SCAT for Tomorrow Workshop



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NOAA's Gulf of Mexico Disaster Response Center

Mobile, AL

Workshop Report

Coastal Response Research Center

Acronyms

ARD	Assessment and Restoration Division (ORR)
ASTM	American Society for Testing and Materials
CAOSPR	California Department of Fish and Wildlife, Office of Spill Prevention and Response
COP	Common Operational Picture
CTEH	Center for Toxicology & Environmental Health LLC.
DOCL	Documentation Unit Leader
DRC	Gulf of Mexico Disaster Response Center
ERD	Emergency Response Division (ORR)
ERMA	Environmental Response Management Application
ETL	Extract, Transform, Load
EU	European Union
FGDC	Federal Geographic Data Committee
FOSC	Federal On Scene Coordinator
FTP	File Transfer Protocol
GIS	Geographic Information System
IAP	Incident Action Plan
ICP	International Cooperative Program
ICS	Incident Command System
JIC	Joint Information Center
LNO	Liaison Officer
NCP	National Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NOO	No Oil Observed
NRDA	Natural Resource Damage Assessment
OCC	Owens Coastal Consultants Ltd.
ORR	Office of Response and Restoration (NOAA)
RAT	Rapid Assessment Team
RPI	Research Planning, Inc.
SCAT	Shoreline Cleanup Assessment Technique
SSC	Scientific Support Coordinator
SITL	Situation Unit Leader
SQL	Structured Query Language
STR	Shoreline Treatment Recommendation
TGLO	Texas General Land Office
TRG	The Response Group Inc.
UC	Unified Command
USCG	United States Coast Guard
QA/QC	Quality Assurance/Quality Control

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The content for the workshop was developed in cooperation with the National Oceanic and Atmospheric Administration (NOAA) Office of Response and Restoration (ORR) Gulf of Mexico Disaster Response Center (DRC) and the following Organizing Committee members:

- Carl Childs, NOAA ORR ERD
- Whitney Hauer, CRRC
- Charlie Henry, NOAA ORR DRC
- Michele Jacobi, NOAA ORR
- Nancy Kinner, CRRC
- Kathy Mandsager, CRRC
- Mark Miller, NOAA ORR ERD
- Zach Nixon, RPI
- Ben Shorr, NOAA ORR ARD
- John Tarpley, NOAA ORR ERD
- David Wesley, NOAA ORR ERD

The workshop was facilitated by Nancy Kinner from the Coastal Response Research Center (CRRC; www.crrc.unh.edu) and was held at the DRC in Mobile, AL. CRRC has extensive experience with issues related to oil spills. The Center is known for its independence and excellence in the areas of environmental engineering, marine science, and ocean engineering as they relate to spills. CRRC has conducted numerous workshops bringing together researchers, practitioners, and scientists of diverse backgrounds (including from government, academia, industry, and non-governmental organizations) to address issues in spill response, restoration and recovery.

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- Jeff Arnett, Shell
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- Michele Jacobi, NOAA ORR
- Kenneth Kumenius, SCATMAN
- Zach Nixon, RPI
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- John Tarpley, NOAA ORR ERD
- David Wesley, NOAA ORR ERD

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Introduction

On January 18-19, 2017, the Coastal Response Research Center (CRRC)[1] and the National Oceanic and Atmospheric Administration (NOAA) Office of Response and Restoration (ORR) Gulf of Mexico (GOM) Disaster Response Center (DRC) co-sponsored the "Shoreline Cleanup Assessment Technique (SCAT) for Tomorrow" workshop at the DRC's training facility in Mobile, AL. NOAA ORR supports the U.S. Coast Guard (USCG) in its role in emergency response (Emergency Response Division [ERD]) and also overseas damage assessment and restoration (Assessment and Restoration Division [ARD]). As part of its role, ORR updates existing tools and creates new ones related oil spill response, assessment and restoration. The workshop assisted ORR in advancing SCAT with respect to data standards and data exchange.

Collecting, managing and sharing SCAT data collected or managed by different organizations can be difficult due to the various data methods and formats used. One of ORR's major goals is to develop a common data standard for SCAT that is acceptable to federal and state agencies, and industry, and enhancing information sharing.

The workshop convened a group of 47 SCAT coordinators, data managers, and stakeholders from international, federal and state agencies and the private sector (Appendix A), to define key standards to allow better management and sharing of SCAT data for response and other purposes. Workshop participants discussed the draft NOAA SCAT Digital Data Standard (herein referred to as the draft Data Standard; Appendix B) and exchange formats to make SCAT more efficient and interconnected during oil spill response. The workshop agenda is located in Appendix C.

There are numerous, distinct applications of SCAT products available in the private and public sectors, each of which has characteristics that may be used by a variety of clients. The workshop explored the 'behind-the-scenes' data-sharing and interoperability aspects of SCAT with the goal of improving information sharing during oil spill response and restoration.

The workshop objectives were to:

- Assess of current concerns regarding electronic data management for SCAT in oil spills;
- Evaluate of future needs for SCAT to improve readiness and efficiency;
- Define of key data standards and data exchange formats to allow better management and sharing of SCAT data for response and NRDA; and
- Provide feedback from stakeholders on the draft Data Standard and for data sharing agreement strategies regarding SCAT.

The workshop consisted of plenary presentations, panel presentations and discussions, breakout sessions, and plenary discussions. Plenary presentation topics included: setting the stage, data collection and information tools, data sharing agreements, data infrastructure, IT security, and the draft Data Standard. Panelists provided reactions to the plenary presentations and included state, industry, and federal agency perspectives. Panel presentations focused on available SCAT data tools. Slides for plenary and panel presentation are located in Appendix D.

[1] A list of acronyms is provided on Page 1 of this report.

The breakout sessions included discussions of: electronic data management during spills; future needs to improve readiness and efficiency; technical aspects of the draft Data Standard; data handling and exercise development; and Quality Assurance/Quality Control (QA/QC) and data flow. The workshop concluded with a plenary discussion of best practices and the path forward.

The information reported below is the best attempt to document the discussion, opinions and ideas presented during the presentations and breakout sessions of the SCAT for Tomorrow Workshop. The summary below does not necessarily reflect the view or products of NOAA or any single participant. This information does not reflect a consensus of opinion, but simply reflects the various group report outs.

Plenary Presentations

A summary of each presentation from the workshop is provided in this section. Most summaries were written by the presenters.

Setting the Stage on SCAT

John Tarpley (NOAA ORR ERD) and Ed Owens (Owens Coastal Consultants Ltd. [OCC]) provided an overview and history of SCAT. Nearly 30 years ago, oil spill responders began to develop a method for assessing oiled shorelines. Over time and with each new spill, this method was refined and new tools developed specifically to support oil spill cleanup operations. SCAT was 'born' in 1989 during the Exxon Valdez response. Later, these assessments became integral to the Incident Command System (ICS) providing critical information to decision-makers in the Operations and Planning Sections. Through the work of dedicated responders, SCAT tools and techniques continued to evolve to support a wide range of habitats and an increasing demand for faster and more detailed information and SCAT products. Key to this ongoing development and innovation has been a collaborative relationship among SCAT practitioners to improve the technique and foster its use world-wide. Today, the response community is a crossroads with the digital development of SCAT. As more tools are created to support electronic data collection, databases are established to store large volumes of information, and more ties are made with geographic information system (GIS) mapping tools; SCAT practitioners need new standards and data exchange formats to handle digital data across different platforms for efficient coordination, data sharing and interoperability.

SCAT Data to Response Information

Carl Childs (NOAA ORR ERD) presented the data elements collected by SCAT teams in the field and the analytical process by which those data are transformed into SCAT information products to guide response activities. Generation of the information products describing the extent of shoreline oiling only uses a small subset of the data collected by field teams. These data are evaluated using incident-specific criteria and transformed using a complex geospatial methodology to create a comprehensive assessment of shoreline oiling conditions.

SCAT field data is of little use to the response unless it is systematically analyzed and collated in order to inform response decisions. Without significant interpretation, raw field data can provide an incomplete and misleading picture of the situation which is particularly important given that advances in electronic field data collection make SCAT data available in near real time in the Command Post. This requires that extra care is taken to ensure that SCAT information presented to the rest of the response has undergone proper QA/QC and analysis.

Data Sharing Agreements and Federal Data Mandates

Michele Jacobi (NOAA ORR) presented data sharing plans and federal data management policies. Access to appropriate information and accurate data is required for an effective spill response operation. The response data and informational products generated are essential to situational awareness. These data support the Common Operational Picture (COP) of the incident and inform the operational decisions for the field crews. In order to have effective situational awareness, a data sharing plan is key; it should be cooperatively generated for each incident and be signed by the Unified Command (UC). The plan should document the collection, management, and access to essential datasets for all parties involved in the incident. Data sharing plans should focus on the timing of data and product delivery, standard format requirements, data interoperability, and data retention requirements. Industry, federal and state agencies should work together on plan development, and practice the implementation of data sharing plans during drills and exercises to help ensure efficient information flow and resolve potential issues in advance of an actual incident.

In addition, the need for data access and sharing, there are several federal data management mandates that must be considered when collecting response data or generating informational products. These requirements include the National Contingency Plan (NCP), the Federal Records Act, the Freedom of Information Act, and the Open Data Policy. Several agency level data directives also must be considered. Each of these policies outlines a documentation and management requirement for the specific federal agency and its support staff. Additional state and corporate requirements may exist for data sharing and retention and all of these requirements must be taken into account when managing spill response data.

Data Infrastructure

Ben Shorr (NOAA ORR ARD) gave an overview presentation on the type of infrastructure and data flow that NOAA ORR considers key to the effective collection, management, and sharing of environmental data, including SCAT data. Key aspects of a SCAT data management approach prioritize scalability and flexibility, and provide for secure data collection, management, sharing, and archiving. Scalability refers to the ability for a SCAT data collection approach to work on small as well as very large spills. Flexibility refers to the ability to quickly adapt to gathering, managing and integrating different data sources and formats, including electronic collection systems. The data collection aspect covers the different pathways that SCAT data may be gathered, and the central data that is commonly referred to as structured (e.g., spreadsheets) and unstructured (e.g., scanned field notes, photos). The approach for data collection and data storage emphasizes gathering all essential data elements in a central and organized location. Interoperability is key as it addresses the ease of getting data in and out of a system. The requirements for data collection and data access should be based on clear and accessible standards, which allow for data providers and data users to readily exchange data and information. The NOAA SCAT data model can serve as a template for data providers to use, and a guide for data access from a centralized system that implements this data standard. The SCAT data flow includes the core requirements for exchanging metadata (i.e., Federal Geographic Data Committee (FGDC), SCAT data specific), in addition to incorporating QA/QC and validation. The SCAT data model is key to the "data warehouse", which is a centralized environmental data store that provides secure and privileged access to integrated and raw data.

IT Security Issues

David Wesley (NOAA ORR ERD) provided a brief introduction to some of the existing federal IT security rules and how they may impact management of SCAT data in the future. IT security rules, along with other mandates, have been tightening for federal agencies and these changes are impacting the technology solutions available for managing federal data. For example, SCAT has evolved from being located on a single computer to being hosted on a server with multiple users in the Command Post. Government data must be on a government-certified server. The assessment and authorization process to become government-certified is costly and requires extensive documentation.

Draft NOAA SCAT Data Standard

Zach Nixon (Research Planning, Inc. [RPI]) provided an overview of the proposed draft NOAA Data Standard, including the concept, guiding principles, and core components. The Data Standard is intended to facilitate interoperability, clarity, and transparency for digital SCAT data. It is software agnostic, includes simple, core elements, and is not an application, database, data structure, or entity-relationship model. The Data Standard is extensible to better the requirements of a wide spectrum of incident complexities and specific needs. It is intended to apply to digital SCAT data management over the whole lifecycle of an incident, from data collection to final archiving. The core elements are:

1. Conceptual entities,
2. Spatial representations,
3. Tabular attributes,
4. Logical relationships,
5. Spatial relationships, and
6. Documentation.

The core conceptual entities are: a shoreline, segments, surveys, surface oiling observations (zones), subsurface oiling observations (pits), and shoreline treatment recommendations (STRs). Of these, the shoreline and its segments, and zones and pits are required to have explicit spatial representation. Each conceptual entity is required to have certain pieces of core information contained in a table. While structure and format of these tables is flexible, they must meet minimum logical relationship tests. Similarly, the draft Data Standard requires that spatial representations meet minimum spatial relationship or topological requirements. Lastly, the draft Data Standard requires documentation sufficient for external users.

Panel Perspectives

There was a panel discussion offering a state, industry, NOAA, and USCG perspective which provided comment and feedback on the plenary presentations.

State

Steve Buschang (Texas General Land Office [TGLO]) provided a state perspective. In his role as state Scientific Support Coordinator (SSC), he is involved in the SCAT process on a more day-to-day basis where scalability is important. While the state needs to work with and participate in large SCAT operations, the majority of TGLO SCAT activities occur on small spill events, often in the capacity of a Rapid Assessment Team (RAT) survey. SCAT should be user-friendly for small spill and large scale applications.

For those who teach SCAT, digital SCAT should be incorporated into the classroom. However, there may be challenges given the number of available SCAT data tools and devices. More importantly, paper SCAT should remain the focus as it will not be completely replaced by digital SCAT.

TGLO is considering pre-segmenting SCAT areas where the segmentation of Resources at Risk (RAR) may coincide with pre-segmented areas.

Industry

Jeff Arnett (Shell) provided an industry perspective highlighting the importance of data interoperability. There is a need for a SCAT framework, and the draft Data Standard provides those guidelines. Next steps for SCAT include implementing the draft Data Standard in the field. Technology is available (e.g., ESRI) to minimize post processing and normalize data in the field.

NOAA

Zach Nixon provided a discussion on SCAT data tools and highlighted two main points:

First, the primary tension in SCAT data management is between the competing requirements of efficiency and quality. By definition, the first and primary “customer” for SCAT data and information products within the response is Operations. The primary reason for collecting SCAT data is to provide timely generation of operational guidance for shoreline cleanup during the response. The most important attributes of any SCAT data management program should be speed and flexibility. However, SCAT data are also critical to other non-operations entities within the Incident Command System (ICS), including generating metrics of survey and cleanup progress for command staff and public release, and other entities for non-response needs such as NRDA. For these users and purposes, it is more important for data management processes to ensure that SCAT data are standardized and of high quality. While these two sets of requirements will always be in competition, the adoption of a minimal, though rigorous and extensible, standard may ease this tension.

Second, the operational period and planning cycle tempo for large or high visibility incidents is often 12 hours or less for certain aspects of SCAT data management. While certain aspects of the QA/QC process, by design, will always insert some delay during the SCAT data workflow, the use of an agreed-upon Data Standard will help SCAT practitioners reduce this delay to the minimum needed to meet the needs of increasingly rapid planning cycles.

USCG

CDR JoAnne Hanson (USCG) commented that recent large incidents have demonstrated an information demand from higher level officials (e.g., White House, Department of Homeland Security) which continues to increase with each successive response. In turn, this causes pressure on the Federal On

Scene Coordinator (FOSC) and UC to report information quickly. Further, we live in a on-demand information management world, compounded by the real-time access of social media.

IT challenges will continue to require resolution. As more electronic products and systems are developed for use on a response, the USCG will face issues with data transfer and management on secure systems. Documentation on a response is an FOSC's responsibility. Data generated on a response belongs to the response and the FOSC, so the data transfer mechanisms must be addressed in order to properly access, maintain, and store response data in accordance with government IT security and legal requirements.

Panel on SCAT Data Tools

The panel on SCAT data tools showcased different tools that are available. Panelist were asked the following:

- *Describe the key features of your SCAT product.*
- *What are the innovative/novel approaches associated with your SCAT product? What new data are being collected? What are the new SCAT information product ideas?*
- *How does the data flow in your SCAT product?*
- *What features of your SCAT product align with the draft Data Standard?*
- *What impact might the draft Data Standard have on your product?*

SCATMAN

Kenneth Kumenius (SCATMAN Ltd.) discussed (via video link) SCATMAN which offers mobile tools for field data collection and management, including SCAT which has been tailored for NOAA. The tools are easy-to-use, fast and offer reliable ways to collect and report data from the field to the Command Post. Possible use-cases vary from surveys and mappings of environmental and natural issues to industrial field operations including asset management, field service, safety, and quality related tasks.

SCATMAN applies normal touch screen smartphones or tablets for easy and reliable in-field data collection and management. Data from the field are updated automatically, in real-time, to the SCATMAN web service where the data are summarized and visualized on a map presentation. It can also work offline. Necessary actions can be decided quickly based on this information. Data can also be integrated with other existing systems and tools used in the company and synchronized into other existing databases.

Technology that is integrated into the system are: drones with laser measurement to estimate the thickness of the oil, dark sensor cameras to take pictures in nearly complete darkness, gas sensors to identify the gas, and physical sampling to identify the quality of the oil. SCATMAN can easily fulfill the draft Data Standard requirements.

For more information: http://scatman.fi/en

Chaac Technologies: Coral

Guillaume Nepveu (Chaac Technologies) discussed Coral which is a mobile geospatial data collector developed by Chaac Technologies. Coral was created originally as a SCAT data management tool.

One key component is that Coral supports all types of features including points, lines and polygons which is essential to manage the complex nature of the geospatial data capture during an oil spill response. Coral also has multiple GIS functions that permit geometry edition. Coral is powered by a dedicated cloud service that provides real-time data access and automated backups for extra data security.

One innovative approach in Coral is the data viewer that provides a new way to explore the data. It is composed of a split screen which includes fields from the data model and an interactive map that puts this data into spatial context. All media, including photos, videos, sketches and maps, are also fully integrated into the system and georeferenced automatically. Sketches can be created using a blank background, satellite imagery or a picture. These media can also be linked to all features providing a binding bound that correlates the data together.

The data flow in Coral can be handled in three ways: data export, data import and data synchronization with the cloud. Coral's ability to manipulate geospatial features efficiently aligns with the required spatial topology in the draft Data Standard. Modules like the snap to algorithm and the zone builder that permits the creation of zones overlapping the segment lines are examples of this alignment.

The impact of the draft Data Standard to Coral infrastructure is minimal. It is only a matter of creation of new forms to match the proposed data model. Coral provides a form creation module that allows assignment of data fields (e.g., text, radio buttons, media, signature) to a form and that can be exported to the cloud server. This form is then accessible to all users connected to the cloud. The form creation module also links forms together (e.g., user can choose the geometry type and control how the feature will be represented on the map with icons or colors).

For more information: www.chaac.tech or http://coralmobile.net/.

Polaris Integrated SCAT Management (PRISM) Application

Stephen Gmur (Polaris) discussed the Polaris Integrated SCAT Management (PRISM) Application. For several years, and especially since the DWH, Polaris has been increasing the efficiency of SCAT data collection and processing with the goal of decreasing errors which might be inherent within the traditional workflow. Results of this effort from the last couple of years have identified a variety of different applications to collect SCAT data, both general mobile data collection applications and SCAT specific applications. Many of the applications reviewed had good data collection features, but what was lacking was how data collected was stored and could be queried and processed after collection (i.e., the database component of the set up). To close the gap between data collection and data storage, Polaris decided the best strategy was to develop an enterprise level database that was web enabled with a SCAT specific data model. The concept for this strategy is that data from any mobile application could be used loaded into the flexible PRISM data structure. In the short term, a third party mobile application could be used until other collection applications are evaluated.

PRISM, the updated workflow, is not a single component, but comprised of several parts. Underlying data principles used to design the PRISM data model are the same as the draft Data Standard. Specifically, the data model has the same components of surveys, segments, zones, pits and STRs along with a few additional pieces of information. To address the need for topologically-corrected post processed data, the PRISM workflow includes post-database tools which snap field collected information to the segmented shoreline. Naming conventions within the database are different, but can be mapped to a cross reference table to follow the Data Standard. Polaris is currently developing metadata templates and will be using the metadata portions of the Data Standard to identify any gaps.

The updated SCAT workflow is able to follow the draft Data Standard due to the different components which are used within PRISM. PRISM resides on an Amazon webserver and is built upon Arches, an open source database platform, which was originally designed for cataloging historical resources. The web interface allows reviewing, searching and exporting data. Field collection uses Fulcrum, a third party data collection app. The innovation associated with the new workflow is that newer technologies have been integrated. Mobile data collection to increase speed and efficiency, web based databases as a single source for all SCAT data and to increase the transparency of how those data are stored and along those lines increasing the access to a variety of user for that data.

For more information: http://www.polarisappliedsciences.com/en/home/.

The Response Group (TRG): SCAT Mobile Application

Kenny Rhame (TRG) presented on TRG's SCAT Mobile Application named TRG Recon which is the latest addition to their suite of mobile apps. This mobile application allows SCAT field teams to capture data in the field improving quality and efficiency. TRG Recon records all information required to complete the NOAA Shoreline Oil Summary (SOS) form which is available in TRG's Incident Action Plan (IAP) software. Users can capture photos and notes, while having flexibility to work offline. Completed NOAA SOS forms in the IAP software have a status approval workflow that requires QA/QC and approvals with digital signatures before the final report is available for others to review. Streamlining the data collection and form approval allows SCAT teams to quickly generate Shoreline Treatment Recommendations (STRs) which guide Operations to the highest priority areas. The collected data and reports are processed to create SCAT products including oiled shoreline maps and SCAT photos. This approved data is displayed on the COP and optionally dashboards can be created as a briefing tool for UC.

For more information: http://www.responsegroupinc.com

CAOSPR: SCATalogue iOS app

Issac Oshima (CAOSPR) discussed the SCATalogue iOS app. Key features of the SCATalogue iOS app include:

- Data capture from NOAA Shoreline SCAT SOS forms,
- Data exports to ESRI geoJSON format,

- Photos, sketch, photo annotation option, and
- ArcGIS custom toolbox process into file geodatabase(s).

One of the novel approaches associated with the SCATalogue iOS app is the multiple ways to push data which include: email, USB flash, and the cloud (e.g., AirDrop, Dropbox, OneDrive, Google Drive). Additionally, shoreline representation and/or segments can be generated by ArcGIS using SCATalogue GPS tracklog. When shoreline segments are available, oiling zones are snapped to them. No oil observed (NOO) zones can either be explicit or inferred. For team lists, the app pulls data from the California Department of Fish and Wildlife File Transfer Protocol (FTP). Team lists can also be created via iOS contacts and ad hoc.

Data can be transferred via email, Apple airdrop, as well as via cloud, flash, and third party apps such as AirTransfer which is dependent on the user/organization. There is OSPR GIS unit processing into an ESRI file geodatabase (individual survey-segment) and into an ESRI Structured Query Language (SQL) geodatabase (spill compilation). Data flow includes the International Cooperative Program (ICP) and other mapping products as well as posting to the Environmental Response Management Application (ERMA).

The SCATalogue iOS app aligns well with the draft Data Standard and any differences can be addressed. Depending how voluntary the Data Standard becomes, it may impact the SCATalogue iOS app and OSPR's positive oil sighting protocol. OSPR uses geodatabases with shapefile output for ERMA. The output can be manipulated and is flexible, however, the app may need coding changes with the Apple app process.

For more information: https://www.wildlife.ca.gov/OSPR.

Center for Toxicology and Environmental Health, LLC (CTEH): Rapid Assessment Tool

Brady Davis (CTEH, LLC) presented on the tool that is best used simultaneously with SCAT. The Rapid Assessment Tool is a rapid, visual qualitative evaluation of shoreline conditions based on elements consistent with SCAT. The key features of the Rapid Assessment Tool are real-time reporting, advanced data visualizations, and IC support. As a case example on the Yellowstone River, CTEH assessed 27 miles of the river with two teams of three people in five days and made 8,162 oil observations with the tool. CTEH also used the tool to make 224 observations with two people following a chemical fire where the responders put dye in the water to determine the hydrography. The innovative and novel approaches of the Rapid Assessment Tool are that it is a scalable, easily customized app used on a flexible mobile framework (e.g., Android, Apple, Windows) which also offers offline data capture. Once the field data is captured using the app, the data is synchronized to CTEH's mobile data studio data server which is extracted, transformed, loaded (ETL) into the CTEH central data server. At that point, the data is reviewed using multiple quality controls. Once the data has gone through QA/QC, it is available for use in a CTEH on-site database and any approved third party databases, as well as CTEH response deliverables pertaining to GIS, cloud services, and reports. The features of the tool that most align with the proposed Data Standard are the attributes used for survey data collection and the suggested file formats used for data exchange. In order to be more aligned with the draft Data Standard, CTEH would need to add attributes such as survey method, tide height, and fields for multiple survey personnel. Not only would CTEH need to add attributes, but they would need to edit and append valid values and edit column names to align with the suggested columns name in the Data Standard. CTEH believes that the Data Standard would be a great guidance tool for any future development in regards to SCAT.

For more information: http://www.cteh.com.

Breakout Groups

Workshop participants were divided into small groups for breakout sessions. The first breakout session consisted of four parallel groups (i.e., each group discussed the same topic) and an effort was made by the organizing committee to have a distribution of participant expertise in each group. The second breakout consisted of three different groups in which participants were distributed by the organizing committee based on their role in SCAT. A list of breakout groups is located in Appendix E. Each group had a group lead to help facilitate the discussion and a note taker equipped with a laptop and projector to capture and display discussion points. The summaries presented below are an amalgamation of the key points identified by the breakout groups for their plenary reports following each session. The detailed breakout session notes are in completed predetermined templates and are available in Appendix F.

Session I

For the first breakout session, participants were divided into four parallel groups to address current concerns with respect to electronic data management for SCAT during oil spills and future needs for SCAT to improve readiness and efficacy.

Electronic Data Management for SCAT during Oil Spills

Multiple groups raised the issue that there will be situations where electronic devices will not be used and paper will be used. Field notebooks, GPS units, and cameras also provide data redundancy. Additionally, shifting from paper to electronic SCAT, there are levels of QA/QC that are lost. Multiple groups discussed the QA/QC process and the need for a standardized process and tagging system to determine the status of data and reports, as well as version control of files.

It is important to determine who gets access, when, and to what degree of detail to SCAT data. There may be different levels of security for access and control. External access to generated information products is available after data has been through QA/QC.

Offline requirements should be addressed for applications that rely on the internet.

Multiple groups raised the concern of releasing provisional or preliminary data and its use in decision making.

One group discussed electronic signatures and requirements as a part of STRs and other operational decision documents.

Future Needs for SCAT to Improve Readiness and Efficacy

The future of SCAT includes drones, canines, and other devices and there must be the ability to capture new forms of data. Best practices for the use of drones in SCAT data collection should be developed.

The immediate data transfer from the field should be separate from the formal SCAT process. One group suggested automating Extract, Transform and Load operations (ETL) in order to make a standard output and to produce products.

It is important to understand what data are available from outside sources and the limitations of their use.

One group discussed whether electronic data management should take other consultations (e.g., wildlife, State Historic Preservation Offices) into consideration in the immediate response (e.g., SCAT access, restricted areas) and STR consultation process. Another group discussed whether there is the ability to geo-reference notes and observations for good information that lacks spatial data.

Another group recommended that the data exchange deliverable be included in the draft Data Standard.

Session II

The second breakout session was divided into three different groups: (1) software developers and data managers discussing the draft Data Standard, (2) SCAT practitioners and customers discussing data handling, and (3) SCAT coordinators discussing QA/QC and data flow. While best practices were introduced during the breakout session, they were refined during the plenary discussion with all participants; best practices are discussed in a separate section.

Technical Discussion of the Draft Data Standard

The group consisted of software developers and data managers and discussed (1) segmentation and pre-segmentation, (2) additions to the draft Data Standard, and (3) data exchange formats.

The draft Data Standard allows for but does not require any segmentation and pre-segmentation. There may be locations (e.g., California) more suitable for pre-segmentation. Segments may evolve with multi-season response which is one reason why there is pressure to move away from having segments as a primary key requirement. The group recommended keeping all versions of segments and adding the start and stop dates related to segments.

The attributes used to produce products and make response decisions (e.g., oil maps) are essential to the Data Standard. It is important to address tracking over multiple seasons. There is other information (e.g., tide level at time of survey) that can be entered into a database that is not required to be collected in the field. The draft Data Standard is focused on the marine environment. The draft Data Standard should be expanded to other environments (e.g., freshwater, Arctic). When using a line, the start and stop for the latitude and longitude should be included. Raw and post-processed data should be maintained and provided in data storage. Raw data should be more explicitly addressed in the draft Data Standard.

More guidance on data exchange formats should be added to the draft Data Standard. It is important to keep flexibility, however, the group noted that a small set of specified formats would be useful. Web services should also be included.

Data Handling

The group consisted of practitioners and SCAT customers and discussed (1) data sharing plan expectations and (2) the "SCAT package".

The group addressed elements of the data sharing plan as it applied during and after the response and what SCAT data is shared when, how and by whom. As a basis for its discussions, the group assumed that a data sharing plan had been created and signed by the UC.

During a response, there are several entities involved, including: Operations, Situation Unit Leader (SITL), Joint Information Center (JIC), Documentation Unit Leader (DOCL),

Environmental Unit Leader (EUL), Liaison Officer (LNO), agency leadership, and jurisdictional entities. Data sharing includes SCAT segment reports, STRs, and products (e.g., maps, photos) that are in a usable format (per the data model), for the customer. The data is generally shared after QA/QC and must be timely in order to support the operational response. When data is transferred depends on the product and the audience. Eventually all SCAT results are delivered to the Documentation Unit and NRDA, as appropriate. The Operational decision-making is dependent on availability of analytical SCAT products, derived from raw SCAT data. There are protocols on how to transfer data (e.g., FTP site, cloud, COP) which include version control and notification to customers regarding new data.

Post response, the entities that are signatories on the data sharing plan are involved in the data sharing. In addition to the type of data shared during a response (outline above), data sharing can also include the raw data. It is preferable if the data are transferred the same way post-response as during the response. Similar to during the response, all SCAT results are eventually delivered to the Documentation Unit and NRDA.

There is no single definition for "SCAT data package", although the data sharing plan may define specific components. The SCAT data package can consist of the raw data, products and the QA/QC status. Products may include dashboard, maps, segment reports, STRs, georeferenced photos/videos. QA/QC status consists of provisional information (e.g., oiled wildlife) which could be shared with appropriate customers, and confidence statements describing where the information is in the QA/QC process. The QA/QC status varies with who is using the data. Products and data sharing might evolve over during the incident.

QA/QC and Data Flow

The group consisted of SCAT coordinators and discussed (1) data and product quality review and approval in the workflow process, (2) future workflows, and (3) SCAT products and timing of production.

In regards to the workflow process, the Team Lead oversees field data collection, whether it is paper or digital, and is responsible for data quality. In larger incidents, the field teams are not responsible for

SCAT product development. The Data Team is responsible for completeness. The SCAT Coordinator and SCAT Data Manager oversee and review the content. There could be a built-in electronic QA component in new SCAT data management systems, QA/QC needs to be more explicit for digital SCAT (e.g., flag data management system to track changes or corrections); while it was previously implicit with paper. QA/QC is done before the product is developed.

For future workflows, it is important to have experienced people on the team to ensure quality data and products in the process. The team QAs data prior to its submission, and checks for completeness and accuracy are performed by the data manager. New SCAT data management systems should have the Team Lead QC input and again post-upload. The SCAT Coordinator performs high-level checks to assure data quality, content and that the consistency is correct. There is a need for QA of processed field data and products.

A SCAT daily report (i.e., including a text summary, identification of oil, SCAT location for the next day) can, and should, be aligned with the planning cycle. The IC may be on a 24-hour action plan, but SCAT STR's may not be developed and approved in that time frame. Management expectations for the timing of SCAT products can be unrealistic and there is a risk of producing preliminary products that are not accurate. There is a need for flexibility on how to reach SCAT objectives through data generation. There may be early feedback products that can be pre-identified (e.g., heavy or light oiling). It is important to recognize that the use of electronic data collection may not necessarily lead to faster product development. Further, end users need to recognize that these products can change. There is a need to communicate change in a SCAT product within the content of the Incident Action Plan.

Best Practices

In the second breakout session, each group discussed best practices which were further refined during the subsequent plenary session.

Best Practices for the Data Standard

- The Data Standard is the best practice. If you have additional information besides the types covered in the Data Standard, it should be well documented and follow in similar format.
- Draft Data Standard is focused on marine environments with respect to NOAA's interest. Recommendation: "de-marine" the Data Standard to other environments (e.g., freshwater, Arctic). Examples of these forms have been developed (e.g., Canada).
- Metadata: Documentation should be provided of how the data was post-processed so "reverse engineering" is not needed to determine this. Recommendation: Add processing information into the documentation; additional attributes should match the field name descriptions; related files/links.
- Segments: Keep versions/documentation and add the start and stop date of when the geometry for that segment was created/used to accommodate segments that may change over time
- Latitude/Longitude: Add start and stop latitude/longitude for a line. Currently, there are not explicit fields for latitude/longitude).

- Data Strategies: Maintain and provide data storage for raw and post-processed data. Address raw data more explicitly in the Data Standard.
- Data Exchange Formats: Add more guidance by refining the list of specified file formats to the standard, but keep flexibility.
- Data Services: Include/reference the topic of web data services for the delivery and exchange of data for export. This might be added to the Data Standard as one of the acceptable ways to deliver data.
- Completion Notation: Identify the completion flags/elements/process/tracking for QA/QC status in the Data Standard. A minimum, check flags by SCAT Field Team Lead, SCAT Data Manager, and SCAT Coordinator.

Best Practices for QA/QC and Data Flow

- Manage expectations through explicit list of products and delivery time table for each product as part of the SCAT Plan, endorsed by the Unified Command.
  - Recognize phase transition in the SCAT process (e.g., recon/bulk oil removal, systematic /STR, inspection/SIR).
  - Recognize the products and timeline may change through the different phases.
  - Be able to scale (scalability/flexibility) the SCAT program based on size and complexity of event.
  - Recognize SCAT Coordinator has ultimate QA/QC responsibility and delegates this according to scale.
- Make QA/QC more explicit. Currently, it is implicit (this is related to Best Practices for the Data Standard regarding Metadata). Steps include:
  - Built-in QA in electronic system (the inherent QA built into the electronic data entry) must remain flexible and not prevent collection of data.
  - Requirement to flag the data management system and track any changes or corrections.
  - Required review on both ends of any transition between electronic field data collection and office data management system to insure data is not corrupted in transition/upload.
  - QA/QC done before a product is developed.
- Insure multi-stage QA/QC:
  - SCAT Field Team Lead is responsible for data quality (quantitative).
    - SCAT Field Team Lead must oversee data (whether it is paper or digital). This has verbal component/interaction. It addresses the data entry process.
  - SCAT Data Manager is responsible for completeness and logical consistency.
    - SCAT Data Manager insures the accuracy of the data uploaded and addresses missing information.
  - SCAT Coordinator oversees/reviews the content entered.
- Identify the completion flags/elements/process/tracking for QA/QC status in the Data Standard.

Best Practices for Data Handling and Exercise Development

Data Handling Best Practices

- There is only one data submission from a SCAT Field Team per survey (paper or electronic).
- SCAT Field Team Leads should be competent/experienced and understand the paper vs. electronic data capture transition.
- If electronic field data collection tools are being used, at least one team member should be competent in those applications.
- Until electronic field data collections systems are operational, hard copy field data must still be collected as a backup.
- SCAT Data Managers should be competent/experienced.
- SCAT Field Team Leads, SCAT Data Managers and SCAT Coordinators need time to perform adequate verification of day's products/data.

Exercise Development Best Practices

- There are templates for data sharing plans that can be used (See Appendix G).
- In order to support SCAT in exercises, there must be adequate "Truth" documentation prepared in advance.
    - Most drills operate 0-48 hr, but to exercise SCAT, drills must be longer or simulate a longer period.
    - To be effective, there must be adequate staffing for SCAT.
    - Exercise SCAT drill data must be complete and developed ahead of time.
- Data sharing (including SCAT data) should be an objective in exercise(s).
- During exercises, a realistic time line for SCAT products must be provided.
    - Develop estimates of time line for SCAT data products (e.g., using NOAA SCAT manual).
- The interoperability of SCAT tools should be tested in exercises.
- Lessons learned regarding SCAT data management must be captured and shared (e.g., RRTs, area committees).
    - A template for this could be the processes used when ERMA was developed as the COP. Similar lessons learned could be applied to SCAT (N.B., States are a key players.).

Path Forward and Conclusion

The Best Practices and Path Forward addressed the current concerns regarding electronic data management for SCAT in oil spills, evaluated the future needs, and provided next steps for the SCAT community. The workshop concluded with a plenary discussion of the path forward. Participants were asked:

What would you consider 'metrics of success' with respect to the outcomes discussed at this workshop within six months, one year, and three years?

Six months:

- Highest priority: Establish a structure on who and how participants will continue to meet regarding the SCAT for the future (e.g., workshop, working group, offline, joint industry, meeting on SCAT at Clean Gulf, AMOP).
- Revise the draft Data Standard and post for agency and industry access.
- Develop a communication strategy to educate and manage expectations of Incident Managers, state representatives, RRTs, other user groups (e.g., NRDA) regarding the draft Data Standard and data sharing. Provide information before a drill.
- Make SCAT data explicit to information workflow, including the QA/QC checks, with proposed time frames for products focused for SCAT coordinators and management teams, as well as for the communication strategy. This is internal to SCAT Coordinators.

One year:

- Incorporate SCAT data management in an appropriate exercise implementing workshop outcomes.
    - Incorporate electronic data capture mobile app, e.g., starting Day 5 (SCAT Teams already in place).
    - Incorporate the new Data Standard, QA/QC, data flow, data sharing.

Three years:

- Support of the Data Standard: Incorporate it within SCAT data management tools and field data collection tools.
- Include SCAT data management as part of American Society for Testing and Materials (ASTM) International.
- Incorporate best practices in the NOAA Shoreline Assessment Manual.

The workshop provided the opportunity for feedback from stakeholders on the draft NOAA Data Standard and data sharing agreement strategies regarding SCAT.

Addendum:

A SCAT for Tomorrow meeting was held in conjunction with IOSC 2017 (May 17, 2017, Long Beach, CA). The SCAT organizing committee gave updates on the Data Standard and the status of future activities. The following are the major outcomes of that meeting:

- A revised draft NOAA SCAT Data Management Standard incorporating suggestions from the May meeting has been completed per workshop attendee suggestions.
- Another SCAT for Tomorrow meeting will be held at Clean Gulf in December 2017.
- Working Groups will be convened to continue work on SCAT for Tomorrow.

Appendix