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# The algorithm for evaluation of the efficiency of combat units location in maritime theater operations on the basis of RICAL indicators

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Nowadays there is a great number of simulated variants of actions of a compact mobile group of forces, which is able to control a large space without creating continuous defense or front areas by applying high-precision and high-speed means of destruction. The analysis of such variants of actions is quite difficult without the help of computational tools. In this regard, the actual problem is to produce algorithms that formalize and automate the evaluation of the simulated situations. The article proposes a two-step algorithm to estimate the location efficiency of combat units in maritime theater operations on the basis of RICAL (Reliability, Information, Controllability, Ability, Learning) indicators. Since it is impossible to give the characteristic of various forces and means within the unitary visions of combat units, the paper offers to apply the technique of decomposition — the division of military unit into subsystems. After creating a mathematical description of status of all units the formation of cumulative target indicator (the indicator of operation efficiency) is carried out. The proposed approach provides the aggregation of the cumulative target indicator based on target indicators of individual combat units. The synthesized algorithm allows to perform a mathematical description of the situation on the maritime theatre of military operations and a quantitative analysis of the effectiveness of actions at a particular moment.

**Keywords:** computer-aided planning, the maritime theater, military operations, network-centric warfare, the theory of efficiency, targets, decomposition, aggregation

## REFERENCES

- [1] Roldugin V.D. *Modelirovanie i otsenka effektivnosti boevykh deystviy RVSN* [Modeling and efficiency evaluation of combat operations of the Strategic Missile Troops]. Moscow, RVSN Publ., 2005, 575 p.
  - [2] Murashov E.A. *Osnovy taktiki voenno-morskogo flota* [The basics of Navy tactics]. St. Petersburg, BGTU Voenmekh Publ., 2002, 166 p.
  - [3] Garret R., London Dzh. *Osnovy analiza operatsii na more* [The basic analysis of marine operations]. Moscow, Voenizdat Publ., 1974, 270 p.
  - [4] Rezyapov N., Chesnakov S., Inyukhin M. *Zarubezhnoe voennoe obozrenie — Foreign military review*, 2008, no. 11, pp. 27–32.
  - [5] Environmental Data Representation & Interchange. *SEDRIS*. 2014. Available at: <http://www.sedris.org/stc/2004/pp/miv/sld004.htm> (accessed August 10, 2015).
  - [6] The End of JWARS. *Instantiations Forums*. Available at: <http://forums.instantiations.com/topic-12-5540.html> (accessed August 10, 2015).
  - [7] Barvinenko V.V. *Vozdushno-kosmicheskaya oborona — Aerospace defense*, 2015, December 2.
  - [8] Zatuliveter Yu.S., Semenov S.S. *Natsionalnaya oborona — National defense*, 2012, no. 11, pp. 30–40.
  - [9] Zaritskiy V.N., Kharkevich L.A. *Obshchaya taktika* [General tactics]. Tambov, TSTU Publ., 2007, 184 p.
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- [10] Voronov E.M., Karpunin A.A., Repkin A.L. *Optimalnoe upravlenie mnogoobektnymi mnogokriterialnymi sistemami* [Optimal control of multi-object multi-criteria systems]. Moscow, BMSTU Publ., 2001, 60 p.

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