

# Spatial Search in Maps Collection

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Tel Aviv University Library

The Department of Geography and The Human Environment

# Introduction

- ▶ The Department of Geography in Tel Aviv University have a vast collection of over 30,000 new and historic maps.
- ▶ A new web application was developed in order to make this collection available to the public



# Introduction

- ▶ In order to provide accurate search results a new approach was introduced – **Spatial Search**



# Map Search

- ▶ Retrieving maps by a standard lexical search can lead to partial or inaccurate results due to the following reasons:
  - Place names can change over the years
  - Spelling variations
  - Usually not all the places in the map appear in the metadata
  - Local place names were not recorded on the maps
  - The place boundaries can change over time



# Our Approach

- ▶ In order to get to a large group of users the map collection must be available on the internet
- ▶ In order to utilize resources we used the existing ALEPH catalog to store the maps metadata
- ▶ A new Google Map based user interface was integrated to the catalog for intuitive search and easy maintenance.

\* The project was implemented as part of a masters degree thesis in GIS and spatial search ranking methods.

# Search term definition

## Newton catalogue: University Library and Dependent Libraries

Basic Advanced

Search History

Search: London all of these within Title

AND

all of these within Keyword (anywhere)

AND

all of these within Keyword (anywhere)

Year:  Current Material

From To

Location: All Locations

Place of publication: All Places

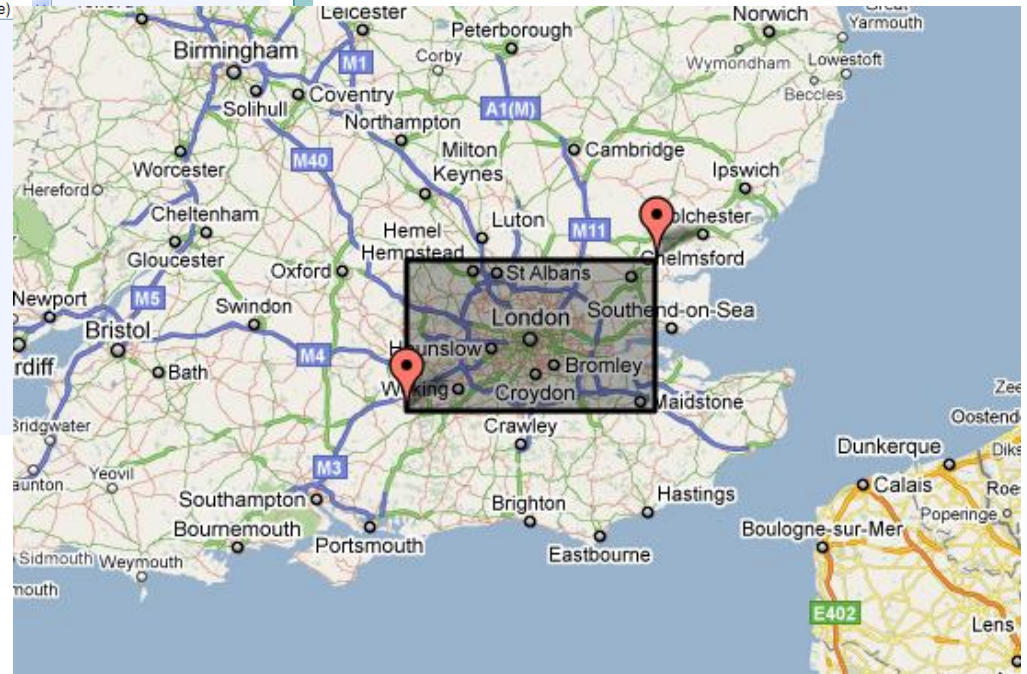
Item type: Map

Status: All Status

Medium: Map

Language: All Languages

Records per page: 25 records per page



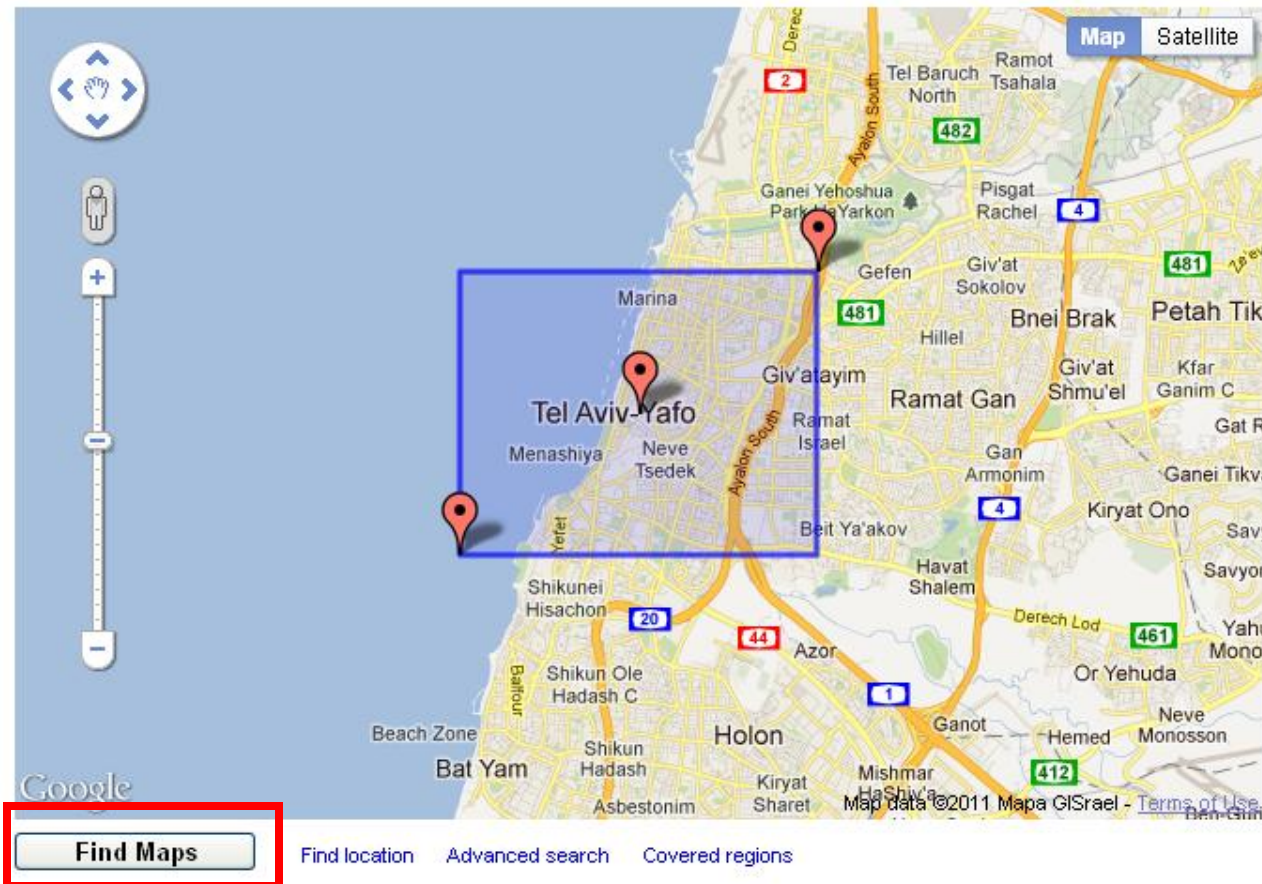
# Demonstration

# Demonstration

## Online Maps Catalog

Welcome to Department of geography maps library.

Drag the rectangle to specify the geographic region and click "Find Maps".

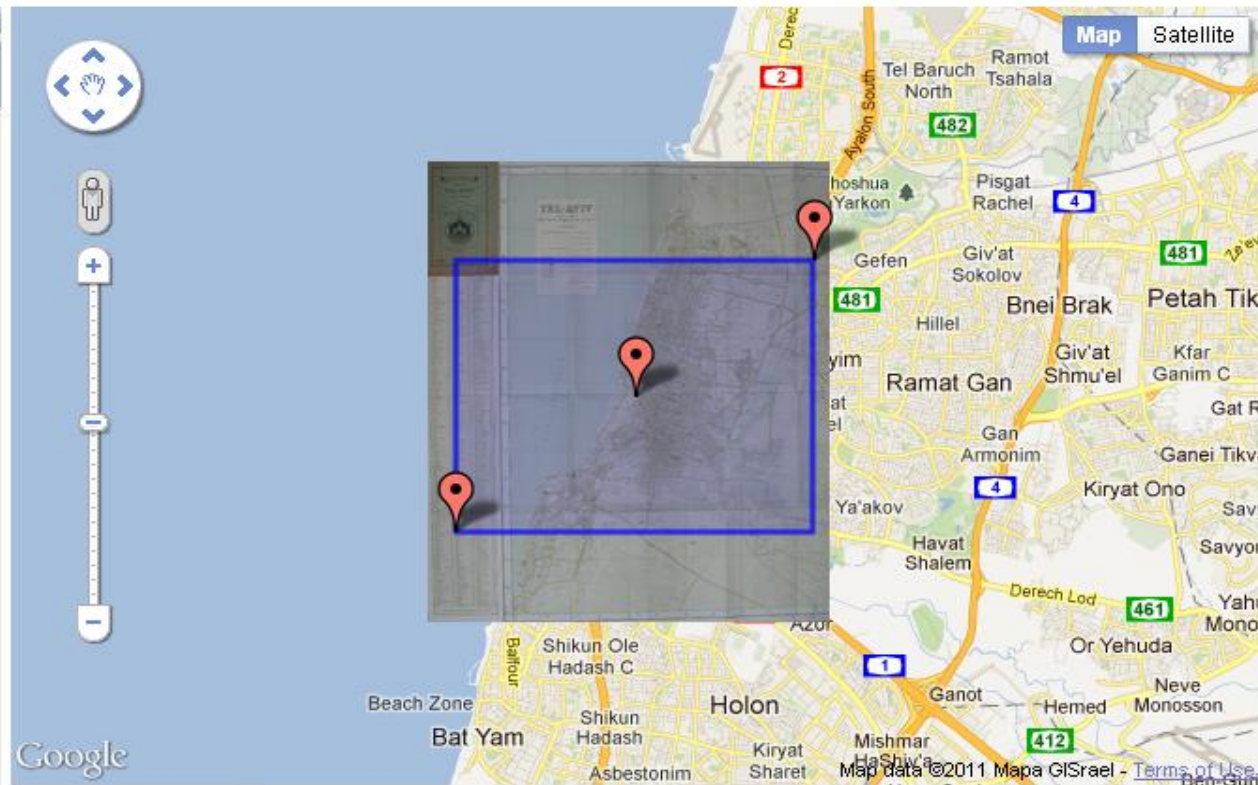


The screenshot shows a Google Maps interface with a map of Tel Aviv-Yafo. A blue rectangle is drawn over the city center, and a red pin is placed on the map. The 'Find Maps' button is highlighted with a red box. The interface includes navigation controls on the left, a search bar at the top, and a 'Find location' button at the bottom. The map shows various neighborhoods and roads, with a red pin placed on the map. The 'Find Maps' button is highlighted with a red box.



# Demonstration

	Map	Location	Year	Scale
1		<a href="#">Jaffa Tel Aviv</a>	1950	1:10,000
2		<a href="#">תל-אביב</a>	1949	1:10,000
3		<a href="#">Urban area of Jaffa-Tel Aviv</a>	1928	1:10,000
4		<a href="#">Jaffa-Tel Aviv</a>	1930	1:10,000
5		<a href="#">Urban area of Jaffa Tel Aviv</a>	1932	1:10,000
6		<a href="#">Jaffa Tel Aviv</a>	1935	1:10,000
7		<a href="#">Tel- Aviv Jaffa</a>	1950	1:12,500
8		<a href="#">Tel Aviv-Jaffa Holon Bat</a>	1953	1:15,000

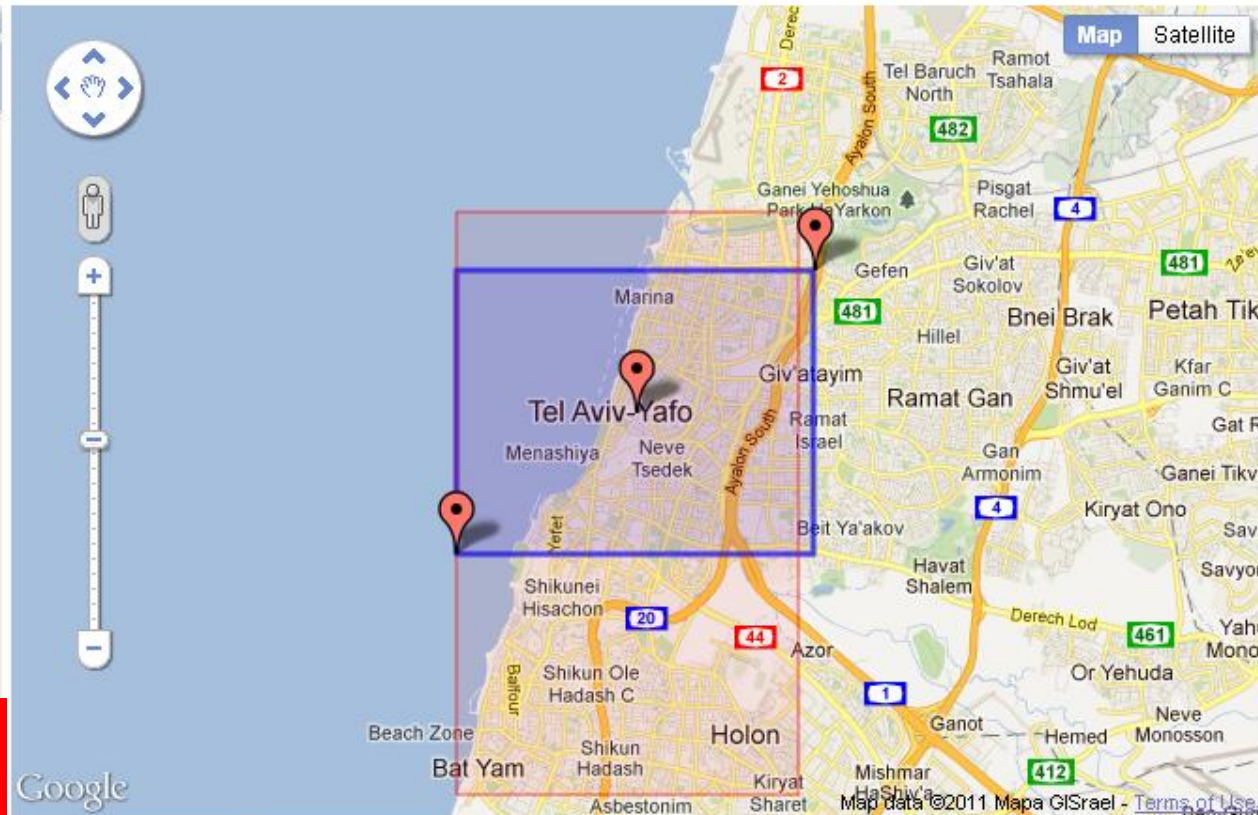


**Find Maps**

[Find location](#) [Advanced search](#) [Covered regions](#)

# Demonstration

Map	Location	Year	Scale
	<a href="#">Jaffa Tel Aviv</a>	1950	1:10,000
	<a href="#">תל-אביב</a>	1949	1:10,000
	<a href="#">Urban area of Jaffa-Tel Aviv</a>	1928	1:10,000
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	<a href="#">Urban area of Jaffa Tel Aviv</a>	1932	1:10,000
	<a href="#">Jaffa Tel Aviv</a>	1935	1:10,000
	<a href="#">Tel- Aviv Jaffa</a>	1950	1:12,500
	<a href="#">Tel Aviv-Jaffa Holon Bat</a>	1953	1:15,000



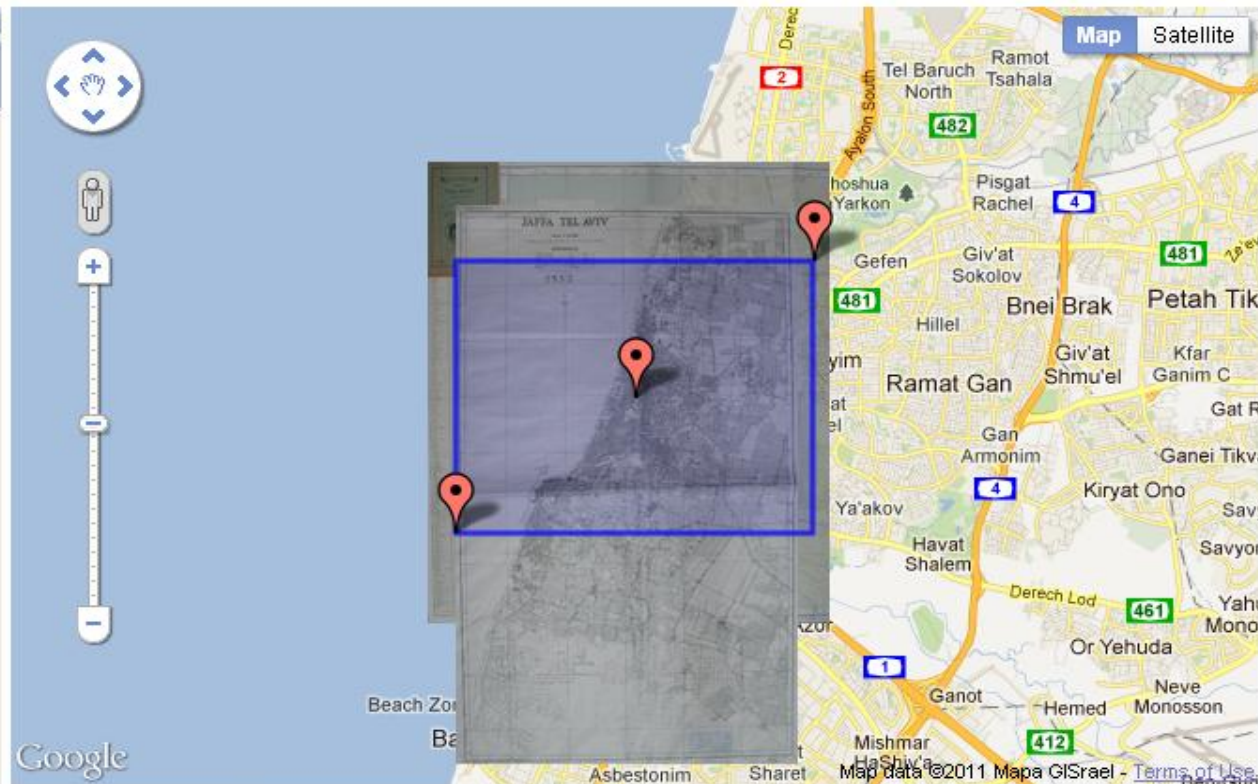
Find Maps

[Find location](#) [Advanced search](#) [Covered regions](#)

TEL-AVIV 1: 10,000 1935

# Demonstration

	Map	Location	Year	Scale
1		<a href="#">Jaffa Tel Aviv</a>	1950	1:10,000
2		<a href="#">תל-אביב</a>	1949	1:10,000
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7		<a href="#">Tel- Aviv Jaffa</a>	1950	1:12,500
8		<a href="#">Tel Aviv-Jaffa</a>	1953	1:15,000



**Find Maps**

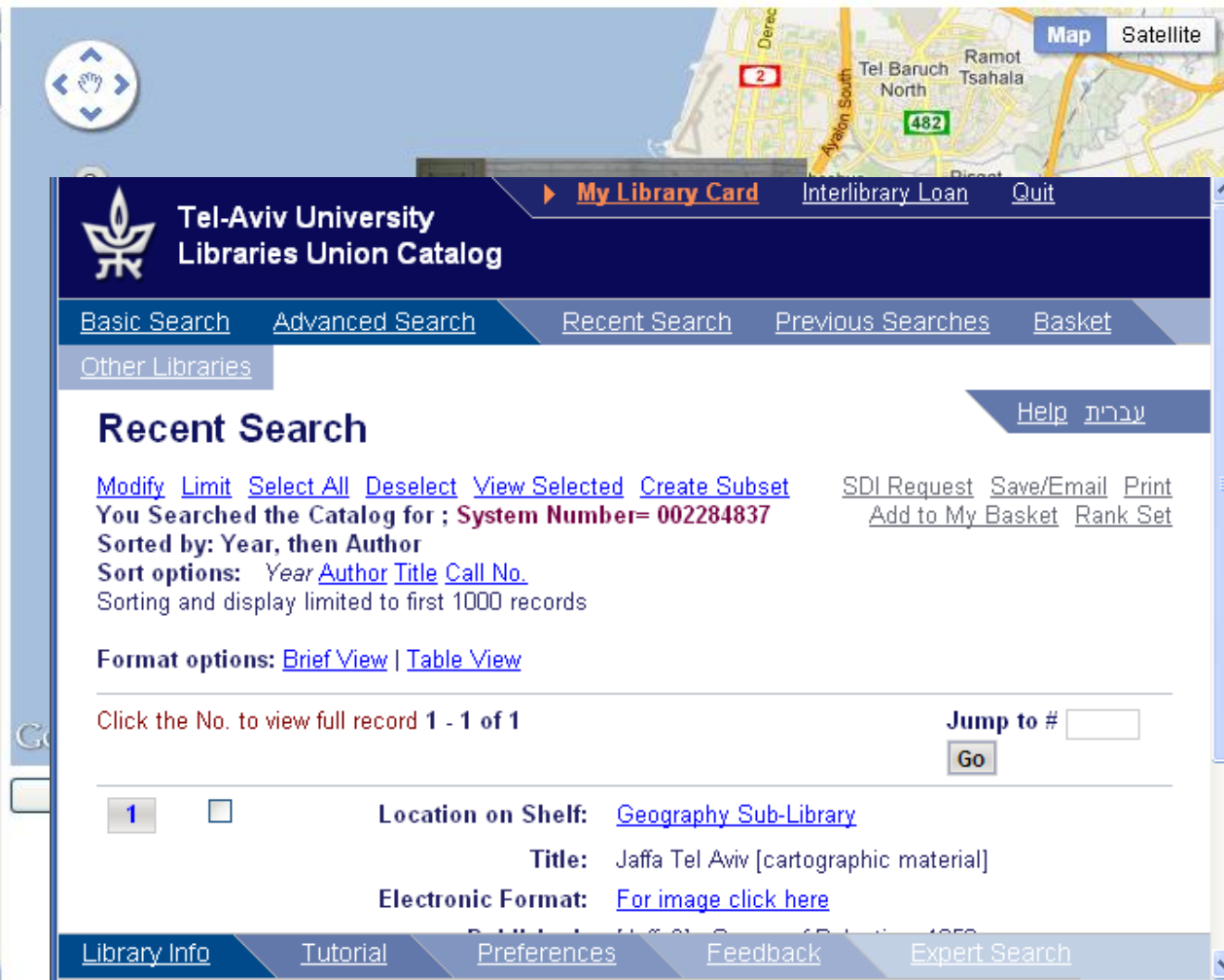
[Find location](#)

[Advanced search](#)

[Covered regions](#)

# Demonstration

	Map	Location	Year	Scale
1		Jaffa Tel Aviv	1950	1:10,000
2		<a href="#">תל-אביב</a>	1949	1:10,000
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8		<a href="#">Tel Aviv-Jaffa Holon Bat</a>	1953	1:15,000



**Tel-Aviv University Libraries Union Catalog**

Basic Search | Advanced Search | Recent Search | Previous Searches | Basket

Other Libraries

### Recent Search

[Modify](#) | [Limit](#) | [Select All](#) | [Deselect](#) | [View Selected](#) | [Create Subset](#) | [SDI Request](#) | [Save/Email](#) | [Print](#)  
 You Searched the Catalog for ; **System Number= 002284837** | [Add to My Basket](#) | [Rank Set](#)

Sorted by: Year, then Author  
 Sort options: Year | [Author](#) | [Title](#) | [Call No.](#)  
 Sorting and display limited to first 1000 records

Format options: [Brief View](#) | [Table View](#)

Click the No. to view full record 1 - 1 of 1 Jump to #

1  Location on Shelf: [Geography Sub-Library](#)  
 Title: Jaffa Tel Aviv [cartographic material]  
 Electronic Format: [For image click here](#)

Library Info | Tutorial | Preferences | Feedback | Expert Search

# Demonstration



## Recent Search

[Modify](#) [Limit](#) [Select All](#) [Deselect](#) [View Selected](#) [Create Subset](#)

[Add to My Basket](#) [Rank Set](#) [SDI Request](#) [Save/Email](#) [Print](#)

You Searched the Catalog for ; **System Number= 002284837**

Sorted by: Year, then Author

Sort options: [Year](#) [Author](#) [Title](#) [Call No.](#)

Sorting and display limited to first 1000 records

Format options: [Brief View](#) | [Table View](#)

Click the No. to view full record 1 - 1 of 1

Jump to #

1



**Location on Shelf:** [Geography Sub-Library](#)

**Title:** Jaffa Tel Aviv [cartographic material]

**Electronic Format:** [For image click here](#)

**Published:** [Jaffa?] : Survey of Palestine, 1960

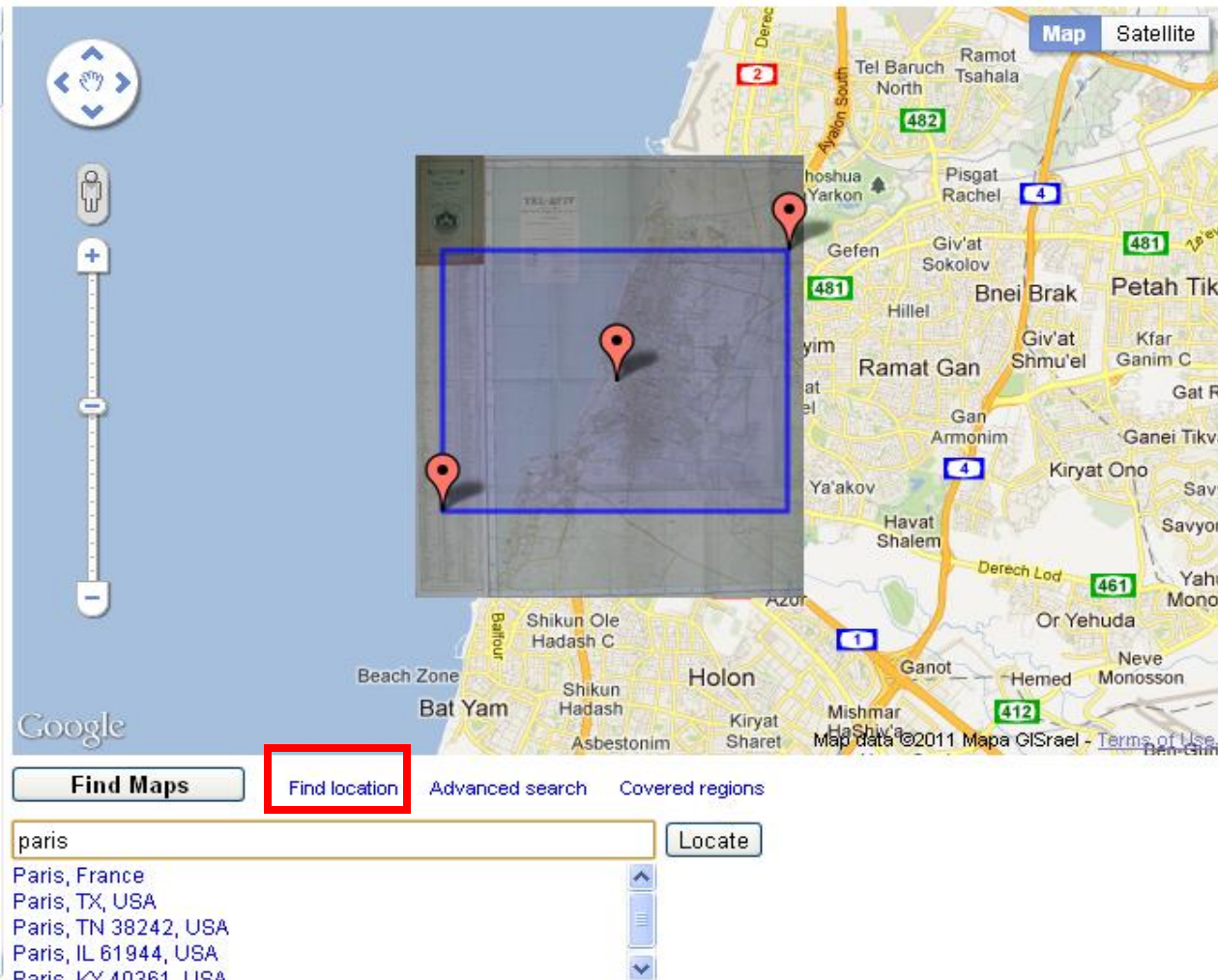
**System Number:** 002284828

[Modify](#) [Limit](#) [Select All](#) [Deselect](#) [View Selected](#) [Create Subset](#)

[Add to My Basket](#) [Rank Set](#) [SDI Request](#) [Save/Email](#)

# Demonstration

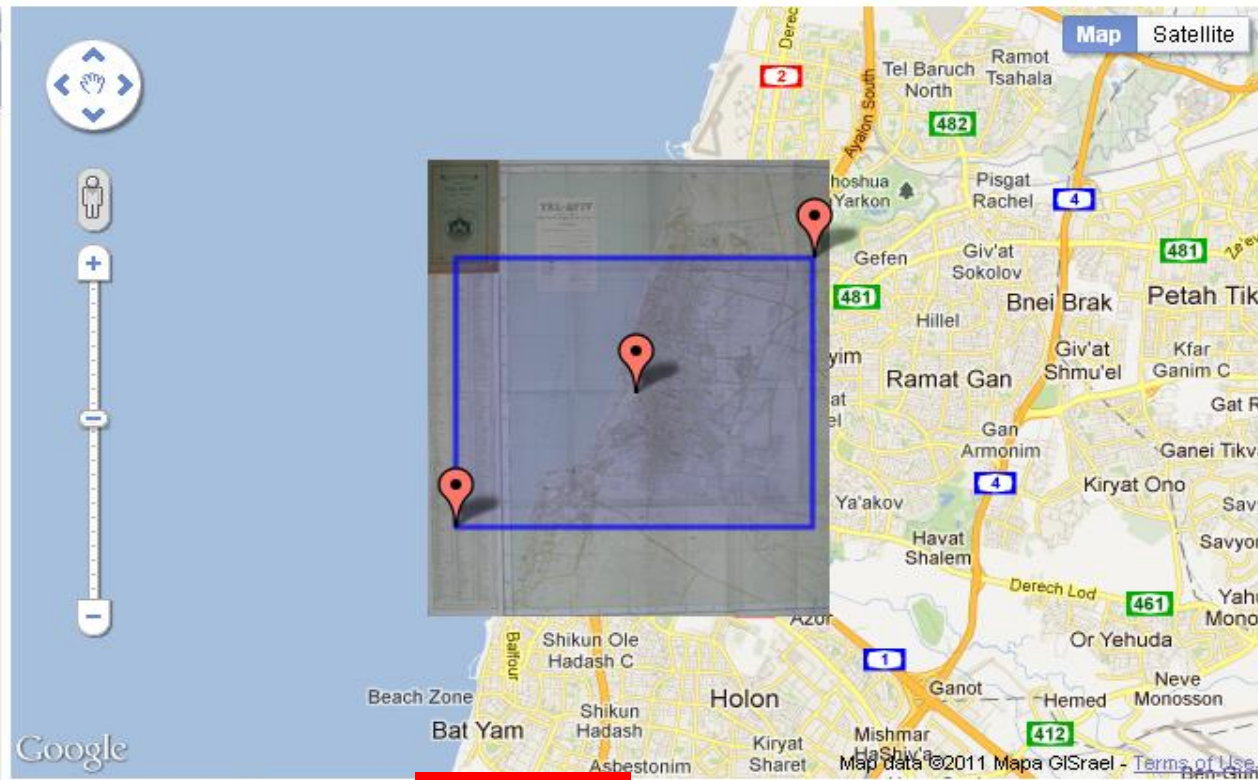
	Map	Location	Year	Scale
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2		<a href="#">תל-אביב</a>	1949	1:10,000
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5		<a href="#">Urban area of Jaffa Tel Aviv</a>	1932	1:10,000
6		<a href="#">Jaffa Tel Aviv</a>	1935	1:10,000
7		<a href="#">Tel- Aviv Jaffa</a>	1950	1:12,500
8		<a href="#">Tel Aviv-Jaffa Holon Bat</a>	1953	1:15,000



The image shows a Google Maps interface. At the bottom, a search bar contains the text "paris". Below the search bar, a list of search results is displayed: "Paris, France", "Paris, TX, USA", "Paris, TN 38242, USA", "Paris, IL 61944, USA", and "Paris, KY 40361, USA". The "Find location" button is highlighted with a red box. The map itself shows a street view of Tel Aviv, with a red location pin placed in the center of a blue rectangular area. The map includes various navigation controls like a compass, a person icon, and a zoom slider. The text "Google" is visible in the bottom left corner of the map area.

# Demonstration

	Map	Location	Year	Scale
1		<a href="#">Jaffa Tel Aviv</a>	1950	1:10,000
2		<a href="#">תל-אביב</a>	1949	1:10,000
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6		<a href="#">Jaffa Tel Aviv</a>	1935	1:10,000
7		<a href="#">Tel- Aviv Jaffa</a>	1950	1:12,500
8		<a href="#">Tel Aviv-Jaffa Holon Bat</a>	1953	1:15,000











**Find Maps**    Find location    **Advanced search**    Covered regions

Keyword

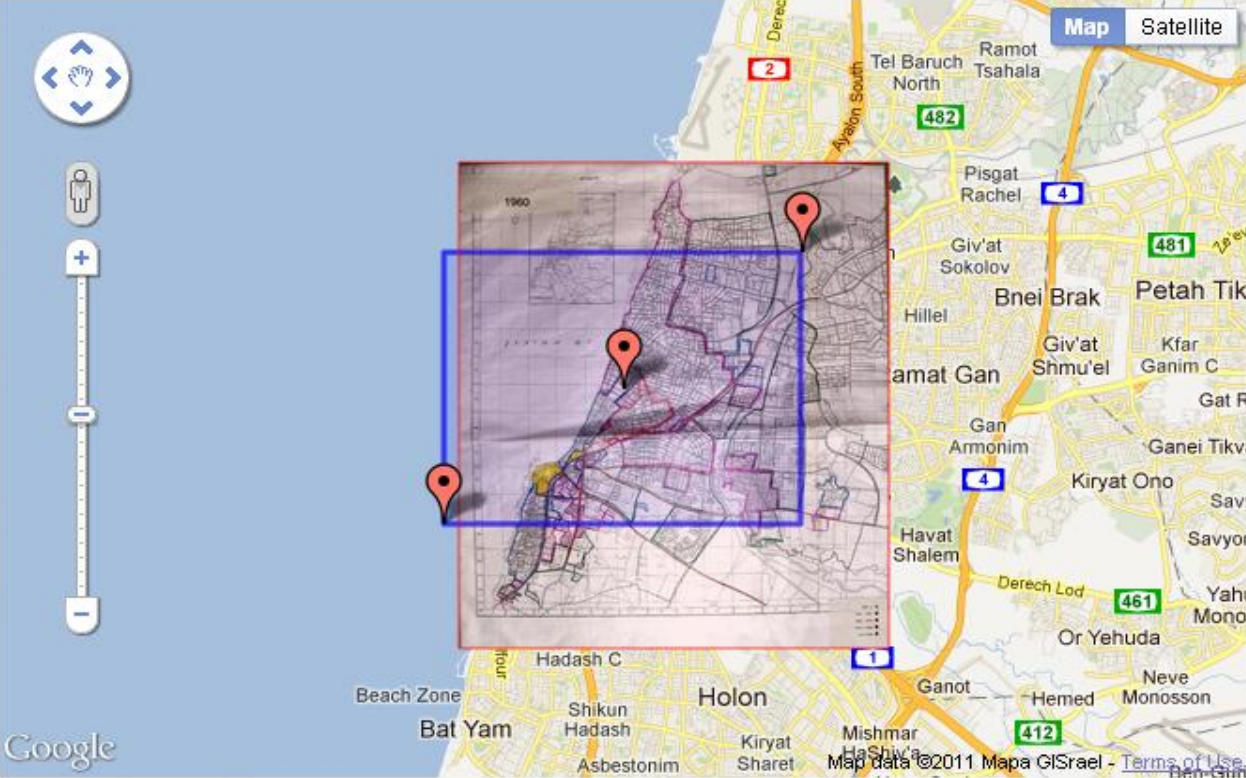
From year    To year    From scale    To scale

1950    1960    1:     1:

# Demonstration

Map	Location	Year	Scale
	<a href="#">Jaffa Tel Aviv</a>	1950	1:10,000
	<a href="#">Tel- Aviv Jaffa</a>	1950	1:12,500
	<a href="#">Tel Aviv-Jaffa Holon Bat Yam</a>	1953	1:15,000
	<a href="#">תל אביב-יפו</a>	1960	1:10,000
	<a href="#">הצעת תכנית אב כבישים מהירים ושוקיים בתל-אביב רבתי</a>	1960	
	<a href="#">תל אביב-יפו רמת-גן גבעתיים ובני-ברק</a>	1958	1:10,000
	<a href="#">תל-אביב-יפו</a>	1955	1:10,000
	<a href="#">תל-אביב-יפו</a>	1959	1:10,000

TEL-AVIV 1: 10,000 1960



Google Maps interface showing a historical map of Tel Aviv. The map includes street names like Derech, Ayalon South, and various neighborhoods like Ramot Tzahala, Pisgat Rachel, and Holon. A red location pin is placed on the map, and a blue bounding box highlights a specific area. The map data is from 2011.

**Find Maps**    Find location    Advanced search    Covered regions

Keyword

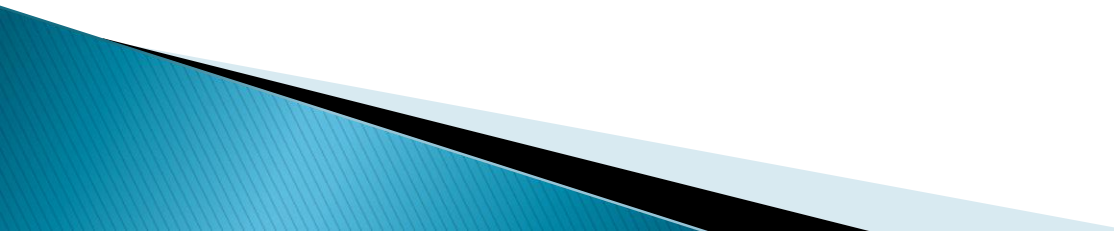
From year    To year    From scale    To scale

1950    1960    1:     1:



# The Process

# The Process

- ▶ The Librarian Catalog the map in the ALEPH
  - ▶ The map is scanned and marked
  - ▶ Geo-referencing is made using Google Earth in order to place the map its geographic location.
- 

# Maps library



# Step 1 – ALEPH Catalog

tavor.tau.ac.il/F/LX8TJX33NSFFIS7DGLXEM1F3YETURJQ2MQ6SY6FNGGBQ25CY3N-09542?func=full-set-set&set\_number=0029438&se

Imported Bookmarks Toolbar JEN ynet בלייור - השותלים - view immigration Remote Sensing Gloss... Listen live RADIO ITA... Other bookmarks

יציאה השאלה בינספרייטית נרטיס הקורא שלי

אוניברסיטת תל-אביב  
הקטלוג המאוחד של הספריות

חיפוש בסיסי חיפוש מתקדם תוצאות חיפוש אחרון חיפושים קודמים סל ספריות אחרות

English עזרה

## תצוגת רשומה

[תצוגת רשומה מלאה](#) [תצוגת רשומה מקוצרת](#)  
לספרים:  
[MARC Tags](#) [Name Tags](#) [Catalog Card](#)

רשומה 1 מתוך 1

<a href="#">כל העותקים</a>	מיקום - הכל
<a href="#">ספריית גאוגרפיה</a>	מיקום:
a 10000 W34.733762 E34.857046 N32.102507 S32.026813	קורדינטות
[Tel Aviv-Yafo] [cartographic material]	סותר:
S.l.] : [s.n.], 1970]	מו"ל:
.map ;114 x 84 cm 1	תיאור:
eng	שפה:
Map has no title	הערה:
Compiled and drawn by Survey of Israel - 1969, printed by Survey of Israel - February 1970. Ordered and revised by the Engineering Dept. Surveys - "of the Tel-Aviv-Yafo Municipality	
<a href="#">Gush Dan (Israel) -- Maps</a>	נושא:
<a href="#">Tel-Aviv (Israel) -- Maps</a>	
<a href="#">Jaffa (Tel-Aviv, Israel) -- Maps</a>	
<a href="#">Ramat Gan (Israel) -- Maps</a>	
<a href="#">Givatayim (Israel) -- Maps</a>	

© 2007 אוניברסיטת תל-אביב

אודות הספרייה לומדה העדפות משוב חיפוש מומחה

# Step 2 – Scanning



# Step 3 – Geo-referencing

Google Earth

קובץ ערוך תצוגה כלים חספי עזרה

חיפוש

טוס אל

חפוש עסק

חירות

טוס אל לדוגמה, 122.107162-, 37.407229

שכבת-על לתמונה חדש

שם: שכבת-על לתמונה ללא כותרת

קישור: דפדף... Jaffa Tel Aviv, 1935, 1=10,000\_1024\_768.jpg

שקופות:

אטום

תיאור תצוגה גובה רענן מיקום

צפון: 32.172679°

מזרח: 34.878021°

דרום: 31.935767°

מערב: 34.711652°

סיבוב: 0.0000

המר ל-LatLonQuad

התאם לגודל המסך

ביטול

אישור

© 2010 GIsrael  
Image © 2010 GeoEye  
© 2010 ORION-ME  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

ראשון לציון

תאריך תמונה: 2010/4/24

גובה מעל פני הים 25 מ' אורך 34.786001° רוחב 32.043311°

גובה מבט 17.31 קילומטרים

תצלומים

כבישים

# Using 0341 Attributes



## Record View

[Full Record View](#) [Short Record View](#) [MARC Tags](#)

[Add to My e-Shelf](#) [Save/Email](#) [Locate](#) [ILL Request](#)

Record 1 out of 1

All Locations: [All items](#)

Location on Shelf: [Geography Sub-Library](#)

Coded cartographic **a 12500 W34.755752 E34.851254 N32.129312 S32.022686**

Title: תל אביב-יפו, בני-ברק, רמת-גן, גבעתיים [חומר קרטוגרפי]

Electronic Format: [For image click here](#)

Published: [תל-אביב] : אגף המידות, ישראל, 1975

Description: 1 מפה : צבע ; 113 X86 ס"מ

Language: heb

Note: "עבד ושרטט ע"י אגף המידות, ישראל - 1974 ; הדפס ע"י אגף המידות, ישראל - אפריל 1975 (ד/6940) ; תקון פרטים חלקי - יוני 1974"

Subject: [Gush Dan \(Israel\) -- Maps](#)  
[Tel Aviv \(Israel\) -- Maps](#)  
[Jaffa \(Tel Aviv, Israel\) -- Maps](#)  
[Ramat Gan \(Israel\) -- Maps](#)  
[Givatayim \(Israel\) -- Maps](#)  
[Bene Beraq \(Israel\) -- Maps](#)

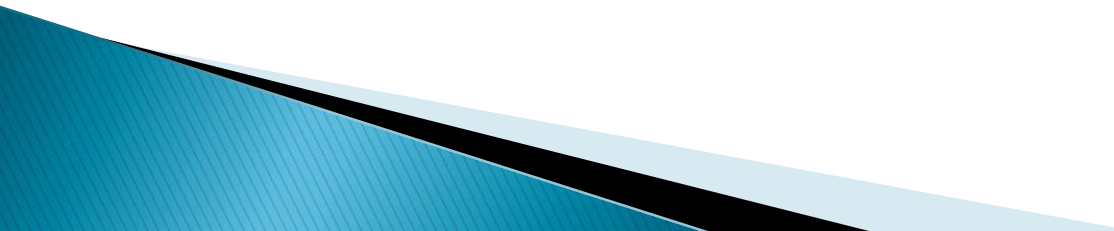
Add. Author: [ישראל, אגף המידות](#)

New-Catalog: 2010-03-March

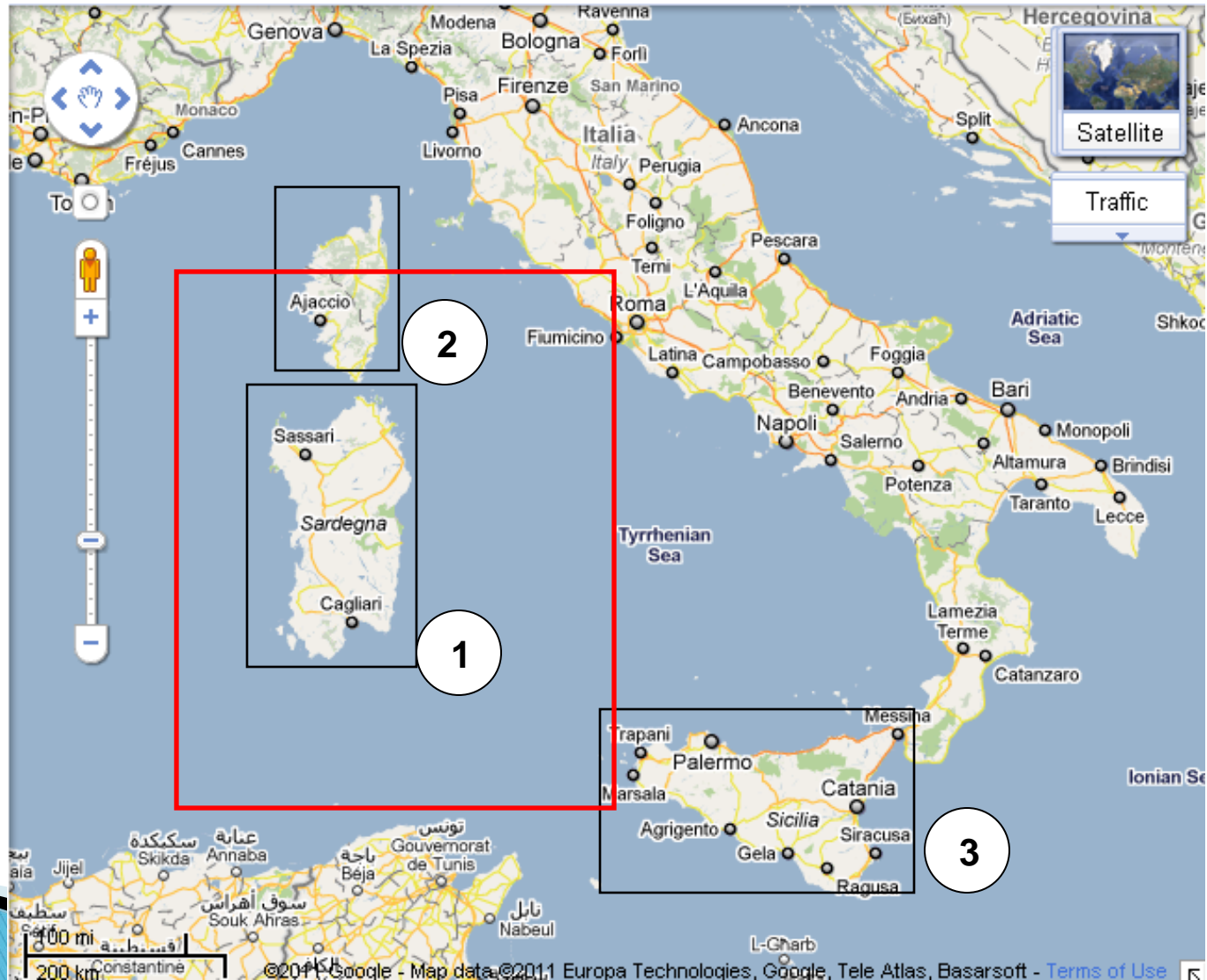
# Ranking



# Spatial Search Ranking

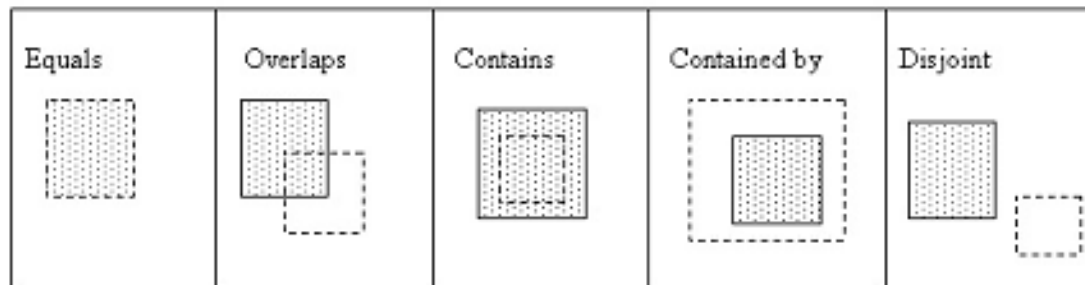
- ▶ One of the most important feature in every search engine is its ranking method
  - ▶ The maps that returned from a given query should be ranked by their relevancy
  - ▶ More general – How to rank spatial object ?
- 

# Spatial Ranking

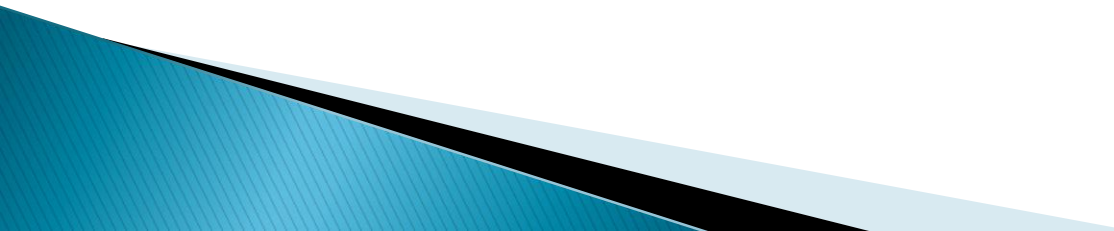


# Spatial Ranking

- ▶ Several spatial parameters should be taken into account:
  - Area of overlap
  - Area of non-overlap
  - Shape similarity



# Future Developments

- ▶ Implementing the selected spatial ranking method
  - ▶ Add advanced search feature
  - ▶ Integration to Primo
- 

# Thank You!

davidtal@post.tau.ac.il

<http://geography.tau.ac.il/en/>

Tel Aviv University Library  
The Department of Geography and The Human Environment