NCMA Geospatial Data and NSDI

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NATIONAL CADASTRE AND MAPPING AGENCY S.A.

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155 62 Cholargos – Athens
Tel. +30 (210) 6505-636
NCMA S.A.
Organizational Structure

Supervising Authority: Ministry of Env.&Energy Administration: 7-member, Board of Directors

Units:
- Office of the President (1)
- Office of the Managing Director (1)
- Office of the General Manager (1)
- Scientific Council (2)
- Internal Auditing Unit (1)
- Communications & Public Relations Division (5)

Departments (9):
- Planning and Investment Projects (6)
- Legal Department (68)
- Human Resources Department (8)
- Finance Department (37)
- Administration Department (12)
- Operating Cadastre Department (100)
- Projects Department (55)
- Digital Systems, Services, and Product Promotion Department (49)
- Forest Mapping and Natural Environment Department (13)

Total number of personnel: 359
NCMA S.A.
Personnel (Total: 359 employees)

A) Distribution of personnel by specialty

B) Distribution of personnel by level of education

C) Distribution of personnel by age

D) Distribution of personnel by years employed in the Agency

1. Surveying Engineer
2. IT (Engineer - Scientist)
3. Engineer (Other) - Scientist
4. Lawyer
5. Economist
6. Employee

1. Primary
2. Secondary
3. Tertiary
4. Masters
5. Ph.D.

< 30
30-34
35-39
40-44
45-49
50-54
55-59
60-64
>= 65
NCMA Technology (Systems)

Data Center (Hardware)

- Power: >110 servers (4 IBM, 24 DB servers, 85 client servers)
- Storage space: >320 Terabytes
- High speed communications network
- Special protection “cage” (“Lampertz room”)
- Other equipment (Backup generators, UPS, …)
- Disaster Recovery Center

Software:

- Database systems: Oracle DB Server 10g, MS SQL 2005 & 2008
- GIS: ESRI Arc/GIS 8.2
- ERP: SAP
- Document management systems: Opentext DM

System’s operation specifications:

- Availability (time): >99,999%
- Concurrent users: >500
- Concurrent users (viewing services): >2,000
A) Electronic Services of the Hellenic National Cadastre

B) The National Cadastral Information System

C) Supporting public “suspension of “forest maps”
NCMA Products: Geodetic (HEPOS)

- **Purpose:** Support the cadastral surveying process and the operation of the cadastre. Coverage of the geodetic needs of the country.
- **System:** One Processing Center and 98 permanent stations receiving GPS signals.
- **Coverage:** Entire country
- **System:** HTRS07, HGRS ’87
- **Scale:** Few centimeters (RTK)
  - Few millimeters (post-processing)
- **Date of operation:** 2008 – (onwards)
- **Frequency / Policy of updating:** Continuous
- **Format:** PINEX, Compact RINEX
- **Compliance:** 100%
- **Metadata:** Ad hoc
- **Provision of data / services:**
  - Subscription (payment by time used)
  - Payment by order
- **Web:** [http://www.hepos.gr/?Lang=GR](http://www.hepos.gr/?Lang=GR)

HEPOS: Network of the permanent stations

Co-financed by EU
NCMA
Products: Orthophotomaps (Large Scale Orthophotomaps – LSO)

- **Purpose:** Support of:
  - Cadastral surveying
  - Operation of the cadastre
  - Other mapping needs of the country
- **Coverage:** Entire country
- **System:** HGRS ’87
- **Scale:** ~1:5.000 (GSD: 50 cm)
- **Accuracy:** RMSExy<1,41m (achieved<0,71m)
- **Date of creation:** 2007-2009
- **Frequency / Policy of updating:** Once
- **Format:** Jpeg2000
- **Compliance:** ~100%
- **Metadata:** Available in XML
- **Provision of data / services:**
  - Free for the Public Sector
  - Free through Web applications
- **Web:** http://gis.ktimanet.gr/wms/ktbasemap/default.aspx

Indicative sample of LSO orthophotomap
NCMA

Products: Orthophotomaps (Very Large Scale Orthophotomaps –VLSO)

- **Purpose:** Support of:
  - Cadastral surveying
  - Operation of the cadastre
  - Other mapping needs of the country
- **Coverage:** 58 Urban centers (Athens, Thessaloniki, prefecture capitals, …)
- **System:** HGRS ’87
- **Scale:** ~1:1.000 (GSD: 20 cm)
- **Accuracy:** RMSE<sub>xy</sub><0,28m (achieved: 0,17m)
- **Date of creation:** 2007-2009
- **Frequency / Policy of updating:** Once
- **Format:** Jpeg2000
- **Compliance:** ~100%
- **Metadata:** Available in XML
- **Provision of data / services:**
  - Free for the Public Sector
  - Free through Web applications
- **Web:** [http://gis.ktimanet.gr/wms/ktbasemap/default.aspx](http://gis.ktimanet.gr/wms/ktbasemap/default.aspx)

Indicative sample of VLSO orthophotomap

Co-financed by EU: 🇪🇺 🇬🇷 🇪🇺 🇬🇷
NCMA

Products: Orthophotomaps (Very Large Scale Orthophotomaps –VLSO)

- **Purpose:** Support of:
  - Cadastral surveying
  - Operation of the cadastre
  - Other mapping needs of the country
- **Coverage:** 58 Urban centers (Athens, Thessaloniki, prefecture capitals, …)
- **System:** HGRS ’87
- **Scale:** ~1:1.000 (GSD: 20 cm)
- **Accuracy:** RMSExy<0,28m (achieved: 0,17m)
- **Date of creation:** 2007-2009
- **Frequency / Policy of updating:** Once
- **Format:** Jpeg2000
- **Compliance:** ~100%
- **Metadata:** Available in XML
- **Provision of data / services:**
  - Free for the Public Sector
  - Free through Web applications
- **Web:** [http://gis.ktimanet.gr/wms/ktbasemap/default.aspx](http://gis.ktimanet.gr/wms/ktbasemap/default.aspx)

Co-financed by EU: 🇪🇺 🇬🇷 🇪🇺
NCMA Products: Orthophotomaps (Large Scale Orthophotomaps 25 –LSO25)

- **Purpose:** Support of:
  - Cadastral surveying
  - Operation of the cadastre
  - Other mapping needs of the country

- **Coverage:** Entire country

- **System:** HGRS ’87

- **Scale:** ~1:1.250 (GSD: 25cm)

- **Precision:** RMSExy <0,35 m (achieved 0,18m)

- **Date of creation:** 2014-2016

- **Frequency / Policy of updating:** Once

- **Format:** Jpeg2000

- **Compliance:** ~100%

- **Metadata:** Available in XML

- **Provision of data / services:**
  - Currently available only to agencies that have employees authorized to manage classified material.
  - To everybody (after de-classification)
NCMA
Products: Elevation (Digital Elevation Model–LSO)

- **Purpose**: Creation of orthophotomaps for the development and operation of the Hellenic Cadastre (byproduct). Coverage of the other cartographic needs of the country.
- **Coverage**: Entire country
- **System**: HGRS ’87
- **Scale**: ~1:5,000
  (Grid size: 5 m)
- **Date of creation**: 2007-2009
- **Frequency / Policy of updating**: Once
- **Format**: ESRI Floating Point Grid
- **Compliance**: ~100%
- **Metadata**: Available in XML
- **Provision of data / services**:
  - Free to the Public Sector
NCMA

Products: Elevation (Digital Surface Model–VLSO)

- **Purpose:** Creation of orthophotomaps for the development and operation of the Hellenic Cadastre in the urban centers (byproduct). Coverage of the other cartographic needs of the country
- **Coverage:** Urban centers (Athens, Thessaloniki, prefecture capitals, …)
- **System:** HGRS ’87
- **Scale:** ~1:1.000
  (Grid size: 0.8 m)
- **Date of creation:** 2007-2009
- **Frequency / Policy of updating:** Once
- **Format:** ESRI Floating Point Grid
- **Compliance:** ~100%
- **Metadata:** Available in XML
- **Provision of data / services:**
  - Free to the Public Sector

Indicative sample of Digital Surface Model (DSM) (VLSO)

Co-financed by EU:
NCMA
Products: Elevation (Digital Elevation Model–LSO25)

Indicative sample of Digital Elevation Model (DEM) (LSO25)

A) Indicative rural area

• **Purpose:** Creation of orthophotomaps for the development and operation of the Hellenic Cadastre (byproduct). Coverage of the other cartographic needs of the country.

• **Coverage:** Entire country

• **System:** HGRS ’87

• **Scale:** ~1:1.250
  (Grid size: 2 m)

• **Date of creation:** 2014-2016

• **Frequency / Policy of updating:** Once

• **Format:** ESRI Floating Point Grid

• **Compliance:** ~100%

• **Metadata:** Available in XML

• **Provision of data / services:**
  o Currently available only to agencies that have employees authorized to manage classified material.
  o To everybody (after de-classification)

B) Indicative urban-suburban area

(road-bridge-fields)

Co-financed by EU:
NCMA

Products: Cadastral maps

- **Purpose:** Registration and maintenance of real property rights in the country. Fulfillment of the INSPIRE requirements.
- **Coverage:**
  - Present: Areas of the 1st and 2nd Generation of Cadastral Surv. Projects
  - Future: Entire country
- **System:** HGRS ’87
- **Scale:**
  - 1:1,000 & ~1:1,250 (Urban-built areas)  
    - RMSExy <0,56 m (achieved 0,20 m)
  - 1:5,000 (Rural & Other areas)  
    - RMSExy <1,41 m (achieved 1,10 m)
- **Date of creation:** 1999-present
- **Frequency / Policy of updating:** Continuous
- **Format:** Shape files
- **Compliance:** ~100%
- **Metadata:** Available in XML
- **Provision of data / services:** To everybody

Indicative sample of a cadastral map for an urban area
NCMA
Products: Cadastral maps

Areas of Cadastral Surveying Programmes

- **Purpose:** Registration and maintenance of real property rights in the country. Fulfillment of the INSPIRE requirements.
- **Coverage:**
  - Present: Areas of the 1st and 2nd Generation of Cadastral Surveying Programmes
  - Future: Entire country
- **System:** HGRS ’87
- **Scale:**
  - 1:1.000 & ~1:1.250 (Urban-built areas)
    - RMSExy <0,56 m (achieved 0,20 m)
  - 1:5.000 (Rural & Other areas)
    - RMSExy <1,41 m (achieved 1,10 m)
- **Date of creation:** 1999-present
- **Frequency / Policy of updating:** Continuous
- **Format:** Shape files
- **Compliance:** ~100%
- **Metadata:** Available in XML
- **Provision of data / services:** To everybody
NCMA
Products: Collaborations

A. **Hellenic Military Geographical Service**

- **Compilation of the 1945/60 orthophotomap**
- **Purpose:** Creation of the basemap for the compilation of the “forest map” of the country (necessary for the development of the Hellenic National Cadastre).
- **Coverage:** Entire country
- **System:** HGRS ’87
- **Scale:** ~1:5,000 (GSD: 1 m)
- **Accuracy:** <10 m. (Achieved: ~6 m)
- **Date of creation:** 2008-2009
  (Original photos taken in 1945)
- **Frequency / Policy of updating:** Once
- **Format:** TIFF
- **Compliance:** ~100%
- **Metadata:** Available in XML
- **Provision of data / services:**
  - Through HMGS
- **Web:** [http://gis.ktimanet.gr/wms/forestssuspension/default.aspx](http://gis.ktimanet.gr/wms/forestssuspension/default.aspx)
NCMA
Products: Collaborations

A. *Hellenic Military Geographical Service*

- Compilation of the 1945/60 orthophotomap
- Carrying-out aerial photography projects and de-classification of collected cartographic material
NCMA
Products: Collaborations

A. Hellenic Military Geographical Service

B. Ministry of Environment and Forest Agencies

- Compilation of “forest maps”
- Support of “public suspension” of “forest maps”
  http://gis.ktime.net.gr/wms/forestsuspension/default.aspx

Indicative extract of “forest map” (“public suspension”)

Co-financed by EU:
EKXA
Products: Collaborations

A. Hellenic Military Geographical Service

B. Ministry of Environment and Forest Agencies

- Compilation of “forest maps”
- Support of “public suspension” of “forest maps”
  http://gis.ktimanet.gr/wms/forestssuspension/default.aspx
- Accurate delineation of the outer borders of the continental areas of the NATURA 2000 Network

Accurate delineation of the NATURA 2000 area borders

Co-financed by EU:

- Original border
- Accurate border

NATURA 2000 areas in Peloponnese
NCMA
Products: Collaborations

A. Hellenic Military Geographical Service

B. Ministry of Environment and Forest Agencies

C. Ministry of Rural Development and Food
   • Digitization of past land consolidation and land distribution maps (to be used as supportive material during cadastral surveying) (in co-operation with “AGROGI”)
   • Use of LPIS data in cadastral surveying (compilation of cadastral maps) (in co-operation with “OPEKEPE”)

Indicative topographic plan of land distribution (digitized)

Co-financed by EU:

NCMA
Products: Collaborations

A. **Hellenic Military Geographical Service**

B. **Ministry of Environment and Forest Agencies**

C. **Ministry of Rural Development and Food**

D. **Ministry of Finance**

- **Compilation of the base-map for delineating the “shore” of the country (Regional Administrations of Public Property - RAPP)**
- **Purpose**: Support cadastral surveying
- **Coverage**: Entire coastal zone, “navigable rivers” and “large lakes”
  Buffer zone: 300 m
- **Content**: Orthophotomap (Color+NIR), DTM and “Preliminary Borderline of the shore”
- **System**: HGRS ’87
- **Scale**: ~1:1.000 (GSD : 25 cm, DTM: 1m)
- **Date of creation**: 2008-2009
- **Frequency / Policy of updating**: Once
- **Provision of data / services**: RAPP

Co-financed by EU:

NCMA
Products: Collaborations

A) CORINE Land Cover 2012 - Greece

B) Specialized photo-interpretation software used to create the CORINE Land Cover data sets

A. Hellenic Military Geographical Service
B. Ministry of Environment and Forest Agencies
C. Ministry of Rural Development and Food
D. Ministry of Finance
E. European Environmental Agency
  • Compilation of the CORINE Land Cover datasets for 2000, 2006 and 2012. Upcoming the compilation of the next version (2017-2021)
NCMA
Products: Collaborations

Adjustment of the HEPOS permanent stations network

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- «Provision of special consultation services to NCMA about HEPOS» (AUTH)
NCMA Standards

Wide use of standards and standardization

A. Specifications of data

- The NCMA follows the guidelines and practices of international agencies and organizations (UN, FIG, OGC, USGS, JRC, ...)

B. Operation of the systems

- Use of SSL encryption standards to secure the integrity in transferring data and information through IT and Internet

C. Quality control

- Use of standards:
  - ISO 19113
  - ISO 19114
  - ISO 19138
  - ISO 2859
  - FGDC GPAS-Part 3
  - ISO 2859-2 (for determining the sample sizes)

Adjustment of the HEPOS permanent stations network