

Part IV – The Soviet Armed Forces, Mobilisation and War Economy from June to December 1941

Chapter IV-1: Overview of the Structure and Terms Used in the Soviet Fully Integrated Land and Air Resource Model (FILARM)

This chapter presents an overview of the Soviet FILARM model, which is detailed in the subsequent chapters 2 to 11 of Part IV of this work. The aim here is to provide the reader with an overview of the Soviet model so that the reader can understand the basic elements of the model and how it aligns with the overall FILARM model structure defined in chapter I-3.¹ It is recommended the reader go through this chapter (I-3), which also defines the main terms and associated acronyms used in the FILARM model. The reader or researcher can also use this overview as a guide to the relevant chapter and section which contains the specific information they require. For example, information relating to Soviet artillery weapons is found in section IV 2. 4), while information relating to Soviet corps artillery unit organisations is found in section IV 3. 9) a.

The Soviet 1941 Fully Integrated Land and Air Resource Model (Soviet FILARM) uses the following chapters and major sections.

Chapter IV- 2: The Soviet Personnel and Equipment Resource Database

The Soviet personnel and equipment resource database chapter contains an analysis of all the significant weapon systems and combat squads available to the Soviet armed forces during 1941. It includes light and heavy infantry weapons, Soviet squads equipped with light infantry weapons, artillery weapons, anti-aircraft weapons, tracked and wheeled AFVs (Armoured Fighting Vehicles), armoured trains, transport vehicles, prime movers, and all aircraft types.

As well as a brief history, the individual weapon system (including aircraft) and squad characteristics are analysed using the methodology detailed in Part II: ‘The Barbarossa Simulation’s Resource Database’. The parameters calculated using this methodology includes: the individual Weapon Combat Power Coefficient (WCPC) values, and the individual weapon system and squad Overall Combat Power Coefficient (OCPC) values.²

Additionally, specific combat attributes are calculated for each weapon system and squad in the Soviet personnel and equipment resource database. These combat attributes include: the Relative Overall Attack (ATT) value, the Relative Overall Defence (DEF) value, the Relative Anti-Personnel (APer) value, the Relative Anti-Armour (AT) value, the Relative Anti-Aircraft (AA) value, the Relative Armour Defence Strength value (ARM), the Relative Assault Defence Strength (ADS) value, the Relative Assault Attack Strength (AAS) value, the Relative Supply Demand Factor (SDF) value, and several others.³ These combat attributes would be used to simulate the basic combat power of Soviet weapon systems and squads in any computer based simulation of operation Barbarossa, such as that discussed in Part VII.⁴

¹ Part I 3. – ‘Military Simulations, and the General Structure of the Integrated Land and Air Resource Model - The Structure of the Fully Integrated Land and Air Resource Model (FILARM)’.

² Part II 2. – ‘The Barbarossa Simulation’s Resource Database - Methodology for Calculating a Weapon System’s or Database Unit’s Overall Combat Power Coefficient (OCPC)’.

³ Part II 3. – ‘Methodology for Calculating a Weapon System’s or Database Unit’s Specific Combat Attributes’.

⁴ Part VII - ‘Complete Simulation of Operation Barbarossa: 22nd June to 31st December 1941’.

Chapter IV- 3: The Tables of Organisation and Equipment (TOE) for Soviet Land Combat Units from 22nd June to 31st December 1941

All combat capable organisations in the Soviet armed forces are defined as combat units, and all these combat units had a Table of Organisation and Equipment (TOE) regardless of their size. The Soviet equivalent term to TOE was *Shtaty*. This chapter contains analyses of the TOEs of Soviet land combat units Deployed (D) on 22nd June 1941 (i.e. available on this date anywhere in the USSR; see chapter IV-4, below, on the ‘Soviet Deployment Matrix’), and land combat units which were newly mobilised from 22nd June to 31st December 1941. Newly mobilised combat units include Mobilised and Deployed (MD) units, and Mobilised and Not Deployed (MND) units.

The TOEs for individual combat unit types (eg, rifle divisions or tank divisions, etc) are shown in terms of the Soviet Personnel and Equipment Resource Database (chapter IV-2, above). Note, the TOE of a combat unit was very rarely its actual strength: this will be analysed for individual combat units in detail in subsequent chapters. In addition to the detailed TOE structure, a discussion on the inherent strengths and weaknesses of specific TOEs is included for brigade and divisional sized combat units, and some background history is provided on the larger combat unit types (if appropriate and for the reader’s interest).

The Soviet land combat units are categorised under the following section numbers and headings (refer Part IV Table of Contents for full section and subsection details):

1. Red Army Rifle Units (includes rifle divisions, rifle brigades and ski battalions).
2. Red Army Armoured, Mechanised and Motorised Units (includes tank divisions, tank brigades, mechanised divisions, motorised divisions and motorcycle regiments).
3. Red Army Cavalry Units (includes cavalry divisions and mountain cavalry divisions).
4. Red Army Mountain Units (includes mountain rifle divisions).
5. Red Army Airborne Units (includes airborne brigades).
6. Soviet Naval Ground Combat Units (includes naval infantry brigades and naval rifle brigades).
7. NKVD Combat Units (includes NKVD border guard forces, NKVD internal guard forces and NKVD tactical forces).
8. Soviet Militia Units (includes militia rifle divisions, Moscow militia rifle divisions and militia fighter battalions).
9. Red Army Corps, Army and Front Level Units (includes corps and army level artillery units, corps and army level anti-tank units, corps and army level anti-aircraft units, corps and army level engineer units, and Soviet headquarter (HQ) units).
10. Soviet Strategic Defence Ground Forces (includes PVO-strany, national air defence ground units, fortified sectors or regions, and coastal artillery).
11. Railroad Artillery and Armoured Trains.

The last section in chapter IV-3 (section 12) is an analysis of the authorised sizes of Soviet divisions and brigades fielded from 22nd June to 31st December 1941. This includes calculations for the relative size of the Soviet divisions and brigades fielded in 1941, using the methodology defined in chapter I-10, and an application of the Minimum Divisional Size (MDS) value.⁵ From

⁵ Part I 10. – ‘Military Simulations, and the General Structure of the Integrated Land and Air Resource Model - A Divisional Sized or Division Equivalent Combat Unit in WWII’ details the equations used for calculating a land combat unit’s ‘size’, and defines the Minimum Divisional Size (MDS) value. The latter is essentially the minimum sized combat unit that can be reasonably called ‘divisional sized’ or a ‘division equivalent’ in 1941.

this analysis we gain an appreciation of which Soviet land combat units could reasonably be called ‘divisional sized’ units, and which were actually ‘brigade sized’ or even ‘regimental sized’ units. The overall result is a better understanding of the relative size and power of the Soviet ground forces fielded during 1941.

Chapter IV- 4: The Order of Battle (OOB) of Soviet Land Combat Units on 22nd June 1941

On 22nd June 1941 the USSR’s armed forces were the largest in the world, and included no less than 304 ground divisions (excluding NKVD rail security and PVO divisions). These were made up of 179 rifle divisions, 19 mountain rifle divisions, 61 tank divisions, 31 mechanised divisions, nine cavalry divisions, four mountain cavalry divisions and one NKVD motorised rifle division. There was also a huge number of smaller combat units deployed; including five rifle brigades, 16 airborne brigades, one naval infantry brigade, 10 anti tank brigades, 168 large corps and RVGK artillery regiments (excluding 15 RVGK high power artillery battalions), and many other units and unit types.

This chapter includes a full Order of Battle (OOB) for of all Soviet Army, NKVD, PVO ground units and naval ground combat units, in all military districts existing on 22nd June 1941. The Soviet OOB is detailed in a series of large table matrices, effectively one for each Military District or Front, which together is termed the ‘Soviet Deployment Matrix’. In the Soviet FILARM model all combat units in the Soviet Deployment Matrix are henceforth classified as having been in a Deployed (D) state.⁶ Note, all combat units in the Soviet Deployment Matrix had a specific TOE, which is detailed in chapter IV 3 (above).

Chapter IV- 5: The Transfer Schedule of Soviet Land Combat Units, which were a Deployed (D) State, to the USSR’s Western Fronts from 23rd June to 31st December 1941

This chapter details the transfer schedule of Soviet land combat units to the ‘west’ from 23rd June to 31st December 1941, by the Soviet army, NKVD and naval ground forces which were Deployed (D) on the 22nd June 1941.

For this purpose, ‘west’ is defined as west of a north-south line lying 100km west of the Urals. The following military districts and non-active fronts are included as being east of this line: the Urals Military District, the Siberia Military District, the Central Asia Military District, the Transbaikal Military District and the Far Eastern Front.

Also included is a review of ‘Siberian’ and Far Eastern divisions which transferred ‘west’ from 23rd June 1941 to 31st December 1941, and their actual affect on the overall capability of the Red Army forces facing the Axis forces in the west in the winter of 1941-42.

Chapter IV- 6: The Actual Strength of all Soviet Land Combat Units in a Deployed (D) State on 22nd June 1941

This is the largest chapter in the Soviet FILARM model: it details the actual strength of Soviet land combat units Deployed (D) on 22nd of June 1941. The ‘actual strength’ in this case is what personnel and equipment combat units actually contained, as opposed to what they were authorised

⁶ Part I 3. 3) a. i. – ‘The Structure of the Fully Integrated Land and Air Resource Model (FILARM) - Resource Allocation States inside the FILARM Model - Combat Units: D, MD and MND - Deployed (D)’.

(i.e. their TOE as covered in chapter IV-3 above). Where appropriate, the overall readiness state of individual combat units on 22nd June 1941 is also discussed.

The actual strengths of individual Deployed (D) land combat units are detailed within separate sections. These section numbers and headings are as follows:

1. Review of the Overall Strengths of Selected Red Army Units and PVO forces on 22nd June 1941. (Units reviewed here include rifle divisions, mechanised corps, anti-tank brigades, fortified sectors and the PVO forces).
2. The Leningrad Military District.
3. The Baltic Special Military District.
4. The Western Special Military District.
5. The Kiev Special Military District.
6. The Odessa Military District (including the 9th Separate Army).
7. Reserves of the Stavka GK.
8. Internal Military Districts and Non-Active Fronts.
9. The Moscow Military District.
10. The Orel Military District.
11. The Kharkov Military District.
12. The Volga Military District.
13. The North Caucasus Military District.
14. The Transcaucasus Military District.
15. The Archangel'sk Military District.
16. The Urals, Siberia, Central Asia and Transbaikal Military Districts.
17. The Far Eastern Front.

Within each of the sections 2 to 17 (above), the actual strength of the individual mechanised corps within each military district, front or Stavka reserve force is shown. The relevant detail on the actual strength of each mechanised corps' tank and mechanised divisions on 22nd June 1941 is also displayed. In addition, each section (above) includes a brief history on the individual divisions and brigades listed, how they fared through 1941, and their ultimate fate by the end of the year. Finally, each of the sections above includes a 'reconciled list' of all the personnel and equipment in the military district (or districts), front or Stavka reserve on 22nd June 1941. This reconciled list includes all personnel and equipment allocated to Deployed (D) combat units within each military district, as well as all personnel and equipment in the military district's rear areas.

Section IV- 6-18: The Soviet Tank Deployment Matrix

A fact understood and appreciated by very few, is that on 22nd June 1941 the Red Army possessed approximately 23 300 tanks and tankettes: by far the largest armoured force in the world and, amazingly, around twice as many tanks as the rest of the world put together. The Soviet Tank Deployment Matrix section presents a very detailed picture of the distribution and strength of the Soviet's entire armoured force on 22nd June 1941. All the main types of fully tracked AFVs are listed for all combat units (including separate tank battalions) which actually contained any tanks or tankettes.

Included here for completeness is a discussion on the importance of the Soviet tank deployments leading up to 22nd June 1941. The numbers of available Soviet and Wehrmacht AFVs during June and July 1941 are compared. In addition the Soviet armoured deployments are analysed to gain an understanding of the offensive or defensive nature of the Red Army in June 1941 (i.e. the Red Army's posture from a military perspective). From this, evidence is presented and conclusions drawn on the possible military-political intent of Stalin prior to June 1941.

Section IV- 6-19: Total Personnel and Equipment in the Soviet Army, NKVD, Air Force, PVO and Navy on 22nd June 1941

This section details the total personnel and equipment in each of the military districts, fronts and Stavka reserves on 22nd June 1941. In addition the amount of transport, weapons and personnel that were available in the Western Military Districts and in Stavka reserves on 22nd June 1941, is established. The Soviet armed forces include: the Soviet Army, NKVD, Air Force, PVO and Navy forces that existed on 22nd June 1941.

The final step in this process includes a review of the amount of transport (motor vehicles and horse drawn), most types of weapons and equipment, and military personnel that were available in the USSR on 22nd June 1941. This includes an examination of Soviet pre-war production (i.e. pre Soviet-German war) and recent mobilisation of personnel (the call up of reservists in the immediate pre-war period).

Section IV- 6- 20: Total Personnel and Equipment Allocated to Combat Units and in a Deployed (D) state in the Soviet Army, NKVD, Air Force Ground Units, PVO Ground Units and Naval Ground Units on 22nd June 1941

Drawing on the relevant information from each military district, front and Stavka reserve, this section ascertains the total personnel and equipment allocated to combat units, and hence in a Deployed (D) state, in the USSR on 22nd June 1941. In addition the amount of transport, weapons and personnel that were allocated to Deployed (D) combat units in the Western Military Districts and Stavka reserves on 22nd June 1941, is displayed.

A very important 'side subject' is highlighted here: specifically the amount of rear-area transport that was available to the USSR's armed forces in June 1941. This had a very strong influence on the Red Army's overall Supply Distribution Efficiency (SDE) and mobility during the 1941 campaign, which is covered in detail in chapter IV-9 (below).⁷

Section IV- 6- 21: The Proportion of Total Available Resources which were in a Deployed (D) State in the USSR on 22nd June 1941

The last section in chapter IV-6 establishes the proportion of total personnel and equipment (resources) that existed in the USSR's armed forces, and which were already utilised in Deployed (D) combat units on 22nd June 1941. It draws primarily on information presented in the previous two sections and involves some manipulation of the data: mainly grouping the total equipment allocated to combat units into appropriate equipment or weapon subtypes.

This section includes an analysis of the above data, and some important conclusions regarding shortages of transport, weapons and equipment in the Soviet Army, NKVD, Air Force ground units, PVO ground units and naval ground units on 22nd June 1941.

⁷ Part IV 9. - 'The Supply Distribution Efficiency (SDE) for the Soviet Armed Forces from 22nd June to 31st December 1941'.

Chapter IV- 7: Soviet Mobilisation After 22nd June 1941: the Actual Strength of all Soviet Land Combat Units Mobilised from 22nd June to 31st December 1941

Between 22nd June and 31st December 1941 the USSR called up 5 500 000 of its reservists and conscripts into active service. In addition another 4 000 000 men and women ‘volunteered’ for militia or volunteer units, and most of these ended up in the Red Army. This easily remains the largest and fastest wartime mobilisation by any country in history. The overall Soviet forces mobilised in the second half of 1941 were actually larger in personnel terms than the entire Soviet armed services that existed on 22nd June 1941 (although in equipment terms, especially tanks and aircraft, they were considerably weaker). This was just as well because by November 1941 the Red Army and Air Force that existed on 22nd June 1941 (then already both the largest in the world) had been all but destroyed. In this chapter we will focus on the immense Soviet ground forces that were mobilised between 22nd June and 31st December 1941.

The initial sections in this chapter focus on the methodology employed to analyse the Soviet mobilisation during the second half of 1941. The use of a ‘homogeneous model’ is discussed as opposed to the use of a ‘heterogeneous model’ used in the previous chapter.⁸ In addition, all combat units mobilised after the 22nd June 1941 are classified as newly mobilised units: all newly mobilised units are classified as achieving either a Mobilised and Deployed (MD) state or a Mobilised and not Deployed (MND) state during 1941.⁹ For each Soviet land combat unit type mobilised after 22nd June 1941 (eg, new rifle divisions, cavalry divisions, tank brigades, etc), a MD and MND matrix is then built to establish the Order of Battle (OOB) of individual units of that type.

The MD and MND matrix for each combat unit type establishes the total number, strength, timing, location and operational assignment of individual combat units within that combat unit type. In section IV-7-3 the structure of the MD and MND matrices is defined; including the terms used, how to read them, and what data is immediately forthcoming from them. For example, the total number of new rifle divisions mobilised, the total number of new rifle divisions mobilised and deployed in the ‘west’ (MD), and where and when the individual divisions were first assigned to an active front or army HQ.

Once the MD and MND matrices have been determined for a particular combat unit type, it is then possible to ascertain the total resources used by mobilised combat units with a specific TOE, and the total reserve (or newly mobilised) resources used by mobilised units which utilised this TOE. Note, all ‘newly mobilised’ units which were originally in a Deployed (D) state and which were simply re-named after 22nd June 1941, and all ‘newly mobilised’ units which utilised manpower and equipment from existing Deployed (D) units, are included in the OOBs of newly mobilised units (i.e. they are included in that combat unit type’s MD and MND matrix). However, these units obviously consumed fewer new resources than totally new units, which is all factored into the applicable MD and MND matrix. This is important because a large number of ‘newly mobilised’ Red Army divisions were in fact essentially renamed units which already existed on 22nd June 1941, or used one or more existing pre-war regiments in their formation.

All the newly mobilised Red Army and Soviet militia ground units are analysed, under the following section numbers and headings:

4. Red Army and Soviet Militia Rifle Units Mobilised from 22nd June to 31st December 1941.
5. Soviet Armoured, Mechanised and Motorised Units Mobilised from 22nd June to 31st December 1941.
6. Red Army Cavalry Units Mobilised from 22nd June to 31st December 1941.

⁸ Part I 8. – ‘The Heterogeneous Model vs. the Homogeneous Model’.

⁹ Part I 3. 3) a. – ‘The Structure of the Fully Integrated Land and Air Resource Model (FILARM) - Resource Allocation States inside the FILARM Model - Combat Units: D, MD and MND’.

7. Red Army Mountain Units Mobilised from 22nd June to 31st December 1941.
8. Red Army Airborne Units Mobilised from 22nd June to 31st December 1941.
9. Soviet Naval Ground Units Mobilised from 22nd June to 31st December 1941.
10. NKVD Combat Units Mobilised from 22nd June to 31st December 1941.
11. Red Army Corps and Army Level Units Mobilised from 22nd June to 31st December 1941.
12. Soviet ground forces mobilised in the Far East from 22nd June to 31st December 1941.

Section IV- 7-13: The Soviet Tank MD and MND Matrix

Similarly to the ‘Soviet Tank Deployment Matrix’, details of the newly mobilised Soviet armoured, mechanised and motorised units, enables us to build a ‘Soviet Tank MD and MND Matrix’. The ‘Soviet Tank MD and MND Matrix’ presents a detailed picture of the fully tracked AFVs (tanks and tankettes) allocated to newly mobilised combat units from 22nd June to 31st December 1941. The Soviet Tank MD and MND Matrix also tracks the following: the number and type of tanks in a non-operational state of repair on 22nd June 1941 that found their way into newly mobilising tank units later in 1941, the number of tanks that became available from disbanding and reorganising tank units that were initially Deployed (D) in the eastern USSR, and new tanks manufactured from 22nd June to 31st December 1941.

Section IV- 7-14: The Total Resources Allocated to Newly Mobilised Units from 22nd June to 31st December 1941

Utilising information from the MD and MND matrices, the total resources allocated to MD and MND units from 22nd June to 31st December 1941 is established. In addition we are now also able to ascertain the ‘rear area transport’ available for supply distribution in the Soviet armed forces from 22nd June to 31st December 1941.

Section IV- 7-15: The Total Resources in the USSR that were Available for Use by Newly Mobilised Units from 22nd June to 31st December 1941

In this section we examine the total resources available in the USSR to newly mobilising Soviet combat units during the second half of 1941. The resources available included: existing equipment resources that were not utilised by Deployed (D) units on 22nd June 1941, all personnel mobilised (called up) after 22nd June 1941, commandeered equipment from the civilian economy (especially motorised transport), and weapons and transport manufactured from 22nd June to 31st December 1941.

Section IV- 7-16: Resources Unallocated to any Deployed (D), MD or MND Units in 1941

In this section we consider the personnel and equipment initially unallocated to any Deployed (D), MD or MND units during 1941. These resources were mostly subsequently used by the Soviet armed forces as Replacements (R) for combat losses in 1941 (refer section below). Included in this analysis is: the total number of personnel successfully mobilised or ‘called up’, the proportion assigned to rear area support services in the Red Army (non-combat units), the proportion assigned to Red Air Force and PVO ground support units (non-combat units), and the proportion assigned to naval maritime units.

Section IV- 7-17: The Proportion of Total Available Resources Allocated to Deployed (D) and Newly Mobilised Units in 1941

In section IV-7-17 we draw on the data in the preceding sections (as well as chapter IV-6-21) to draw conclusions in regards to the weaknesses, bottlenecks and constraints on the Soviet mobilisation process during 1941. This analysis focuses on the shortages of transport, weapons and

equipment in the Soviet ground forces during 1941. Highlighted and discussed is why these shortages became inherent in most Soviet combat units, and why these same shortages dictated the TOE structure of almost all Red Army combat units well into 1942.

Section IV- 7-18: The Resource Replacements (R) Available to the Red Army, NKVD, PVO and Soviet Militia from 22nd June to 31st December 1941

In the final section on Soviet ground forces mobilised during 1941, the personnel and equipment utilised by the Soviets as Replacements (R) for combat and attrition losses is considered.¹⁰ The Soviets Replacements (R) are considered in terms of the Soviet Personnel and Equipment Resource Database (chapter IV- 2), so they can be used in any computer based simulation of operation Barbarossa. The discussion on Soviet Replacements (R) during 1941 encompasses the following:

- Small arms used in the USSR during 1941, including by all ground combat units and Replacements (R).
- The personnel used by all types of Replacements (R): here personnel used as ‘crews’ accompanying new weapon and transport type Replacements (R) are considered, as well as the vast majority that were used as rifle infantry.
- The timing of Replacements (R) in the period June to December 1941. The Soviet Replacements (R) are considered within two time frames: the period from 22nd June to 19th July 1941, and the period from 20th July to 31st December 1941. The Soviet pre-war plan always called for the divisions in the Western Military Districts (and to a lesser extent the Stavka reserves) to be rapidly brought up to full strength in 7 to 14 days after the war started. Thus the number of Soviet Replacements (R), particularly rifle squads and all types of commandeered transport, was much higher in the first few weeks of operation Barbarossa than in the subsequent months.

Chapter IV- 8: The Soviet Air Forces in 1941

All the previous chapters in Part IV (the Soviet FILARM model) focused on land combat units. In chapter 8 we focus on the Soviet Military Air Force (*Voyenno-Vozdushnye Sily* or VVS) during 1941.

Section IV- 8- 1: The structure of the Soviet Air Forces (VVS): June to December 1941

In this section we scrutinise the TOE structure of the VVS’s overall command infrastructure, the VVS KA (*VVS Krasnaya Armiya* or VVS Red Army) aviation divisions in June 1941, the VVS VMF (*VVS Voyenno-Morskoy Flot SSSR* or VVS Naval Forces of the USSR) aviation brigades in June 1941, and new VVS aviation units mobilised from July to December 1941. Similarly to the Soviet land combat units, the TOEs for air combat units very rarely corresponded to their actual strength: this is ascertained for individual air combat units in the next section.

Section IV- 8- 2: The Order of Battle and Actual Strength of all Soviet Air Combat Units in a Deployed (D) State on 22nd June 1941

The OOB and actual strength of Soviet air combat units in all military districts on 22nd June 1941 is considered. The actual strength of Soviet air combat units includes the serviceability and numbers of operational aircraft, and is determined using historical references, the principles of

¹⁰ Part 13, 3) c. – ‘The Structure of the Fully Integrated Land and Air Resource Model (FILARM) - Resource Allocation States inside the FILARM Model - Reserves and Replacements (R)’.

homogeneous models and checksums.¹¹ The fate of the VVS forces within each Military District or Front after 22nd June 1941 is also assessed.

Section IV- 8- 3: The Soviet Aircraft Deployment Matrix

The resulting detailed analysis of the VVS (above) enables us to build a complete Soviet 'Aircraft Deployment Matrix' for 22nd June 1941. A detailed examination of the numbers and distribution of 'modern' aircraft in the VVS in June 1941 enables us to review the common perception that the VVS was principally obsolescent at this time. In addition, the distribution of combat aircraft across the USSR in June 1941 enables an insight to be gained of the possible intent of Stalin and the Stavka immediately prior to 22nd June 1941.

Section IV- 8- 4: Soviet Air Combat Unit Reinforcements: June 1941 to January 1942

This discussion encompasses two major areas of VVS reinforcements:

- The transfer of Deployed (D) VVS KA and VVS VMF air combat units from the 'East' to the USSR's western fronts from June to December 1941.
- Newly Mobilised VVS KA, VVS VMF and PVO Air Combat Units from June 1941 to January 1942. The OOB and actual strength of Soviet MD and MND air combat units are shown in the same Aircraft Deployment Matrix used in section IV- 8-3 (above).

Section IV- 8- 5: Overall Soviet Combat Aircraft Usage, Production and Replacements (R): 22nd June to 31st December 1941

In the final section relating to the Soviet Air Forces in 1941, we examine the overall usage and production of aircraft in the USSR from 22nd June to 31st December 1941. Also ascertained is details of all aircraft available as Replacements (R) which were not previously allocated to air combat units in a D, MD or MND state. Combat aircraft Replacements (R) are based on the total aircraft manufactured from June to December 1941 and aircraft sourced from pre-war stockpiles.

A final review (analysis) is carried out on the VVS losses from June to December 1941, and how this correlated to the VVS's front line strength during this period.

Chapter IV- 9: The Supply Distribution Efficiency (SDE) for the Soviet Armed Forces from 22nd June to 31st December 1941

In chapter IV-9 the methodology relating to SDE detailed in Part I is applied to the Soviet ground forces from June to December 1941.¹² A force's SDE has a direct impact on its Relative Overall Combat Proficiency (ROCP).¹³

The Soviet SDE is considered for each of the following: the SDE for all Deployed (D) units on 22nd June 1941, the SDE for all Deployed (D) units in the Western Military Districts on 22nd June 1941, the SDE for all MD and MND units from 22nd June to 31st December 1941, and the SDE for all D, MD and MND units from 22nd June to 31st December 1941. In addition, the supply and support infrastructure required to support VVS operations in 1941 is included in the overall analysis of the Soviet armed force's SDE during 1941.

In calculating the SDE for the Soviet armed forces from 22nd June to 31st December 1941 certain specific parameters are used. These relate to the unique conditions or circumstances faced

¹¹ Part I 8. 2) – 'The Heterogeneous Model vs. the Homogeneous Model - The Homogeneous Model and the Use of Checksums'

¹² Part I 9. – 'Military Simulations, and the General Structure of the Integrated Land and Air Resource Model - Supply Distribution Efficiency (SDE)'.

¹³ Part III – 'Relative Overall Combat Proficiency (ROCP): the ROCP of Soviet and Axis Forces in 1941'.

by the Red Army and Red Air Force (VVS) during 1941. These factors include: specific weapon system or squad Supply Demand Factors (SDFs), the Soviet soldiers apparent ability to 'live off the land', the proportion of available rear area trucks, tractors and light transports allocated to rear area support functions, and the average lift capacity of Soviet motorised vehicles and horse teams (measured in metric ton kilometres per day).

Finally, the Soviet armed force's SDE is compared to that of the Wehrmacht during 1941, and some relevant conclusions are drawn.

Chapter IV- 10: A Review of the Numbers and Strengths of Soviet Land Combat Units Mobilised from June to December 1941

Chapter IV-10 is concerned with analysing the actual numbers and strengths of the Soviet ground combat units mobilised during the second half of 1941. This analysis initially uses absolute numbers based on the Soviet combat unit designations; but then, and more importantly, includes an analysis based around the concept of a Minimum Divisional Size (MDS) value. The MDS value is defined, along with its accompanying methodology and principles, in Part I-10.¹⁴

The MDS value enables a truer comparison to be made between any combat unit type and the common perception of a typical contemporary divisional sized unit. By including factors for the reduced size of the Soviet's newly mobilised ground forces, and taking into account their average actual strength when committed to combat, we find that the overall combat power of the Red Army in the second half of 1941 was far less than commonly perceived. The analysis also includes an examination of the Red Army's actual mobilised strength in comparison to the overall losses during 1941.

Chapter IV- 11: Soviet Naval Forces: June to December 1941

The last chapter of Part IV (the Soviet FILARM model) is devoted to the USSR's naval forces in 1941. The initial section in this chapter is concerned with the Red Navy's high level command structure in June 1941. The subsequent sections are devoted to the named Soviet fleets that existed during 1941. The actual strength of each fleet, down to individual named ship and submarine level, is separately documented in the following section numbers and headings:

2. The Red Banner Baltic Fleet
3. The Black Sea Fleet
4. The Northern Fleet
5. The Pacific Fleet
6. Separate Inland Waterway Flotillas

Each of the sections above also includes a brief history of naval operations carried out by that fleet during the second half of 1941, along with a list of all naval losses sustained during this period. The final section (section IV-11.-7) presents the Soviet naval vessel reinforcements (including the individual submarines) that were commissioned into service from July to December 1941.

¹⁴ Part I 10. – 'Military Simulations, and the General Structure of the Integrated Land and Air Resource Model - A Divisional Sized or Division Equivalent Combat Unit in WWII'.