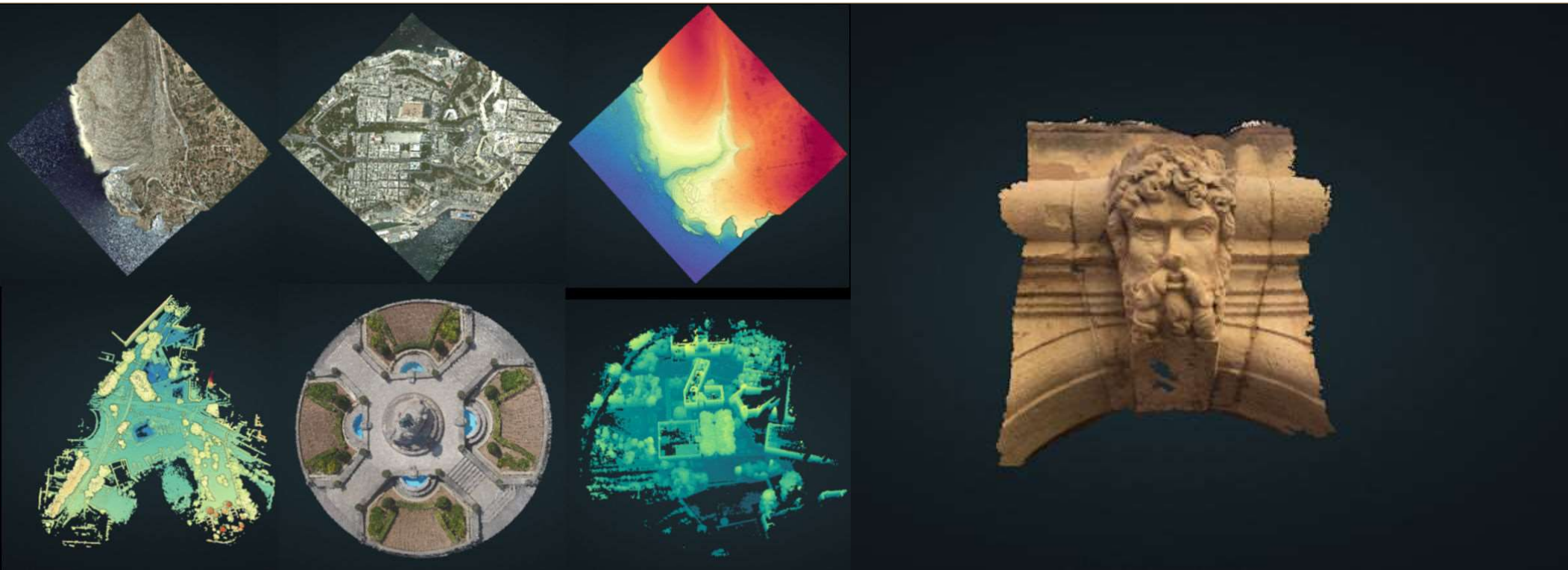


CRIME, **Colours** and *Patterns*

Professorial Lecture Series

14 March 2019



Prof Saviour Formosa

e: saviour.formosa@um.edu.mt

p: <https://www.um.edu.mt/profile/saviourformosa>

In 1995

I dreamt of integrated information

which required a generational shift...
and sleepless nights

until it got to the **POINT**

with the help of 13m in funding

*that set the basis for **Spatial Forensics***

However, before that, I shall outline what we understand as crime from an environmental criminology perspective

- The dynamism between the **victim and the offender**
- The **spaces** they operate in (McLaughlin et al, 2001)
 - Environmental Criminology Theory
 - Parks & Burgess concentric zone theory – 1920s
 - Shaw and McKay – 1930s
 - Cohen and Felson's Routine Activity Theory (1970s)
 - Structuration Theory (Giddens, 1980s)
 - Bursik and Grasmick - Felson and Clark's Opportunity Theory (1990s)
 - Ekblom's Conjunction of Criminal Activity in the 2000s

- CPTED - Crime Prevention Through Environmental Design
 - CPTED “is defined as a multi-disciplinary approach for reducing crime through urban and environmental design and the management and use of built environments”
 - <http://www.cpted.net/>
- The W6H
- Our understanding that the **CONTEXT** reigns
- The **PREFET** constructs
- The **REALITY** they operate within



What is reality?

Is it a reflection of what we visualise as dictated by:

something we value?

something we place an interest in?

something we believe in?

something that ethics/morals blinds us to?

something we know as a fact?

something that is NOT real?

Before I attempt to destroy your concept of reality...

Theoretical constructs within which we operate:

- the concept of spatial reasoning and locational choice: seeing beyond reality
- expansion of the Hierarchical spatial reasoning: aggregation
- conceptualising data and information in a visual 3D spatial cognitive approach
- multidimensional models of perception and cognition
- external validity as against laboratory experiments
- spatial information theory – model-based spatial modeling
- spatio-temporal conceptualisation
- spatial distribution and nearest neighbours
- spatio-statistical approach

Transitions in the quantitative domain

0	44	44	0	2		3
16	67	1027	17	35	69	69
10	67	667	11	22	45	45

Numbers

Text

Imagery

What makes a crime a crime? The Mens Rea (il-hsieb, il-kilba, it-tektik fil-mohh biex tfassal pian malinn...) and the Actus Reus (l-azzioni, il-fatt, li sar sar) play within a duality: a duality that investigators delve into through their deductive or inductive approaches.

However, c
technologie

Understand
the field of
processes t
justice. The
(laser) and
creation of

This combin
view throug

Patterns, m
course crim
as the pote
understand



Visualisation

The science of vision

The art of interpretation

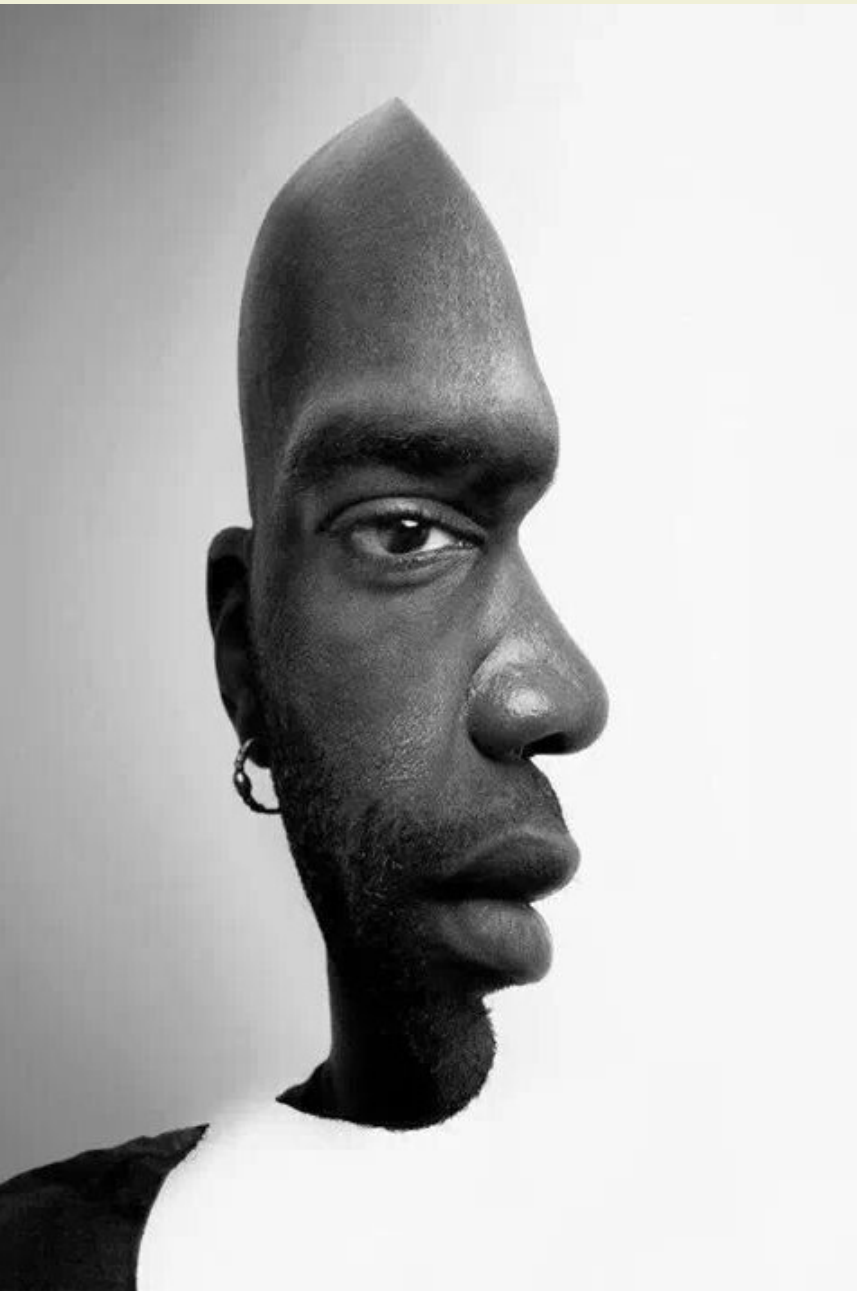
The courage of imagination

The scourge of memory loss....

Need Tools

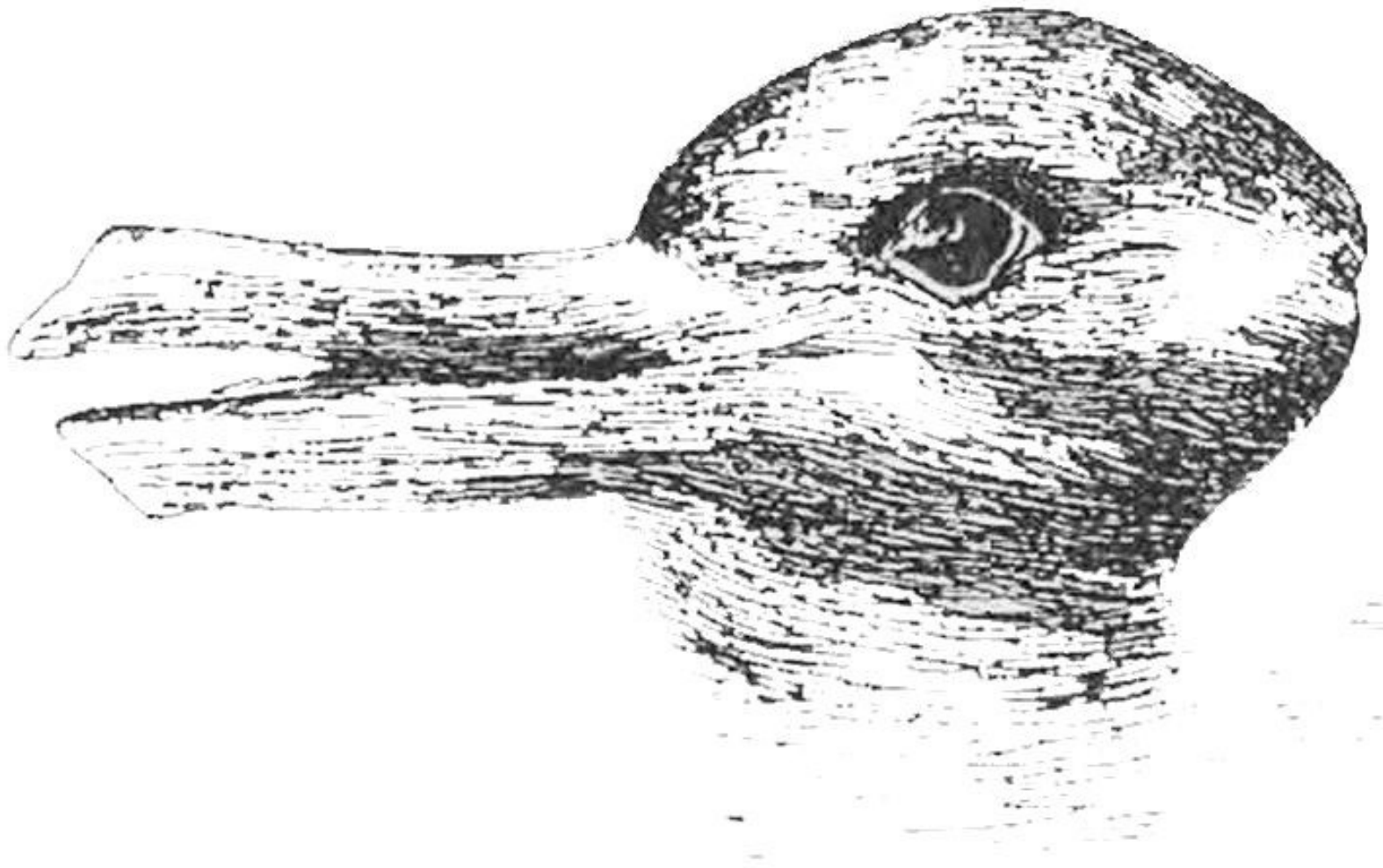
- to help us remember
 - to help us hard code
 - to trigger the recall caches
-

The power of visualisation....



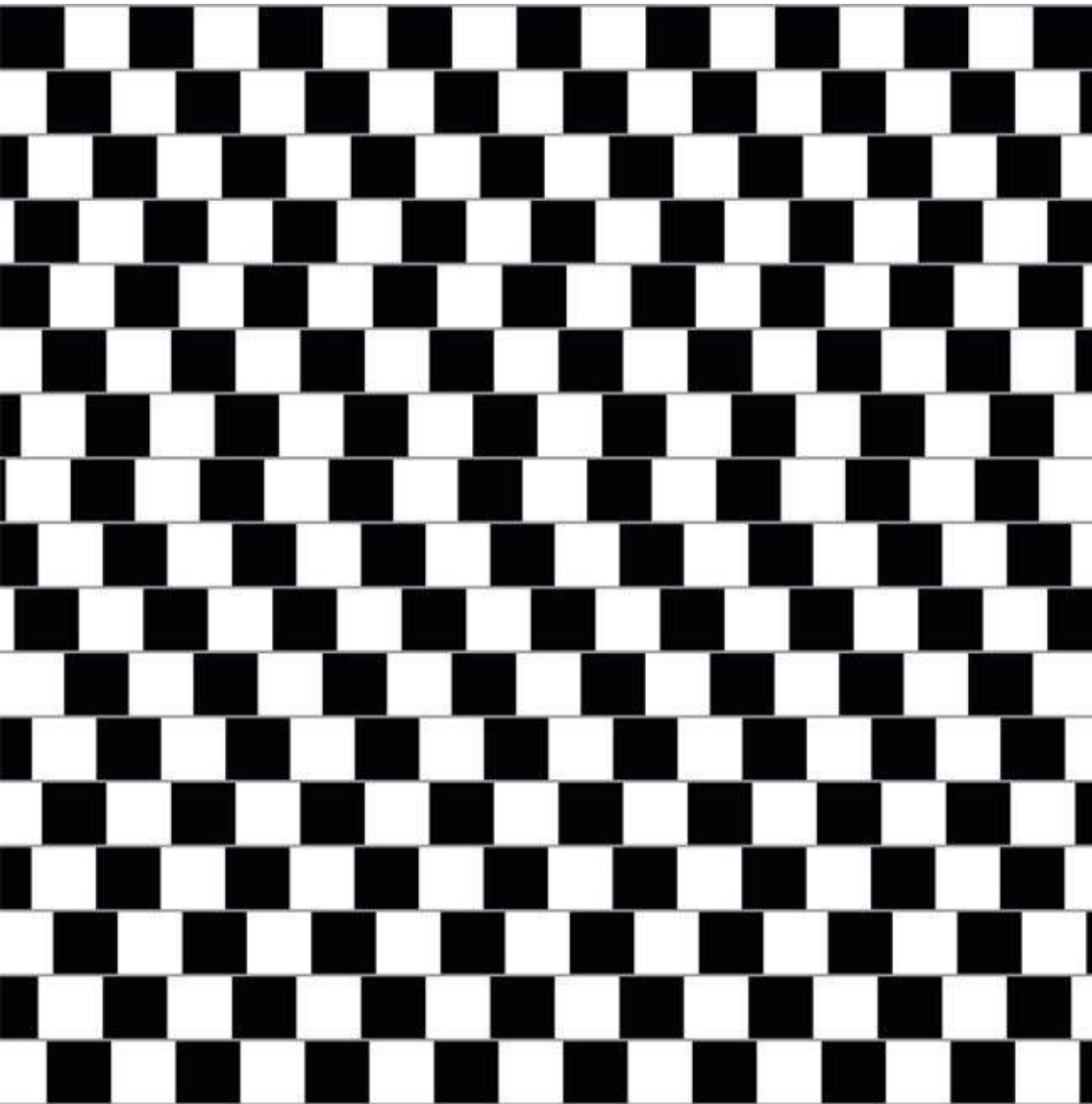
Front or Side?

Duck or Rabbit?





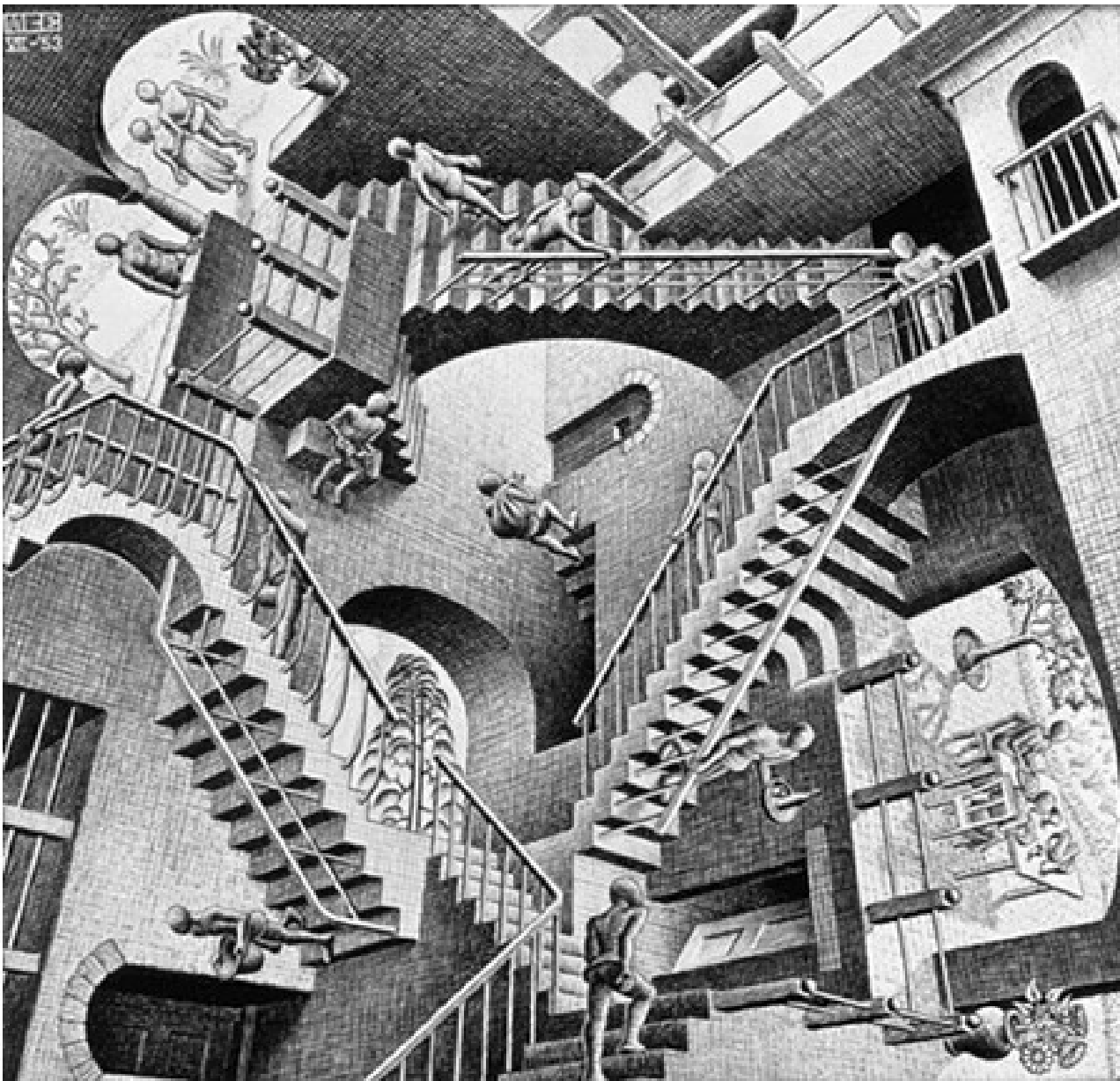
My Wife
My Mother in Law



Cafe Wall Illusion

The Ames Room





Tribute to Escher:
A 360 degree tour

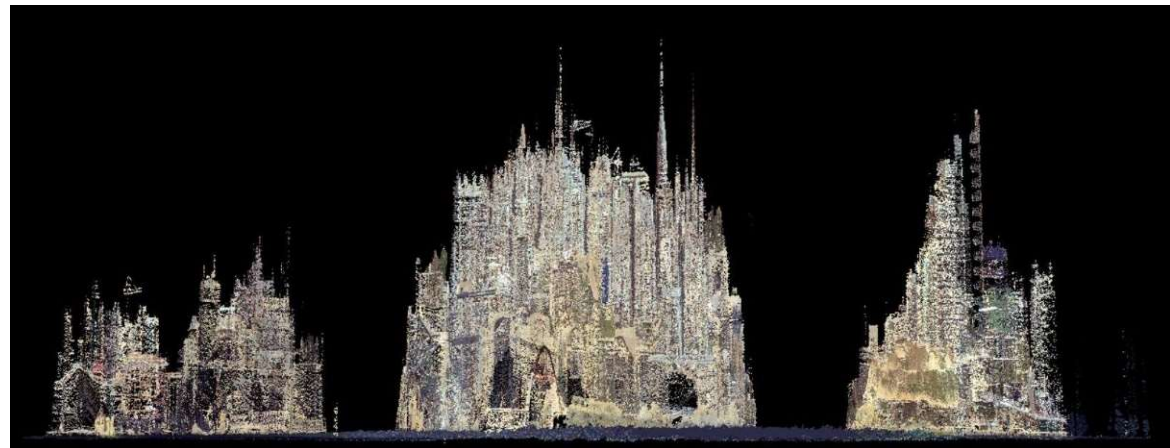
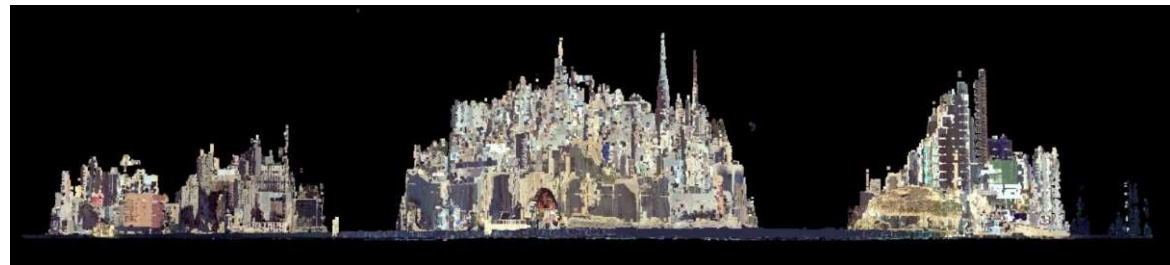
Maps – Easy No?



Z \longrightarrow **S**

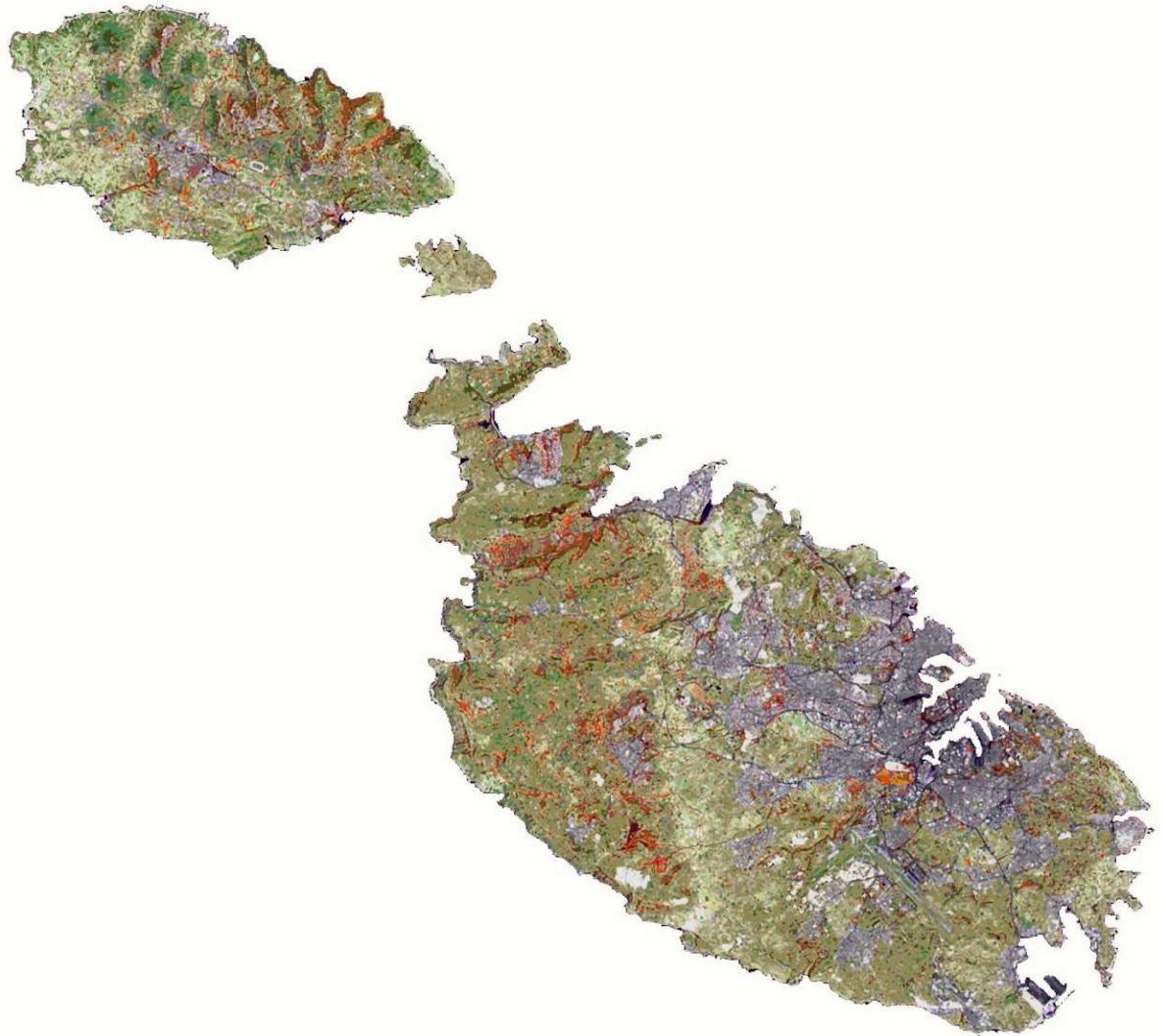


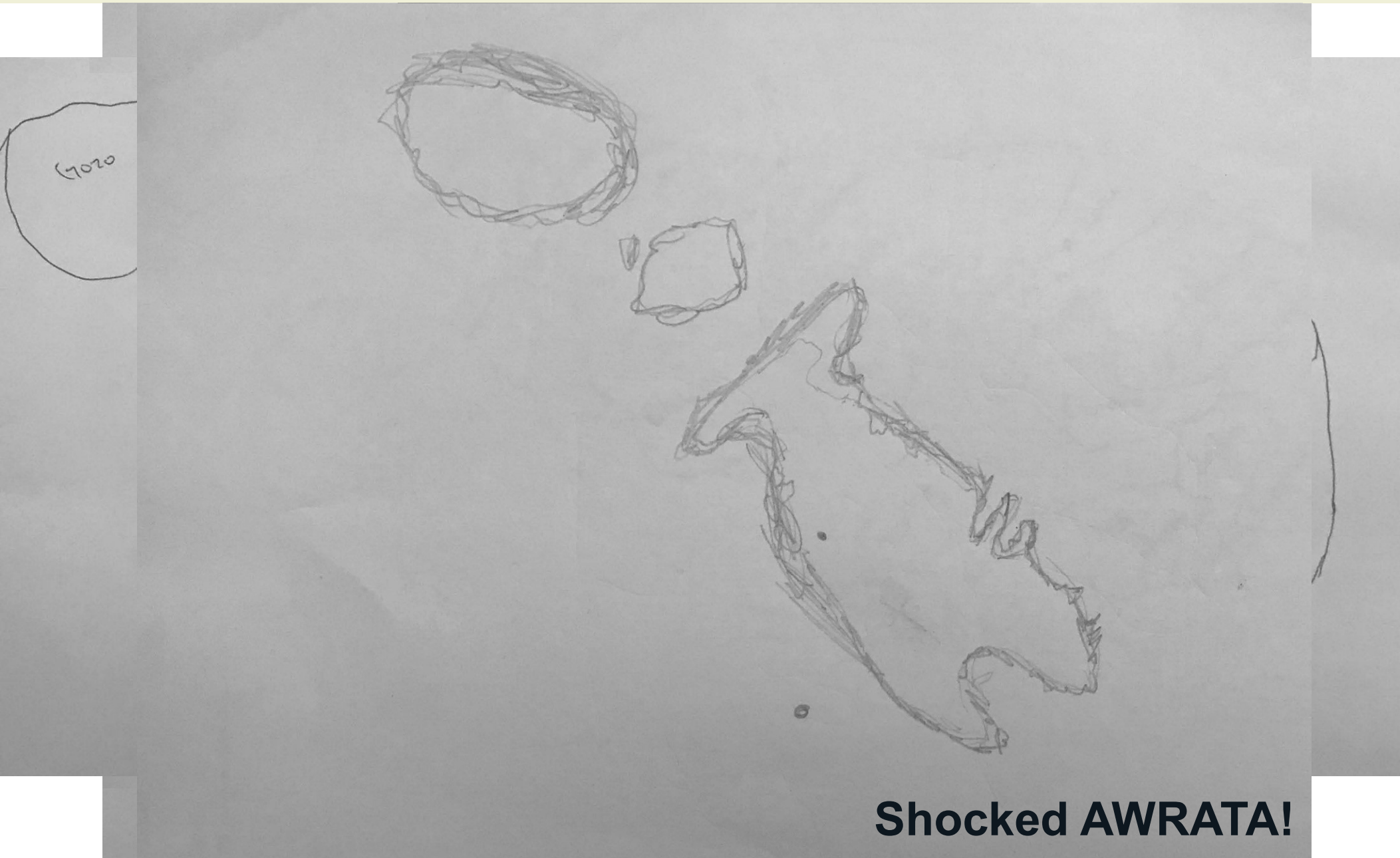
Imagine the Valletta Grand Harbour Vista



Visualisation – Sample Group 2010

Imagine the Maltese Islands and locate Valletta





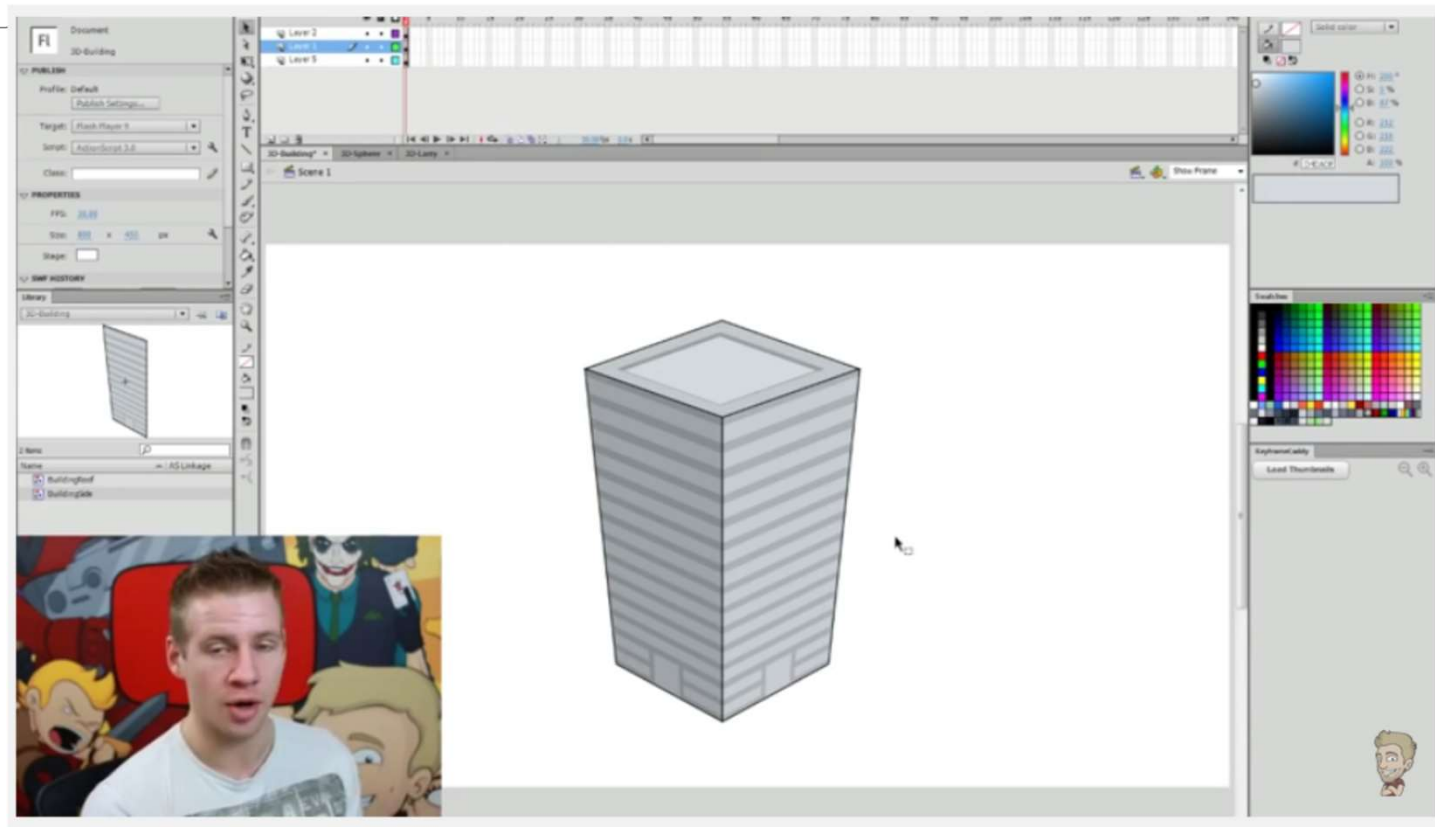
Shocked AWRATA!

Our Destination

Realms

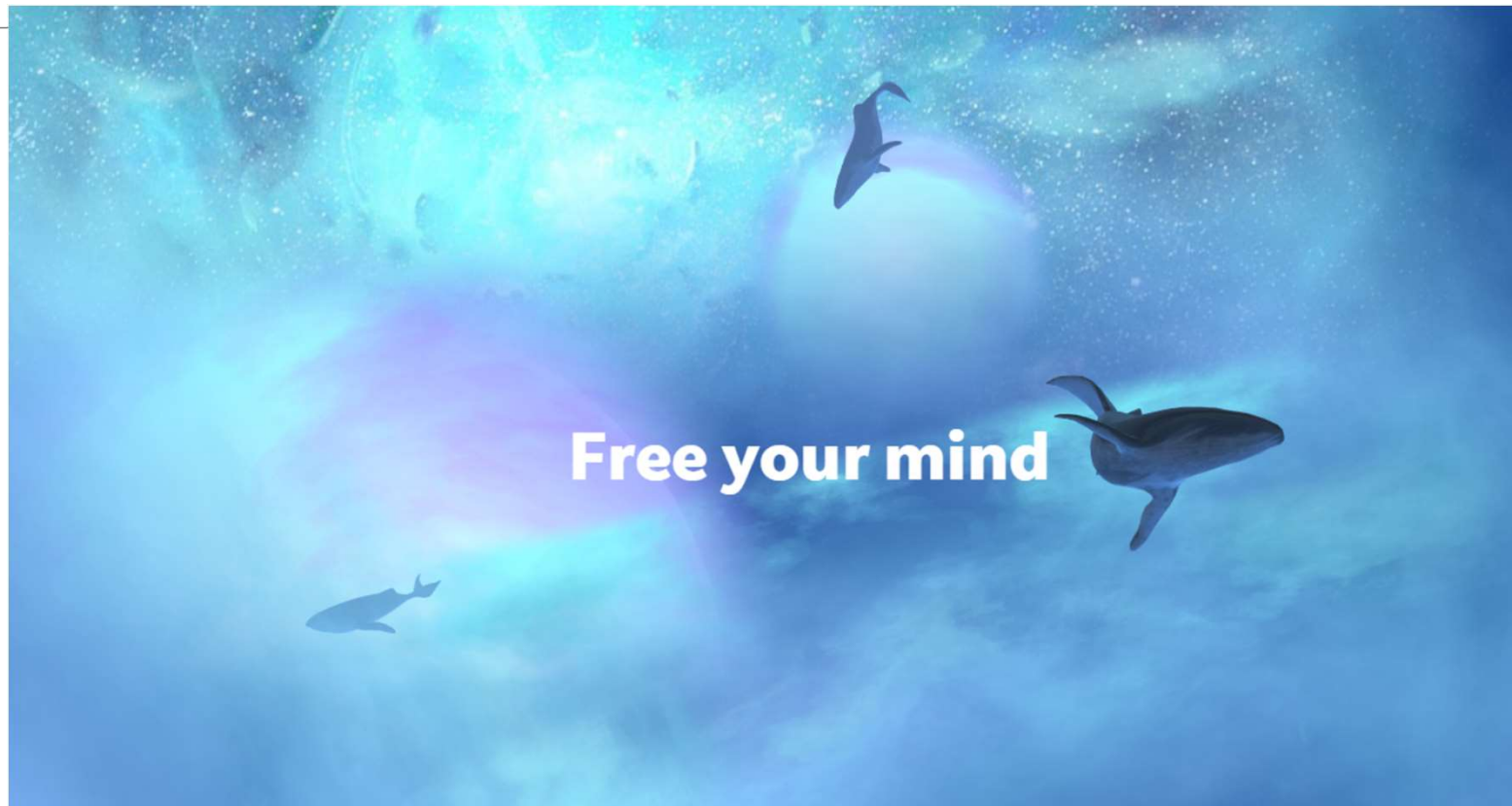


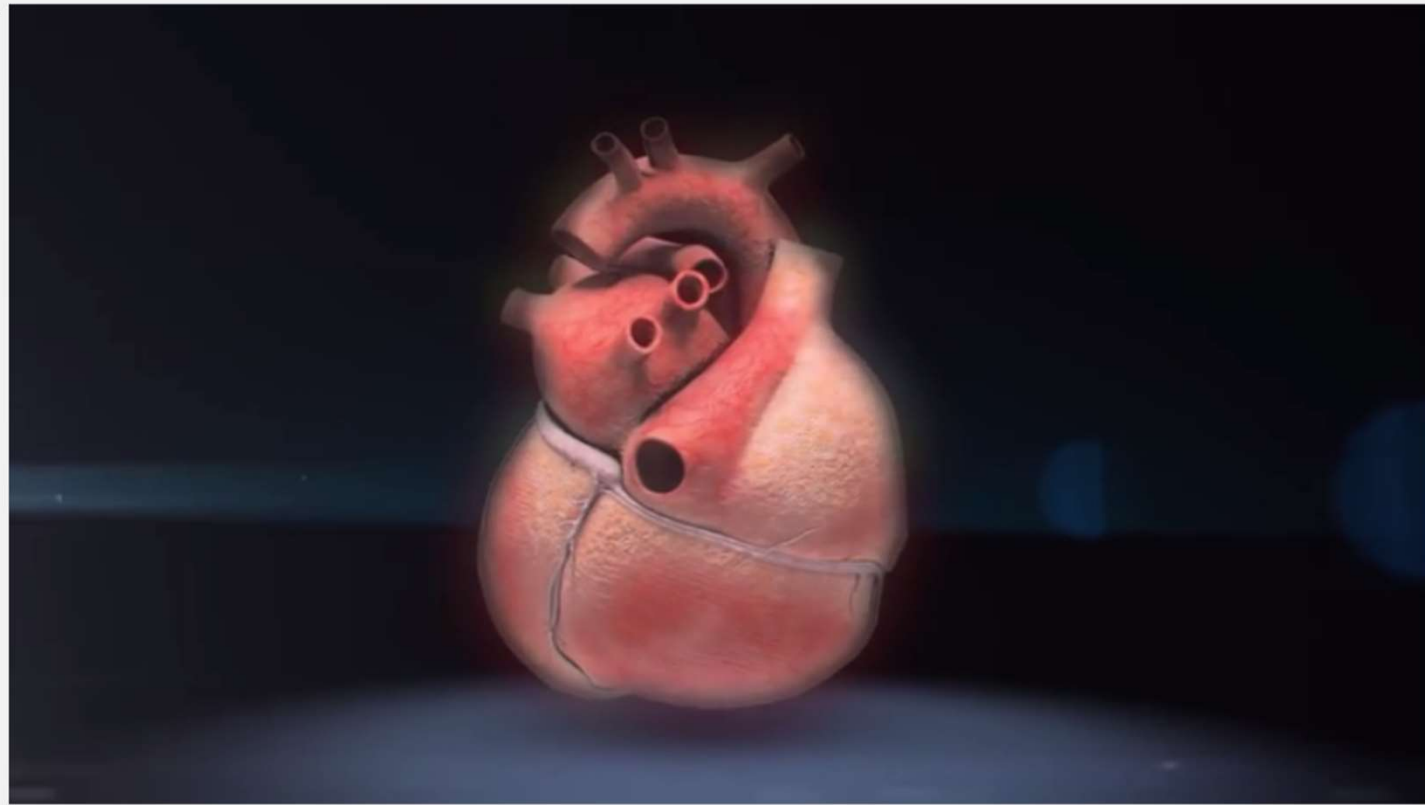
Pseudo Reality













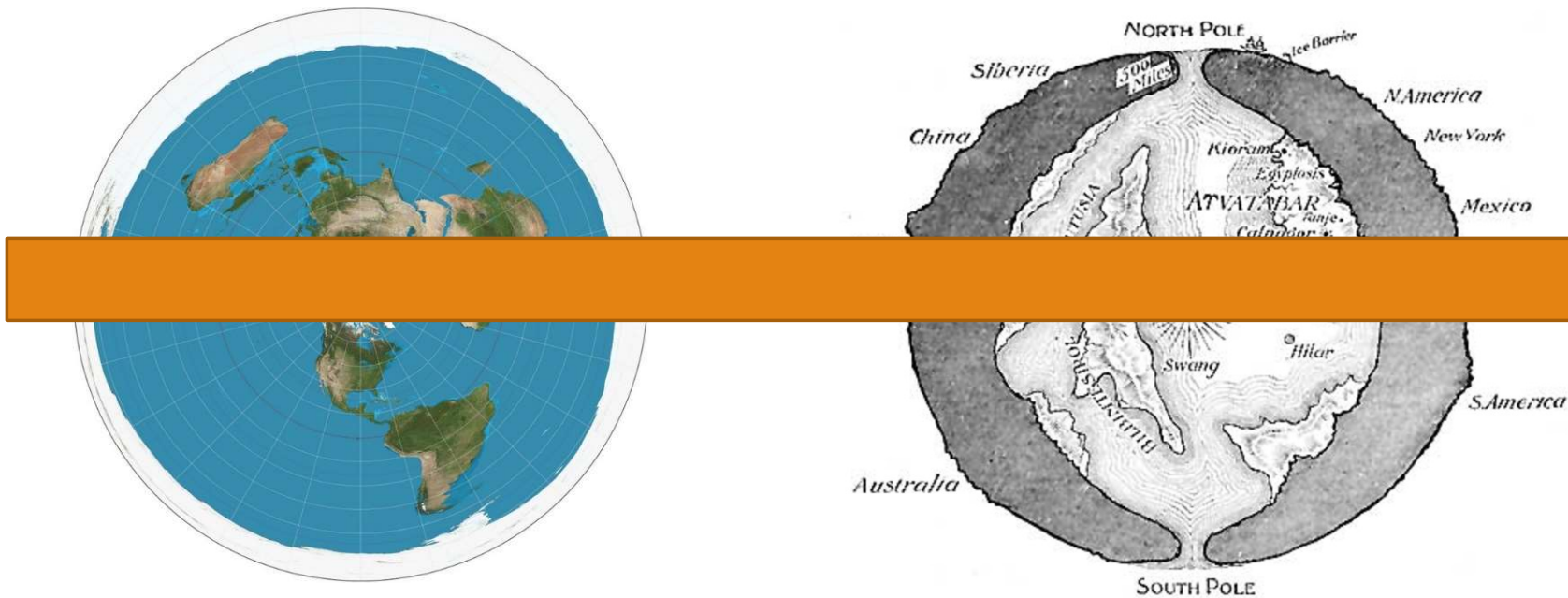


But before we get there...

Do we really know our world around us...

...remember

“I shall attempt to destroy your concept of reality”?

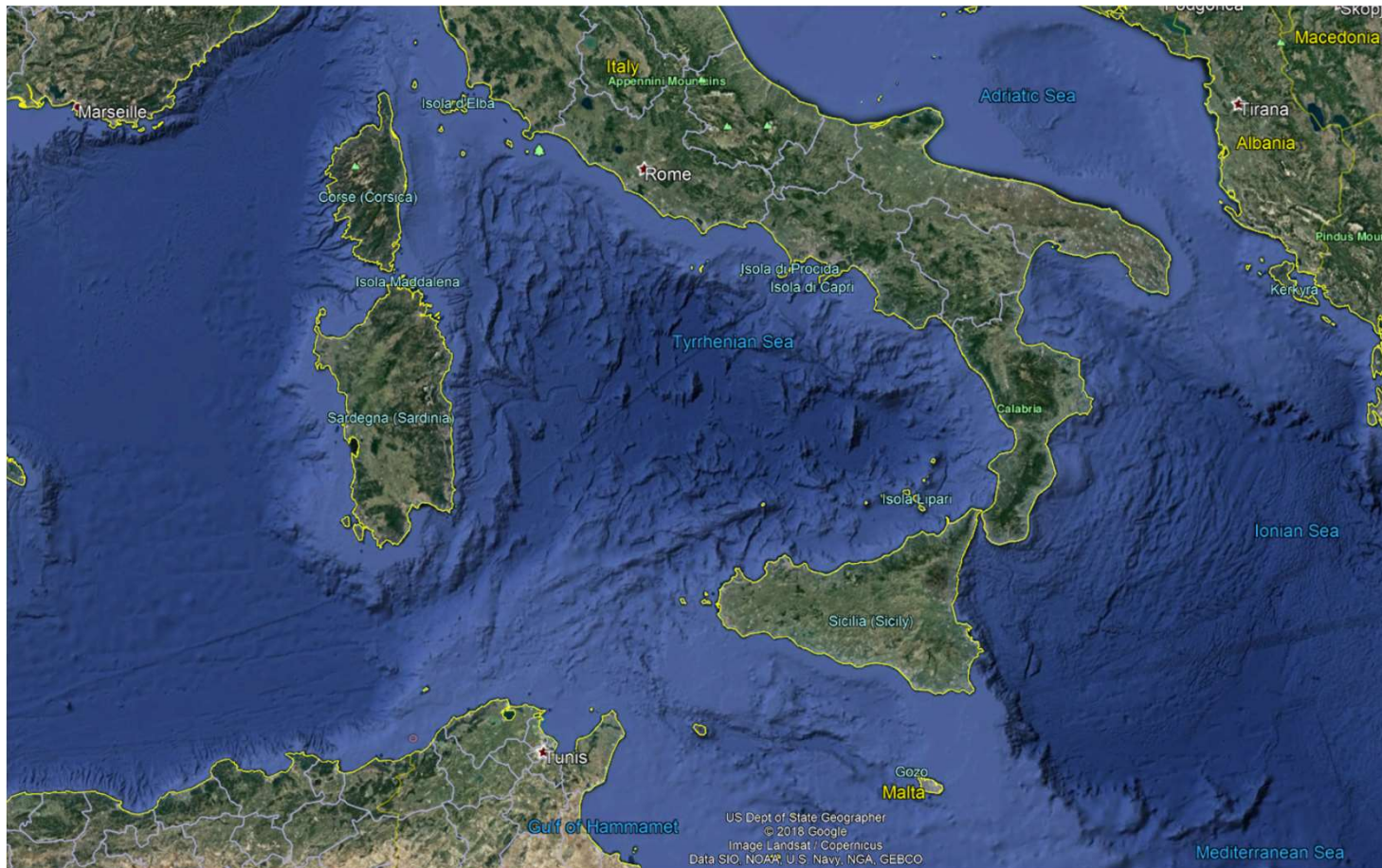


Anyone knows what happened to USS San Francisco (SSN-711)?
Maybe heard about Malaysia Airlines Flight 370?



One disappeared and one ran into a mountain

Is this reality? Google Earth



The case for the USS San Francisco (SSN-711)

In 2005, a U.S. Navy Submarine Ran Into a Mountain

The USS *San Francisco* didn't sink, and that's no accident.

 By Kyle Mizokami Dec 5, 2016




In 2005, the nuclear attack submarine *USS San Francisco* suddenly stopped dead in its tracks. The ship's crew were thrown about, some over distances of 20 feet, and the majority of the 137-member crew suffered one injury or another—including one that would later prove fatal. Further inspection would explain what happened, and reveal that the submarine's bow looked like a crushed soda can. *USS San Francisco* had run into an undersea mountain.

The case for Malaysia Airlines Flight 370



Pareidolia



This is the name given to the psychological phenomena that convinces people that they are seeing faces or other everyday things in random images that are often obscured enough to ignite the imagination of many a conspiracy theorist.

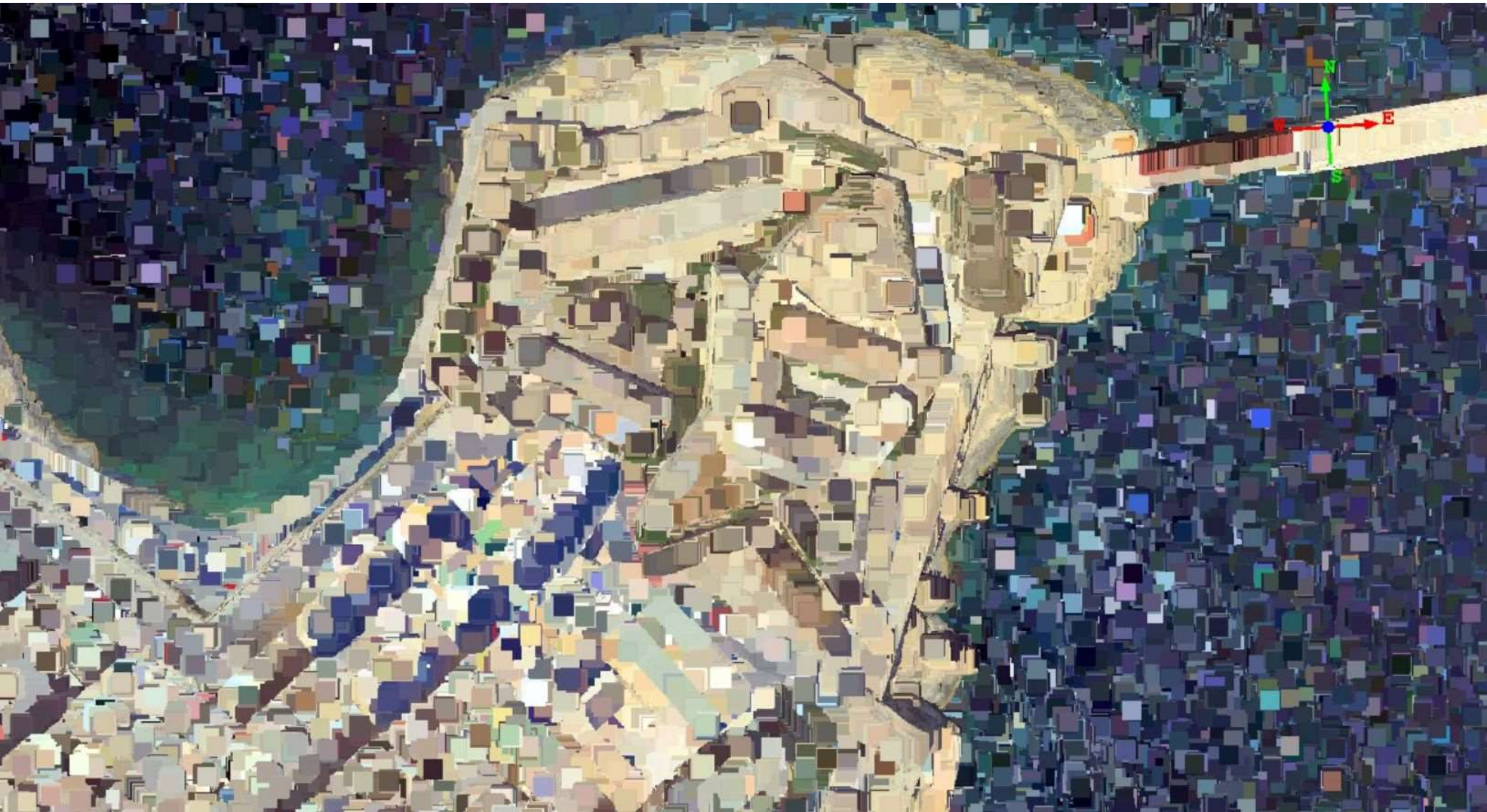
Pareidolia

This is the name given to the psychological phenomena that convinces people that they are seeing faces or other everyday things in random images that are often obscured enough to ignite the imagination of many a conspiracy theorist.



If we need to investigate our environment
we need to create it in a way that reflects that reality

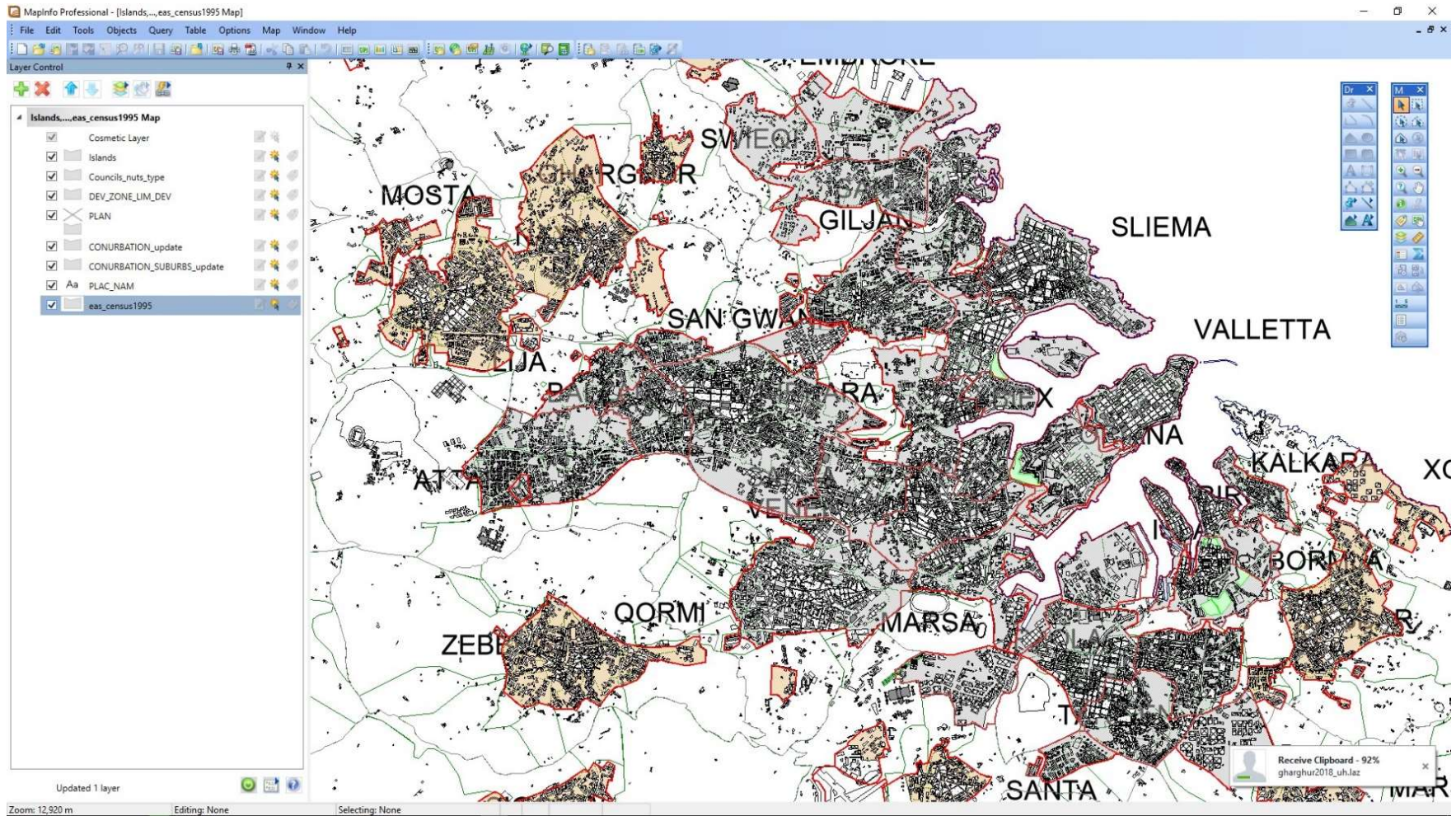
Setting the baselines for a virtual world



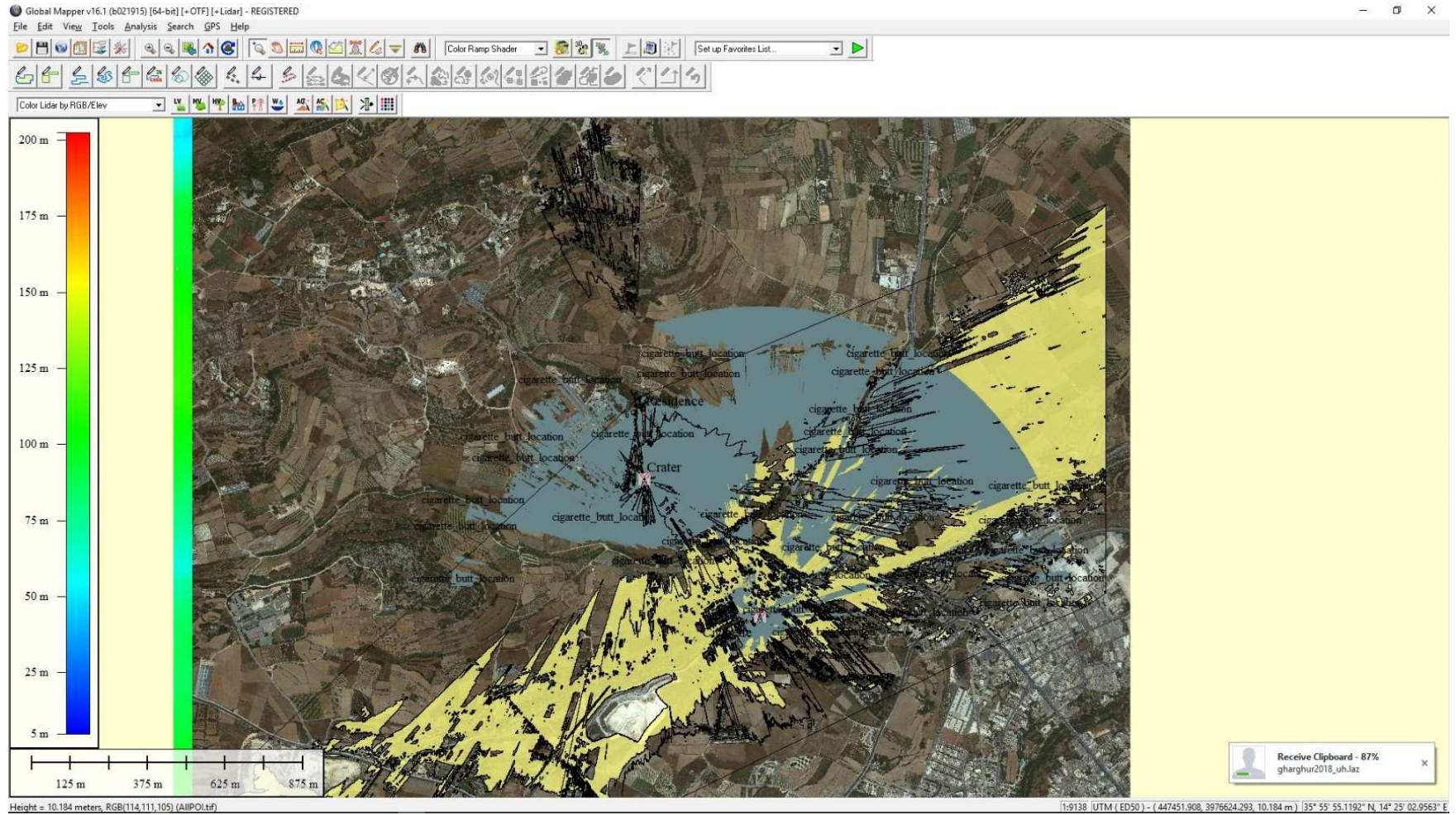


The Static Flat Maps

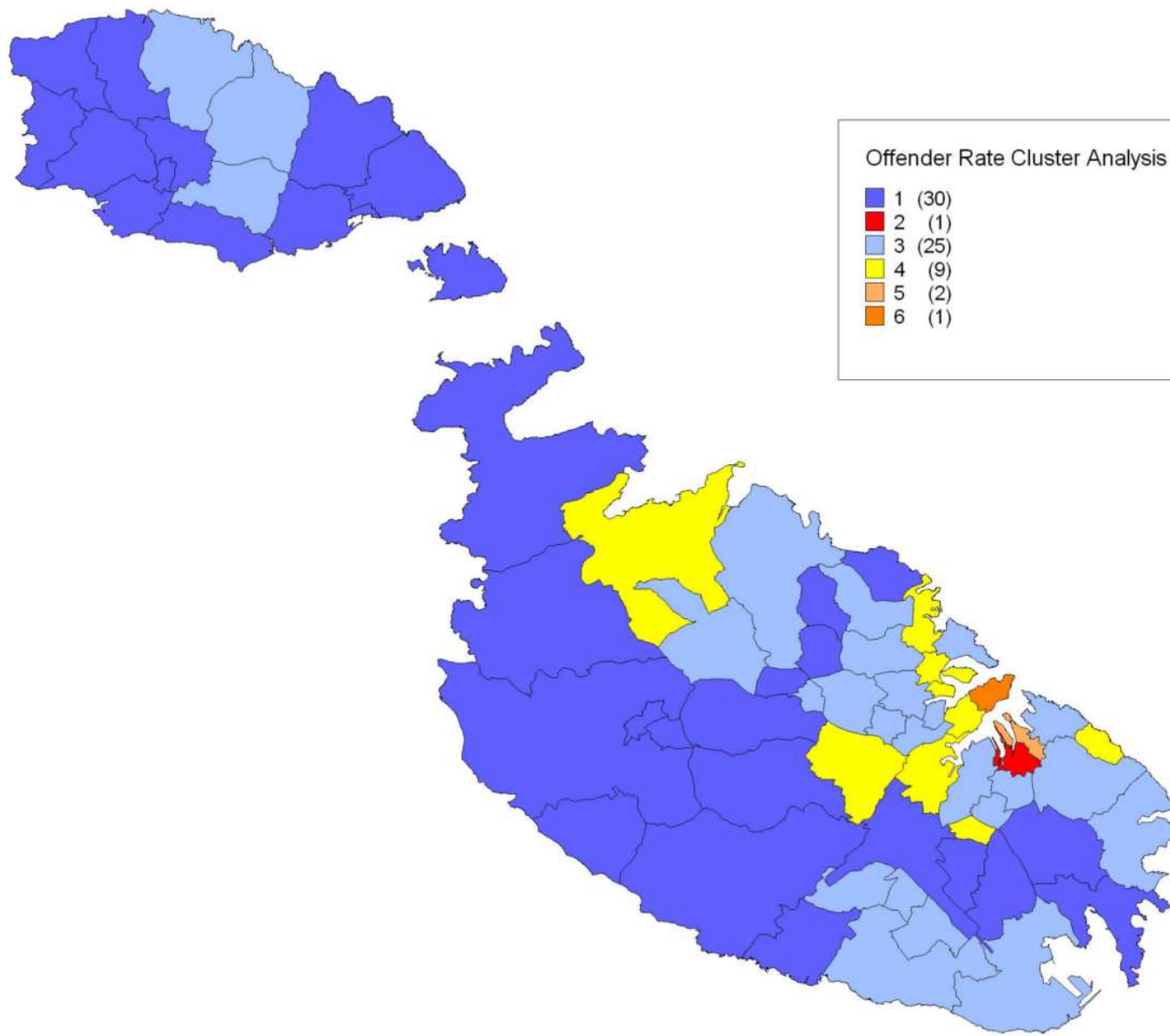
GIS – Input-Output



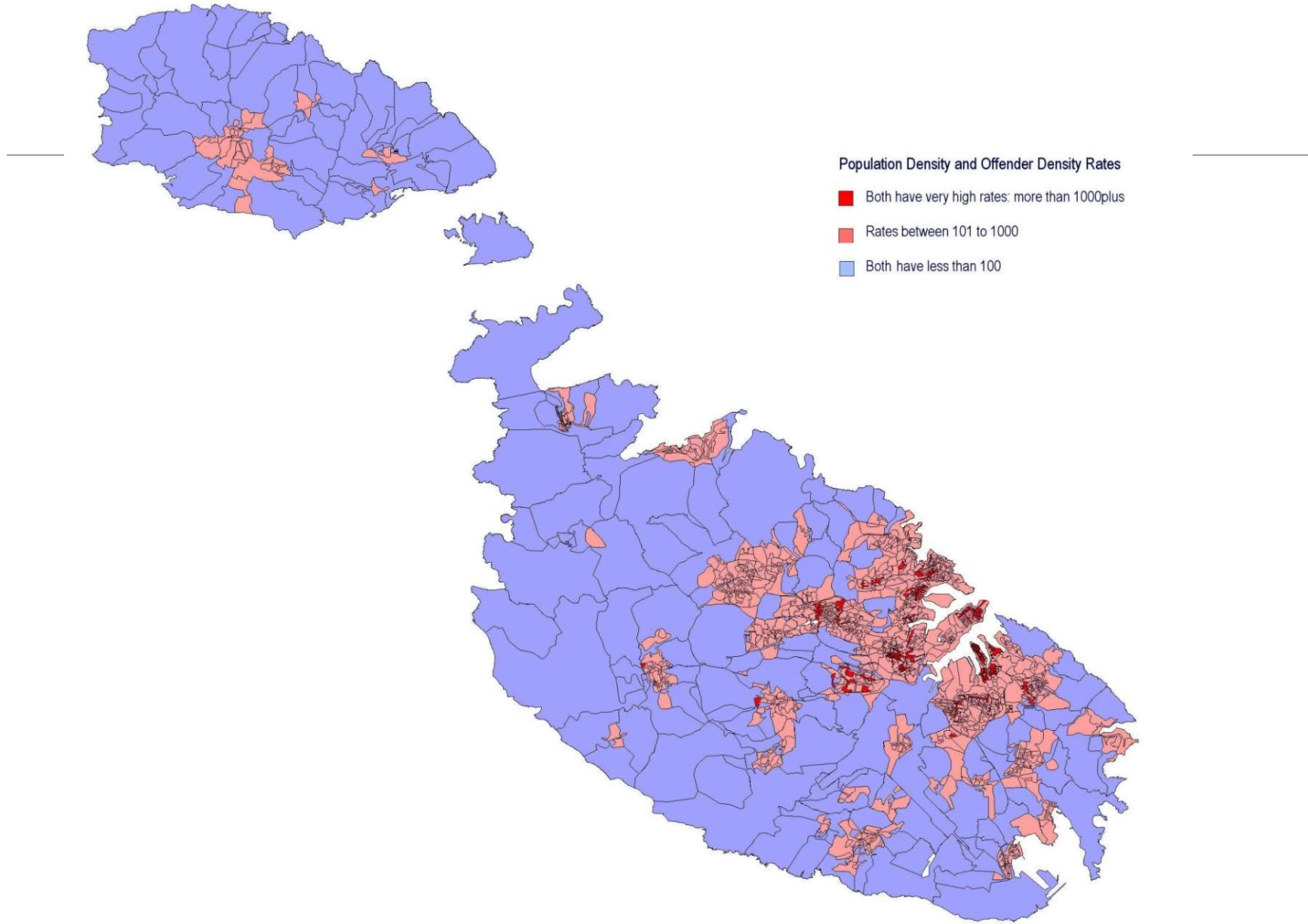
GIS - Interpretation



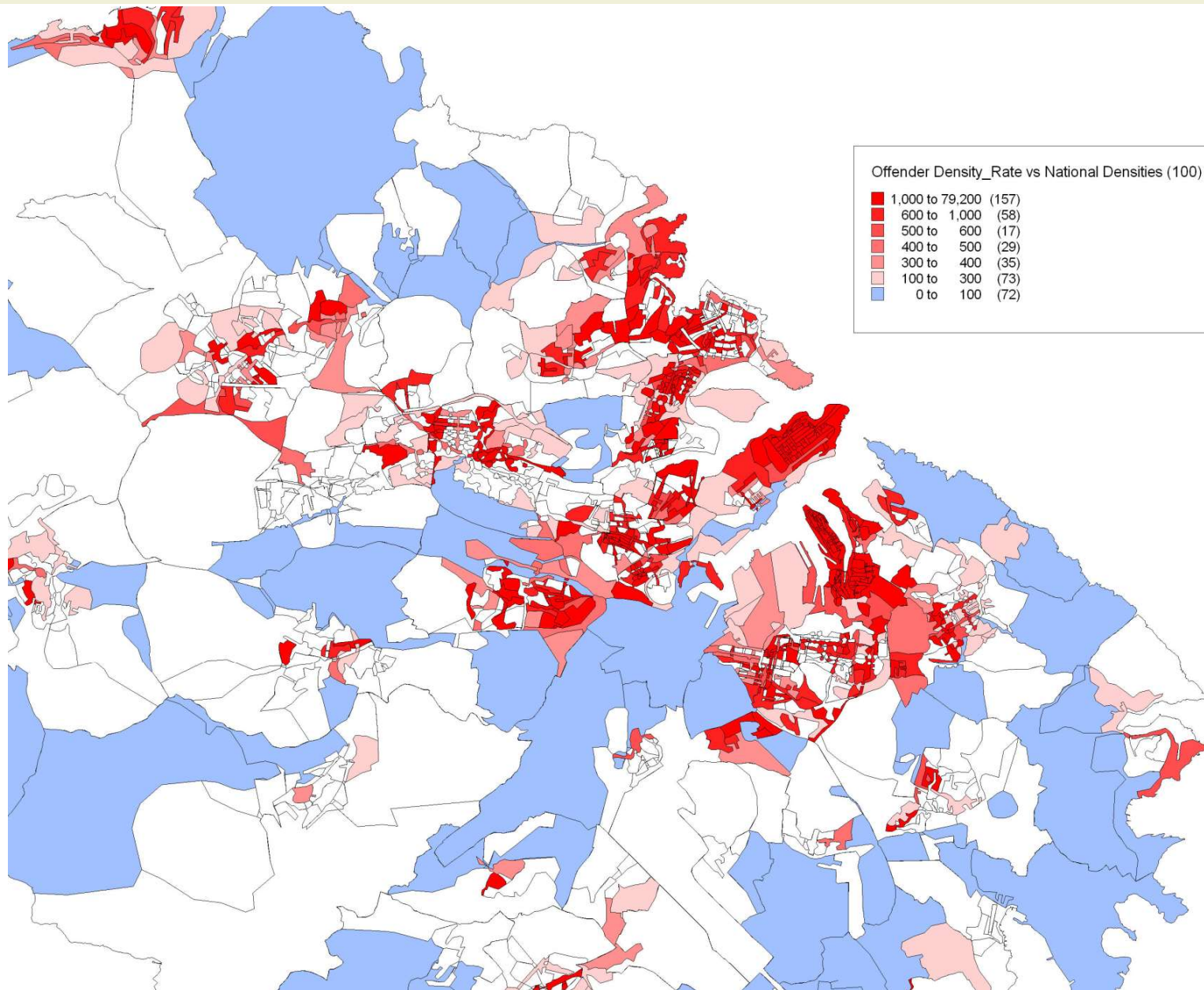
Offender Cluster Analysis



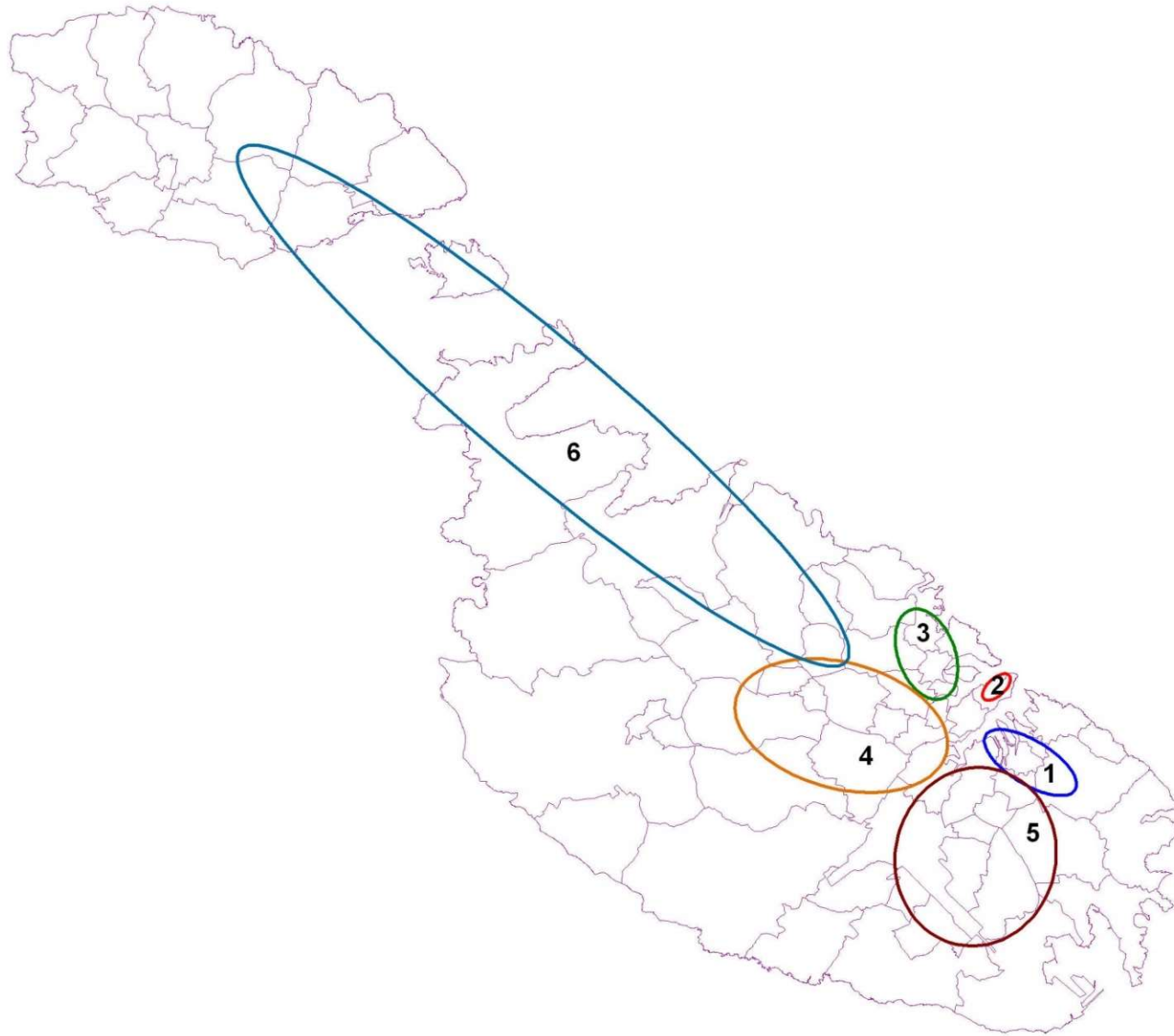
Offender densities by EAs: popdens-offender correlation



Offender densities vs National densities: EAs



Offender clusters



Offender hotspots: a spatio-statistical approach

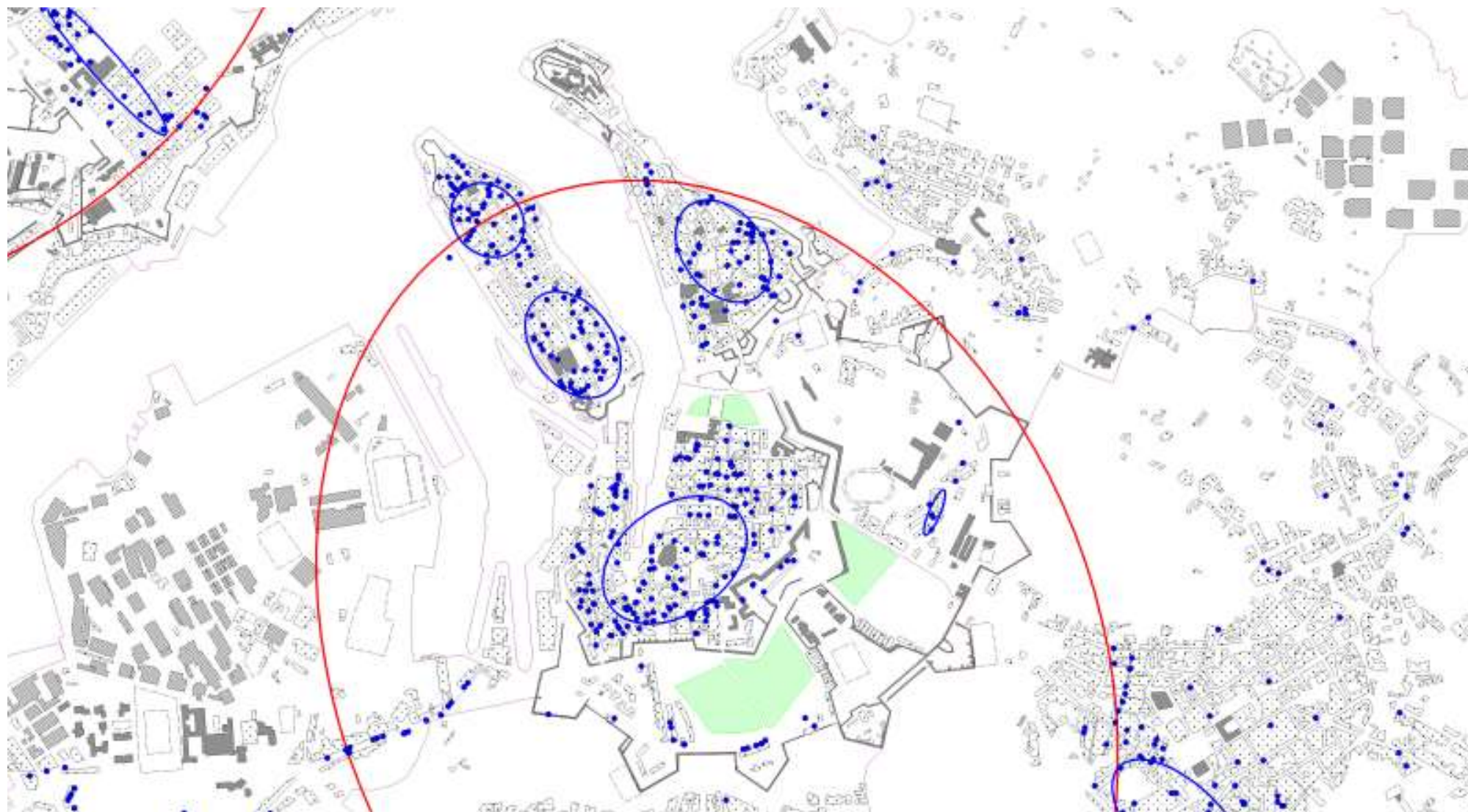


Figure 8.39: 1NNH hotspot analysis for offender residence and poverty

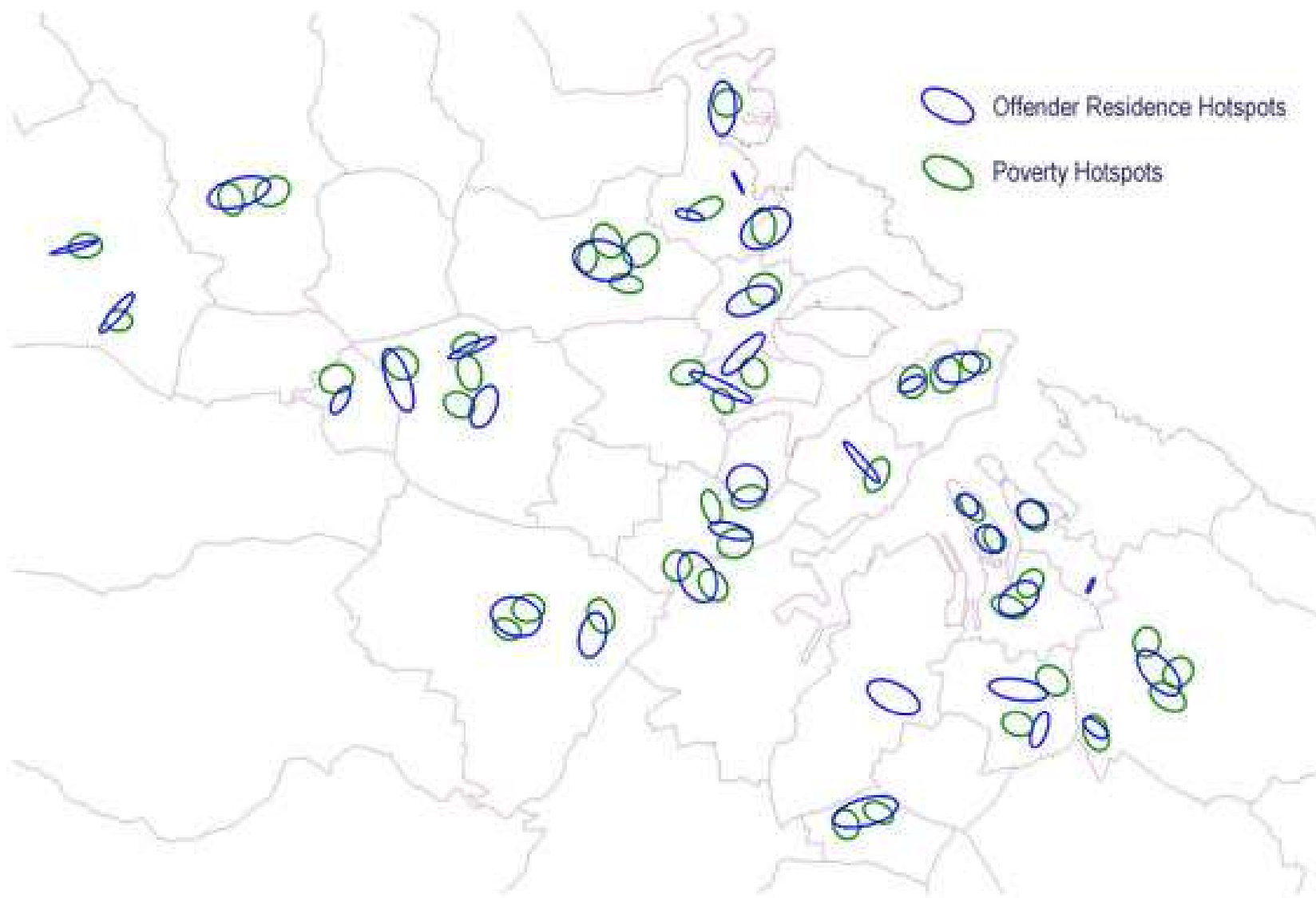
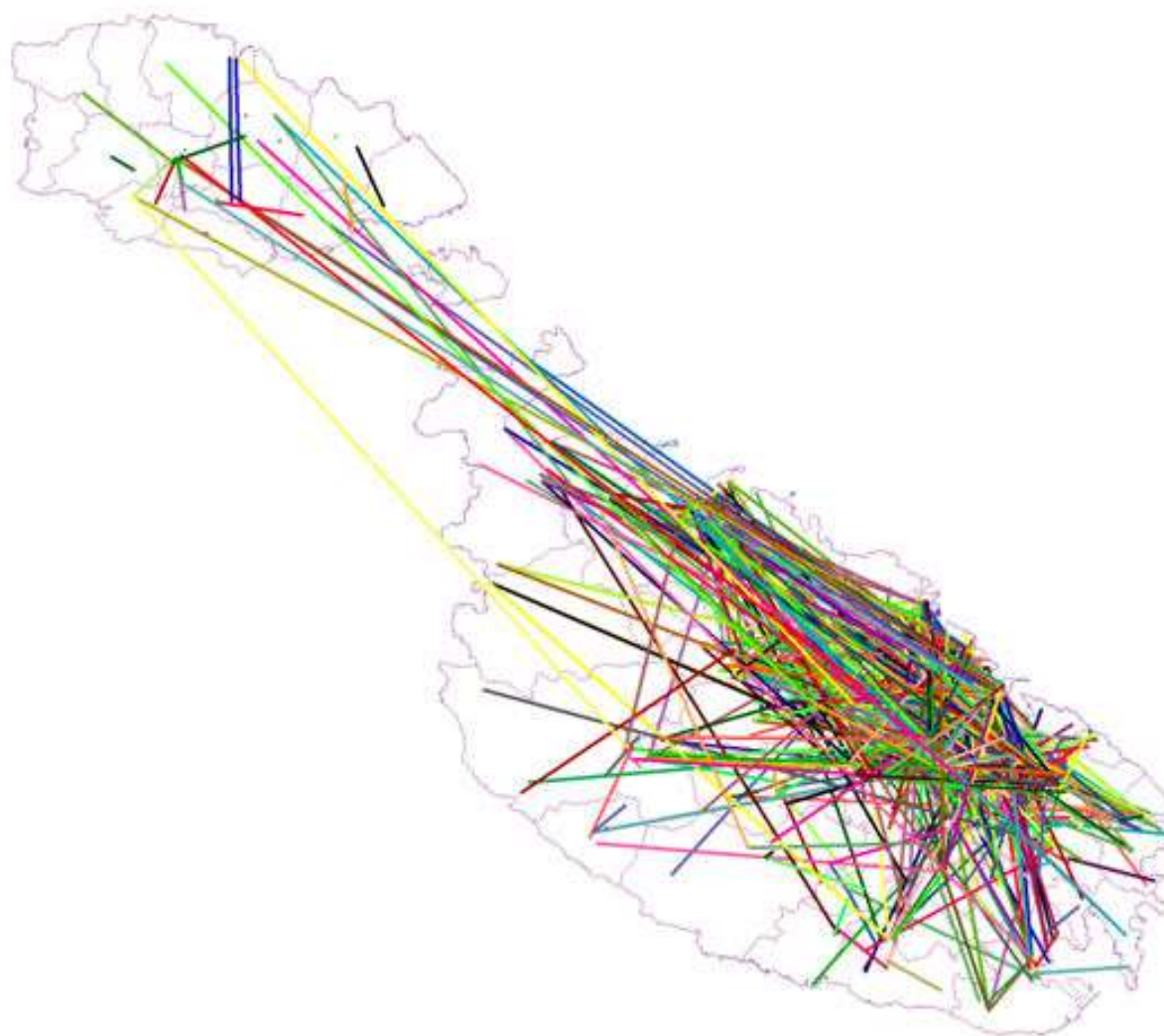
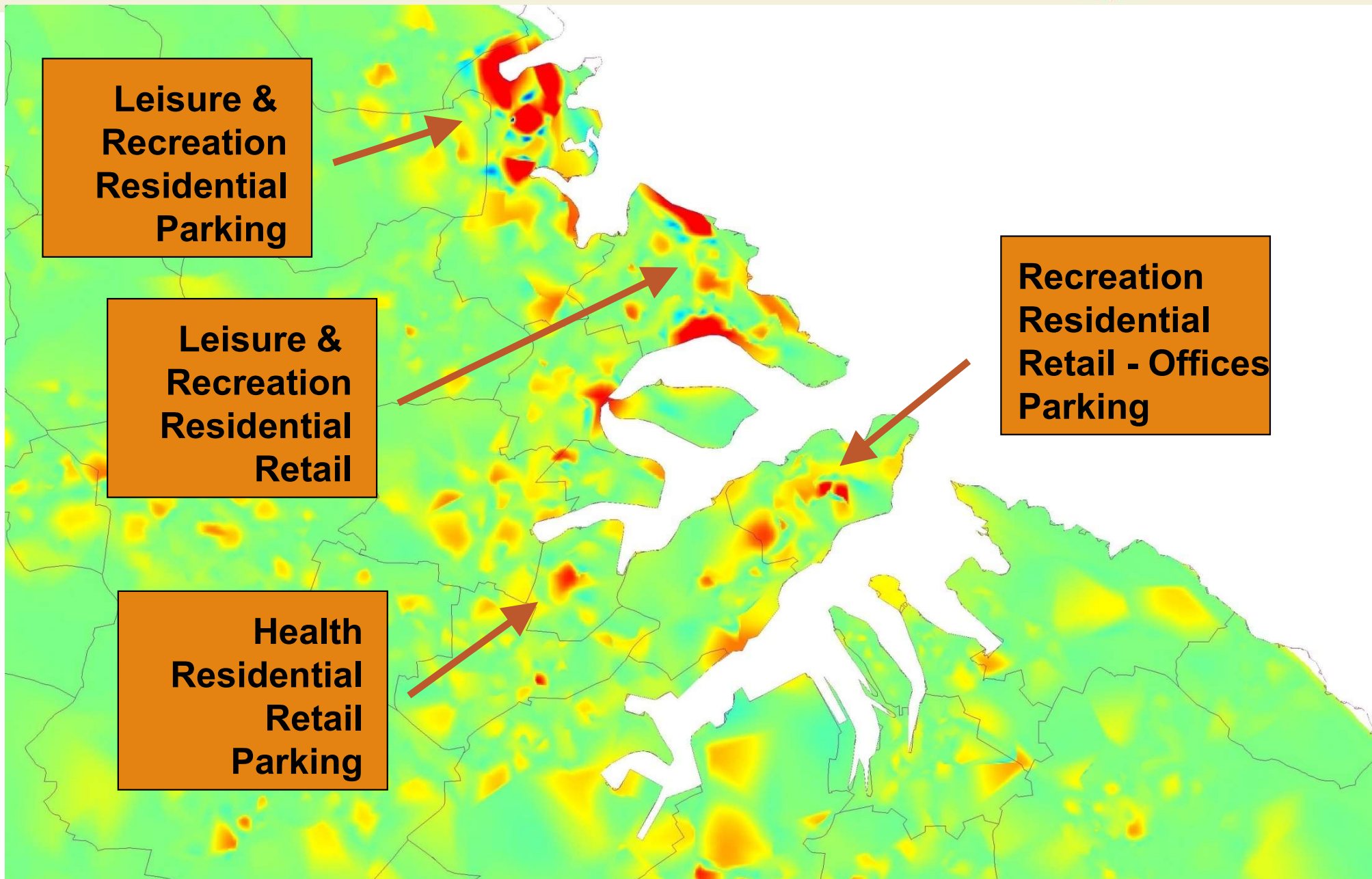


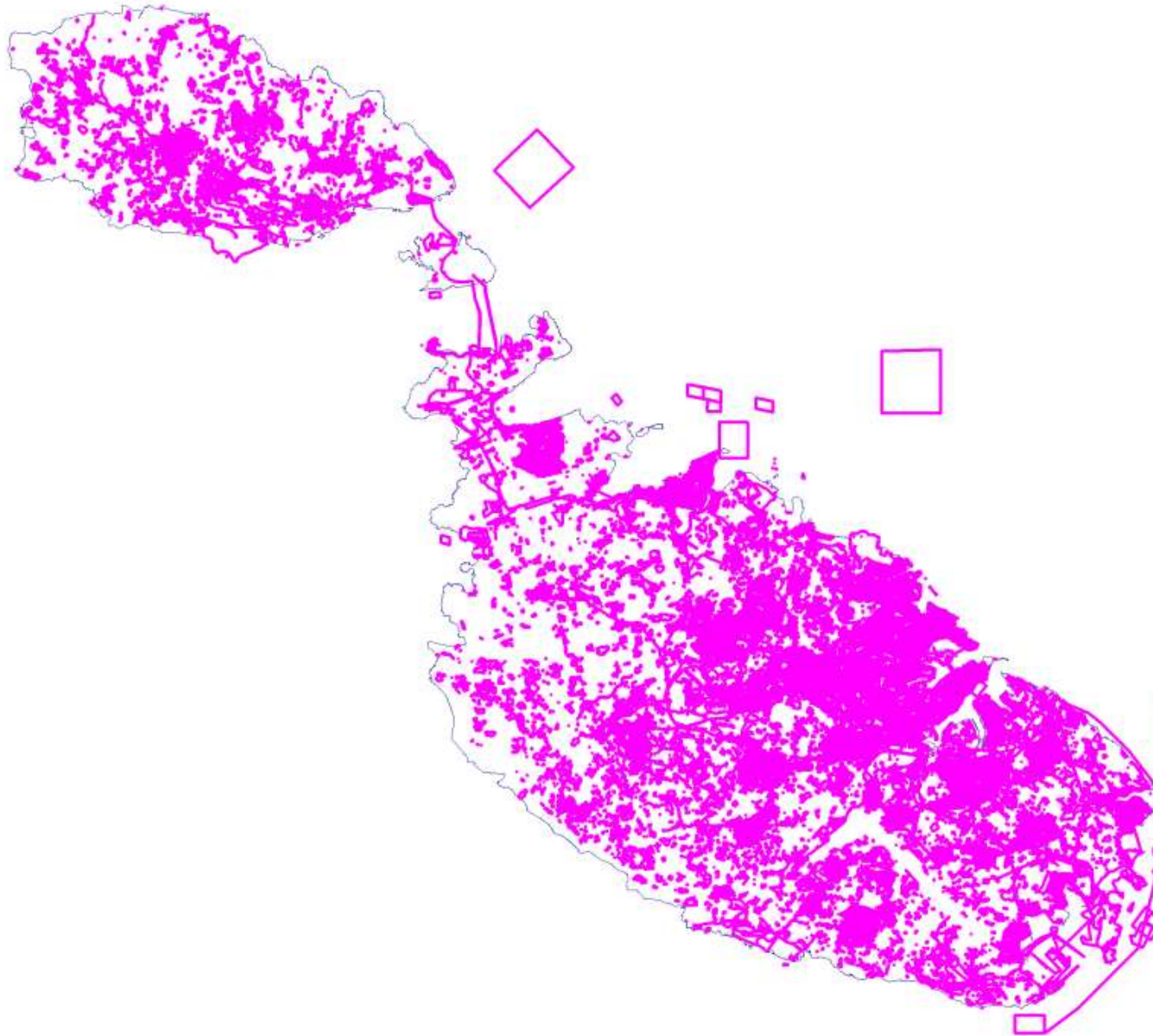
Figure 8.49: The Maltese Islands Journey-to-Crime Web



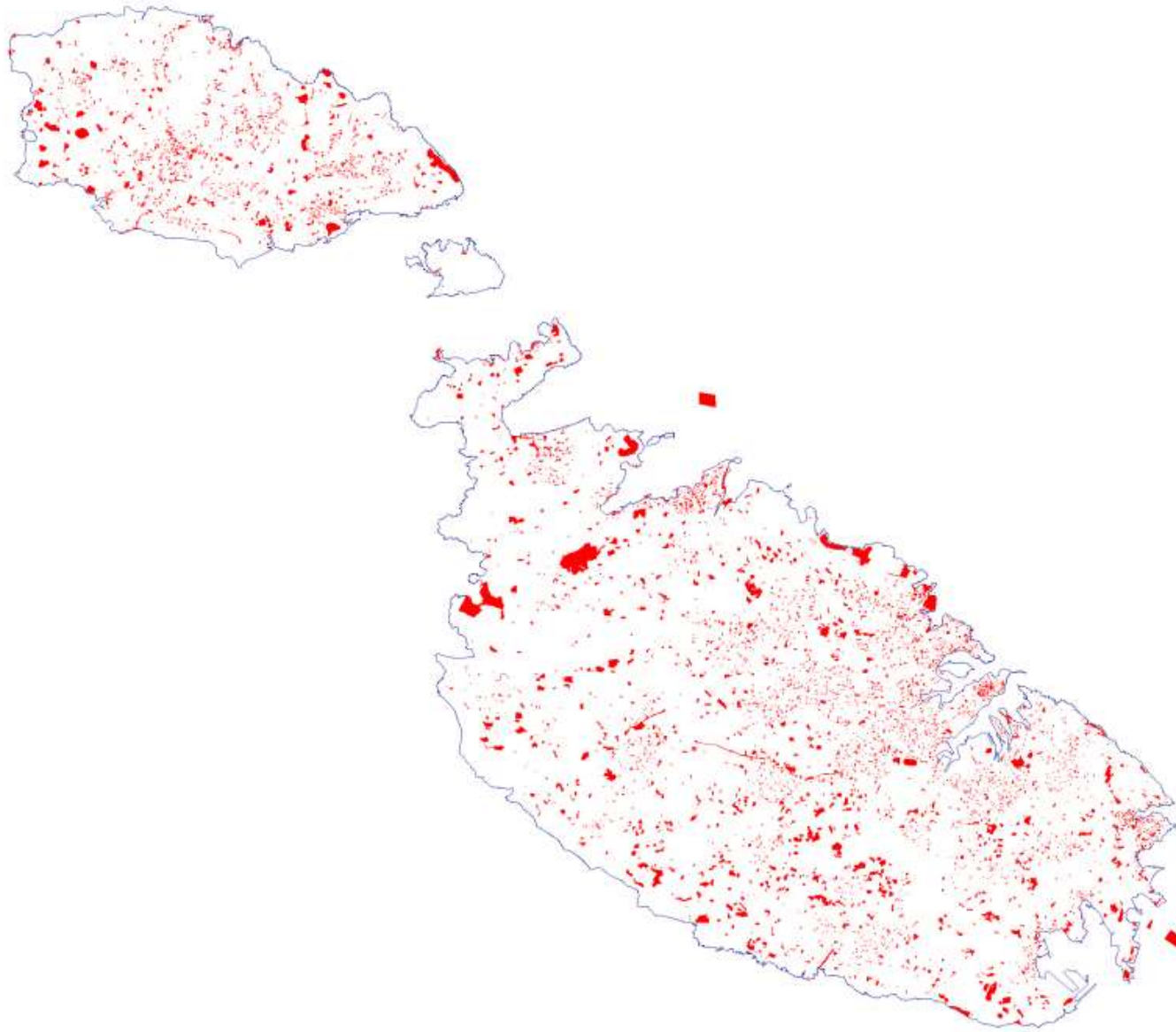
Offence NNA: spatial – Type by spread – Most effected



Development Planning



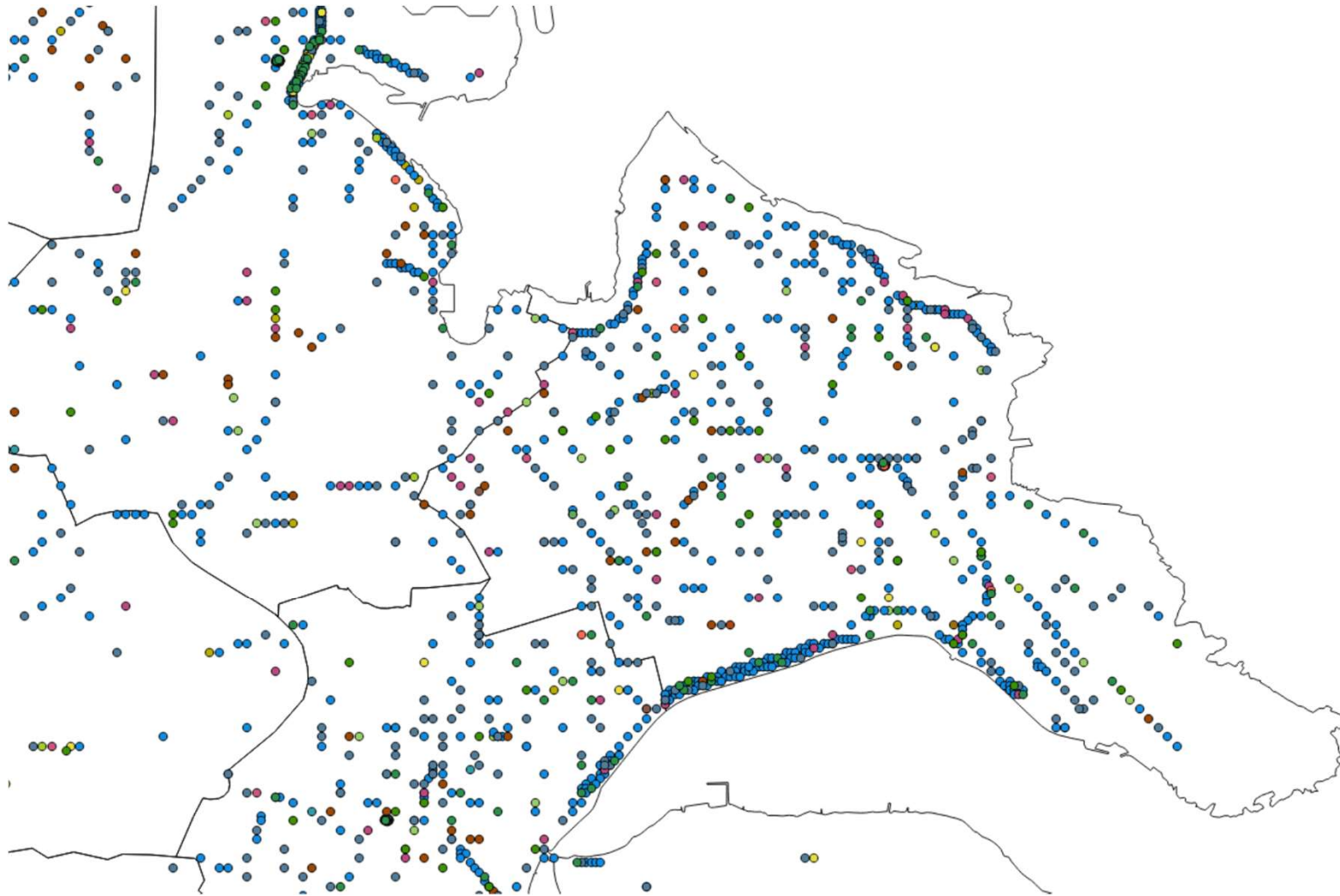
Enforcement Cases



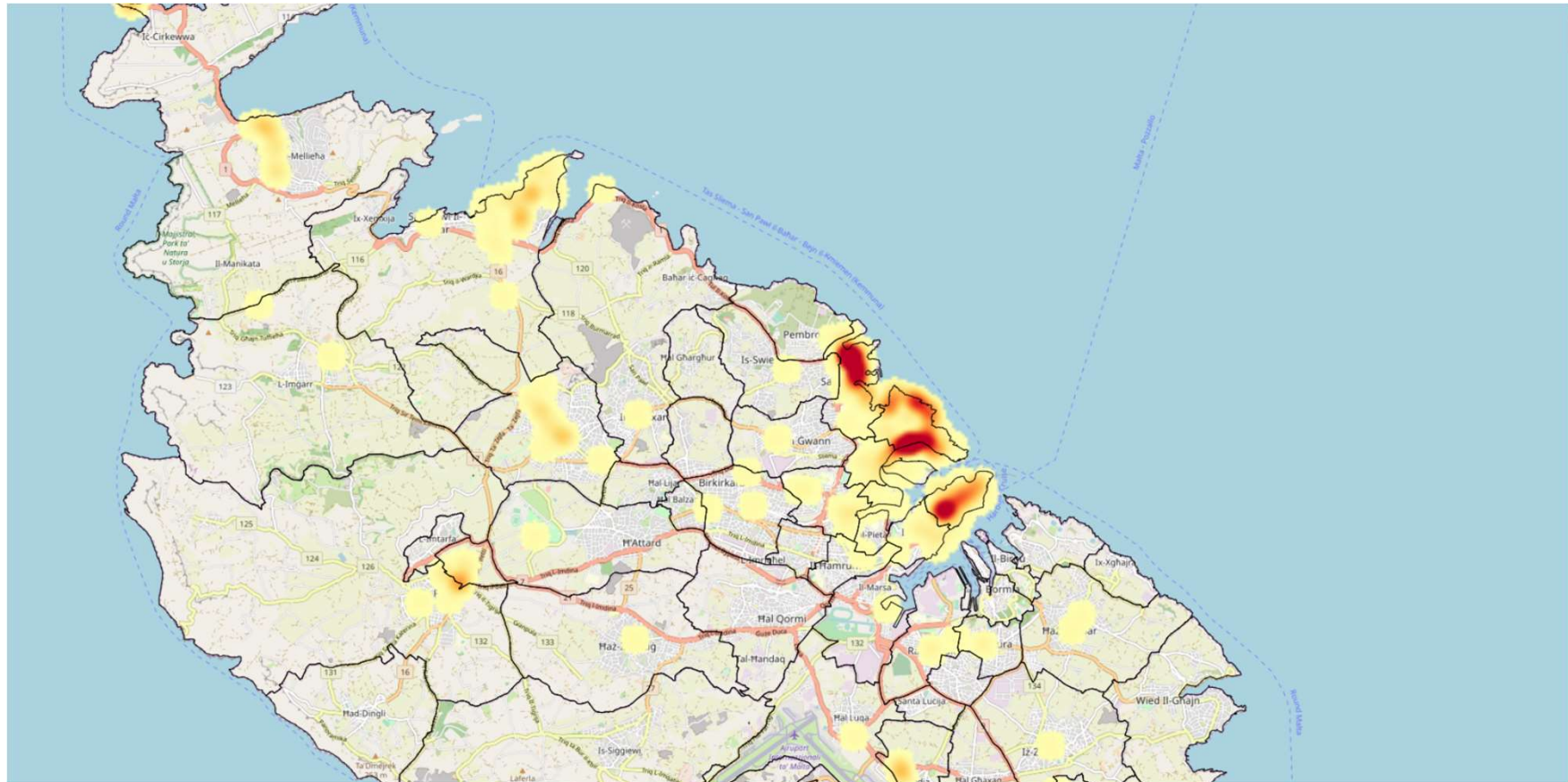


The Interactive Flat Maps

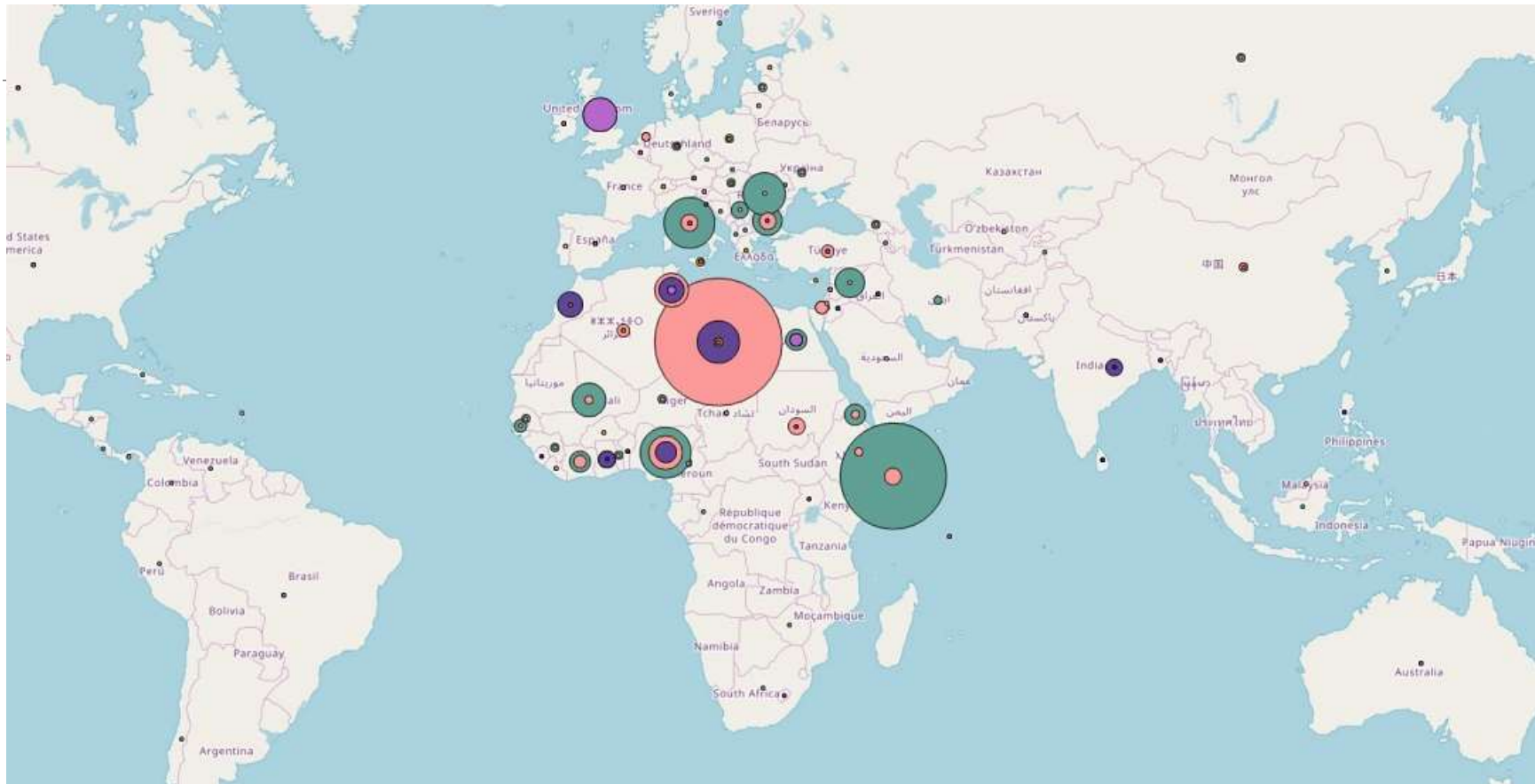
Web Maps for public use: Crimemaps



Web Maps for public use: Crimemaps



Web Maps for public use: CCF



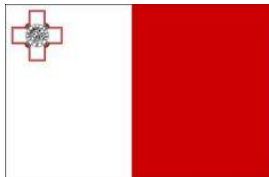
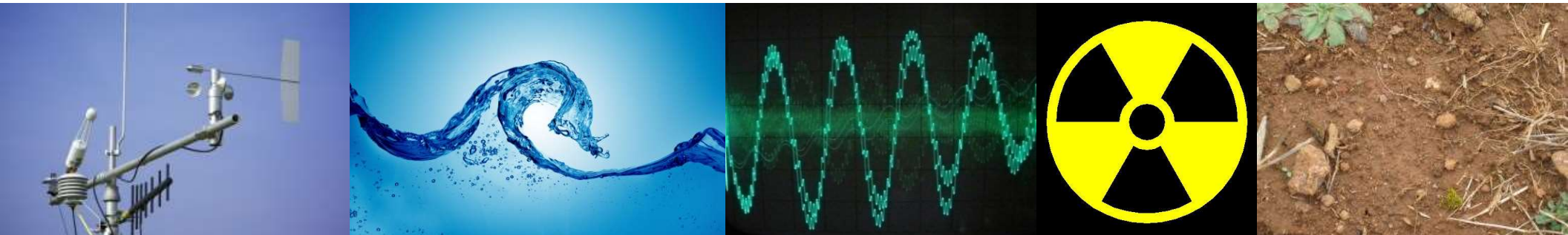


The Interactive 3D Scenarios



EUROPEAN REGIONAL DEVELOPMENT FUND
MALTA 2007-2013

ERDF 156: Developing National Environmental Monitoring Infrastructure and Capacity

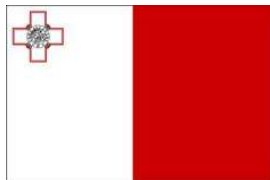
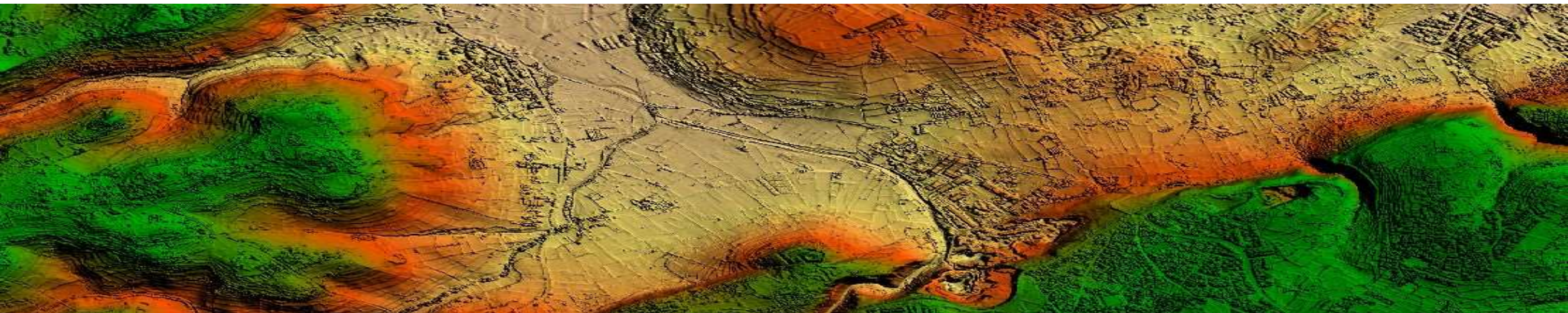


Operational Programme I – Cohesion Policy 2007-2013
Investing in Competitiveness for a Better Quality of Life
Project part-financed by the European Union
European Regional Development Fund (ERDF)
Co-financing rate: 85% EU funds; 15% National Funds



SIntegraM:

Spatial Integration for the Maltese Islands:
Developing Integrated National Spatial Information Capacity



Operational Programme – Cohesion Policy 2014-2020
Investing in Competitiveness for a Better Quality of Life
Project part-financed by the European Union
European Regional Development Fund (ERDF)
Co-financing rate: 85% EU funds; 15% National Funds



Remote Sensing +

Drone Video – Imagery +

Site Scan +

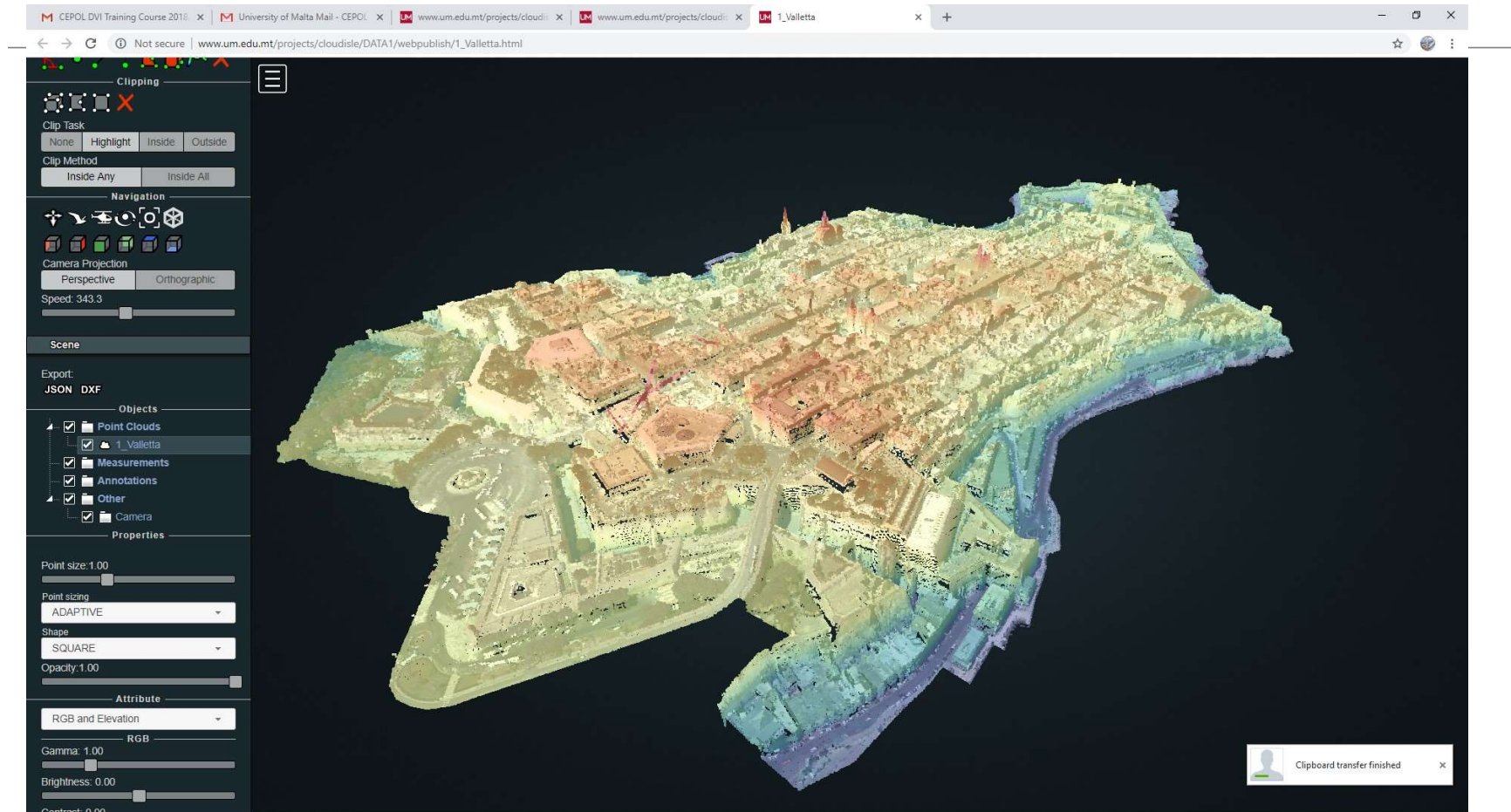
DTM – DTM +

Patience



Some serious tech



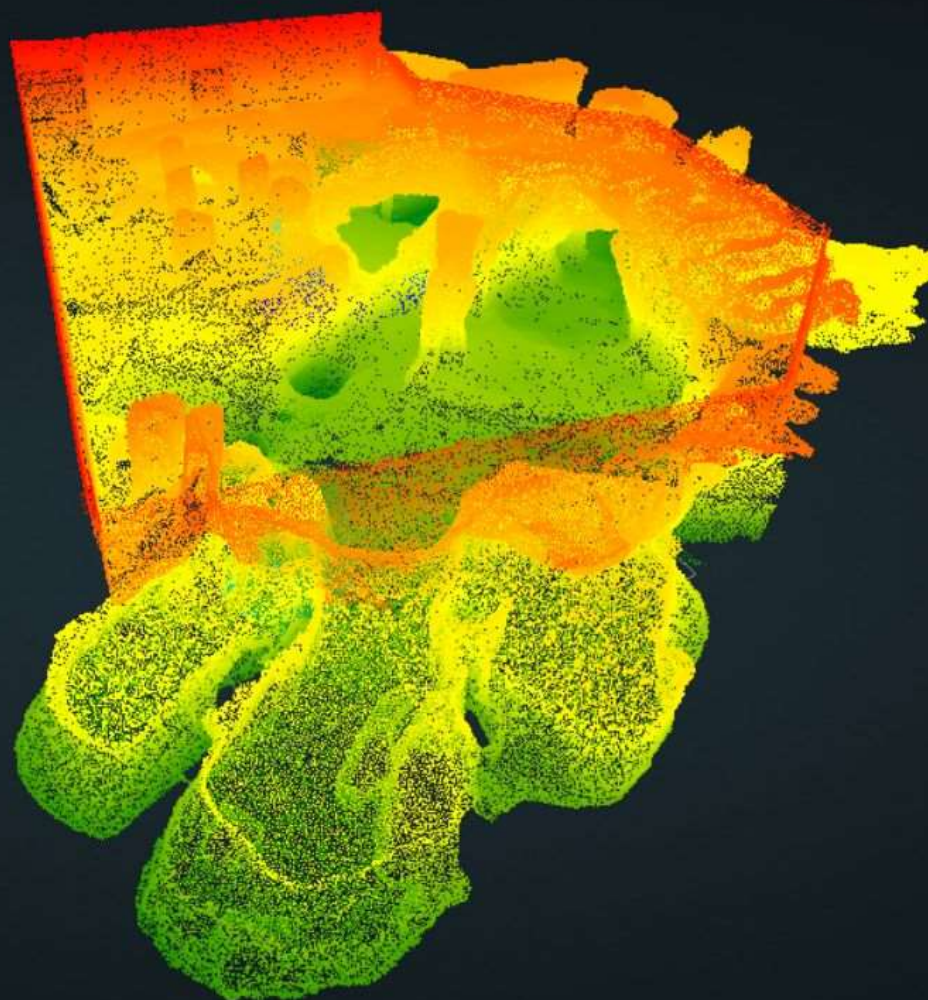


Spatial Forensics – 3D Rendition

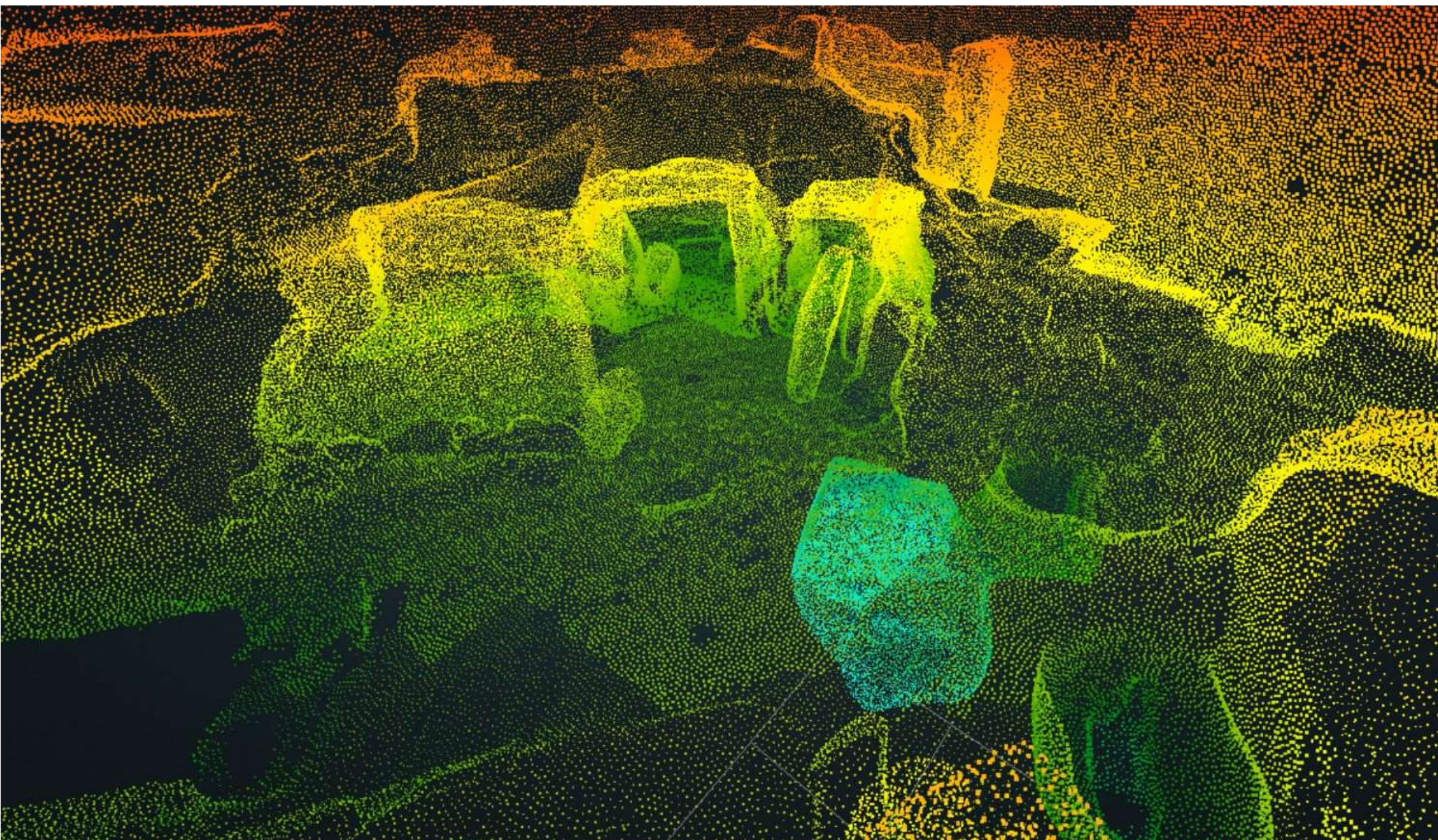


3D – Scanning for Immersion and Analysis





3D – Scanning for Immersion and Analysis



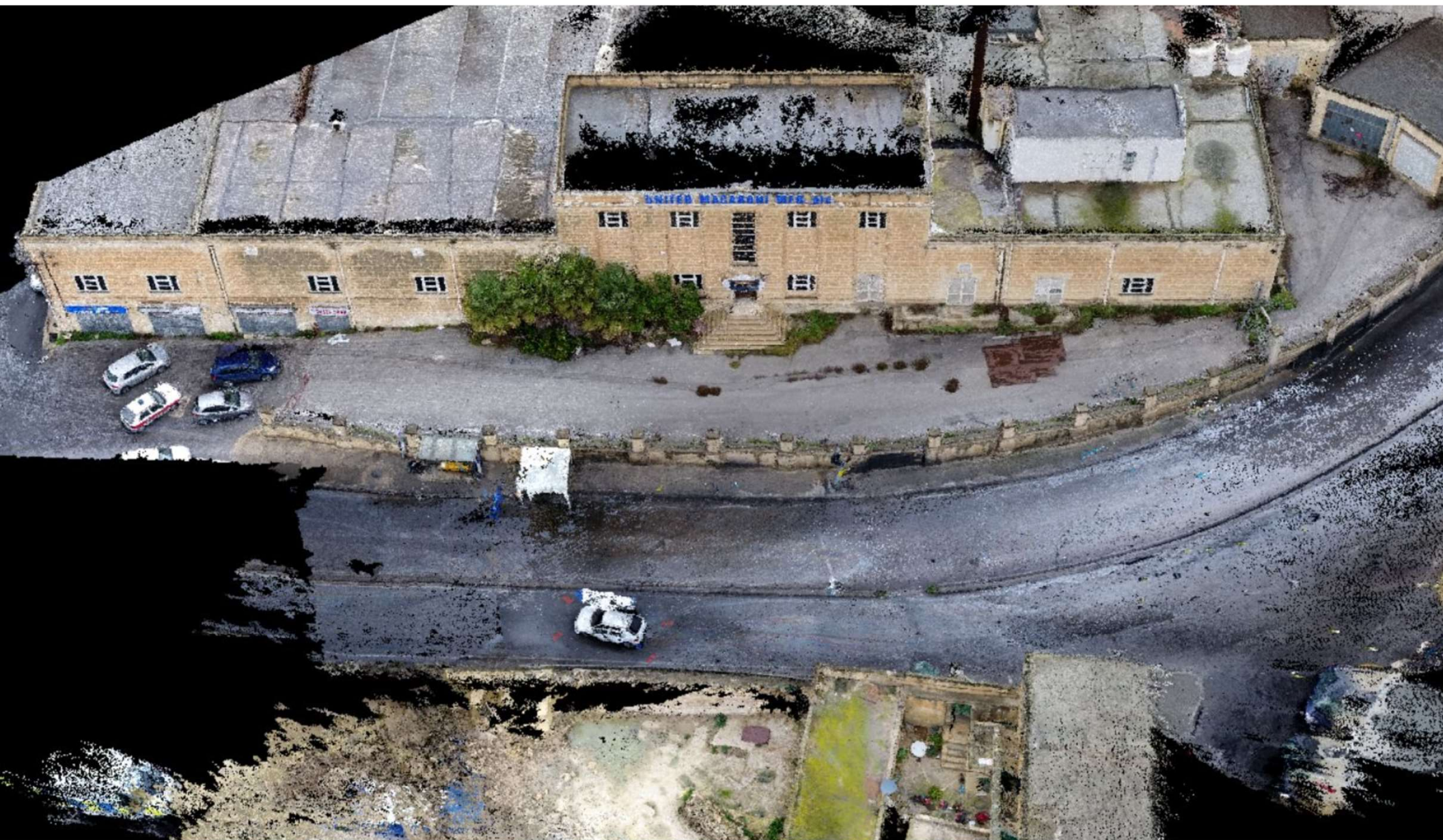
Case Study – Immersion - Hypogeum



3D – Recreating Crime Scenes



3D – Recreating Crime Scenes



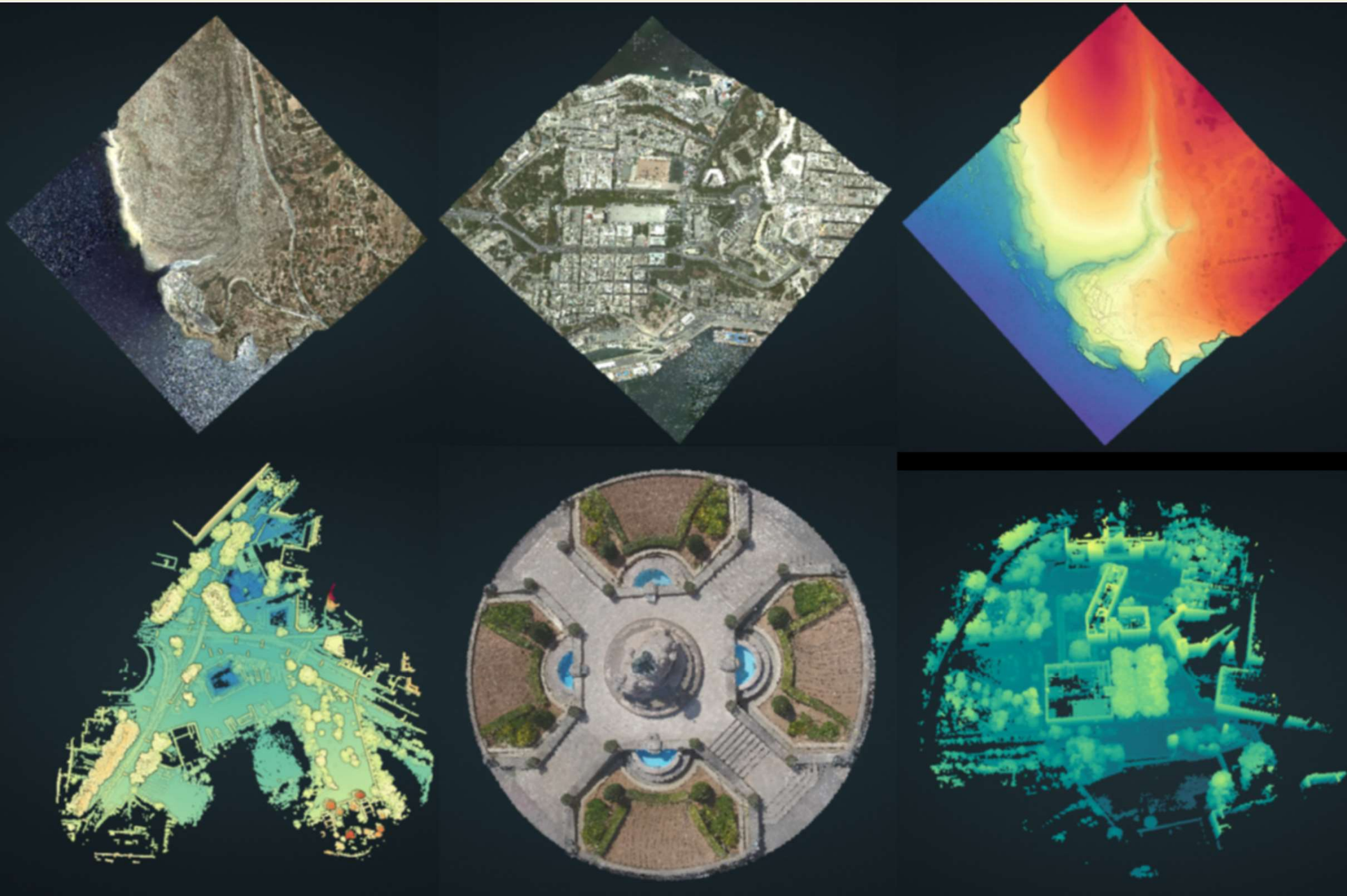
3D – Recreating Real Worlds











CloudIsle

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Pointcloud Visualisations of Real Space

Malta3D LIDAR Rendition

WELCOME



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p: <https://www.um.edu.mt/profile/saviourformosa>