

GDC

#GDC17

JOSEPH AZZAM
TECHNICAL DESIGNER
WORLD VOID

PORTING A REAL LIFE
CASTLE
INTO YOUR GAME WHEN YOU'RE **BROKE**



GAME DEVELOPERS CONFERENCE | FEB 27-MAR 3, 2017 | EXPO: MAR 1-3, 2017





WORLD®
VOID



IYΔΛδγζηθ⊕⊗+W9PΥΓΟ≡



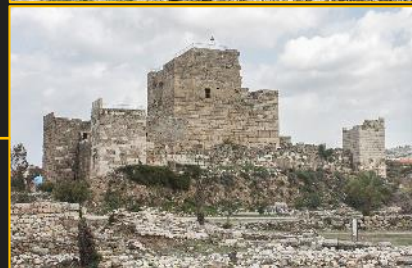




BYBLOS

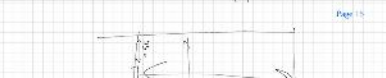
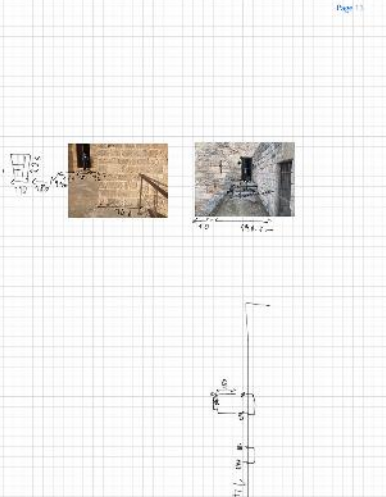
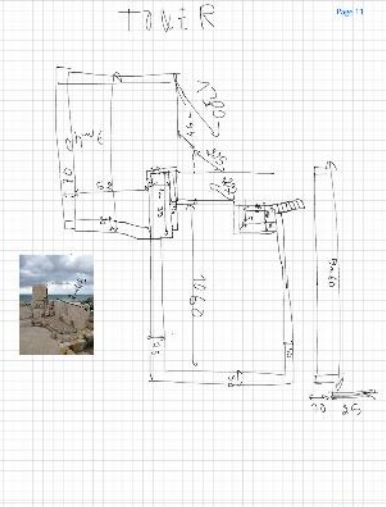
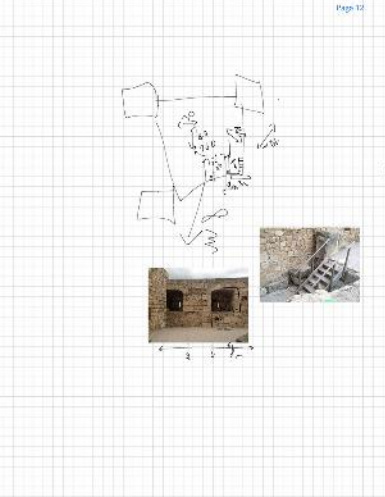
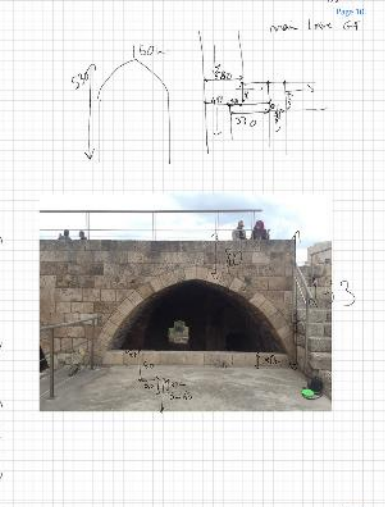
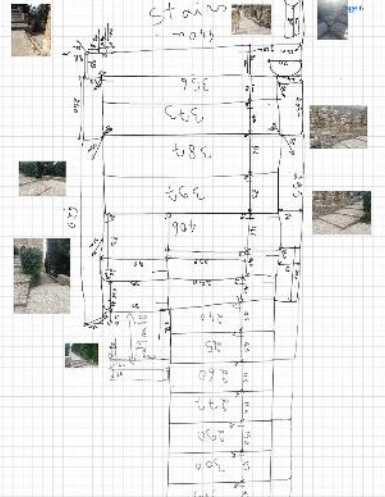
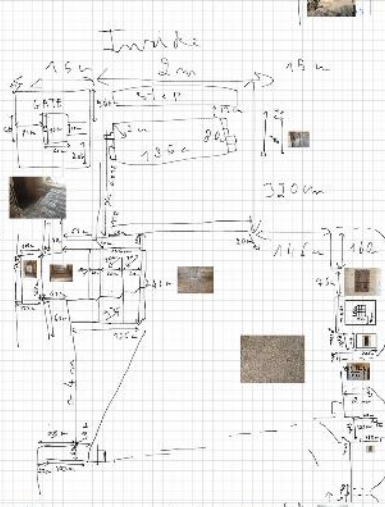
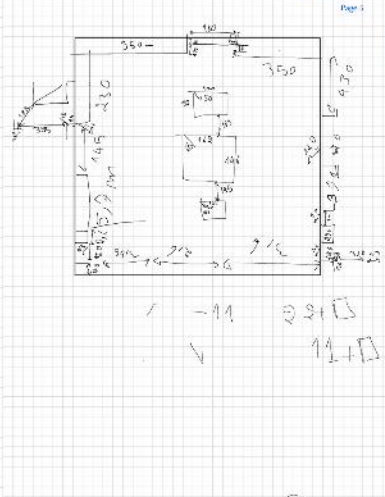
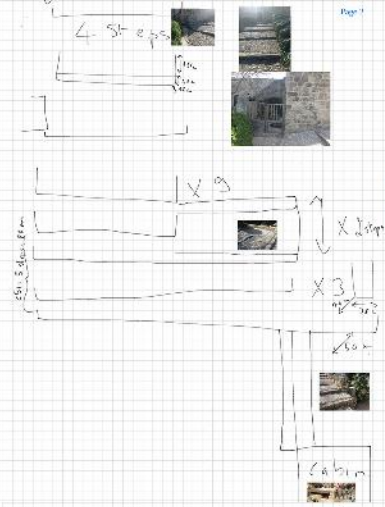
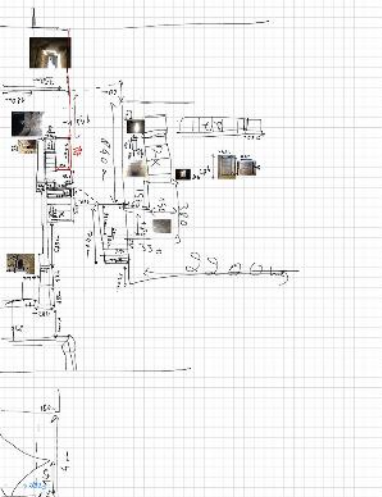
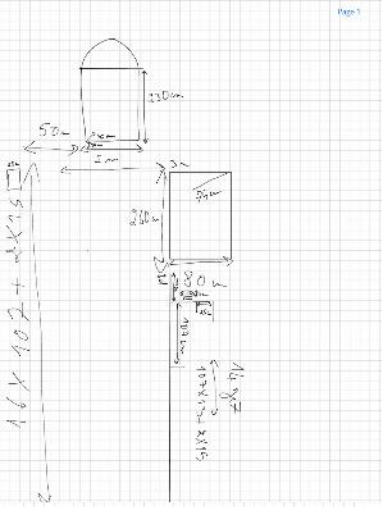


Draw From Reference



Draw From Measure

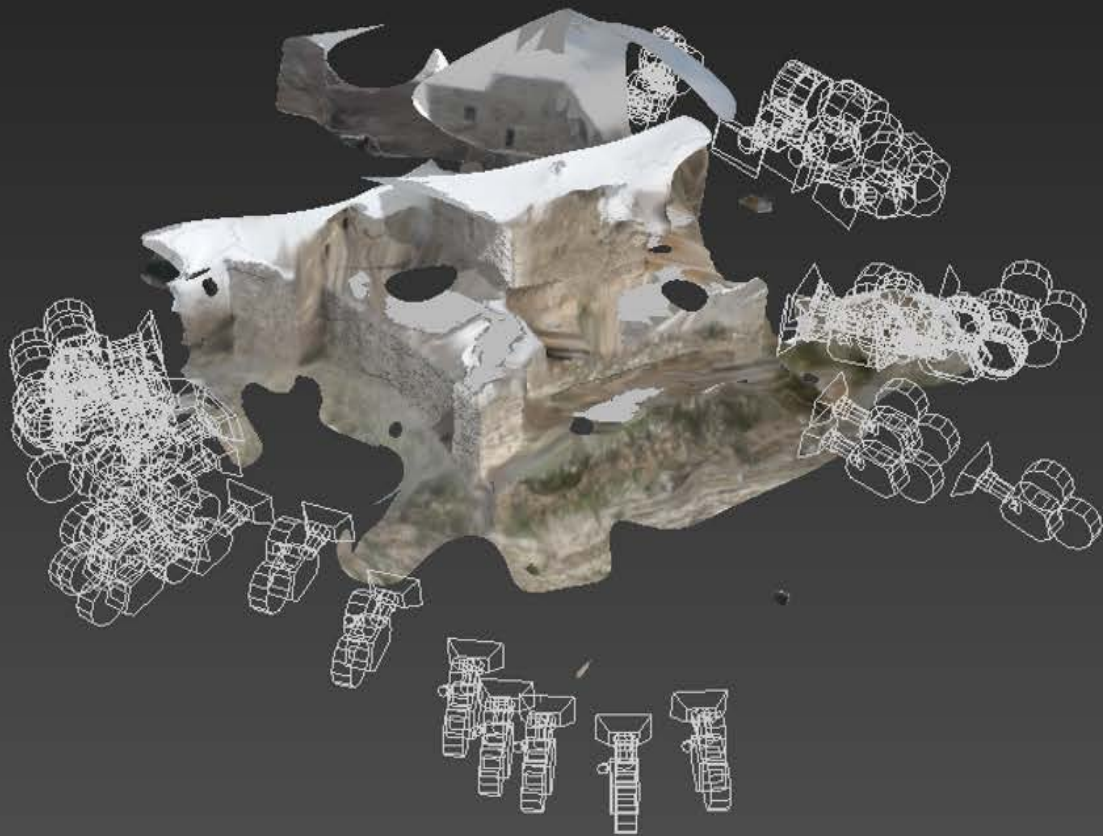




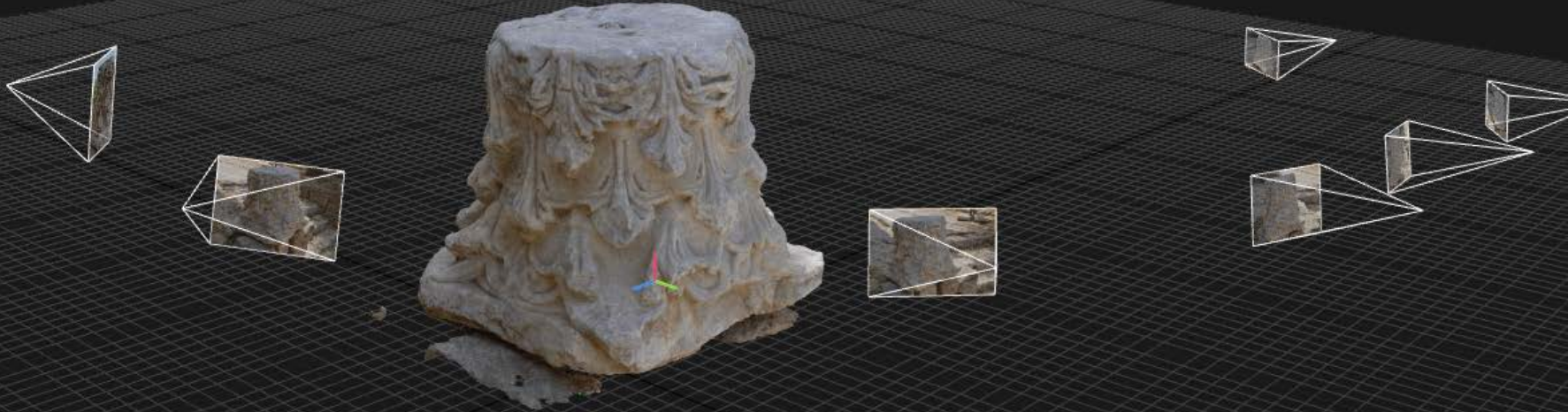


Draw From Measure

Quick Test In Recap



Photogrammetry



[ARTICLE]

Everything You Need to Know about Photogrammetry... I hope



Equipment



DSLR

\$2800



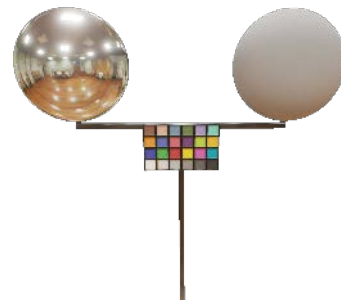
Accessories

\$400



Drone

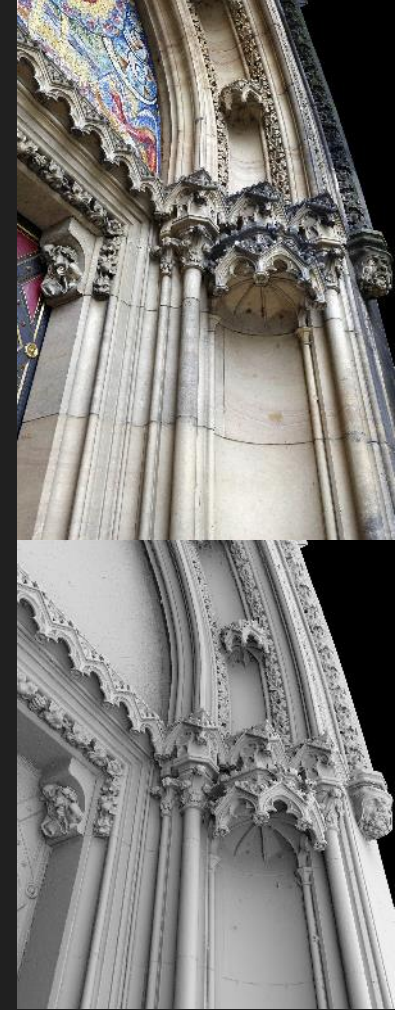
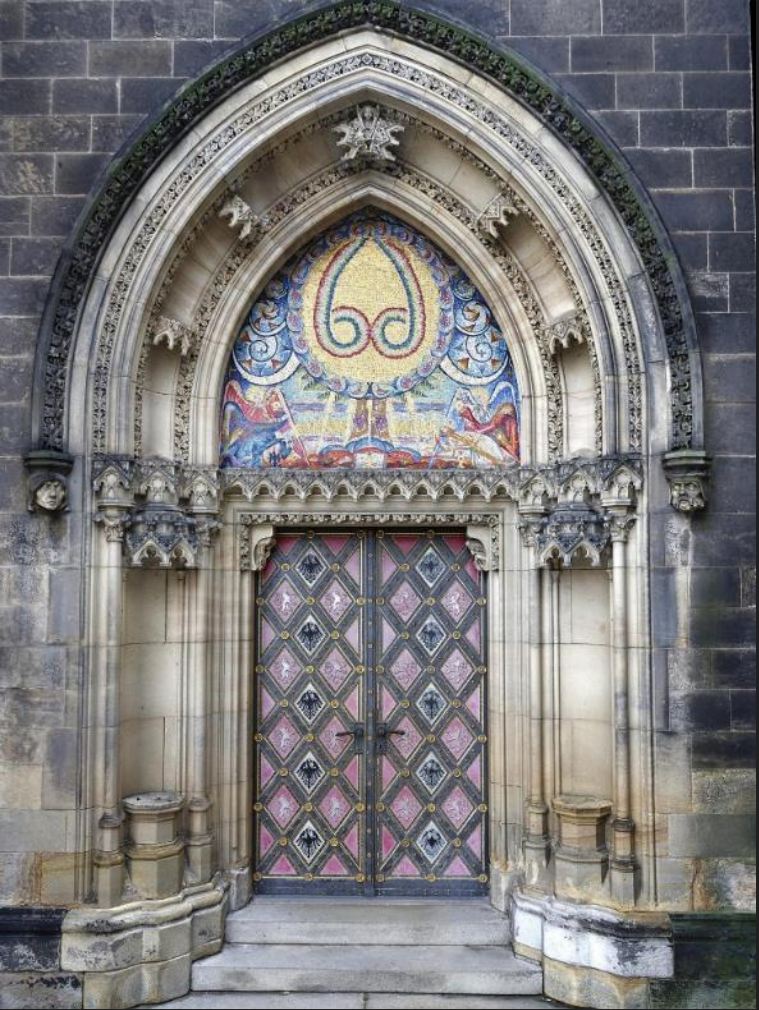
\$3000



Special Rig

\$1000





Scan by Milos Lukac, Canon 550D, 18-55mm lens, 436 photos x 18 MP, Reality Capture



Camera

- Most DSLR will work
- Rent or Borrow
- Post-Process your photos





Accessories



Fixed Lens

\$200



SD Card

\$40



Battery

\$30



Tripod

\$30



Monopod

\$10



Remote

\$2





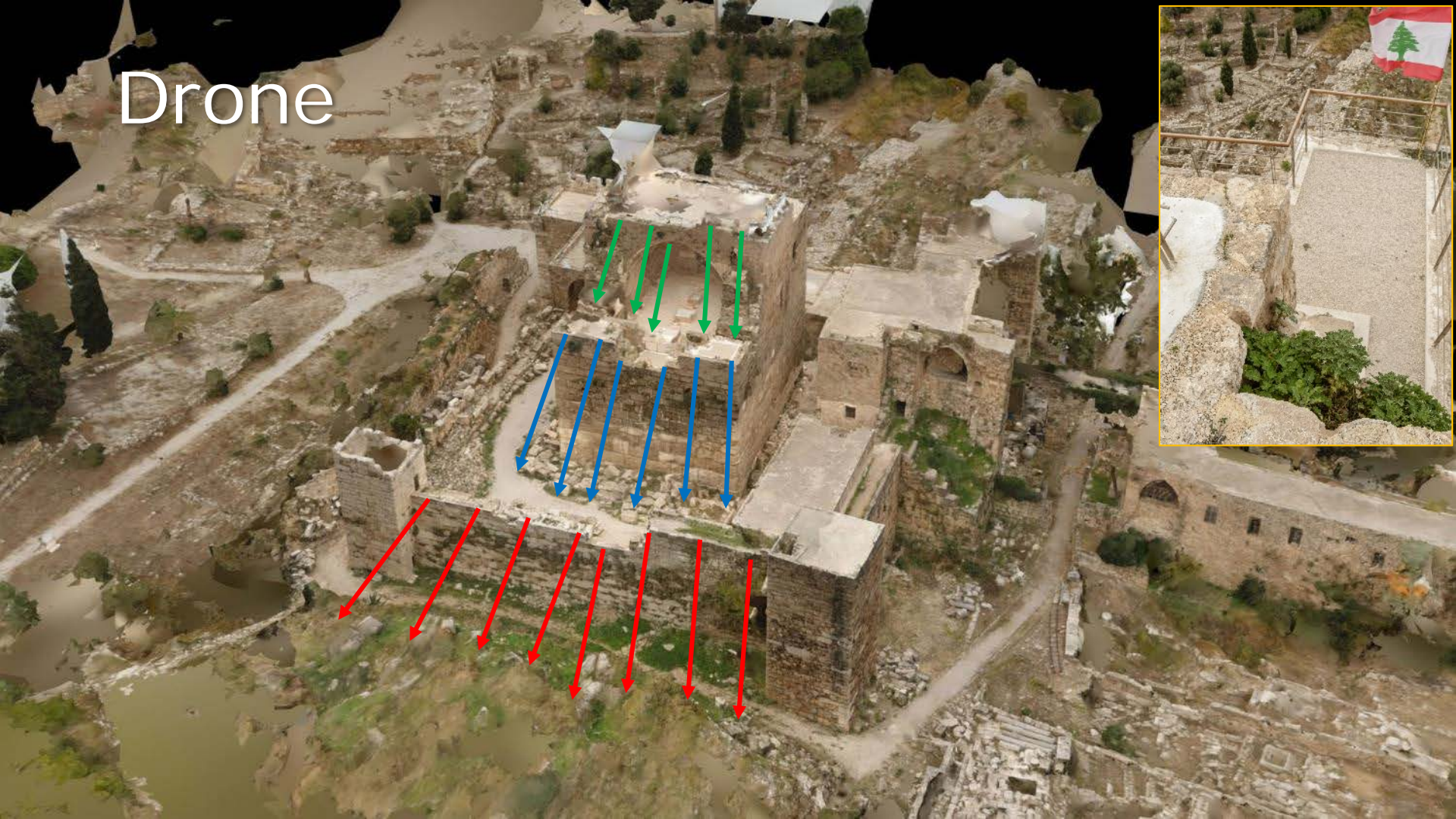
Drone



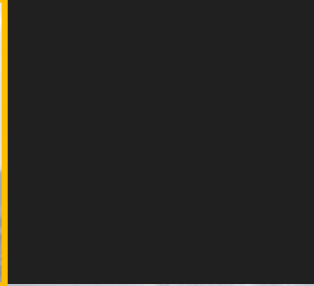
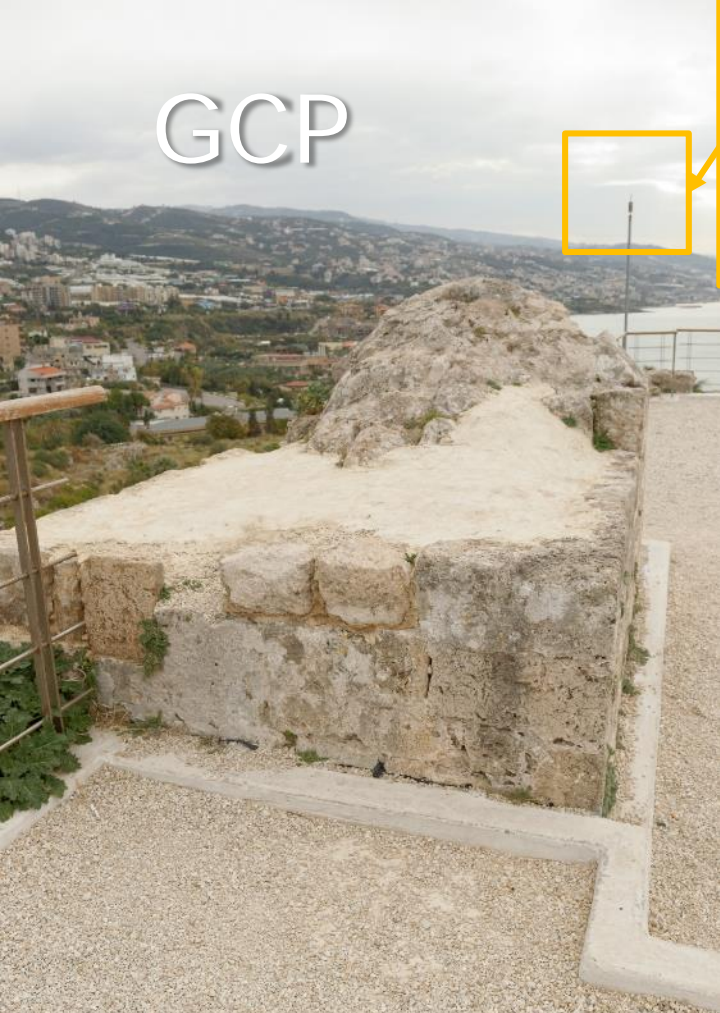
It will make your life easier



Drone



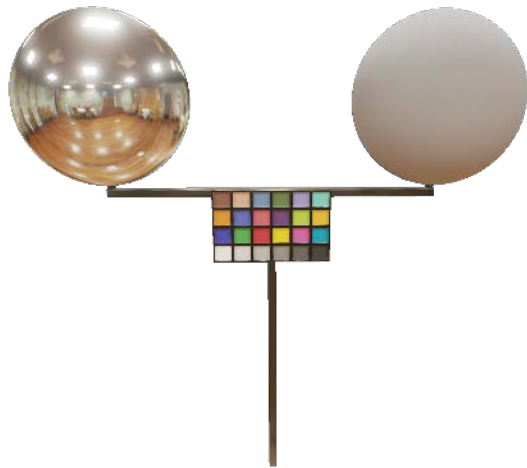
GCP





Special Rig

I did not use one,
I used a software solution



GDC: Photogrammetry and Star Wars Battlefront





Software



Remake

30\$/month



Agisoft

\$180 - \$3500



Reality Capture

€99/3 month
€7,500/year



Pix4D

\$350/month





PC

- Min Specs:
 - GPU: NVidia GTX 4GB
 - CPU: I7 is best
 - RAM: 32 GB
 - Hard Drive:
 - SSD for processing
 - HDD for storage

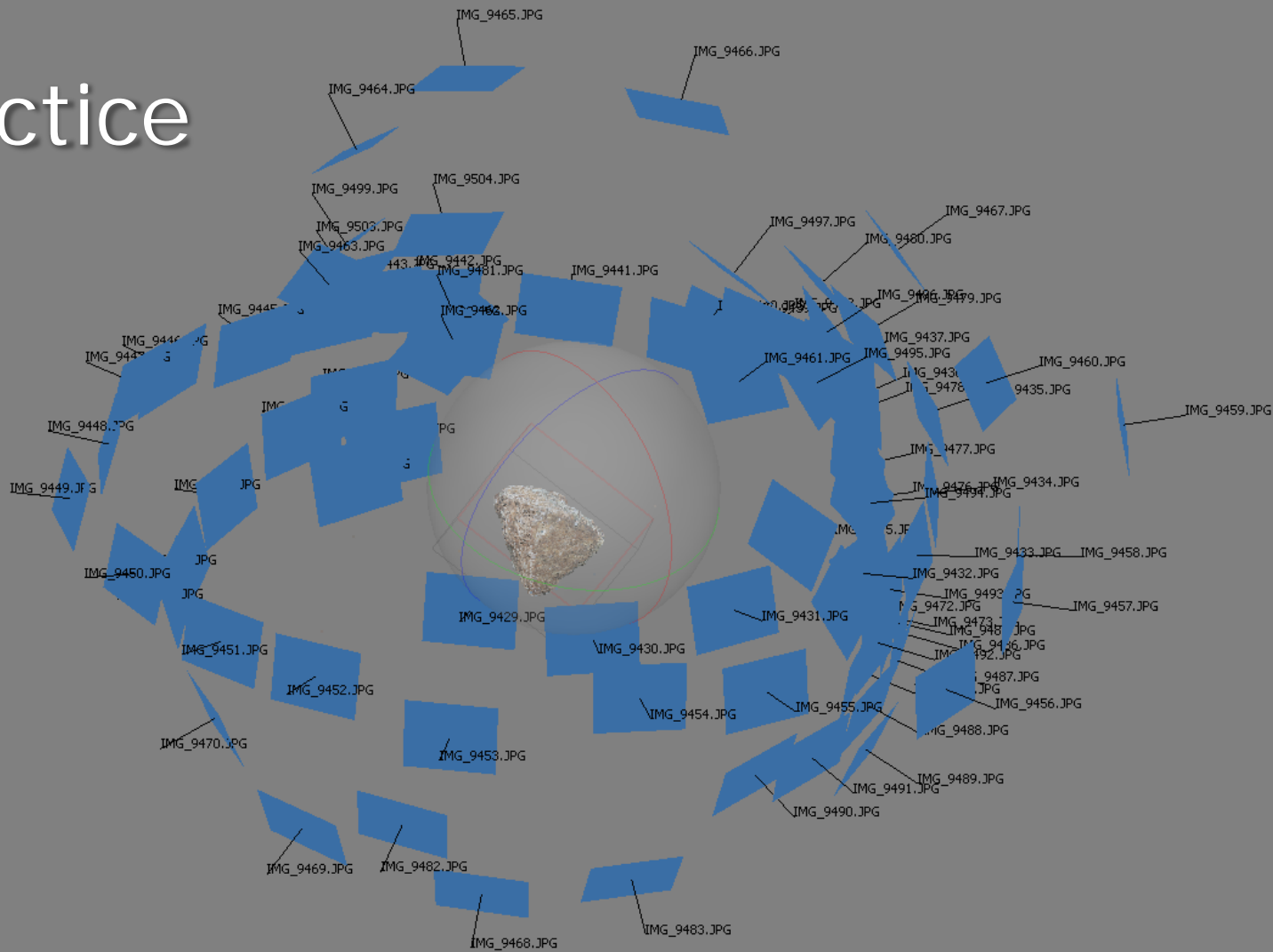


Please don't use a laptop!



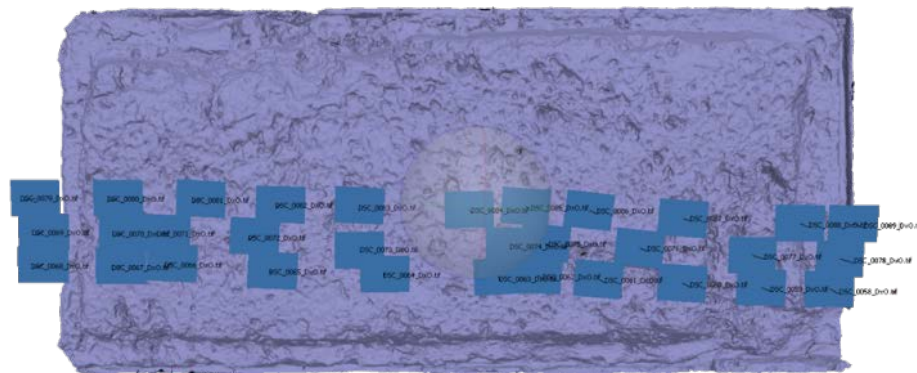
PRE-PLANNING

Practice



Resolution

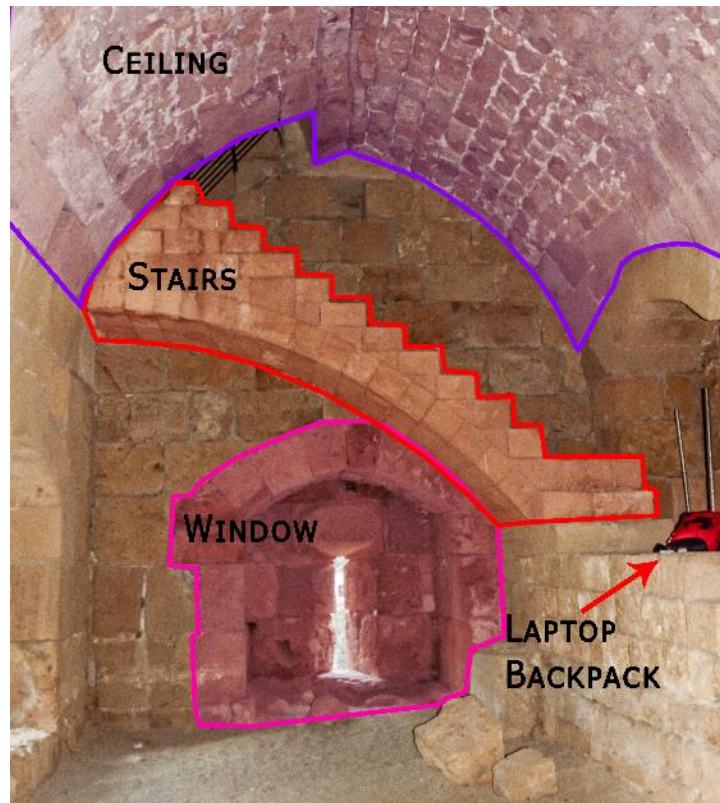
- Precision
- Details
- Textures



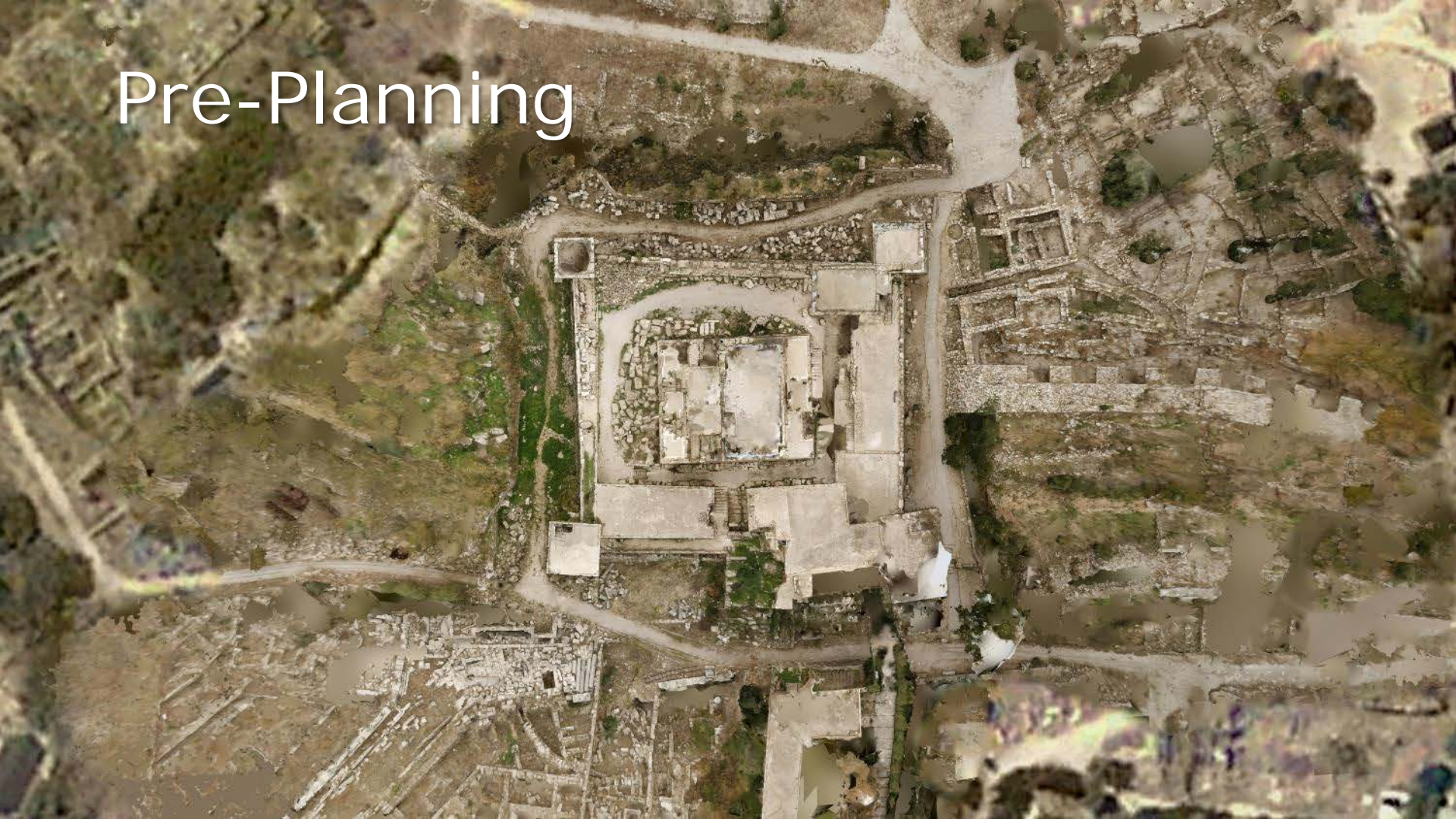


Key Features

- Textures
- Modular Pieces
- Repetitive Elements
- Architecture Features

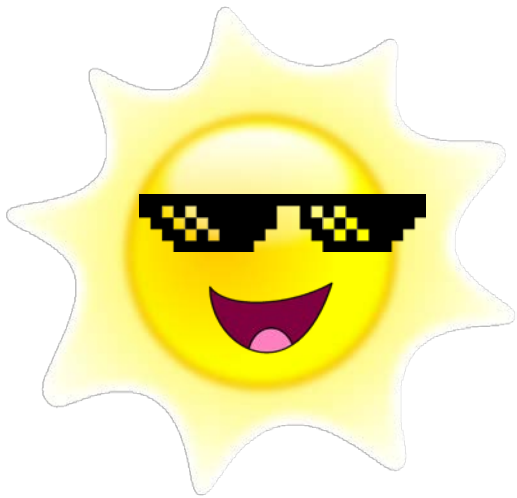


Pre-Planning





Something to consider

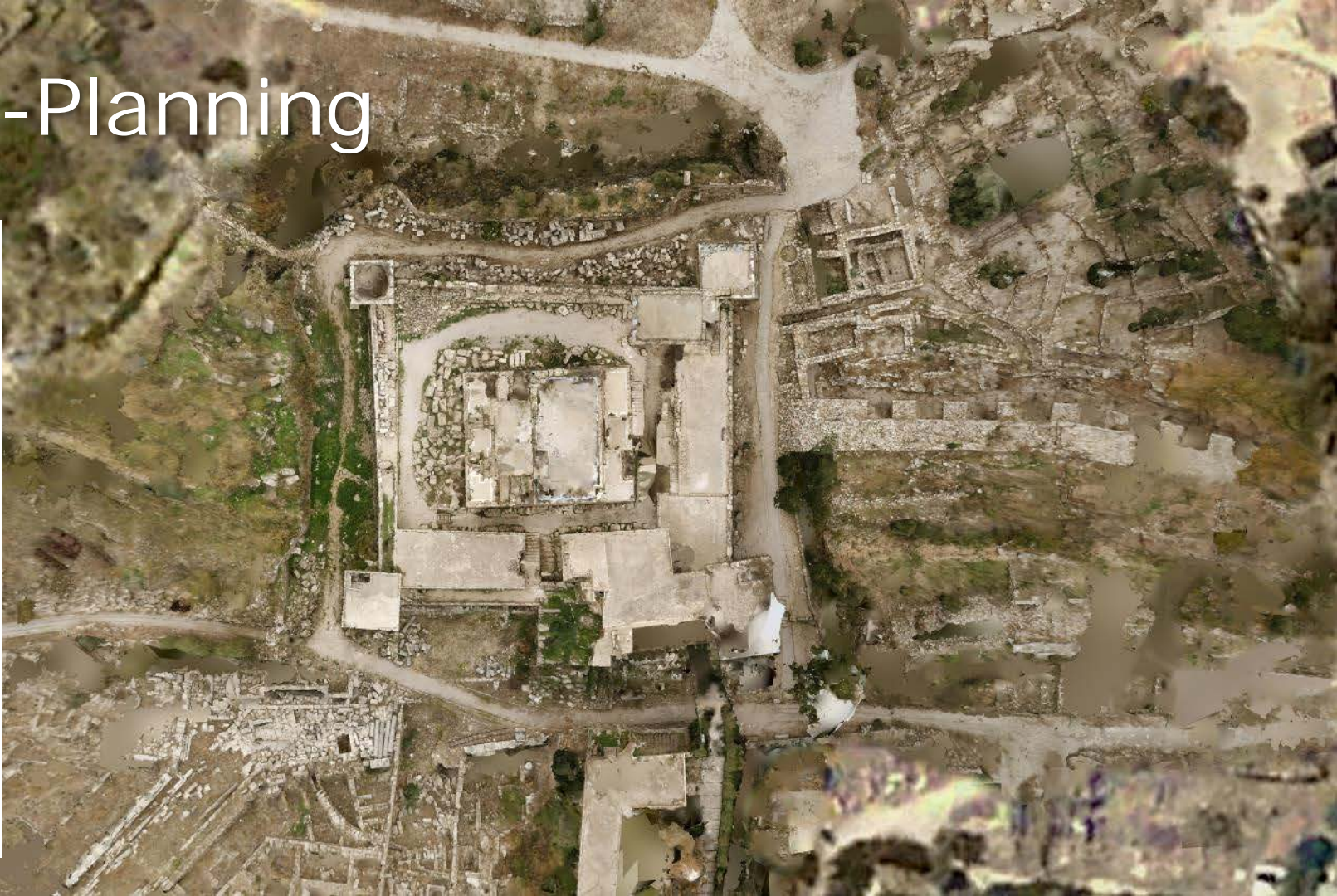


Scanning can take a while, be careful of sun-shifting
It's always a good idea to have a on-field verification



Pre-Planning

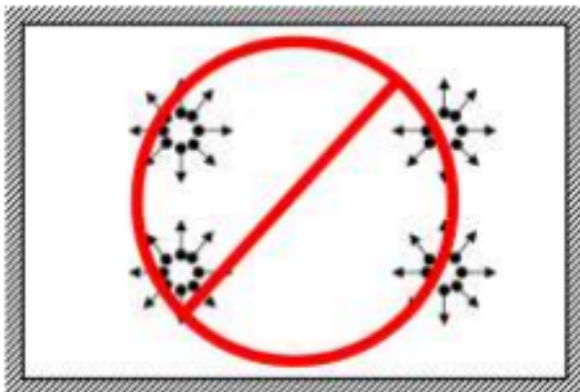
- Canon
- CenterTower
- Day1
- Day2
- Entrance
- Exterior
- ExteriorLap1
- ExteriorLap2
- ExteriorTurnAround
- Jbeil
- Museum
- SecretRoom
- StairsF1
- StairsF2
- Surroundings
- TowerRoom
- Tunnel
- tunneljpeg



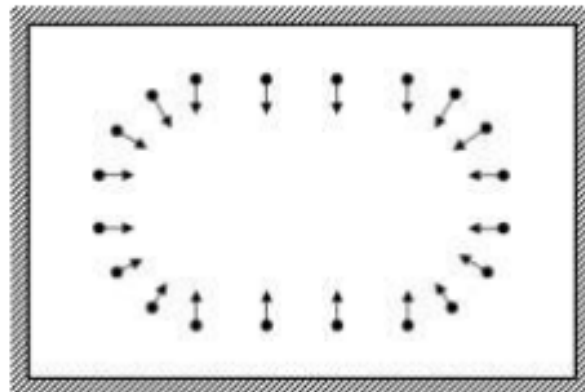


Scanning Interior

Interior (Incorrect)



Interior (Correct)



© Agisoft



Tunnels



Dark Tunnels



ALIGNING

| 1D5 | |
|------------------|--------------------------|
| Images | 4157 images |
| Control points | empty |
| Component 14 | 3312/4157 cams, 0 models |
| Component 0 | 34/4157 cams, 0 models |
| Component 10 | 2/4157 cams, 0 models |
| Component 11 | 3319/4157 cams, 0 models |
| Component 12 | 3/4157 cams, 0 models |
| Component 13 | 7/4157 cams, 0 models |
| Component 14 (1) | 2/4157 cams, 0 models |
| Component 15 | 2/4157 cams, 0 models |
| Component 16 | 2/4157 cams, 0 models |
| Component 17 | 5/4157 cams, 0 models |
| Component 18 | 3/4157 cams, 0 models |
| Component 19 | 17/4157 cams, 0 models |
| Component 20 | 5/4157 cams, 0 models |
| Component 21 | 14/4157 cams, 0 models |
| Component 22 | 4/4157 cams, 0 models |
| Component 23 | 3/4157 cams, 0 models |
| Component 24 | 3/4157 cams, 0 models |
| Component 25 | 10/4157 cams, 0 models |
| Component 27 | 4/4157 cams, 0 models |
| Component 32 | 2/4157 cams, 0 models |
| Component 33 | 113/4157 cams, 0 models |
| Component 34 | 33/4157 cams, 0 models |
| Component 35 | 5/4157 cams, 0 models |
| Component 36 | 15/4157 cams, 0 models |
| Component 37 | 14/4157 cams, 0 models |
| Component 39 | 4/4157 cams, 0 models |
| Component 40 | 7/4157 cams, 0 models |
| Component 41 | 5/4157 cams, 0 models |
| Component 42 | 7/4157 cams, 0 models |
| Component 43 | 7/4157 cams, 0 models |
| Component 44 | 23/4157 cams, 0 models |
| Component 45 | 2/4157 cams, 0 models |
| Component 46 | 5/4157 cams, 0 models |

Selected component(s)

| Name | Component 11 |
|---------------------------|----------------------------------|
| Component Id | {16F0DAEC-14E4-462A-8FE4-49...} |
| Reconstruction Id | {00F04770-576C-40B8-97FF-F8F...} |
| Cameras count | 3319 |
| Points count | 13489646 |
| Control points count used | 0 |
| Constraints count used | 0 |

Alignment report

| | |
|------------------------|----------|
| Total projections | 36917610 |
| Average track length | 2.736752 |
| Maximal error [pixels] | 2.000000 |
| Median error [pixels] | 0.313624 |
| Mean error [pixels] | 0.477123 |
| Geo-referenced | true |
| Metric | true |
| Alignment time | 1:09:45 |

Alignment settings

| | |
|------------------------|----------------|
| Alignment engine | RealityCapture |
| Alignment mode | High |
| Max features per mps | 10000 |
| Max features per image | 80000 |
| Detector sensitivity | Medium |
| Preselector features | 40000 |

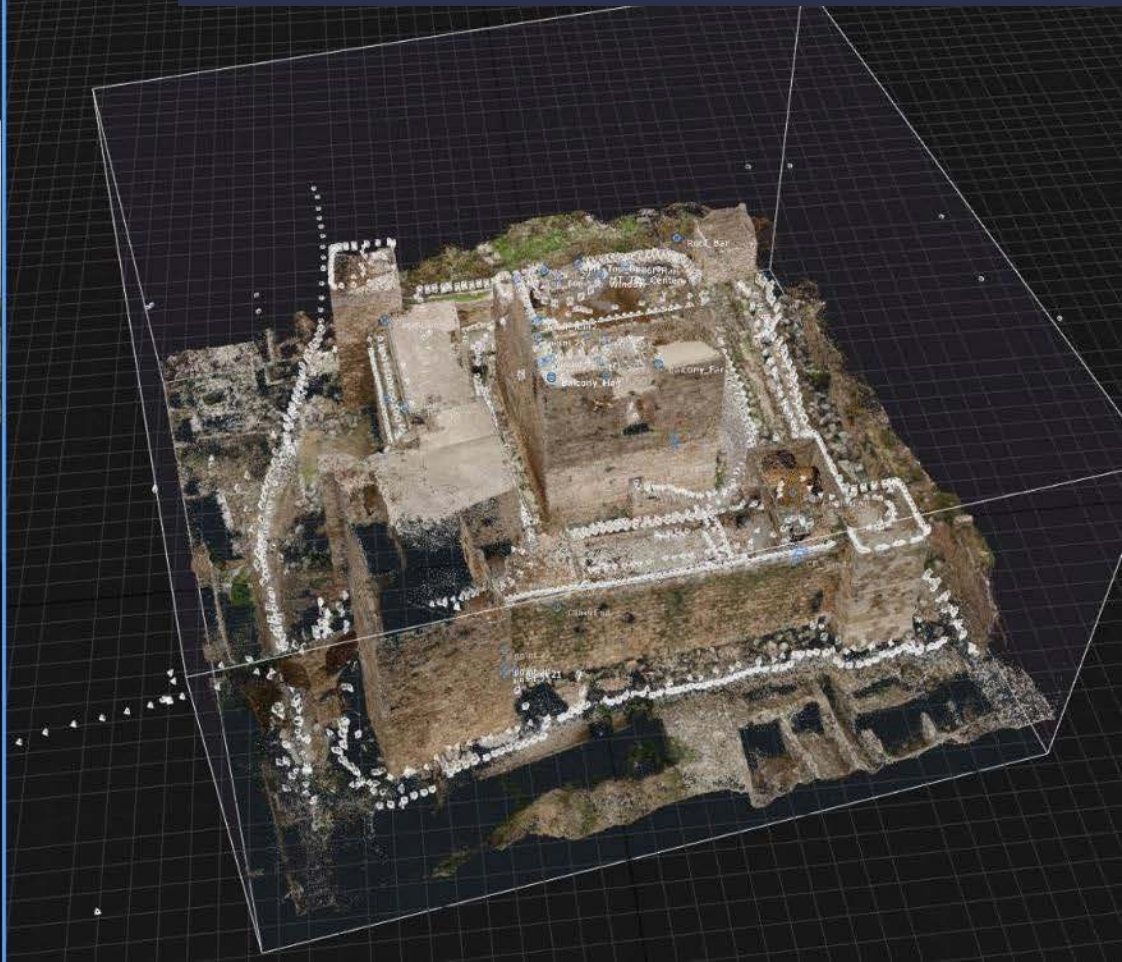




Split to Components

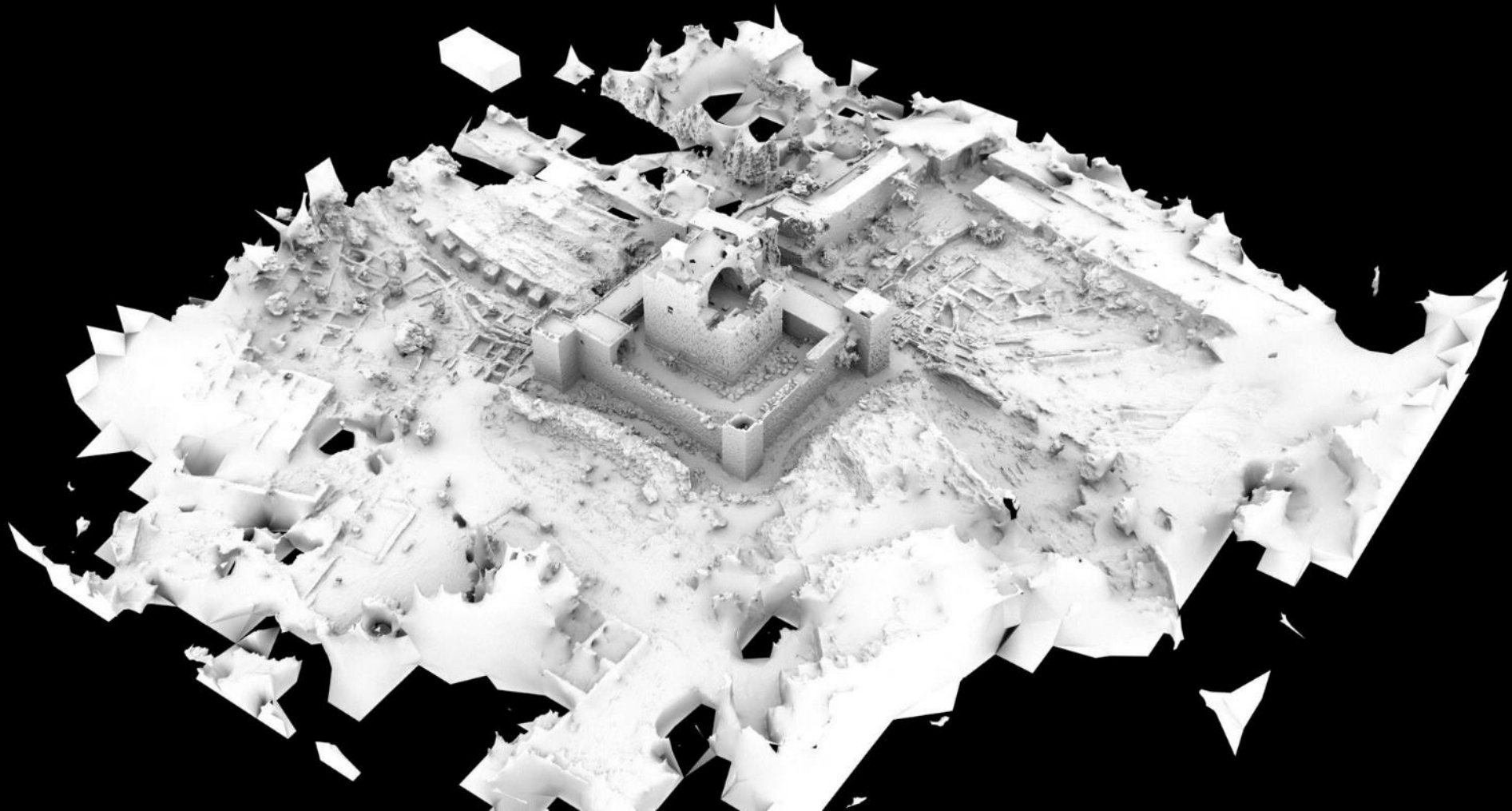
- Castle_CenterTower.rcproj
- Castle_CenterTower_add1.rcproj
- Castle_CenterTower_add2.rcproj
- Castle_Exterior.rcproj
- Castle_Exterior_Day1.rcproj
- Castle_Finale.rcproj
- castle_lastpatcheshopefully.rcproj
- castle_lastpatcheshopefully_not.rcproj
- castle_lastpatcheshopefully_not_¬.rcproj
- Entrance.rcproj
- Interior_Meuseum.rcproj
- P_Castle_BelowEntrance.rcproj
- P_Castle_Exterior_Back.rcproj
- P_Castle_Exterior_Front&Left.rcproj
- P_Castle_Exterior_Right.rcproj
- P_Interior_Stairs1.rcproj
- P_Interior_Tunnel.rcproj
- P_MainTowerRoom.rcproj
- TheCastle.rcproj
- TheCastle_ComponentAligning1.rcproj
- TheCastle_ComponentAligning2-Surroundings.rcproj
- TheCastle_Surroundings.rcproj
- TheCastle_TunnelFix.rcproj

The screenshot shows the Agisoft Metashape software interface. The top toolbar includes options for Tie Points, GCPs, Alignment Points, Alignment Cameras, Display, Scene Render, and Tools. The left sidebar lists the project hierarchy: Images (3029 images), Control points (30 points), and various camera models (CP_Sanita, OtherEnd, Sign, CenterEnd, MT_SQ1, MT_SQ3, Gate_Door, Gate_Power, Gate_rail, Balcony_Rust, Balcony_Flag, Balcony_Far, MT_SQ2, MT_SQ4, MT_Top_Edge, MT_Top_Window, MT_Top_Door, MT_Top_Center, TunnelRoof1, TunnelRoof2, point 20, point 21, point 22, point 23, point 24, point 25, Roof_Rail, point 27, Roof_Bar, Roof_Rail2). The main workspace displays a 3D point cloud of a castle ruin on a hillside, with a camera view showing the same scene. The bottom status bar indicates 'Added 3029 images' and 'Loading Project completed in 34.579 seconds'.

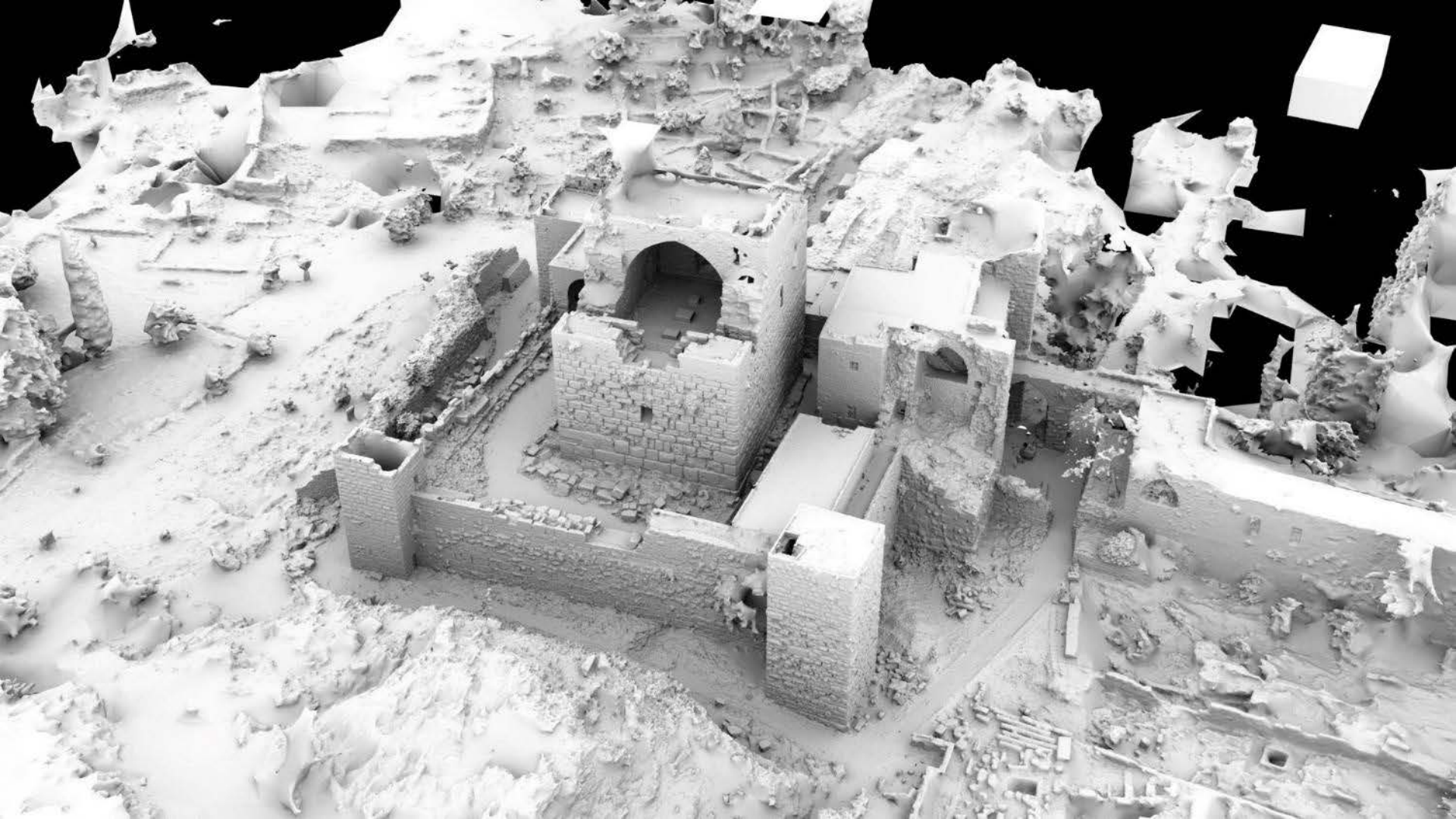




Final Alignment

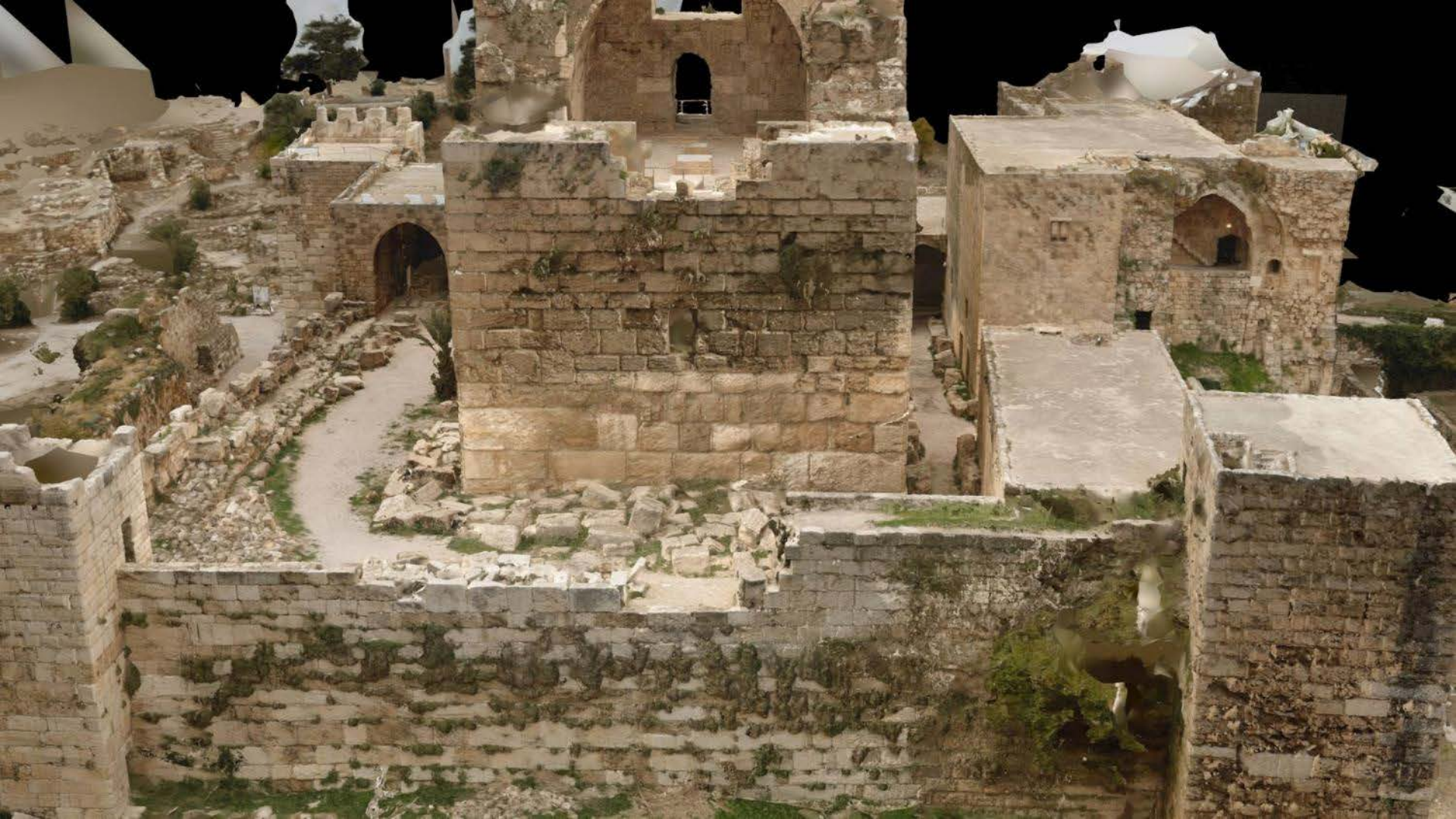












Polycrunched



[ARTICLE] Scanning a Castle Inside Out with No Budget



Cost

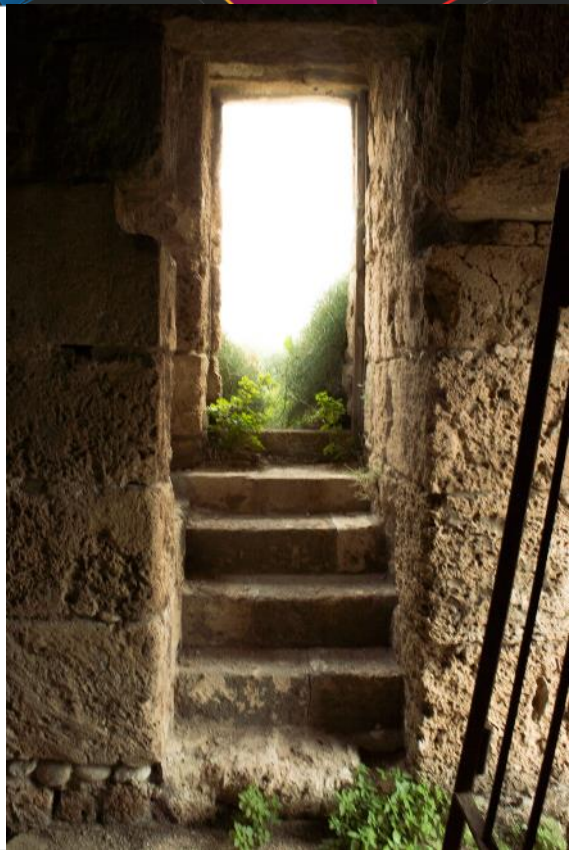
- What it will cost you \$11,912
 - Drone \$1000
 - Camera \$300
 - Camera Accessories \$112
 - PC \$2000
 - Reality Capture \$8300
 - Photoshop/DxOptics \$200
- **How much it cost me** **\$70**





Finding Opportunities

- If you're at GDC...
- Join the 3D scanning group
- Go to events
- Make Friends
- Contact the software developers
- Stay up to date

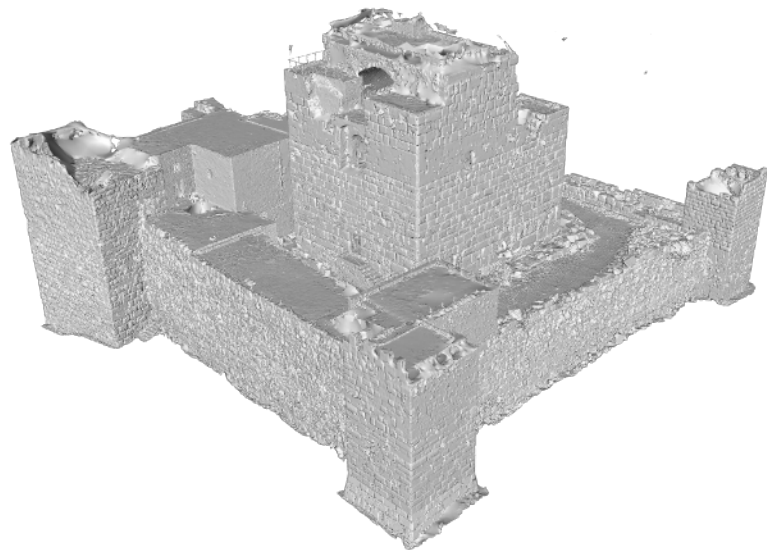
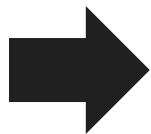
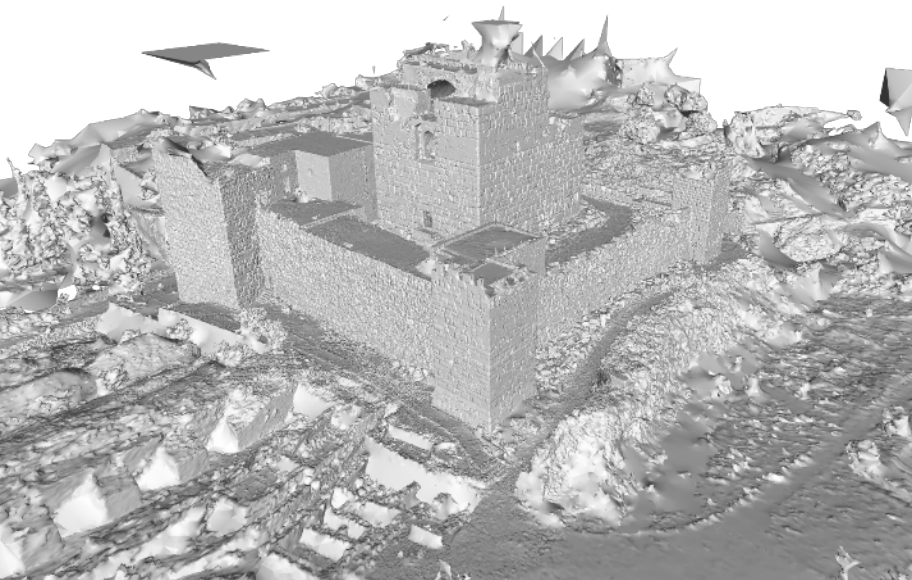


You Scanned it, Now what?



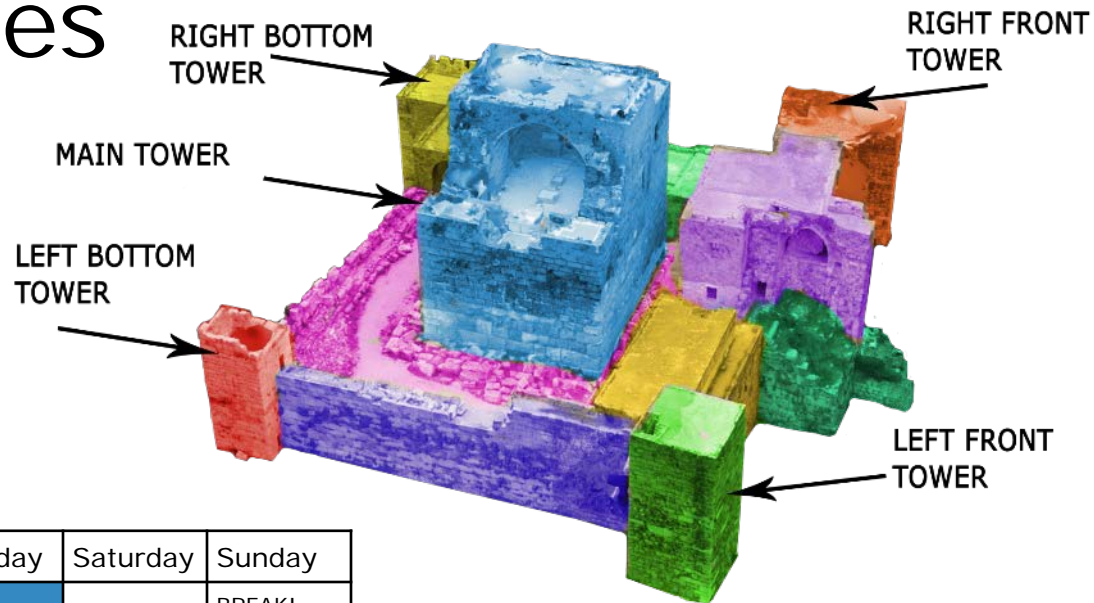


Remove All Unnecessary Details





Split Into Pieces



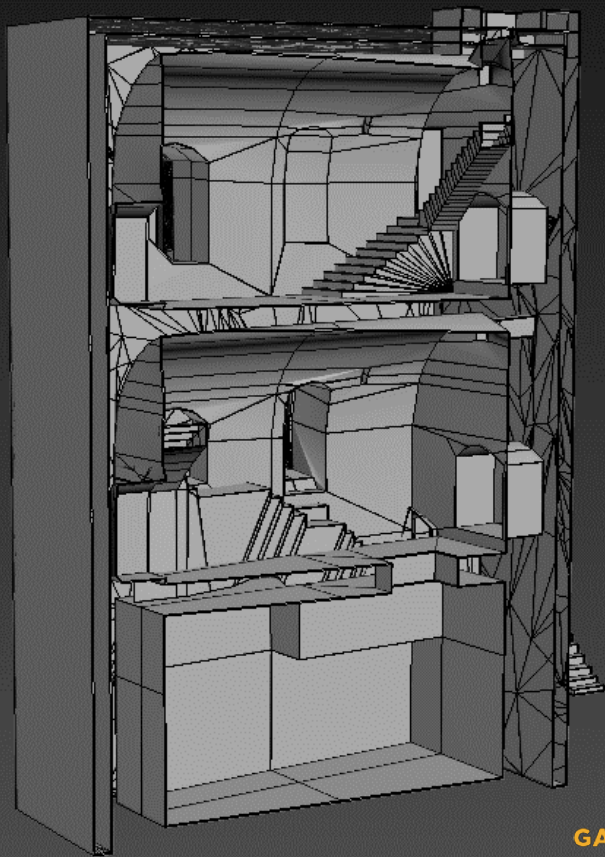
| Hours | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|----------|------------|---------|------------|--------------|--------|----------|--------|
| 9:00 AM | Clean-up | | Clean-Up | | | | BREAK! |
| 10:00 AM | Retopology | | | | | | BREAK! |
| 11:00 AM | | | Retopology | Texture Bake | | | BREAK! |
| 12:00 AM | | | | | | | BREAK! |



The Old Methods Still Work



Block your Model



Perfect the Process

Don't Be a Perfectionist



Invest in your textures

- Retopology
- Create Proper UVs
- Remove Shadows
- Remove Highlights
- Create Tileable Textures



Gamasutra: The Workflows of Creating Game Ready Textures and Assets using Photogrammetry



Alchemy

[ARTICLE] ... :/





Free Software

UE4

Unity Personal

XNormal

Instant Meshes

Sketch Retopo

Meshmixer

Blender

VSFM

GIMP

Natron

MeshLab

MakeHuman

Sculptris

Cloud Compare

Game Engine (5% Royalty)

Game Engine

Texture Baking

Retopology

Retopology

Scan Handling

3D modeling

3D Scanning

Image Editing

Video Editing

Mesh Editing

Character Creation

Sculpting Software

3D point cloud and mesh Processing





Just Do It!





Thank you



**Nada
Khorchid**



Milos Lukac



**Jeffrey Ian
Wilson**



**Hassan Adonis
Al Akra**



**Samia
Abi Nader**



**3D Scanning
User Group**



American University of Beirut
Office of Grants and Contracts
Center for Research and Innovation | CRInn





Questions

Catch me in the Wrap-Up Room after the talk
(North Lower Lobby by the elevators)



WorldVoid.com (DevLog)



JosephRAzzam

