The Cartographic Journal *Vol. 33 No. 2 pp. 131–139 December 1996*

The State of Mapping in the Former Satellite Countries of Eastern Europe

Peter Collier, Dominic Fontana, Alastair Pearson and Andrew Ryder

Department of Geography, University of Portsmouth, Portsmouth, Hants PO1 3HE.

Since the breakup of the former Eastern Bloc and the emergence of newly independent states from the former Soviet Union, there has been a more liberal approach to the publication of maps. Types and scales of maps which had formerly been available only to the military or planners are now being sold freely to the general public and to foreigners. Freed from the straitjacket of military requirements and censorship, a number of the former Eastern Block countries are also producing a much wider range of map types. This paper explores both the types of maps formerly produced in the satellite countries of Eastern Europe and those being produced under the new, more liberal regimes.

INTRODUCTION

With the breakup of the former Eastern Bloc most of the countries that made up the Bloc have adopted more liberal map publication policies. These new policies have made available for the first time a wide range of map types formerly barely hinted at in reference works such as World Mapping Today (Parry and Perkins 1987). Even recent publications such as Verzeichnis der amtlichen topographischen Kartenwerke: Neuerwerbungen 1946-1992 (Garschagen and Knorr, 1993) have almost no information on medium to large scale mapping in Eastern Europe. Bohme (1993) while incorporating some information on current and recent mapping was forced to go to print while the former Eastern Bloc was still in the midst of opening up. Among the maps which are being made available to the public for the first time are military maps produced for the USSR armed forces which cover Western European and North American cities at scales of 1:10,000 and 1:25,000. These contain details of potential military, industrial and administrative targets. They are, however, beyond the scope of the present study, but will be discussed in a future paper. It is felt therefore that a survey of what was currently available in Eastern Europe is timely and that it is worth considering the likely future course of map production and publication.

In general, the countries of the former Eastern Bloc may be separated into the former Soviet Union and the other members of the Council for Mutual Economic Assistance (CMEA), plus Albania. As will be seen below, this difference is still important in terms of attitudes to map publication and dissemination. The former satellites are, on the whole, more liberal in their publication policy than the former Soviet Republics. The exceptions to this are the three Baltic States which are currently amongst the most liberal.

In order to determine the current state of mapping and map publication in the former Eastern Bloc, a standard questionnaire was sent to all the known survey organisations in the former Eastern Bloc. In some cases it was difficult to identify who actually had responsibility for mapping in the newly independent states. In some cases even the embassies were unable to provide contact names and addresses. In those cases the questionnaire was sent to the Department of Geography of the university in the capital city with the request to forward it to the appropriate organisation.

For completeness, it was also decided to send the questionnaire to the Survey Departments of the Lander in the former DDR. It was expected that similar responses would be obtained from all former Lander. It was also expected that their present situations would be atypical. The responses did much to confirm what the position had been under the former regime, with its centralised approach to map production, and also threw up some differences between the Lander.

The questionnaire was aimed at obtaining information on the scales at which topographic mapping had been produced under the former regime, the amount of coverage at each scale and whether those maps were now being made available to the public. It asked whether there had been any changes in the content and scales of maps being produced after 1989. The mapping organisations were also asked if aerial photography was available to the public, and whether geodetic data was being published. The final part of the questionnaire was aimed at determining whether digital mapping was available and if this was being published. The Departments were asked also to comment on whether changes in publication policy were being contemplated. Finally, the organisations were asked to provide any additional information that they felt might be helpful.

Among the additional information supplied by the mapping organisations, there were a number of references to cadastral mapping and other issues not covered in the original questionnaire. Following the initial responses to the questionnaire it was therefore decided to ask some additional questions of all the organisations about cadastral mapping, navigational charts, ortho-photomapping, the use of satellite imagery and changes in the projection and grid used.

Completed questionnaires were received from Bulgaria, the Czech Republic, Hungary, the Slovak Republic, Slovenia and three Lander of the former DDR, Mecklenburg-Vorpommern, Sachsen and Thuringen. Alternative sources such as official publications and university contacts were used to obtain information on Albania, Poland, Romania, Brandenburg and Sachsen-Anhalt. A summary of the results are given in Table 1.

THE SOVIET SYSTEM

The Soviet system of topographic mapping was highly centralised and produced maps of uniform appearance, except for the characters used (Cyrillic or Latin), throughout the former Soviet Bloc. In the Soviet Union itself direction was given by a military institution, the Main Directorate of Geodesy and Cartography (Glavnoe Upravlenie Geodezii i Kartographiei or GUGK) and was aimed at meeting military requirements. Topographic mapping and geodesy were mainly the responsibility of military organisations or centralised bodies in Leningrad and Moscow. Institutes in the constituent republics of the Soviet Union could map areas of between 5-100km^2 in the local coordinate system, the size of the area being set by the GUGK and based on specific requirements from the individual republics.

Maps were classified into 4 groups: "public", "for authorised use only", "secret" and "top secret".

"Public" maps were readily available to the public and generally took the form of enlargements from 1:2,500,000 scale maps. These maps could be enlarged and updated manually by "visual estimates" (Jagomagi and Mardiste, 1994). Any additional information required the approval of a special commission. Printing permission had to be given by the censor of GLAVLIT. Maps for general use, such as tourism and city plans, were only produced on a specially distorted base prepared by GUGK. "Public" maps were characterised by the gross simplification of detail, the omission of information and the incorporation of deliberate errors. In restricting public access to good mapping, the Soviet system merely inherited and elaborated on the one developed in Tsarist times.

"For authorised use" maps were of limited areal extent. For example a topographic map extract could only cover less than 10km^2 and then only if all coordinate numbers, information on cross-country mobility (such as fords and peat depths) and military objects were omitted. Simplified and moderately distorted maps without height information and with only sparse place names could be made for areas in excess of 10km^2 for use on collective farms and for administrative districts.

"Secret" maps included all topographical maps but extracts were permitted for publication if they did not show secret information. In 1965 the "1963-year system" was adopted but the sheet line was moved about 1′ in both directions relative to the "1942-year system" (see below).

"Top secret" maps included the "1942-year system" maps but also included gravimetric and radiometric maps.

Table 1.

COUNTRY	UP-TO-DATE MAPPING PERCENTAGE AVAILABLE 10000	25000	50000	100000	GEODETIC DATA AVAILABLE	DIGITAL MAPPING AVAILABLE
ALBANIA	**	**	**	**	not known	not known
BULGARIA	**	100	100	100	yes	some large scale
CROATIA	***	***	***	***	***	
CZECH	100	100	100	100	yes	various scales
BRANDENBURG	100	100	100	100	yes	some
MECKLENBURG	100	100	100	100	yes	25000 scale
SACHSEN	100	100	100	100	yes	
SACHSEN ANHALT	100	100	100	100	yes	
THURINGEN	100	100	100	100	yes	
HUNGARY	70	26	none	100	yes	100000 scale only
MACEDONIA	***	***	***	***	***	
POLAND	some	none	some	60	not known	
ROMANIA	*	**	**	100	not known	
SERBIA	***	***	***	***	***	
SLOVAK REP.	100	100	100	100	yes	50000 complete
SLOVENIA	Y	Y	Y	Y	yes	some

* incomplete and not available to the public

** complete but not available to the public

*** no information received

The "1942-year system" was the standard adopted for all military mapping in the Warsaw Pact and uses a sheet designation system and sheet-lines based on the International Map of the World (IMW). Figure 1 is an extract of a 1:50,000 1942-System map of Kovno, Lithuania. The 1942-year System has an importance beyond its military origins as its style and sheet designation system strongly influenced the development of civilian mapping in the DDR, Poland and much of the former Soviet Union.

The 1:1 million scale maps conformed to standard 6° by 4° format with the sheet-lines being defined by the graticule. Each 1:1 million sheets was divided into four 1:500,000 sheets which had an additional letter in the designation to indicate which quadrant of the 1:1 million sheet was covered by the map. At some stage in the early 1970's an additional sheet designation system was adopted, shown in blue, which replaced the initial letter of the IMW designation by the number corresponding to the position of the designation letter in the Roman alphabet (for example N 33 became 14 33).

For the 1:200,000 sheets, which covered 1° by 40′ the 1:1 million sheet was divided into 36 and numbered from top left to bottom right. This additional number was given in Roman numerals. 1:100,000 sheets were numbered from 1 to 144, in Arabic numerals and covered 30′ by 20′. 1:50,000 sheets were designated by the addition of a capital letter A to D, in the sequence top left, top right, bottom left and bottom right.

1:25,000 sheets were then designated by the addition of a lower case letter, a to d in the same sequence. Each 1:25,000 was divided into four 1:10,000 sheets, numbered 1 to 4. This resulted in the 1:10,000 sheets being 50% larger in each direction than any of the other scales. The full designation for the 1:10,000 sheet for the centre of Lodz in Poland was therefore M-34-3-D-b-4.

One disadvantage of a rigid adherence to the IMW sheet-lines is that, apart from the 1:10,000 sheets, the individual

Figure 1. 1:50,000 Soviet map on the 1942-System of Lithuania

Figure 2. 1:50,000 DDR AV edition map from 1978 (reproduced with the permission of Landesvermessungsamt Mecklenburg-Vorpommern)

sheets are quite small, typically about 350 x 370mm. This gives a relatively small area of coverage and necessitates large numbers of individual sheets to cover the countries concerned.

Apart from the standardisation of sheet-lines, the marginal information and map contents were also standardised. No reference box or key was provided on sheets except for the 1:200,000 scale which had a key to communications symbolisation. Marginal information was restricted to sheet numbering, name, survey and publication dates, geographical coordinates of sheet corners, grid numbering, a scale bar and scale ratio, grid, magnetic and True North orientation information and the map publisher. There was no information on the projection and ellipsoid or origin of the projection. It may have been felt that such information was not necessary on military maps or the information may have been contained on separate sheets. It has not, as yet, been possible to ascertain which was the case.

Within the sheet lines there were a number of scale dependent variations in the use of symbolisation but the striking feature is the degree of uniformity there was both between scales and countries of origin. If the 1:50,000 scale maps are taken as an example, sheets from the Soviet Union were normally printed in six colours, black, a light and a dark blue, orange, brown, yellow and green (Figure 1). By the use of half-tone screens, maps from Satellites such as the DDR and Poland were able to use four colours (Figure 2). Major roads were shown using a black casing and solid orange fill, railways in solid black, dense urban areas were shown in orange half-tone or cross-hatching while lower density building were shown in black. Woodland was shown in solid green, with no indication of composition although plantations, orchards and nurseries were indicated by the use of half-tone. Contour intervals of both 5 and 10 metres

Figure 3. 1:50,000 DDR AS edition reprint from 1993 (reproduced with the permission of the Landesvermessungsamt Macklenburg-Vorpommem)

were used in different countries. These were supplemented, where appropriate, by intermediate contours.

Within the Satellite States 1942-year System maps were produced to meet all military requirements but some states also produced topographic map series for "civilian" use which did not conform to the 1942-year System. There is no evidence that non-1942-year System mapping was produced in the Soviet Union prior to the end of communism. The "civilian" mapping that has emerged from Russia conforms very closely in appearance and content to the 1942-year System maps even if different formats and sheetlines are now being used. Most of the "civilian" mapping seen to date has been produced by military mapping establishments (for example the 1:200,000 series of Russian oblasts).

Not all satellite states produced "civilian" mapping which differed from the 1942-year System maps. Poland, as noted below, produced mapping based very closely on the 1942-year System, and, even now, still produces mapping which sticks very closely to the old system.

In the DDR two versions were produced of basic topographic maps, the "Ausgabe fur die Volkswirtschaft" (AV) produced by the VEB Kombinat Geodasie und Kartographie for the Interior Ministry (Figure 2) and the "Ausgabe Staat" (AS) produced by the Militar-topographischer Dienst for the Ministerium fur Nationale Verteidigung (Figure 3). Production of the AS version commenced in 1954 but access to these sheets was highly restricted. The production of the AV versions, intended for administrative and economic purposes, commenced in 1978 (initially only at 1:25,000 scale, although subsequently 1:10,000, 1:50,000, 1:100,000 and 1:200,000 were added). The AV version was superficially very similar to the AS version but, in addition to the omission of any sensitive information, it lacked certain information such as geographical coordinates for the sheet corners and used a different grid and sheet numbering system. One difference between the AS and AV versions was to have implications for digital conversion after reunification: while the AS edition was on the Krassovsky ellipsoid, the AV edition was on the Bessel ellipsoid.

Similar local variations existed in some other satellite states, such as Hungary (Figure 4) and Czechoslovakia, although, as noted below, the "civilian" mapping from these satellite countries was visually very different to 1942-System map.

CHANGES SINCE 1989 AND THE POSITION TODAY

A characteristic of the changes that have taken place in the former Eastern Block since 1989 has been a move towards greater openness. This has, of course, had profound implications for the availability of mapping both to the local population and to outsiders. An initial response by some countries such as Poland was simply to "declassify" much of the former secret or top secret mapping. It has thus become possible to acquire standard topographic mapping at scales up to 1:10,000 for much of the former Eastern Block. In some cases it is even possible to obtain much larger scale mapping. Along with the greater availability of maps has gone a willingness to make geodetic information and aerial photography available to the general public. Since, however, individual countries have followed rather different policies, it is necessary to treat each country separately. Not all countries have provided the necessary information to discuss their policies, those countries have an appropriate note against them.

Albania

Of all the countries of the former Eastern Block information about mapping in Albania has been the most difficult to obtain. Parry and Perkins (1987) have very little information and note that Albania did not respond to United Nations questionnaires and does not belong to the International Cartographic Association. Bohme (1993) has been able to gather some information. Maps are produced

Figure 4. 1:25,000 Hungarian civil topographic map from 1982. Copyright: Magya Allami Foldmeres (Hungarian Geodetic Survey)

at scales from 1:10,000 based on the Soviet system but complete coverage is available only at 1:25,000 or smaller. There is no reliable information on the present publication policy. The Albanian maps on display at the International Cartographic Association conference in Barcelona (1995) consisted entirely of small scale thematic maps which were generally poorly designed and reproduced. It is possible that the lack of reliable data now owes more to economic conditions within the country than to any desire for secrecy.

Bulgaria

Topographic mapping is now generally available at 1:25,000. The whole country is covered by mapping at 1:5,000 except for some mountain areas which are covered at 1:10,000 scale. Consideration is being given to a move to 1:10,000 as the base scale for topographic mapping.

Large scale plans of urban areas are now available to the public without limitation. There is now a policy to produce such plans at 1:1,000 and 1:500 scale both as hardcopy and digital products. Similarly rural areas will be covered by both digital and hardcopy plans for the purposes of land reform but no indication has been given of the scales to be used nor of the time scale for completion.

Geodetic information is now being made available although it is not clear whether it is, as yet, widely available.

As no maps have been made available for this study, it is not possible to comment on changes from the 1942-system but at the time of writing there had been no significant change in the content.

Czech Republic

The Czech Republic now publishes, without any restrictions, topographic mapping at 1:10,000, 1:25,000, 1:50,000, 1:100,000 and 1:200,000 for the whole country. The mapping differs in a number of respects from the 1942-system but, importantly the differences pre-date the change of regime. As the system was developed before the break with the Slovak Republic, the numbering systems of the two countries are the same.

Parry and Perkins (1987) state that Czech maps are on a transverse conformal cylindrical Gauss projection with sheet-lines based on subdivisions of the IMW system. This was true at the time of writing for topographic maps produced by the General Headquarters of the Czechoslovak People's Army (Generalni Stab Ceskoslovenke Lidove Armady) but there was also a series of so-called "Basic maps" whose sheet-lines were not based on "normal" subdivisions of the IMW. These Basic maps are based on a Bessel ellipsoid and the Krovak projection. The fundamental division of these maps is into 1:200,000 sheets each covering 40′ East-West by 20′ North-South producing maps of approximately 48 x 38cm. The side sheet-lines are on the whole degree, 40′ or 20′ but the top and bottom sheet-lines are not precisely correlated with natural divisions of the graticule. The sheets are numbered sequentially from top left to bottom right but, as mentioned above, the numbering system also covers the Slovak Republic. Each 1:200,000 sheet is then divided into four 1:100,000 sheets numbered from top left to bottom right 1-4. Each 1:100,000 sheets is divided into 1:50,000 sheets in a similar fashion and these are, in turn, divided into 1:25,000 sheets. Thus the centre of Prague is on sheet 12 at 1:200,000, sheet 12-2 at 1,100,000, 12-24 at 1:50,000 and 12-243 at 1:25,000. A separate sheet numbering system is needed for 1:10,000 sheets where each 1:50,000 sheet is divided into 25 x 1:10,000 sheets numbered sequentially from top left to bottom right. Thus central Prague is covered by sheet 12-24-17.

Curiously for a system with sheet-lines based on the graticule, no graticule or grid is printed on the maps at any scale and graticule and grid ticks are not shown for scales smaller than 1:25,000. No key or reference box is included with any of the maps. Indeed there is hardly any marginal information. For example, no indication of the direction of Magnetic North is shown. This lack of marginal information seems to have been a common feature of East European mapping produced for non-military users. The AV editions of the former DDR share this characteristic. It clearly has its origins in the culture of secrecy that existed under Communism and the wish that the maps should be of little value to unauthorised users.

The maps at all scales are similar in appearance. They are printed in subdued colours and the number of colours used varies with scale. The 1:200,000, for example has most place names within the neatlines in black as well as all the marginal information and border. The neatline and all cultural detail are in grey, water features and names in blue, woodland in green and contours in brown. Administrative boundaries and administrative area names outside the neatline are in pale magenta. Also shown in pale magenta are the names of administrative regions (okresy) on the body of the map where the name does not coincide with a place name, where it does coincide the name is underlined in magenta. Thus on sheet 12, Praha, the names of the okresy Praha Vychod and Praha Zapad are in pale magenta while the name PRAHA is underlined. On other scales the grey for cultural features is replaced by a pale olive-green.

Conventional line maps are also being supplemented by the production of photomaps and image maps derived from satellite data. Photomaps are currently being produced at 1:15,000. Space image maps are being produced at 1:50,000 from SPOT data and 1:100,000 from ERS-1 data.

Lander of the Former D.D.R.

Following the reunification of Germany, one of the first steps taken was to publish the existing AV versions of the topographic mapping (on the 1 January 1990). To bring the organisational structure for surveying and mapping in line with the rest of the Federal Republic, and following the creation of Lander, Landesvermessungsamten were established in 1991 using the former local survey administration of the DDR. Since the establishment of the Landesvermessungsamten, there has been a policy of publishing the AS versions of topographic maps in addition to the AV editions. In time the AV versions will be phased out and replaced by AS versions recast on Federal sheetlines and with a new numbering system (Bohme, 1993). All the Lander are making rapid progress with the production of digital products but here, as elsewhere, Sachsen seems to be ahead of the other Lander.

Brandenburg

No response has been received from the Landes-vermessungsamt Brandenburg but the publication policy

would appear, from the evidence of the available maps, to have much in common with the other Lander. As noted above, Bohme (1993) claims that while the sheetlines and numbering system will be revised to comply with equivalent sheets in the Federal Republic, the symbolisation of the former AS editions will be retained. Unfortunately, the maps available at the time of writing are all "Ausgaben mit Wanderwegen" (edition with footpaths) dating from 1991 and 1992. They retain the symbolisation of the AS editions but, the sheetline do not correspond with either the Federal series or the AS series. In the absence of any contradictory evidence, it would seem that these are intended as interim editions.

From the sparse information available, it would appear that the focus of Brandenburg's mapping effort is the area around Berlin and the area of the Land between Berlin and Sachsen. Almost certainly this reflects the perception of this area as being the most important in terms of future development.

Some topographic maps of Brandenburg have also been issued by the "Kartographische Dienst Potsdam". This was the former DDR survey organisation which became the Landesvermessungsamt.

Mecklenburg-Vorpommern

In common with the other Lander, Mecklenburg-Vorpommern is in the process of issuing topographic maps which conform with the sheet lines and numbering system of the Federal Republic. By the end of 1993 some 25% of the 1:25,000 sheets had been issued in the new format. Only one sheet at 1:50,000 had been issued by the same date but a further nine were due for issue in 1994. No sheets had been issued at 1:100,000. While revised editions of the AS version are available (some date from as recently as the early 1990s) the lack of complete coverage in the new format should not create too many problems for potential users. The 1:10,000 maps are currently only available as AS or AV versions. There does not appear to be any intention to replace them with sheets on Federal sheetlines.

Contrary to the claim by Bohme (1993), the sheets on Federal sheetline have not retained the symbolisation of the AS version. All the available sheets now use the same symbolisation as the old Federal Lander.

Mecklenburg-Vorpommern, unlike most other Lander, at the time of writing issues only topographic maps on Federal sheetlines as "Normalausgaben" (normal or standard editions). There are no "Ausgaben mit Wanderwegen". It does, however, produce a number of "Topographisch-touristische karten" (topographical tourist maps) at 1:25,000 (for example, Wismar und die Insel Poel), 1:50,000 (Insel Rugen) and 1:100,000 (the whole Land in 17 sheets).

The Landesvermessungsamt is also issuing reprints of the pre-war 1:25,000 and 1:100,000 topographic maps. These reprint only cover the area of the present Land, i.e. they do not cover former German territories in modern Poland. This is in sharp contrast to similar maps being issued in Poland (see below).

Sachsen

Unlike a some of the other Lander of the former DDR, Sachsen has started to produce topographic maps on Federal sheetlines at 1:10,000, 1:25,000, 1:50,000 and 1:100,000.

The 1:10,000 sheet numbering system follows normal Federal practice, i.e. each 1:25,000 sheet is made up from four 1:10,000 sheets which have the same number as the 1:25,000 sheet followed by the appropriate suffix (NO, NW, SO or SW).

Sachsen differs from most of the other Lander of the former DDR by having almost complete coverage at 1:100,000, 1:50,000 and 1:25,000.

Sachsen-Anhalt

No response has been received form the Landes-vermessungsamt Sachsen-Anhalt but it would appear that about 80% of the Land is covered by 1:100,000 topographic maps on Federal sheetlines (the whole Land is, however covered by topographic "Regionalkarten" at 1:100,000). Well under half of the Land is covered at 1:50,000 although some of the former border areas in the west are covered by regular Federal mapping, presumably produced in Niedersachsen. The coverage at 1:25,000 is very similar to that at 1:50,000.

Thuringen

The Thuringer Landesvermessungsamt has made rapid progress in converting to the Federal mapping standards. By 1993 complete coverage was available at 1:100,000 scale and a start had been made on the 1:25,000 series (16 published and 25 in progress). By 1994, 46 1:25,000 sheets had been published and 81 were in progress. This represented most of the Land. No start has, however, been made on the 1:50,000 which, as elsewhere in the former DDR, has been assigned the lowest priority.

The only 1:10,000 maps currently available are different versions of the DDR AS editions. These are available in monochrome or 4 and 5 colour editions.

As in Mecklenburg-Vorpommern, the pre-war 1:100,000 and 1:25,000 maps of the Land are being reprinted. Aerial photography and orthophotographs are also widely available.

Hungary

Hungarian mapping for non-military purposes had already diverged from the Soviet model long before the breakup of the Soviet Bloc. Possible reasons for this are discussed below. In common with other Soviet Bloc countries, military mapping after 1952 was based on the Krassovsky projection. Civilian mapping was initially based on the Gauss-Kruger projection and used neatlines based on the grid rather than the graticule. After 1965 civilian mapping was produced on a stereographic projection. This changed again in 1975 with a change to a new projection system, the Egyseges Orszagos Vetuleti Rendszer or EOV (Uniform National Projection System). This is based on the IUGG International ellipsoid and an oblique secant cylindrical projection. All maps now conform to a Uniform National Mapping System (Egyseges Orszagos Terkepezesi Rendszer or EOTR) (Apagyi, 1994).

All map sheets at 1:100,000 and 1:200,000 are now available on the EOV, about 70% of 1:10,000 sheets but

only 26% of 1:25,000 are available. Those sheets which are not currently available as EOV editions are still available on the old projections (Apagyi, 1994).

The EOTR map at 1:100,000 is currently available in digital form but with reduced contents. It is also intended to produce digital data at 1:10,000 and 1:25,000 to meet the growing demand for GIS mapping. A "Government Development Project on GIS-Oriented Digital Mapping, Surveying and Cadastre" has been set up to establish the necessary infrastructure and staffing to implement the proposed mapping.

Hungarian mapping, like that of the Czech Republic, is distinctive in appearance. The colours used are different from those used in other east European countries. The background colour for many land cover classes is a pale yellow, rather than the green used elsewhere, while contours are printed in an orange (almost vermilion). The same orange is also used for some road fillings. Buildings are all shown as a solid black at scales of 1:25,000 or smaller, even where at smaller scales generalised area symbols are used. At 1:10,000 buildings are shown with a black outline and a half-tone orange fill.

Poland

Although no response has been received from Polish mapping agencies it has been possible to put together a fairly accurate picture of developments since 1989 using published material including a catalogue (Wojskowe Zaklady Kartograficzne, 1994), discussions with Polish academics and the published maps.

In 1949 mapping in Poland was reorganised with military mapping becoming the responsibility of the General Staff of the Polish Army and civilian mapping being undertaken by the Glowny Urzad Geodezji i Kartografii (GUGiK) (Head Office of Geodesy and Cartography). Mapping was carried on the 1942-year System (Uklad 1942) covering the whole country at 1:25,000, 1:50,000 and 1:100,000. In the mid 1950s larger scale mapping was started at 1:5,000 or 1:10,000, depending on the area. As elsewhere in the Eastern Bloc, these maps were not available to the general public. In consequence it was necessary to produce maps for civilian at 1:25,000 and 1:100,000 but lacking geographical coordinates and containing intentional distortions. These were the equivalent of the AV editions in the DDR and subject to the same security restrictions. In 1976 a start was made on a new civilian edition (Uklad 1965) with mapping at 1:10,000, 1:25,000 and 1:50,000 and in the late 1970s on a new unified edition at 1:100,000.

The financial problems of the country in the 1970s had led to a lack of investment in the mapping programmes of both the military and civilian agencies and by the late 1980s all Polish maps were out of date.

Following the change of regime the Wojskowe Zaklady Kartograficzne started to publish the Uklad 1942 maps, the only significant changes being the addition of a printed cover. The whole country was covered by 1:200,000 scale maps during 1990-92, and a start was made on issuing the 1:100,000 maps during 1991-93. It was soon realised that the Uklad 1942 maps were inappropriate for civilian usage due to their relatively small area of coverage per sheet and the decision was therefore made to produce a new series of 1:100,000 scale maps each sheet covering two of the former sheets. Only 28 of the Uklad 1942 sheets were issued before the change-over took place. The first of the new double size sheets were issued in November 1993. Apart from some changes in the colours, these are recognisably the same maps as the Uklad 1942 sheets. The real difference is on the reverse of the sheets which are now has information about the settlements on the map, tourist information and advertisements. More recent sheets (for example sheet M-34-3/4, Lodz) are joint publications of Zarzad Topograficzny Sztabu Generalnego WP, Panstwowe Przedsiebiorstwo Geodezyjno – Kartograficzne and Wojskowe Zaklady Kartograficzne. This indicates some attempt at the rationalisation of map production in Poland although in the early 1990s these organisations competed for custom.

A start has been made on the publication of topographic maps at 1:50,000. The first sheets are in two blocks around Warsaw and Plock. These new 1:50,000 maps are being produced by the Glowny Geodeta Kraju rather than the Wojskowe Zaklady Kartograficzne and are derived from the 1:10,000 sheets of the same organisation (see below). This indicates a move away from miliary to civilian control of mapping. Most publication dates are given as 1995 although one sheet (N-43-139-C, Piaseczno) has a publication date of 1994 despite containing data which is dated 1995. These new sheets have bilingual (Polish and English) keys, a revised colour scheme and identify a wide range of land and building uses, including garages, orphanages, slaughter-houses, mills, bakeries and distilleries. A number of 1:50,000 tourist sheets based on districts, such as Okolice Opola and Okolice Lodzki, have also been issued. These cover the equivalent of more than four Uklad 1942 sheets but the similarity to the early maps is unmistakable, the only significant difference being the change in the contour colour from brown to black.

At the time of writing a start has been made on publishing 1:10,000 maps. Like the 1:50,000 sheets, these are published by Glowny Geodeta Kraju. Publication seems to have started in 1993 and covers major centres such as Lodz. The style and sheet-lines are again derived from early Soviet models but they have the addition of a key. Despite the similarities of style with early maps, these are clearly new editions with survey dates in the 1990s.

Other new maps include a series of topographic-administrative maps at 1:100,000. These are produced by Przedsiebiorstwo Geodeezyjno-Kartograficzne, Katowice. Each is design to cover a Wojewod, although it has sometimes been necessary to print the sheet in two halves, for example the Katowice sheet. Each sheet is accompanied by a gazetteer. At the time of writing this paper, sheets are available for only 14 Wojewods, all in the south of the country.

Some pre-war military topographic maps, originally produced by the Wojskowy Institut Geograficzny, have been published since about 1993. Unlike the German examples discussed above, in a number of cases these cover territory which is no longer part of Poland. Some examples are of the Vilnius area in Lithuania and others cover parts of what is now the Czech Republic. Although most of the original maps dated from the mid 1930s there are a number of different styles of cartography, almost certainly representing the different histories of the territories mapped, Russian,

German and Habsburg. Whether these maps were produced for historical reasons or to reflect a revanchist tendency that has been noted in some right-wing Polish political organisations is not clear.

Romania

Most Romanian mapping still conforms to the Soviet 1942-system, although town plans have been produced at 1:10,000 and 1:5,000 based on a stereographic projection. The only significant change to have taken place since 1989 has be a relaxation in publication policy, with maps at a scale of 1:100,000 and smaller being available to the public.

Slovak Republic

As noted above, the mapping of the Slovak and Czech Republics should be regarded as having been the same up until the separation on 1 January 1993. Although the two republics were responsible for their own mapping prior to the separation, they worked to a common specification.

States of the former Yugoslavia

The state of mapping in Yugoslavia prior to the breakup is adequately described in Parry and Perkins (1987) and Bohme (1993).

Bosnia Hercegovina, Croatia, Macedonia and Serbia

Little information is available on the present state of mapping or future plans in these countries due to security problems.

Slovenia

Of all the countries of the former Yugoslavia, only Slovenia has little or no restrictions on the availability of topographic maps. The whole country is covered at 1:5,000, with urban areas also covered at 1:2,500. As Yugoslavia was the most liberal of the former communist countries, there has been little change in map content since independence. Geodetic information is available to the public as is aerial photography of all but a few militarily sensitive areas.

DISCUSSION

If the states of the former Yugoslavia can still be regarded as an entity, similarly the Czech and Slovak Republics, all the countries dealt with here (with the exception of the DDR) were independent states before 1939. They had their own cartographic traditions and had developed their own distinctive styles of topographic mapping. Even the DDR can be regarded as potentially inheriting a German cartographic tradition. After 1945 these independent traditions were suppressed by the new Soviet authorities. Copies of pre-war maps were systematically destroyed as part of the effort to erase the past histories of the countries (Jagomagi and Mardiste, 1994).

Despite the high level of uniformity in the provision of military mapping, a number of countries, notably Czechoslovakia and Hungary, had parallel series of maps for non-military purposes long before the breakup of the Soviet Bloc. Other countries, such as Poland, had no parallel series before 1989. Since 1989 the non-military mapping that has been produced is very similar in appearance and content to the 1942-System mapping.

It is interesting to speculate why some satellite countries were able to produce their own distinctive mapping under communism, while others conformed to the Soviet system. Despite having one of the most "Stalinist" governments in Eastern Europe between 1948 and 1956, Czechoslovakia had no Soviet troops on its territory prior to 1968 and was therefore free to follow a fairly independent policy. Hungary also had an extremely "Stalinist" government between 1947 and 1956. Both Hungary and Czechoslovakia rebelled openly against Soviet rule, both rebellions were crushed and repressive regimes installed. One characteristic of both these regimes was, however, a strongly national character. In Hungary, after Kadar came to power in 1956, there was a policy of internal deviation from the Soviet pattern, but a strict adherence to the Soviet line on foreign policy. It was as if the regimes kept the lid on internal dissent in order to prevent renewed Soviet interference. Under these conditions, one way in which a national identity could be asserted was through a distinctive cartography.

Hungary and Czechoslovakia also shared a common Habsburg heritage which may have played some role in them developing separate cartographic identities. More importantly, perhaps, was the degree of continuity that could be enjoyed by the cartographic communities in both countries. Czechoslovakia was occupied by Germany in 1939 with Bohemia and Moravia being formed into a "Protectorate" and Slovakia into a puppet state. Hungary was an ally of Germany until 1944 when it was occupied by the German Army. In both cases, however, the cartographic communities could have survived the occupation relatively intact.

In Poland, initially occupied by the Germans and the Soviets, there was a deliberate policy of removing the intellectual and technical elites through deportations and killings. One in six of Poles had been killed by the end of the war and the life of the country completely disrupted. Warsaw had been deliberately levelled and many other Polish cities had been badly damaged. Cartography would therefore have needed to be restarted from scratch and, because the Polish Army was under Soviet command (until 1956) its cartography would have been firmly based on the Soviet model. To make matters worse, for several years Polish ministries were run jointly by Polish ministers and Russian shadow ministers. Soviet control was strongest in the Defence Ministry and the armed forces, the very organisation charged with remapping the devastated country.

The DDR was in much the same position as Poland, a state with its infrastructure in ruins and under Soviet occupation. As a "front-line state" it would have had even less autonomy than Poland. The DDR was, however, to develop a parallel series, albeit one which looks very similar to the military series. As the most advanced economy in the Soviet Block, did it find that it simply could not do without good quality civilian mapping?

CONCLUSION

The research which informs this paper was originally conducted for purely practical reasons, the need to know what mapping was available for countries in which the Department of Geography, University of Portsmouth had a research interest. As more information has been collected some questions have been answered but many more have arisen. It has not been possible to address all of them here. A forthcoming paper on mapping in the former Soviet Union will deal with some of them but there is still much research to be done.

Among the questions to which we have no answers are: did the Soviet military authorities have parallel series of mapping for all countries, so that the domestic mapping system was irrelevant to them? After all, they had regional and large scale maps of Eastern, as well as Western Europe. Why was this the case? What kind of maps did Warsaw Pact troops use on exercises? Domestic ones, Soviet style ones, or something else? Do the differing types of mapping represent different commitments to Warsaw Pact obligations?

Maps were, like all information, subject to censorship. How accurate were military maps? Soviet cartographers used to claim that the best maps of the USSR and Moscow were produced in the West, by the CIA. Surely some of them had seen Soviet topographic maps, and yet they said Western ones were better. Why?

REFERENCES

Apagyi, G. (1994). personal communication.

Bohme, R. (1993). Inventory of World Topographic Mapping – Vol. 3: Eastern Europe, Asia, Oceania and Antarctica, Elsevier Science Publishers Ltd., for the International Cartographic Association.

Garschagen, R., and Knorr, B. (1993). Verzeichnis der amtlichen topographischen Kartenwerke: Neuerwerbungen 1946-1992, Berlin, Staatsbibliothek zu Berlin.

Jagomagi, J. and Mardiste, H. (1994). 'Maps and mapping in Estonia', **GeoJournal**, 33, 1, 81–90.

Parry, R.B. and Perkins, C.R. (1987). **World Mapping Today**. London, Butterworth and Co.

Wojskowe Zaklady Kartograficzne (1994). Oferta Sprzedazy: 1 kwartal 1994. WZKart Al. Jerozolimskie 97, 00-909 Warszawa.