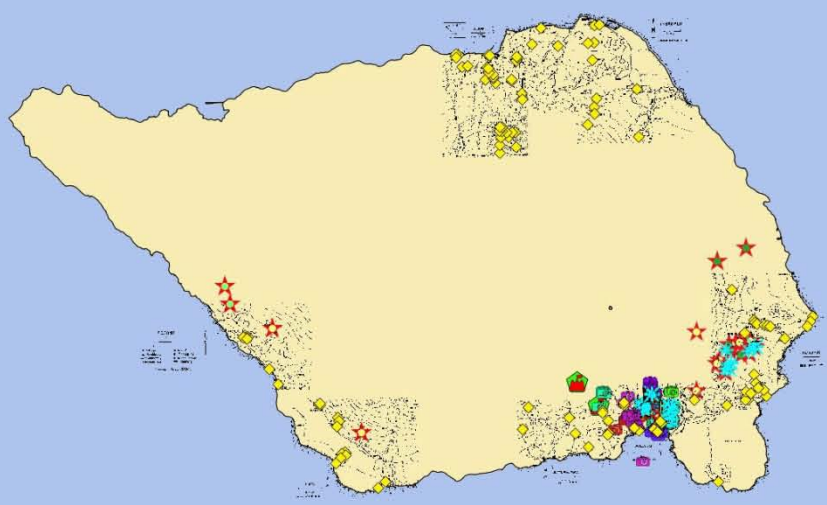


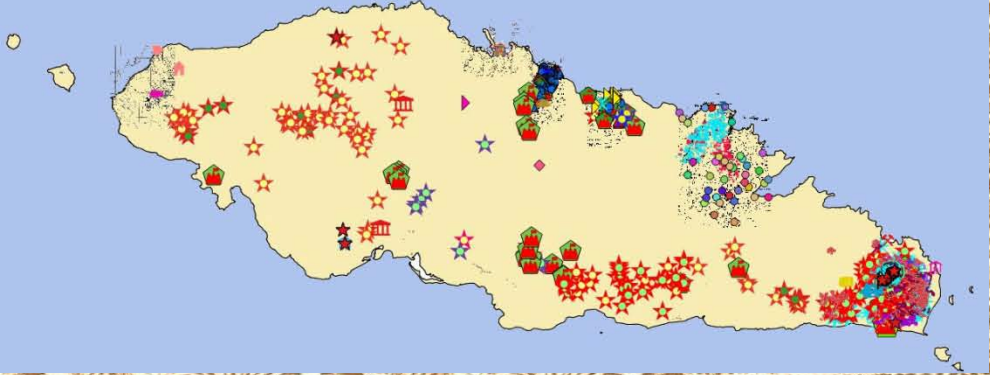


Select icon to view presenter notes.



Utu

(Su'a fa'aoti le utu a le faimea.)



**Sāmoan Archaeology and
Cultural Heritage Database**
for the Independent State of Samoa

Utu – Time Line

2014 : Planning / Research

Archaeological Publications

Anthropological Publications

**MESC (Ministry for Education
Sports & Culture)**

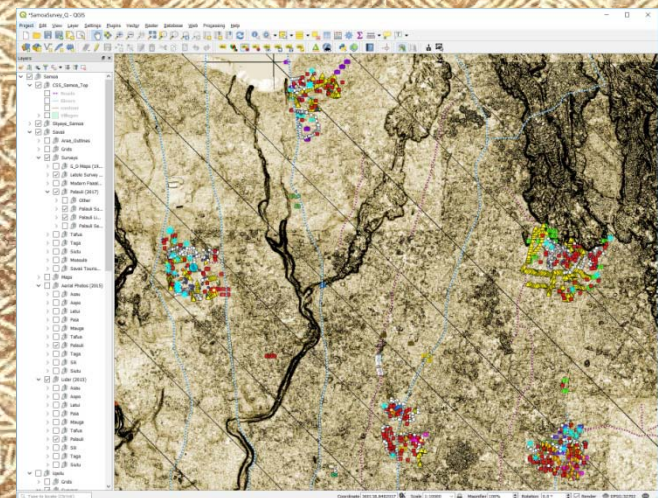
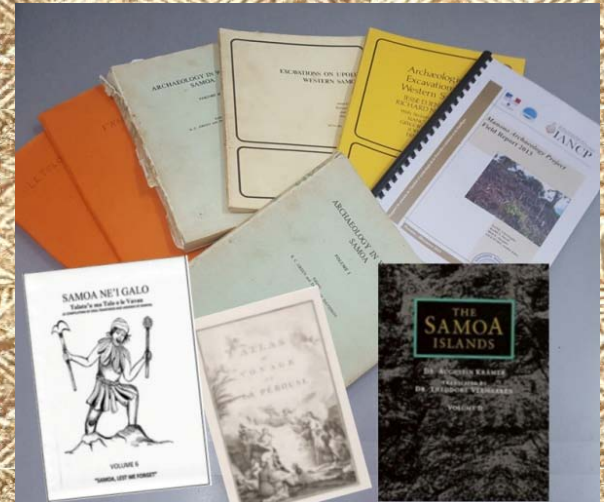
Historical Documents

2015 : Funding Sought

**AFCP (Ambassadors' Fund for
Cultural Preservation)**

2016 ---- : Implementation -

**Data Collection, Research,
and Data Entry**



Utu – Present System

Software:

QGIS 3.20.2

Hardware:

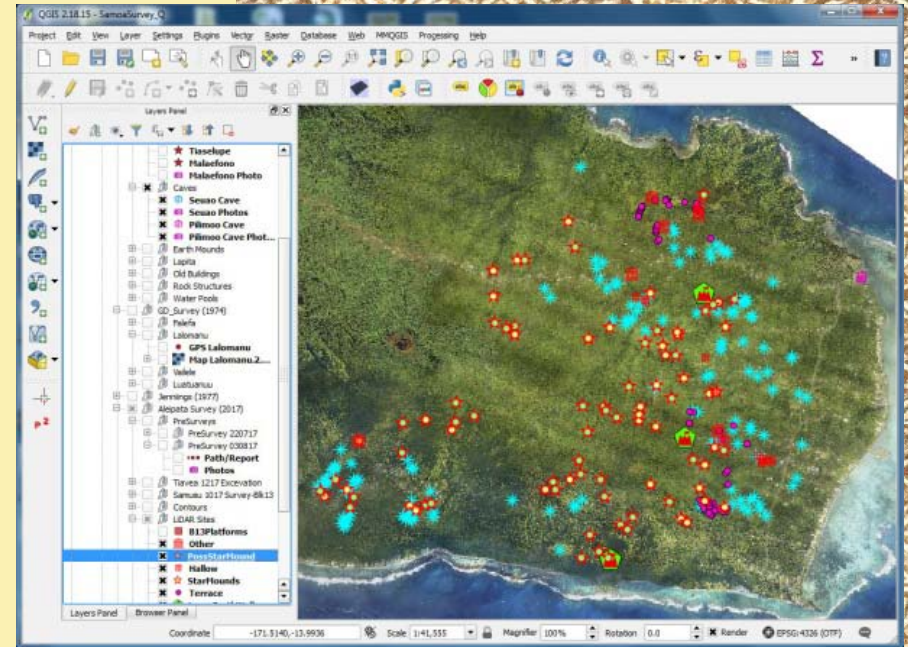
Intel i7 - x4

64GB Ram

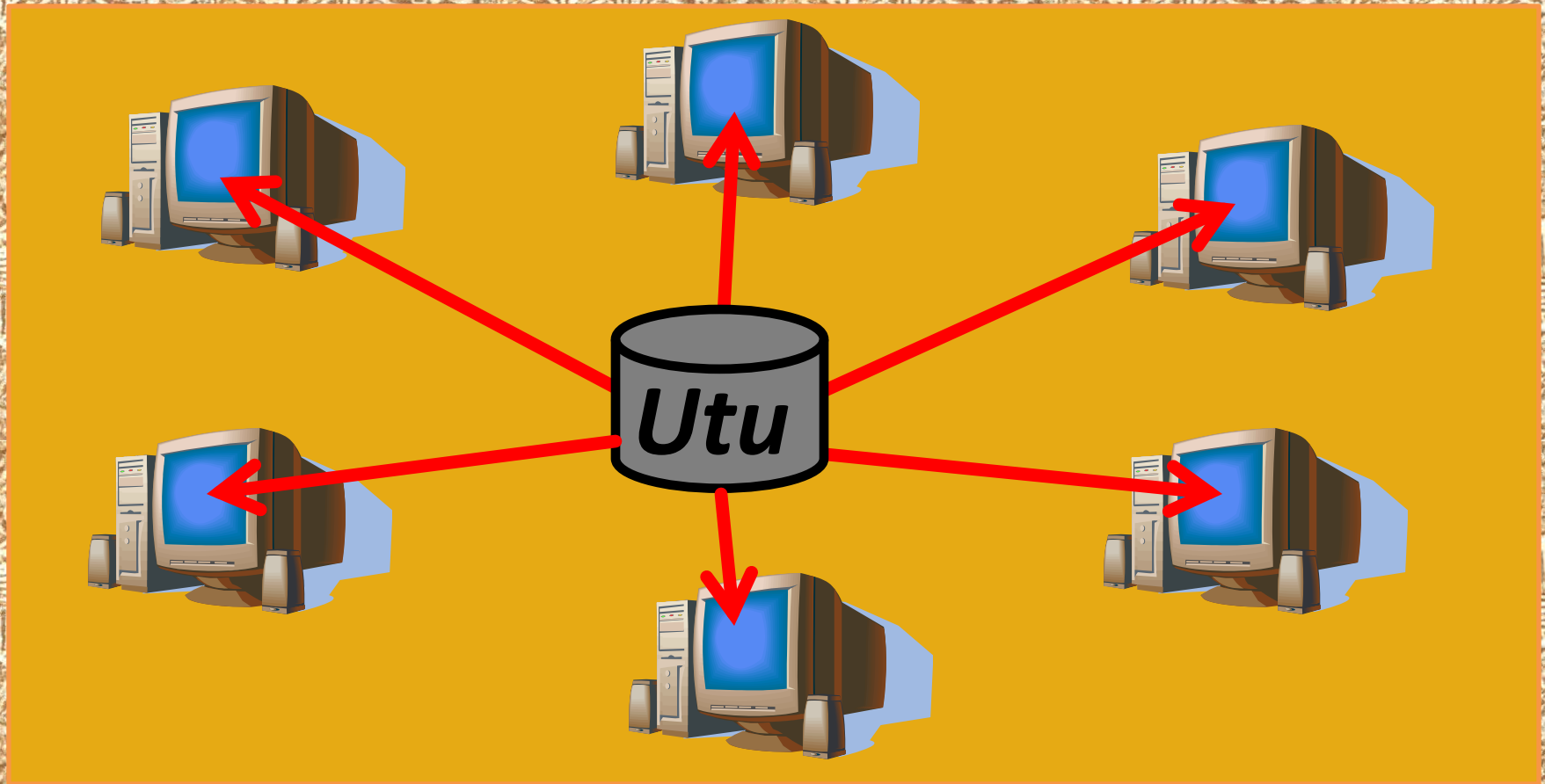
GTX 1060 8GB Video Card

Dual 28" Monitors

8TB Shared Hard Drive



Shared Drive



Data available to all

Basic Layout



Layer Files - Map overlays

ACH

0.5kmGrid Archaeology Found Savaii.qlr
 0.5kmGrid Archaeology Found Upolu.qlr
 0.5kmGrid Savaii.qlr
 0.5kmGrid Upolu.qlr
 All_Archaeology_pts.qlr
 Archaeology_Line.qlr
 Archaeology_Polygons.qlr
 Archaeology_Polygons_Plus.qlr
 Green&Davidson_pts.qlr
 Jackmond_pts.qlr
 Media_Master_pts.qlr
 Starmounds_only.qlr
 StoneAdzes_Pts.qlr

American Samoa

Districts.qlr
 Google Satellite.qlr
 Islands.qlr
 Ofu_Olosega_HillShade.qlr
 Ofu_Olosega_LiDAR.qlr
 RoseAtoll_LiDAR.qlr
 Tau_HillShade.qlr
 Tau_LiDAR.qlr
 Tutuila_HillShade.qlr
 Tutuila_LiDAR.qlr
 Tutuila_Volcanics.qlr
 Villages.qlr

Base Data

Building_Footprints.qlr
 Districts.qlr
 Forestry 1954.qlr
 Forestry 1989.qlr
 Health Centres.qlr
 Kear_Savaii.qlr

Kear_Upolu.qlr

Lakes Reservoirs.qlr
 Land Use.qlr
 Land_Tenure.qlr
 Political_Districts.qlr
 Rivers_Streams.qlr
 Roads_Lyr.qlr
 Samoa Islands.qlr
 Samoa_GeoFormations.qlr
 Savaii Geology.qlr
 Soils Samoa.qlr
 Upolu Geology.qlr
 Villages.qlr
 Water Catchments.qlr

Contours

1m Contours Savaii.qlr
 1m Contours Upolu.qlr
 20m Contours Samoa.qlr
 5m Contours Savaii.qlr
 5m Contours Upolu.qlr

Historic Maps

Apia1886.qlr
 Apia1900.qlr
 Upolu1900.qlr

Historic Scans\Savaii

Faaala Approximate Boundaries 1979.qlr
 Faala Survey 1979.qlr
 Fagamalo Survey 1969.qlr
 Lata Survey 1969.qlr
 Letolo Survey 1978.qlr
 Ologogo North Survey 1969.qlr
 Ologogo South Survey 1969.qlr
 Palauli East Survey 1969.qlr

Palauli West Survey 1969.qlr
 Sagone Survey 1969.qlr
 Sapapalii Survey 1976.qlr
 Satupaitea Survey 1969.qlr
 Tuasivi Survey 1969.qlr

Historic Scans\Upolu

Afulilo Survey 1974.qlr
 Falefa Villages 1974.qlr
 Lalomanu Survey 1974.qlr
 Luatuanuu Survey 1974.qlr
 Manono Survey1 2013.qlr
 Manono Survey2 2013.qlr
 Mt.Olo District 1976.qlr
 Mt.Olo Survey 1977.qlr
 Mt.Olo Survey 1980.qlr
 Mulifanua Survey 1974.qlr
 Vaialele Survey 1974.qlr

Imagery\Savaii

Savaii_AerialPhoto1954.qlr
 Savaii_AerialPhoto2015.qlr
 Savaii_HillShadeLiDAR2015.qlr
 Savaii_SkyViewLiDAR2015.qlr
 Savaii_TopoMap20.qlr
 Savaii_TopoMap50.qlr

Imagery\Upolu

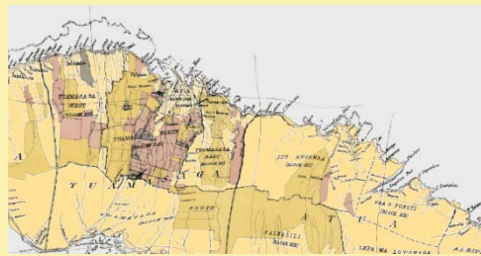
Upolu_AerialPhoto1954.qlr
 Upolu_AerialPhoto2015.qlr
 Upolu_HillShadeLiDAR2015.qlr
 Upolu_SkyViewLiDAR2015.qlr
 Upolu_TopoMap20.qlr
 Upolu_TopoMap50.qlr

Map overlays	Maps	
Historic Maps	1800	3
	1900	3
	1914	1
	1920	2
	1990	2
Historic Surveys	Savaii	13
	Upolu	11
Imagery	Savaii	7
	Upolu	7
Base Data	General	13
	Forestry	2
	Geology	5
	Land	4
	Soil	5
Archaeology		11
American Samoa		12
	Total Maps	101

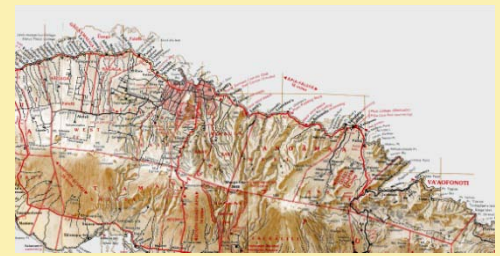
Digitized Map Data



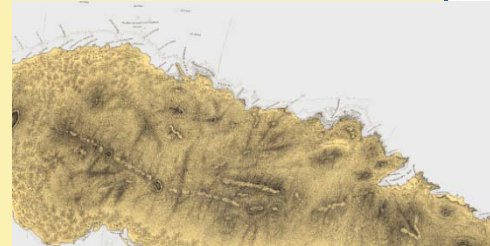
Historic - 1914



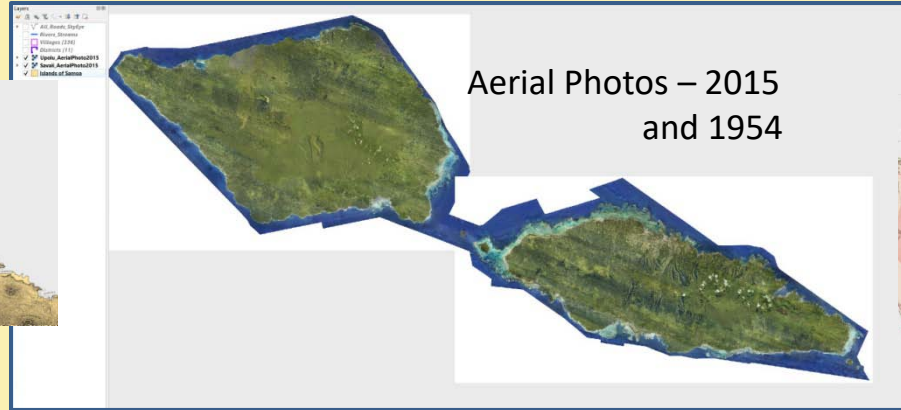
Historic - 1921



Historic - 1990



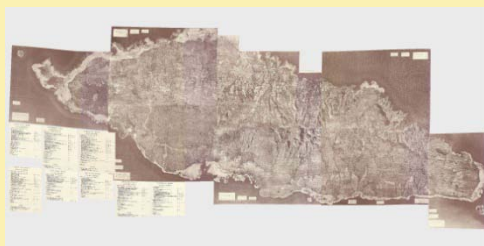
Historic - 1839



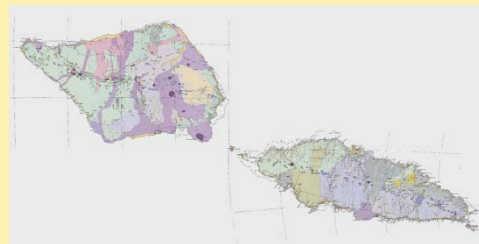
Aerial Photos – 2015
and 1954



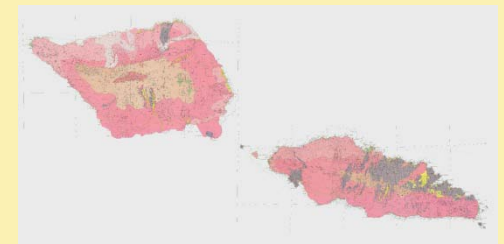
Historic - 1900



Soil Map - 1956

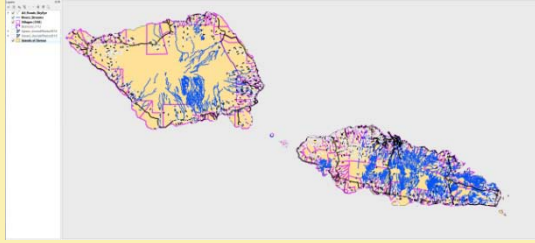


Geological Formations



Soil Map 1961

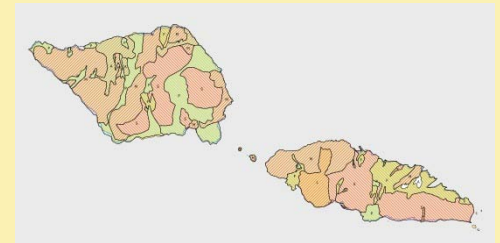
Map Shape Files



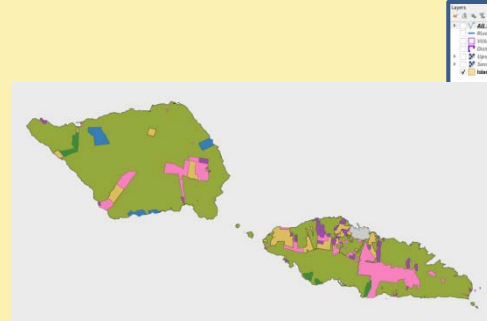
Roads – Rivers - Villages



Forestry - 1954



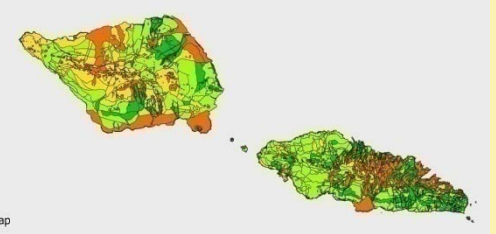
Geology Shape - 1961



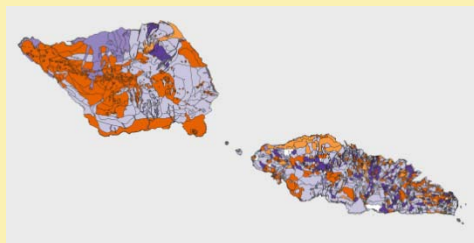
Land Tenure



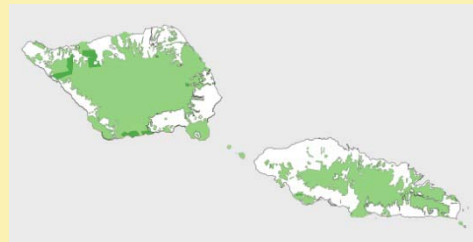
Island Outline



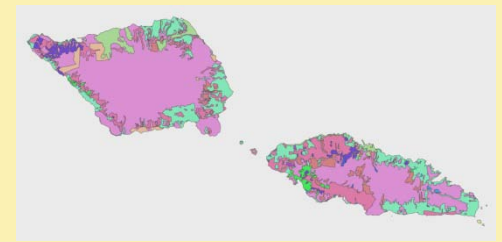
Soil – Agricultural Use



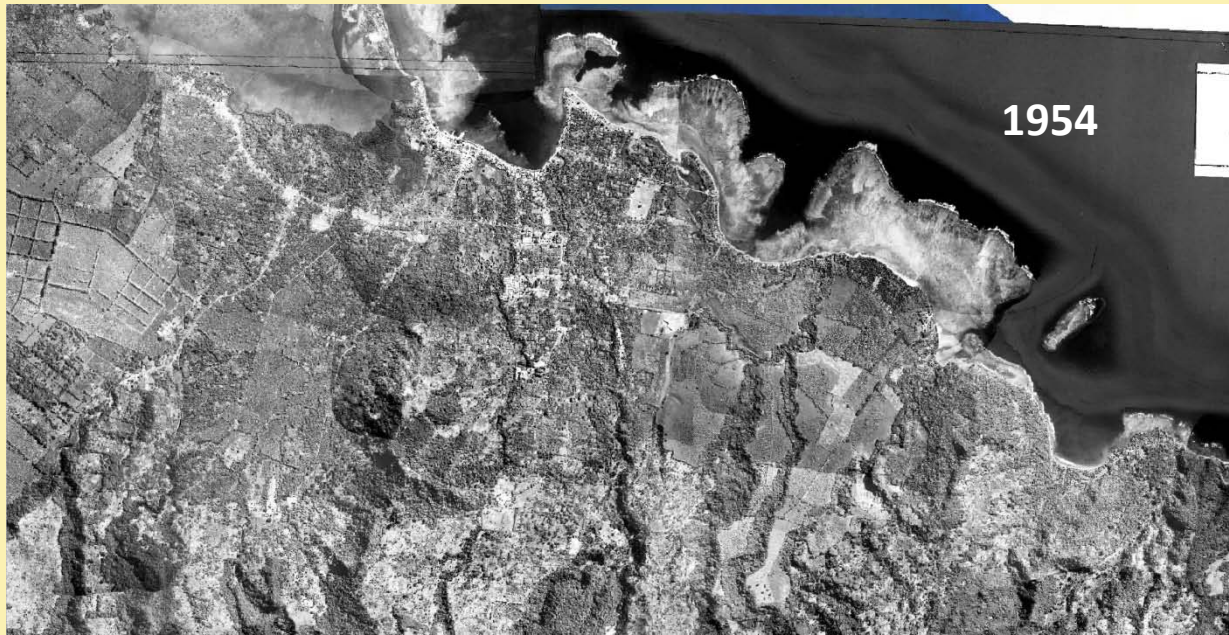
Soil Type



Forest 1989



Land Use

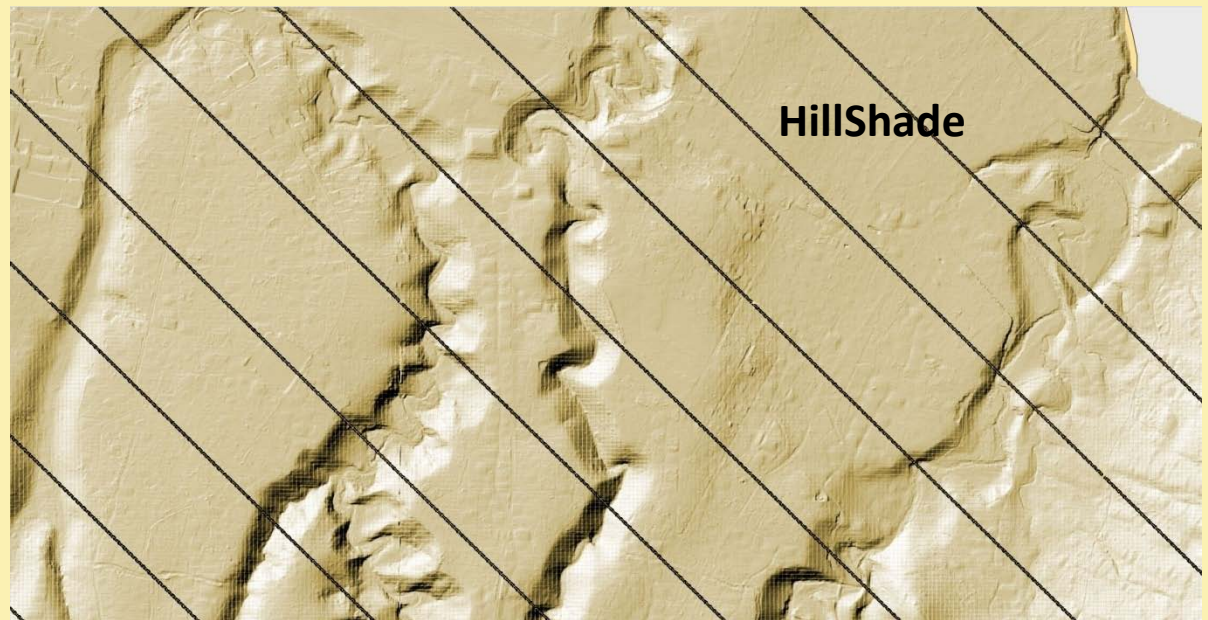


**Maps :
Aerial
Photos**

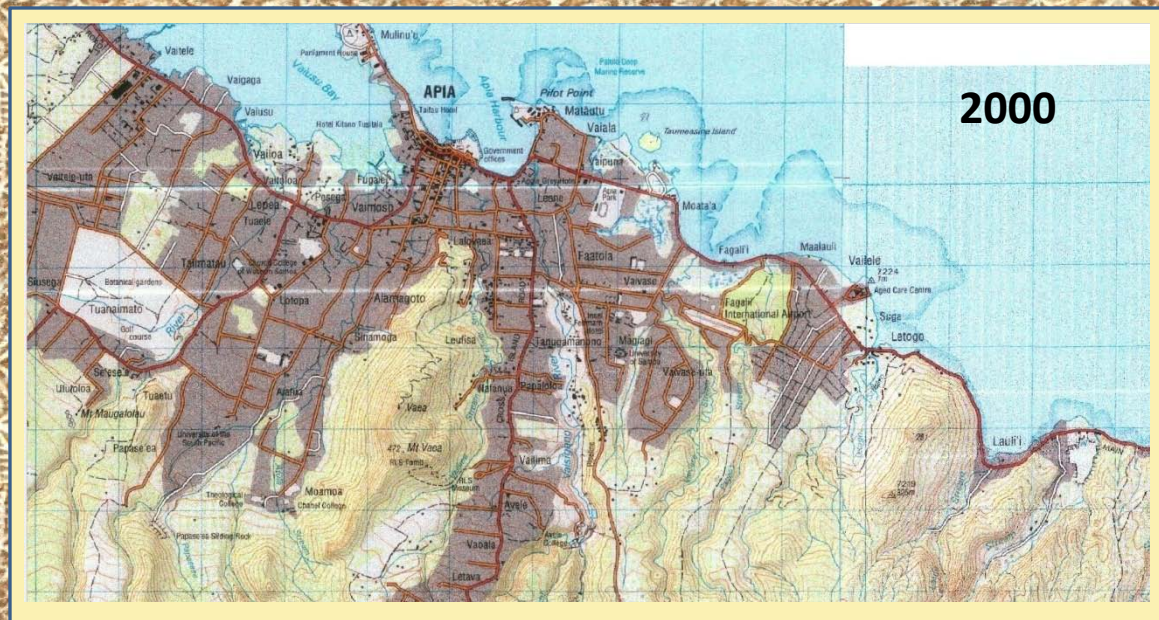
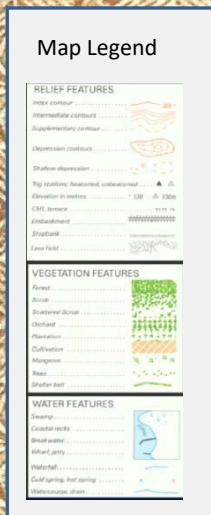
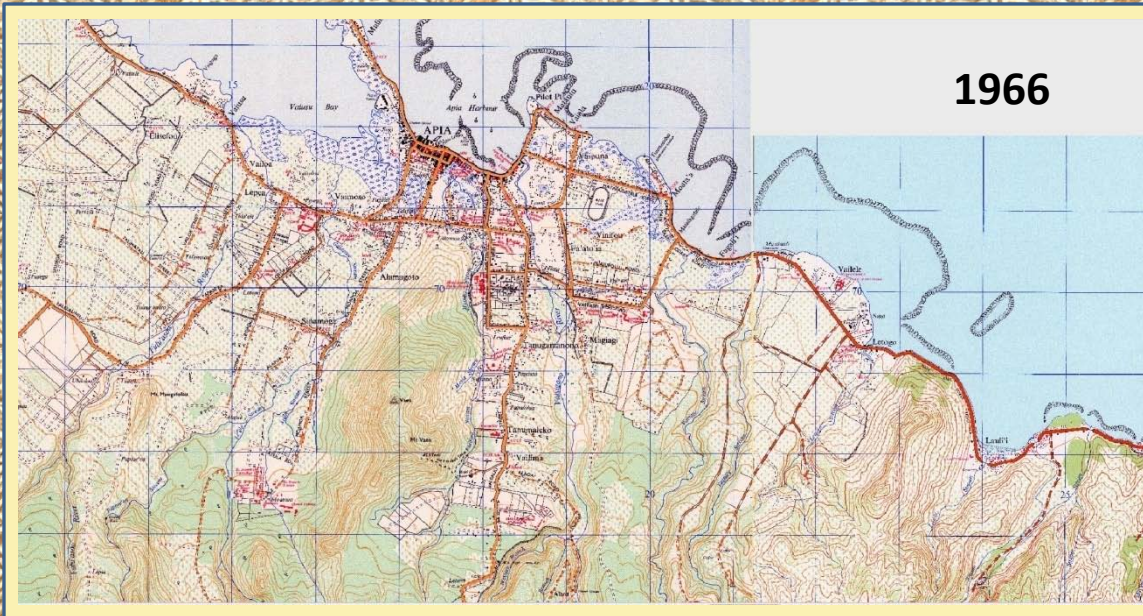




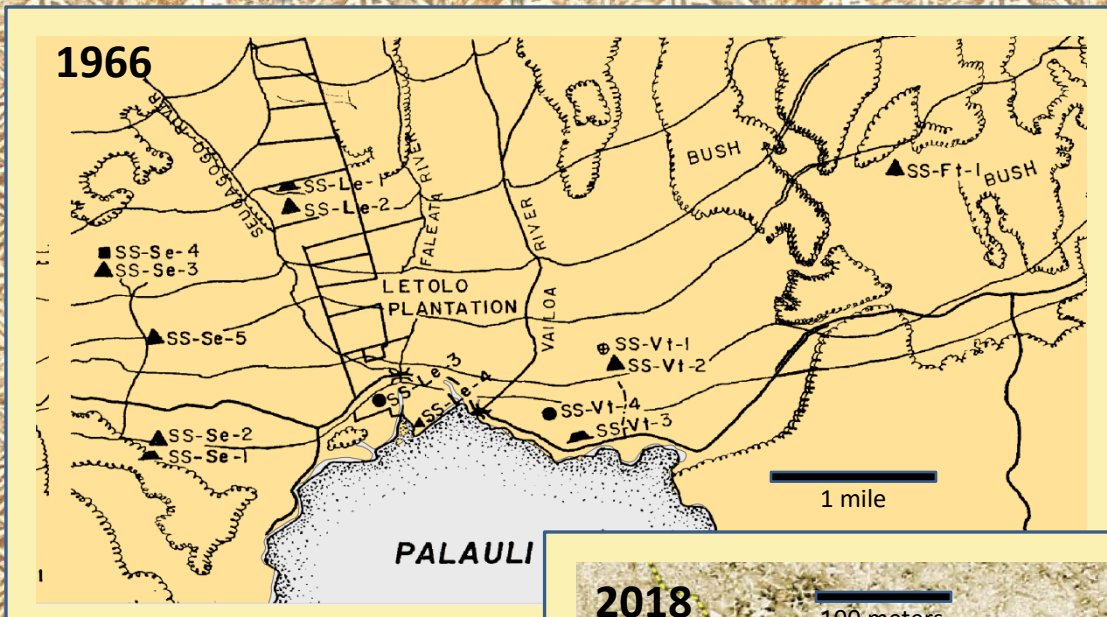
Maps : LiDAR



Maps : Topographic



Survey Maps – Historic & Recent



Map Legend

- ▲ Village
- Fortification
- - - Causeway
- ▬ Stone Wall
- Mound
- ⊕ Star Mound
- Miscellaneous
- ⋯ Roadway

Map Legend

All_Archaeology_Points

- ★ Star Mound
- ▲ Platform
- ✱ Umu ele'ele
- ⊕ Hollow,

Line_Features_All

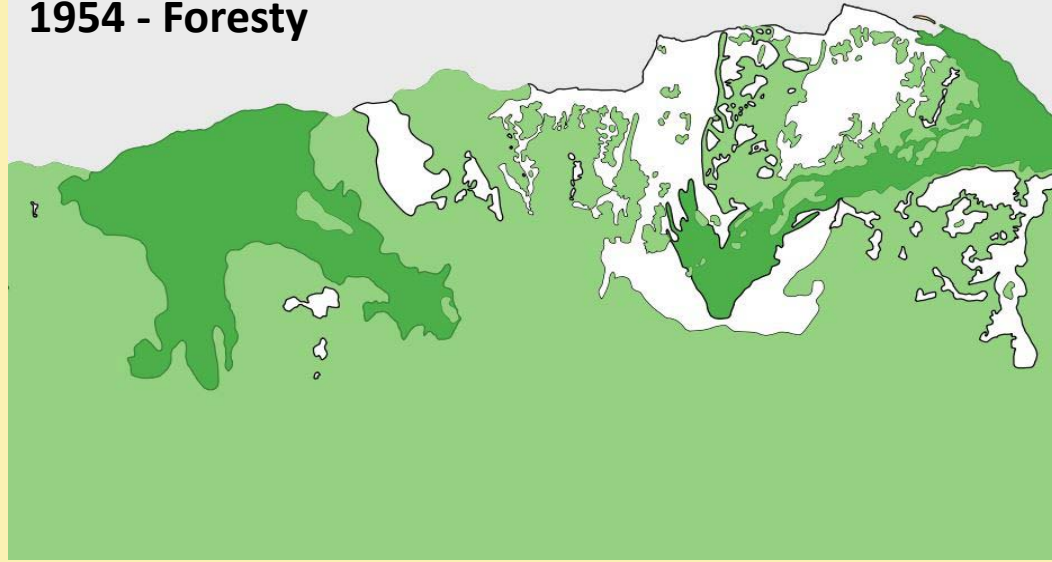
- ▬ Ditch
- ▬ Wall
- ▬ Walkway



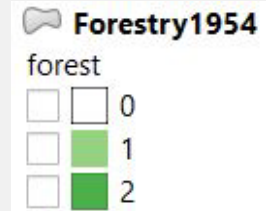
Samuau

Maps : Shape files & Overlays

1954 - Forestry



Map Legend



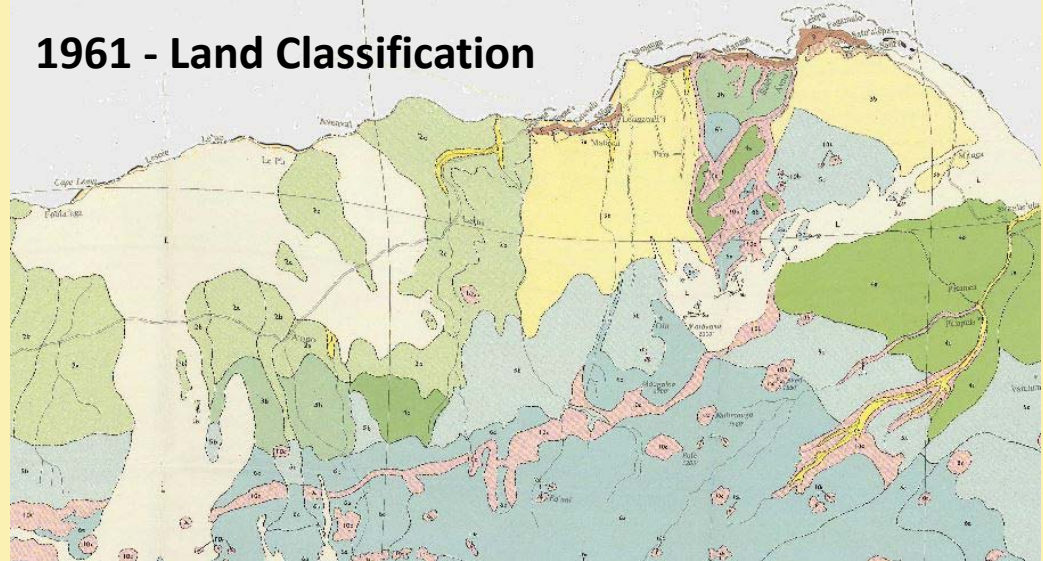
Map Legend

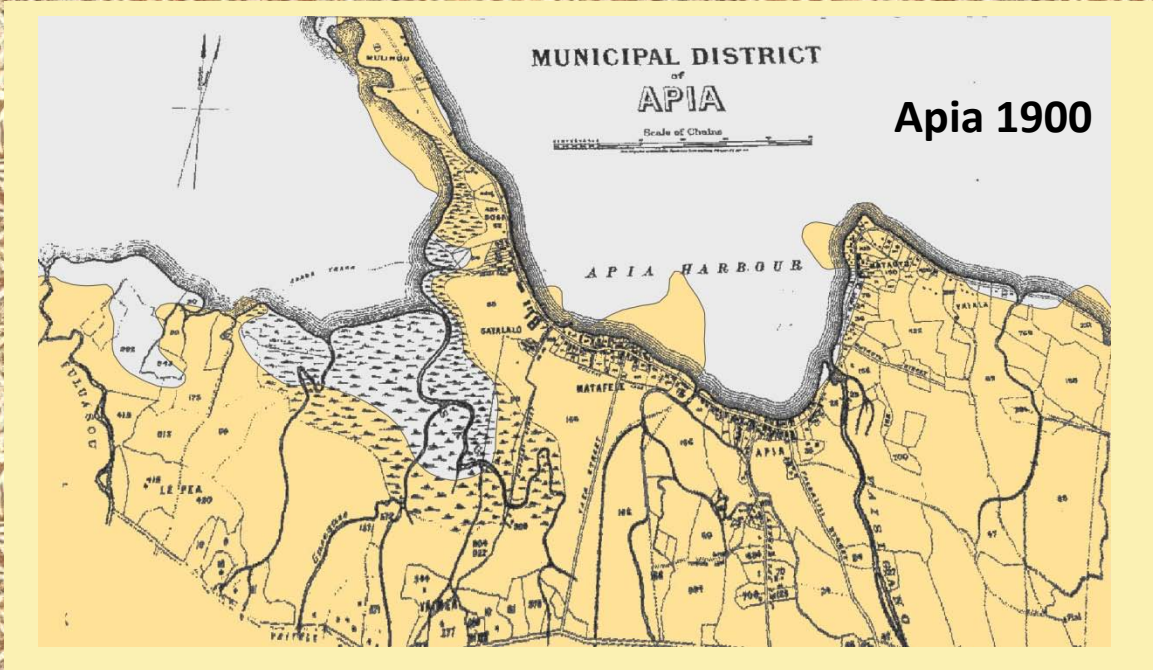
Land Classification - 1961

LEGEND

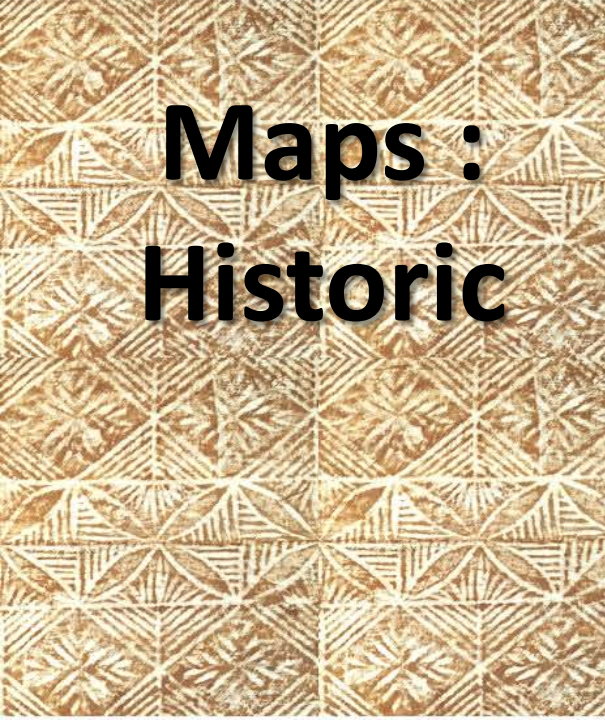
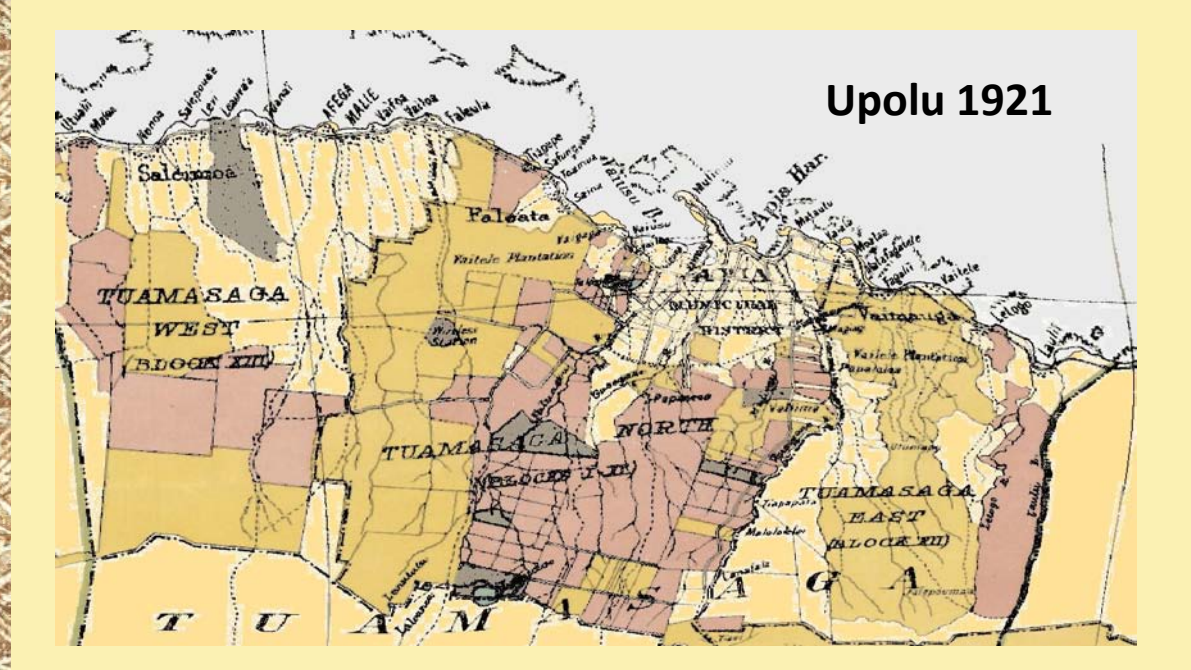
Class	Description	Limitations for Application
Class 1	Soils of high natural fertility Subclass: No very stony soils	Subject to potential flooding. Good drainage may be necessary
Class 2	Soils of medium to high natural fertility Subclass: No shallow water soils with 100% saturation Subclass: No high water table	Subject to erosion. Attention needed for soil development. Attention needed for soil development. Attention needed for soil development. Attention needed for soil development.
Class 3	Soils of medium natural fertility Subclass: No shallow water soils with 100% saturation Subclass: No high water table	High operation attention to control of water resources. Attention to soil development. Attention to soil development. Attention to soil development.
Class 4	Soils of medium to low natural fertility Subclass: No shallow water soils with 100% saturation Subclass: No high water table	High operation attention to control of water resources. Attention to soil development. Attention to soil development. Attention to soil development.
Class 5	Soils of low natural fertility Subclass: No shallow water soils with 100% saturation Subclass: No high water table	High operation attention to control of water resources. Attention to soil development. Attention to soil development. Attention to soil development.
Class 6	Soils of low to very low natural fertility Subclass: No shallow water soils with 100% saturation Subclass: No high water table	High operation attention to control of water resources. Attention to soil development. Attention to soil development. Attention to soil development.

1961 - Land Classification





Maps : Historic



Archaeological Data

Utu data by GIS Data Type

GIS Data Type	GIS Points	GIS Lines	GIS Polygons	Map Overlays	Media
Total Sites in Utu	10299	6951	3579	101	6272
New Sites 2016-2020	8976	4929	1966		
Non CSS Site in Utu					
Green & Davidson 1969-1974	327			19	
Jennings 1970s	13	319	395	2	
Jackmond 1970s	976	1708	1218	3	
Sand 2013	7			2	
Quintus 2018 (Pattern recognition) ¹		1545	431		

Attribute Tables – SQLite DBs

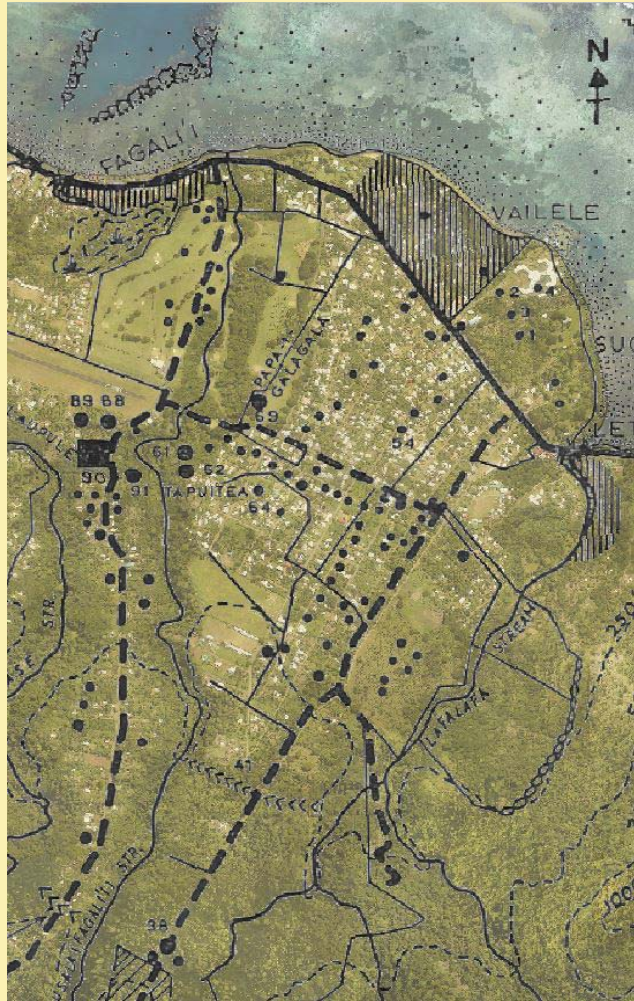
SMS_P_GPS :: Features total: 113, filtered: 113, selected: 0

	_nam	p_latitude	p_longitude	#bit	_tim	c_name	ata	ata	ata	ata	Data	Data	Data	P_Data_Com	Data	_SMS_AiPhotos_Gr	IS_AiPhotos_GPS_I	SMS_AiPhotos_GPS	MS_AiPhotos_GPS	IS_AiPH	MS_AiPhotot	MS_AiPhotos_I	_AiPho	otos_GPS_SM	i_GPS	3PS_Sk	otos_GPS_SMS_A
1	P1001	-14.0011752	-171.463099	253	0/...	B13G10_...	9	8	1	257	WSW	O	S	Sloping side...	10	20170923_1057...	2017-09:23 10:5...	14 deg 00' 04.00"	171 deg 27' 48.00"	10:57	-14.00111...	-171.4633333	T10-...	23-09-2017	10:...	E	P1001-platform h
2	P1001	-14.0009109	-171.46296...	248	0/...	B13G10_...	9	8	1	257	WSW	O	S	Sloping side...	10	20170923_1057...	2017-09:23 10:5...	14 deg 00' 04.00"	171 deg 27' 48.00"	10:57	-14.00111...	-171.4633333	T10-...	23-09-2017	10:...	E	P1001-platform h
3	P1002	-14.00122769	-171.46317...	250	0/...	B13G10_...	11	9	0.8	155	S-SE	O	S	Sloping side...	1	20170923_1108...	2017-09:23 11:0...	14 deg 00' 04.00"	171 deg 27' 48.00"	11:08	-14.00111...	-171.4633333	T10-...	23-09-2017	11:...	N	P1002-platform h
4	P1003	-14.0011561	-171.46324...	250	0/...	B13G10_...	7	5	5	102	E-SE	O	S	Sloping side...	10	20170923_1118...	2017-09:23 11:1...	14 deg 00' 04.00"	171 deg 27' 48.00"	11:18	-14.00111...	-171.4633333	T10-...	23-09-2017	11:...	N-NE	P1003 hilly lookin.
5	P1004	-14.00117801	-171.46329...	250	0/...	B13G10_...	9	7	1.4	174	S	O	S	Sloping side	10	20170923_1126...	2017-09:23 11:2...	14 deg 00' 05.00"	171 deg 27' 48.00"	11:26	-14.00138...	-171.4633333	T10-...	23-09-2017	11:...	N	P1004-Very high
6	P1005	-14.00133566	-171.46346...	253	0/...	B13G10_...	9	8	1.1	70	E-NE	O	S	Very high lo...	10	20170923_1128...	2017-09:23 11:2...	14 deg 00' 05.00"	171 deg 27' 48.00"	11:28	-14.00138...	-171.4633333	T10-...	23-09-2017	11:...	N	P1005-irregular r.
7	P1006	-14.00147369	-171.463728	254	0/...	B13G10_...	13	8	1.3	10	NE	O	S	disturbed hi...	10	20170923_1141...	2017-09:23 11:4...	14 deg 00' 05.00"	171 deg 27' 49.00"	11:41	-14.00138...	-171.4636111	T10-...	23-09-2017	11:...	N-NE	P1006-disturbed
8	P1009	-14.00099362	-171.462312	247	0/...	B13G10_...	6	5	0.5	0	N	O	S	greatly dist...	10	20170930_1018...	2017-09:30 10:1...	14 deg 00' 04.00"	171 deg 27' 44.00"	10:18	-14.00111...	-171.4622222	T10-...	30-09-2017	10:...	N-NE	P1009-platform g
9	P101	-14.00204879	-171.46178...	255	0/...	B13G1_3_...	6	6	0.7	330	N-N...	C	S	associated ...	1	20170923_1126...	2017-09:23 11:2...	14 deg 00' 07.00"	171 deg 27' 42.00"	11:26	-14.00194...	-171.4616667	T1-2...	23-09-2017	1/0...	N	covered with fer...
10	P101	-14.00202822	-171.46179...	255	0/...	B13G1_3_...	6	6	0.7	330	N-N...	C	S	associated ...	1	20170923_1126...	2017-09:23 11:2...	14 deg 00' 07.00"	171 deg 27' 42.00"	11:26	-14.00194...	-171.4616667	T1-2...	23-09-2017	1/0...	N	covered with fer...
11	P1010	-14.00092016	-171.462153	250	0/...	B13G10_...	6	4	6.2	121	E-SE	O	S	deformed pl...	10	20170930_1028...	2017-09:30 10:2...	14 deg 00' 03.00"	171 deg 27' 44.00"	10:28	-14.00083...	-171.4622222	T10-...	30-09-2017	10:...	N	P1010-disrupted
12	P1011	-14.00081341	-171.46215...	245	0/...	B13G10_...	5	3	0.3	332	N-NW	O	S	platform co...	10	20170930_1034...	2017-09:30 10:3...	14 deg 00' 03.00"	171 deg 27' 44.00"	10:34	-14.00083...	-171.4622222	T10-...	30-09-2017	10:...	N	P1011-deformed
13	P1012	-14.00139241	-171.462065	249	0/...	B13G10_...	3	3	0.2	226	S-W	I	V	circular plat...	10	20170930_1103...	2017-09:30 11:0...	14 deg 00' 05.00"	171 deg 27' 44.00"	11:03	-14.00138...	-171.4622222	T10-...	30-09-2017	11:...	W	P1012-circular d.
14	P1013	-14.00123258	-171.46240...	253	0/...	B13G10_...	6	5	0.4	102	E-SE	O	S	bsadly dest...	10	20170930_1110...	2017-09:30 11:1...	14 deg 00' 04.00"	171 deg 27' 45.00"	11:10	-14.00111...	-171.4625	T10-...	30-09-2017	11:...	N	P1013-platform d.
15	P1014	-14.00079091	-171.462935	239	0/...	B13G10_...	6	6	0.4	255	W-SW	O	S	A platform ...	10	20170930_1319...	2017-09:30 13:1...	14 deg 00' 03.00"	171 deg 27' 47.00"	1:19	-14.00083...	-171.4630556	T10-...	30-09-2017	1:19	N	P1013-platform d.
16	P1015	-14.00145084	-171.46314...	250	0/...	B13G10_...	11	9	0.1	57	E-NE	O	S	This is a pile...	10	20171014_1041...	2017:10:14 10:4...	14 deg 00' 05.00"	171 deg 27' 47.00"	10:41	-14.00138...	-171.4630556	T10-...	14-10-2017	10:...	N	There's a plant w.
17	P1016	-14.001998	-171.46367...	256	0/...	B13G10_...	9	7	0.1	56	NE	I	I	It's an platf...	10	20171014_1150...	2017:10:14 11:5...	14 deg 00' 07.00"	171 deg 27' 49.00"	11:50	-14.00194...	-171.4636111	T10-...	14-10-2017	11:...	N	Platform that gre.
18	P1017	-14.00167987	-171.46386...	256	0/...	B13G10_...	5	4	0.1	137	SE	S	I	Another pla...	10	20171014_1418...	2017:10:14 14:1...	14 deg 00' 05.00"	171 deg 27' 49.00"	2:18	-14.00138...	-171.4636111	T10-...	14-10-2017	2:18	N	Platform that is t.
19	P1018	-14.00165893	-171.46399...	253	0/...	B13G10_...	6	5	0.1	145	SE	S	I	elevated w...	10	20171014_1424...	2017:10:14 14:2...	14 deg 00' 06.00"	171 deg 27' 50.00"	2:24	-14.00166...	-171.4638889	T10-...	14-10-2017	2:24	S	Another disturbe.
20	P1019	-14.00149478	-171.46396...	254	0/...	B13G10_...	6	3	0.1	168	S-SE	O	I	Platform de...	10	20171014_1528...	2017:10:14 15:2...	14 deg 00' 08.00"	171 deg 27' 51.00"	3:28	-14.00222...	-171.4641667	T10-...	14-10-2017	3:28	N	Platform that cov

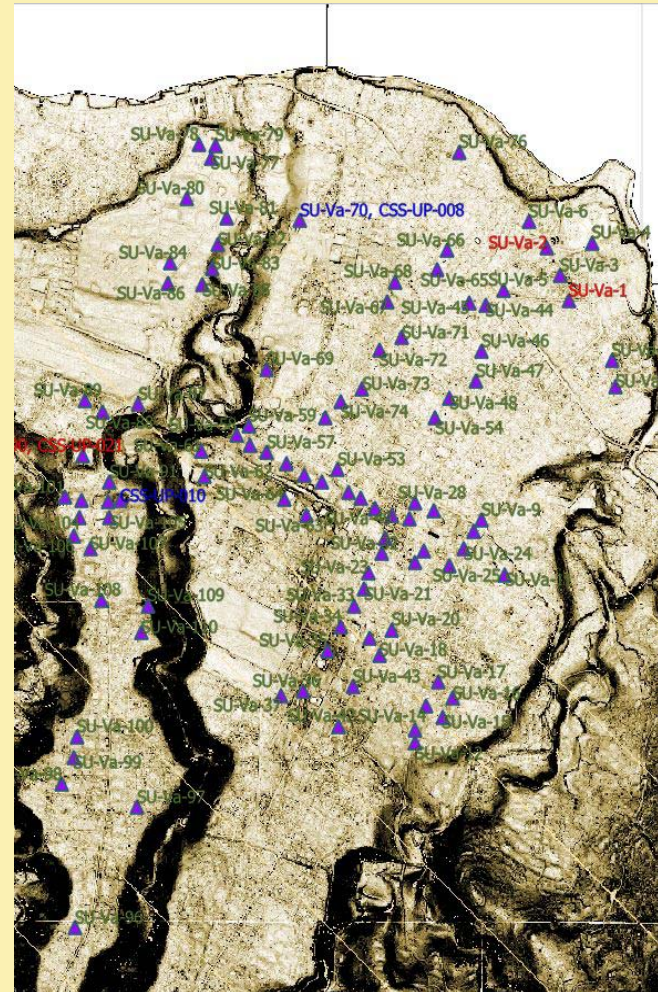
Show All Features

Data Display

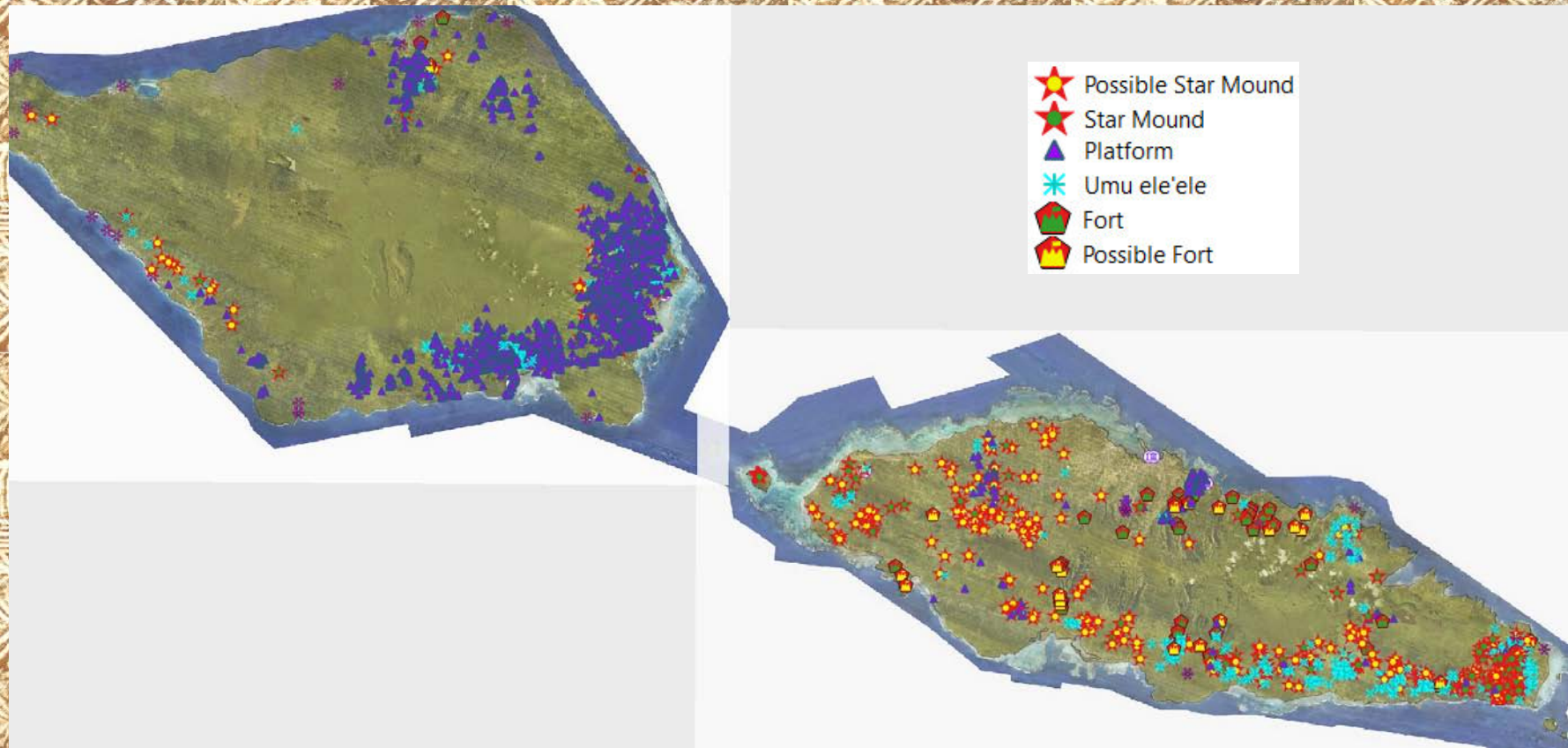
Digitized Historic Survey



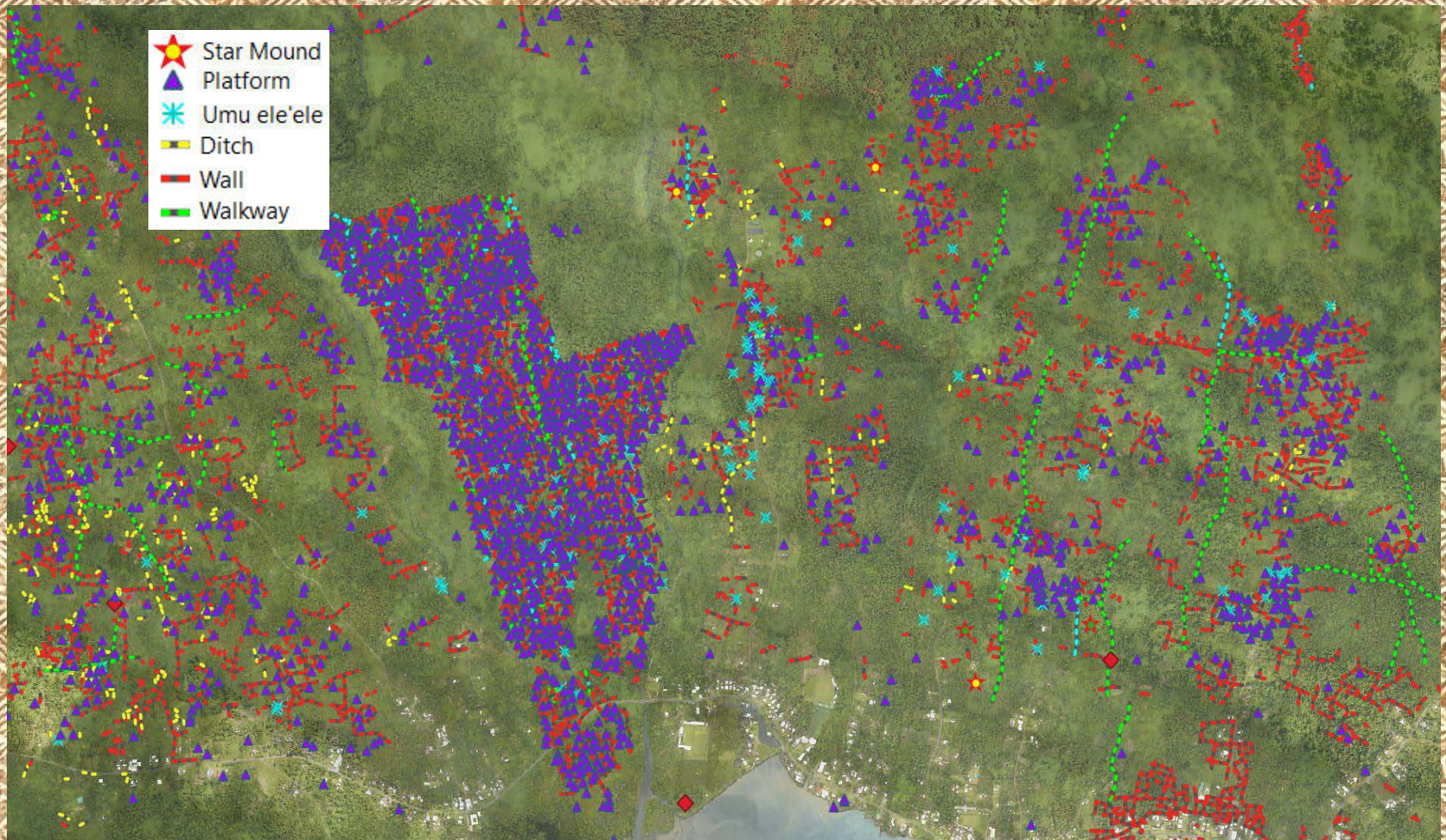
Enhanced Utu Information



Archaeological Sites



Archaeological Sites (close up)



Archaeological Site Data

Attributes – Identify Feature

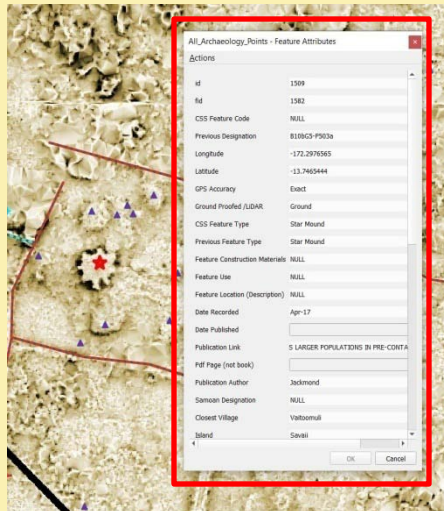
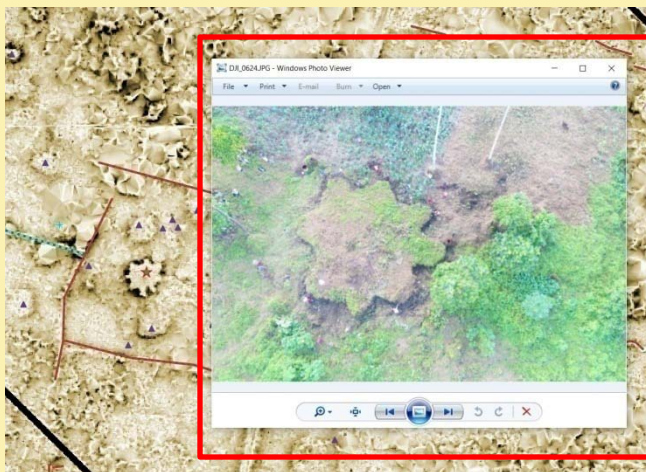


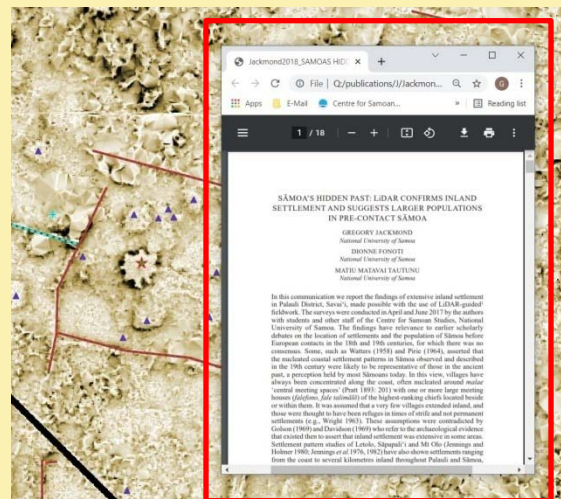
Photo Popup - Show Map Tips



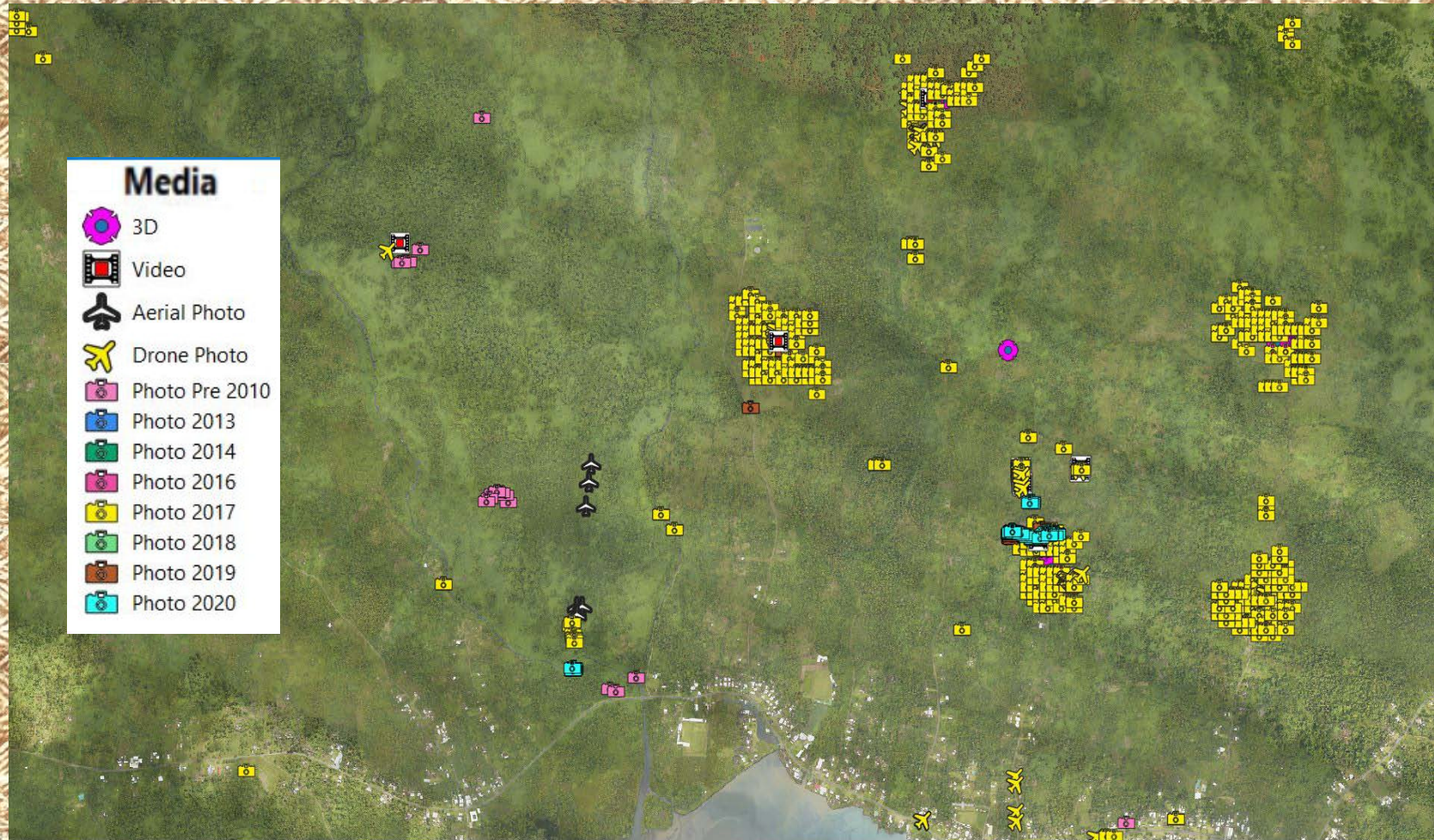
View Photo – Identify Feature



View Publication – Identify Feature

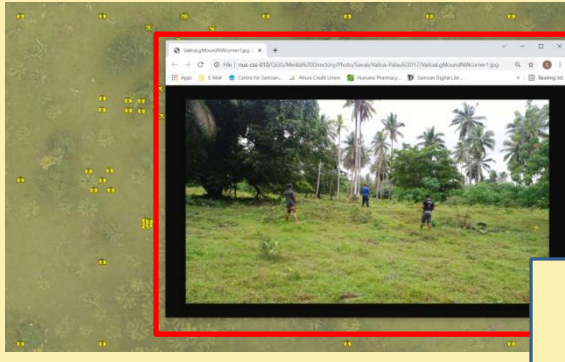


Media Data



Media Data

Display Media – Photo



Display Media – Video

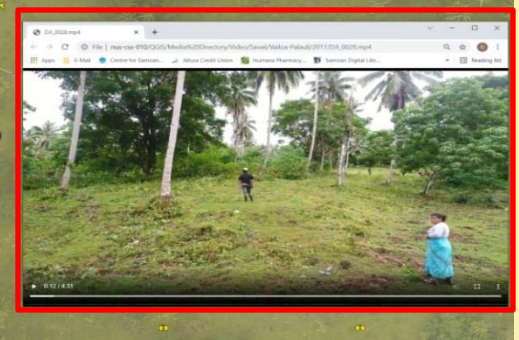
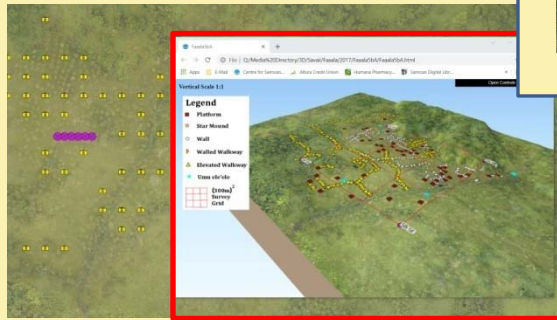


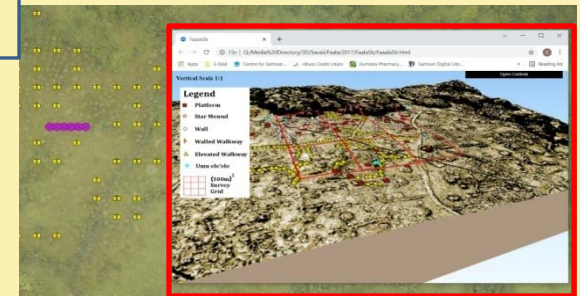
Photo Popup - Show Map Tips



Display Media – 3d



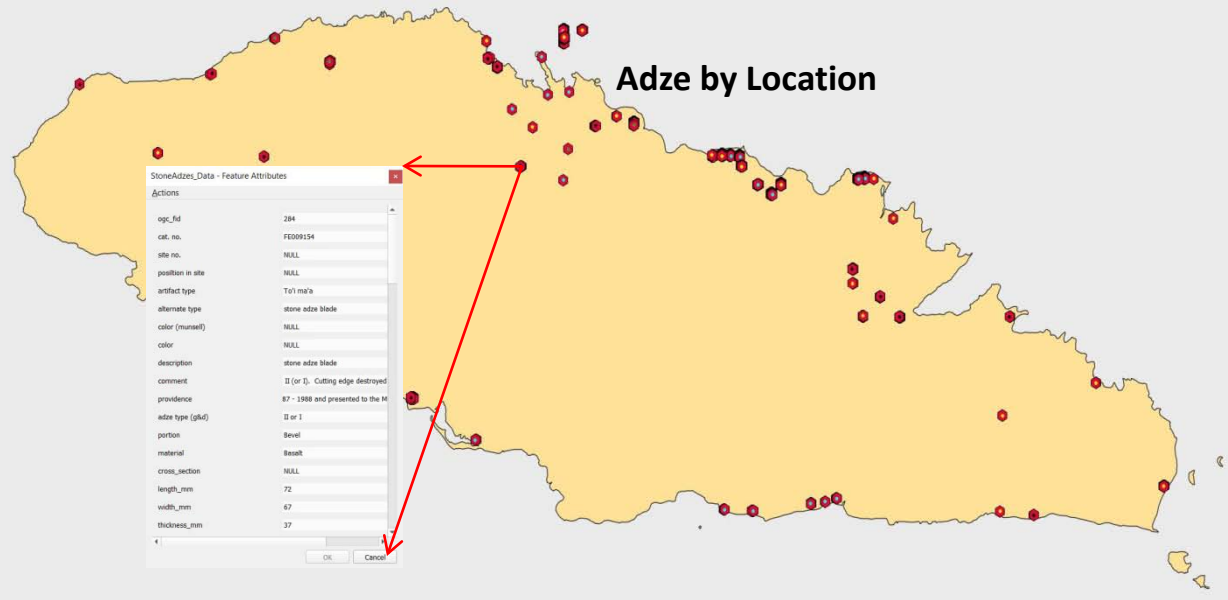
Display Media – 3d



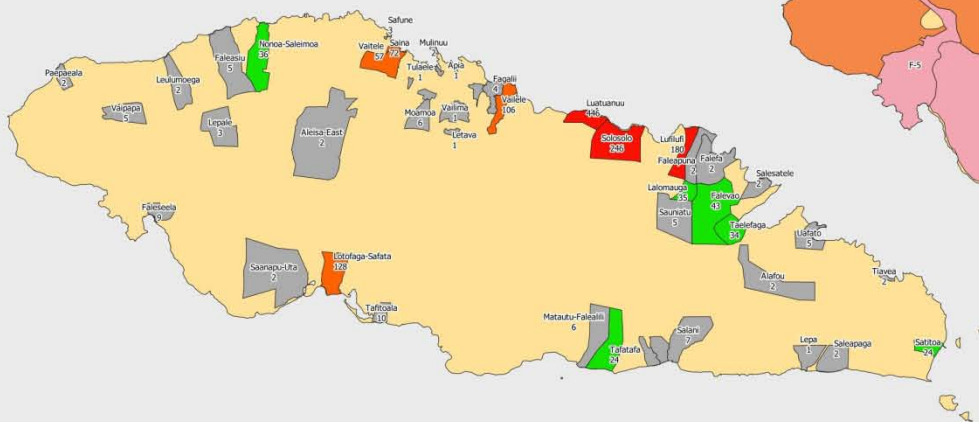
Data Analysis - Adze Data

Attributes – Identify Feature

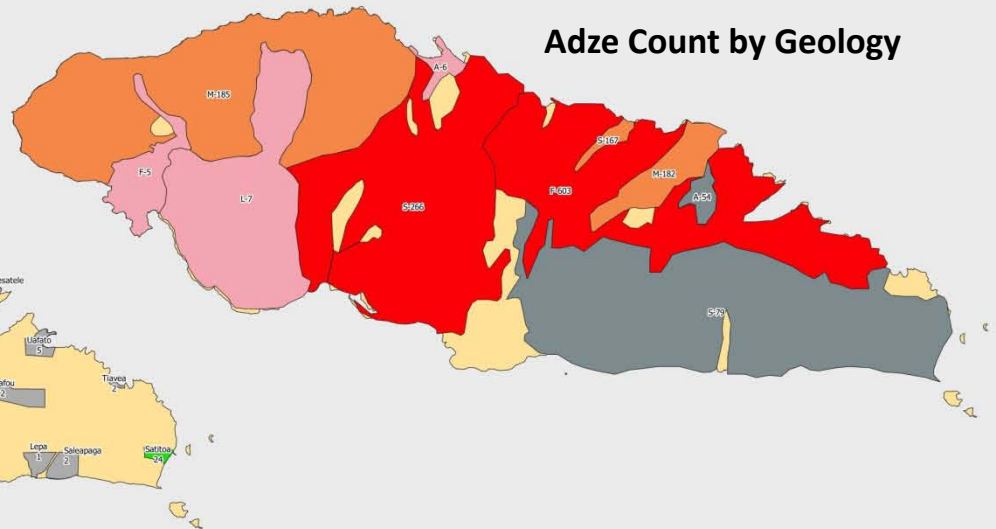
- Adzes
 - StoneAdzes_Data [2595]
 - Publication Only [1343]
 - Web Link Only [119]
 - Publication & Web Link [793]
 - Publication & Illustration [128]
 - None [212]
 - Adze Count-Village
 - 0
 - 1-10
 - 11-50
 - 51-150
 - >150
 - Adze Count-Geo
 - 0
 - 1-10
 - 11-50
 - 51-100
 - 101-200
 - >200



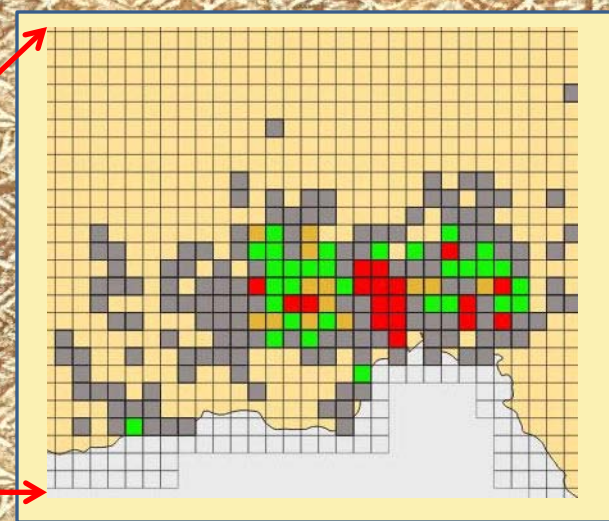
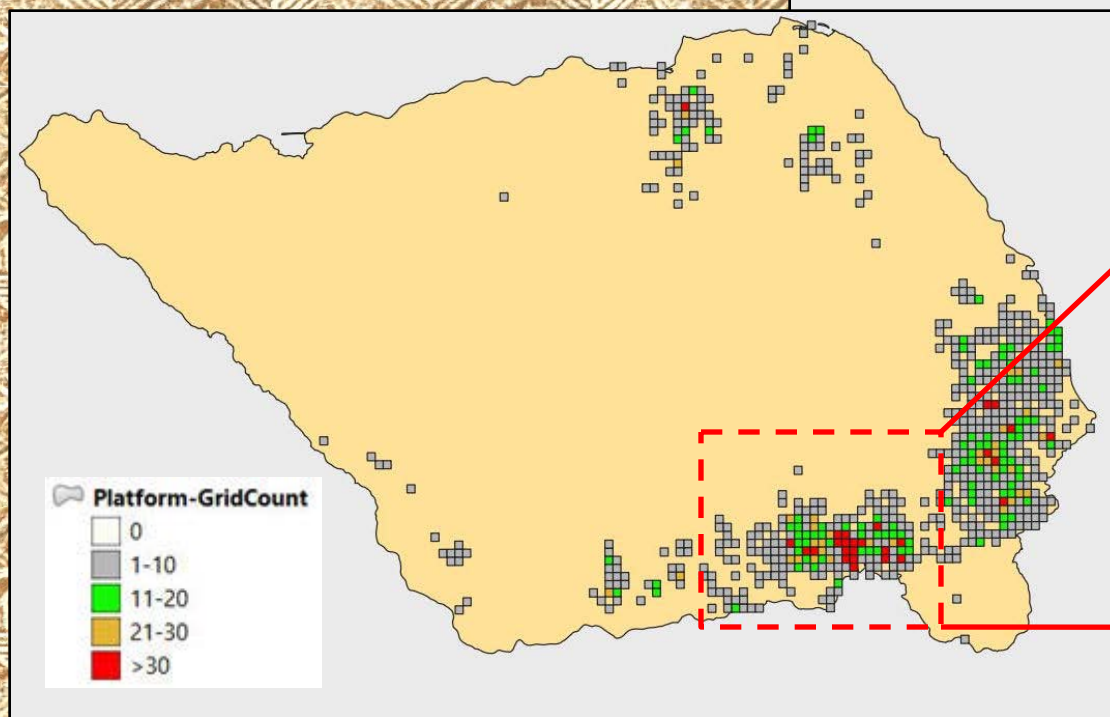
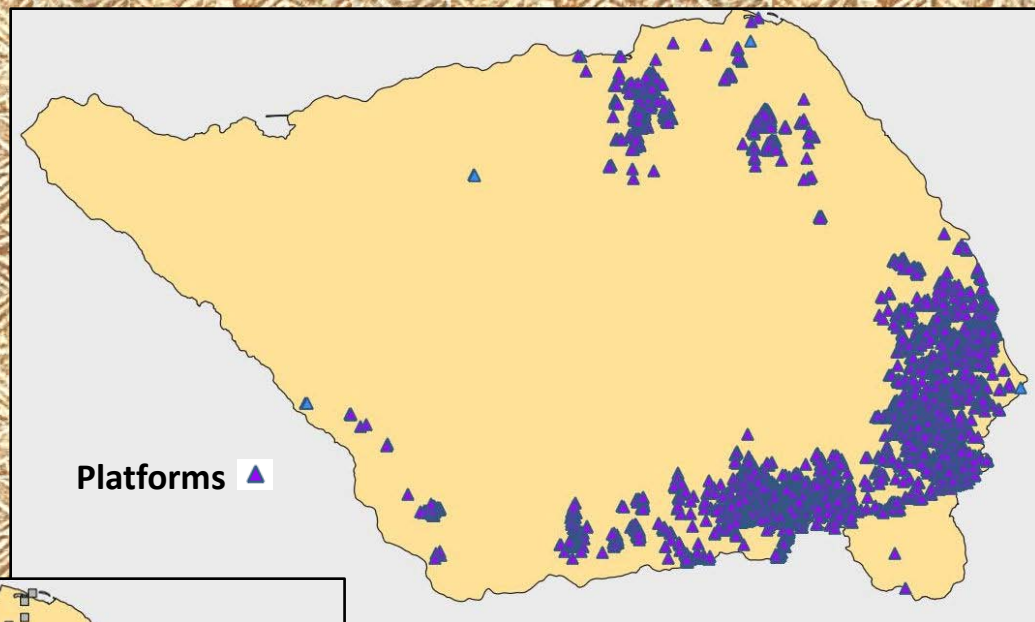
Adze Count by Village



Adze Count by Geology



Data Analysis Arch Data

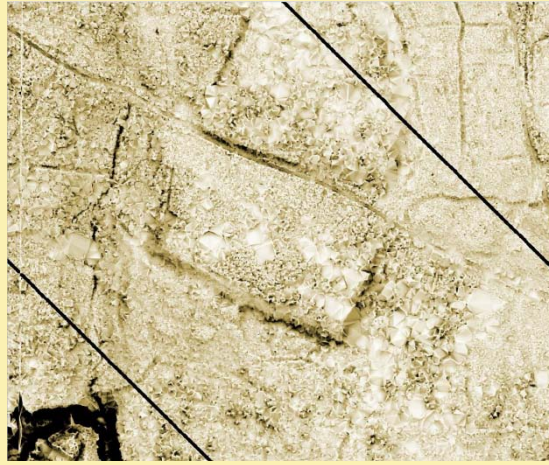


Data Analysis - Discovery

Simple Aerial View



LiDAR View



LiDAR w/ Contour



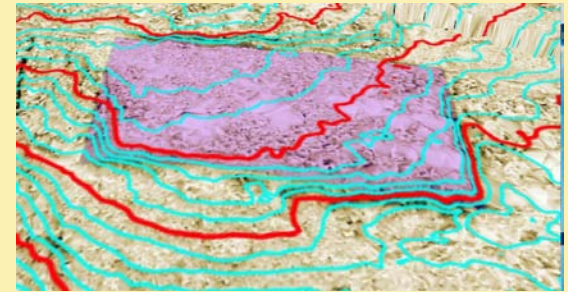
Shape File Overlay



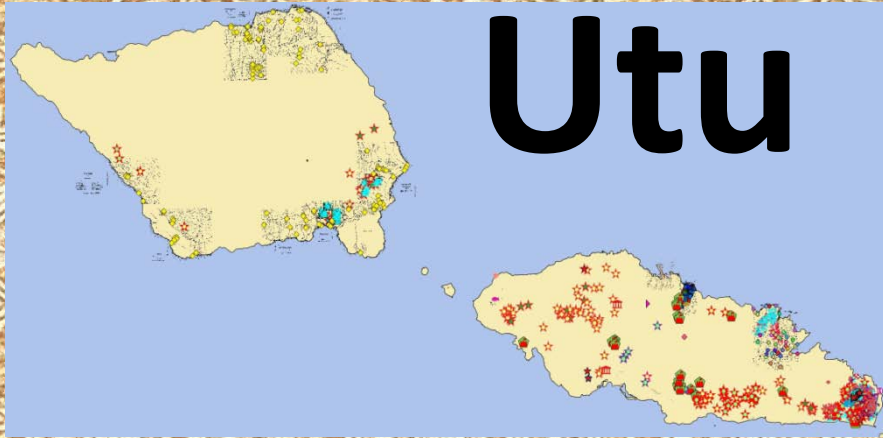
3d - LiDAR



3d - LiDAR - Contour
w/ Shape File Overlay

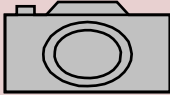






Utu



Already Contains
½ Terabyte of data
(500,000,000,000 bytes)

That is equivalent to: (choose 1)

	155,000	Cell Phone “selfies”
	250,000,000	Double Spaced Typed Pages of Text [210,000 copies of the <u>Bible</u>]
	8500 [354]	Hours Music [Days]
	500 [20]	Hours of <i>Youtube</i> “Cat” videos [Days]
	250 [125]	Hours of Movies [2 Hour Movies]

QGIS Additions

Home

samoanudies.ws/ACH

Centre for Samoan Studies -- Map Server
Introduction

Home [Main Map](#) [Background](#) [LiDAR Info](#) [Help](#)

What is the CSS LiDAR Map Server?

It is the publicly viewable, Centre for Samoan Studies/National University of Samoa (CSS/NUS), collection of LiDAR and aerial photos of the Independent State of **Samoa** (Upolu, Manono, Apolima, Savaii).

- LiDAR stands for **L**ight **D**istance **A**nd **R**anging. Please see [An Introduction to LiDAR](#) for a brief (14 page - mostly pictures) explanation of LiDAR.
- LiDAR allows us to see “around/through” vegetation seeing the “hidden” archaeological features beneath (see example on the right). A more indepth explanation and examples are given on the [LiDAR Info](#) page of this web site (also see the menu above).
- This web page has been made possible through the generous assistance of and our collaborative efforts with the Samoan Ministry for Natural Resources and the Environment (MNRE) who furnished the raw LiDAR data and aerial photos for this page.



Colonized LiDAR Image

Why was it created?

The Map Server is an effort to make **Samoa’s Hidden Cultural Heritage** available for everyone to see, **scholars and the public** alike.

It is hoped that allowing **everyone** to view the extent of this previously underreported **cultural treasure** will build interest in Samoa’s cultural heritage and encourage the Samoan Government to pass meaningful **cultural heritage protective legislation**

Online Map Server



Palauli LiDAR

samoanstudies.ws/ACH

Centre for Samoan Studies
Map Server
Palauli, Savaii LiDAR

[Home](#) [Main Map](#) [Arch. & Cult. Heritage](#) [LiDAR Info](#) [Help](#)

Aerial Photo Slider

Legend

- Platform
- Star Mound
- Wall
- Walled Walkway
- Elevated Walkway
- Channel
- Umu ele'ele

Online Map Server - LiDAR



Palauli LiDAR

samoanstudies.ws/ACH

Centre for Samoan Studies
Map Server
Palauli, Savaii LiDAR

[Home](#) [Main Map](#) [Arch. & Cult. Heritage](#) [LiDAR Info](#) [Help](#)

+

-

Aerial Photo Slider

Legend

- Platform
- Star Mound
- Wall
- Walled Walkway
- Elevated Walkway
- Channel
- Umu ele'ele

Online Map Server - Aerial

Crowd Sourcing

Palauli SAA
samoanstudies.ws/ACH

Centre for Samoan Studies
Samoan Armchair Archaeologist
Palauli, Upolu - *Record Features*

CSS-Map Server SAA Main Map Arch. & Cult. Heritage Tutorial

Feature Type: [v]
Delete Features
Export Features
Submit Features

Aerial Photo Slider 0 100

Legend

- Platform
- Star Mound
- Wall
- Walled Walkway
- Elevated Walkway
- Channel
- Umu ele'ele

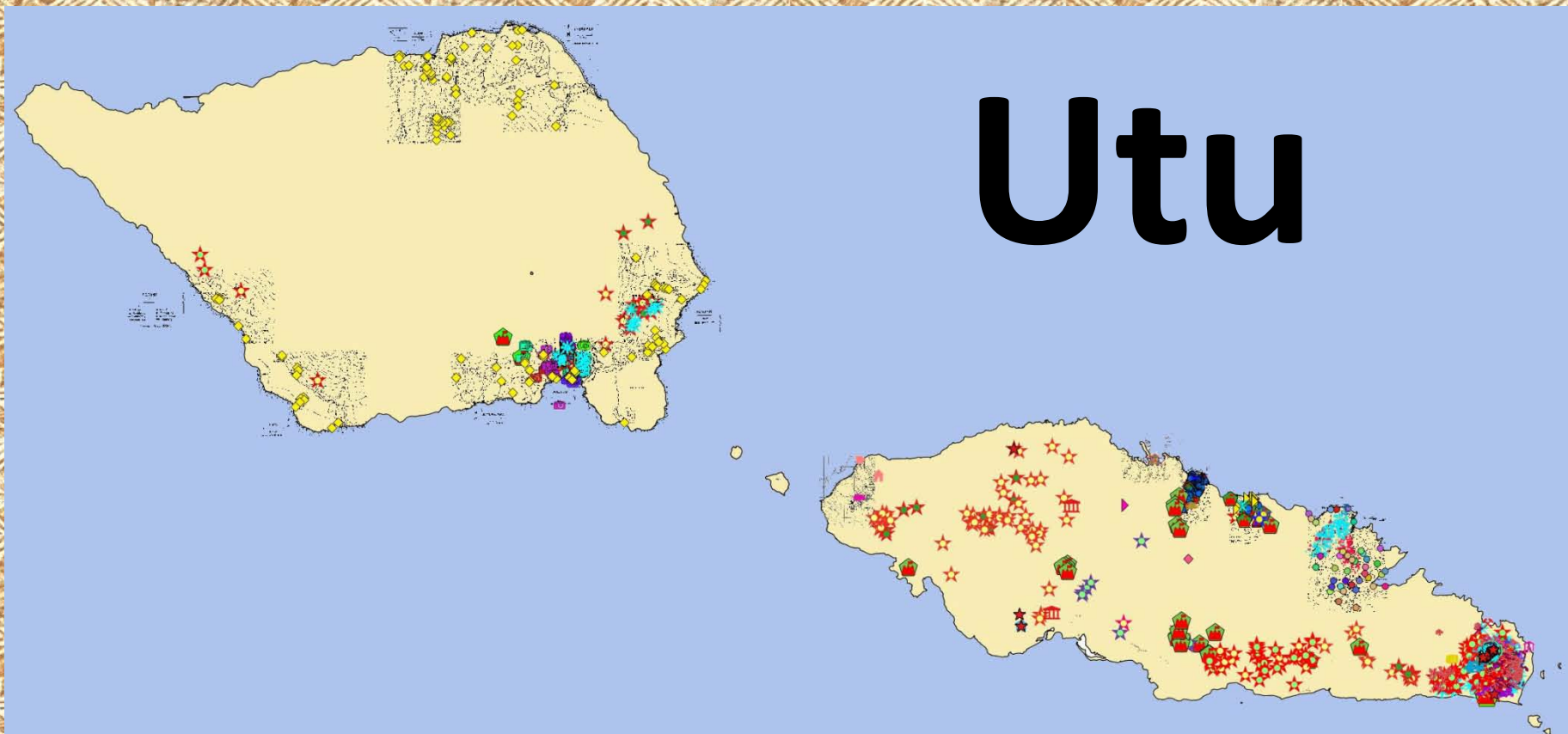
Directions for using map.
Directions for Drawing Tools.
Hide/Show

Recorded Sites

Crowd Sourcing

The screenshot displays the 'Palauli SAA' web application interface. The browser address bar shows 'samoanstudies.ws/ACH'. The page title is 'Samoan Armchair Archaeologist' and the subtitle is 'Palauli, Upolu - Record Features'. Navigation links include 'CSS-Map Server', 'SAA Main Map', 'Arch. & Cult. Heritage', and 'Tutorial'. The main map area shows an aerial photograph with purple lines representing detected features. A red line with white square markers indicates a vectorized path along a feature. A red dashed box highlights a zoomed-in view of this path. The interface includes a 'Feature Type' dropdown menu set to 'Wall', buttons for 'Delete Features', 'Export Features', and 'Submit Features', an 'Aerial Photo Slider', and a 'Legend' with categories: Platform, Star Mound, Wall, Walled Walkway, Elevated Walkway, Channel, and Umu ele'ele. A 'Draw' menu is open, showing options like 'Finish', 'Delete last point', and 'Cancel'. A scale bar at the bottom left indicates 50 m and 200 ft. A distance of 193 m is shown at the bottom of the map.

Site Detected & Vectorized



**Sāmoan Archaeology and
Cultural Heritage Database**
for the Independent State of Samoa