

Cataloguing and visualizing aerial imagery at the Institut Cartogràfic de Catalunya

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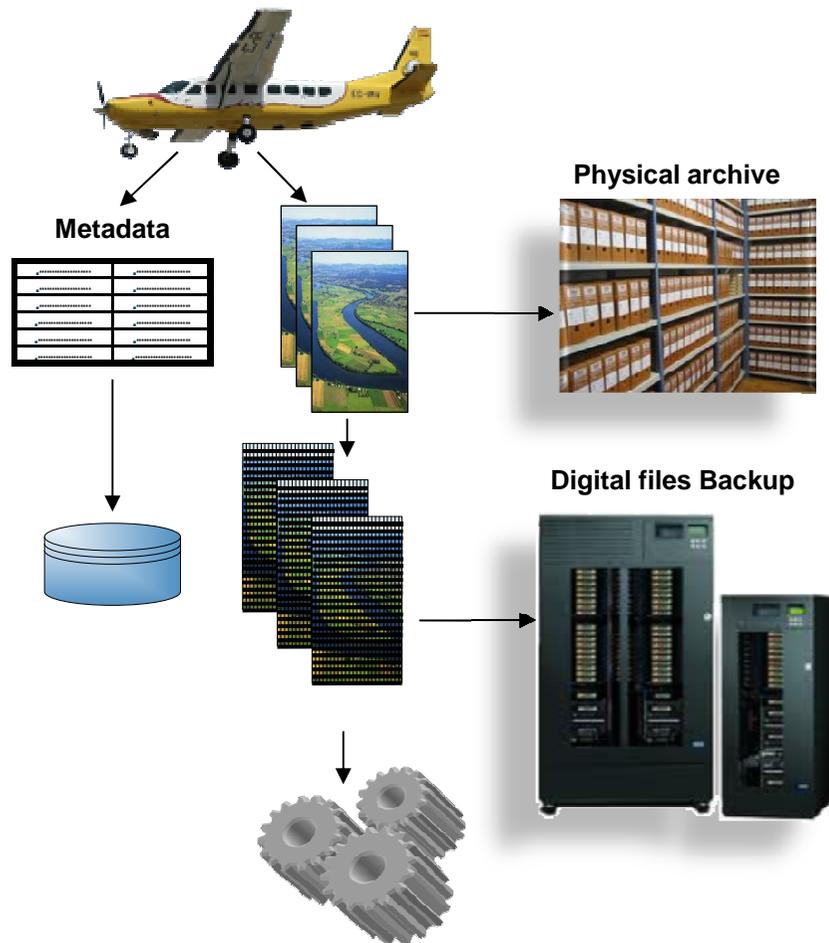
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Cataloging photogrammetric flights (I)



Analogical cameras

- Image negative was catalogued in a traditional way
- The metadata Data Base had information about the location of the physical file
- The images were scanned before going into production
- These images were stored on tapes for long term storage
- Little data processing was needed to meet the needs of the different production departments

Cataloging photogrammetric flights (II)



Digital cameras

- Image negative was no longer available
- New data was ready to go into production: no need to scan.
- The need of preprocessing data for different production departments was increased due to the different data structure of the DMC images
- The metadata Data Base had to be upgraded in order to store information on the digital location
- Catalogue was not “File Centered”

Previous image catalogs and production integration

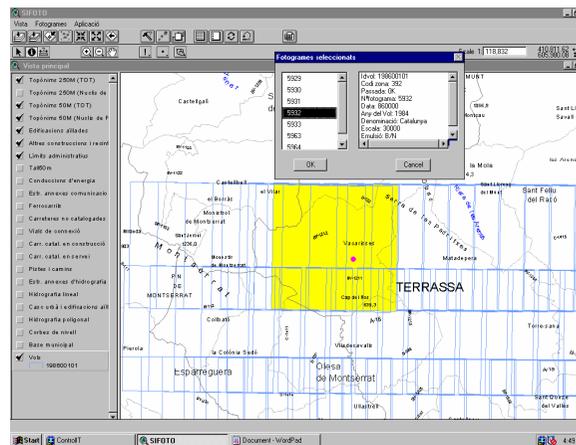
- Metadata flight catalog
 - Auxiliary information on the flights surveys using analog cameras
Code, Year, Flight Scale, Overlap, Author, Customer, Number of images, Camera, plane...
 - Information down to block/strip level (no image level)

Vol	Subcc	Any d	Denominació				Escala del v	Emulsió	Recol	Rec	Autor	Destinatari		Data de	Nom
-	10001	1	1963	Accessos a Barcelona				5000 B/N	60	0	CETFA	DGC			39
	IdBloc	Bloc	Passada	Data de	Fotograr	Fotogram	Full del MTN	Fotograma inici	Fotograma final	Arxiu GPS	Rolle				
	67433		10	863	2331	2338	447								
	67434		20	863	3178	3179	448								
	67436		21	863	3201	3208	420								
	67435		21	863	3201	3208	420								
	67437		33	863	2962	2968	420								
	67438		51	863	2850	2855	420								
+	10002	0	1963	Accessos a Barcelona C-246				12500 B/N	60	0	CETFA	DGC			42
+	10003	0	1965	Palma - Santa Ponça				5000 B/N	60	0	TFA	DGC			119
+	10004	0	1965	Sóller - Valldemosa				23000 B/N	60	30	TFA	DGC			33
+	10005	0	1965	Lleida - Tarragona - Barcelona (polígor				12000 B/N	60	30	CETFA	DGC			532
+	10006	0	1965	el Garraf				5000 B/N	60	0	CETFA	DGC			134
-	10007	0	1966	Llobregat - Besós				10000 B/N	60	30	CETFA	DGC			140

- No information on flight surveys using digital cameras
- No relation with the digital file

Previous image catalogs and production integration (II)

- Georeferenced image catalog
 - 70 % of the flight catalog
 - Information down to image level
 - Graphical exploitation of vector data for ArcView 3.0 and Avenue



- No information on flight surveys using digital cameras
- No relation with the digital file

Previous image catalogs and production integration (III)

- Scanned images stored on magnetic tapes
 - No quality control of image readability had been performed
 - Image files in non standardized formats
 - Proprietary formats, different formats and compressions,...*

- Catalog of scanned images
 - List of images per magnetic tape with auxiliary information on scanning data
 - No relation with the corresponding image of the flight surveys



Previous image catalogs and production integration (IV)

- Three different catalogs
- No direct correspondence with the different database registers
- No crossed verification
- No support for digital imagery
- No maintenance on the exploitation of the georeferenced metadata catalog
- No connection between data and metadata
- None of the catalogs were used for production purposes



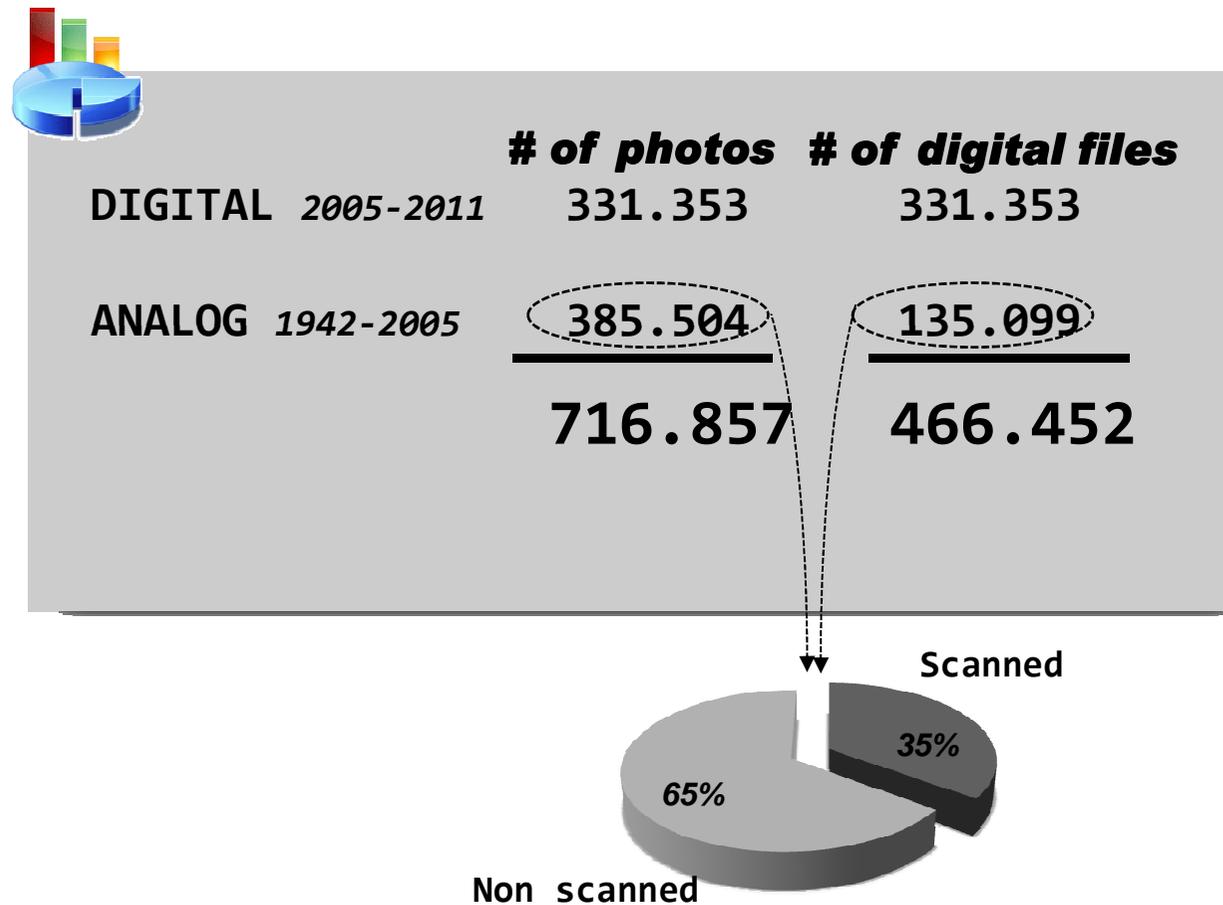
Aerial image inventory



	# of photos	# of digital files
DIGITAL 2005-2011	331.353	331.353
ANALOG 1942-2005	385.504	135.099
	716.857	466.452



Aerial image inventory



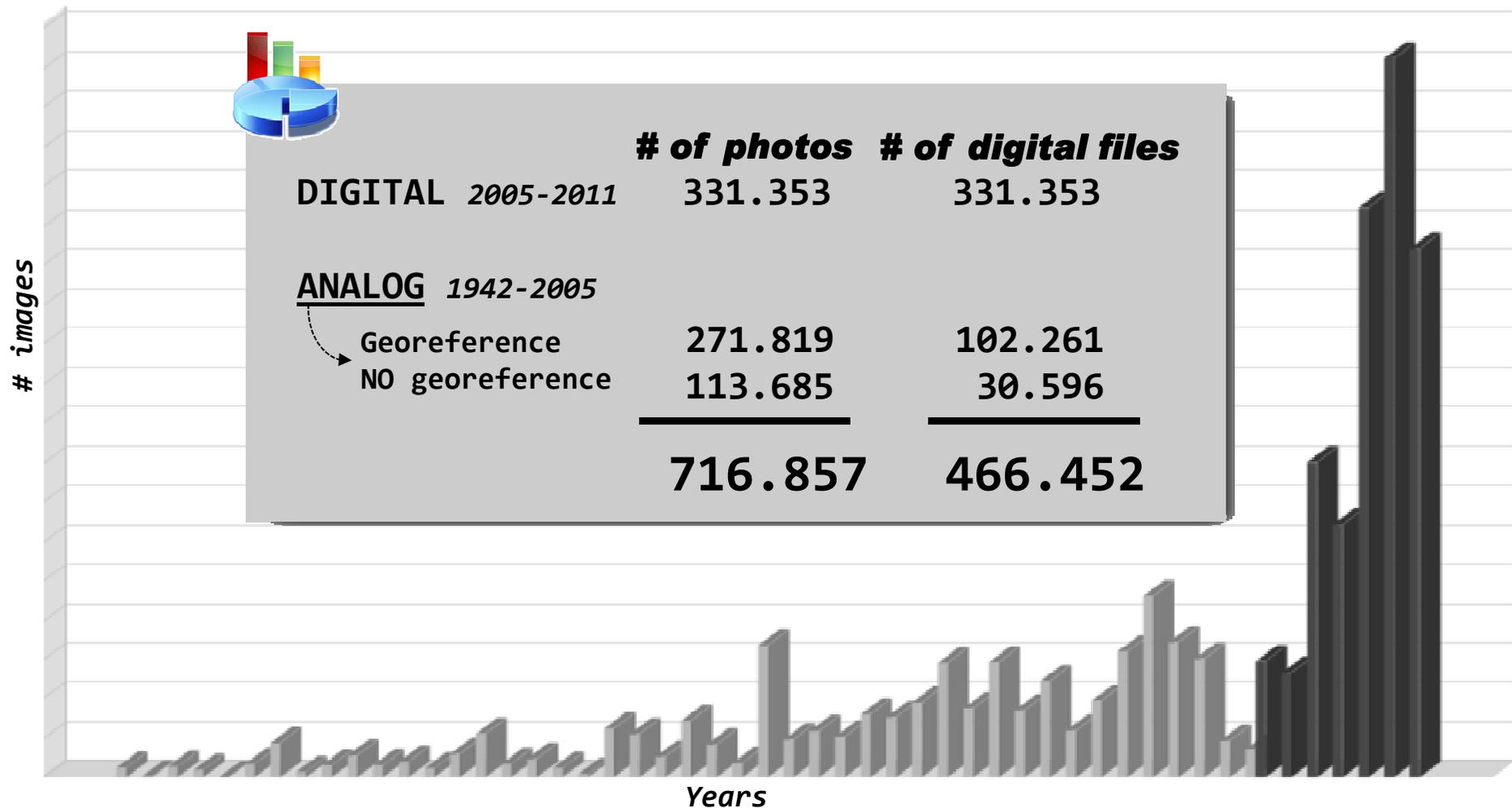
Aerial image inventory



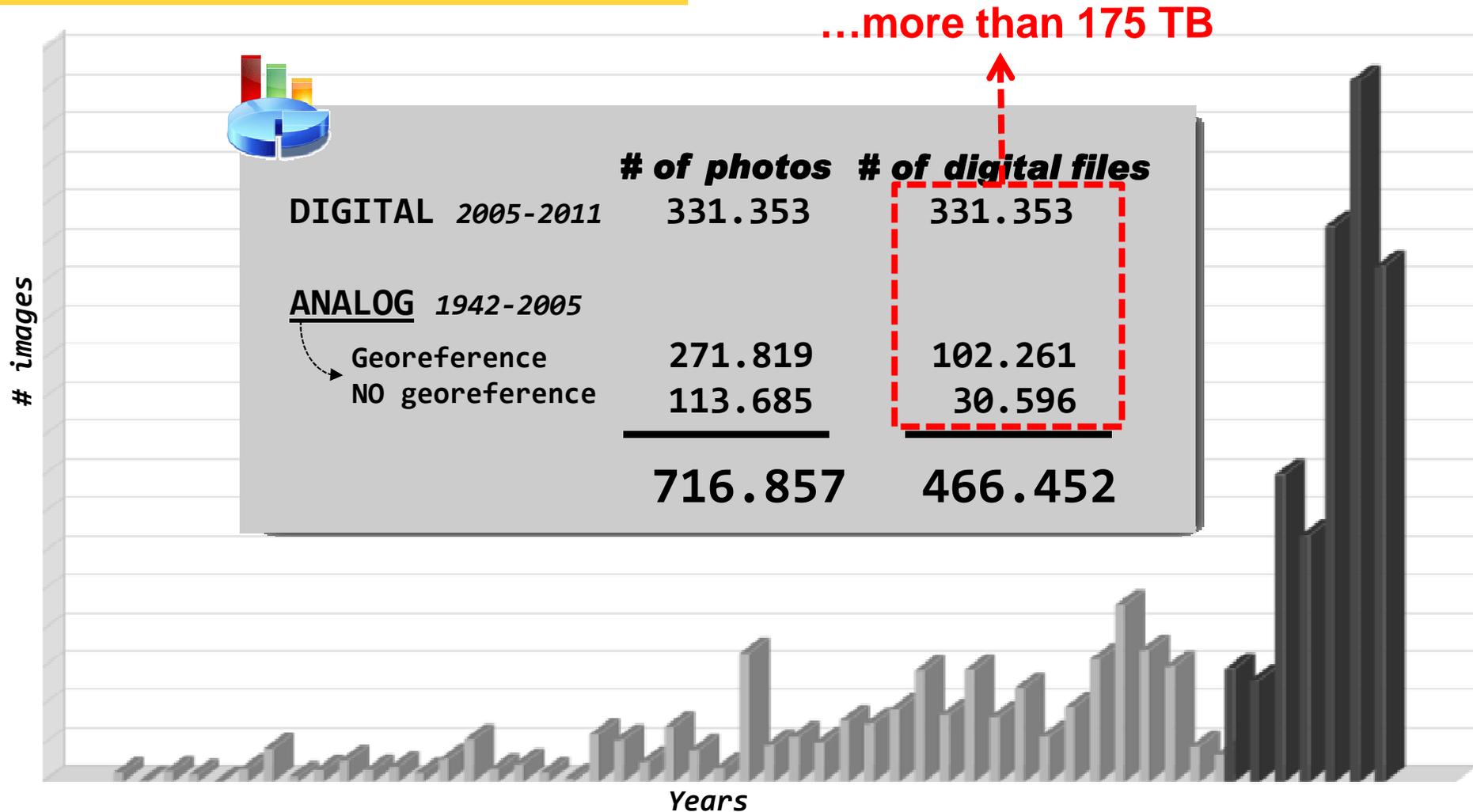
	# of photos	# of digital files
DIGITAL 2005-2011	331.353	331.353
<u>ANALOG</u> 1942-2005		
Georeference	271.819	102.261
NO georeference	113.685	30.596
	<hr/>	<hr/>
	716.857	466.452



Aerial image inventory



Aerial image inventory

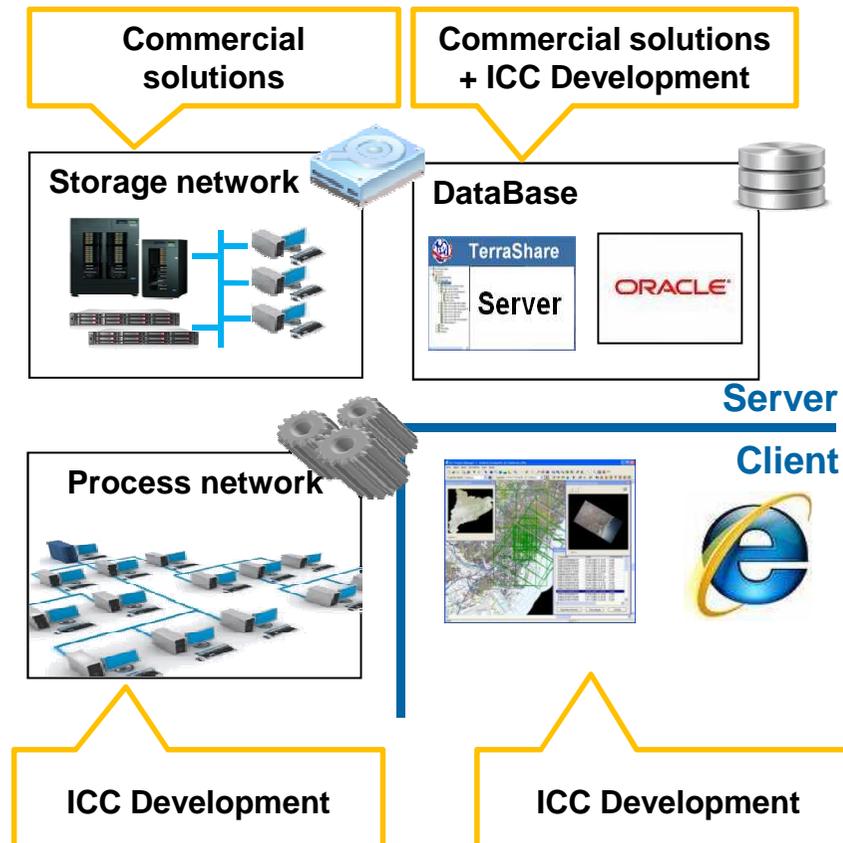


New approach to image cataloguing and exploitation

- Image file level
 - Granting readability of all ICC images
 - TIFF format transformation (Tiled, JPEG Comp. QF 95, Overviews)
 - Image files managed by a Storage Management solution
- Catalog level
 - Single data & metadata catalog (Unique relation between image file and its corresponding metadata)
 - Information cross-checked and verified
- Exploitation level
 - Graphical and alphanumerical searches
 - Visualization of on-line low-res imagery for all digital and scanned imagery
 - Automating data retrieval processes
 - Integration with production processes for both cataloguing and exploitation



New approach to image cataloguing and exploitation (II)



Client-Server architecture

Single Metadata & Data catalog

Two main storehouses in the server side

OnLine data storehouse: high speed disk

Managed data: automatic data retrieval and data distribution on managed servers

Direct connection to the processing network from the client without additional human intervention

ICC's applications is used in client side

Desktop exploitation

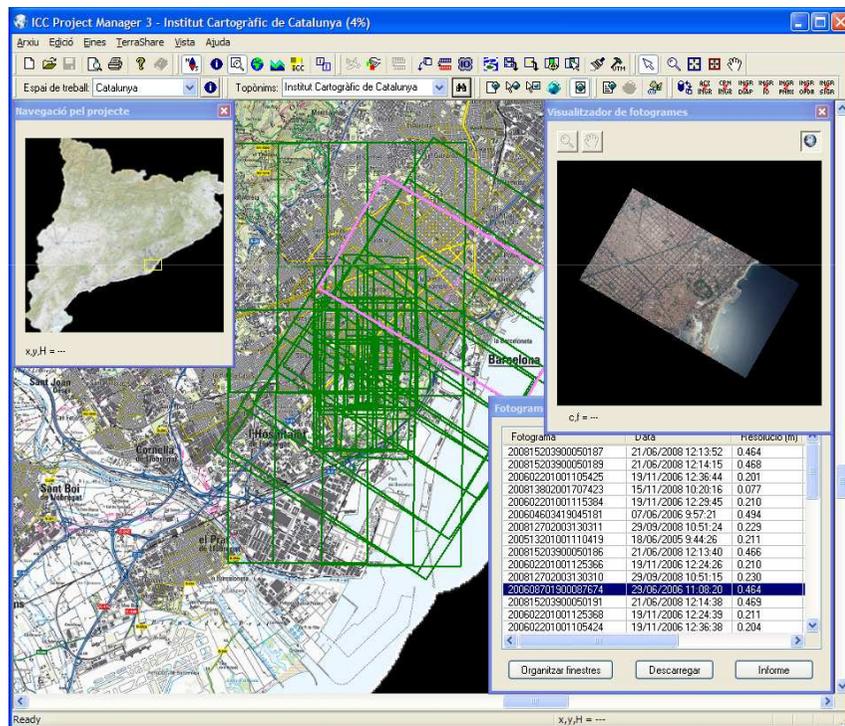
The application was initially created at ICC to manage photogrammetric flights

Integrates production tools with ICC Services:

- WMS visualization as background image*
- Connection with terrain height data*
- Internal geocoding tool*

Aerial imagery catalog integration

- Data ingesting*
- Data browsing and retrieval*
- Graphical and alphanumeric searches*
- Low-resolution image visualization*



DEMO



Desktop exploitation (II)

The application enables browsing throughout the logical structure as a file browser

Folder browsing

Display folder contents

Preview of the selected image

Auxiliary information of the selected file:

User metadata

Auxiliary files

Georeference

The application enables refined data downloading

Selection of the auxiliary files to download

Connection to the processing network for image conversion

georeferenced view is available by adding the files in the main window

The screenshot displays the TerraShare application interface. The main window shows a file browser with a tree view on the left and a list of files in the center. The selected file is previewed in a window below the list. A metadata table is also visible, showing various attributes and values for the selected file.

Concepte	Valor
Codi	2008029
TIPUS PROJECTE	16431.21
FLIGHT DATE	06/03/2008 12:11:10
GPS TIME	389471.173859
BLACK	050R
MIR 000	333
STRIP	5

Desktop exploitation (III)

Georeferenced mode

Image navigation

Metadata information

The screenshot displays the ICC Project Manager 3 - TerraShare (9%) application. The main window shows a georeferenced aerial photograph of a residential area. The interface includes a menu bar (Arxíu, Edició, Eines, Vista, Ajuda), a toolbar with various navigation and editing tools, and a search bar containing 'Topònims: Tossa de Mar'. Below the search bar is a map showing the georeferenced area with a pink polygon highlighting a specific region. The status bar at the bottom indicates 'Ready' and 'x,y,H = ---'.

Overlaid on the main window is the 'Visualitzador de fotogrames' (Image Viewer) window, which displays the selected aerial photograph. To the right of the image viewer is the 'Informació del fotograma' (Image Information) window, which provides detailed metadata for the selected image. The metadata is organized into sections: 'Fotograma' (Image), 'Format' (Format), and 'Fotograma' (Image).

The 'Informació del fotograma' window shows the following metadata:

- Fotograma: 200830601001070841CON (TSID:#BLADE01:TerraShare Or
- Imatge
- Imatge ID: mages\200830601001070841CON.TIF
- Format: Imatges Geotiff i Tiff
- Arxíu: \\Blade01\StoreHouse\PhotogrametricFlights\
- Mida: 1280 x 2304 (1.8 MB)
- Número canals: 3
- Cantonada oigent: Superior esquerra
- Bits pixel/canal: 8 (Entier sense signe)

The 'Fotograma' section shows a table of metadata:

Concepte	Valor
Metadades	
ICCFLIGHTCODE	2008306
ICCPROJECTCODE	1573466
FLIGHTDATE	04/10/2008 10:05:21
GPSTIME	554722,781217
BLOCK	TOSSA DE MAR
MNT5000	366
STRIPID	7

The metadata table is circled in red in the original image.

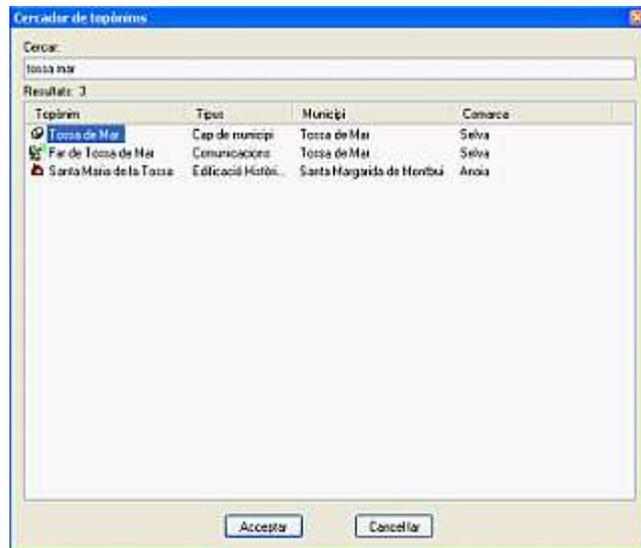
Desktop exploitation (IV)



Typing in a place name

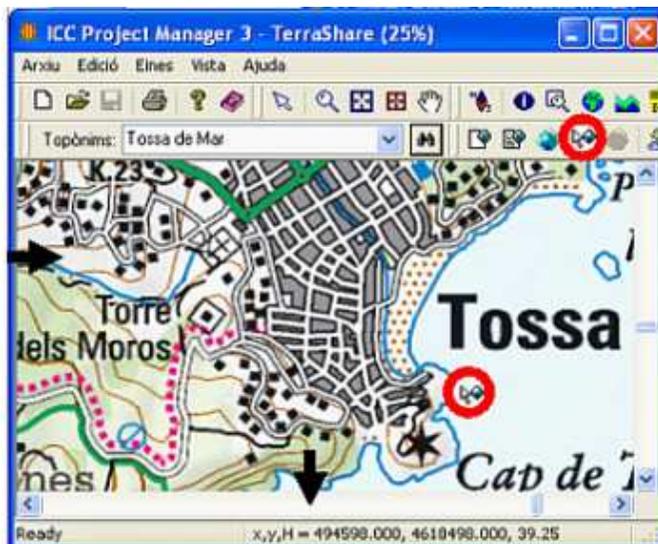
background imagery using ICC WMS services

Desktop exploitation (IV)



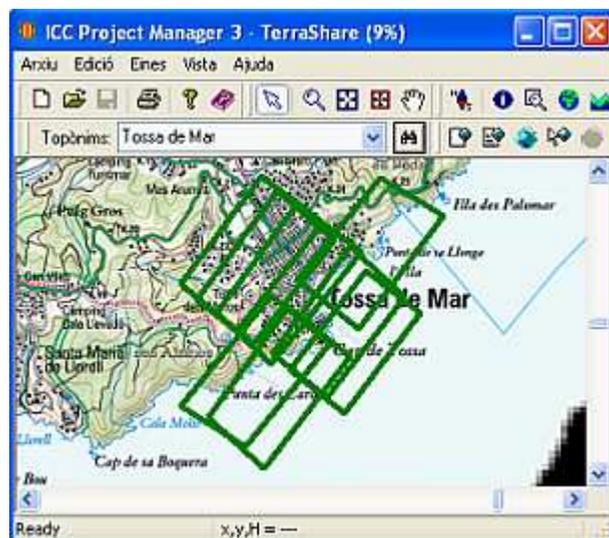
Selecting one of the suggested place names
place names though ICC geocoding tool

Desktop exploitation (IV)



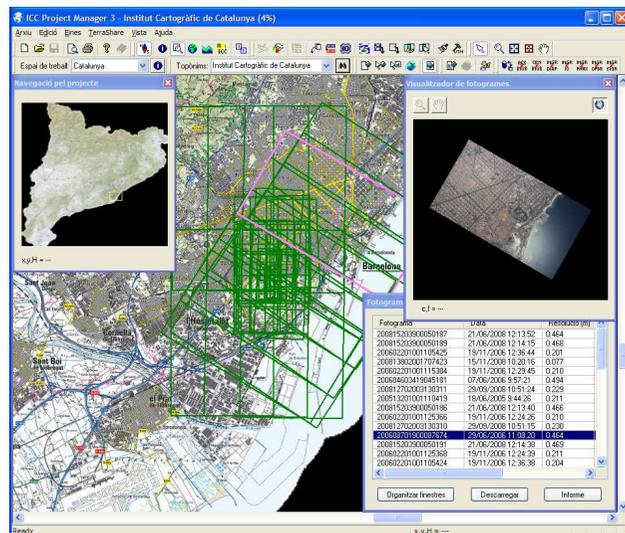
Selecting the exact desired location

Desktop exploitation (IV)



The results are shown over the map

Desktop exploitation (IV)



View low-res thumbnail & download the image

Automatic image request in background

Few minutes operation if not in cache

The user deals with logical location

Physical data handling is done by the system

Next Steps or... still active problems

- Not all the image negatives have been scanned (**250.000 images**)
 - Scanning projects must be included in our roadmap
- Not all the images have a digital georeference (**113.000 images**)
 - Georeferencing projects depending on the existing data
 - Digitizing flight plans*
 - Manual georeferencing of single images*
 - ...
- Fully automation of data management
- Web access to ICC's aerial image catalog



Conclusions

- Image accessibility
 - Access to more than 600.000 image register and increasing
 - Automatic access to more than 433.000 image files and increasing
 - Automatic management of more than 175 TB and highly increasing
 - Granting system scalability

- Integration into production workflows: Cataloguing and Exploitation

- Cataloguing digital files for long-term preservation



Thanks for your attention

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