

**Geospatial Information Sources:  
A Global Primer**

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**Our Objectives Today**

- Overview of global geospatial data resources
- Special emphasis on Russian geospatial data
- Trends for the future

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**East View Cartographic:  
Company Overview**

- **Major supplier** of large-scale topographic maps and associated data on global basis
- Core speciality: **Russian** topographic mapping and satellite imagery
- Full service bureau capabilities
- Supply of other imagery and maps

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**East View Cartographic:  
Company Overview**

- Parent company founded 1989 as specialist in Russian-language publications
- Active in maps since 1992
- EVP: foreign-language newspapers/STI/SS publications (Russian, Chinese) and related services
- EVC: topo/scientific maps/sat imagery/GIS data and related services

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**Overview of Global  
Geospatial Data Resources**

- Topographic maps (JOG, TLM)
- Digital elevation models (DTED)
- Vector databases (VMAP, VPF)
- Raster products (ADRG)
- Imagery products (CIB)
- Associated databases (geonames, geographic data, statistical data)

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**Global Data: Three Choices**

- USA (NIMA)
- Russian (VTU)
- Local
  
- PLUS: Data fusion

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**USA / NIMA Geospatial Data**

- **Advantages**
  - It's free (if you are cleared)
  - It's cheap (if you are not)
  - Extensively digitized
- **Disadvantages**
  - Mostly still classified: so not an OPEN source
  - Very partial global coverage
  - "Swiss cheese" problems with individual data sets

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**Russian Geospatial Data**

- **Advantages**
  - Massively more global coverage
  - More accurate
  - More features
- **Disadvantages**
  - Relatively expensive
  - Less has been digitized
  - It's in Russian

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**"Local" Geospatial Data**

- **Advantages**
  - Often fresher
  - Authoritative for names and features
- **Disadvantages**
  - May be utterly restricted
  - Language may be impenetrable
  - Often very difficult to obtain in any event

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**Example:**  
**Topographic maps of CHINA**

USA / NINA	Russian	Chinese
1:1m	1:1m	1:1m
1:500k	1:500k	
	1:200k	
	1:100k	
	1:50k	
	1:25k/1:10k	

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**Russian Geospatial Data:  
Special Focus**

- Topographic mapping
  - scale series: 1:1m, 1:500k, 1:200k, 1:100k, 1:50k, 1:25k, 1:10k
- Nautical charts
  - scale series: 1:2m, 1:500k, 1:250k/200k, port plans
- Satellite imagery
  - military cartography
  - military intelligence
  - civilian systems

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**Advantages of Russian mapping  
and imagery resources**

- Unique coverage, unified system
  - de facto global standard
- quality and accuracy second to none
- massive quantities
- much is off-the-shelf in digital format
- cost-effective
- rapid delivery

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### Russian Topographic Mapping



- Provides base data for wide range of digital products
  - DEMs
  - vector data
  - other databases
- Freshly updated in many key regions
  - Balkans
  - Iran
  - Iraq
  - China
  - Pakistan
  - Central Asia

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### Russian Nautical Charts



- Global
- Fresh
- Excellent source of bathymetric data
- New sheets are bi-lingual
- Many unique coverages
  - Caspian Sea
  - Russian water bodies
  - Antarctica
- Sometimes a substitute for topographic maps

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### Russian satellite imagery systems



- Military cartography
  - TK-350
  - KVR-1000
- Military reconnaissance
  - DD-5
  - KVR-3000
- Civilian systems
  - KFA-1000
  - MK-4

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**Russian satellite imagery:  
military cartography**

- TK-350 system
  - unique in world
  - 10m resolution, 200x300 km stereo images
  - designed to support 1:50,000 scale topo mapping from space, with or without ground control
  - massive global archive
  - AGE NOT IMPORTANT!!!!
  - Best source of global DEMs or 10m contour lines

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**Russian satellite imagery:  
military cartography**

- KVR-1000 system
  - co-located with TK-350 on same satellite
  - 2m resolution, 40x160 km panoramic images
  - designed to support 1:50,000 scale topo mapping from space, feature identification to 1:10,000
  - massive global archive

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**Russian satellite imagery:  
military reconnaissance**

- DD-5 and KVR-3000 systems
  - sub-meter systems provided at various resolutions
  - film return, not digital
  - massive global archive since 1993
  - new missions every few months
  - tasking is possible
  - important source for updating large-scale topo maps

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### Russian satellite imagery: civilian systems



- KFA-1000 and MK-4 systems
  - 5 and 8 meter panchromatic/spectrozoal (color)
  - 70x70 km and 140x140 km image sizes
  - film return, not digital
  - massive global archive
  - important source for updating topo maps of scales 1:100,000 to 1:250,000
  - especially valuable for hydrography, forest and vegetation, and transportation objects

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### Trends for Future



- Elevation Data: Forever an Open Source?
- Elevation data (contour lines) on large-scale topographic maps represent the single most sensitive information element
- Will US seek "resolution control" for DEMs akin to "shutter control" for imagery?

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### Whither DEMs?



- Shuttle data (SRTM)--may never be released
- VMAP-2 has been withdrawn after 9/11
- VMAP-1 unlikely to be fully released
- DTED-1: NIMA unlikely to release

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**Whither DEMs:  
The Private Sector Response**

- Voracious appetite in industry for high-resolution DEMs all over the globe
- News media, academia, others
- Russian topo maps, Russian imagery
- SPOT 5: a French DTED-2 global database

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**3D-representation is the essential  
element in virtual-reality GIS**

- More than any other digitized map feature, terrain relief is what captures the public attention
- Inherently attractive
- Intuitive; everyone understands
- Seeing is believing, seeing is understanding
- Look at news media usage of virtual GIS

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**Open Sources and  
Virtual Reality GIS**

- One decade into GIS revolution, and much remains to be done
- GTOPO30 is still the best global database (1:1m scale NIMA mapping)
- below this, a very fractionated situation
- consequently, virtual GIS is mostly potential

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### Issues in virtual GIS

- Military secrecy
- Copyright law
- Scarcity of raw materials (maps, imagery)
- High cost of data creation
- other infrastructure: software, hardware, Internet bandwidth

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### Issues: Military secrecy

- Depends on whose data; each case unique
- US situation
  - DTED-1 not available; SRTM not ready
- Russian/Soviet situation
  - totally out of control; big impact
- other countries
  - none offer global coverage

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### Issues: Copyright law

- Not an issue with US civ/mil gov't-produced data
  - unique by design; U.S. public data policies are precisely why U.S. software companies are leaders in GIS
- (Probably) not an issue with Soviet-produced data
  - but, not by design; rather because of Soviet collapse
- Definitely an issue with everyone else
  - National mapping organizations
  - Private companies

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### Issues: Source materials

- Maps
  - US 1:1m, 1:500k, 1:250k, 100k/50k
  - Russian 1:1m, 1:500k, 1:200k, 1:100k, 1:50k, city plans
  - Other maps
- Imagery
  - STRM
  - SPOT 5
  - Russian TK-350

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### Issues: Financial

- Very little off-the-shelf data
- Licensing costs
- Production costs
  - if map, \$200 to \$2000 per sheet
  - if image, \$1 to \$200 per square km

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### What will next global DEM database cost?

- 1:1m (Russian): \$1,000,000
- 1:500k (Russian): \$4,000,000
- 1:200k/250k (Russian): \$15,000,000
- 1:100k (fusion): \$50,000,000
- 1:50k (fusion): \$200,000,000
- TK-350 (Russian): \$150,000,000
- SRTM: ???
- SPOT-5: ???

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**Future of Virtual GIS**

- It will happen, just more slowly than most of us want
- factors driving DEM production and consolidation
- expanding commercial uses of GIS data in all forms of life
- BUT: challenges to national security policies all over the world
- Cannot escape fact that maps are the classic dual-use technology

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**Thank you for your attention**

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