

3D Cadastre Modelling in Russia
G2G10/RF/9/1

Mission Report 3

Version
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3D-cadastre modelling in Russia

G2G10/RF/9/1

Mission Report No 3

19 June – 23 June 2011

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1. General

The third mission of the “3D-cadastre modeling in Russia¹” project took place in the period 19 June - 23 June 2011. The mission team was composed of the following members:

- Rik Wouters (Project Manager, Kadaster) [RW]
- P.J.M. van Oosterom (TU Delft) [PvO]
- Andreas Hoogeveen (Royal Haskoning) [AH]
- Boudewijn Spiering (Grontmij) [BS]
- Veliko Penkov (Project leader, Kadaster) [VP]

From the beneficiary side the working meetings and discussions were attended by representatives of (names included):

The Ministry of Economic Development of the Russian Federation

- Vyacheslav Spirienkov (Division Head Real Estate Department) [VS]

The Federal Service for State Registration, Cadastre and Cartography (Rosreestr)

- Sergey Sapelnikov (Deputy Head of Rosreestr)
- Oleg Schwarz (IT and Operation Systems Department Head) [OS]
- Lyudmila Goncharova (Division Head IT and Operation Systems Department) [LG]
- Lyudmila Lilina (Deputy Head Control and Methodical Maintenance Department) [LL]
- Dmitriy Fefelov (Division Head Control and Methodical Maintenance Department) [DF]

Federal Cadastral Centre Zemlya

- Anatoly Ivanov (Deputy Technical Director) [AI]
- Modesat Yakubovich (International Projects Division Head)
- Natalya Vandysheva (Spatial Data Division Head) [NV]
- Sergey Pakhomov (Design and Development Software Division Head) [SP]
- Jury Gorodnichev (Methodological Support and Software Maintenance Division Head)
- Tatiana Kulakova (Chief Expert)
- Nalaty Sevestyanova (Project Manager)

Pilot Region of Nizhny Novgorod

- Vasily Romanov (Deputy Head Regional Office) [VR]
- Irina Yufereva (Deputy Director Regional Federal State Institutions “Land Cadastre Chamber”) [IY]

¹ In this report ‘Russia’ is synonym to ‘The Russian Federation’



The interpretation during meetings and discussions was supported by Olga Chaley. Meetings were held in a very constructive atmosphere and mutual understanding, showing the commitment of both sides to achieve marked project results.

2. Venues and programme

The working discussions and presentations were held at the Federal Service for State Registration, Cadastre and Cartography's main office at Prospekt Vernadskogo.

The mission programme was drafted and communicated prior to the mission (See Mission programme in Annex 1).

3. Discussions and agreements

3.1. Working meetings

During the Mission preparation phase it became clear that the initially planned visit to the pilot area of Nizhny Novgorod can not be realised. This is why a shorter (4 day) mission was planned, with participation of representatives from Nizhny for one day in Moscow. The teams had common sessions as well as they split to discuss in parallel legal/organisational and technical matters separately.

Here follows a review of the working sessions with some notes.

Monday, 20 June

A common meeting was held to discuss overall project implementation, goals, tasks and products. Specific for RF issues, relevant to 3D cadastre were discussed. The meeting was opened by Mr. Sapelnikov, Deputy Head of Rosreestr.

A possible connection with ongoing project of Moscow Municipality on new technology centre "Skolkovo" was mentioned as a possible additional pilot area.

NV brings us up to date about the activities of the Russian team so far:

- Changes in the project team and organisation
- 3D modelling in Russia & LADM: Russia has voted in favour of the ISO standard. There is no Russian profile yet, but the ISO standard has been translated into Russian. It will be provided to Peter, so it can be made available on the ISO's website.
- Schemes and structures of the database haven been sent to the NL team

Sergey Pakhomov [SP] makes introduction to some of the aspects of the database and the IT infrastructure. Current specs include:

- .NET Framework 2.0
- Oracle 10
- MapXtreme for the 2D maps on the current portal
- ArcGIS server 10, with 3D analyst



Each region has its own database, although schemas are the same.

In the current workflow, the (private) Cadastral Engineers deliver XML data on the rights to Rosreestr. These XML files are imported into the database by custom scripts and applications. Rosreestr performs these activities. The coordinates in the XML data are currently 2D, but 3D is possible. Note: only one polygon per cadastral object can be stored in the XML. This means that there is no room for polyhedrons in the current structure. The structure of the XML file (which is described in a XSD-file) is available for the NL team. The 3D buildings are design by e.g. the architect of the building in 3D CAD software. For the Teledom building, ArchiCad drawings are available.

For each object there are technical passports and cadastral passports.

For reference data, topographic maps are available. The topographic map includes contours (heights). The Russians have a Digital Terrain Model, but is unclear whether the Dutch team can be provided with this. Other reference data include structural design (e.g. in ArchiCad) and floor plans (e.g. in PDF or MapInfo) from 3D buildings.

Pilot and prototype

The strategy for the prototype is to use the current database schema and to replace the 2D polygons with 3D polyhedrons. Apart from this, the theoretical situation for the future will be elaborated on. This will see a GML approach, in which the XML exchange will be replaced by a GML file. The structure of the database (both register, cadastre and building info) will be based upon the LADM. The prototype will not go as far, but it will have to provide us insight into the do's and don'ts of using GML and LADM.

For the prototype several basic questions have to be resolved:

- Which 3D viewer?
- How to combine 2D and 3D data?
- How to validate the Oracle topology?

PvO reported on WP1 - Legal framework and organisation of 3D-cadastre: 3 steps have been done:

- analysis of background, 3D in other countries
- what would be a good model for RF
- tools/solutions for creating the prototype

Tuesday, 21 June

Teams split in two parallel sessions: Group 1 – discussion on legal basis, relevant laws and sub-laws, terminology in LADM. Group 2 – functional and technical design of prototype, cadastral data, possibilities for visualisation of 3D objects, pilot.



With the participation of Nizhny Novgorod representatives this day the main stakeholders were listed:

- Rosreestr (federal)
- Cadastral chamber (oblast, "state")
- BTI (buildings, regional?)
- Administration of NN (local). They have a 1:500 map
- Private designers and architects
- Private surveyors (cadastral engineers, 385 of them in the oblast), who are licensed by a committee.
- Notary
- General Public

Transactions can be registered with or without help of the notary. Without a notary, both the buyer and seller go to the Rosreestr office and register their transactions.

Available data in pilot area:

- topography
- cadastre
- 3D visualisations
- technical data (e.g. floorplan)
- rights

Functionality of the prototype:

- 2D map showing reference data and index
- different levels of detail depending on scale
- no export functionality

The data acquisition in the pilot will differ from the data acquisition in the production environment in the future. This needs to be addressed in WP4. Note: the cadastral engineers submit only changes to the parcels. So when only one coordinate changes, only this single coordinate is submitted back into the database. Future database schemas have to provide in this. And also the system needs to be able to track the history of changes.

The NL team is going to build the prototype, but some existing (parts of the) portal may be re-used. The prototype will be tested by Rosreestr colleagues, but the final prototype may be used by more people.

Transactions can be registered with or without help of the notary. Without a notary, both the buyer and seller go to the Rosreestr office and register their transactions.

3D activities are now being carried out by sub-contractors. We can use ArchiCad files for the pilot, provided the NL team can get exports in a suitable format. For the future, the pilot and the workplans after that have to consider the specifications and requirements for the input data.

Expectations of the future users of the prototype?

- to have their (3D) rights secured and visualised
- to see where there are conflicts
- to see what belongs to who



- to validate data (overlap, overhanging)
- NV has a document on use cases for 3D.

Wednesday, 22 June

Common meeting of the working group on the 3D model, functional requirements, general architecture concept, data acquisition for the pilot, cadastral data requirements.

After the presentation on the pilot and prototype (AH) we jointly agree that solution 1 (existing 2D portal with new 3D viewer) is the preferred option. The NL team will come up with criteria to establish the amount of success of the pilot.

Thursday, 23 June

Wrap-up of Mission achievements was made. Plan for next steps and distribution of tasks with deadlines (see Chapter 3.3. Detailed Project Implementation Schedule). Conditions for next visit to the Pilot Area were marked.

3.2. Main topics and agreements

1. Overall project implementation and Organisational Issues

Despite of the lack of progress in the beginning of the year, due to administrative changes in RF counterpart, a considerable progress during last months is observed. This mission contributes well to the project implementation and there is a common understanding, that with strict commitment and good planning, project results can be achieved within the original project time span.

The Russian team has been enforced by relevant expertise both at decision making and operational levels in the field of law, SW development, DB management, cadastral data. Experts demonstrate good understanding and commitment to the project which is good indication for successful achievement of the project result.

Here follows a review of project results:

Result 1 – Analysis of Legal Framework 3D

Result 2 – Modelling of 3D cadastre

Result 3 – Prototype and Pilot

Result 4 – Recommendations for legal, administrative and organizational setting for 3D cadastre

Result 5 – Curriculum for Training in 3D

Result 1 – Analysis of Legal Framework 3D

- Comparison study - completed
- Analyses of the Russian law - completed



- **To be done:** study of bylaws on the current 2D registration
- NB: Recommendations on extension of the law for 3D (in Result 4)

Result 2 – Modelling of 3D cadastre

The draft report on WP2 was finalized and delivered by PvO during the mission.

- 3D model is ready
 - Based on LADM
 - Based on GML and PDF
 - envisaging 5 standard type objects
- Model discussed with Working Group
- Comments of RF team – expected within 1 month (see Detailed Project Implementation schedule)

Result 3 – Prototype and Pilot

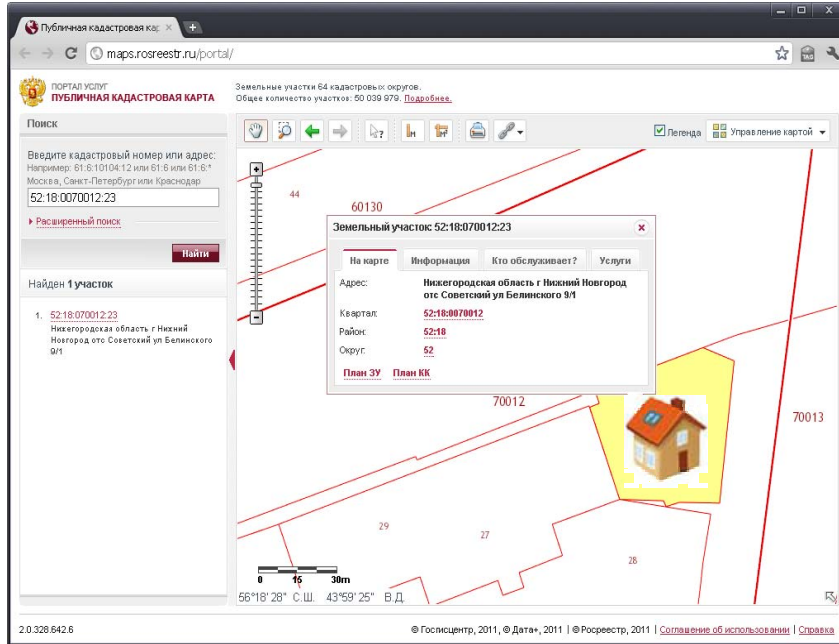
Functional requirements based on use cases:

- identifying objects
- inspecting 3D objects
- viewing 3D objects
- Etc
- Issue: existing data model of the registrations

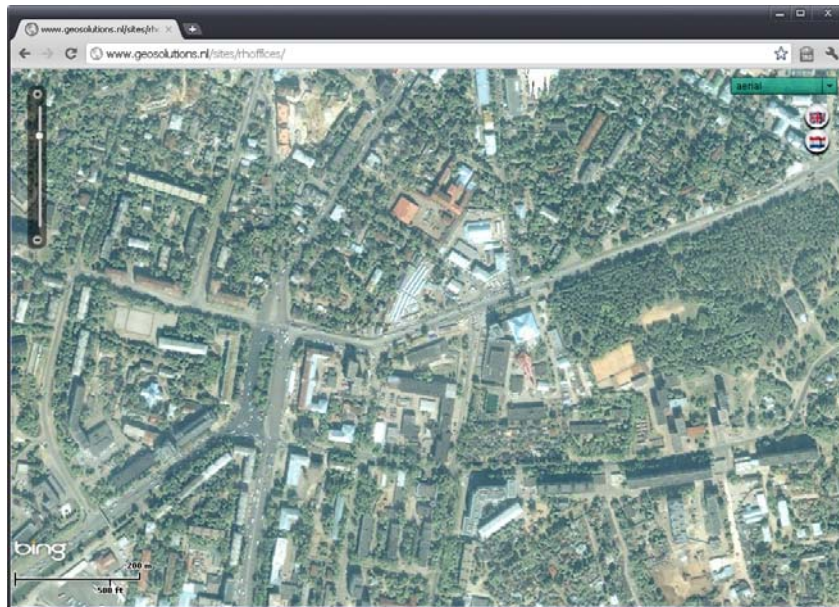


Concept for the general architecture

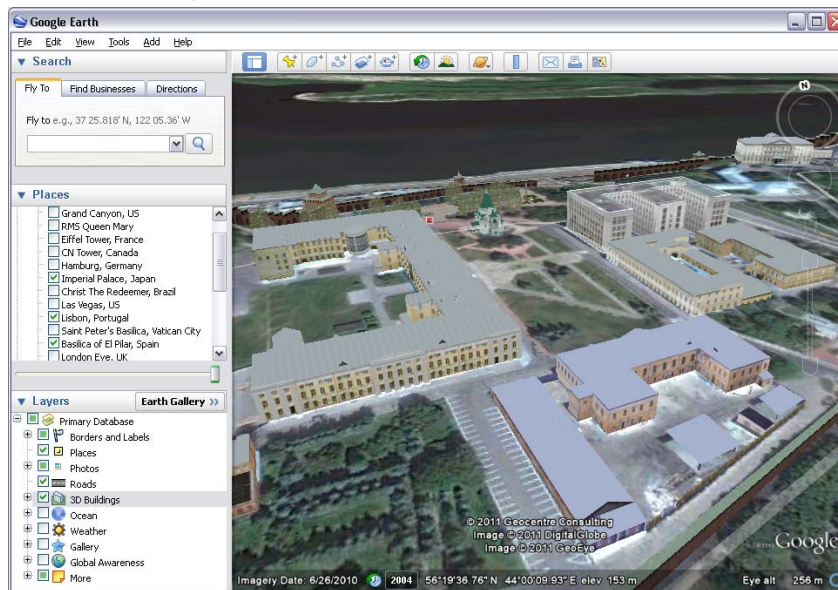
- Three basic solutions:
 - existing 2D portal with link to new 3D viewer



- new 2D portal with link to new 3D viewer

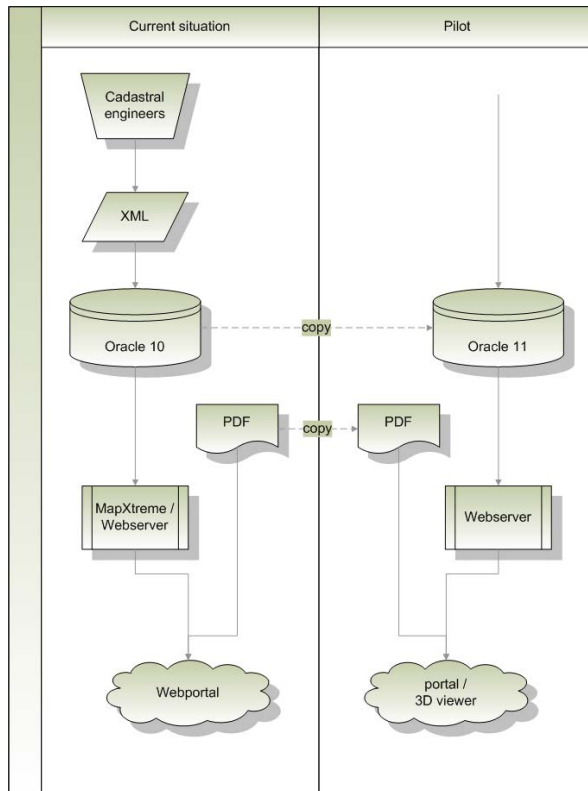


– new 3D portal



- assumptions:
 - Oracle 11 spatial (supports polyhedrons)
 - existing 3D visualization (web) software
- polyhedrons
 - 2D parcel = polygon → 3D parcel = polyhedron
 - complies to ISO 19152 LADM

General approach and data acquisition for the pilot



Set of requirements for cadastral data

- 3D parcel narrative as PDF (for easy visualization) and 3D data (LADM / CityGML model able to land registration process) have to be supplied;
- For normal parcels 3D polyhedron is a sufficient description;
- For 3D linear parcels (including pipeline) an additional option would be the following: an attached (multi-) polyline diameter or height and width;
- New 3D parcel that crosses multiple land parcels is a transfer of ownership (or other right of these parcels at a single new 3D parcel);
- A 3D parcel has a (temporary) ID.
- For reference, the following topographic objects are required: 3D buildings (rooms), roads, pipelines and cables and relevant surface with height;
- Accuracy 3D object is equal to 2D object (15 cm). A face must be within 15 cm of a flat plane.
- Horizontal and vertical reference: standard Oblast Nizhny use
- Height (z) coordinate: absolute (vertical reference) required and relatively (compared to Earth's surface) is optional;
- Curved surfaces represented by multiple flat edges (this model will remain relatively well implementable);

Result 4 – Recommendations for legal, administrative and organizational setting for 3D cadastre



A general time planning was developed as follows:

Activity	2011							2012			
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Report Legal framework and organisation of 3D-cadastre	█	█	█								
Report 3D-cadastral model for data generation, storage and distribution	█	█	█								
Report Documentation prototype											
Report Recommendation organisational aspects and legal amendments											
Finalisation of functional requirements	█										
Finalisation of technical requirements	█										
Delivery of pilot data	█	█									
Preparation technical environment	█	█									
Preparation Datasets			█	█							
Functional design		█	█								
General architecture		█	█	█							
Technical design		█	█	█							
Building 1st increment Prototype			█	█	█	█					
First Pilot mission						█					
Training							█	█	█	█	
Building 1nd increment Prototype							█	█	█	█	
Second Pilot mission											█
Final report											█

It is further detailed in Chapter 3.3. Detailed project implementation schedule below.

It was agreed to maintain frequent communication via emails on pending issues to avoid possible lags behind the planned timeline.

Result 5 – Curriculum for Training in 3D



4. Actions

[Rik: shall we keep updating this or the new planning is good enough?]

For the coming period the following actions/responsible persons/deadlines were agreed:

	Action	Responsible persons	Time
1	Agree the date for study tour (provisionally: week 48, starting 29 November)	Rik Wouters/Vladimir Tikhonov	08/10/10
2	Check of refined activities for project results 1 and 2 and communicate to project teams	Jantien Stoter	08/10/10
3	NL team will send Mission Report 2, including English version of the FIG Questionnaire as annex.	Villy Penkov	08/10/10
4	An official invitation letter is needed for the Russian participants upon submission of list of participants by Russian side	Rik Wouters	15/10/10
5	Communicate final version of IR to all involved partners (note language change of prototype English -> Russian and increase the actual input Russian side)	Rik Wouters	15/10/10
6	Russian team checks the completed Questionnaire (Russian language version) and sends to Villy Penkov	Vladimir Tikhonov	22/11/10
7	Russian team sends current Database schemas (models) from the register of rights database, land parcels database, technical building (including other constructions) database	Database expert from Russian Cadastre	To be determined
8	Finding the 3 additional cases (see above)	Russian (Nizhny Novgorod) project members	15/11/10
9	Process diagram of registration & cadastre (UML sequence diagram-like: actors, actions, communication input/output) ²	Irina Yufereva	10/10/10
10	Relevant Russian legislation (only selected extracts from codes, laws, regulations etc. – 2-5 pages) in Russian language sent to Dutch team	Roman Sultanov	29/11/10
11	Sending documentations (maps, photographs, text, legal documents, database content etc.) of cases: the 2 agreed cases + the 3 additional (all together 5)	Russian team	29/11/10
12	Russian team experts read the ISO LADM 19152	Russian team	29/10/10
13	Creation of the model of current Rosreestr registrations (LADM country profile) of current system (2D)	Peter van Oosterom with confirmation of the Russian modeling/database experts	29/10/10
14	Translation of legal documents' extracts (see above)	Villy Penkov	13/12/10
15	Create first recommendation on the Russian Country profile UML model - able to support	Peter van Oosterom	12/11/10

² Please make a detailed overview where in each step also the data which are changed in the data base are included (as far as applicable)

	registration of 3D case		
16	Overview international legal frameworks relevant to 3D cases	Hendrik Ploeger, Jantien Stoter, Peter van Oosterom	12/11/10
17	Analysis of the relevant parts Russian legislation	Hendrik Ploeger	12/11/10
18	Organization of 3-weekly communications: deliverables, statements, input – communicated by email (before 12:00h Moscow time, followed by maximum 30 min telecom afternoon communication on deadline day for discussions, questions where needed	<p>Initiation by Villy Penkov, supported by Kadaster International back-office, Chair – Rick Wouters, communication language – English</p> <p>Participants (persons depending on topics):</p> <ol style="list-style-type: none"> 1. Russia, members of 3D Cadastre working group (FCC Zemlya, Nizhny Novgorod, ICT/database expert, legal/ministry) 2. Netherlands, members of 3D Cadastre working group (1 person from every organization: Kadaster, Veliko, TUDelft, Grontmij, Haskoning) 	Every 3 weeks, more/less frequent, depending on needs

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5. Annexes

5.1. Programme Kadaster team Third Mission 3D Moscow/Nizhny Novgorod 20 - 23 June 2011

Flights Schedule

RIK WOUTERS, BOUDEWIJNV SPIERING, ANDREAS HOOGEVEEN

AMSTERDAM – MOSCOW SU 230 19JUN arrival 18:25
MOSCOW – AMSTERDAM SU 403 23JUN departure 18:00

PETRUS VAN OOSTEROM

AMSTERDAM – MOSCOW SU 418 20JUN arrival 02:00
MOSCOW – AMSTERDAM SU 403 22JUN departure 18:00

VELIKO PENKOV

SOFIA – MOSCOW OK 904 19JUN arrival 21:40
MOSCOW – SOFIA OK 903 23JUN departure 19:55

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VELIKO PENKOV (VP): +359 888 709699



Programme Kadaster team Third Mission 3D Moscow/Nizhny Novgorod 20 - 23 June 2011

Sunday 19 June

Time	Activity	Participants	Location	Remarks
18:25	ARRIVAL	<i>Rik Wouters</i>	Sheremetyevo Arpt (SVO)	
18:25	ARRIVAL	<i>Boudewijnv Spiering</i>	Sheremetyevo Arpt (SVO)	
18:25	ARRIVAL	<i>Andreas Hoogeveen</i>	Sheremetyevo Arpt (SVO)	
21:40	ARRIVAL	<i>Veliko Penkov</i>	Sheremetyevo Arpt (SVO)	
02:00 on 20JUN	ARRIVAL	<i>Petrus van Oosterom</i>	Sheremetyevo Arpt (SVO)	

Monday 20 June

Time	Activity	Participants	Location	Remarks
10:00 – 10:30	Opening	RUS team, NL team	FCC “Zemlya” conf. hall	FCC “Zemlya” conf. hall (4th floor; Gusyatnikov per. 11; tel. 747-98-01)
10:30 – 11:30	General discussion on: - goals, tasks and expected products	RUS team, NL team	FCC “Zemlya” conf. hall	



	- briefing on resents of implemented works			
11:30 – 13:00	Actual data for the prototype/pilot, both existing 2D data and 3D data for selected cases	RUS team, NL team	FCC “Zemlya” conf. hall	Some existing 3D data in XML may have been sent during week 24
13:00 – 14:00	Lunch break			
14:00 – 17:00	Proposals of Dutch experts on a 3D cadastre model for the Russian Federation and conclude the modelling discussion	RUS team, NL team	FCC “Zemlya” conf. hall	3D data should be fitting into and extension of the current model, use ISO's LADM as reference model, investigate what is the impact of implementing the model in Oracle 10 and/or 11

Tuesday 21 June

Time	Activity	Participants	Location	Remarks
10:00 – 12:30	Discussion on the WP1 Report of Dutch experts “Legal framework and organisation of 3D cadastre”	RUS team, NL team	FCC “Zemlya” conf. hall	
13:00 – 14:00	Lunch break			
14:00 – 17:00	Current Russian legal framework of real	RUS and NL legal	FCC “Zemlya” conf. hall	



	property registration and cadastre. Clarification of statements included in previous reports and the FIG Questionnaire	experts, team 1		
14:00 – 17:00	Development of the 3D cadastre model in the part of technical performance with consideration of data base organization in the current registration and cadastre system Realization of the prototype: what software tools will we use/select for creating the prototype	RUS and NL IT and DB experts, team 2	FCC “Zemlya” conf. hall	

Wednesday 22 June

Time	Activity	Participants	Location	Remarks
10:00 – 13:00	Development of the registration part of the 3D cadastre model Decision on rules/guidelines for initial registration of 3D parcels (cadastral	RUS and NL legal experts, team 1	FCC “Zemlya” conf. hall	Also see our recent abstract as submitted to the FIG workshop on 3D Cadastres



	objects) for out prototype/pilot What a valid 3D cadastral parcel is (in Russian context)			(Nov'11) Also see UDMS'11 paper on this topic (by Rod Thompson and myself), what validation should be included in prototype/database development?
10:00 – 13:00	Pilot: discussion/preparation of pilot matters (organization, planning, participants, etc.)	RUS and NL IT and DB experts, team 2		See Andreas' approach
13:00 – 14:00	Lunch break			
14:00 – 17:00	Necessary amendments to legal and normative acts for the implementation of 3D cadastre	RUS and NL legal experts, team 1		
14:00 – 17:00	Requirements to information, data availability for pilot objects Choice of exchange formats	RUS and NL IT and DB experts, team 2	FCC "Zemlya" conf. hall	Possible demo Dutch prototype 3D cadastre (Bentley Systems)
	<i>DEPARTURE</i>	<i>Petrus van Oosterom</i>	Sheremetyevo Arpt (SVO)	

Thursday 23 June

Time	Activity	Participants	Location	Remarks
09:30 – 12:00	Wrap up and approval of a project work schedule		FCC “Zemlya” conf. hall	
12:00	Lunch and transfer to airport			
18:00	<i>DEPARTURE</i>	<i>Rik Wouters</i>	Sheremetyevo Arpt (SVO)	
18:00	<i>DEPARTURE</i>	<i>Boudewijnv Spiering</i>	Sheremetyevo Arpt (SVO)	
18:00	<i>DEPARTURE</i>	<i>Andreas Hoogeveen</i>	Sheremetyevo Arpt (SVO)	
19:55	<i>DEPARTURE</i>	<i>Veliko Penkov</i>	Sheremetyevo Arpt (SVO)	



5.2. Pilot datasets to be delivered for the prototype

General

- All geometry (including the geometry in the cadastral database) must be delivered in the same coordinate system. Vertical reference:
 - if a digital terrain model (see 9) is available: for all data absolute coordinates;
 - if a digital terrain model is not available: for all data relative coordinates (heights above/under local average ground level);
- Vertices of a 3D surface within a specified tolerance of a flat plane;
- Google SketchUp format can be exported from ArchiCAD by a free available add-on for ArchiCAD see <http://www.graphisoft.com/products/archicad/addons/sketchup/>

1. 3D geometry of building units (apartments)

Goal:	<ul style="list-style-type: none"> • Visualisation in 3D viewer of the prototype • Analysis functionality of the prototype
Format:	For each building: .skp (Google SketchUp) or else .dxf (preferably both formats)
Objects:	All building units within the building as polyhedrons (closed volume defined by flat surfaces);
Attributes:	Will be added by NL-team (see 2 and 3).

2. Attribute information of building units (apartments)

Goal:	Show this information of a selected building unit in the 3D viewer of the prototype
Format:	For each building: table in .csv or .xls, or .mdb or .doc
Objects:	Each record in the table represents a building unit
Attributes:	<ul style="list-style-type: none"> • Unique identification number of the building unit • additional attributes to be shown in the 3D viewer of the prototype (e.g. reference/link to rights (and other RRSs) and owners (parties)) • specification of datatype and length of the attribute fields.

3. Floor-plan drawings with building unit identification numbers

Goal:	Provide necessary information to link 3D geometries of building units to the corresponding attributes (not to be displayed in the 3D viewer of the prototype).
Format:	For each building: .pdf or .dxf with all the floors of the building
Contents:	Floor-plan with boundaries plus temporary identification numbers of building units. Identification numbers must be unique for the whole pilot area.

4. Other Construction (3D pipeline)

Goal:	<ul style="list-style-type: none"> • Visualisation in 3D viewer of the prototype • Analysis functionality of the prototype
Format:	.skp (Google SketchUp) or else .dxf (preferably both formats) plus a separate document with attribute information.
Objects:	Pipeline with optional branches represented as 3D multi-curve or as a polyhedron
Attributes:	To be delivered as a separate document, containing: <ul style="list-style-type: none"> • identification number • diameter • additional attributes to be shown in the 3D viewer of the prototype (e.g. reference/link to rights (and other RRSs) and owners (parties)) • specification of datatype and length of the attribute fields.

5. Cadastral database of the pilot area (including geometry of 2D parcels)

Goal:	<ul style="list-style-type: none"> • Visualisation of parcels in 3D viewer of the prototype (projected on a flat surface or on a digital terrain model) • Analysis functionality of the prototype • Show cadastral information of a selected parcel in the 3D viewer of the prototype • Base for the database to be used by the 3D viewer of the prototype
Format:	Export from Oracle (.dmp)
Objects:	Existing objects of the cadastral database, from the pilot area, e.g. the whole cadastral zone or district
Attributes:	Existing attributes of the cadastral database

6. Registration database of the pilot area

Goal:	Show registration information of a selected parcel in the 3D viewer of the prototype
Format:	Export from Oracle (.dmp)
Objects:	Existing objects of the registration database. Same objects as in number 6.
Attributes:	Existing attributes of the registration database

7. 3D geometry of buildings for visualisation/reference

Goal:	Visualisation of buildings in 3D viewer of the prototype as a reference
Format:	At least for each building which has building units: .skp (Google SketchUp) or else .dxf (preferably both formats)
Objects:	3D polygons (surfaces) and/or polyhedrons representing the building and/or its structure
Attributes:	-

8. Digital terrain (height) model

Goal:	<ul style="list-style-type: none"> • Visualisation of the terrain in 3D viewer of the prototype, so absolute heights can be used for the 3D objects; • Projection of 2D parcels on the terrain to make them 2,5 D; • Projection of topographic map on the terrain
Format:	ArcGIS format for digital terrain model
Objects:	Depending on the chosen ArcGIS format
Attributes:	Depending on the chosen ArcGIS format

9. Topographic basemap

Goal:	Visualisation of topographic basemap in 3D viewer of the prototype (projected on a flat surface or on a digital terrain model)
Format:	Georeferenced raster format (.jpg, .ecw, .tif)
Contents:	Same topographic basemap as in the current 2D portal



5.3. Minutes from the Russian-Dutch Workshop

RUSSIAN-DUTCH WORKSHOP

3D Cadastre Modelling in Russia

Project G2G10/RF/9/1

MINUTES

Moscow – June 19-23, 2011

Representatives of Netherlands Kadaster, the RF Ministry of Economic Development, Rosreestr, the Rosreestr Office in Nizhegorodskaya Oblast, FCC “Zemlya”, the Moscow Aerogeodetic Enterprise attended the workshop hold by Rosreestr, FCC “Zemlya” and Netherlands Kadaster. According to the programme agreed with the Dutch side and approved by the Rosreestr headquarters, the sides discussed project progress and results of works implemented during the workshop.

Within the project “3D Cadastre Modelling in Russia”, the following subjects were discussed:

1. Brief presentation of the results of works implemented by the Dutch and Russian sides.
2. Discussion on goals, tasks and expected products of 3D cadastre in Russia.
3. Presentation on the WP1 Report of Dutch experts “Legal framework and organisation of 3D cadastre”.
4. Proposals of Dutch experts on a 3D cadastre model for the Russian Federation. Presentation on the draft WP2 Report of Dutch experts “3D-cadastral model for data generation, storage and distribution”.
5. Legal and technical issues of project implementation (in groups of experts):
 - 5.1) *Russian and Dutch legal experts, team 1:*
Current Russian legal framework of real property registration and cadastre. Clarification of statements included in previous reports and the FIG Questionnaire.
Development of the registration part of the 3D cadastre model, discussion on the draft LADM standard.
Necessary amendments to legal and normative acts for the implementation of 3D cadastre.
 - 5.2) *Russian and Dutch IT and DB experts, team 2:*
Development of the 3D cadastre model in the part of technical performance with consideration of data base organisation in the current registration and cadastre system.
Development of a prototype for the proposed 3D cadastre model.
Data availability for pilot objects, requirements to data.
Choice of exchange formats.
6. Planning and approval of a project work schedule.

The following decisions were made:

1. On legal subjects:



1.1. The Russian side will present extracts from subordinate legislation regulating the description of objects in cadastre and registration of rights (by 18.07.2011).

1.2. On the analysis of presented materials, the Dutch experts will draft supplements to WP1 and give proposals on necessary changes in normative legislative acts in order to implement 3D property cadastre (deadline – 01.09.2011).

1.3. Comments on results of the discussion on legal subjects are given in Annexes 2 and 3.

2. On technical subjects:

2.1. On the consideration of the 3D cadastre model and the discussion of the draft WP2 report: the report is agreed in the main;

for further work, Russian specialists will translate the draft report into Russian (by 15.07.2011); after translation, the Russian side will present remarks and proposals on the draft report (by 29.07.2011);

considering the remarks and proposals, the Dutch experts will prepare a final WP2 version (by 01.09.2011).

2.2. As a result of the discussion of the prototype:

the Dutch side will give proposals on the technical implementation of the prototype, including a portal (by 15.09.2011). Proposals on a 3D viewer option will be presented by 01.08.2011;

the Russian side will present the description of the data source (by 08.07.2011) and prepare and transfer necessary information to the Dutch side according to agreed requirements (by 01.08.2011);

the Dutch side will finalise an initial version of the prototype (tentatively by 15.11.2011; an exact date is to be appointed by 01.07.2011).

2.3. The results of the discussion of the 3D cadastre model and the prototype are stated in agreed decisions presented in Annex 4.

3. The Dutch side suggested to schedule the next workshop in Moscow and Nizhny Novgorod for November 2011. The meeting in Nizhny Novgorod shall be governed by the readiness of the 3D cadastre prototype and a place and an exact date shall be agreed by the sides.

The duration of the workshop will be 5 days. A one-day training of Russian specialists by Dutch experts can be included.

Dutch specialists will present proposals on training by 01.08.2011.

Workshop time suggested by the Russian side shall be agreed by both sides 3 weeks before the workshop.

4. The Dutch side will present an elaborated project work schedule by 05.07.2011.

From the Russian side:

Rosreestr

O.F. Schwarz

FCC “Zemlya”

A.N. Ivanov

N.M. Vandysheva

M.M. Yakubovich

From the Dutch side:

Netherlands Kadaster

Rik Wouters

Veliko Penkov



Annex 1

RUSSIAN-DUTCH WORKSHOP

3D Cadastre Modelling in Russia

Project G2G10/RF/9/1

List of participants

Moscow – June 19-23, 2011

Ministry of Economic Development of the Russian Federation

1. Victoria Valeryevna ABRAMCHENKO – Deputy Director; Real Property Department
2. Viacheslav Alexeyevich SPIRENKOV – Chief; Division for the Normative and Legislative Regulating of Cadastral Recording and Cadastral Activities, Real Property Department

Federal Service for State Registration, Cadastre and Cartography (Rosreestr)

1. Galina Yuryevna ELIZAROVA – Deputy Head
2. Sergey Alexeyevich SAPELNIKOV – Deputy Director
3. Lyudmila Evgenyevna EROSHENKO – Deputy Chief; Planning, Organisation and Control Department
4. Oleg Ferdinandovich SCHWARZ – Chief; Information Technology Department
5. Nadezhda Sergeevna LESHCHENKO – Deputy Chief; Department for Control and Methodological Support in Rights Registration and Cadastral Recording
6. Lyudmila Ivanovna GONCHAROVA – Chief; Division of the Development of Information Systems and Technologies, Information Technology Department
7. Irina Alexandrovna STALNOVA – Chief; Analysis and Coordination Division, Department for Control and Methodological Support in Rights Registration and Cadastral Recording
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Federal Cadastral Centre “Zemlya”

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3. Natalia Mikhailovna VANDYSHEVA – Chief; Spatial Data Division
4. Sergey Alexeyevich PAKHOMOV – Chief; Division of Software Designing and Development
5. Vera Pavlovna IZOTOVA – Chief Specialist; Spatial Data Division
6. Elena Yuryevna MAKOSSEVA – Chief Specialist; Spatial Data Division
7. Ekaterina Victorovna BELORUSTSEVA – Leading Specialist; Spatial Data Division
8. Yury Anatolyevich GORODNICHEV – Chief; Division of Methodological Support and Software Maintenance
9. Anatoly Ivanovich SHCHERBAKOV – Project Manager; International Projects Division
10. Tatiana Alexandrovna KULAKOVA – Chief Specialist; International Projects Division
11. Alexandr Alexandrovich ZHULEPNIKOV – Chief Specialist; International Projects Division
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Nizhegorodskaya Oblast (pilot region)

1. Irina Victorovna BERDNIKOVA – Head; Rosreestr Office in Nizhegorodskaya Oblast
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Moscow Aergeodetic Enterprise

1. Nikolay Konstantinovich KAZEEV – Interim Chief Engineer

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Kadaster International, the Netherlands

1. Rik WOUTERS – Manager
 2. Veliko PENKOV – Project Coordinator
 3. Peter van OOSTEROM – Expert
 4. Boudewijn SPIERING – Expert
 5. Andreas HOOGEVEEN – Expert
- Interpreter
1. Olga Valeryevna CHALEY

Annex 2

Questions and explanations during the examination of the draft LADM standard

- | | |
|---|---|
| <p>1. Что понимается под термином «управление недвижимостью» - более подробное определение?
<i>Пояснения: Это понятие включает в себя процессы формирования объекта недвижимости, осуществление государственного кадастрового учета, проведение государственной регистрации права на объект недвижимого имущества и предоставление из кадастра и реестра прав. Словосочетание “land administration” включает в себя более широкое понятие нежели «администрирование земельных участков» и распространяется на слой земли, недра, воздух и неразрывно связанную с земельным участком недвижимость.</i></p> | <p>What is meant by “land administration”?
A more detailed definition.
<i>Explanations:
This term includes processes of the formation of a real property, recording in state cadastre, registration of rights to a real property and data distribution from cadastre and the register of rights.
The phrase “land administration” includes a wider concept than “the administration of land parcels” and extends under and above surface, including mineral resources and attached real properties.</i></p> |
| <p>2. Что понимается по “регистрацией”, что является объектом регистрации - объекты недвижимости, правообладатели объектов недвижимости или права на объекты недвижимости?
<i>Пояснение: В стандарте слова “учет” и “регистрация” являются синонимами. LADM – описывает объекты для управления</i></p> | <p>What is meant by “registration”?
What are objects of registration: basic administrative units, their right holders or rights to basic administrative units?
<i>Explanations:
In the standard, “recording” and “registration” are synonymous.
A LADM describes basic administrative</i></p> |



- недвижимостью*
3. Что понимается под правом землепользования и право землевладения? (аналог российских вещных прав на земельные участки?)
В стандарте перечислены возможные виды прав (как вещные, так и обязательственные), которые определены законодательством конкретного государства.
4. Что понимается под понятием “обязанности”, и в каких случаях они подлежат регистрации? Какая разница между ограничениями и обязанностями?
Обязанности – правила использования недвижимости (например: для российского законодательства – категория земель и вид разрешенного использования, в законодательстве других стран: обязанность косить траву, красить ежегодно фасад здания и т.п.), устанавливаются законодательством каждого государства, в том числе требование о регистрации таких обязанностей. Ограничения – запрет на выполнение каких-либо действий в отношении объекта недвижимости (например: запрет на проведение земляных работ в охранной зоне трубопровода и т.п.).
5. Каким образом осуществляется регистрация водных ресурсов, участков недр?
Порядок регистрации устанавливается законодательством государства (например: регистрация водных ресурсов в России осуществляется в государственном водном реестре и т.п.). При этом для проектирования информационной системы ведения государственного водного реестра также можно (рекомендуется) использовать LADM для обеспечения обмена информацией между ведомствами, осуществляющими ведение водного реестра, кадастра недвижимости и иными.
6. Каким образом осуществляется индивидуализация таких объектов как лестница, подъезд, место парковки, зона прачечной (3-мерные объекты)?
Индивидуализация осуществляется путем определения пространственного объекта, который описывается с помощью
- units.*
- What is meant by “right of land use” and “land ownership”? (Analogues of proprietary rights to land parcels in Russian legislation?)
The standard has named possible types of rights (both proprietary and personal) as defined by the legislation of a particular jurisdiction.
- What is meant by "responsibilities" and when they are subject to registration?
What is the difference between restrictions and responsibilities?
Responsibilities are rules for the use of real property (e.g.: in Russian legislation – a land category and a permitted use; in other jurisdictions: the responsibility to mow the grass, to paint the facade annually, etc.). They shall be prescribed by the legislation of each jurisdiction, including the requirement to register such responsibilities. Restrictions are prohibitions to make some actions concerning a property unit (e.g.: prohibition on earth works in the protection zone of a pipeline, etc.).
- How are water resources, mining plots registered?
Registration procedures are set by the legislation of a jurisdiction (e.g.: the registration of water resources in Russia is performed in the public water register, etc.). In designing an information system for a public water register, the LADM can (is recommended to) be also used to support information exchange between agencies involved in keeping the water register, real property cadastre and other registers.
- How is the individualization implemented for such objects as a stairs, a threshold, a parking place, a laundry space?
Individualization is made by defining a spatial unit that is described using geometric parameters of boundary faces, strings.

- геометрических параметров ограничивающих поверхностей, р² бер.*
Геометрические параметры могут быть представлены геодезическими данным в трехмерной системе координат.
Законодательством некоторых государств (например: Австралии) установлена возможность определения объемного пространственного объекта для регистрации права на это пространство (например: “вид из окна” – для запрета возведения объектов, изменяющих сложившуюся инфраструктуру, на определенном удалении от основного объекта).
7. *Объект недвижимости как субъект права?*
Ситуация когда право следует судьбе объекта недвижимости.
8. *Понятие парцеллы? Это правовая или техническая категория? Является ли парцелла объектом недвижимого имущества?*
Парцелла в понимании LADM – объект недвижимости технически описанный, права на который зарегистрированы.
Парцелла – символ пространственного объекта.
9. *Понятие “неофициальной нормы”? Где прописана? Насколько обязательна для исполнения? Правовые последствия нарушения указанной нормы?*
Неофициальная норма – норма определенная традициями (не определенная законодательством, и не гарантируется государственная защита).
10. *Вопрос о наложении прав: не приведет ли пересечение прав к нарушению законных интересов правообладателей?*
Пример: реституция - регулирует разрешение вопросов в случае наложения прав.
11. *“Обязанности” и “обязательственные права” – одно и тоже понятие? Если разные понятия, то в чем различие?*
См. пункт 4
- Geometry can be presented by geodetic data in a 3D coordinate system.*
Legislations of some jurisdictions (e.g., Australia) have set the possibility to define a voluminous spatial unit for the registration of a right to this space (e.g.: “a view from the window” in order to prohibit the construction of objects changing the existing infrastructure at a certain distance from the main object).
- A “basic administrative unit” as a “party”?
A case is when a right belongs to a basic administrative unit.
- A “parcel”? Is it a legal or technical denomination? Is a parcel considered as a basic administrative unit?
In the LADM context, a parcel is a technically described basic administrative unit with registered rights.
A parcel is a representation of a spatial unit.
- An "informal obligation"? Where is it defined? To what extent is it obligatory for execution? Legal effects of a breach of this obligation?
An informal obligation is a-rule established by traditions (not by law; it is not protected by a state).
- Overlapping rights.
 Would overlapping rights lead to the infringement of legal interests of right holders?
Example: restitution – it regulates the solution of problems in the case of overlapping rights.
- "Responsibilities" and "personal rights".
 Do they represent one concept? If different, what is the difference?
See line 4

Annex 3

**On the discussion of the WP1 report of the Dutch experts
“Legal framework and organisation of 3D cadastre”
(the legal section)**

The following subjects were considered in the legal section:

Russian legislation structure.

Specific features of state cadastral recording and state rights registration in Russia/

The WP1 report of the Dutch experts “Legal framework and organisation of 3D cadastre”/

The following was ascertained in the result of discussions:

1. The federal legislation of the Russian Federation has the following structure: the Constitution of the Russian Federation, codes, federal laws, laws, decrees of President, resolutions of the Government, subordinate normative legislative acts.

Federal laws prescribe general requirements in a whole sphere, procedures for state cadastral recording and state rights registration. Procedures for data distribution from state property cadastre and the Unified State Register of Real Property Rights and Transactions are defined by an authority of normative and legislative regulating in the area of respective activities.

2. In the Russian Federation, there are not notions “registration in cadastre” or “cadastral registration”. There are notions “cadastral recording” and “registration of rights”. These are separate procedures and, although they are in Rosreestr capacity, actually they are performed by different organisations and are managed in different data bases (GKN/State Real Property Cadastre and EGRP/Unified State Rights Register).

3. In result of the discussion of the WP1 report, it was ascertained that, in Section 2.2 (Cadastral object types), it is stated that, according to Article 1 (Part 5) of the Federal Law “On State Cadastre of Real Estate” No. 221-FZ of 24.07.2007 (hereinafter – Cadastre Law), cadastral recording is performed in five property types: land parcels, buildings, structures, premises (in the report – “apartment units”), unfinished objects.

Therewith, according to Article 43 (Part 1) of the Cadastre Law, a transition until January 1, 2013, was set for the application of the Cadastral Law to relationships arising in connection with the state recording of buildings, structures, premises, unfinished objects.

During the transition, the state recording of buildings, structures, premises, unfinished objects shall be performed by:

- 1) authorities and organisations for state technical recording and/or technical inventories – according to the earlier prescribed procedures for state recording;
- 2) budget institutions subordinate to the cadastral recording authority – according to the procedures for state recording in the transition period.

Annex 4

Decisions on the development of a model and a prototype for 3D cadastre

3D parcel narrative as PDF (for easy visualization) and 3D data (LADM / XML model using GML) have to be supplied.

For normal parcels, 3D polyhedron is a sufficient description.

For 3D linear parcels (including pipeline), an additional option would be the following: an attached (multi-) polyline with object characteristics.

New 3D parcel that crosses multiple land parcels is a transfer of ownership (or other right of these parcels at a single new 3D parcel).



For reference, the following topographic objects are required: 3D buildings (rooms), roads, pipelines and cables and if possible DTM.

Accuracy 3D object is equal to 2D object. A face must be within the same accuracy.

Horizontal and vertical reference: the standard coordinate system used in Nizhegorodskaya Oblast.

Height (z) coordinate: absolute (vertical reference) required and relatively (compared to Earth's surface) is optional.

Curved surfaces approximated by flat faces (this model will remain relatively well implementable).

The preference is to store the 3D parcels in the same database table as the 2D parcels. With this, it is also necessary to allow the storage of a 2D description of a 3D object for coupling with adjacent 2D objects. The structure of a table must allow the storage of the footprint of a 3D object, and its projection.

The implementation of the prototype will be based on Oracle 11.

