

# Operations Research/Systems Analysis Functional Area

## 1. Introduction

a. *Purpose.* The Operations Research/Systems Analysis (ORSA) Functional Area (FA) provides uniquely skilled officers that assist decision makers in solving complex problems by producing the analysis and logical reasoning necessary to inform and underpin critical decisions. The ORSA is an integral part of the Army and Joint leaders' decision-making processes to organize, man, train, equip, sustain, and resource transformation from the current to the future force and conduct analysis in support of Multi-Domain Operations (MDO) and other warfighting operations.

b. *Proponent information.* The FA 49 is managed within the Operations Support functional category. The FA 49 proponent office resides in the Program Analysis and Evaluation Directorate, Office of the DCS, G-8.

c. *Functions.* The FA 49 officer combines operational experience with technical expertise using a wide variety of traditional and emerging analytic tools and techniques to underpin and enable leadership decisions in a constantly changing global environment. The ORSA introduces quantitative and qualitative analysis, data analytics, and data science to the military's decision-making processes by developing and applying probability models, statistical inference, simulations, optimization, data analysis, and data visualization. The ORSA FA encompasses diverse disciplines that include personnel management, doctrine and force development, training management, system testing, system acquisition, decision analysis, and resource management, as well as tactical, operational and strategic planning from division through combatant command, and from Army Command through the highest levels of the Department of Defense.

## 2. Officer characteristics required

a. *Characteristics required of all officers.* All officers are expected to possess the base characteristics that will enable them to develop into agile and adaptive leaders for 21st century. Our leaders must be grounded in Army Values and the Warrior Ethos, competent in their core proficiencies, and broadly experienced to operate across the spectrum of conflict. They must be able to operate in JIIM environments and leverage capabilities beyond the Army in achieving their objectives. Our officers must be culturally astute and able to use their awareness and understanding to conduct operations innovatively and courageously to exploit opportunities in the challenges and complexities of the operational environment. Further explanation of these characteristics can be referenced in ADP 3-0 and in Part One of DA PAM 600-3.

b. *Unique knowledge and skills of an ORSA officer.* The FA 49 officer is a highly skilled, operationally experienced, effective communicator who incorporates both well established and emerging technologies and analytics to add value in a constantly changing global environment. Officers serve as subject matter experts in studies and assessments, modeling and simulations, optimization, forecasting, data science, data analytics, data visualization, and other big data specialties. Officers leverage new technical skills to rapidly apply tools and insight in the technical domains of Cyber, Special Operations, Networks, and Intelligence, while continuing to support Warfighters and Senior Decision Makers. The ORSA officer will typically serve in one of several general assignments as:

- (1) An analyst in a large analytic organization such as the Center for Army Analysis and Army Futures Command's The Research and Analysis Center, whose principal missions are to provide analysis that supports the organizing, equipping, manning, training, and operations of future and emerging technologies and force structures in support of Multi-Domain Operations.
- (2) An analyst in a highly technical domain such as Cyber, Special Operations, Networks, or Intelligence.
- (3) A combat analyst on a division, corps, Army Service Component Command (or equivalent joint headquarters staff), or Combatant Command headquarters staff.
- (4) An analyst on an Army, Joint, Office of the Secretary of Defense, or Defense agency staff or direct reporting unit.
- (5) An instructor teaching ORSA and/or mathematics courses at the United States Military Academy,

Naval Postgraduate School, Air Force Institute of Technology, or Army Logistics University.

c. *Training/qualification of a FA 49 officer.* FA 49 officers are expected to maintain a high level of technical expertise in the areas of Operations Research, Systems Analysis, Data Analytics, and Data Science. This expertise is gained through Professional Military Education, advanced graduate education, continuing education opportunities, and hands-on experience.

(1) Qualification for entry into FA 49. Due to the technical nature of FA 49, not all Army officers are qualified to move into the FA. Officers are expected to have a strong background in math and science. Officers should have a STEM (Science, Technology, Engineering, or Mathematics) undergraduate degree, have successfully completed at least one semester of calculus, have a minimum undergraduate GPA of 2.5 on a 4.0 point scale, and have a Graduate Record Exam (GRE) Quantitative Reasoning score (within the last five years) in the 50th percentile or greater.

(2) Initial training/education. All ORSA officers are required to learn the basic tools for their trade. This education comes in one of two forms, completion of Operations Research/Systems Analysis-Military Applications Course (ORSA-MAC) or completion of a graduate degree in an operations research related field approved by the proponent, such as Data Science (Data Analytics, Artificial Intelligence, Machine Learning, etc.), Computer Science, Statistics, Applied Mathematics, Economics, Industrial Engineering, Operations Research, or Systems Engineering. Even if an officer completes ORSA-MAC, they are expected to continue their advanced education by pursuing a master's degree in an operations research related field.

(3) Mid-grade military education. All officers junior to YDCS, G-1993 are required to complete the ILE Common Core Course and the FA 49 Qualification Course. These two courses combine to grant FA 49 officers full ILE qualification. As such, officers are encouraged to complete ILE Common Core at a satellite campus or via distance learning, even if selected for resident ILE. Exceptions to this are rare but may be reviewed and granted on a case-by-case basis.

(4) Advanced education. Select FA 49 officers will be afforded the opportunity to obtain additional training or education. These opportunities include master's degree and PhD opportunities through the Advanced Civil Schooling (ACS) program, Training with Industry (TWI), various fellowships and broadening opportunities such as the School of Advanced Military Studies (SAMS), AFC Software Factory, or RAND, Congressional, or White House Fellowships.

(a) Officers selected to attend graduate school for a master's degree or PhD will serve a utilization tour in a validated billet, per the Army Education Requirements System.

(b) Officers selected for TWI, fellowships, or broadening opportunities will work with the FA49 Proponent and Career Manager to determine the most appropriate follow-on utilization.

(5) Senior Service College. A centralized Army selection board will afford a select number of lieutenant colonels and colonels the opportunity to attend SSC.

(6) Security Clearance. FA 49 officers must possess or have the ability to obtain and maintain a TS/SCI security clearance.

### 3. Officer development

a. *Officer development model.* In general the officer development model is focused primarily on the quality and range of experiences, rather than the specific gates or assignments required to progress. Army leaders expect senior FA 49 officers to have a broad set of experiences that enable them to provide strategic flexibility to the Army. FA 49 will develop this breadth of experience by assigning officers to a variety of organizations in multiple analytic disciplines.

b. *Lieutenant development.* FA 49 has no lieutenant authorizations.

c. *Captain/junior major development.* Officers are selected for FA 49 as captains around their 6th year of service. Before transitioning to FA 49, officers will be fully qualified as a captain in their basic branch, having completed their respective Captain's Career Course and an appropriate key development assignment.

(1) *Education.* Prior to their first ORSA assignment, officers are required to either complete initial ORSA training via ORSA-MAC or complete a graduate degree in a field approved by the proponent. Officers completing ORSA-MAC are still eligible to earn a graduate degree through ACS.

(2) *Key developmental assignments.* None.

(3) *Developmental and broadening assignments.* Upon completion of initial ORSA training FA 49 officers will enter into their first assignment with the goal of mastering their analytic skills. These assignments are typically in organizations that have senior FA 49 officers available to coach, teach, and mentor the new FA 49 officers. Because FA 49 officers are selected as senior captains, the combination of their basic branch assignments with their initial ORSA assignment (defined above) provides a sufficiently broad developmental experience.

(4) *Self-development.* Officers with a non-ORSA related graduate degree or officers whose professional timeline does not support a fully funded ACS program are encouraged to pursue an advanced degree through other means. Officers should maintain and build upon their technical and professional skillsets through programs like the Continuing Education Program sponsored by the FA49 proponent, relevant military courses (e.g., the Force Management course), and involvement in professional organizations such as the Military Operations Research Society (MORS), the Army Operations Research Society (AORS), and the Institute for Operations Research and Management Sciences (INFORMS).

(5) *Desired experience.* Upon completion of their first FA 49 assignment, officers should have mastered their analytic skills and be capable of applying those skills in support of operational, generating, or Headquarters/Department analytic efforts.

d. *Major development.*

(1) *Education.* Majors should continue to pursue a master's degree in an operations research related field. Senior Majors that have displayed high performance and potential that have completed a master's degree are encouraged to pursue an advanced degree in a doctorate program approved by the proponent. Majors are required to complete ILE qualification, which consists of successful completion of ILE Common Core and the FA49 Qualification Course. Officers are encouraged to complete ILE Common Core at a satellite campus or via distance learning, even if selected for resident ILE.

(2) *Key developmental assignments.* None.

(3) *Developmental and broadening assignments.*

(a) After an officer's initial FA 49 assignment, select officers should seek assignments that support the operating force. These officers can expect an assignment to a Division or Corps headquarters, Army Service Component Command, Combatant Command, Special Operations or a tasking as an individual augmentee to a deployed organization.

(b) In subsequent assignments, officers can also expect to serve on high-level headquarters staffs as Action Officers, and in units with a lower density of FA 49 officers. Officers should also seek opportunities in technical domains such as Cyber, Special Operations, Networks, and Intelligence.

(4) *Self-development.* Officers with a non-ORSA related graduate degree or officers whose professional timeline does not support a fully funded ACS program are encouraged to pursue an advanced degree through other means. Additionally, officers should continue to maintain and build upon their technical and professional skillsets through programs like the Continuing Education Program sponsored by the FA49 proponent, relevant military courses such as (e.g., the Force Management course), and involvement in professional organizations such as MORS, AORS, and INFORMS.

(5) *Desired experience.* The FA 49 officers should have mastered ORSA skills, be operationally relevant, and be prepared to serve as an ORSA leader.

e. *Lieutenant colonel development.*

(1) *Education.* Lieutenant colonels that have displayed high performance and potential that have completed a master's degree in an ORSA related field are encouraged to pursue an advanced degree in a doctorate program approved by the proponent. A select number of lieutenant colonels will have the opportunity to attend SSC.

(2) *Key developmental assignments.* Select FA 49 lieutenant colonel billets are designated as Key Nominative Billets (KNB). KNB billets are key and strategic positions across the ORSA enterprise that serve to develop well rounded FA 49 Colonels with a depth of knowledge and experience capable of successfully serving in the Army's most demanding positions.

(3) *Developmental and broadening assignments.* The FA 49 lieutenant colonels are expected to serve in positions of increased responsibility and leadership in the ORSA community, particularly on the Army Staff, Joint billets, and ACOMs. Officers should also seek assignments that broaden their

Operations Research/ Systems Analysis skill and experience set.

(4) *Self-development*. Lieutenant colonels should continue to pursue a master's degree in a program approved by the proponent. Additionally, officers should continue to maintain and build upon their technical and professional skillsets through programs like the Continuing Education Program sponsored by the FA49 proponent, relevant military courses such as e.g., the Force Management course), and involvement in professional organizations such as MORS, AORS, and INFORMS.

(5) *Desired experience*. The ORSA lieutenant colonels should serve as leaders in the ORSA community and on high-level staffs such as the Army Staff, Joint Staff, Office of the Secretary of Defense, and Combatant Commands.

f. *Colonel development*.

(1) *Education*. All FA 49 colonels are required to have completed a master's degree in an operations research related field approved by the proponent. A select number of colonels will have the opportunity to attend a resident SSC. All other colonels are encouraged to complete the Army War College Distance Education Program.

(2) *Key developmental assignments*. None.

(3) *Developmental and broadening assignments*. FA 49 colonels serve in a variety of positions across the Army and Department of Defense.

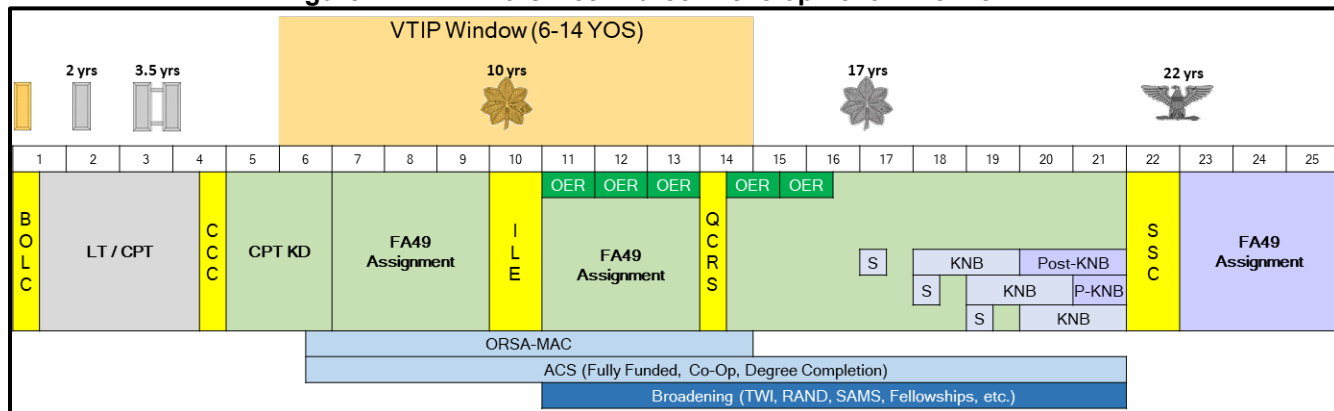
(4) *Self-development*. Officers should continue to maintain and build upon their technical and professional skillsets through programs like the Continuing Education Program sponsored by the FA49 proponent, relevant military courses such as (e.g., the Force Management course), and involvement in professional organizations such as MORS, AORS, and INFORMS.

(5) *Desired experience*. FA 49 colonels are senior leaders across the ORSA enterprise and are strategic thinkers capable of leading analytically focused individuals, teams, and organizations at all echelons across the JIIM environment.

**Figure 1. AC FA 49 Officer Lifecycle and Utilization**

Active Component FA49 Officer Lifecycle Development and Utilization Model				
Rank	Captain	Major	Lieutenant Colonel	Colonel
<b>PME</b>	<ul style="list-style-type: none"> <li>Captain Career Course</li> </ul>	<ul style="list-style-type: none"> <li>ILE - Intermediate Level Education (Phase I)</li> <li>FA49 Qualification Course (Phase II)</li> </ul>	<ul style="list-style-type: none"> <li>SSC -Senior Service Colleges</li> </ul>	<ul style="list-style-type: none"> <li>SSC -Senior Service Colleges</li> </ul>
<b>Functional Training</b>	<ul style="list-style-type: none"> <li>ACS (Masters) - Advanced Civil Schooling</li> <li>ORSA-MAC - ORSA Military Applications Course</li> </ul>	<ul style="list-style-type: none"> <li>ACS (Masters) - Advanced Civil Schooling</li> <li>ACS (PhD) - Advanced Civil Schooling</li> <li>JPME II- Joint Professional Military Education</li> <li>ORSA-MAC - ORSA Military Applications Course</li> <li>SAMS - School of Advanced Military Studies</li> </ul>	<ul style="list-style-type: none"> <li>JPME II- Joint Professional Military Education</li> <li>ACS (PhD) - Advanced Civil Schooling</li> </ul>	<ul style="list-style-type: none"> <li>JPME II- Joint Professional Military Education</li> </ul>
<b>Developing and Broadening Assignments</b>	<b>Key Developmental Assignments</b>			
	<ul style="list-style-type: none"> <li>Army Command</li> <li>Operating Force</li> <li>Staff/FOA/DRU</li> <li>Education</li> </ul>	<ul style="list-style-type: none"> <li>Army Command</li> <li>Operating Force</li> <li>Staff/FOA/DRU</li> <li>Education</li> </ul>	<ul style="list-style-type: none"> <li>Army Command</li> <li>Operating Force</li> <li>Staff/FOA/DRU</li> <li>Education</li> </ul>	<ul style="list-style-type: none"> <li>Ch Reqs/Assess, SOCOM</li> <li>Dep Dir, CCDC</li> <li>Dep Dir, Center for Army Analysis</li> <li>Dep Dir, TRAC-FLVN</li> <li>Dep Dir, TRAC-WSMR</li> <li>Dir, Strat Plans, CENTCOM</li> <li>Army Command</li> <li>Staff/FOA/DRU</li> <li>Education</li> </ul>
	<b>Developmental and Broadening Assignments</b>			
	<ul style="list-style-type: none"> <li>Analytic Agency (CAA, TRAC)</li> <li>ATEC/OTC Analyst</li> <li>Personnel Analyst (G1, HRC, USAREC, Cadet Command)</li> <li>USMA Instructor</li> <li>TRADOC CoE Analyst</li> </ul>	<ul style="list-style-type: none"> <li>Analytic Agency (CAA, TRAC)</li> <li>ATEC/OTC Analyst</li> <li>Congressional Fellowship</li> <li>COCOM Analyst</li> <li>Joint Staff/OSD Analyst</li> <li>Division/Corps/ASCC/TSC Analyst</li> <li>Instructor (USMA, ORSA-MAC, Q-Course)</li> <li>TRADOC CoE Analyst (Maneuver, Fires, Maneuver Support, Intel, Sustainment)</li> <li>Personnel Analyst (G1, HRC, USAREC, Cadet Command)</li> </ul>	<ul style="list-style-type: none"> <li>Branch Chief</li> <li>Joint &amp; Defense Analyst</li> <li>Lead Analyst</li> <li>RAND Arroyo Center Fellowship</li> <li>Senior Military Analyst</li> <li>Team Chief</li> <li>White House Fellowship</li> </ul>	<ul style="list-style-type: none"> <li>Army Senior Fellows Program</li> <li>Army Senior Service College Fellowship Program</li> <li>Army/Joint/Defense Staff</li> </ul>

**Figure 2. AC FA 49 Officer Career Development Timeline**



#### 4. Warrant officer development

The FA 49 does not have warrant officers.

#### 5. Reserve Component officers

*a. General.* Only Army Reserve (USAR) AGR officers can be designated into FA 49 (Operations Research/Systems Analysis) as their career management branch. All other RC officers (TPU, IMA, and NGB) may fill a 49A billet if appropriately trained, but are still managed in their basic branch. RC Operations Research/Systems Analysis officers fulfill similar roles and missions as their RA counterparts; however, the range and scope of possible RC assignments is somewhat more limited than those found within the RA. For additional guidance on RC officer development, see Part One of DA PAM 600-3.

*b. Assignment opportunities.* RC Operations Research/Systems Analysis assignments exist in various levels of command throughout the reserve forces. Generally, USAR entry-level positions are in the accessions system area. The USAR AGR Operations Research/Systems Analysis serve primarily at the OCAR and the USAREC. They also on the Army Staff, at the USAREC, and in various other agencies. USAR AGR officers have the opportunity to deploy in support of Overseas Contingency Operations. The ARNG analysts are primarily assigned to organizations in the National Capital Region and to ARNG staffs.

(1) *Captains.* The USAR entry-level positions include several captain billets, most managed under the AGR Program. Almost all USAR captains serve as analysts at USAREC headquarters. They are supervised and mentored by senior civilian analysts and work alongside their AA peers.

(2) *Majors/lieutenant colonels.* Most RC Operations Research/Systems Analysis positions are field grade and are governed by the IMA and AGR programs, and most authorizations for senior majors and above are in the National Capital Region. Two ARNG Operations Research/Systems Analysis majors are authorized for the Division, Corps and Army Headquarters staff.

(3) *Colonels.* There are few colonel positions and senior analysts should seek branch/FA generalist positions. Colonels should maintain broad perspectives and should seek experience throughout the analytical community.

*c. Mobilization.* Significant numbers of mobilization requirements exist for FA 49 qualified officers. HRC manages pre-trained individual manpower to fill shortfalls in Regular Army, Army Reserve and ARNG units using officers assigned to the IRR.

*d. Qualification and professional development.* Any RC officer who attends Operations Research/Systems Analysis - Military Applications Course is considered a qualified Operations Research/Systems Analysis. Additionally, USAR AGR officers who successfully complete the Operations Analysis program at the Naval Postgraduate School are also considered a qualified Operations Research/Systems Analysis. USAR AGR officers are accessed into FA 49 at various points in time during their professional career; some will access as a captain, others as a major, and others as a lieutenant colonel. The below criteria apply to those USAR AGR officers who are managed as a FA 49 while in that rank.

(1) Captain development.

(a) Successfully complete basic branch captains Officer Education System courses (either RA or RC curriculum.)

(b) Serve in at least one basic branch position for a minimum of 24 months to gain the requisite skills and experiences required by their basic branch

(c) Serve in at least one entry-level Operations Research/Systems Analysis position for at least 24 months.

(2) Major development.

(a) All officers in the primary zone for the lieutenant colonel Selection Board in September 2010 or later are required to complete the FA 49 Qualification Course and the ILE Common Core Course to successfully complete ILE requirements. The FA 49 Qualification Course is designed to prepare field grade officers to serve successfully in FA 49 positions on Army and Joint Staffs. All USAR AGR majors must attend ILE Common Core Course through any one of the various

modes. Majors must also attend the FA 49 Qualification Course to complete ILE qualification.

(b) All FA 49 positions are considered KD. Serve a minimum of 24 months in at least one Operations Research/ Systems Analysis position.

(c) Continue development through continuing education program or various civilian education venues with the ultimate goal of obtaining a master's degree in an operations research related field (see table 1).

(3) Lieutenant colonel development.

(a) All FA 49 positions are considered KD. FA 49 lieutenant colonels should serve in positions of greater responsibility and leadership.

(b) Continue development through continuing education program or various civilian education venues with the ultimate goal of obtaining a master's degree in an operations research related field (see table 1)

(c) Lieutenant colonels are encouraged to complete for lieutenant colonel command and for SSC.

(4) Colonel development.

(a) All FA 49 Colonel positions are considered KD.

(b) As senior analysts, colonels serve in assignments that require both technical and managerial skills. They should be able to oversee and direct diverse studies and analytical efforts. Colonels should have a broad background in analysis throughout the Army, having served in a variety of different FA 49 authorizations in previous field grade assignments.

e. *Life-cycle development model.* The RC life-cycle development model for FA 49 officers is shown at figure 2.

f. *Civilian-acquired skills.* Many RC officers possess education and/or work experience through their civilian profession comparable to that of Operations Research/Systems Analysis officers but are not designated FA 49. Civilian Operations Research/Systems Analysis-related work experience will be considered for developmental equivalency when qualifying these officers for positions of increased responsibility.

g. *Reserve Component training participation and credit.* See Part One of DA PAM 600-3.

(1) CCC required for promotion to major.

(2) ILE: must complete ILE Common Core for promotion to lieutenant colonel.

Figure 2. RC FA 49 officer career development

