Economic Cooperation Organization

Presidency Islamic Republic of Iran
Plan and Budget Organization

National Cartographic Center(NCC)

3rd Meeting of ECO Geomatics Committee

IRAN National Report on Geomatics and Spatial Information Management

18 Oct. 2021 - Tehran/IRAN

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Review of main activities in Geo information production & Management in IRAN

- Geodesy and land surveying
- Hydrographic Survey & Tidal affairs
- Aerial mapping and Spatial Surveying
- GIS & Spatial Data Infrastructure
- Cartography & National Atlases
- Disaster Management
- Technical Supervision and Quality Control
- Iranian Society of Surveying Engineers(Non-Governmental)
- IT Activities
- Technical services
- Planning, Budget, Research and Standards
- Public & International Relations
- Cooperating & Collaborating between NCC and other Organizations
- Councils & Committees

Geodesy and land surveying

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Geodesy and land surveying

Main activities

- Implementation of Fundamental Geodesy Networks to provide National Coordinate Reference Frame. The Fundamental Networks divide in to different types:
  - **1. Precise Leveling Network**
  - **2. Gravity Network**
  - **3. Iranian Permanent Geodynamic and GNSS Network**
- Providing technical reports and papers
- International activities and cooperation with domestic and foreign scientific centers

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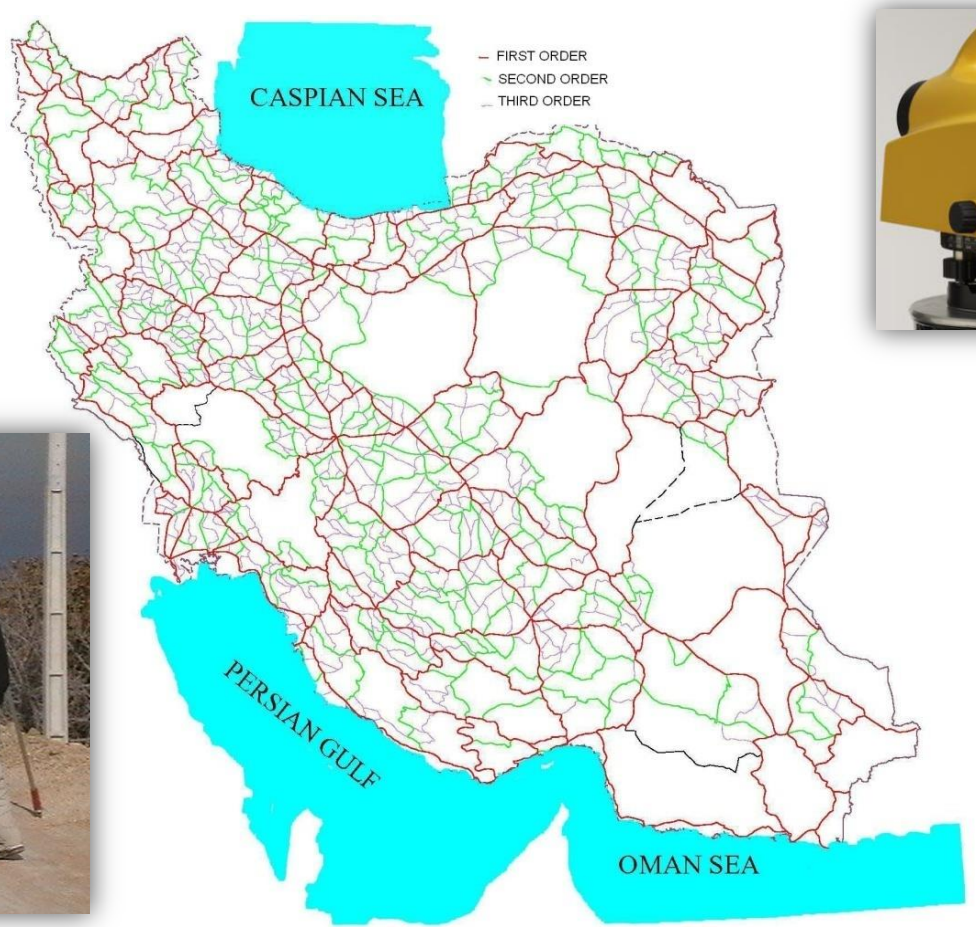
Implementation of Precise Leveling Networks in different orders

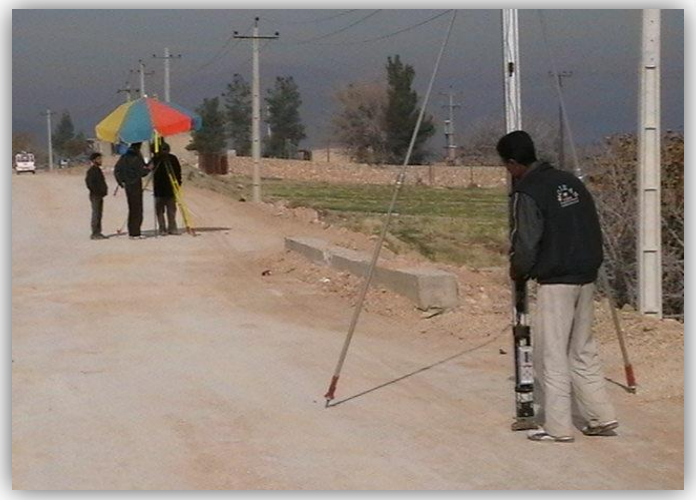
Geodesy and land surveying

• Measurements of the 1st order leveling network include more than **33,000 km**, carried out from **1980 up to 1996** using optical levels. After that, this measurements were repeated **in 2001** and were completed in **2009** using new digital levels and has been updated up to now.

• 2nd Order : **26000 km**

• 3rd Order : **25000 km**





Absolute and Relative Gravimetric Networks (Zero, 1st , 2nd and 3rd order)

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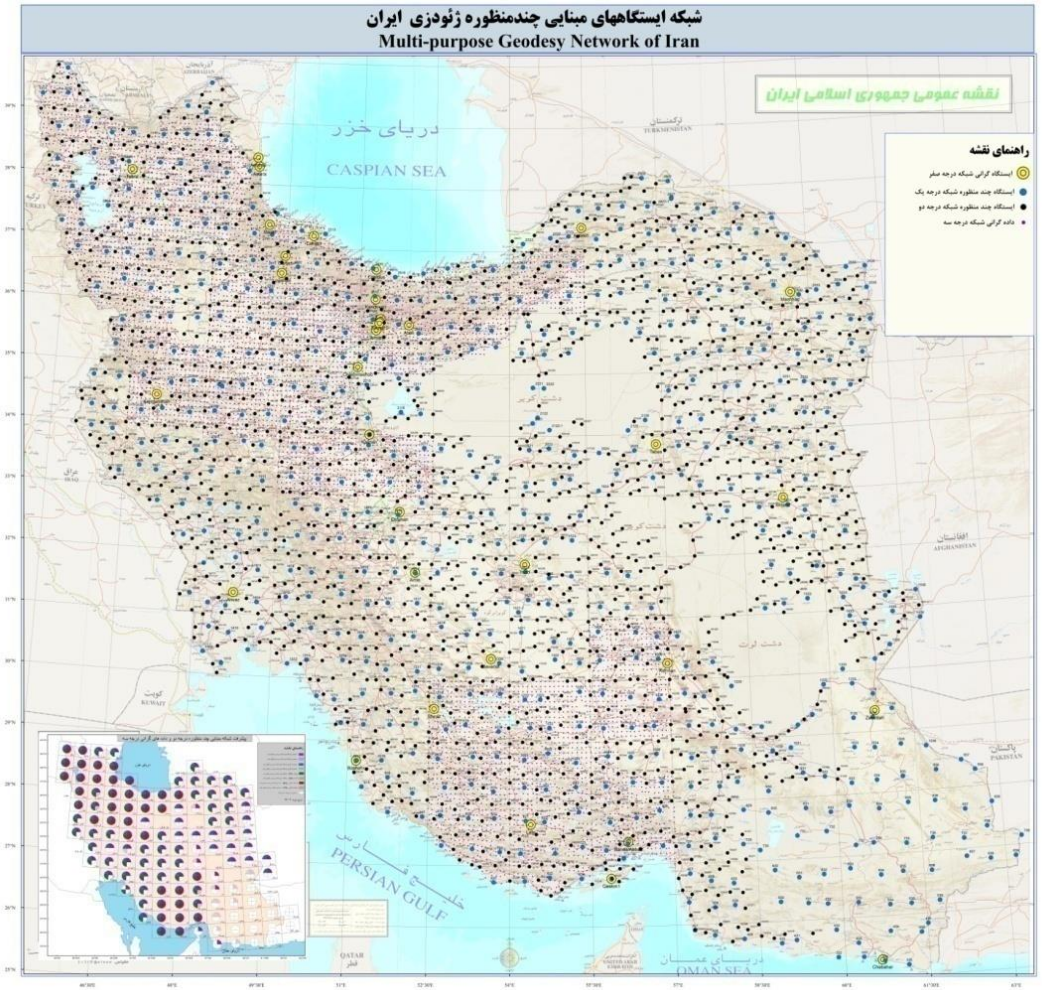
Geodesy and land surveying

- Zero-order gravity network of Iran designed in 2000, including 36 stations, measured absolute gravimeters in 1-2 microgal level of uncertainty.

- 1st order gravity network of Iran consists of 670 stations on 55km
- 2nd and 3rd order gravity networks were designed in 2008 which have 2100 and 22400 stations, respectively
- National gravity calibration line including 15 stations all observed in absolute sense and used for calibrating the relative gravimeters each year



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Iranian Permanent geodynamic and GNSS Network (IPGN)

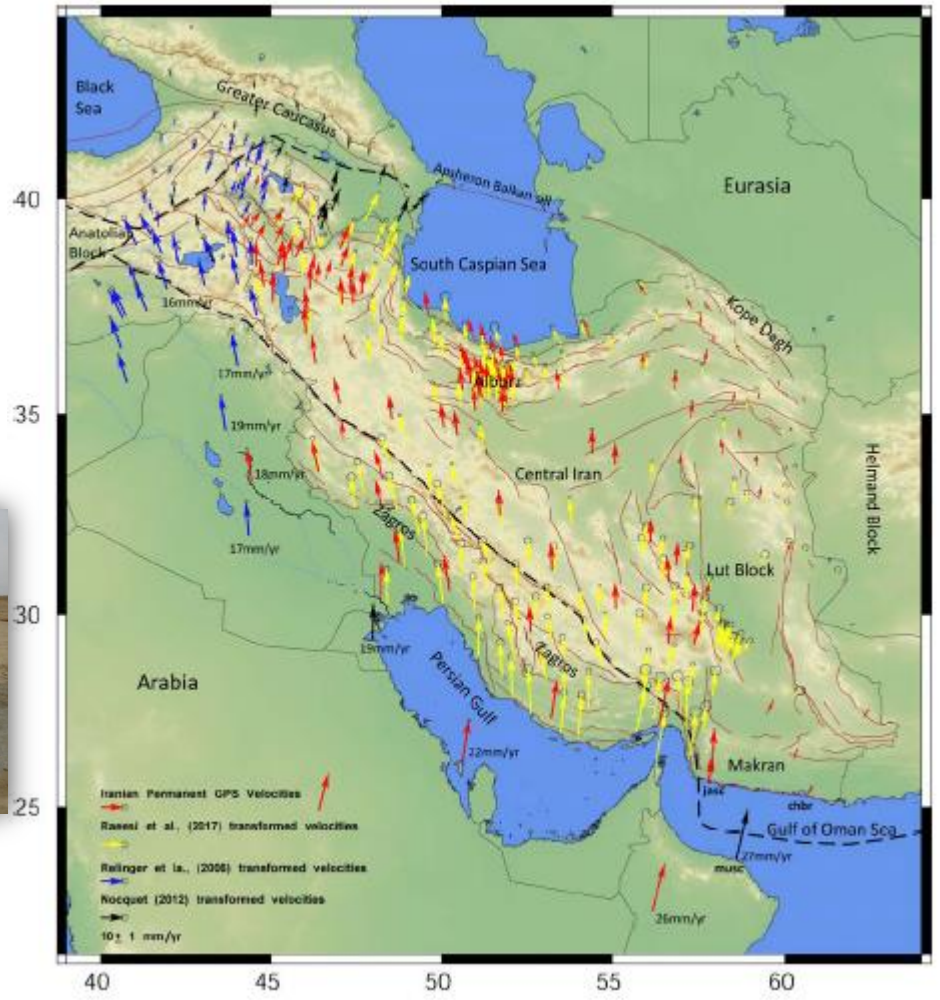
Geodesy and land surveying

Goals:

- Better understanding of tectonic deformation
- Estimation of potential for future hazards
- Promoting scientific knowledge
- National Positioning Reference Frame
- RTK services (Hoda CORS Network)

To support tectonic deformation monitoring, the permanent stations are distributed in a way to:

- cover the entire country
- cover densely populated areas



Other main activities

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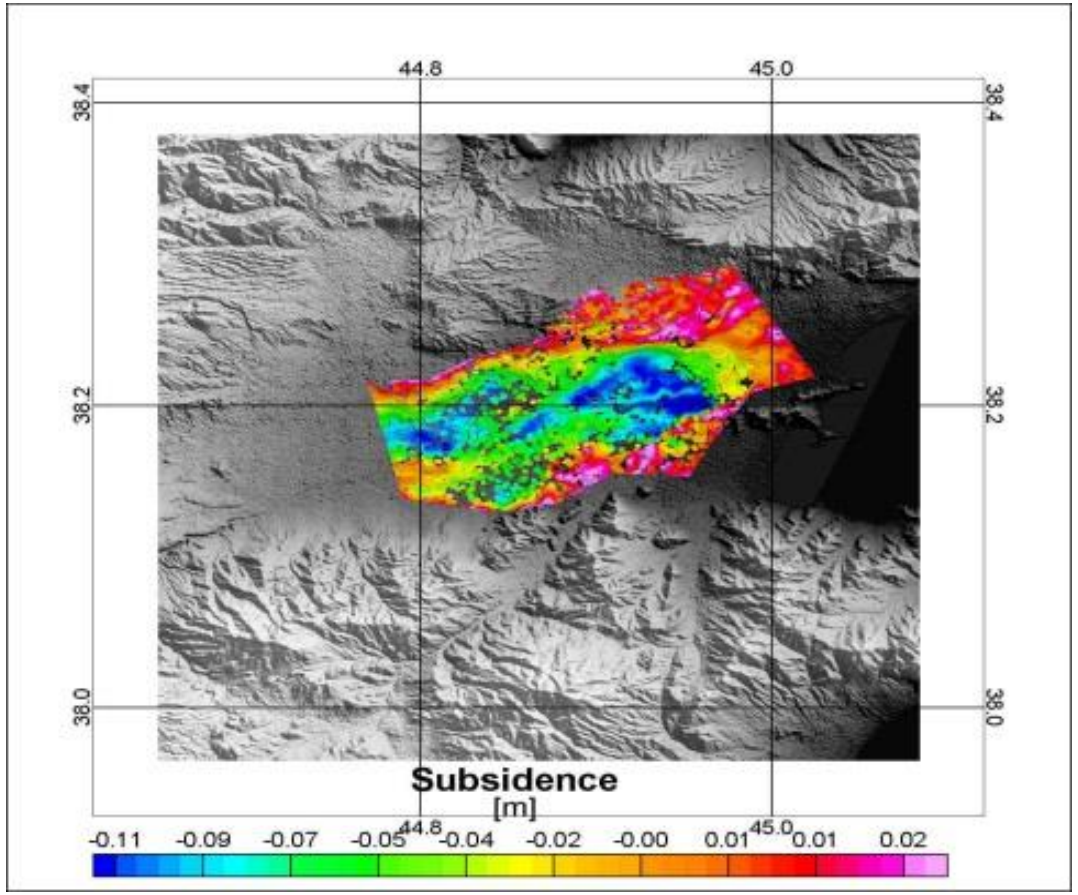
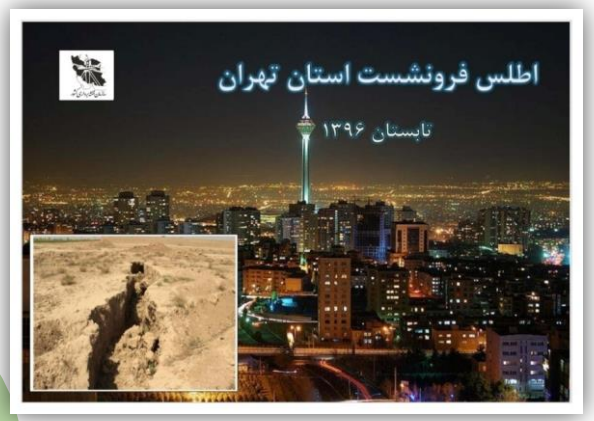
Geodesy and land surveying

- Introduction of the new Iranian Height System IRHS2014 and revision of the old height system IRHS1998
- Detecting subsidence areas based on InSAR technique for disaster management





Other main activities

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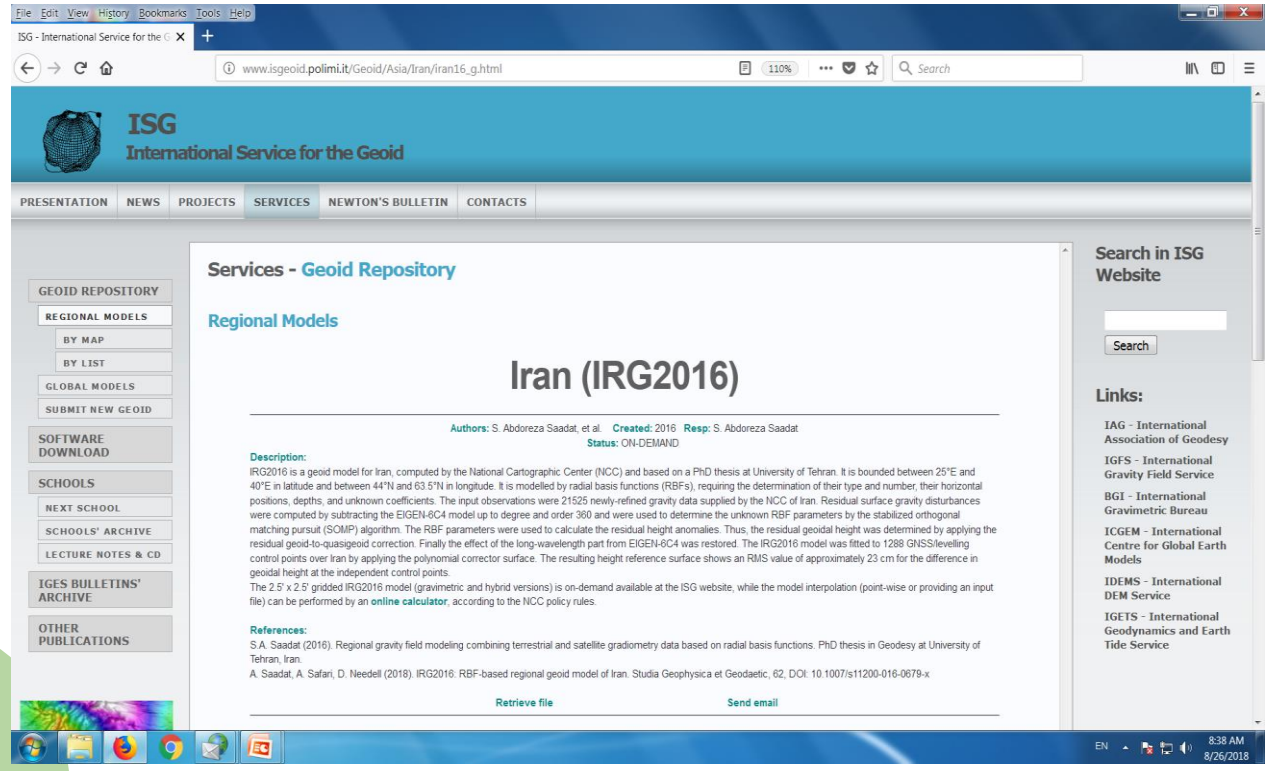
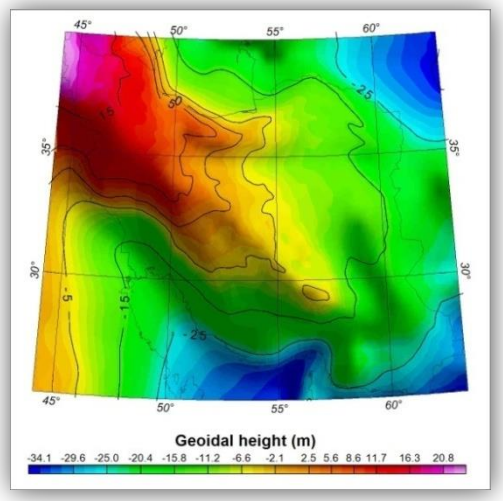
Regional gravity field recovery

- Providing Iranian Regional Geoid Model IRG2016

- Absolute gravity measurement in collaboration with the University of Strasbourg, France

Geodesy and land surveying





https://IRG2016.ncc.gov.ir

Other main activities

Geodesy and land surveying

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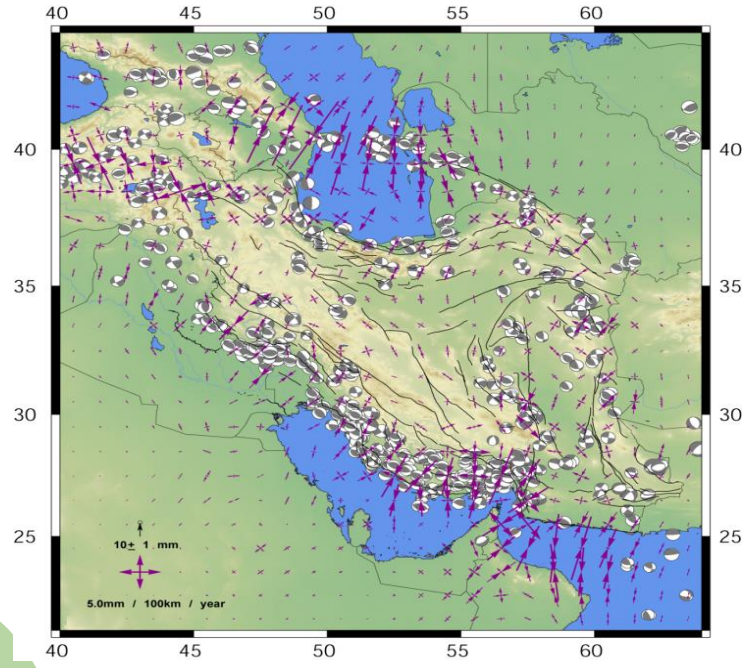
Introduction of the new Iranian Geodetic Datum IRGD2017 and revision of the old geodetic datum IRGD2010

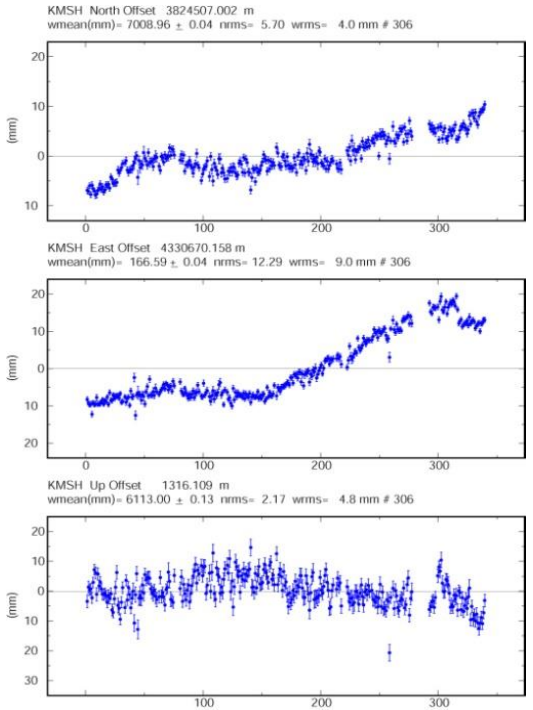
- Providing DGNSS /RTK services for real-time positioning

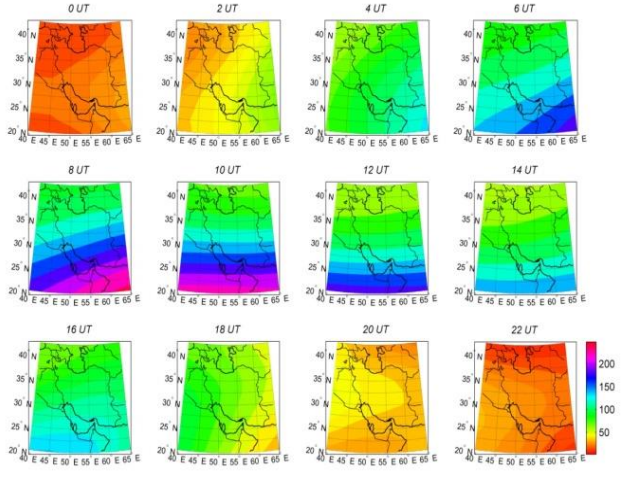
- Crustal monitoring for geodynamic and disaster management

- Determining Iranian Regional Ionosphere Model (IR-RIM)



Geodetic strain rate of Iran





Hydrography & Tidal affairs

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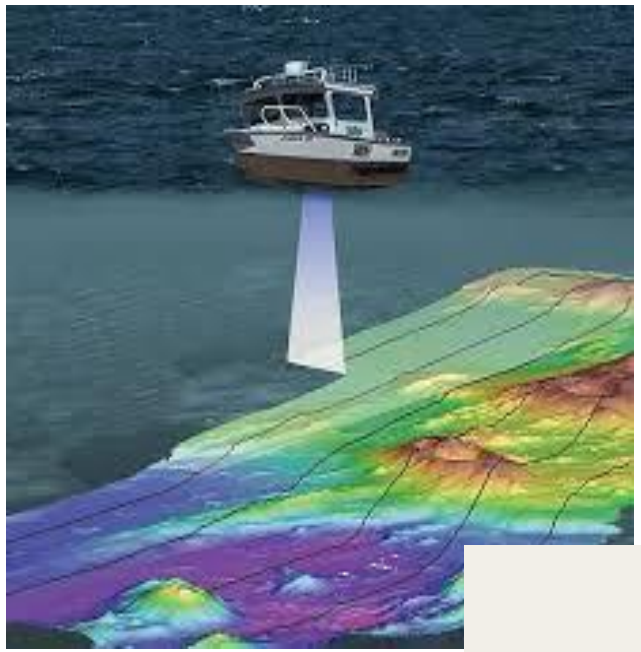
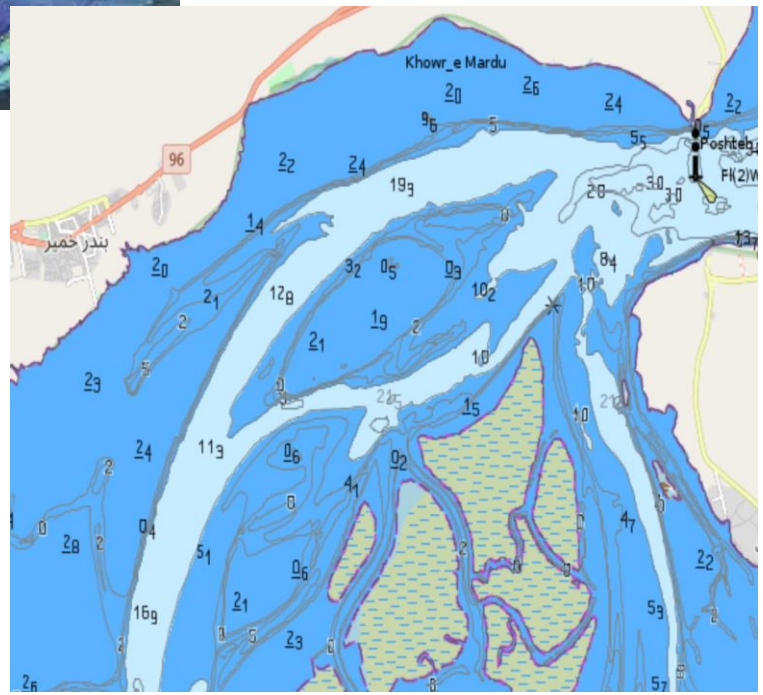
Hydrography & tidal modeling

Aiming to ensure:
- maritime safety
- marine environmental protection
- climate studies
- Tsunamis
- coastal and marine resource management





IHO International Hydrographic Organization

UNESCO United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

(IRINHC) I.R.I National Hydrographic Committee

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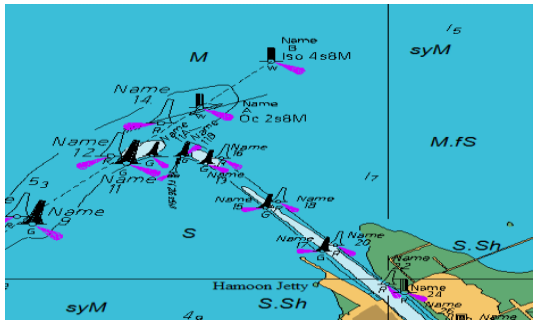
Hydrography & tidal modeling

- Hydrography and Production, Updating and Publishing of Marine navigational charts from the seas(Persian Gulf, Oman & Caspian Sea) around the country



- Using well-equipped vessels with single and multi-beam echo sounders, *side scan sonar, Magnetometer, … according to the latest* IHO standards

- Production of hundreds of navigational charts, international publication of 92 charts and annual sales of more than one hundred thousand copies to users to ensure maritime safety

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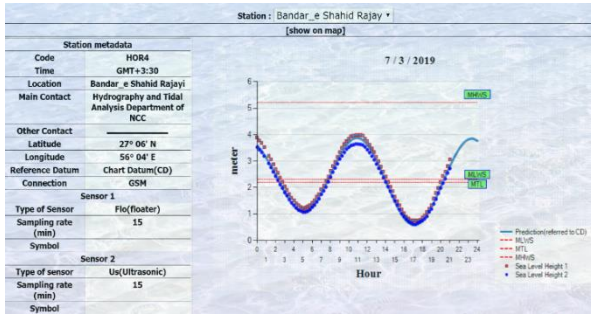
Hydrography & tidal modeling

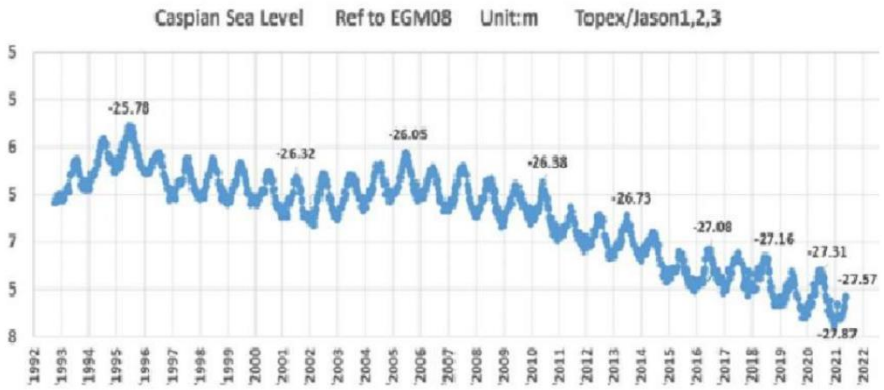
- Monitoring, modeling and forecasting sea level using satellite and coastal Tide Gauge Data



- Twenty permanent Tide-gauge stations on the shores of the Persian Gulf, the Sea *of Oman and the Caspian Sea*

- Sea level monitoring for tsunamis and hurricanes

- Annual tidal forecast and publication through website and mobile App



Aerial mapping and Spatial Surveying

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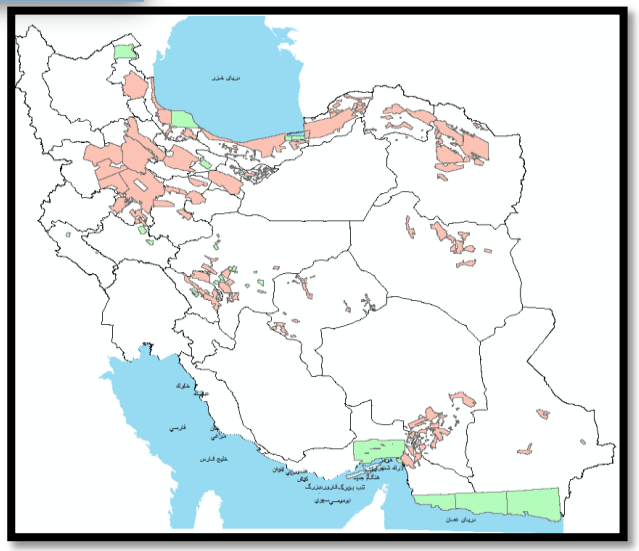
- Aerial Photography
- Digital Topographic Map Compilation in 1:25000 scales
- Digital Topographic Map Compilation for Cities
- Image processing & Digital Elevation Model (DEM)

Photogrammetry Department

Aerial Photography

- **Carrying out covered Imaging of country**
- **Aerial Photography for Cadastral map planes**
- **Carrying out Imaging Operations of Agricultural Lands**



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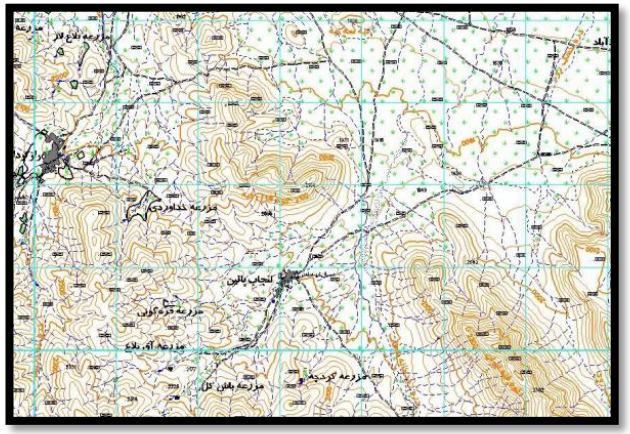
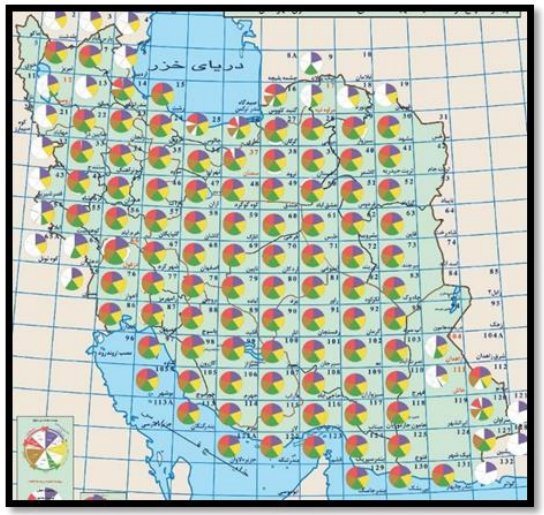
Digital Topographic Map Compilation

GIS & Spatial Data Infrastructure

Digital Topographic Map Compilation in 1:25000 scales :

- *Updating of these based maps are in progressing*





Digital Topographic Map Compilation for Cities :

- *Updating of these maps are in progressing*

Image processing & Digital Elevation Model (DEM)

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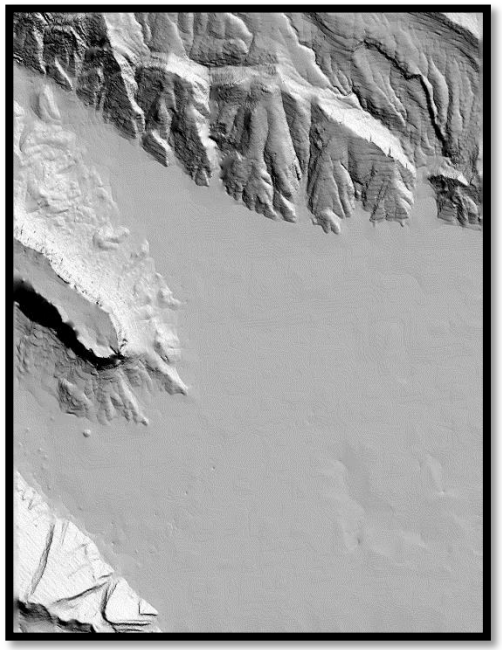
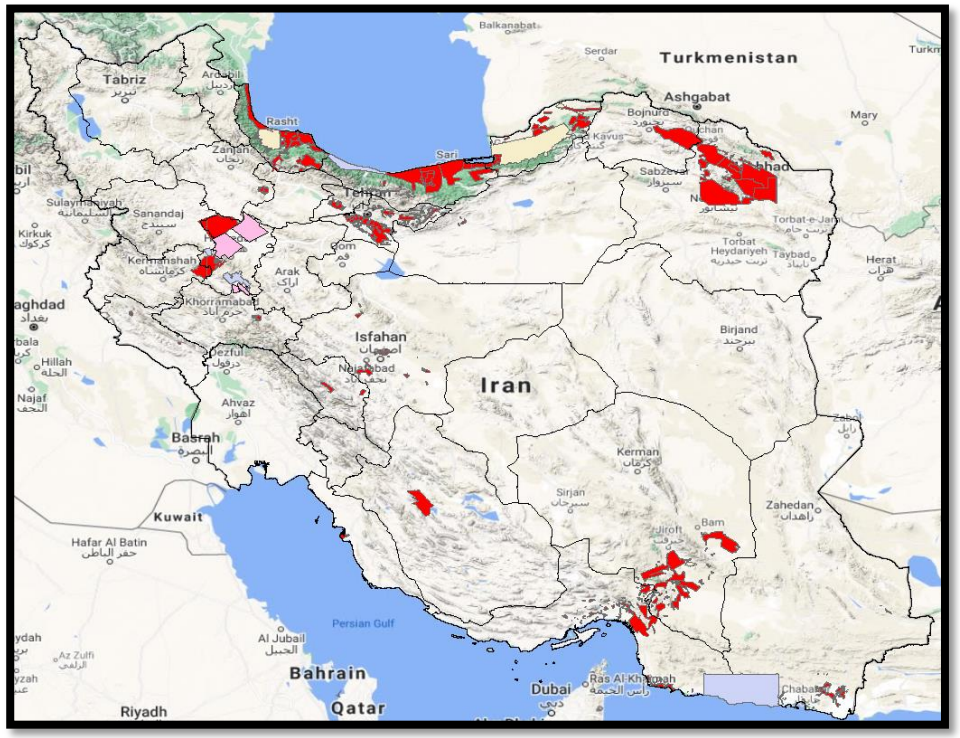
Photogrammetry Department

Geo-referenced and geometrically correction:

- Digital Elevation Model of whole country based on 1:25000
- Ortho Photo Covered maps in 1:25000 scales
- Ortho Photo in 1:2000 scales of Agriculture Lands





GIS & Spatial Data Infrastructure

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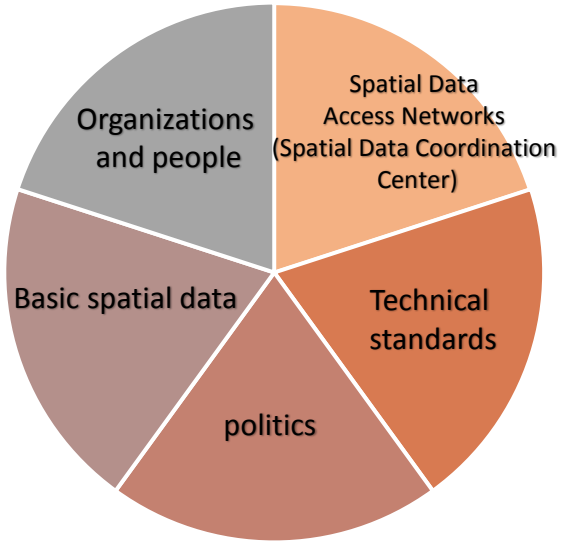
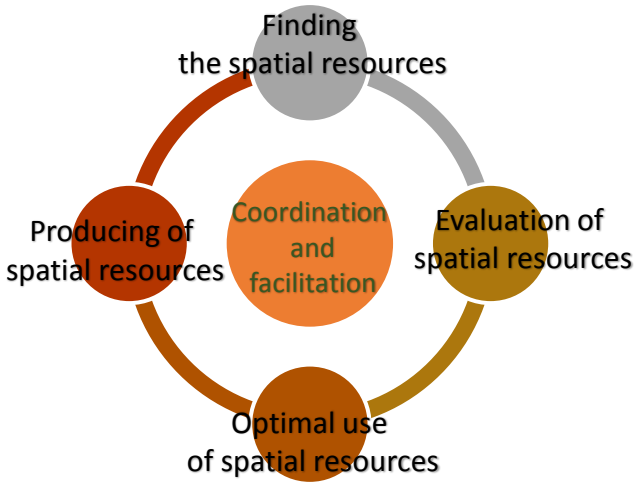
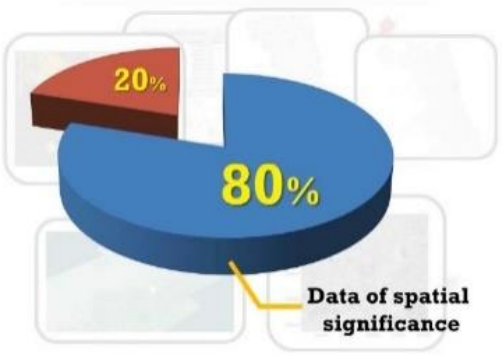
GIS & Spatial Data Infrastructure

Spatial Data Infrastructure

- ✓ increasing the volume of in production data
- ✓ Spatial data challenges
- ✓ Optimal use of data by data sharing
- ✓ Solution: Using the SDI







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Access networks

Clearinghouse or Spatial data coordination network

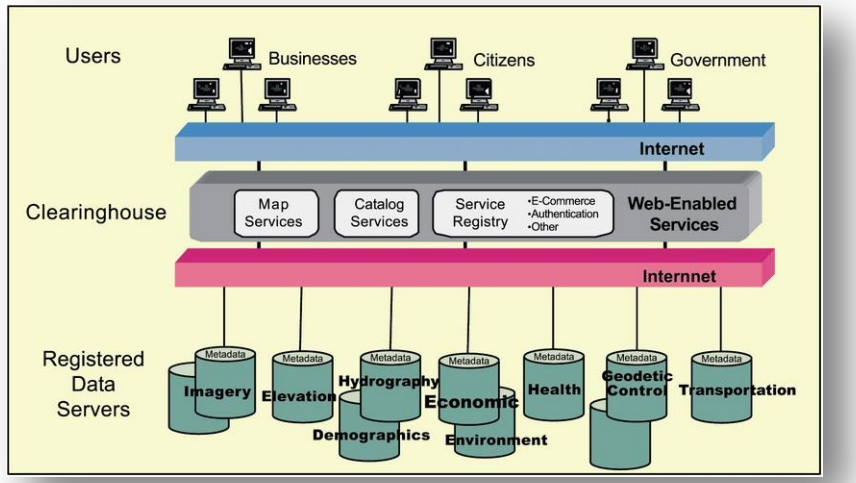
- ✓ Clearinghouse is one of the most important components of SDI to access spatial data from various sources via the Internet.

Attracting the participation of stakeholders

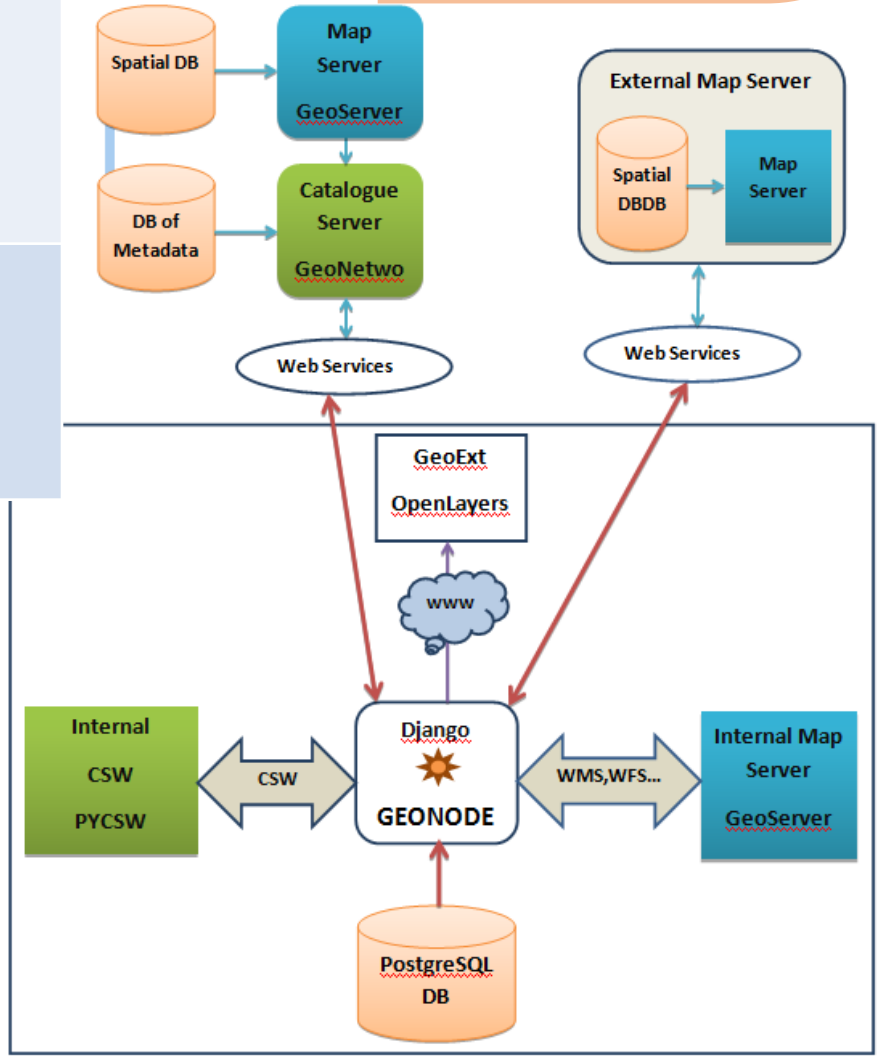
- ✓ Failing to receive the original data from responsible devices
- ✓ Ease of spatial data sharing by the stakeholders
- ✓ Providing comprehensive educational documents and videos

Meeting the needs of users

- ✓ Ease of access to required spatial data
- ✓ Assigning the latest available version to users through the stakeholders



GIS & Spatial Data Infrastructure



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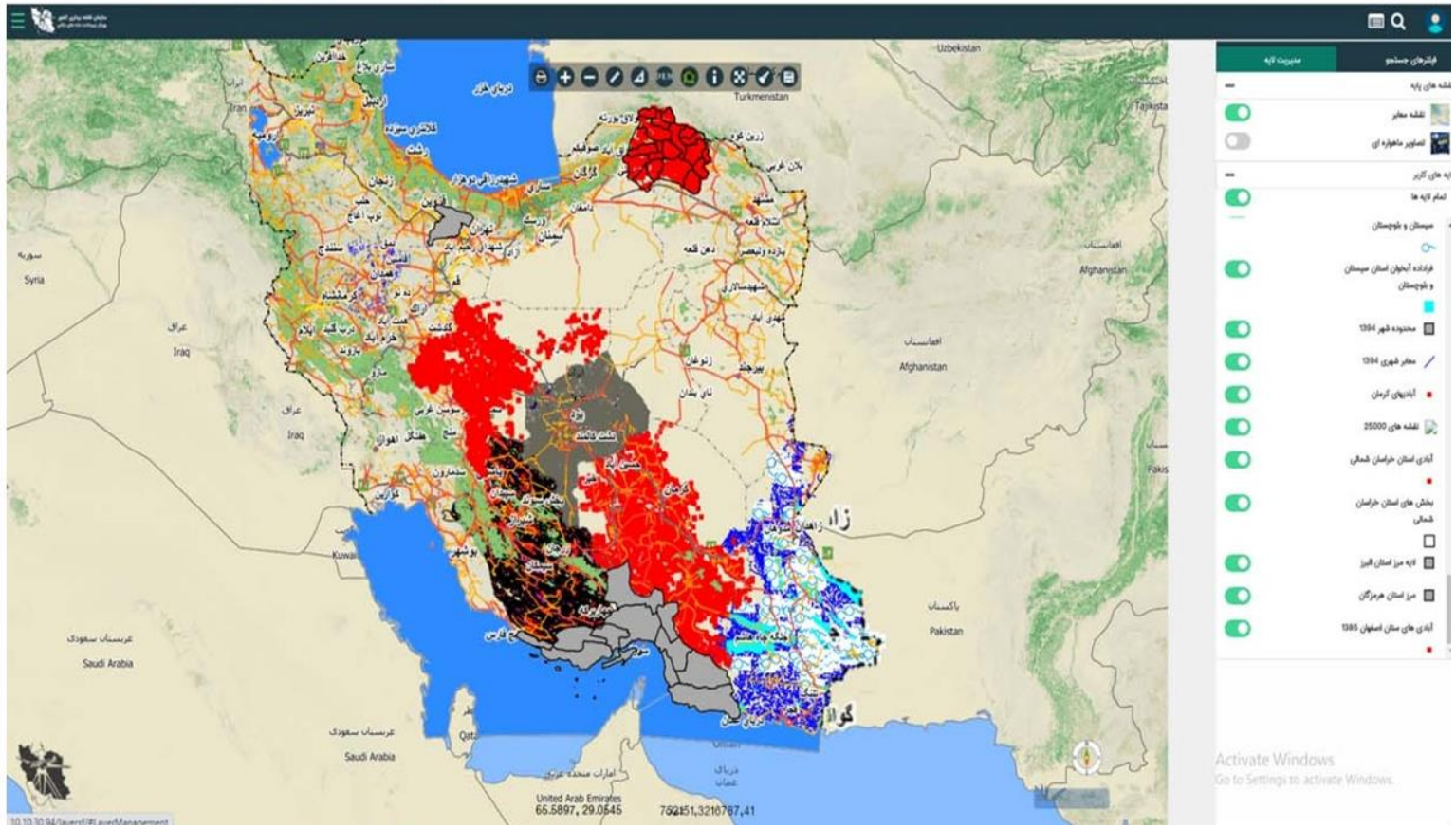
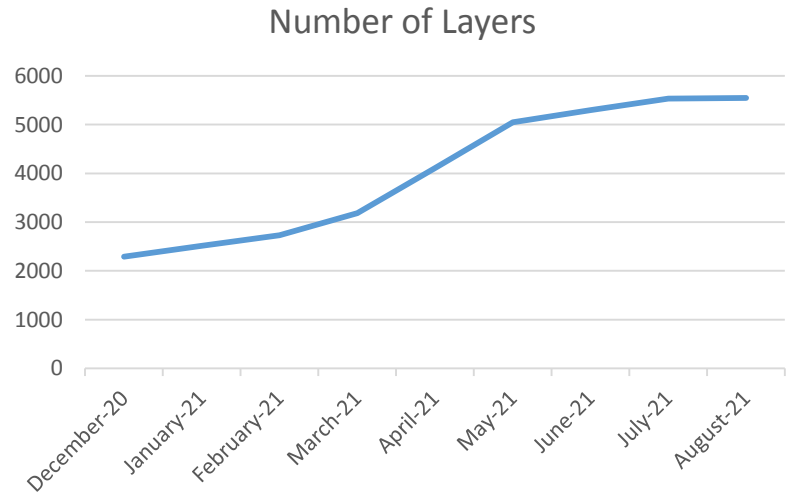
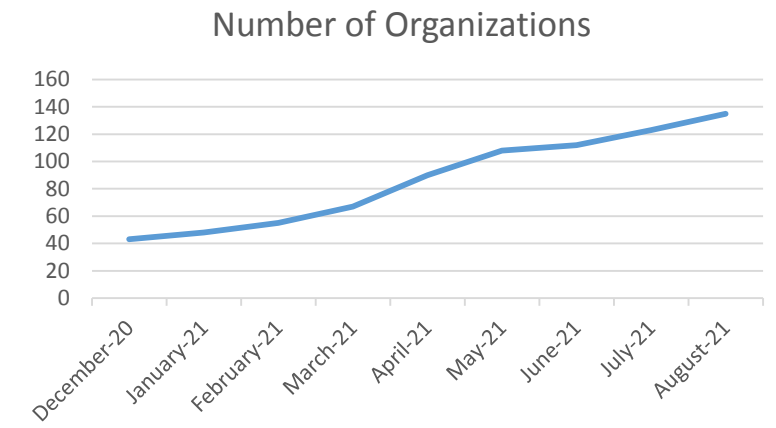
Iranian National Geoportal

There are more than 5000 Data Services on this site. Over 130 executive agencies have been registered from all over the country on the National Geoportal of Iran, increasing its policies and security.

GIS & Spatial Data Infrastructure







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Cartography & National Atlases

Iranian Geographical Names Database (IGNDB)

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Introduction

Cartography & National Atlases

Establishing a database in which the approved names:

- can be searched
- access to correct pronunciation
- access to other characteristics related to its location

Is necessity for all organizations that would facilitate communication, business, programming and providing maps and atlases.

National Cartographic Center of Islamic Republic of Iran as one of the members of UNGEGN and national mapping organization of the country is responsible for production of maps and Geographic information as well as services and also standardization of GeoNames in the country.

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Iranian GeoNames Database (IGNDB)

Cartography & National Atlases

- IGNDB started since 2003
- Information collected for 1:25000 base maps of the country used to create this database
- More than 140,000 geonames that linked to 250,000 features are stored in this database and can be searched and retrieved by users.

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IGNDB structures

Cartography & National Atlases

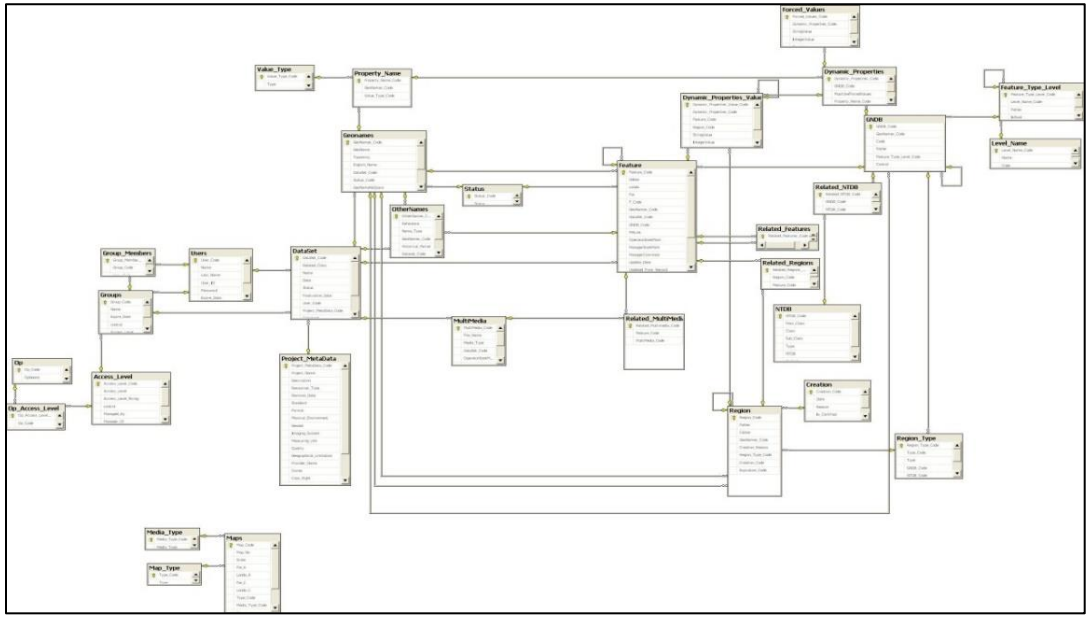
The main information in this database is:

Names: Persian names, transcription, Latin names, sound file of each name

Features: Coordinates, base map Id, metadata, feature Id and properties

Country Divisions: include provinces, counties, districts and Rurales

GNDB Diagram



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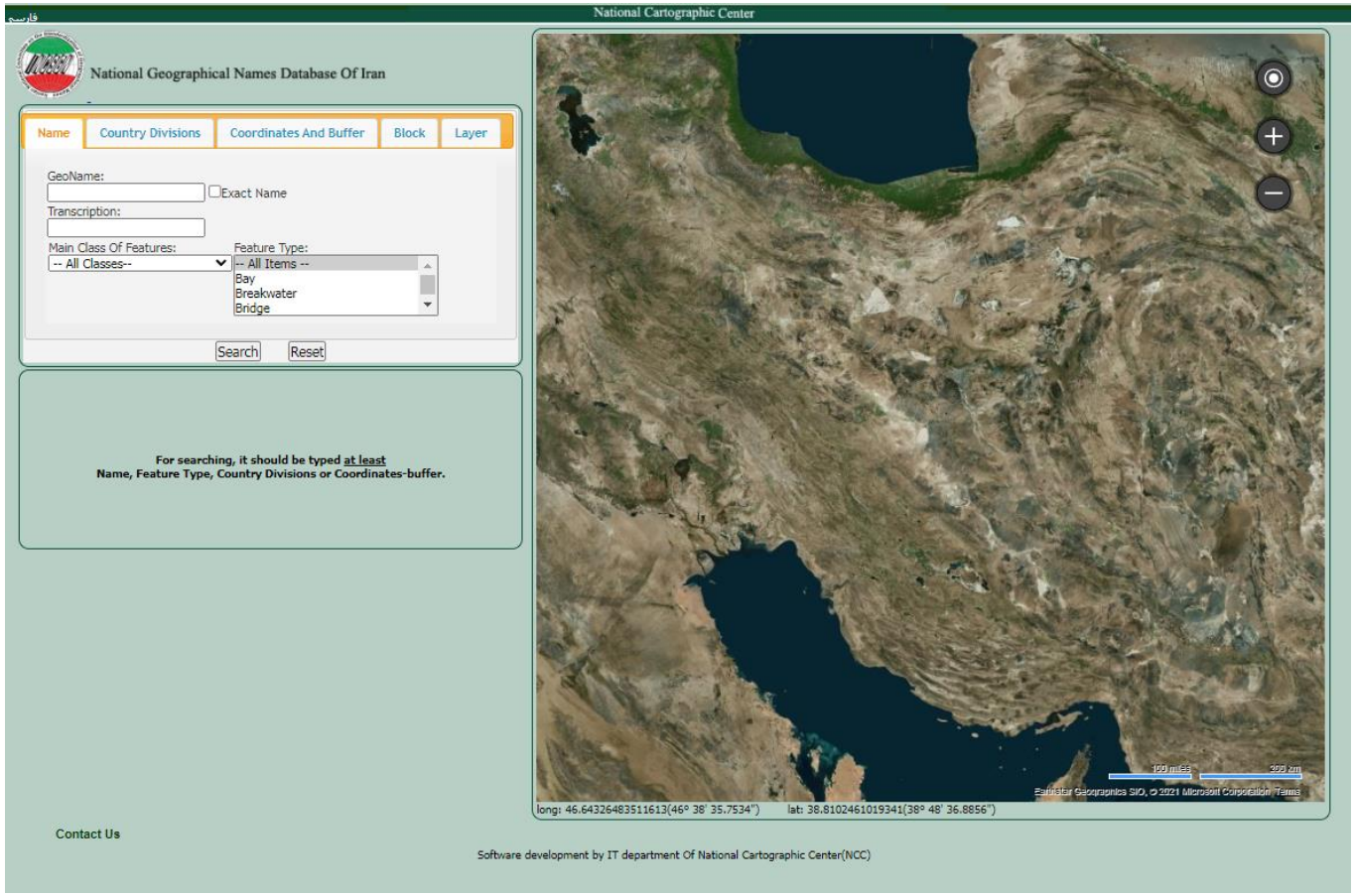
IGNDB in internet

Cartography & National Atlases

- IGNDB is accessible in web address: https://gndb.ncc.gov.ir/
- This website is designed for English and Persian users
- Information can be searched with four methods:
  - by Names
  - by Base map ID
  - by Country Divisions
  - by Coordinates



IGNDB website

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The Role of National Cartographic Center of IRAN, in Disaster Management

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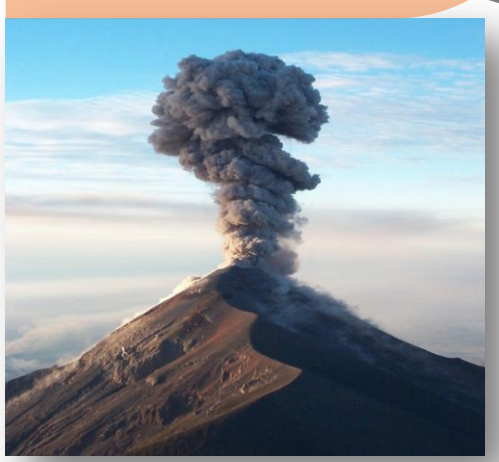
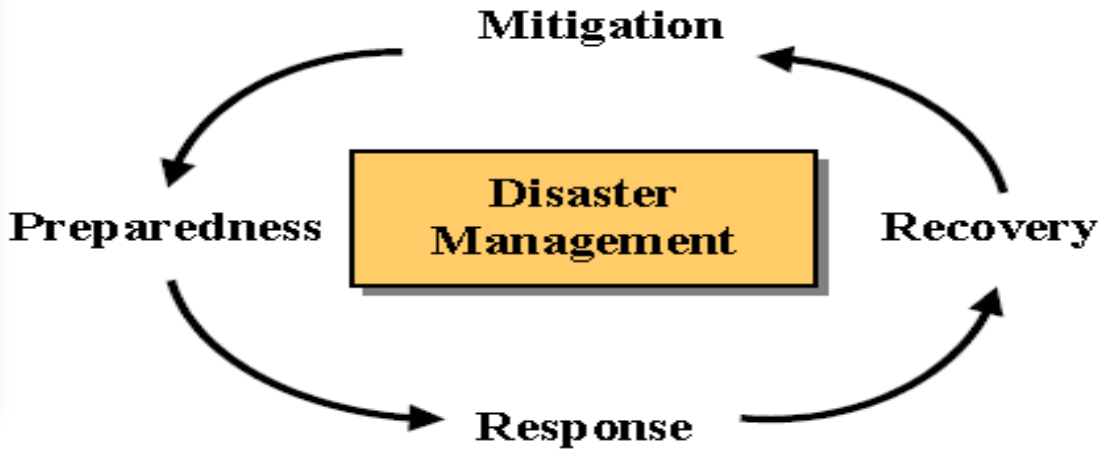
Types of natural disasters occurring in the region

Disaster Management

- Earthquake
- Landslide
- Flood
- Drought
- Tsunami
- Subsidence
- Volcano
- Wildfire





Disaster Management cycle

Technical Supervision and Quality Control

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Missions

Supervision and Quality Control

- Supervision and quality control of all geospatial activities conducted by governmental organizations and the private sector according to national/international standards.
- Standardization in the field of ***Geomatics Engineering*** and improvement in the quality of Geomatics, products and services.
- Development of standards, regulations and specifications needed for enforcing uniformity in technical and operational procedures at NCC and other beneficiaries

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Standardization

Supervision and Quality Control

- In general, the Institute of Standards and Industrial Research of Iran (ISIRI) is the authority for national standards, and represents the I.R. Iran at the International Organization for Standardization (ISO). The National Cartographic Center (NCC) is the main authority for standardization of maps and spatial information under the I.R. President's Deputy for Planning and Strategic Supervision. NCC and ISIRI cooperate with each other on related subjects.

- At the international level, mirror committees are established under ISIRI to cooperate with corresponding ISO Technical Committees. NCC is secretariat of ISIRI/TC211, which is the Iranian mirror technical committee that cooperates with ISO/TC211 (Geomatics/ Geographic Information). Iran is currently an O-Member (Observer) of this committee.
- At the national and sector levels, standards are developed through NCC's Standards Committee for Digital Spatial Data. This is accomplished with the participation of specialists from different sectors (government, private sector, academia, ...) and is based on user needs reflected by the National Council of GIS Users. Based on the scope and degree of consensus, these standards and specifications can then be ratified by ISIRI for national status

Iranian Society of Surveying Engineers (Non-Governmental)

NCC

Iranian Society of Surveying Engineers

- Iranian Society of Surveying Engineers is a union, non-governmental and non-profit institution that with a history of over 40 years of activity in the field of the organization has been able to pursue problems and issues related to the society of Surveying engineers in the Country.
- In addition to operating in Tehran province as the head office, Iranian Society of Surveying Engineers has branches and representative offices in most provinces of the Country.
- Main Goals
  - Promotion of professional activities in the field of Surveying Engineering
  - Protecting the professional rights of members
  - Efforts to update the technical and professional knowledge of members
  - Promote a culture of using maps and spatial information
  - Support and promotion of specialized and research activities

Thanks