

ADVANCED SURVEY123

TIPS & TRICKS

TO ENHANCE YOUR MOBILE FIELD OPERATIONS

32nd Annual
South Central Arc User Group Conference
May 3-5, 2022
Fort Worth, TX

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LANGAN





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STAR WARS DAY™
MAY THE 4TH
BE WITH YOU

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OUTLINE

- What is Survey123?
- Basic Functionality
- Advanced Functionality



ABOUT LANGAN

Integrated Engineering Solutions
One-Stop Shop

50+
Years in Business



37
Locations



1400+ Employees

Projects in
100+
Countries



100+
Awards

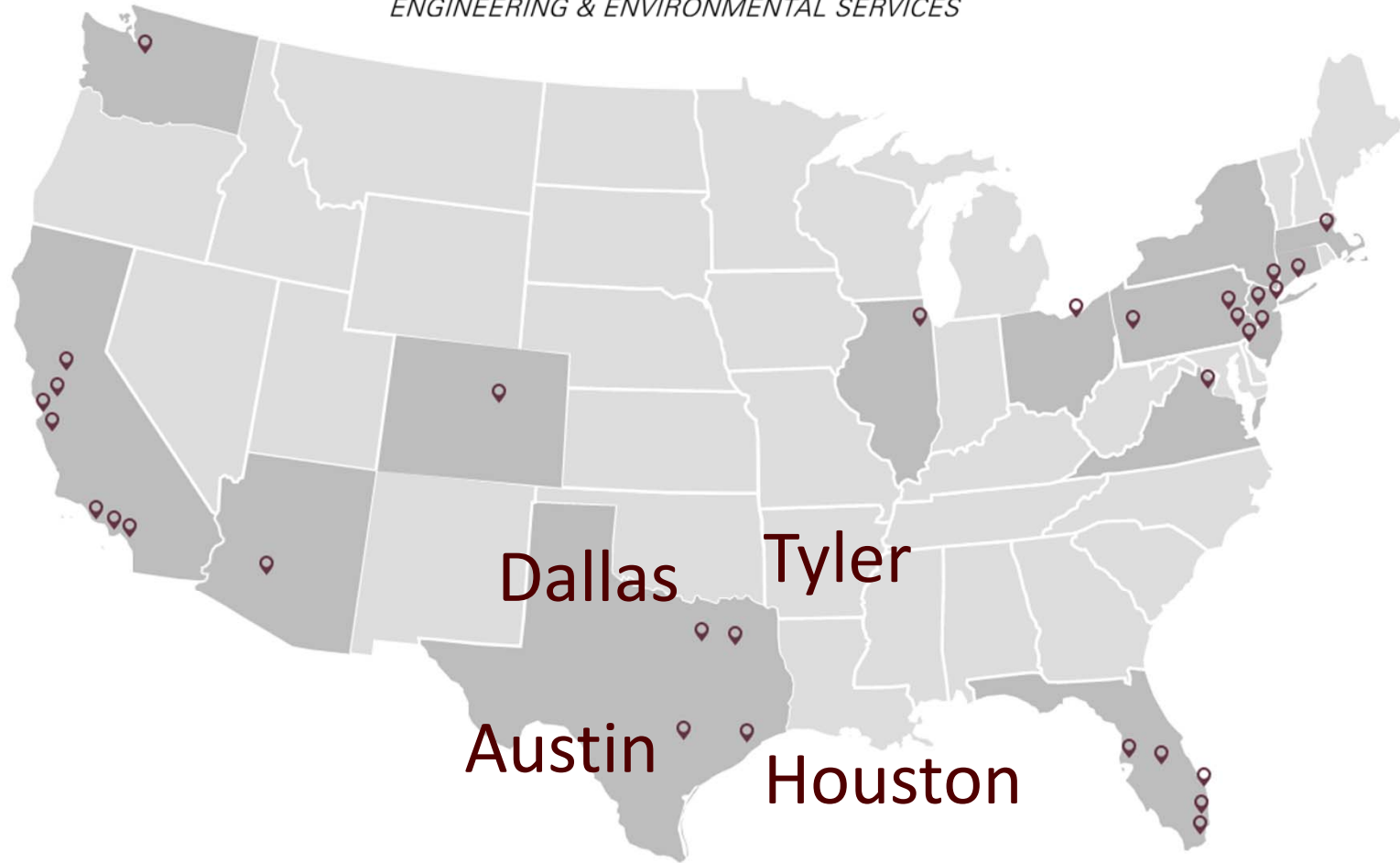
Technical Excellence

Practical Experience

Client Responsiveness

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ENGINEERING & ENVIRONMENTAL SERVICES



GEOSPATIAL & DIGITAL SOLUTION SERVICES



GIS Mapping and Analysis

- Field Data Collection / Real-Time Mapping
- Site Analysis
- Data Interpretation, Management and Analysis



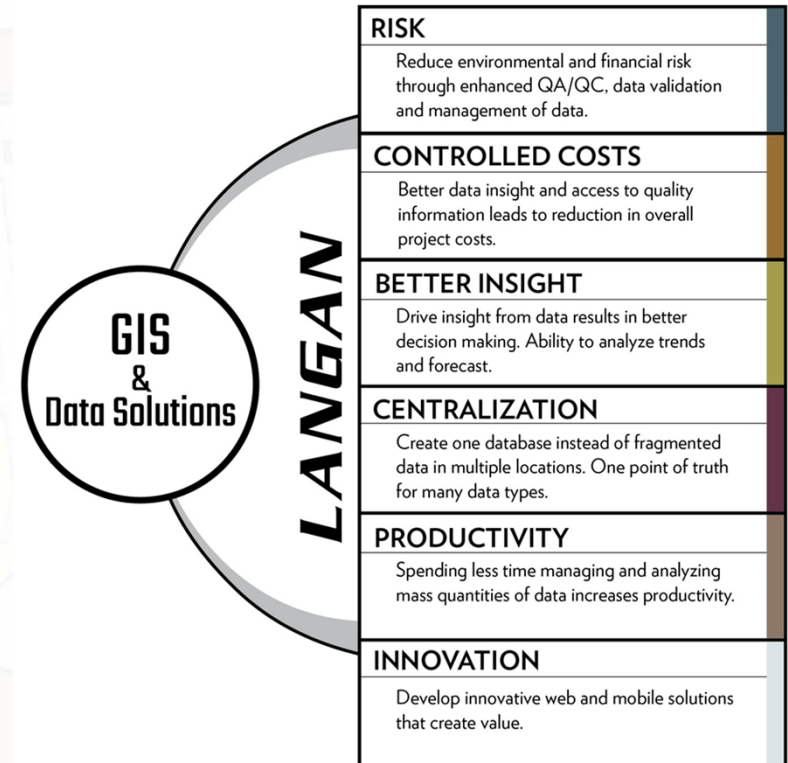
Data Visualization

- Data Dashboards and Web Viewers
- Historical Data Acquisition
- Spatial and Non-Spatial Data Integration
- Map-Based Document Management



Custom Solutions

- Process/Workflow Development
- Enterprise Software Integration
- Litigation Support
- Asset Management



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DEVELOPMENT SERVICES



Advanced Solutions

- Process Automation
- IoT / Real-Time Data Capture & Reporting
- AI / Machine Learning



Custom Tools

- Web & Mobile Application Development
- Custom Viewers & Websites
- Interactive Data Exploration



IT Infrastructure Support

- System Architecture Design & Implementation
- Enterprise Systems Integration
- Data Extract, Transform & Load (ETL) Services

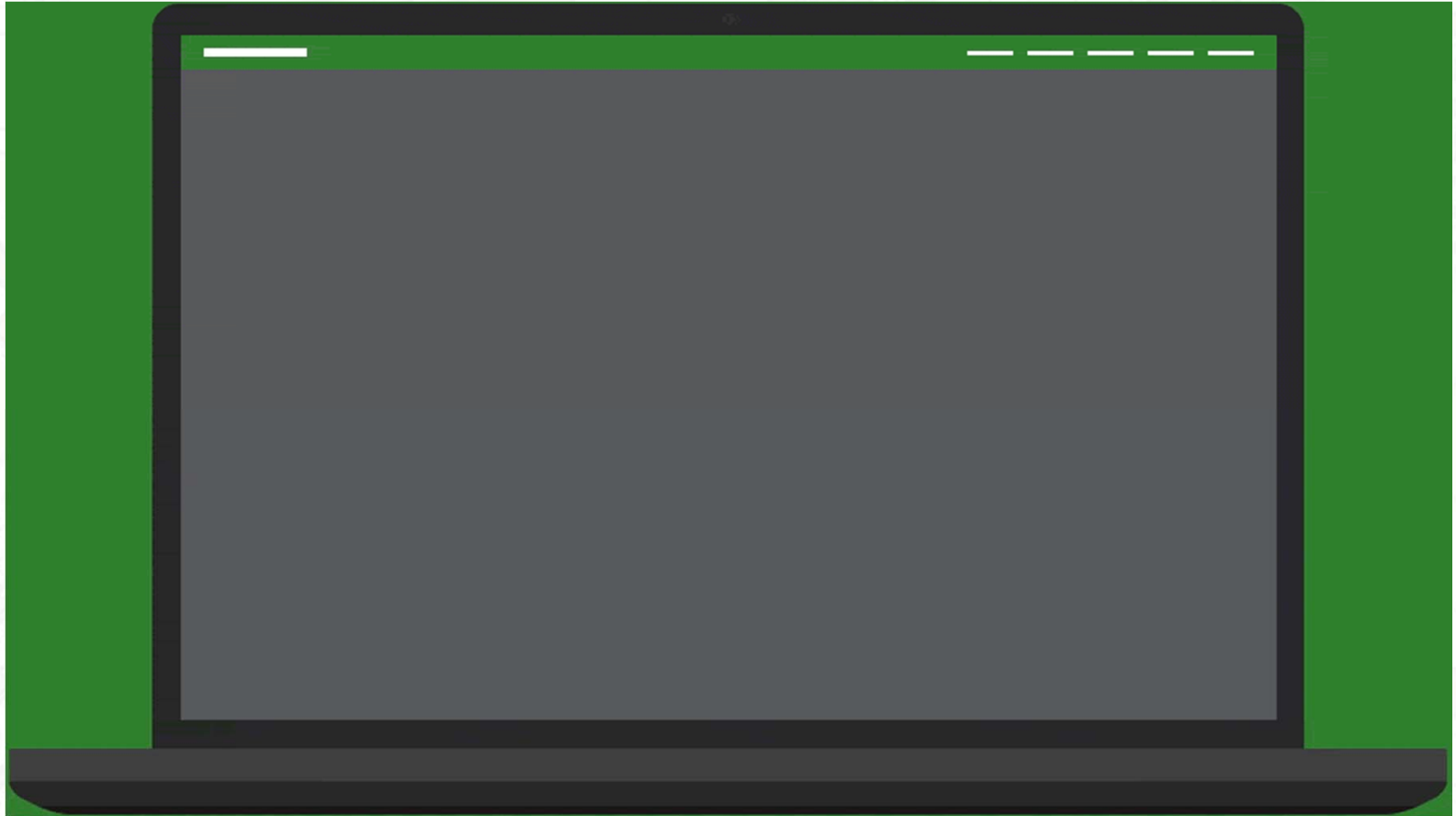
WHAT IS
SURVEY123?

INTRO TO SURVEY123



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INTRO TO SURVEY123



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SURVEY123 BASICS

- Data Collection Application
- Form-Based
- Allows for Disconnected Collection
- Report Generation

The image displays two screenshots of the Survey123 mobile application. The left screenshot shows a map with a 'Campground Inspection Survey' form overlay. The right screenshot shows a 'Park Campground Inspection' form with fields for location, date, and various inspection details.



The image shows a 'Water Violation Report' form. It includes a header with a water drop icon, a map showing the location of the violation, and a section for 'Violations: Assigned day violation'. The form also includes a signature and contact information for the offender.



SURVEY123 VS. FIELD MAPS



SURVEY123

- Form-Based First (“Smart Forms”)
- Complex Data Collection Rules Possible
- Custom Reports
- Flexibility May Equal Complexity



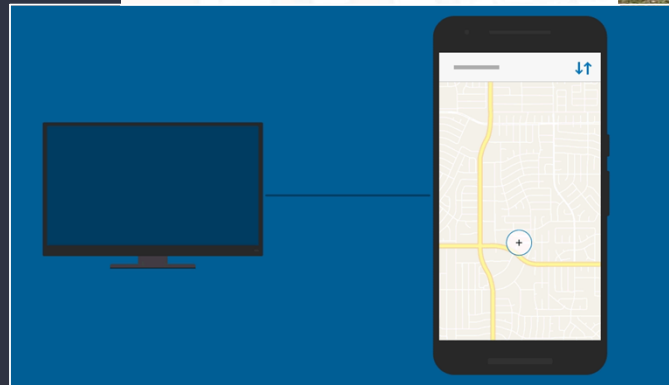
FIELD MAPS/COLLECTOR

- Mobile Data Capture Applications
- Collects Any Attribute, Photo, etc.
- Web Services Can Feed Into Esri Stack/Web Maps

- Map-Based First
- Simple Data Collection Rules
- Other Tools for Reporting
- Simplicity

MOBILE ACCESSIBILITY

- Phone and Tablet Access
- Authoritative Data
- Real-Time Updates
- Field and Office Access
- Restricted User Permissions



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BASIC FUNCTIONALITY

2 WAYS TO CREATE

The image displays two side-by-side screenshots illustrating methods to create a survey.

Left Screenshot (Excel): Shows an Excel spreadsheet titled "HousesAndResidents.xlsx". The spreadsheet is structured with columns A, B, C, and I. The data is organized into rows, with a header row (row 1) and subsequent rows (rows 2-14) defining survey questions. A yellow tooltip is visible over cell A15, stating: "Enter a supported XLSForm type. Please select an XLS Form Type from the supplied list. Enter a valid list name if using a select_one or select_multiple XLS Form Type."

A	B	C	I
type	name	label	appearance
text	address	Address	multiline
text	eircode	EirCode	
select_one choiceCurrentState	currentState	Current State	horizontal
date	dateBuilt	Date Built	
image	housePicture	House Pictures	
geopoint	houseLocation	House Location	
begin repeat	residentsRepeat	Resident Details	
text	firstName	First Name	
text	lastName	Last Name	
select_one choiceOccupationCategory	occupationCategory	Occupation Category	horizontal
integer	age	Age	
image	residentPictures	Resident Pictures	
end repeat			

Right Screenshot (Survey123 Connect for ArcGIS): Shows the "My Survey" interface. The interface includes tabs for "Form Preview", "Schema Preview", and "Settings". The "Form Preview" tab is active, displaying a survey form with fields for "EirCode", "Current State" (radio buttons for Abandoned, Inhabited, No One Home), "Date Built" (date picker), "House Pictures" (image upload), and "House Location" (map with a red pin). The "House Location" field shows coordinates: 53°22'N 6°20'W ± 59 m. The bottom status bar indicates "Load time on Windows 0.8 seconds" and a "Validate Input" button.

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WEB DESIGNER = WYSIWYG

ArcGIS Survey123 ▾ My Surveys Help

DMcRitchie@esriuk.com ▾

Potholes Overview Design Collaborate Analyze Data Settings

Potholes

Description content for the survey

Please drag from or press on the right panel to add your first question.

Submit

Powered by ArcGIS Survey123

Add Edit Appearance Options

Singleline Text	Multiline Text
Single Choice	Single Choice Grid
Multiple Choice	Dropdown
Rating	Likert
Number	Date
Time	Date/Time
Image	File Upload
Map	Ranking
Email	Website
Signature	Note

Save Preview Publish

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INTEGRATION TO WEB MAPS



ADVANCED FUNCTIONALITY

WHERE ARE WE GOING

Langan Safety Work Certificate Application

Project Information

Event Date
Tuesday, May 3, 2022 12:41 ...

Project Location
Position source closed error

Project Number Project Name

Project Address

Phase/Task(s) Number/Description

Weather Temperature (°F)

Site Control

Are workers required to have any specific training or orientation?
☐ Yes ☐ No

Does owner/client have site specific health and safety policy or procedures?
If yes, ensure all fieldwork is done in accordance with policies/procedures.
☐ Yes ☐ No

Project Contacts

Langan PM Name Langan PM Number

Facility/Client Contact Name Facility/Client Contact Number

Other Contacts?
If yes, please specify
☐ Yes ☒ No

1 of 6

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SCRATCHING THE SURFACE



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SURVEY123 CONNECT

AutoSave Off

form - Excel

File Home Insert Page Layout Formulas Data Review View Help Search

Paste Cut Copy Format Painter

Arial 10 A A

B I U

Wrap Text

Text

Conditional Formatting

Clipboard Font Alignment Number

C1 label

	A	B	C	D
1	type	name	label	hint
2	note	generated_note_surveyDescription		A sample survey for reporting
3	note	generated_note_form_submit_text	Submit	
4	note	generated_note_form_footer	<a target='_blank' s	;" href='https://www.esri.co
5	note	generated_note_prompt_submitted	<p style="text-align	p style="text-align: center;">
6	select_one list_what_f	what_feature_would_you_like_to_	What feature would	
7	date	date_of_report	Date of report?	
8	integer	pothole_diameter	Pothole diameter	<p>Give approximate answer
9	geopoint	show_the_location_of_the_report	Show the location of the reported prob	
10	image	upload_an_image_of_the_problem	Upload an image of the problem	
11	text	anything_else_to_note	Anything else to note?	
12				
13				
14				

Label
The label will act as the question in your survey (e.g., What is your name?).

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READY TO GET CRAZY??

SURVEY

type
name
label::[language]
hint::[language]
guidance_hint::[language]
constraint
constraint_message::[language]
required
required_message::[language]
default
relevant
read_only
calculation
repeat_count
image
audio
video
image::language
audio::language
video::language
appearance
instance::attribute
bind::attribute
body::attribute
body::accuracyThreshold
parameters

start
end
today
deviceid
username
subscriberid
simserial
phonenummer
email
audit
select_one [choices] [or_other]
select_multiple [choices] [or_other]
select_one_from_file [file]
select_multiple_from_file [file]
select_one_external
text
integer
decimal
date
time
datetime
geopoint
background-audio
file
note
barcode

acknowledge
calculate
geotrace
geoshape
begin_group
end_group
begin_repeat
end_repeat
\${variable_name}
.
field-list
table-list
minimal
label
list-nolabel
autocomplete
likert
horizontal
compact
compact-n
quick
quickcompact
image-map
numbers
multiline

url
printer
thousands-sep
bearing
vertical
no-ticks
rating
picker
distress
month-year
year
no-calendar
ethiopian
islamic
coptic
new
new-front
new-rear
annotate
draw
signature
maps
hide-input
streets, terrain, satellite, [other]
placement-map

CHOICES

list name
name
label::[language]
media
[filter_category_name]

SETTINGS

form_title
form_id
public_key
submission_url
default_language
style
version
instance_name

FIELD RELEVANCY

Tree Inventory Form

Tree Inspection *

Unit of measurement:

☒ inch ☐ cm

Diameter at breast height (DBH) :

☐ 1-9 in ☐ 10-14 in ☐ 15-19 in ☐ 20-29 in ☐ >29 in

Condition:

☐ excellent ☒ good ☐ fair ☐ poor

What maintenance work is needed?

☐ Application of Fertilizer

☐ Application of insecticides/ fungicides

☐ Pruning

- Conditionally change questions based on previous sections
- Hide by default, show if something selected
- Returns if TRUE

	A	B	C	L
1	type	name	label	relevant
2	select_one yes_no	work_complete_indicator	Is work complete in this zone?	
3	select_one yes_no	zone_inspected_indicator	Has the zone been inspected?	\${work_complete_indicator} = 'yes'
4	text	who_inspected_zone	Who inspected the zone?	\${zone_inspected_indicator} = 'yes'
5	text	work_remaining	What work is remaining to be completed in this zone?	\${work_complete_indicator} = 'no'

CHOICE FILTERING

The screenshot shows a mobile application interface titled 'Choice Filters v2'. A dialog box titled 'Countries Regions' is open, displaying two sections: 'Countries' and 'Regions'. In the 'Countries' section, 'Spain' is selected with a radio button, and 'France' is unselected. In the 'Regions' section, 'Aragon', 'Catalunya', 'Euskadi', and 'Extremadura' are all unselected. The interface includes a left sidebar with icons for 'XLSForm', 'Update', 'Files', and 'Publish'. A bottom navigation bar contains icons for 'Form', 'Details', 'Options', 'Map', 'Linked Content', and 'Schema'. A green header bar at the top of the dialog box contains a back arrow and the title 'Choice Filters v2'.

- Filter down by large list
 - (All counties versus just Texas)

CHOICE FILTERING

1	A	B	C	D	E
	type	name	label	hint	choice_filter
2	select_one countries	country	Countries		
3	select_one regions	region	Regions	selected	#{country} {country}
4					

1	A	B	C	D
	list_name	name	label	country
2	countries	Spain	Spain	
3	countries	France	France	
4				
5	regions	Aragon	Aragon	Spain
6	regions	Catalunya	Catalunya	Spain
7	regions	Euskadi	Euskadi	Spain
8	regions	Extremadura	Extremadura	Spain
9	regions	Alsace	Alsace	France
10	regions	Burgundy	Burgundy	France
11	regions	Brittany	Brittany	France
12	regions	Loire Valley	Loire Valley	France
13	regions	Normandy	Normandy	France
14				

- XXX

CHOICE FILTERING

The screenshot displays the 'Choice Filters v2' window within an XLSForm application. The interface features a green header bar with a back arrow and the title 'Choice Filters v2'. On the left, a vertical toolbar contains icons for 'XLSForm', 'Update', 'Files', and 'Publish'. The main content area is titled 'Countries Regions Cities' and is divided into three sections: 'Countries' with radio buttons for 'Spain' and 'France' (where 'France' is selected), 'Regions' with checkboxes for 'Alsace', 'Burgundy', 'Brittany', and 'Normandy', and 'Cities' which is currently empty. A green horizontal line separates the 'Regions' section from the 'Cities' section. A checkmark icon is visible in the bottom right corner of the main content area. At the bottom of the window, a navigation bar includes icons and labels for 'Form', 'Details', 'Options', 'Map', 'Linked Content', and 'Schema', with 'Form' being the active tab.

- Sub Categories and Multiple Choices Allowed

SEARCH

type	name	label	appearance
select_one us_states	state	Select a US state	search("state?url=https://services.arcgis.com/P3ePLMYs2RVChkJx/ArcGIS/rest/services/USA_States_Generalized/FeatureServer/0")

- Dynamically Search for Potential Values
- CSV, Feature Services, etc.
- Allows choices to be managed outside of Survey123
- Attribute AND spatial queries!

▼ **Polygon contains points**
 Draw a search polygon (within USA)

Select a school
 This choice list loads dynamically from the [Public School Locations - Current](#) layer, using your search polygon as the **searchText** parameter in the query.

search('school?url=https://services1.arcgis.com/Ua5sjt3LWT
 PigjyD/arcgis/rest/services/Public_School_Location_201819/
 FeatureServer/0', 'contains', '@geoshape', \${search_poly})

▼ **This example is only supported in the field app**
 This is because the **tableName** parameter cannot be populated by a previous survey question in the web app

Place a search point (within USA)

Enter a search distance *

Select the search distance unit *

Store Category (optional)
 This can be used to filter the results of the spatial query based on an attribute in the feature layer. This example uses the 'Shop' field which gives store categories.

Select a store within a specified distance
 This choice list loads dynamically from the [OSM - Shops for North America](#) layer (updated every 5 minutes), intersecting your search point with a specified buffer of the store locations as the **searchText** parameter in the query.

type	name	label	appearance	calculation
geopoint	search_point2	Place a search point (within USA)		
range	search_distance	Enter a search distance		
select_one distance_unit	search_distance_unit	Select the search distance unit	horizontal	
calculate	search_url	This question concatenates the URL string to include the search distar concat("store?url=https://services6.arcgis.com/Do88DoK2xjTUCXd1		
select_one us_stores_cat	store_cat2	Store Category (optional)	autocomplete	
select_one us_stores	store2	Select a store within a specified (autocomplete search(\${search_url}, 'intersects', '@geopoint', \${search_point2}, 'shop', \${store_cat2}))		

PULLDATA()

The screenshot shows the XLSForm application interface. The main form, titled "GSA Rates", is displayed on a tablet. The form contains the following fields:

- County:** A group of radio buttons with options: Ada, Kootenai, Blaine / Elmore, and Gallatin.
- Season:** A text input field.
- Lodging:** A text input field.
- MIE:** A text input field.

The interface includes a sidebar on the left with icons for XLSForm, Update, Files, and Publish. The bottom of the tablet frame features a navigation bar with icons for Form, Details, Options, Map, Linked Content, Scripts, and Schema.

- Prepopulate answers
- From CSV, feature layers, external APIs, etc.
- Examples:
 - Enter Project number, get PM, client, date, etc.
 - 3rd party API for weather

REPEATS

The screenshot shows a mobile application interface for 'Manhole Inspection'. The interface is displayed on a smartphone screen within a larger application window. The top navigation bar is green and contains three tabs: 'Form Preview' (selected), 'Schema Preview', and 'Settings'. On the left side of the application window, there is a green sidebar with several icons and labels: a back arrow, 'XLSForm', 'Update', 'Files', 'Publish', 'Online', 'Sign in', and 'Help'. The main content area of the smartphone screen shows the 'Manhole Inspection' form. The form has a title 'Manhole Inspection' and a 'Manhole ID' field with the value '660090'. Below this is a section titled 'Components' with a dropdown menu for 'Component'. Underneath is a 'Condition' section with two radio buttons: 'Good' (selected) and 'Needs repair'. Below the radio buttons is a trash icon, a counter '1 of 1', and a plus icon. At the bottom of the form is a section titled 'Components inspected' with a grid of checkboxes for 'Cover', 'Cone', 'Bench', 'Chimney', 'Wall', and 'Channel'. A green checkmark is visible at the bottom right of the form. At the bottom of the application window, it says 'Smartphone Black' and 'Load time on Windows 0.3 seconds'.

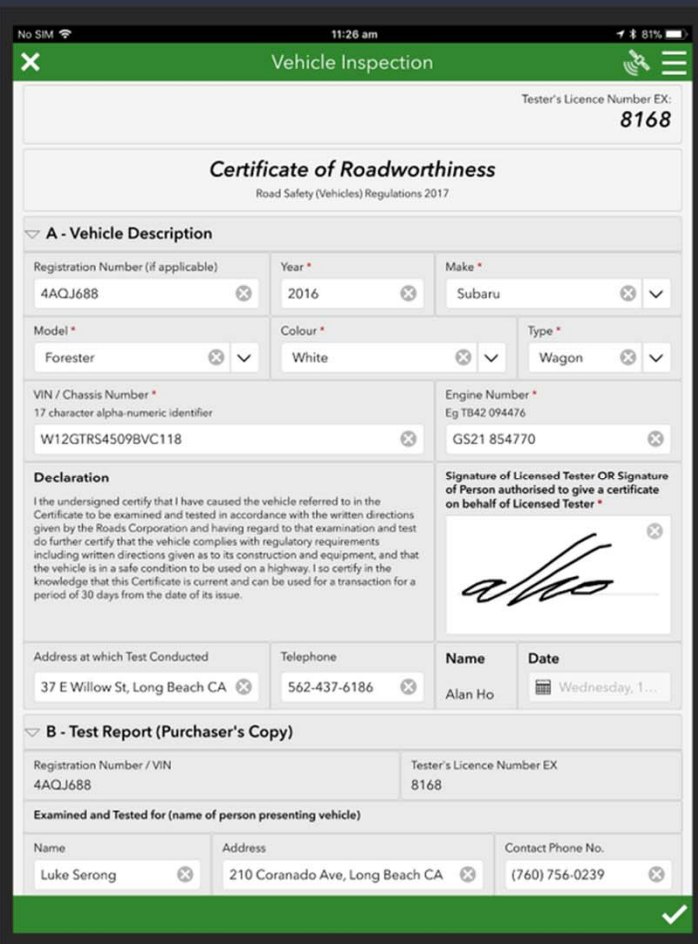
- Ability to create related records for existing location
- Examples:
 - Multiple photos and notes of same area
 - Multiple inspections
 - Multiple elements to collect

REPEATS

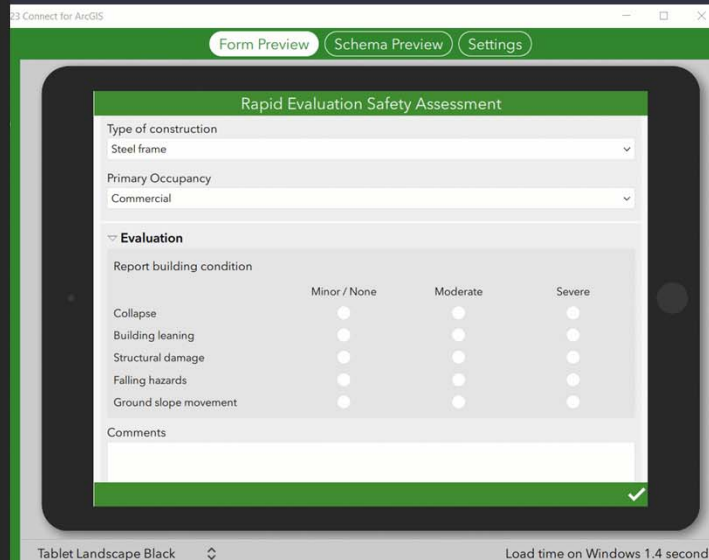
The screenshot displays the XLSForm application interface. At the top, there are three tabs: 'Form Preview' (selected), 'Schema Preview', and 'Settings'. On the left side, there is a green sidebar with icons for 'XLSForm', 'Update', 'Files', 'Publish', 'Online', and a user profile for 'Ismael'. The main area shows a tablet displaying a 'Household Survey' form. The form has a green header with the title 'Household Survey'. Below the header, there are two text input fields: 'Household ID' with the value '7709' and 'Address' with the value '82 Orange St, Redlands, CA 92373'. Below these is a section titled 'Household members:' with a dropdown arrow. Under this section, there are two text input fields: 'Name and last name' and 'Age'. At the bottom of the form, there is a repeatable section with a trash icon, the text '1 of 1', and a plus icon. The bottom of the tablet screen shows a green bar with a checkmark. At the very bottom of the application, there is a status bar with the text 'Tablet Landscape Black' and 'Load time on Windows 0.3 seconds'.

- Also aggregation with Join, Sum, Min, Med functions

UI/UX ENHANCEMENTS



The mobile app interface for 'Vehicle Inspection' features a green header with a close button and a menu icon. Below the header, the 'Tester's Licence Number EX: 8168' is displayed. The main section is titled 'Certificate of Roadworthiness' with a subtitle 'Road Safety (Vehicles) Regulations 2017'. It is divided into two parts: 'A - Vehicle Description' and 'B - Test Report (Purchaser's Copy)'. Part A includes fields for Registration Number (4AQJ688), Year (2016), Make (Subaru), Model (Forester), Colour (White), Type (Wagon), VIN / Chassis Number (W12GTRS4509BVC118), and Engine Number (GS21 854770). It also contains a declaration section and a signature field for the licensed tester. Part B includes fields for Address at which Test Conducted (37 E Willow St, Long Beach CA), Telephone (562-437-6186), Name (Alan Ho), Date (Wednesday, 1...), and a section for the purchaser's details including Name (Luke Serong), Address (210 Coranado Ave, Long Beach CA), and Contact Phone No. (760) 756-0239. A green checkmark is visible at the bottom right of the form.



The web browser interface for 'Rapid Evaluation Safety Assessment' features a green header with tabs for 'Form Preview', 'Schema Preview', and 'Settings'. The main section is titled 'Rapid Evaluation Safety Assessment' and includes fields for 'Type of construction' (Steel frame) and 'Primary Occupancy' (Commercial). It also contains an 'Evaluation' section with a table for reporting building condition. The table has columns for 'Minor / None', 'Moderate', and 'Severe'. The rows include 'Collapse', 'Building leaning', 'Structural damage', 'Falling hazards', and 'Ground slope movement'. A 'Comments' field is located below the table. A green checkmark is visible at the bottom right of the form. The browser interface also shows 'Tablet Landscape Black' and 'Load time on Windows 1.4 seconds'.

- Cleans up look and feel

- Easier to Use

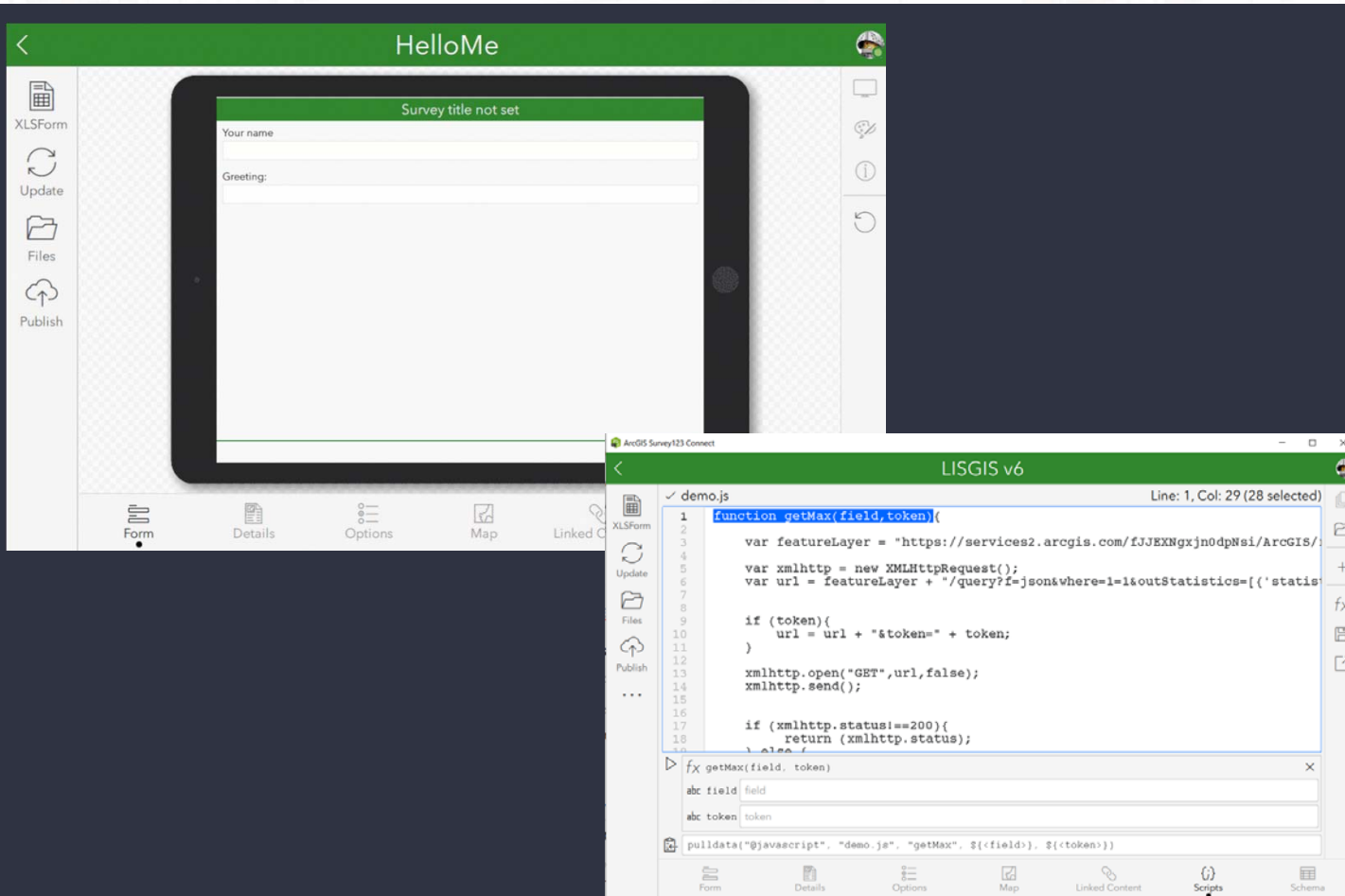
- Pages

- Table lists

- Dynamic Grids

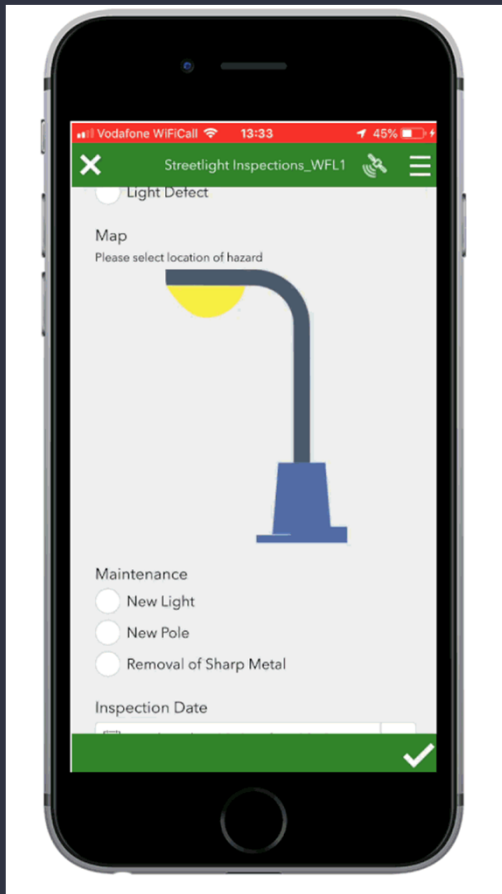
- * Need to evaluate end users, how use, etc.

JAVASCRIPT



- Extends Survey123
- Examples:
 - Complex data validations
 - Remove duplicates from lists (inspection dates, or inspect something twice)
 - Pull weather APIs
 - Spatial Join (select valves in construction zone)
 - Concat, Sum, etc.

IMAGE-MAP



- Clickable images
- Scalable Vector Graphics (SVG) files
- Intuitive Data Collection
- Only in Field App, not Web

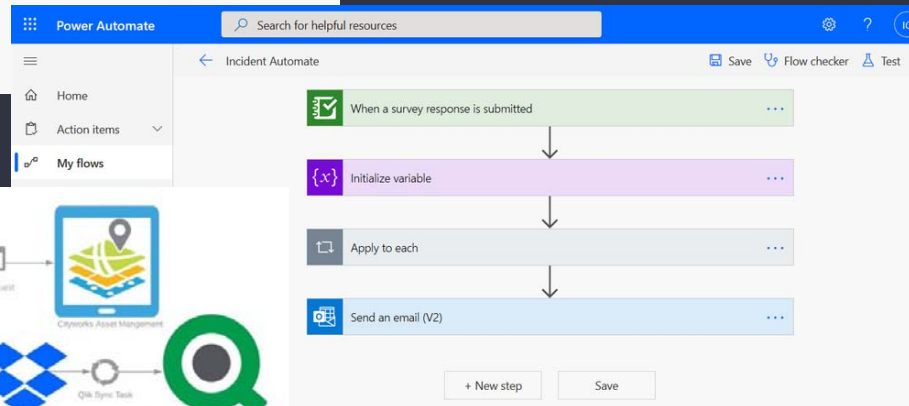
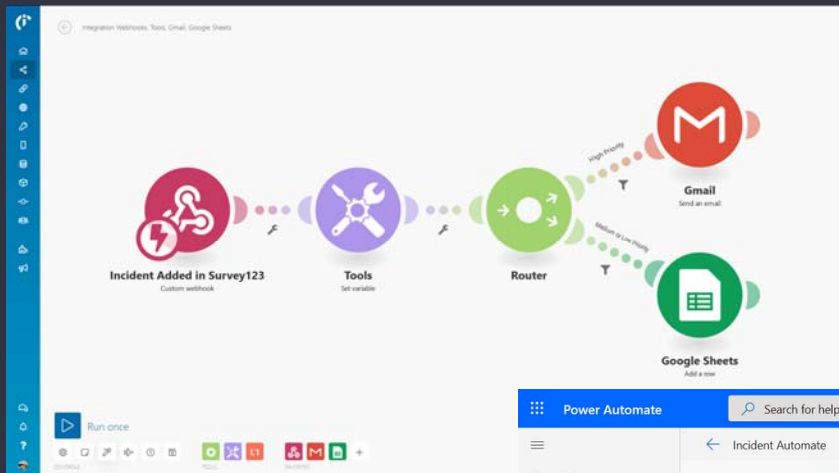
SURVEY123-FIELDMAPS INTEGRATION



*arcgis-survey123://?itemID=89bc8c483e548e90Langan09495e78b&
field:AssetID={asset}&field:Status=Good¢er=32.9289,-96.9896*

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ADVANCED INTEGRATIONS



Webhooks

- Activate applications/process when Survey123 submitted
- Send emails, convert/format data, update DBs
- Possible Integrations:
 - MS Power Automate
 - Zapier
 - Tray.io
 - IFTT
 - Make (Integromat)
 - Safe FME

PULLING IT ALL TOGETHER

Langan Safety Work Certificate Application

Project Information

Event Date
☐ Tuesday, May 3, 2022 12:41 ...

Project Location

☐ Position source closed error

Project Number Project Name

Project Address

Phase/Task(s) Number/Description

Weather Temperature (°F)

Site Control

Are workers required to have any specific training or orientation?
☐ Yes ☐ No

Does owner/client have site specific health and safety policy or procedures?
If yes, ensure all fieldwork is done in accordance with policies/procedures.
☐ Yes ☐ No

Project Contacts

Langan PM Name Langan PM Number

Facility/Client Contact Name Facility/Client Contact Number

Other Contacts?
If yes, please specify ☐ Yes ☒ No

1 of 6

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CHRIS AKIN, GISP



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Technical Excellence

Practical Experience

Client Responsiveness