# **Contributing Real-Time MET and TSG Data to SAMOS**



### Introduction

Since 2005, the shipboard automated meteorological and oceanographic system (SAMOS) initiative has been collecting, quality evaluating, and preserving navigational (NAV), meteorological (MET), and surface oceanographic (TSG) observations from research vessels (RVs). In 2009, the SAMOS data center joined the NSF Rolling Deck to Repository (R2R) project to recruit additional universityoperated vessels.

- The SAMOS initiative supports marine research by creating quality estimates of the air-sea heat, moisture, momentum, and radiation fluxes;
  - improving our understanding of the biases and uncertainties in meteorological parameters and fluxes;
  - benchmarking new satellite and model products; and
  - providing high-quality data to support modeling activities (e.g., reanalysis) and global climate programs.



- The SAMOS 2.0 protocol provided the operator a mechanism to transmit real-time MET and TSG data collected at the native instrument sampling rate. Data reduction to one-minute averages is completed by the FSU data center. This system is still in development and undergoing testing with the R/V Endeavor.
- Differences between SAMOS 2.0 and SAMOS 1.0 include:

#### SAMOS 2.0

- Hourly data transmissions (pull)
- Multiple files per transmission NAV file, MET file, OCE file
- Multiple formats (formats may differ between files) NMEA, xml, CSV
- Embedded metadata in each file
- High temporal resolution data (1 Hz)
- Automated and visual QC with new NAV QC
- All instantaneous values
- True wind calculations optional

#### SAMOS 1.0

- Daily data transmission (push)
- 1 file
- 2 formats (SAMOS v001, JGOFS)
- Metadata stored in semistatic database
- 1 minute temporal resolution
- Automated and visual QC
- All instantaneous values or 1minute averages
- Provider calculates true winds

Shawn R. Smith, Jeremy J. Rolph, and Kristen Briggs Center for Ocean-Atmospheric Prediction Studies, Florida State University, Tallahassee, FL, USA Corresponding Author: S. R. Smith, smith@coaps.fsu.edu

## What is a SAMOS?

- A SAMOS is a continuously recording, computerized data logger connected to navigational,
- meteorological, and near-surface ocean sensors.
- The desired interval between sequential observations is equal to or less than one minute and varies between the SAMOS 1.0 and 2.0 data protocols.
- The SAMOS initiative does not specify or provide sensors used to collect data.
- The initiative leverages existing science-quality instrumentation deployed by RV operators (Fig. 1).

Fig. 1. SAMOS on

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- The original SAMOS (1.0) protoc and TSG data relies on vessel o data reduction from the native in one-minute averages. This data on the participating RV and then email and sent to s nos data@
- Once received by the data cente flow (Fig. 2) and are served to th processing includes:
- Combining received data with ve metadata from a ship profile data
- Daily monitoring for instrumer
- Automated (visual for some v
- Submission to National Ocear long-term preservation





Fig. 2. SAMOS data flow.

# SAMOS 2.0 Data Protocol

- Submission of data and metadata in SAMOS 2.0 format allow center to
  - Continually update instrumental metadata (via extraction fr XML files) as opposed to manual updates in SAMOS 1.0 (
  - Calculate true winds and other derived quantities using cor algorithms
- Upon data receipt and completion of data reduction at FSU (v show in Fig. 5), the data undergo the same data quality proce as for SAMOS 1.0 (Fig. 2).
- Note: SAMOS 2.0 does involve transmitting larger data files o satellite broadband. For some vessels this may not be possib tests with the Endeavor have not shown a significant impact of to-shore bandwidth.





	SAMC	)S	1.0 Data Protocol
col to transfer real operators to compostrument samplin reduction is typic in the data are atta coaps.fsu.edu. er, all data follow for the user communit essel and instrum abase int or data flow err vessels) data qual inographic Data C	I-time MET lete the ag rate to ally done ched to an the data y. The ent fors ity control center for	1. 2. 3.	<ul> <li>Contact SAMOS data center:</li> <li><u>samos@coaps.fsu.edu</u></li> <li>Download vessel and instrument metadata forms (Fig. 3), SAMOS data format specification</li> <li>Submit vessel and instrument metadata</li> <li>Email forms</li> <li>Use web-based metadata tool (URL)</li> <li>Determine whether you need to develop scripts to develop SAMO</li> <li>1.0 format (examples below) or cause existing applications</li> <li>NOAA SCS – contains application and data emails</li> </ul>
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Data Extraction and Metadata Updating	Extract vessel metadata	;	Extract instrument metadata Update metadata in database

Fig. 5.
SAMOS 2.0
data flow.

-> Quality control data

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### Final Thoughts

- The success of the SAMOS data center and its contributions to the NSF R2R would not be possible without the dedication of the individual operators and RV technicians.
- Although active new vessel recruitment in 2013 will be limited, we encourage all university operators to "self recruit".
- We will work closely with each operator to ensure that their NAV, MET, and TSG data are received and quality processed in a timely manner.

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