How To: SAMOS in SCS

Jeremy Rolph, Shawn Smith, Kris Suchdeve
Florida State University

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

Overview:

- Setting up SCS Configuration File

- Setting up Sensor Configuration File

- Setting up SAMOS Event Logger Template File

- Setting up SAMOS Mailer Configuration Values

- Running the SAMOS Event Logger

- Running the SAMOS Mailer

- Maintaining SAMOS Metadata

- Transforming ELG Files into $SAMOS Format
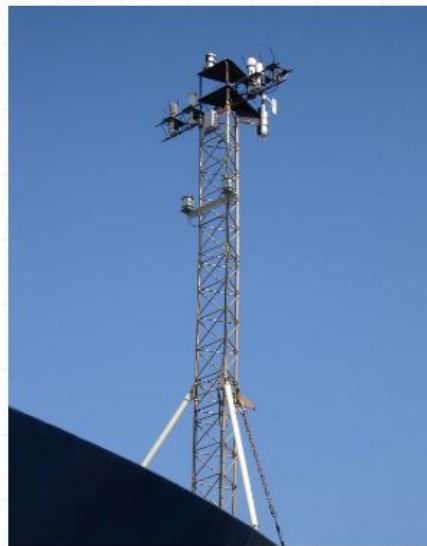
Credit: WHOI   Credit: Rik Wanninkhof/AOML

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	██████████	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	██████████	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.

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).

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

Setting up Sensor Configuration File (Steps):

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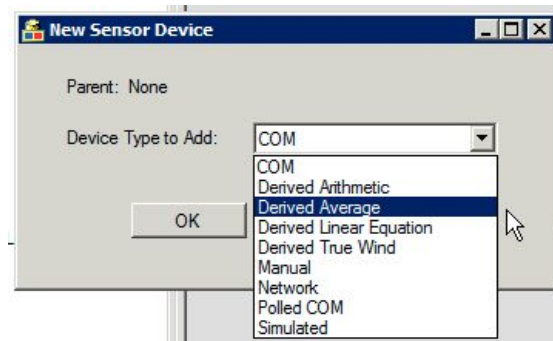 *Acquisition → Data Acquisition → Sensor Config Edit (Database)*

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*
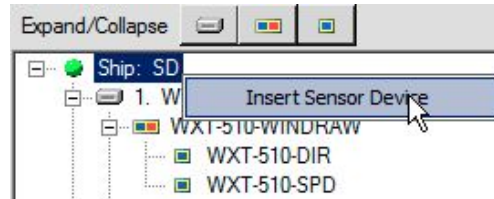
Setting up Sensor Configuration File (Steps):

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

- Right-click the ship name and click *Insert Sensor Device*
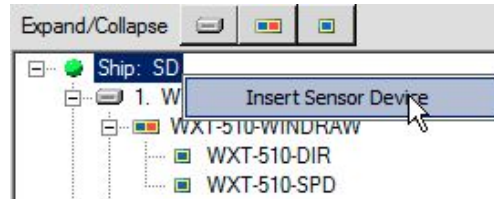
- Pick the appropriate *Derived* device type
  (*Derived Average* in this case)

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 minutes) *(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

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

- 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-

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

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

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- 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

Setting up SAMOS Event Logger Template File:

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

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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*

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

Setting up SAMOS Event Logger Template File:

- 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
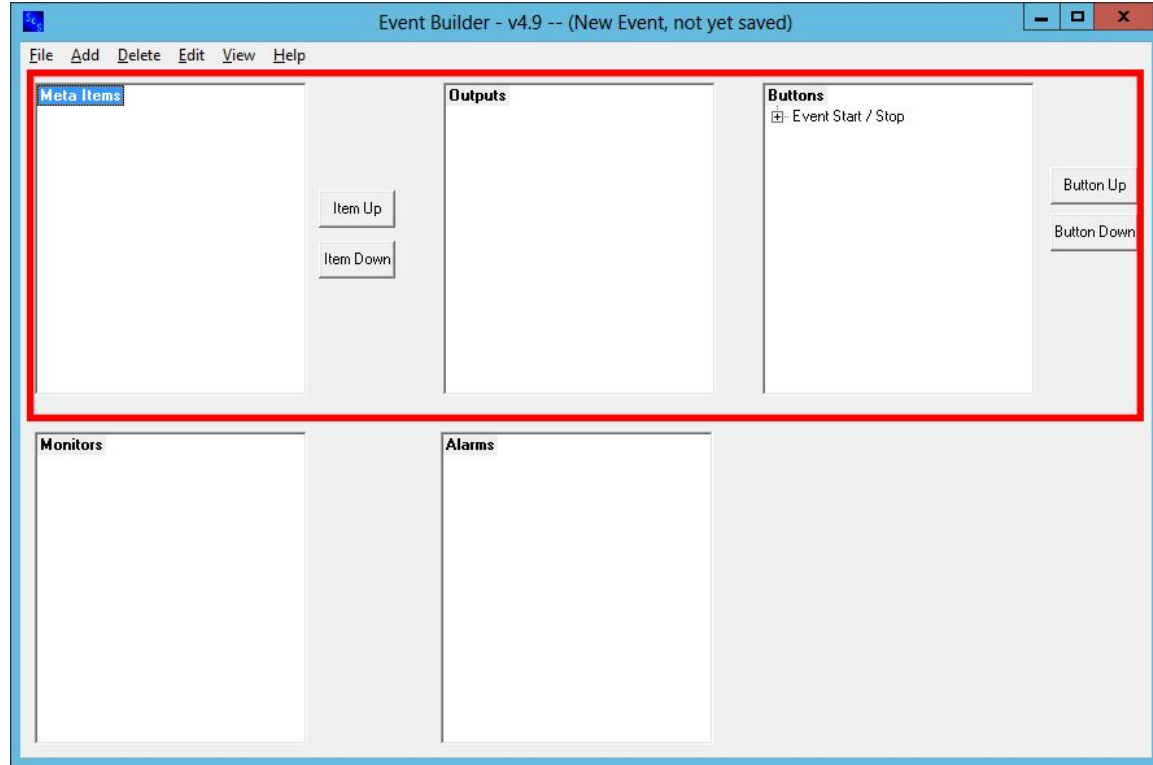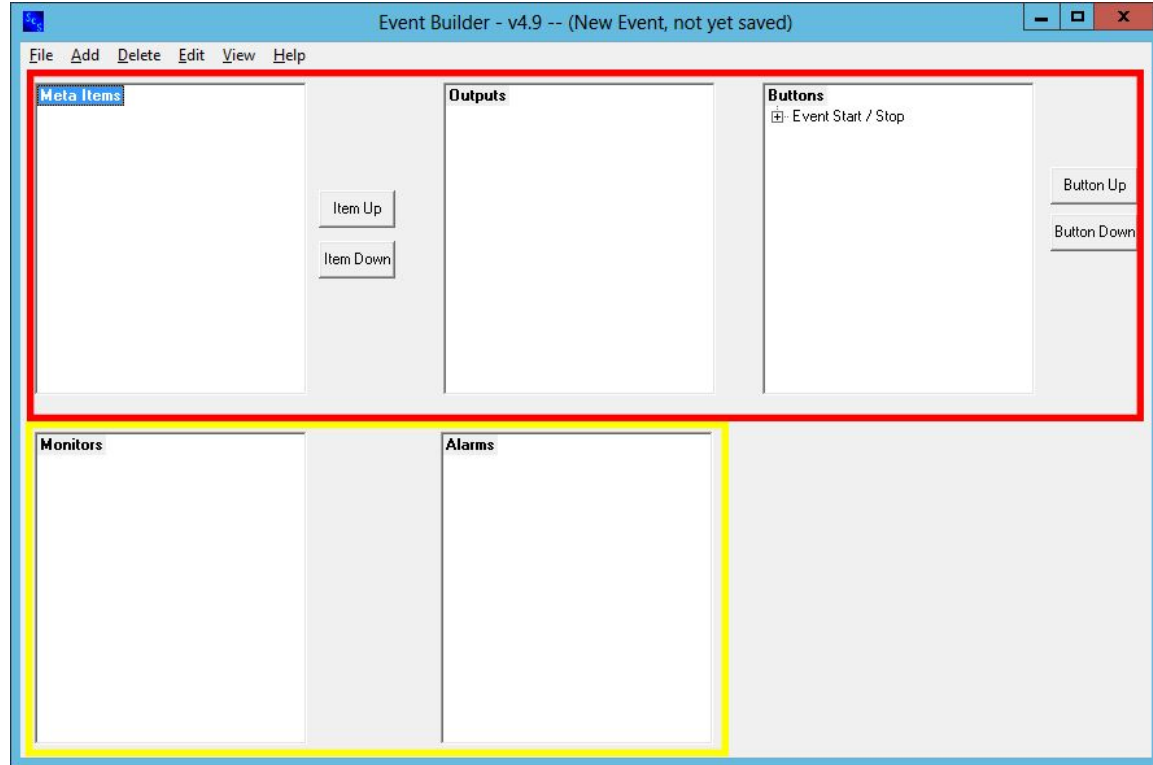

See: Page 121-132, Section 4.3, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Logger Template File:

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

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

Setting up SAMOS Event Logger Template File:

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

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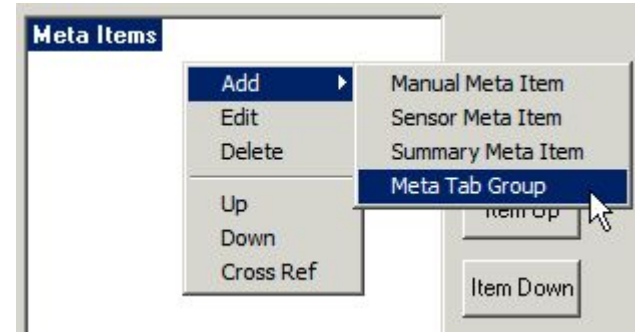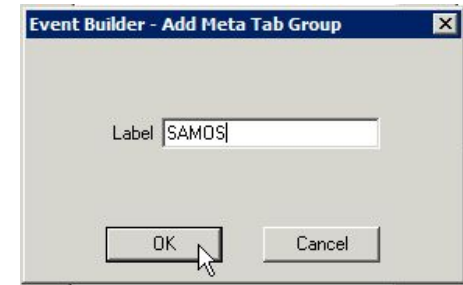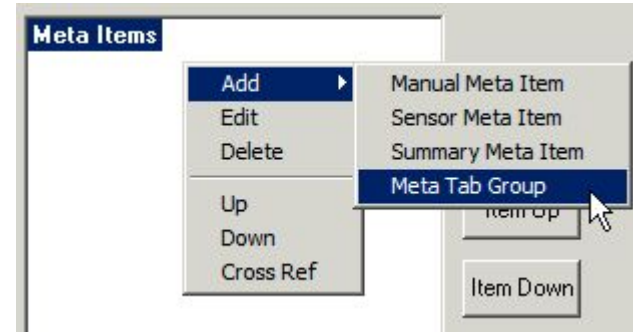 - Label the *Meta Tab Group* (right, bottom)

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

Setting up SAMOS Event Logger Template File:

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

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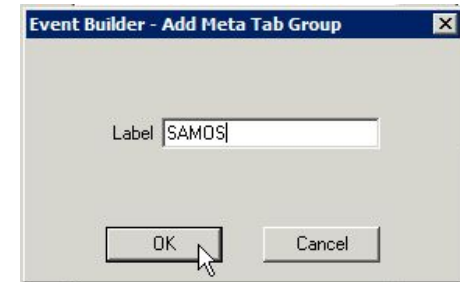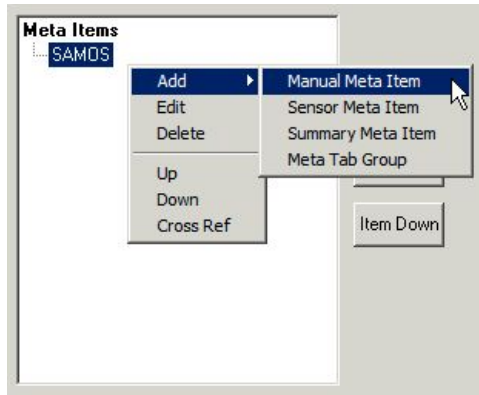 - Label the *Meta Tab Group* (right, bottom)
  - To add your ship's call sign, right-click the *Meta Tab Group* and choose *Add → Manual Meta Item* (below)

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

Setting up SAMOS Event Logger Template File: *(cont'd)*

- 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*

Setting up SAMOS Event Logger Template File: *(cont'd)*

- 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*

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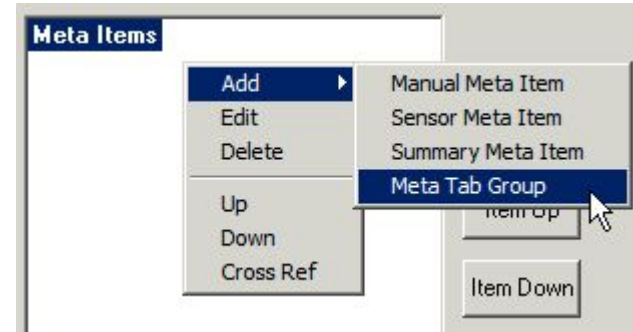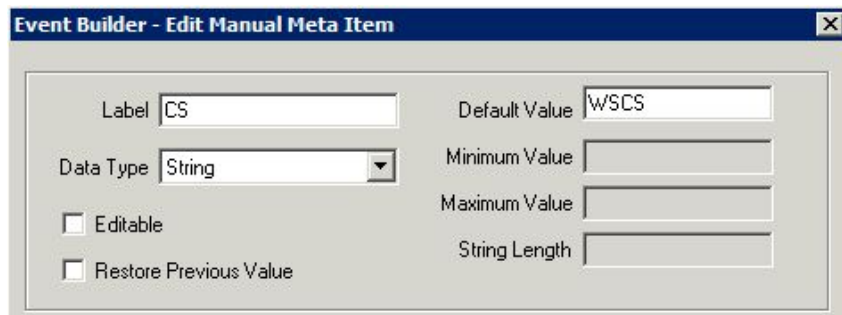   - Right-click the Meta Tab Group and select *Add → Sensor Meta Item* *(right)*

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

Setting up SAMOS Event Logger Template File: *(cont'd)*

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

- For the *Label*, refer to page 330 of the v4.9 SCS User's Guide for the full suggested designator list *(far 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
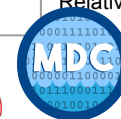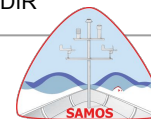
Event Builder - Edit Sensor Meta Item

Label: RWSPD

Eligible Sensors

```
Pick an item
[Date & Time]
SAMOS-DRV-PRESS-DRV-VALUE
SAMOS-RWSPD-VALUE
WXT-510-DIR
WXT-510-PRESS
WXT-510-RH
WXT-510-SPD
WXT-510-TEMP
```

☐ Editable

[OK] [Cancel]

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

Setting up SAMOS Event Logger Template File: *(cont'd)*
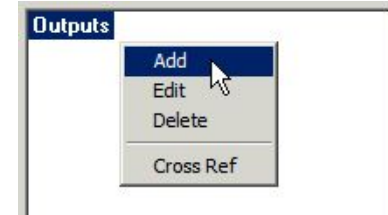
- Right-click on the *Outputs* heading and click *Add* (right, top)

Setting up SAMOS Event Logger Template File: *(cont'd)*

- 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
  - Log rate is 1 minute
  - 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
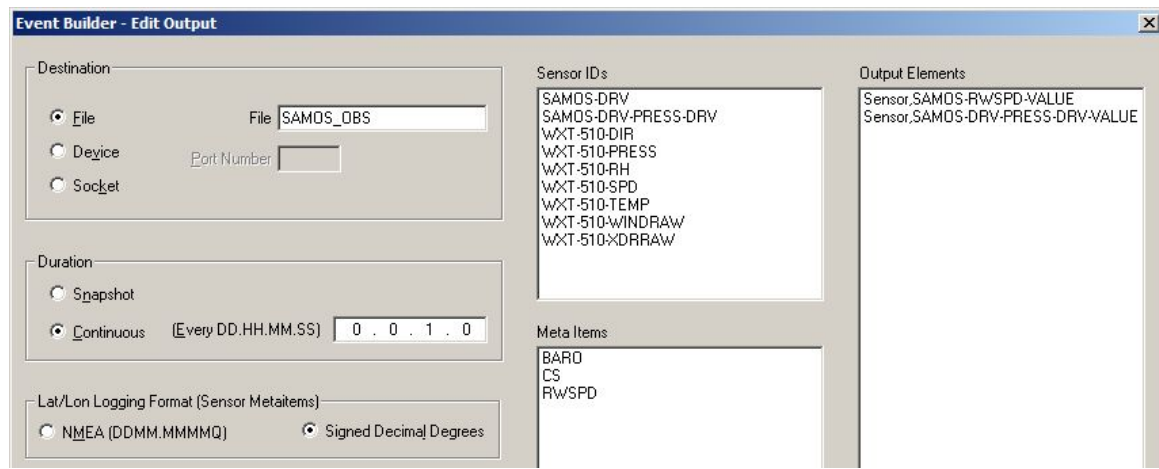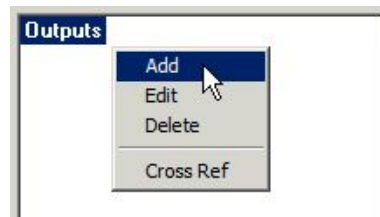

See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

Setting up SAMOS Event Logger Template File: *(cont'd)*

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

Setting up SAMOS Event Logger Template File: *(cont'd)*

- 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 *(right, top)*

Setting up SAMOS Event Logger Template File: *(cont'd)*

- 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 *(right, top)*
  - Under the *Outputs* tab, add the *SAMOS_OBS* output created earlier *(right, bottom)*
    - For the *Button Action*, select the *Start* radio button *(right, bottom)*

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

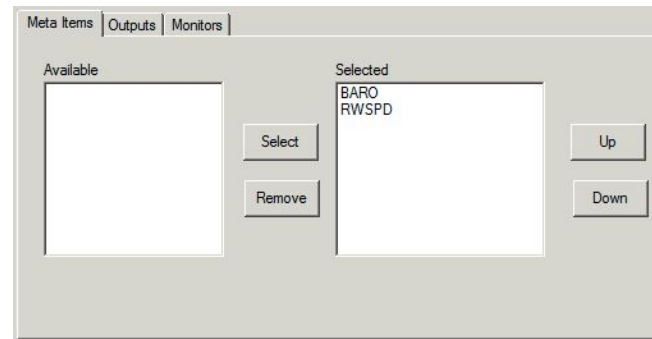# Setting up SAMOS Event Logger Template File: *(cont'd)*

- 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
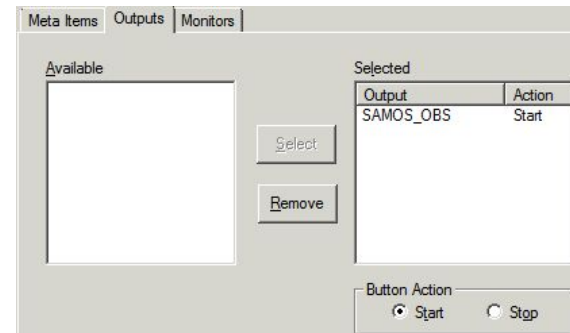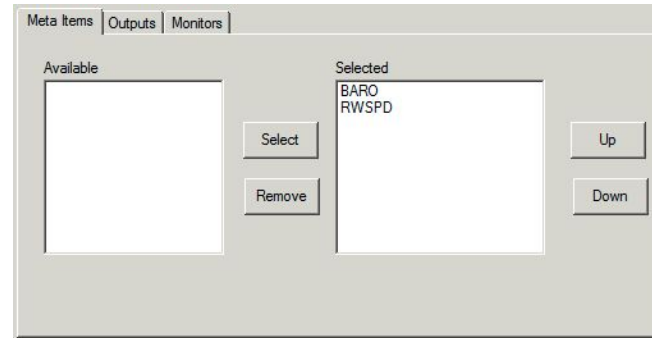 - Under the *Meta Items* tab, add the SAMOS Derived Meta Items created earlier *(right, top)*
  - Under the *Outputs* tab, add the *SAMOS_OBS* output created earlier *(right, bottom)*
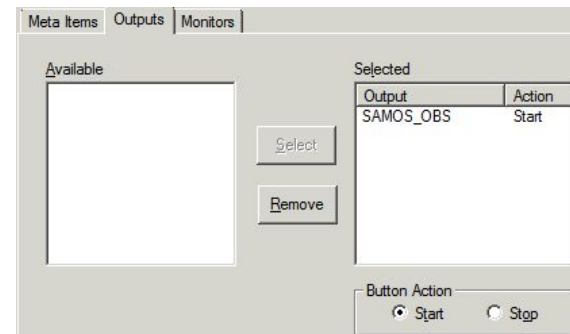   - For the *Button Action*, select the *Start* radio button *(right, bottom)*
- Double-click the *Stop Event* button
  - Follow the same steps above, adding the previously created SAMOS Derived Meta Items under the *Meta Items* tab
  - Under the *Outputs* tab, add the *SAMOS_OBS* output and select *Stop* for *Button Action*
- Make sure to save the *Event Template* as SAMOS.tpl
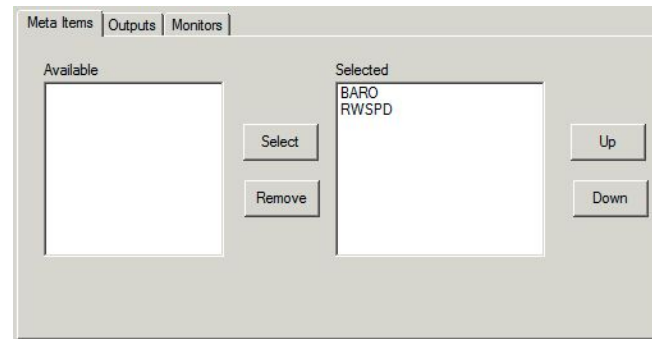
See: Page 331, Section 12.4, SCS User's Guide (v4.9) for more info

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:
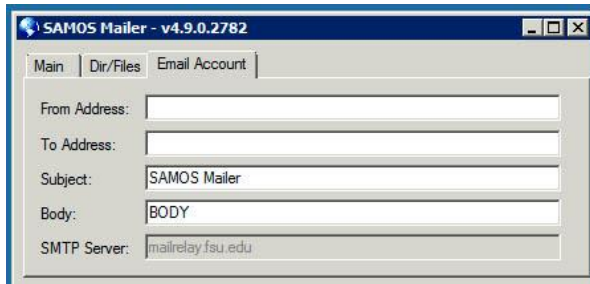*Utilities → SAMOS Mailer → Email Account* tab *(right)*

From Address
To Address (samos_data@coaps.fsu.edu)
Subject (preferably include call sign and date)
Body (preferably blank)
SMTP Server (filled from SCS Configuration File)
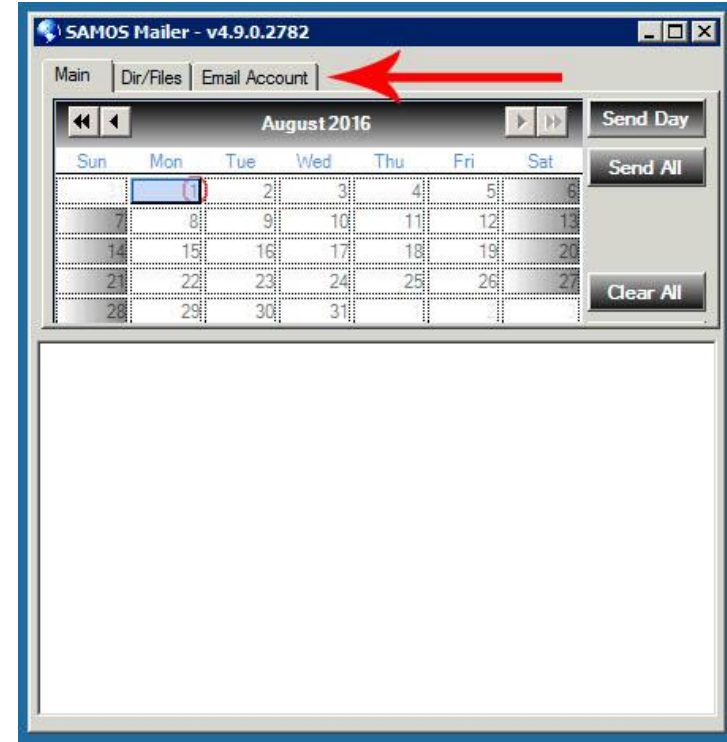
See: Page 278, Section 9.4.7.4, SCS User's Guide (v4.9) for more info

Running the SAMOS Event Logger:

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

Running the SAMOS Event Logger:

- 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\SCP-Ship\Templates\EventTemplates

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

Running the SAMOS Event Logger:

- 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:
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- Select the SAMOS.tpl *Event Template* and click *Open* (right)

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  {Drive}:\SCSServer{version}\SHIP40\SCP-Ship\Templates\EventTemplates

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

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

See: Page 276, Section 9.4.5, SCS User's Guide (v4.9) for more info
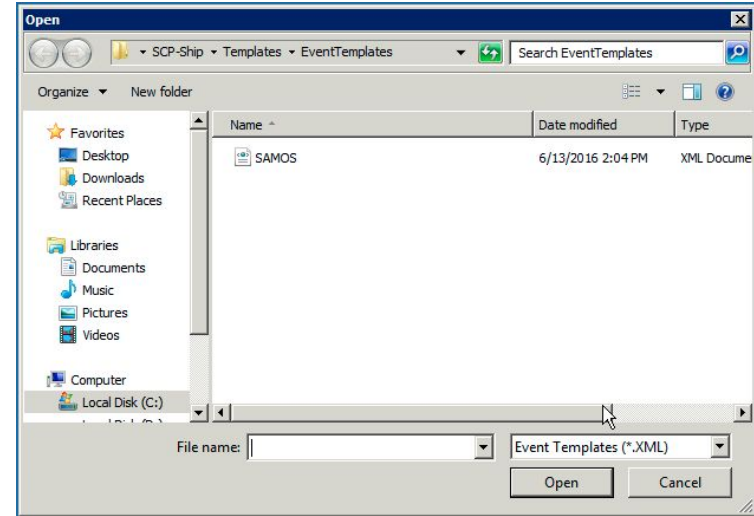
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  {Drive}:\SCSServer{version}\SHIP40\SCP-Ship\Templates\EventTemplates

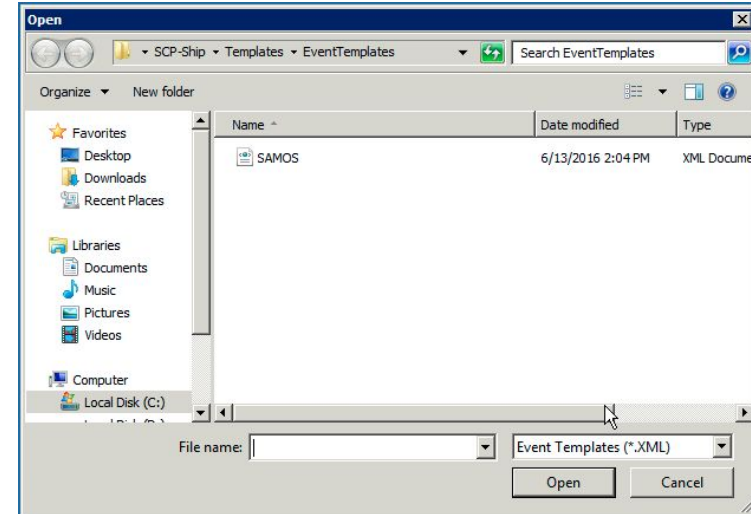- Select the SAMOS.tpl *Event Template* and click *Open* (right)

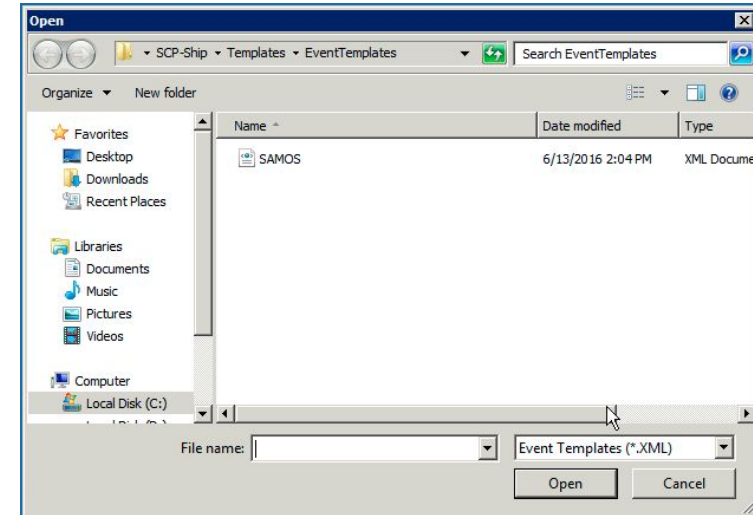- On the left side of the *Event Logger*, click *Start Event* button to start the SAMOS Event.

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

Running the SAMOS Mailer:

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

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 *(right)*
  - If a date was missed, it is marked red *(right)*

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 *(right)*
  - If a date was missed, it is marked red *(right)*

- 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

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

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  - Clear All - deletes/clears all data for the SAMOS event

- 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

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.
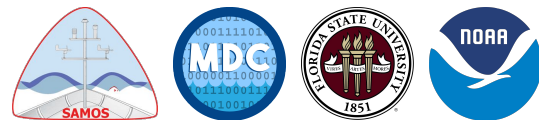
Have Problems or Need Tech Questions Answered?

SAMOS Technical Staff

samos@coaps.fsu.edu

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