Soviet military mapping

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At the meeting in Cambridge on 8 October, the author presented a personal view of the history and scope of Soviet military mapping based, in part, on his extensive private collection of these maps. This is an edited version of his talk.

It is appropriate that Cambridge is our venue because my interest began in 1993, when Anne Taylor and I attended the International Cartographic Congress in Köln. Delegates from a little known map shop in Latvia (of which we shall hear more later) distributed an A4 leaflet advertising Soviet topographic and city plan mapping. If they really were Soviet military city plans, then these were items which four years before were so highly classified that even squaddies in the Red Army were not allowed to see them. This was what Ivan was going to invade the West on at the height of the cold war: I just had to try to get them.

Over the next four years the trail laid from Latvia into Estonia, Poland and the US, until by early 1997 I managed to amass possibly the UK's most comprehensive private collection of, firstly, town plans and then topographic maps of UK produced by the Soviets. The next step, when I retired, was to do some 'map research' on them but somebody else got in first.

What follows is very much a 'work in progress' and it is important to be aware that no catalogue is available against which to check map coverage. The views expressed, and errors and omissions made, are entirely my own and do not represent those of Defence Geospatial Intelligence or the MoD.

Soviet Organisation

What is now the Russian Military Topographic Directorate or *Voyenno Topograficheskogo Upravleniya* (VTU) has had various names over the years. VTU was established in 1812, immediately after the Siege of Moscow, so Napoleon was influential, an historical connection to the OS *raison-d'être*!

VTU has always been administered by the Army General Staff (hence *Generalnyy Shtab* as the title to all mapping). The strategic value of accurate topographic mapping has always been realized in autocratic states and Russia was, and is, no exception. Such important information must be tightly controlled at the highest level.

Up to 1917, VTU carried out military topographic surveys of strategically important areas of Russian territory. The British were able to use Russian mapping of the Crimea, but other strategic areas mapped included St Petersburg and Moscow. It also developed a comprehensive military topographic officer training programme, initially at the academy in St Petersburg. Training manuals are still held in the Lenin Library.

The Revolution added impetus to the need for good quality military mapping, ostensibly as a foundation for economic development. However such products were also useful for 'internal' purposes, firstly in the post-revolutionary state and then the Soviet Union.

An organization which could systematize and provide an independent capability in all aspects of surveying (and later satellite technology), photogrammetry, cartography and printing was required. So in March 1919 the Supreme Geodesic Directorate (VGU) was set up. Its initial mission was to survey and map the vital Donbass, Kusbass, North Caucasus, Central Asia and Greater Moscow coal, oil and gas fields. City mapping of Moscow, Leningrad and other places was also required.

Survey and mapping continued throughout the 1920s and 1930s, despite frequent re-organisations mirroring political change. However the Great Patriotic War presented the greatest challenge, specifically the need for large-scale topographic mapping from the western borders to the Volga. The effort was heroic. Mapping at 1:1,000,000 was completed for this area in less than a year. Over 80 million copies of 13,000 map sheets were printed in the first six months of the war.[1]

After the war two goals emerged: mapping the USSR to aid post-war redevelopment and mapping the world the spread the Revolution, of which more later.

Current situation and Soviet comparison

VTU is headed by a Lieutenant General and consists of five training academies (St Petersburg, Moscow, Novosibirsk, Khabarovsk and Tomsk); cartographic factories in Moscow, Novosibirsk, Omsk and Ekaterinburg; print factories in St Petersburg, Moscow and Saratov; map stores throughout the country; optics factories for satellite / photographic equipment; surveying equipment factories; research facilities and an archive.

Then there are the topogeodesic surveying teams themselves. I have not seen any figures for how many there were / are, or where they are based, but when you are surveying a fifth of the world's land surface with the technology available I suggest you would need a fair few.

In terms of staff, current figures are not available, at least in the English language, but in 1996 there were around 4500 cartographers in Kiev looking for work and this was just one factory and probably not the largest, which was probably in Moscow. So maybe 35,000 – 40,000 cartographers plus surveyors!

However, in many respects what we have today is a shadow of the Soviet leviathan! The organisation was headed by a Colonel General and two Lieutenant Generals. As well as the 'Russian' factories above, there were print factories in Minsk, Kiev, Riga, Tbilisi and Tashkent and cartographic factories here and in the capitals of most of the Socialist Republics. Each Republic also had its own map store, the little one in Chisinau (Moldova) being roughly the size of two Tolworth spurs: heaven knows what a central store in Moscow would look like.

Then the organization effectively administered 'contracting' of cartographic work across the eight European Soviet satellites and trained their technical staff. It also provided 'technicians' who aided development in Mongolia, Somalia, Mozambique, Yemen, Cuba, Angola, Libya and Syria, and probably a lot more nooks and crannies! So in terms of global reach they were probably the most comprehensive mapping organisation in the world.

World mapping programme

It is useful to distinguish between three types of mapping: topographical, cadastral and city plans. The Russians define 'topographical' as mapping between 1:25,000 and 1:1,000,000, although contoured mapping is produced at 1:10,000.[2] Cadastral mapping is produced at scales from 1:500 to 1:25,000. City plans are at 1:10,000 or 1:25,000.

It may also be useful to remember that at the height of its paper production the OS had an inventory of around 230,000 sheets.

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[1] This compares to around sixty million copies under direct GSGS control for the whole war, and around 315,000,000 by all printers between January 1943 and December 1945.

[2] Scales smaller than 1:1,000,000 are classified as planning maps.

Russia: topographic

Dr Vereshchaka's book[3] states that there is complete topographic cover of the Soviet Union at 1:250,000,[4] 1:100,000, 1:50,000 and 1:25,000. A conservative estimate of the combined total for these is around 380,000 sheets.

It has also been reported that around 25% of the country (the agriculturally productive part) is covered at 1:10,000, although there is a plan to complete the cover.[5] That would make about another 440,000 sheets.

Cadastral

Soviet cities were each covered by cadastral sheets at 1:500, 1:1000, 1:2000 and 1:5000. I can find no data either on how many cities were covered but as a pure guess, say this could be another 20,000 sheets.

City plans

Finally consider the city plans proper at either 1:10,000 or 1:25,000 depending on the geographic extent of the city. No examples covering cities within the Russian Federation have been acquired by UK collectors (despite some energetic searches at times) but given the size of some of the towns covered in the UK, this could be another 3000 sheets.

Highly approximately that brings us up to around 840,000 sheets, to be compiled and maintained.

The rest of the world: topographic

It is highly likely that the world (with the possible exception of Antarctica) was mapped completely at 1:1,000,000, 1:500,000 and 1:200,000. Experience counting patchy 1:250,000 NATO standard cover suggests that 1:200,000 cover might be around 20,000 - 25,000 sheets, with 1:500,000 and 1:1,000,000 contributing another 4000 or so between them. So that might be another 24,000 - 29,000 sheets, taking the grand total to say 870,000 sheets.

Topographic mapping at 1:100,000 and/or 1:50,000 has also been released, or believed to exist, over the whole of Europe, the Middle East, North and Central America, large areas of South America, the Indian subcontinent, south-east Asia, China and the populated areas of Africa. If there was 50% cover, then, between both series, that might be another 200,000 sheets. And we're now up to 1,070,000 sheets.

Cadastral

We are now in the realms of pure conjecture, but as I have seen sheets at 1:5000 over Luanda in the classic Soviet cadastral specification, it would imply that cadastral mapping could have been produced over virtually anywhere where they had their fingers in the pie! Say another 50,000 sheets?

City plans

Nearly eighty of these have been released over UK alone (although one could argue that as their 'number two enemy' in the Cold War the Soviets had an especially unhealthy interest in us).

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[3] *Topographic Mapping, a Scientific Basis*, Moscow State University of Geodesy and Cartography, 2002.

[4] An odd scale to quote as the Soviets mapped at 1:200,000.

[5] The programme began in mid 1960s and is still going on.

UK collections are aware of city plans over all western European capitals, most major cities and a number of much smaller ones. If this is extrapolated worldwide then we could be looking at between say 2000 to 3000 settlements: so possibly 10,000 sheets.

In other words, an extremely approximate estimate would put their inventory at around 1,130,000 sheets, of which over 300,000 sheets are of 'foreign parts', and this does not include mapping produced for internal consumption to their own specifications by Soviet satellites and to which the Soviet Union would have had direct access. How many sheets of this there were is anyone's guess.

Bear in mind also that VTU had to organise the cartography, printing, storage and distribution of all these sheets, and that production, printing and storage of mapping over the Soviet Union also had a political element in that, for instance, maps covering Latvia would be produced, printed and stored well away from Latvia so that insurgents raiding the map store could not use the Soviet maps against the Red Army.

How the maps were produced

As John Davies is about to give us his thoughts on this over UK, I will not go into too much detail. Suffice to say that before 1962 and the first photographic satellite, the best sources would have been the host country's own mapping[6] plus any 'other information' which could be gleaned. (Although I did hear someone say that the Russians did not use Ordnance Survey mapping because it was merely capitalist government propaganda, which it was of course!)

After 1962, progressive satellite systems, beginning with Zenit, were and are used. Interestingly though, the technology was photographic, not imagery based, with cameras having focal lengths of up to 3.5m. (Your average 35mm camera focal length is somewhat shorter!)

[6] Shades of the Germans buying UK mapping before WWII.