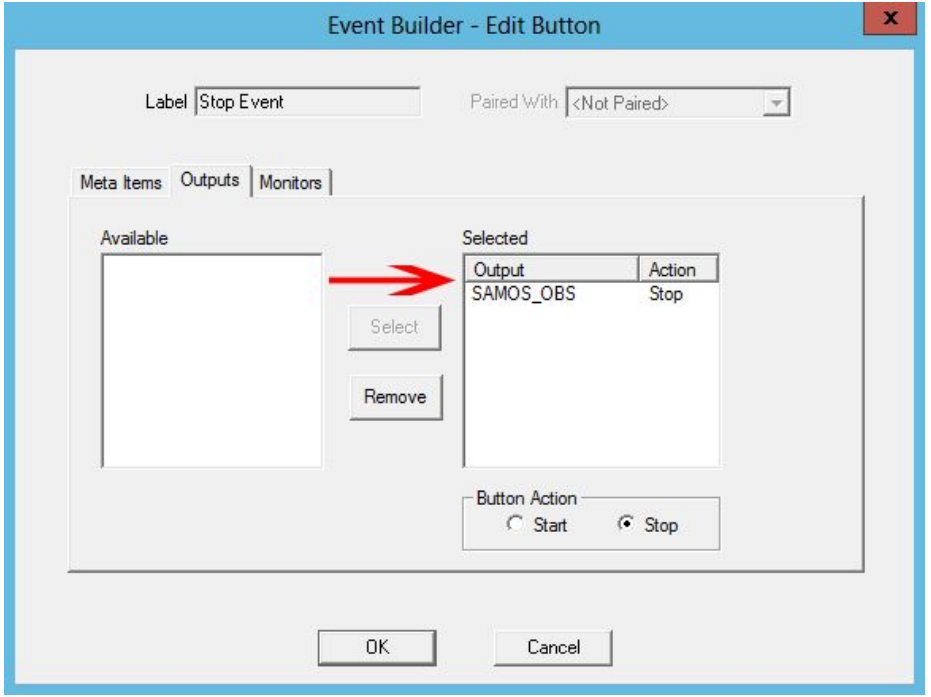


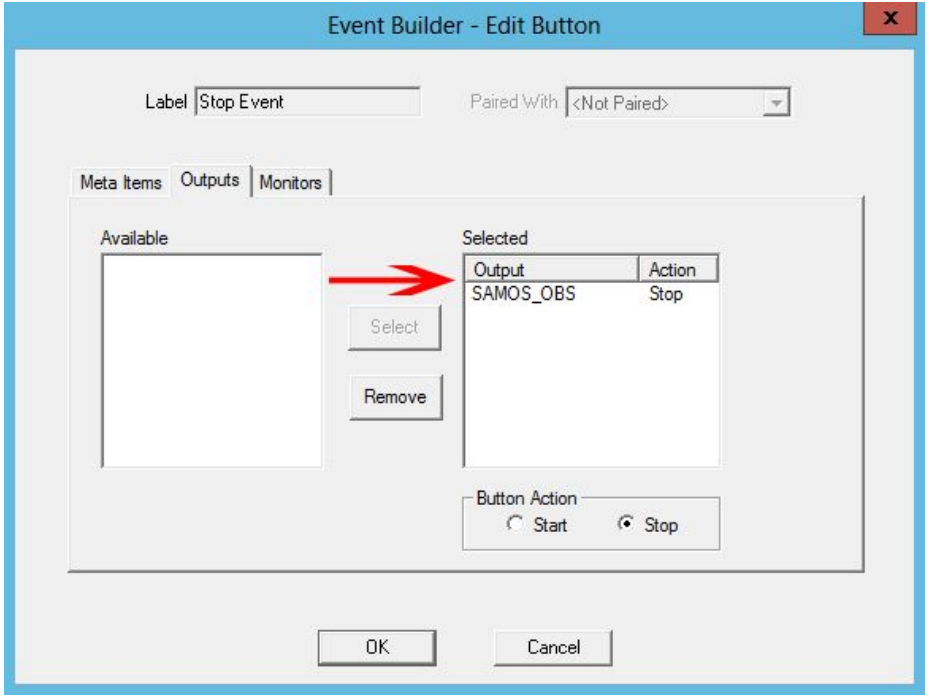
See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Template File:

- Under the *Outputs* tab, add the *SAMOS_OBS* output created earlier
  - For the *Button Action*, select the *Start* radio button

- Double-click the *Stop Event* button
  - Follow the same steps above, adding the previously created SAMOS Derived Meta Items under the *Meta Items* tab
  - Under the *Outputs* tab, add the *SAMOS_OBS* output and select *Stop* for *Button Action*

- Make sure to save the *Event Template* as SAMOS.tpl



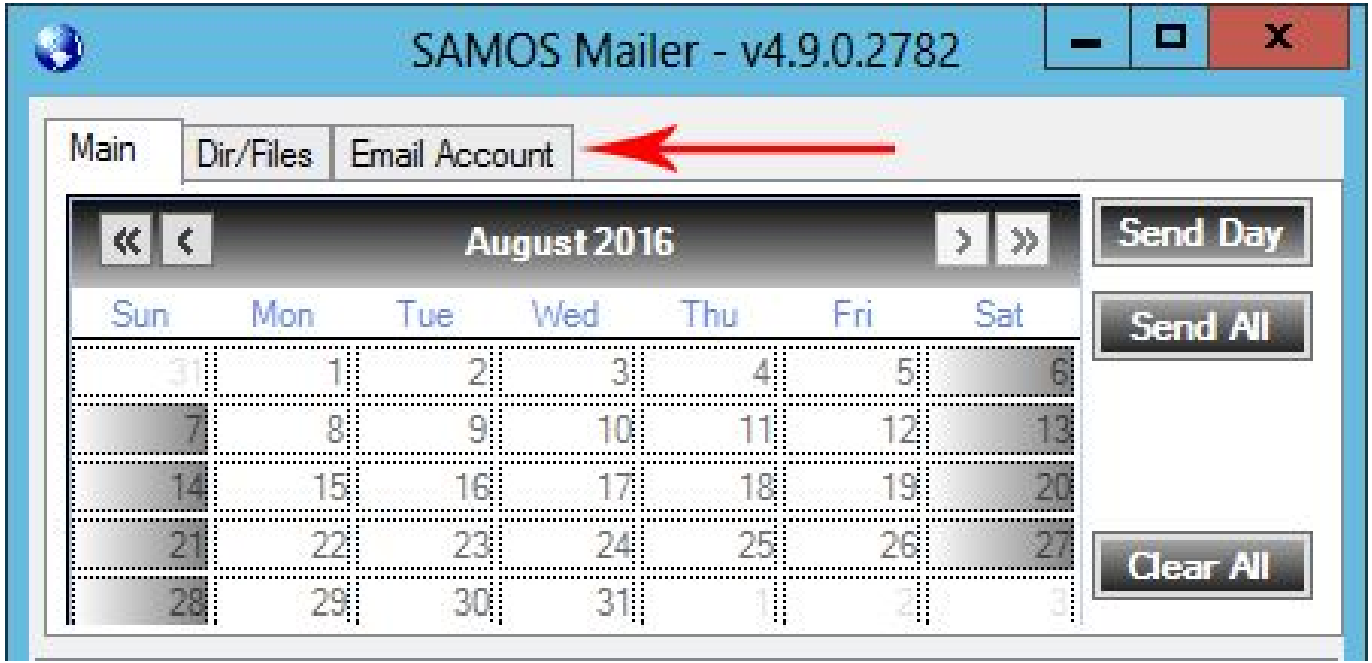
See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Questions about Event Template?

Setting up SAMOS Mailer Configuration Values:

The following values required to send email are entered on the Email Account tab

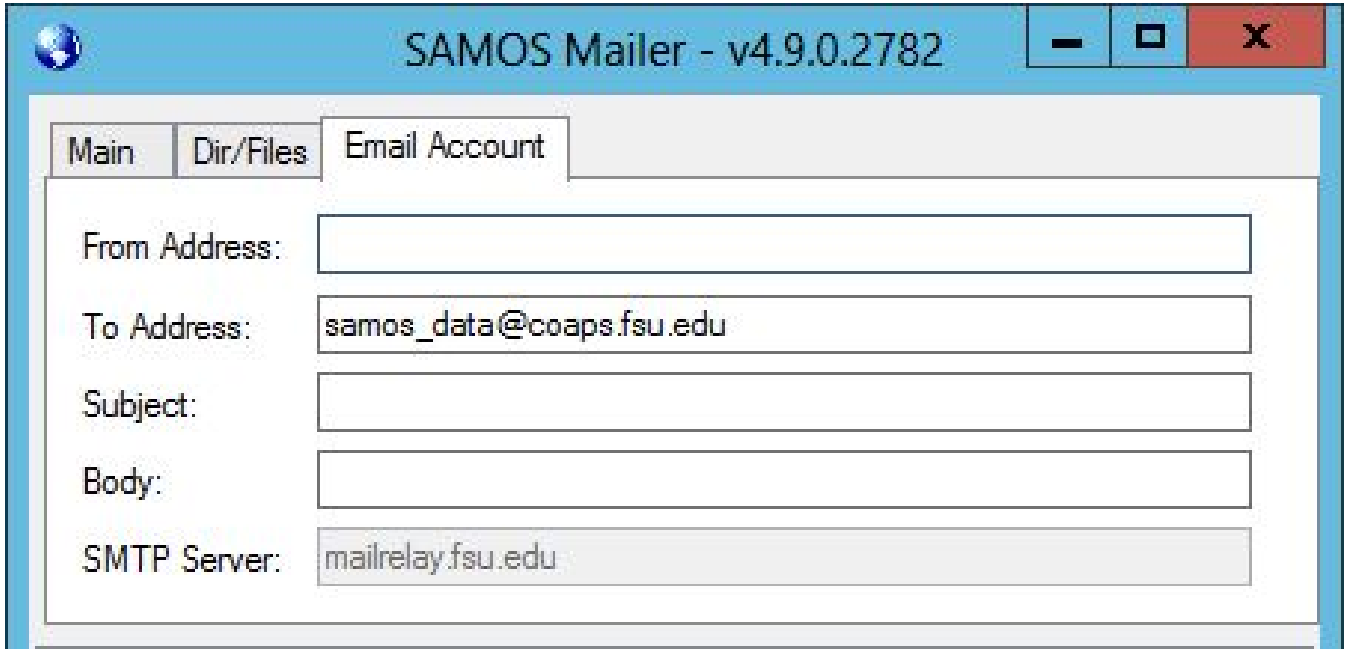
From the main SCS Menu, select *Utilities* → *SAMOS Mailer* then select the *Email Account* tab *(below)*



See: Page 278, Section 9.4.7.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Mailer Configuration Values:

From Address (your ship's outbound email)
To Address (samos_data@coaps.fsu.edu)
Subject (preferably include call sign and date)
Body (preferably blank)
SMTP Server (filled from SCS Configuration File)



See: Page 278, Section 9.4.7.4, SCS User's Guide (v4.9) for more info

Questions about SAMOS Mailer setup?

Running the SAMOS Event:

- **ACQ must be running in order for SAMOS Event to collect data**

See: Page 276, Section 9.4.5, SCS User's Guide (v4.9) for more info

Running the SAMOS Event:

- **ACQ must be running in order for SAMOS Event to collect data**

- From the main SCS Menu, select:
  Acquisition → Events → Event Logger Classic

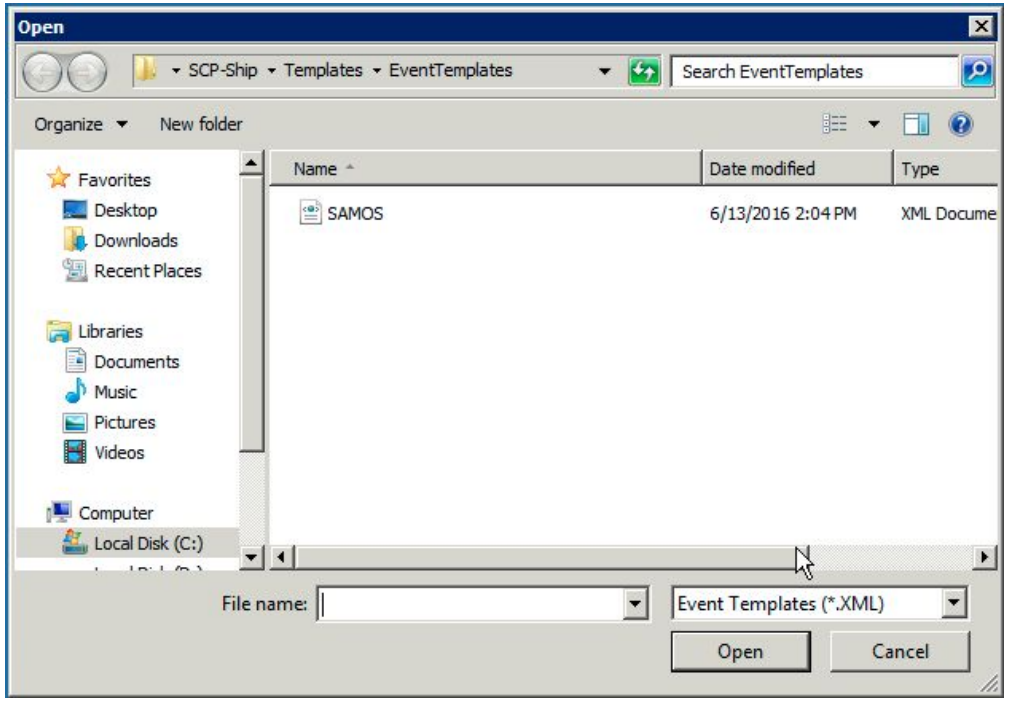
See: Page 276, Section 9.4.5, SCS User's Guide (v4.9) for more info

Running the SAMOS Event:

- **ACQ must be running in order for SAMOS Event to collect data**

- From the main SCS Menu, select:
  Acquisition → Events → Event Logger Classic

- The Open dialog box should open in the right Location. If not, navigate to:
  {Drive}:\SCSServer{version}\SHIP40\
  {Ship-Name}\Templates\EventTemplates



See: Page 276, Section 9.4.5, SCS User's Guide (v4.9) for more info

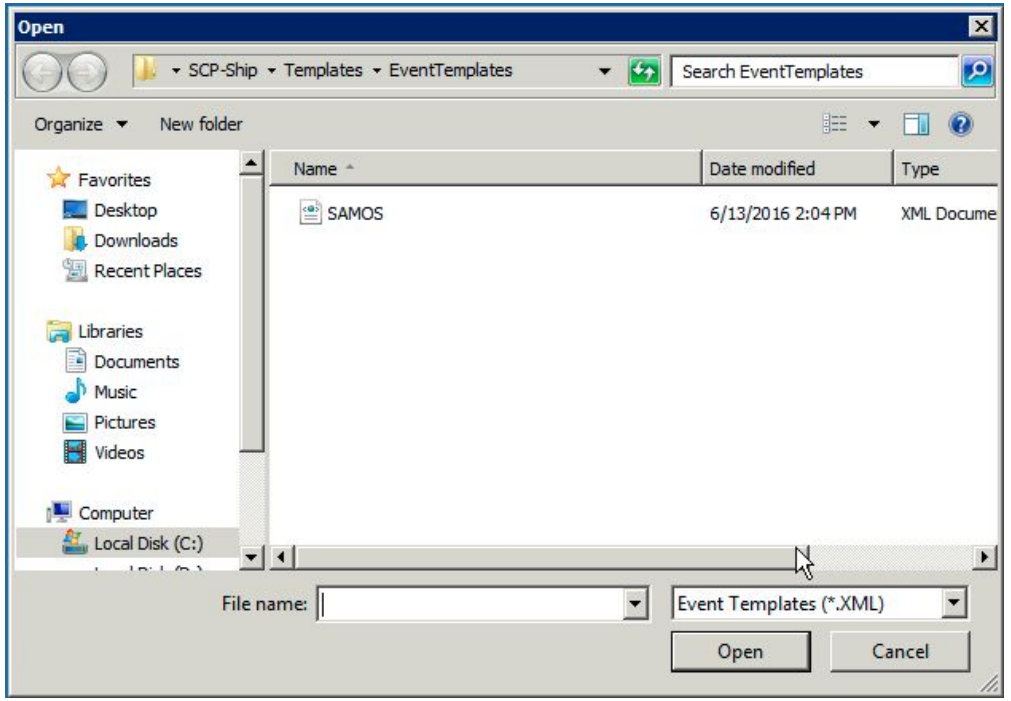
Running the SAMOS Event:

- **ACQ must be running in order for SAMOS Event to collect data**

- From the main SCS Menu, select:
  Acquisition → Events → Event Logger Classic

- The Open dialog box should open in the right Location. If not, navigate to:
  {Drive}:\SCSServer{version}\SHIP40\
  {Ship-Name}\Templates\EventTemplates

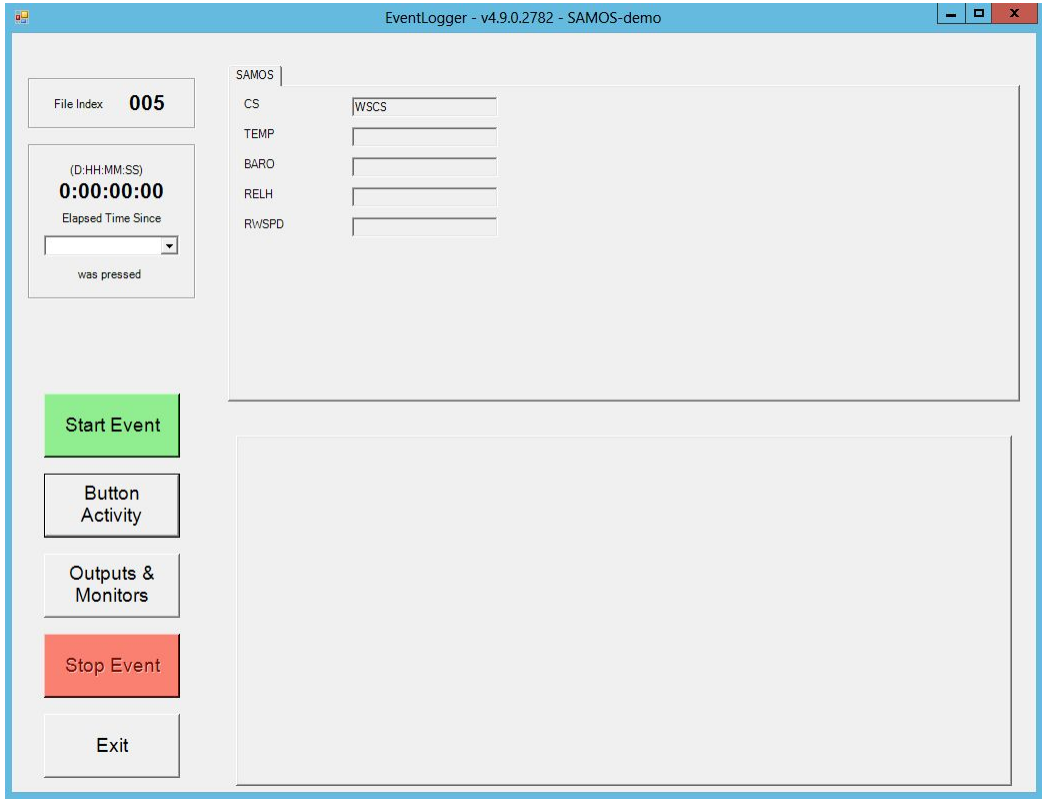
- Select the SAMOS.tpl *Event Template* and click *Open*



See: Page 276, Section 9.4.5, SCS User's Guide (v4.9) for more info

Running the SAMOS Event:

- On the left side of the *Event Logger*, click *Start Event* button to start the SAMOS Event.



NOTE: This SAMOS Event should stay running the entire time Data Acquisition is running, except in the case that the ship is doing classified research, or as otherwise instructed by Chief Officer.

See: Page 276, Section 9.4.5, SCS User's Guide (v4.9) for more info

Questions about running SAMOS Event?

Running the SAMOS Mailer:

- Once the SAMOS Event is running, from the main SCS Menu, select:
  Utilities → SAMOS Mailer

See: Page 276, Section 9.4.7.1, SCS User's Guide (v4.9) for more info

Running the SAMOS Mailer:

- Once the SAMOS Event is running, from the main SCS Menu, select:
  Utilities → SAMOS Mailer

- The calendar displays the current month with a red circle around the current day
  - All prior dates in which data was sent are set to green *(below)*
  - If a date was missed, it is marked red *(below)*

See: Page 276, Section 9.4.7.1, SCS User's Guide (v4.9) for more info

Running the SAMOS Mailer:

- Buttons
  - Send Day - sends data for the currently selected date on the calendar
  - Send All - sends ALL available data in [Event Data/SAMOS] to the designated email address. **Do not use this option if some of the data has already been sent. Only send the days that SAMOS has not received.**
  - Clear All - deletes/clears all data for the SAMOS event

See: Page 276, Section 9.4.7.1, SCS User's Guide (v4.9) for more info

Running the SAMOS Mailer:

- Status Icon/System Tray
    - Since the software should run continuously, the SAMOS Mailer resides mainly in the System Tray. If the globe is blue *(below)*, then all is well, however, if the globe is red *(below)*, then a problem was encountered within the last 24 hours.

See: Page 276, Section 9.4.7.1, SCS User's Guide (v4.9) for more info

Running the SAMOS Mailer:

- Problems/Bugs
  - There is a known problem with SCS 4.9.0 where if days are missed, the Send All and Send Day buttons will not work.
  - If they are not working, we have worked with SOI R/V FALKOR to develop a method that will help get your raw ELG data converted to $SAMOS data format and then to the SAMOS team until you can get your SCS software updated to the correct, fixed version (4.9.1).

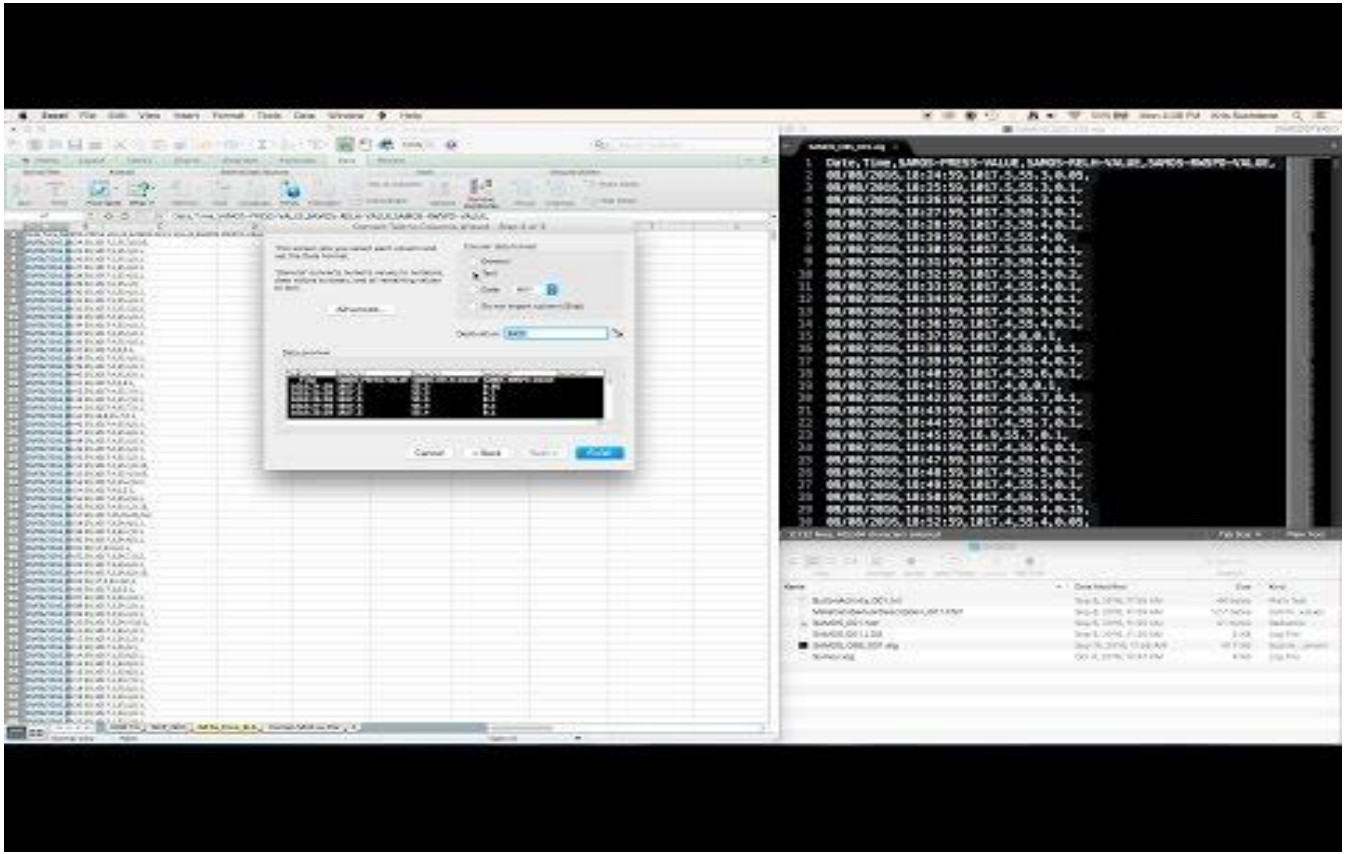
See: Page 276, Section 9.4.7.1, SCS User's Guide (v4.9) for more info

Questions about running SAMOS Mailer?

What if SAMOS Mailer is not working?

Transforming Raw ELG Data to SAMOS Format

https://docs.google.com/presentation/d/1P4P3RIEGkUYt5TcY8Ba-tWaLGRC8MqQ8T3X2R1h6hsU



Maintaining SAMOS Metadata:

Initial Vessel Setup requires name, call sign, date of recruitment, and the time format (one string w/YYYYMMDDhhmmss or 2 strings, YYYYMMDD and HMS). The designator(s) for time must be input upon initial vessel setup in DB.

Also file format (SAMOS001, JGOFS, etc…)

Finally, we need to know the email address the data will be sent from.

Vessel:	**Instrument:**
Name	Variable Name
Call Sign	Designator
Date of Recruitment	Original Units
Primary Contact Email	Date Metadata Valid - begin
Operating Institution	**Winds need direction convention met/oceanographic**
IMO#	**TS needs TS sensor type**
Institution Address	**RAD needs RAD direction upwelling or downwelling**
Contact Phone Number	**RWDIR needs 0 line reference**

* = Can get away without, but quite important
** = Can get away without, though leaves us to make assumptions. Best to have during setup.

Have Problems or Need Tech Questions Answered?

Issue Tracking System (ITS) for NOAA-SCS

noaa-scs@coaps.fsu.edu or https://groups.google.com/a/coaps.fsu.edu/forum/#!forum/noaa-scs

Problems or tech issues with the SAMOS portion of NOAA's SCS software can be reported/discussed with the internal Issue Tracking System. You can visit the link above directly to access the forum, or you can send an email to noaa-scs@coaps.fsu.edu to have the issue automatically posted to the ITS.

****Be sure to CC noaa-scs@coaps.fsu.edu on all replies to ensure that the questions/responses are being tracked.****

SAMOS Technical Staff

samos@coaps.fsu.edu

SAMOS technical staff can be reached directly at the email address above.

Final Questions?