

Military OR/SA in Germany since the 1960s

A Personal Recollection and Outlook

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Milestones 1

- **1959: EWR (Bölkow-Messerschmitt-Heinkel) installs OR group to support its R&D**
- **1961: German MoD hires experienced Northrop OR team (ORG) to evaluate VTOL designs and train EWR analysts on the job**
- **1963: ORG becomes part of MoD-owned IABG**
- **1963: Military advisory group attached to ORG**
- **1964: ORG subdivided into ORL (Air Force OR) and ORM (Naval OR)**
- **1966: ORG complemented by ORH (Army)**

Milestones 2

- **1972: Functional re-organization of ORG under IABG's Study Directorate:**
 - SO (operations):** combat modelling and analysis including wargaming
 - SZ (central functions):** intelligence, C2, defence economics
 - SV (support functions):** logistics, medical, planning systems,
- **1973: Univ. Bw Munich - MOR (part computer science curriculum)**
- **1980: Institute of Applied Systems and Operations Research (IASFOR)**
- **1993: Institute for Technology of Intelligent Systems (ITIS) e.V.**
- **1993: IABG privatised**
- **2002: Center for Transformation of the Bundeswehr (ZTransfBw)**

Characteristic Phases of German Military OR/SA

- **1960s-1970s: Weapon Systems-oriented OR/SA**
- **1970s-1980s: Defence System-oriented OR/SA**
- **1990s-2000s: Stability and Defence Reform-oriented OR/SA**
- **since 2002: Transformation-oriented OR/SA**

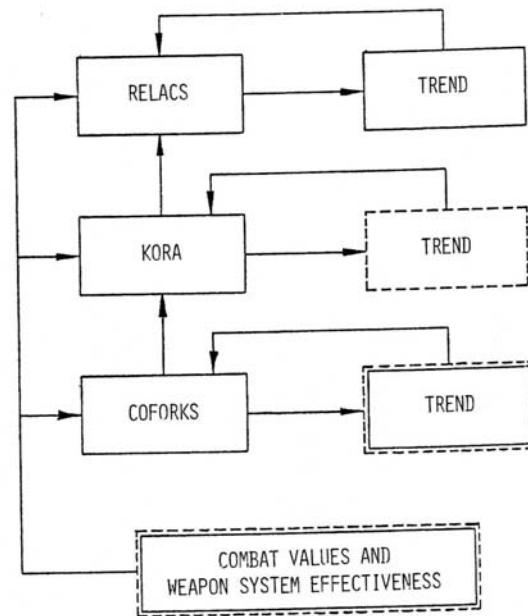
Weapon Systems-oriented OR/SA (1960s-1970s)

- **F 104G Improvement**
- **US/FRG V/STOL design assessment**
- **Requirements for new tactical fighter**
- **Air wing support operations planning**
- **Field experiments**
- **FORKS / COFORKS wargames**
- **OPS War Gaming System**
- **Theatre-level Staff Exercise Support (Bw Planübung 1970)**

Defence Systems-oriented OR/SA (1970s-1980s)

- **Driving Issues: MBFR and LTDP**
- **Model developments: Hierarchical Gaming Systems**
 - **COFORCS → KORA → RELACS**
 - **SIRA → HORUS → JOANA**
- **Studies:**
 - **Force Reduction Options (MBFR)**
 - **„90 Days Study“**

FIGURE 1
GAMING SYSTEMS - MODEL HIERARACHY



Defence Systems-oriented OR/SA cont'd (IASFOR)

Driving Issues:

- Alternative Defence Debate
- Conventional Stability in Europe (VW Research Grant)
- Model developments:
 - GEFRAM
 - KOSMOS
- Studies:
 - Alternative Defense Options
 - Stable Defence (NATO-DRG Panel 7 RSG 18)

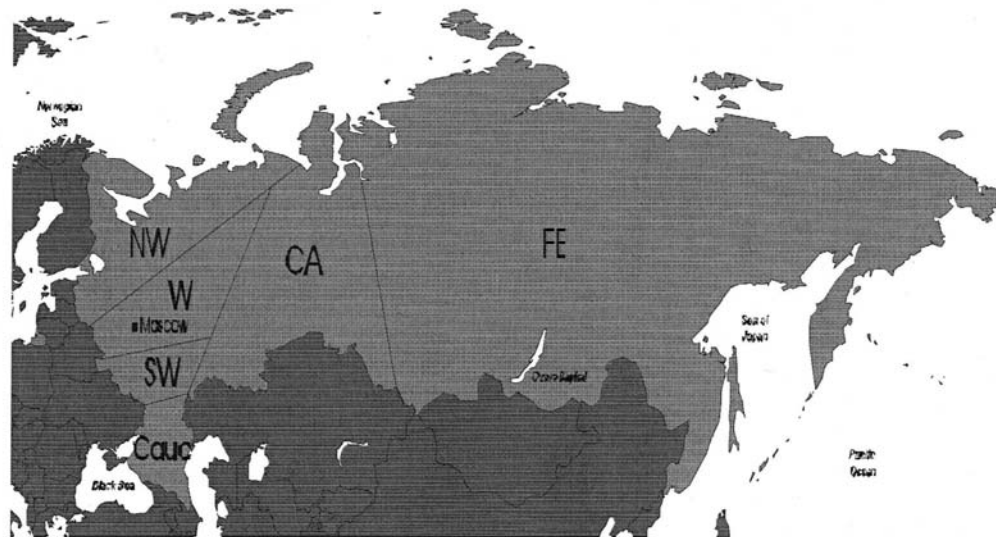
Stability and Defence-Reform-oriented OR/SA (1990s -2000s)

■ Driving Issues:

- Post-Cold War Stability and NATO Enlargement**
- Analytical Framework for Restructuring Military Forces**
- Strategic Uncertainty and Force Planning**

■ Studies / Research:

- NATO Enlargement: Russian Security and Costs**
- Limits of German Defence Reform**
- Modelling the impact of randomly occurring SASO**



NW=North-west, W=West, SW=South-west, Cauc=Caucasus, CA=Central Asia, FE=Far East

Figure 1: Tsygichko's Sectors of Potential Risk (Leszczelowski, 1997)¹

¹ Leszczelowski's assumptions about the location of the sectors were confirmed by Tsygichko (e-mail of 14. Apr. 1997).

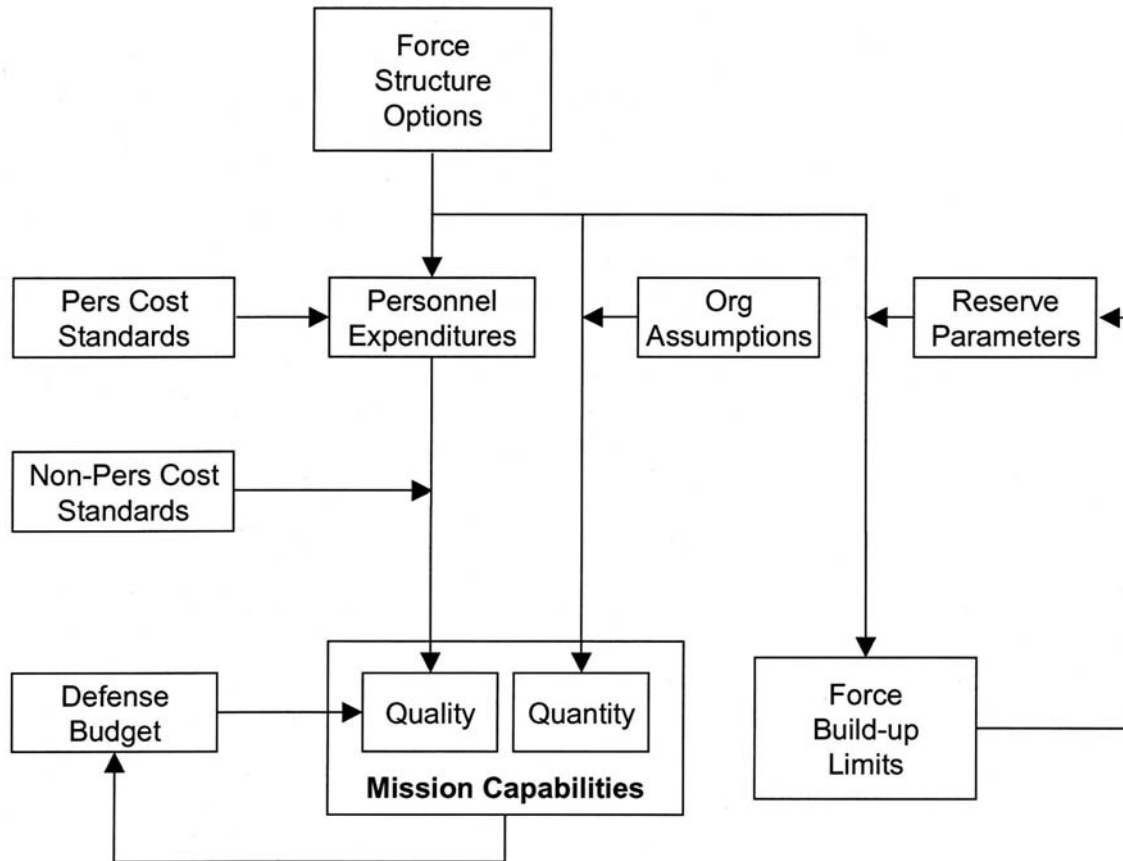


Fig 1: Solution Strategy Concept

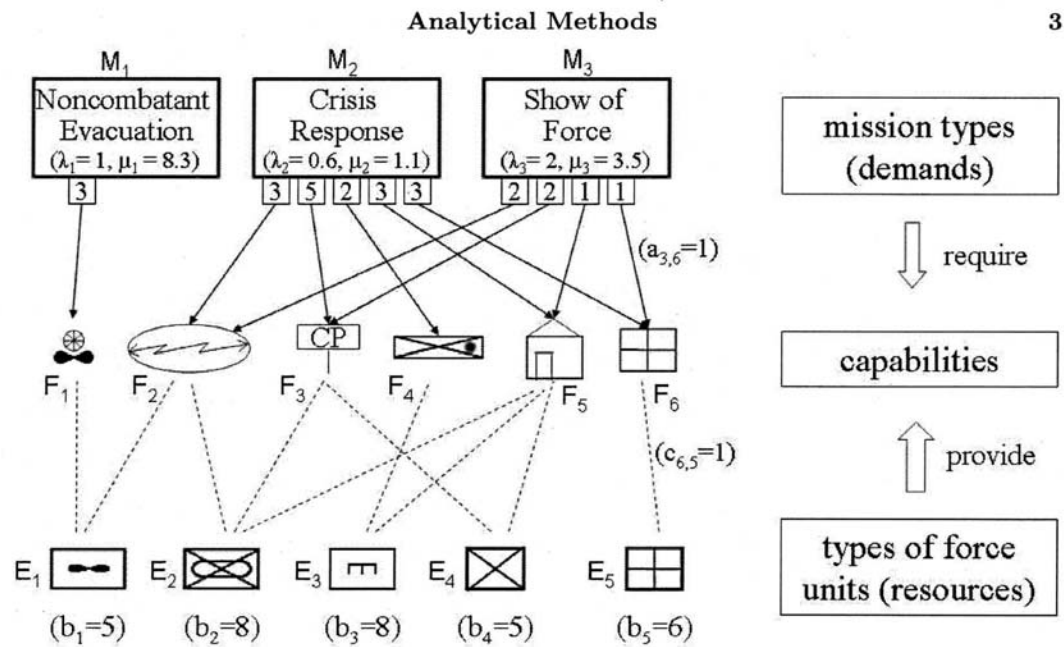


FIGURE 1. Illustrative Capabilities-based Loss System

Transformation-oriented OR/SA (since 2002)

Modelling Activities (Contractors)

- **Adaptation of models and simulations to new tasks (EBAO)**
- **Adaptation of training simulators for joint operations**
- **Linking simulation systems with life C2**
- **Modelling human behavior**
- **Agent-based modeling experiments for identifying relevant decision variables in complex operations**
- **Knowledge base development**
- **Integrated simulation and test environment**

Transformation-oriented OR/SA (since 2002)

(Institute for Technology of Intelligent Systems (ITIS) e.V.)

Conceptual C2 Modeling

- **SAS-026 (COBP for C2 Assessment)**
- **SAS-050 (Exploring new C2 Concepts)**
- **SAS-065 (NATO NEC C2 Maturity Model)**

Empirical Research

- **Impact of individual and team characteristics on the performance of small networked teams**