

Best Practices in Deploying Field Data Collection Solutions

National Geospatial Preparedness Summit

December 3, 2018

National Alliance for Public Safety GIS (NAPSG) Foundation

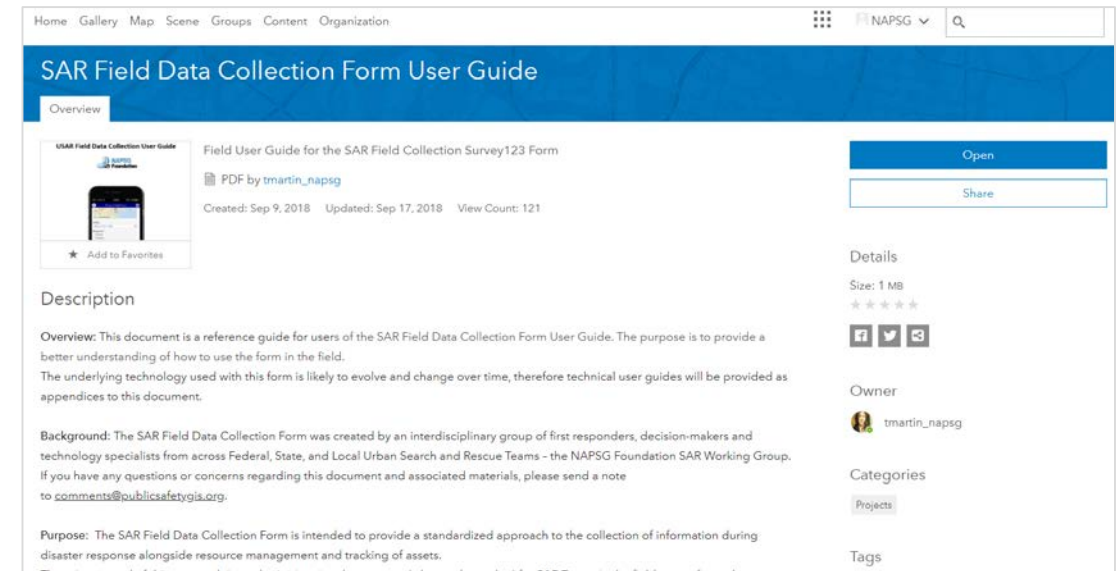
napsfoundation.org | [@napsfoundation](https://twitter.com/napsfoundation)

Goals and Objectives

Learn technical skills for deploying a standardized form for field data collection into your web GIS infrastructure. Participants will also develop skills for incorporating live data collected in the field into situational awareness applications and other solutions.

Agenda

- Intro to Survey123 – Esri
- Background: Standardized Survey123 Form developed by the SARGIS Field Data Collection Working Group and used during the 2018 Hurricane Season
- Download and Deploy SAR Prototype Survey using Connect for ArcGIS (xls)
- Configure a Dashboard to display field data
- Demonstration of Webhook Configuration
- View Live Survey Results coming in from the field
- Additional Resources



Survey123 for ArcGIS: An Introduction

Jeremiah Lindemann, Esri
Chris Ferner, Esri

Forms > Survey123

a printed or typed document with blank spaces for insertion of required information

The image shows two overlapping Survey123 forms. The top form is titled "Getting To Know You Survey" and includes a grid for rating various activities. The bottom form is titled "Digital Advanced Control Light Controller Survey Form" and includes a grid for rating various features.

Many Industries

Forestry
Public Safety
Government
Utilities
Health
Transportation
Emergency Management

Many Needs

Incident Reports
Damage Assessments
Inspections
Asset Inventories
Interviews

Smart Forms for ArcGIS

Easily convert paper forms into Digital Smart ArcGIS Forms

Digital Advanced Street Light Condition Survey Form

Getting to Know Your Survey



Asset Inspection

Inspection date:
Wednesday, November 04, 2015

Asset ID:
Scanning if available

Photo

Action required?
☐ Yes
☐ No

Asset location:
Map view

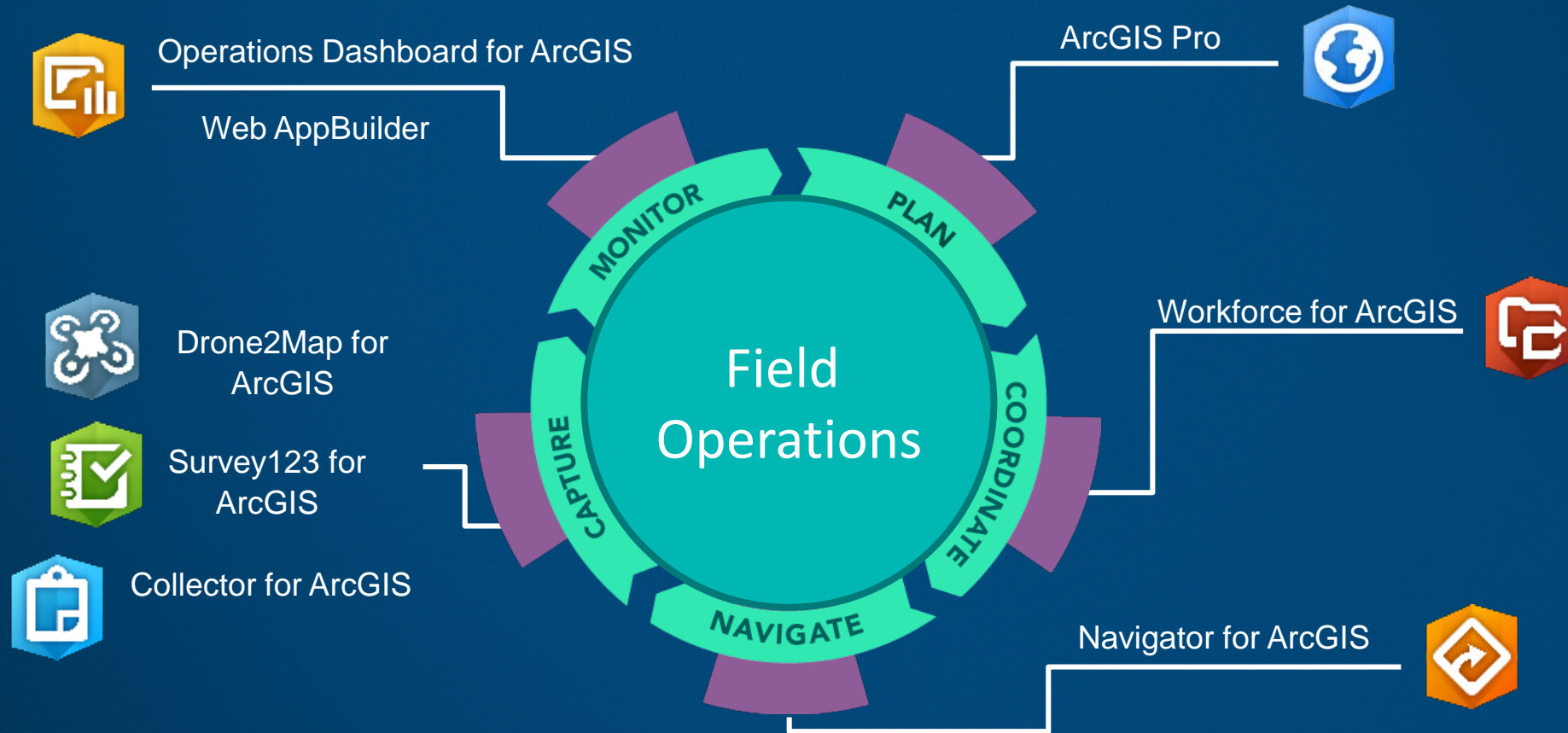


Why Smart Forms in ArcGIS?

- **Reduce Errors**
 - During Data Capture
 - Transcribing data from paper to digital
- **Boost Field Data Capture productivity**
 - Precompute responses
 - Associate photos with alphanumeric data
- **Data: From the field to the office in Real Time**
- **All data captured is georeferenced**



Field Operations and ArcGIS Apps





1- Ask Questions

(Design & Publish)



2- Get Answers

(Capture Data)

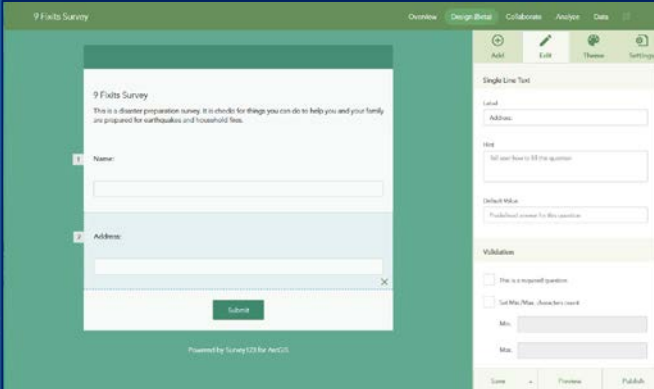


3- Make Decisions

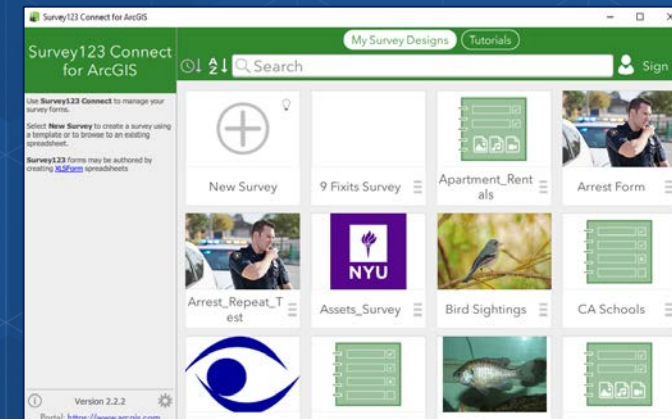
(View & Analyze)

Creating Surveys

- **Survey123 Web Designer**
 - Built within the Survey123 website
 - Interactive WYSIWYG user experience
- **Survey123 Connect**
 - XLSForms based
 - Uses spreadsheet editor
- Video: [Product overview](#)



The screenshot displays the Survey123 Web Designer interface. The main window shows a survey form titled "9 Fixits Survey" with a description: "This is a disaster preparation survey. It is checks for things you can do to help you and your family are prepared for earthquakes and household fires." The form includes two numbered sections: "1 Name" with a text input field and "2 Address" with a text input field. A green "Submit" button is at the bottom. On the right, a sidebar shows the "Single Line Text" question type settings, including fields for "Label", "Address", "Hint", "Default Value", and "Validation". The top navigation bar includes "Overview", "Design Beta", "Collaborate", "Analyze", and "Data".





1- Ask Questions

(Design & Publish)



2- Get Answers

(Capture Data)



3- Make Decisions

(View & Analyze)

1- Ask Questions (Tools for authoring your surveys)



- **Survey123 Web Designer:**
 - Build smart forms graphically right from your web browser
 - Very easy to get started.
 - Ideal for simple forms
- **Survey123 Connect:**
 - A downloadable desktop tool. Works in combination with Microsoft Excel.
 - Requires learning and familiarity with XLSForms specification
 - Complete smart form capabilities

1- Ask Questions (Publishing and Sharing)



- **Publishing**

- Survey123 Smart Forms are published into ArcGIS
 - Forms are a new type of item
 - Feature layers (new or existing) store captured data
- ArcGIS Online and ArcGIS Enterprise support

- **Sharing**

- Survey123 leverages the ArcGIS security model: Named Users and Groups
- You can define distinct security rules to:
 - Field Users: Submit data to your survey
 - Stakeholders: View the results of your survey



1- Ask Questions

(Design & Publish)



2- Get Answers

(Capture Data)



3- Make Decisions

(View & Analyze)

2- Get Answers



- **Survey123 WebForms**

- Capture data from a web browser. Can be embedded within a web site.
- Nothing to install.
- Online only. Add new data only.

- **Survey123 Field App**

- Available for download (Google Play,iOS, Windows, Mac)
- Leverage device sensors (external GPS, camera etc)
- Can work Online and Offline
- Can add new data and update existing features.



1- Ask Questions

(Design & Publish)



2- Get Answers

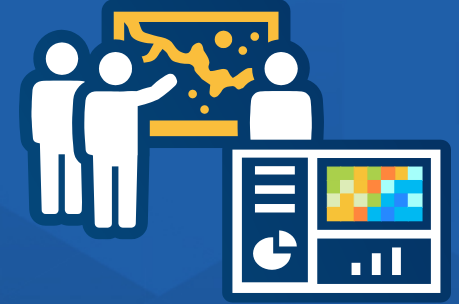
(Capture Data)



3- Make Decisions

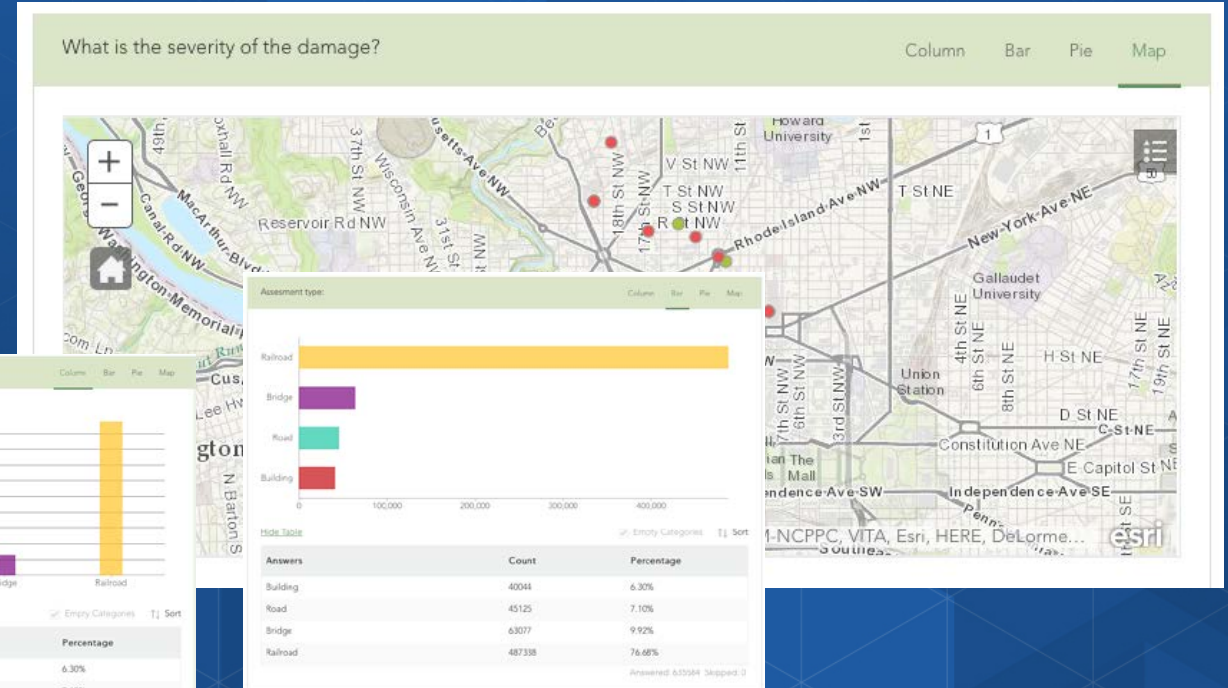
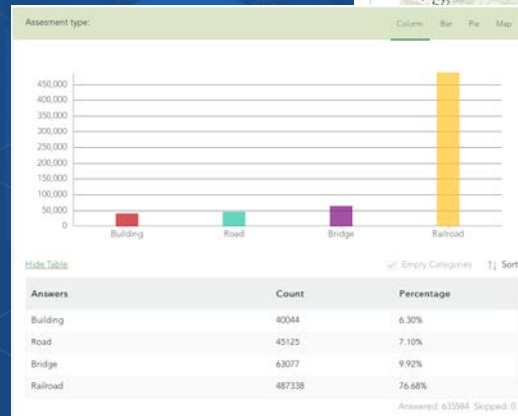
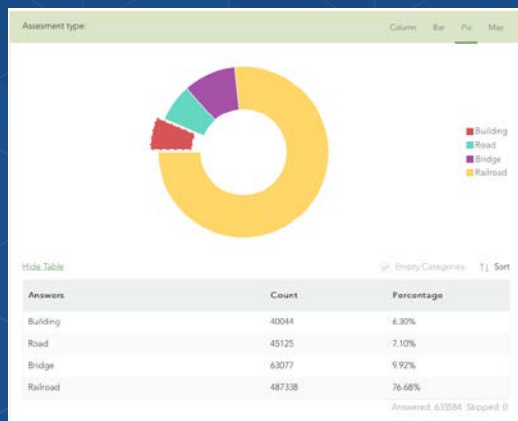
(View & Analyze)

3- Make Decisions

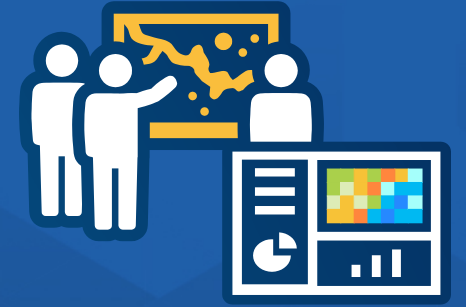


- Ready to use Reporting tools

- Understand data submission patterns
- Create detailed survey reports
- Aggregate survey data
- Selectively download data



3- Make Decisions



- **Real-Time data collection**
 - Survey123 submitted data is immediately available for visualization and analysis
 - All data stored in ArcGIS Feature Services

- **Multiple Uses of data**

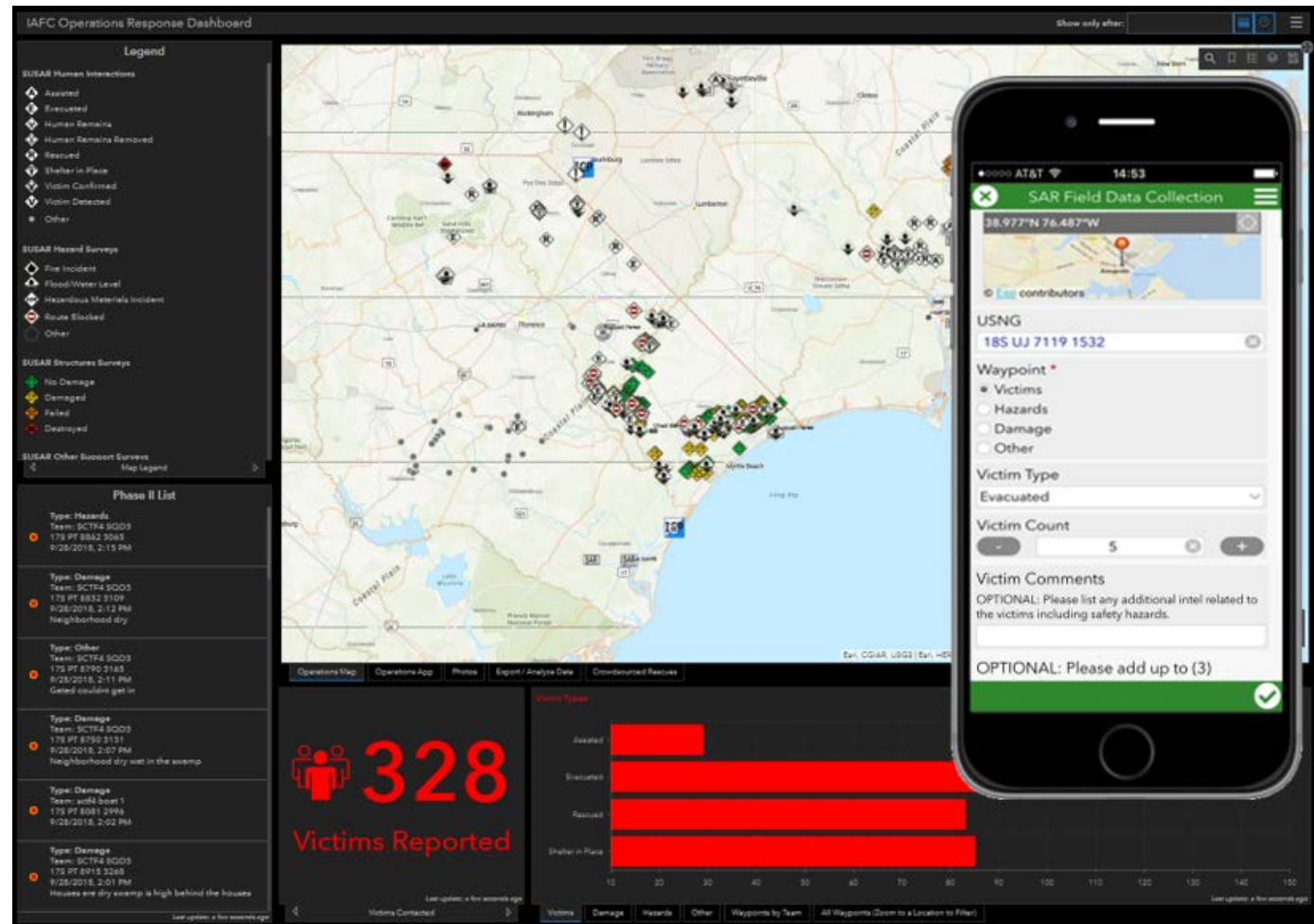


Phase II Field Data Collection Form

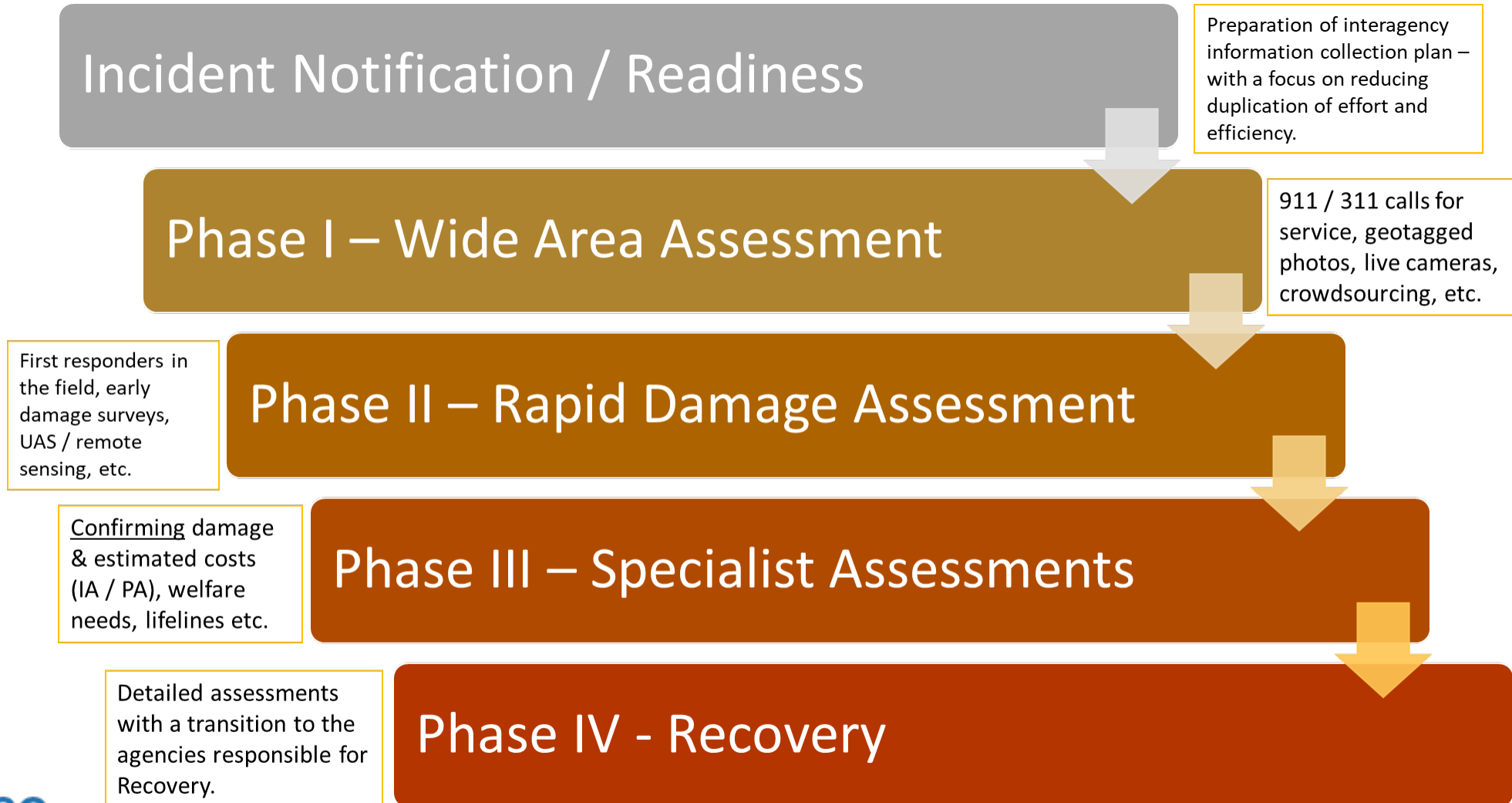
Standardized Survey123 Form developed by the SARGIS Field Data Collection Working Group and used during the 2018 Hurricane Season

Hurricane Florence Summary:

- Survey deployed and hosted by International Association of Fire Chiefs (IAFC) in partnership w/NAPSG
- 60 SAR teams from 11 states
- FEMA (IST AND REGION) and US Coast Guard
- 2,600 field forms submitted from 340+ users
- Multiple support/help resources documented in the [SAR Toolkit Guide](#)



Phases

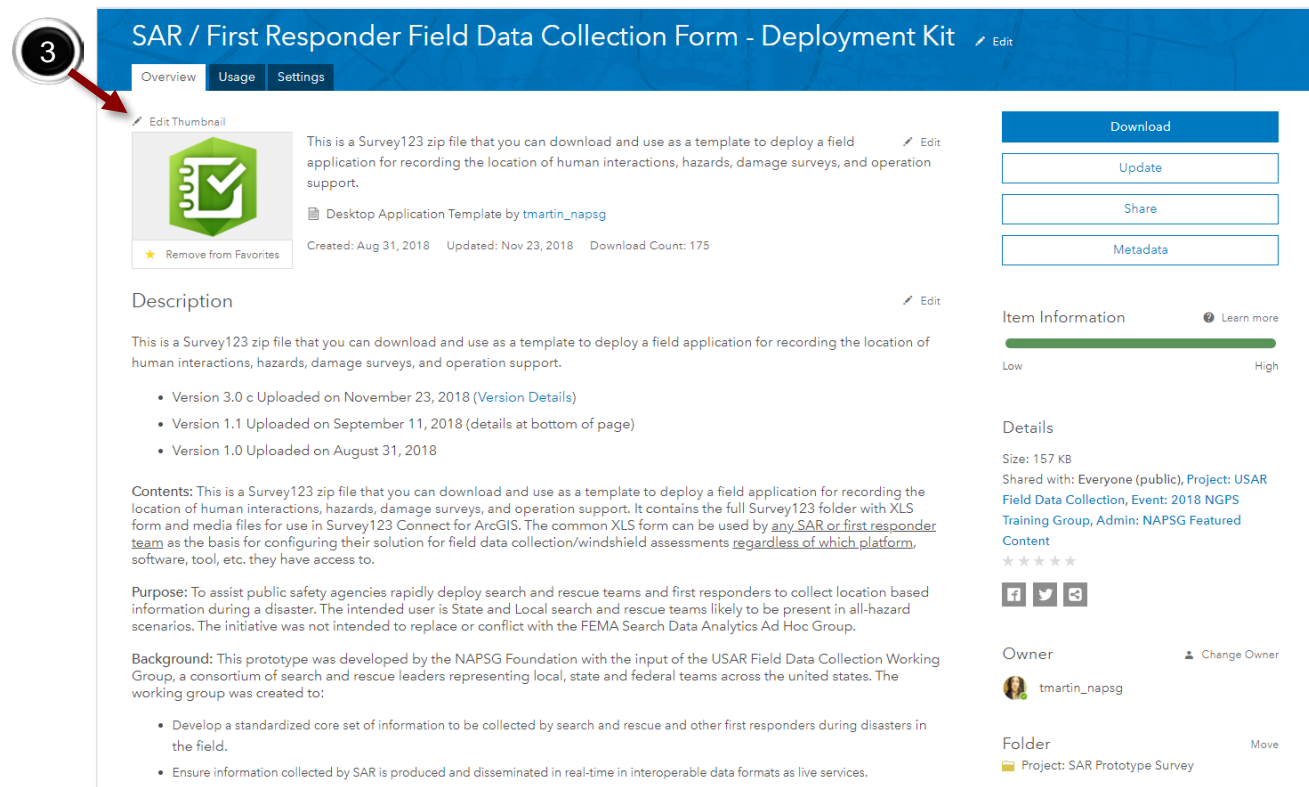


**diagram is based on the [Australasian Damage Assessment Framework](#)*

Deployment Toolkit

Review and follow the instructions for downloading the Survey

1. Download Survey123 Connect for ArcGIS <https://doc.arcgis.com/en/survey123/download/>
2. Download zip file with SAR Survey from Deployment Kit page <http://bit.ly/2FALLzP>
3. Follow steps for opening survey locally



SAR / First Responder Field Data Collection Form - Deployment Kit Edit

Overview Usage Settings

Edit Thumbnail

This is a Survey123 zip file that you can download and use as a template to deploy a field application for recording the location of human interactions, hazards, damage surveys, and operation support.

Desktop Application Template by tmartin_napsg

Created: Aug 31, 2018 Updated: Nov 23, 2018 Download Count: 175

Remove from Favorites

Description

This is a Survey123 zip file that you can download and use as a template to deploy a field application for recording the location of human interactions, hazards, damage surveys, and operation support.

- Version 3.0 c Uploaded on November 23, 2018 (Version Details)
- Version 1.1 Uploaded on September 11, 2018 (details at bottom of page)
- Version 1.0 Uploaded on August 31, 2018

Contents: This is a Survey123 zip file that you can download and use as a template to deploy a field application for recording the location of human interactions, hazards, damage surveys, and operation support. It contains the full Survey123 folder with XLS form and media files for use in Survey123 Connect for ArcGIS. The common XLS form can be used by any SAR or first responder team as the basis for configuring their solution for field data collection/windshield assessments regardless of which platform, software, tool, etc. they have access to.

Purpose: To assist public safety agencies rapidly deploy search and rescue teams and first responders to collect location based information during a disaster. The intended user is State and Local search and rescue teams likely to be present in all-hazard scenarios. The initiative was not intended to replace or conflict with the FEMA Search Data Analytics Ad Hoc Group.

Background: This prototype was developed by the NAPSG Foundation with the input of the USAR Field Data Collection Working Group, a consortium of search and rescue leaders representing local, state and federal teams across the united states. The working group was created to:

- Develop a standardized core set of information to be collected by search and rescue and other first responders during disasters in the field.
- Ensure information collected by SAR is produced and disseminated in real-time in interoperable data formats as live services.

Download

Update

Share

Metadata

Item Information Learn more

Low High

Details

Size: 157 KB

Shared with: Everyone (public), Project: USAR Field Data Collection, Event: 2018 NGPS Training Group, Admin: NAPSG Featured Content

Owner Change Owner

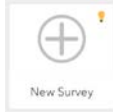
tmartin_napsg

Folder Move

Project: SAR Prototype Survey



Survey123 Connect

1. Unzip the file to an appropriate location on your computer.
2. Open Survey123 Connect (this should be in your ArcGIS apps folder)
3. Click the + button to Add a New Survey 
4. Select the option to use a File for the initial XLSForm design. Browse to the unzipped folder and select "**Phase_II_SAR_Form_v3**".
*You will be able to edit and create surveys but will need to log into your AGOL account to publish.
5. Give your Form a Title. For example, " Phase_II_SAR_Form _*YourName*". You will also want to edit the basic header information with your organization and any other important details.
6. Open the "media" folder to copy and paste all files from the "media" folder in the original "Prototype_Phase_II_SAR_Form" that you unzipped earlier to this location.
7. Create Survey



Demonstration

Explore Survey in Connect for ArcGIS

Demonstration: Survey123 Connect

View and Configure the Template for Deployment


Settings Page

Survey123 Connect for ArcGIS

Form Preview Schema Preview Settings

General Style Map Images Inbox Sent Surveys

Thumbnail



Title

Phase II SAR Form v3

Summary

Phase II SAR Field Data Collection Prototype Form v3.0c

Description

Prototype Only

The Field Data Collection form is based on the Phase II SAR Field Data Collection Prototype Form v3.0c. This is a prototype (not for real-world use at this time) template of standardized core information collected by search and rescue and other first responders during a disaster in the field. It has been developed by the National Alliance For Public Safety GIS (NAPSG) Foundation with input from the SAR Field Data Collection Working Group.

This template includes all XLSForm features supported in Survey123 for ArcGIS

?

Survey123 Connect

Test out the form in Form Preview, noting:

- Form Questions
- Follow-up Questions
- Question Types

The screenshot shows the 'Form Preview' window for a survey titled 'Phase II Field Data Collection'. The interface includes a green header bar with navigation tabs: 'Form Preview' (selected), 'Schema Preview', and 'Settings'. A left sidebar contains icons for a survey form, a data table, a folder, and a user profile. The main content area displays the following text:

Prototype developed by the [NAPSG Foundation](#) with input from the SAR Field Data Collection Working Group. Open the [Data Dictionary](#) for descriptions on SAR terminology and symbology.

Hint: To enlarge buttons on your device, go back to the 'My Surveys' page. Select the hamburger button (top right), 'Settings' and increase the 'Text Scale'.

▶ Event Details: *Hint: **Expand and Complete** Team Name, Your Name, and County/State fields, and then ★ **Set as Favorite** (using the top right hamburger button) to pre-populate future forms.

Location ★
Select the map to improve location accuracy or search an address / place / USNG.

A map is displayed with a red location pin. Above the map, the coordinates are shown as 39°8'N 76°37'W ± 91 m. The map includes labels for roads such as Covington Ave, Elvaton Rd, and Paul I Pitcher Memorial Hwy, and a 'Center of Applied Technology'.

Below the map, there is a 'USNG' section with a text input field containing the value '18S UJ 5993 3286'.

The bottom of the window features a green status bar with a question mark icon, the text 'Load time on Windows 1.2 seconds', and a 'Validate Input' button with a checkmark icon.

Survey123 Connect

Open the .xls



Review the tabs

Excel window: Phase II SAR Form v3.xlsx - Excel

Table Tools: Design

Table: esriFieldTypeDouble

	A	B	C	D	E	F	G	H
	type	name	label	hint	constraint	constraint_message	required	required_message
1	note	header_text	Prototype developed by the NAPSG Foundation with input from the SAR Field Data Collection Working Group. Open the Data Dictionary for descriptions on SAR terminology and symbology.					
2	note	help	<H5>Hint: To enlarge buttons on your device, go back to the 'My Surveys' page. Select the hamburger button (top right), 'Settings' and increase the 'Text Scale'.</H2>					
3	begin group	favorites	<h5>Event Details:</h5> *Hint: Expand and Complete Team Name, Your Name, and County/State fields, and then ★ Set as Favorite (using the top right hamburger button). In ^{pre-populate future forms.}</h5>					
4	text	team_name	Team Name					
5	text	team_user	Your Name					
6	end group							
7	geopoint	location	Location				yes	
8	text	usng	USNG					
9	select_one	waypoint	Waypoint				yes	
10	calculate	waypoint_cat_cal	Waypoint Category					
11	hidden	mgrs	MGRS					
12	hidden	state_territory	State					
13	hidden	county	County					
14	hidden	horizontalaccuracy	Horizontal Accuracy					
15	integer	victim_num	Person Count				>0	
16	begin repeat	victim_details	Patient Identification					
17	text	victim_note	* IMPORTANT: Use this field in accordance to the agency having jurisdiction guideline regarding personally identifiable information (PII).					
18	end repeat							
19	text	victim_desc	Human Interaction Comments			OPTIONAL: Please list any additional info related to the human interactions.		
20	text	water_depth	Water Depth (Inches)			Depth of water in inches.		
21	text	haz_other	If Other, please list.					
22	text	haz_desc	Hazard Comments			OPTIONAL: Please list any additional info related to the hazard including Name or Asset Description		
23	text	asset_other	Other			OPTIONAL: Please list any additional		
24	text	comments	Comments			OPTIONAL: Please list any additional		
25	text	dmg_loc	Address or Location			OPTIONAL: Street Address or Location Description		

Ready

survey choices settings types

Phase II Survey Highlights: Questions

- Hidden Fields:
 - [Pulldata feature](#) to grab US National Grid USNG, Lat & Long
 - Horizontal Accuracy
 - Capture time to complete survey
- Categories
 - 4 types prompting specific follow-up (relevant) questions
 - Subcategories all then pulled into a single field using an IF statement for analysis & interoperability with FEMA data schema
- Appearance
 - Groups
 - Minimal
 - Dropdowns
- Choices
 - Match (as close as possible) FEMA Iron Sights options
 - Include SAR standard symbology

Phase II Survey Highlights: Settings

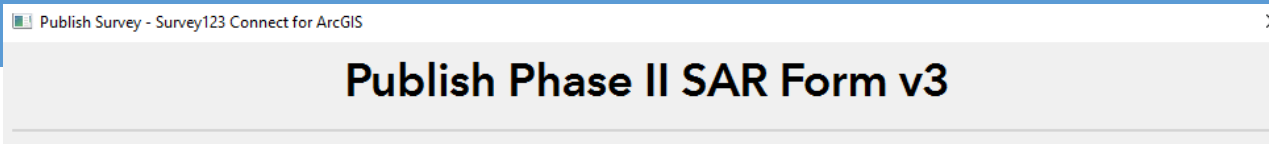
- Enable Inbox – Allowed mobile team to see locations of surveys submitted by other team. Spatial Filter – list of surveys currently in view.
- Instance Name – Configured the “name” of each survey submitted to be the Location (USNG) and Category (located in the settings tab of the .xls)
- Map – Set the basemap, zoom level and coordinate format displayed on the map

Survey 123 Connect: Modify Survey & Publish

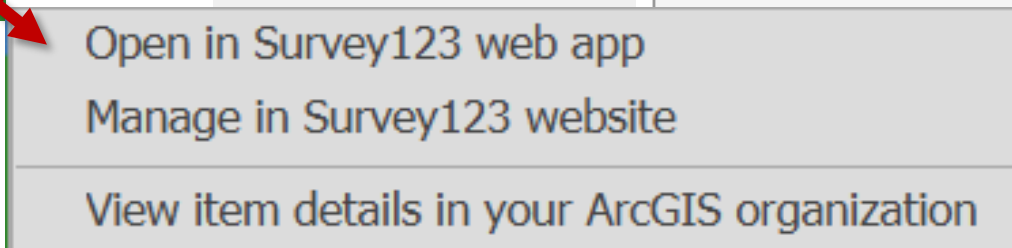
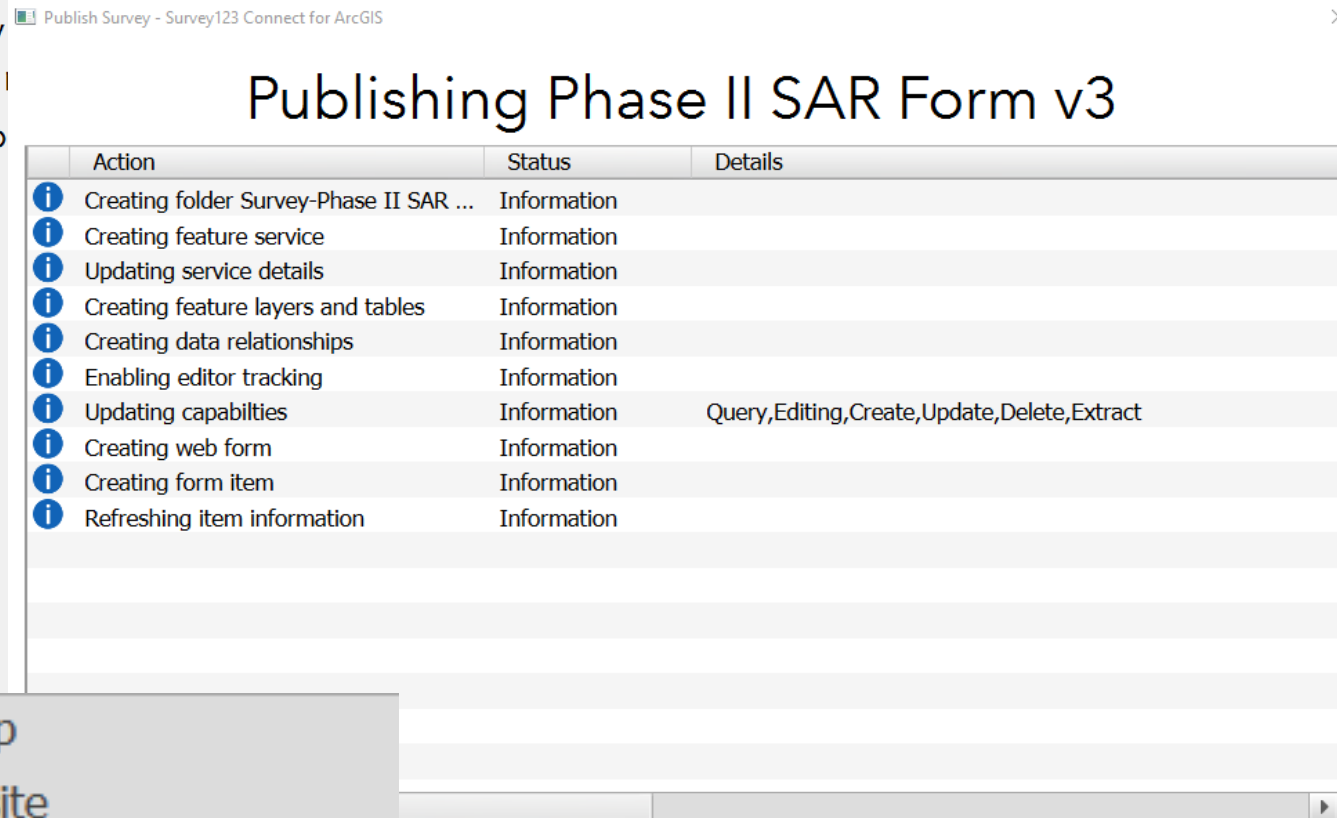


- Opens excel file for survey.
- Saving the excel form updates the survey and the display
- Folder created for each survey that includes the xls and media folder (icons in survey)
- Publish Survey
 - Some changes can be made and the survey re-published without the loss of the data
Read more: <https://doc.arcgis.com/en/survey123/browser/create-surveys/publishsurvey.htm#>

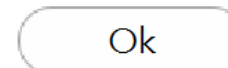
Publish the survey



Warning: Once a survey without losing data that
Tip: Before you share your design is complete.



Publishing completed



Demonstration

View and Manage Survey in ArcGIS Online

Open in Survey123 web app

Phase II Field Data Collection

Prototype developed by the [NAPSG Foundation](#) with input from the SAR Field Data Collection Working Group. Open the [Data Dictionary](#) for descriptions on SAR terminology and symbology.

Hint: To enlarge buttons on your device, go back to the 'My Surveys' page. Select the hamburger button (top right), 'Settings' and increase the 'Text Scale'.

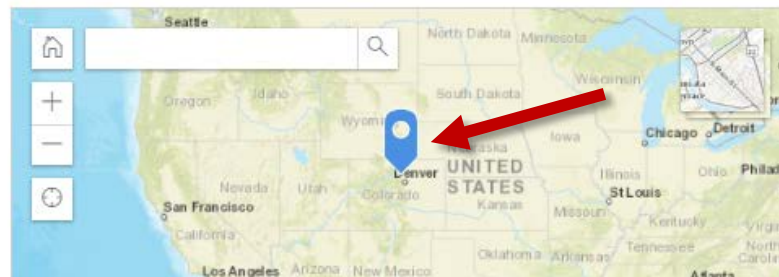
Event Details: **Hint: **Expand and Complete** Team Name, Your Name, and County/State fields, and then ★ **Set as Favorite** (using the top right hamburger button) to pre-populate future forms.*

Team Name

Your Name

Location*

Select the map to improve location accuracy or search an address / place / USNG.



Manage in Survey123 website

Phase II SAR Form v3

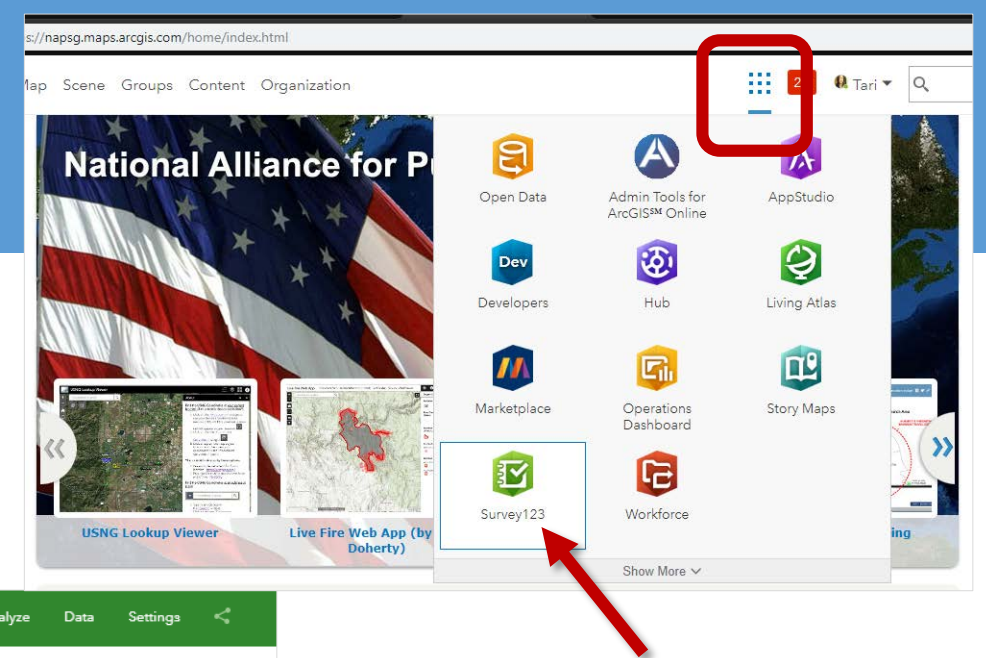
Overview

Phase II SAR Field Data Collection Prototype Form v3.0c

First created on: Nov 20, 2018

The survey is **private** now. No one except you can submit data to the survey.

The survey has no records



Phase II SAR Form v3

Overview Design Collaborate Analyze Data Settings

Submitter

Viewer

Group Settings

Choose who can submit data to this survey:

☐ Everyone (Public)

☐ Members of my organization (NAPSG Foundation)

☒ Following Groups:

☐ Event: 2018 NGPS - Winter Wrath Exercise Planning Group Details

☒ Event: 2018 NGPS Training Group Details

☐ Event: 2018 SARGIS10 Group Details

☐ Event: Colorado NCR Field Exercise (May 2018) Details

Save

Survey link:

☐ Open the survey in browser directly

☒ Ask the user how to open the survey, in browser or in the Survey123 field app

☐ Open the survey in the Survey123 field app directly. (Learn more about this option)

View Item Details Page

Phase II SAR Form v3

Edit

Overview

Usage

Settings

Edit Thumbnail

v3.0

Add to Favorites

Phase II SAR Field Data Collection Prototype Form v3.0c

Form by tmartin_napsg

Created: Nov 20, 2018 Updated: Nov 20, 2018 View Count: 0

Edit

Open in Survey

Share

Metadata

Item Information

Learn more

Low

High

Top Improvement:

Add a longer summary

Details

Size: 146 KB

Shared with: The item is not shared.

★★★★★

f

t

e

Owner

Change Owner

Description

Edit

Prototype Only

The Field Data Collection form is based on the Phase II SAR Field Data Collection Prototype Form v3.0c. This is a prototype (not for real-world use at this time) template of standardized core information collected by search and rescue and other first responders during a disaster in the field. It has been developed by the National Alliance For Public Safety GIS (NAPSG) Foundation with input from the SAR Field Data Collection Working Group.

This template includes all XLSForm features supported in Survey123 for ArcGIS.

Layers

Phase II SAR Form v3

Demonstration

Prepare Survey Feature Layers and Web Map

Prepare Data and Web Map

Steps:

- Create Feature Views
 - Human Interactions
 - Hazard Surveys
 - Structures Surveys
 - Other Support Surveys
- Locate your [SA Web Map](#) and Add Feature Views & master (SUSAR All Survey Data)
- Create Dashboard from updated SA Web Map

Create Feature Views

- For each Category (Damage, Human Interactions, Hazards, Other Support), update:
 - Filter (waypoint_cat_cal)
 - Symbology ([NAPSG Symbol Library](#))
 - Configure Pop-Up
- Save as New Layer

Content

My Content

My Favorites

My Groups

My Organization

Living Atlas

+ Add Item

Create

Search Survey-Phase II SAR Form v3

1 - 2 of 2 in Survey-Phase II SAR Form v3

Sort by: Date

Folders

New

Filter folders

Survey-Phase II Feedback Form (State)

Survey-Phase II SAR Form v3

Phase II SAR Form v3

Form

Phase II SAR Form v3

Feature Layer (hosted)

Phase II SAR Form v3

Overview Data Visualization Usage Settings

Save Layer

Save As New Layer

Change the layer's default style, filter, pop-ups and labels.

Phase II SAR Form v3

Add Feature Views to SA Viewer Map

The image displays two overlapping screenshots from the ArcGIS online interface. The background screenshot shows the 'Content' page with a search for 'Survey-Phase II SAR Form v3', listing six items. The foreground screenshot shows the 'Situational Awareness Viewer-SAR' map application with a layer list on the left and a map of Colorado on the right.

Content Manager Screenshot:

- Content Header:** My Content | My Favorites | My Groups | My Organization | Living Atlas
- Search:** Search Survey-Phase II SAR Form v3
- Results:** 1 - 6 of 6 in Survey-Phase II SAR Form v3
- Table:**

Title
Other Support View
Human Interactions View
Structure Damage View
Hazards View
Phase II SAR Form v3 - Master View
Phase II SAR Form v3

Situational Awareness Viewer-SAR Screenshot:

- Map Title:** Situational Awareness Viewer-SAR
- Map Tools:** Home, Details, Add, Edit, Basemap, Analysis, Share, Directions, Find address or place
- Contents Panel:**
 - All Survey Data
 - ☒ Hazards Surveys
 - ☒ Structure Damage Surveys
 - ☒ Human Interactions Surveys
 - ☒ Other Support Surveys
 - ☒ Base Data - NCR Counties
 - ☒ COFloodTTX18 BaseData Areas - NCROutline
 - ☒ COFloodTTX18 BaseData Areas - COFloodTTX18 BaseData NCRMAsk
- Map:** A map of Colorado showing major cities (Longmont, Boulder, Denver, Aurora, Littleton, Castle Rock) and highways (72, 76, 70, 25, 86, 24, 285). The map includes a scale bar (0 to 20 miles) and a north arrow.

Demonstration

Configure Operations Dashboard

Dashboard

Header Panel

Category Selector:

Filter by: Team Name

Preferred Display Type: Dropdown

Actions: Filter (list and serial charts)

LIST

Data:

Sort By: start_time

List Options:

Type: {waypoint} {asset_other}

Team: {team_name}

{usng}

{editDate}

{victim_desc}{haz_desc}{asset_other}{dmg_desc}

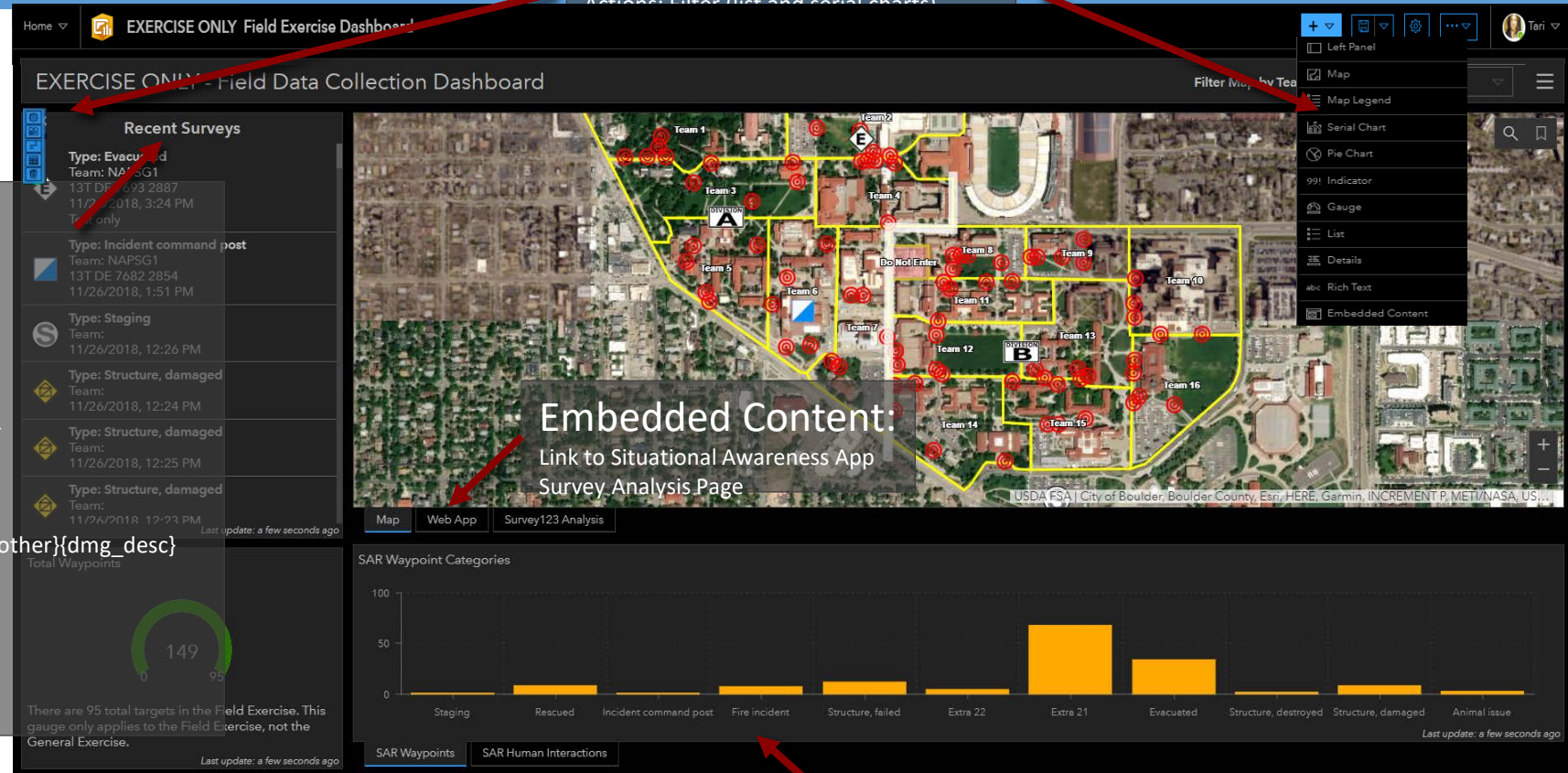
Actions

Pan (map)

Show Pop-up (map)

Flash (map)

Zoom (map)



Serial Chart(s)

"SAR Waypoints" - Category Field: waypoint_cat_cal

"SAR Human Interactions" - Filter = Human Interactions

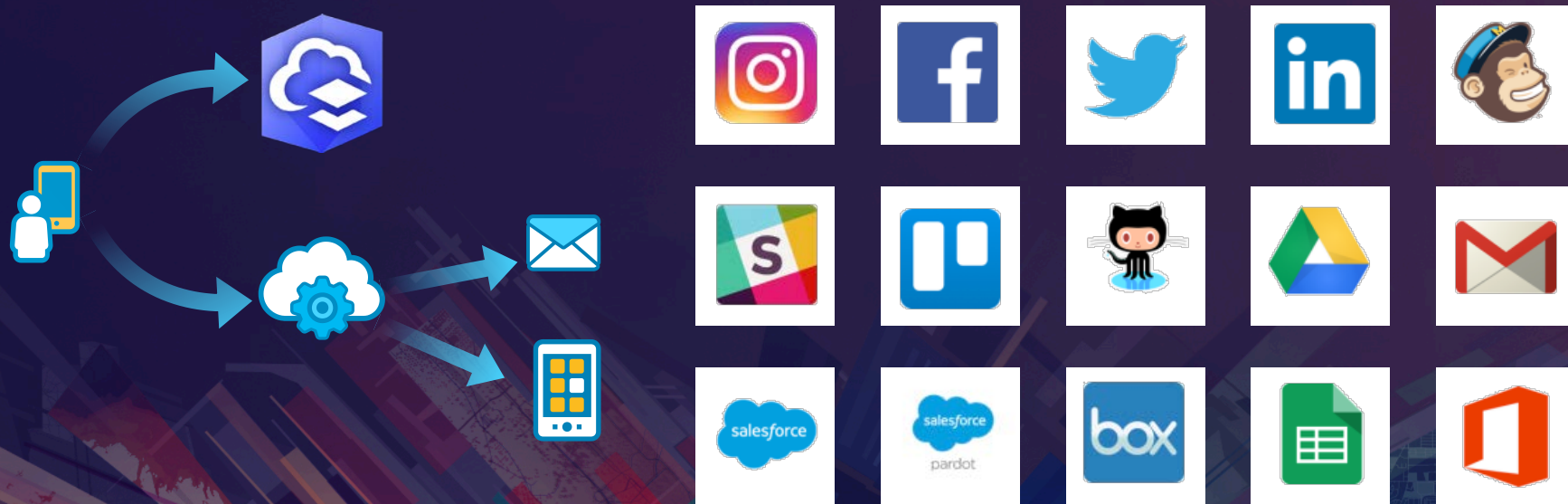
Completed Dashboard: <https://arcg.is/1KLq84>

Introduction to Webhooks



Survey123 version 3.0 integrates with hundreds of apps and services

- Office 365, SalesForce, Google (Gmail, Drive, Sheets...), Box, Social Media...
- No code required, out the box, instant.

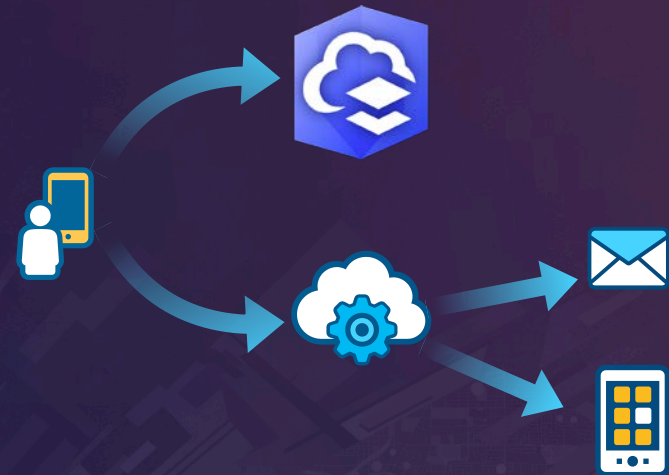


Common Use Cases

- **Instant Notifications (SMS, e-mail, Push Notifications):**
 - Send an e-mail to a supervisor when a new well pad inspection is performed
 - SMS an emergency team coordinator when a High Priority Incident is submitted
- **Instant Data Transfer (Box, Office 365, Google Drive, Box, Salesforce Pardot)**
 - Associate customer satisfaction survey data with prospects in Salesforce Pardot
 - Automatically log in an Office 365 Excel worksheet all data sent through a survey
- **Other:**
 - Create a calendar event when a new Inspection is scheduled from Survey123
 - Register a new PayPal payment when a new City Code violation is reported
 - Invoke my own web service when a new survey is submitted

How it works

- **Survey123 is adding support for webhooks**
 - A webhook is simply an HTTP callback... a URL
 - Survey owners can associate one or more webhook URLs with a survey
 - Webhooks are invoked after data is submitted from Survey123...
 - The receiving app or service, takes the data and does something with it

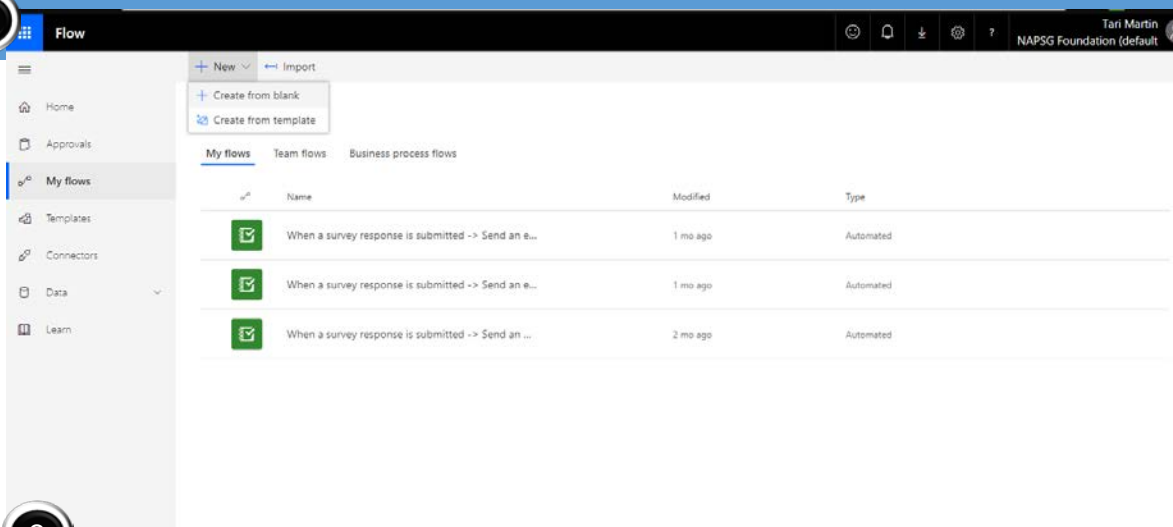


How it works

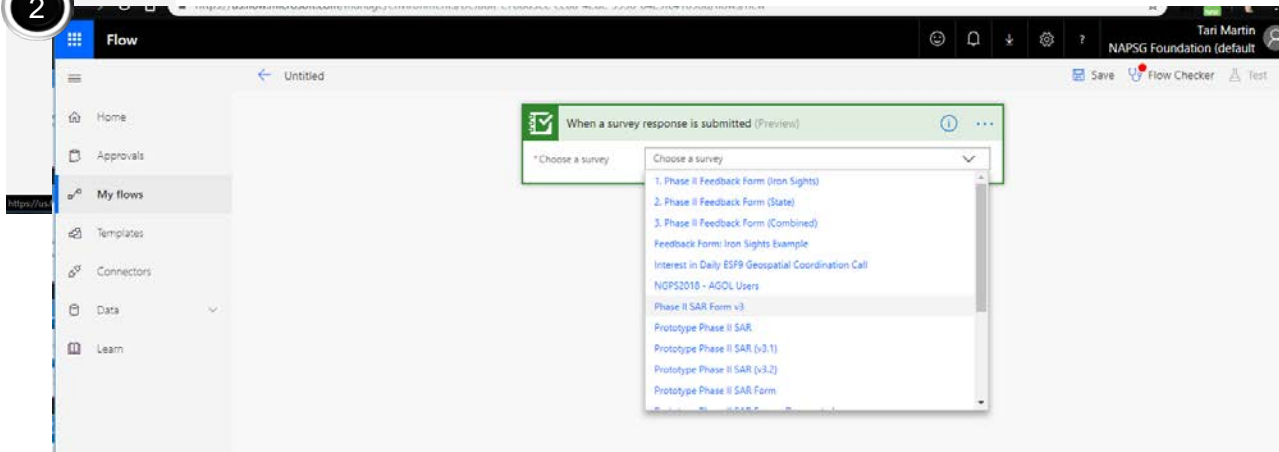


Webhooks – Microsoft Flow

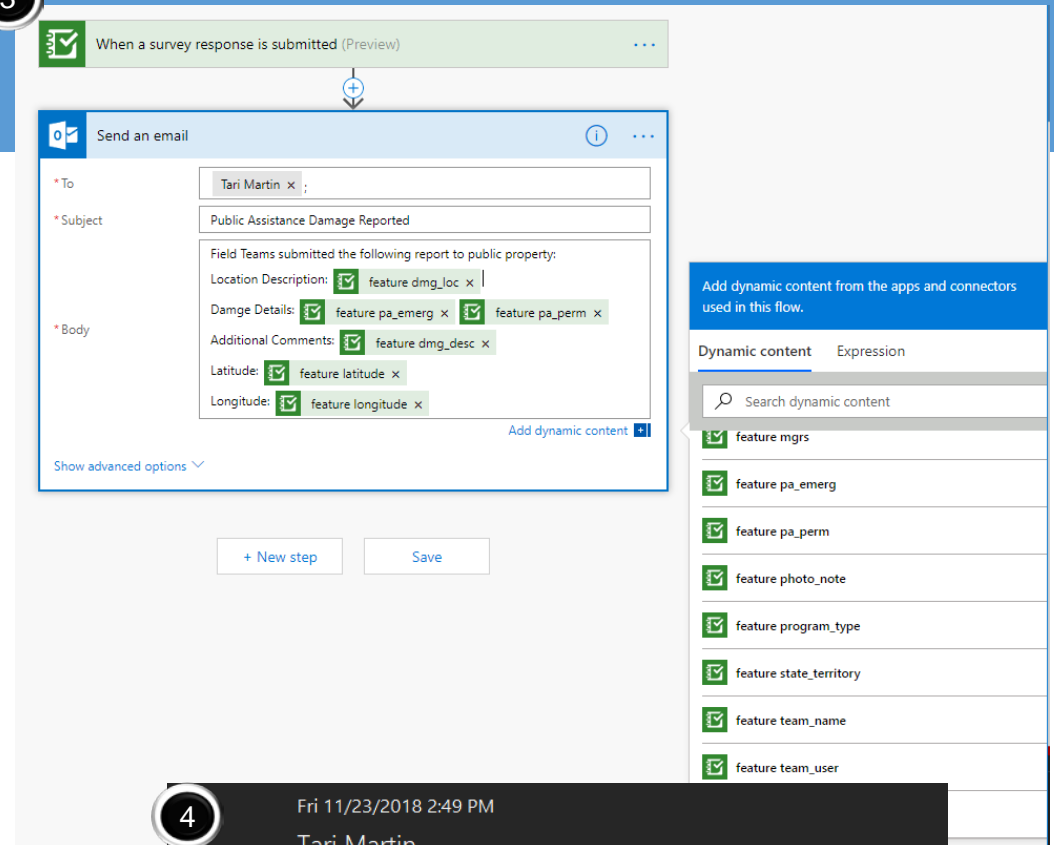
1



2



3

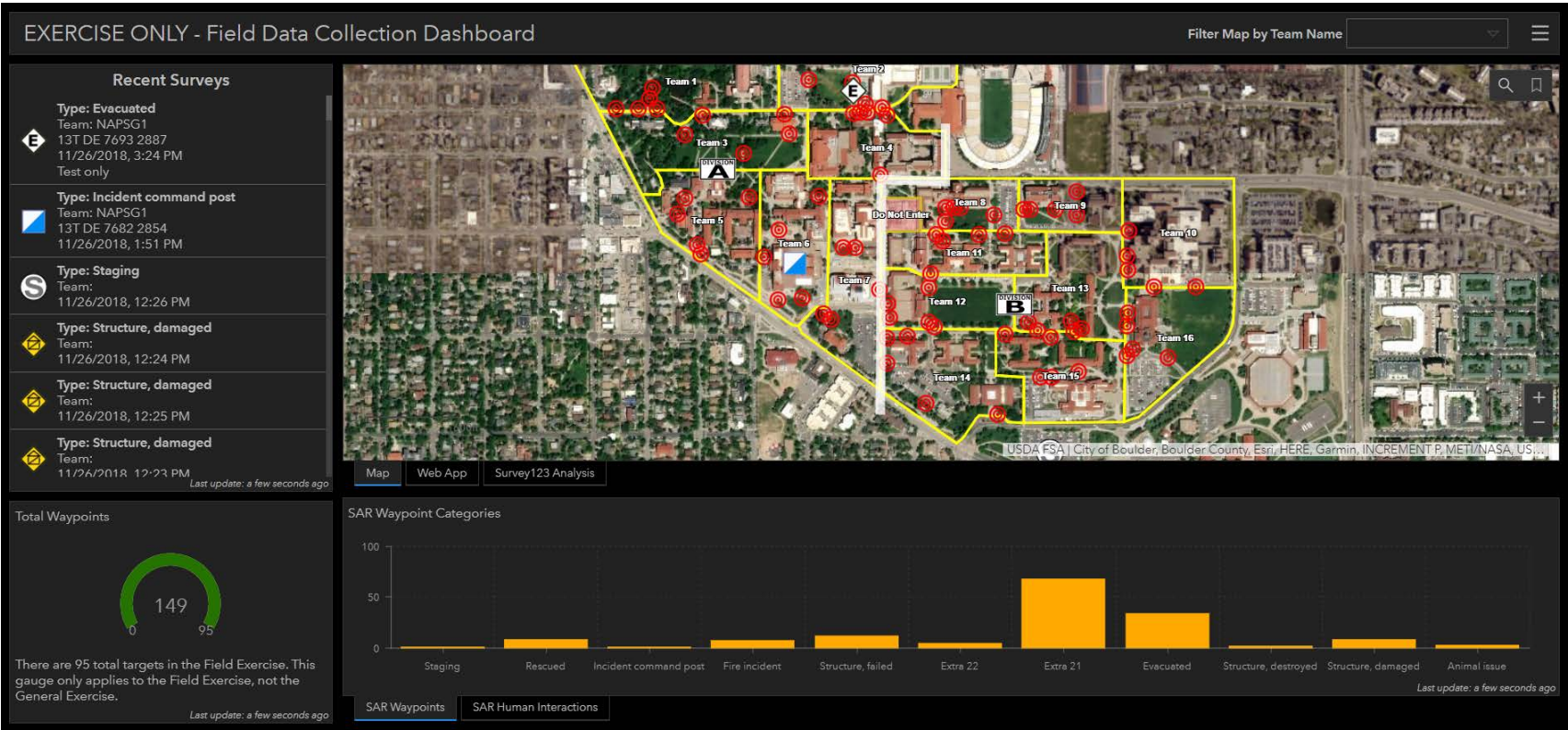


4



Automating workflows with Survey123 and Microsoft Flow

View Live Operations Dashboard



Additional Resources

- [FEMA's Survey123 Preliminary Damage Assessment Templates](#)

