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Enabling Mission Success Together: Resident Management Offices at the Nexus of NASA and Industry Partners

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Abstract

Resident Management Offices play a critical role in NASA's approach to ensuring mission success, particularly for human spaceflight programs where safety and reliability are paramount. NASA assigns personnel to work on-site at contractor facilities. These individuals serve as direct liaisons between NASA and its industry partners, overseeing the development, manufacturing, and testing of systems and components vital to its missions. In this capacity, resident offices act as NASA's technical and programmatic representatives, embedded within the supplier's operations. Their responsibilities include verifying compliance with NASA requirements, monitoring production processes, assessing supplier readiness, witnessing key tests, reviewing documentation, and participating in failure investigations. This close involvement allows NASA to maintain real-time awareness of contractor progress, resolve technical issues early, and prevent delays that could affect critical mission timelines. This paper discusses best practices from individuals working in these roles, as well as examples on how these resident offices insight help identify risks and discrepancies before they impact downstream integration or launch activities. By placing trusted NASA personnel at the heart of supplier operations, resident management offices strengthen communication, transparency, and accountability. It enables rapid decision-making and issue resolution without waiting for escalation through formal channels. This proactive presence is particularly valuable when managing complex, geographically distributed supply chains supporting multi-billion-dollar, multi-year projects or programs.

Keywords: NASA, Industry Partners, Resident Management Office, Trust, Collaboration, Mission Success

Acronyms/Abbreviations

ACO: Administrative Contracting Officer
CAO: Contract Administration Office
FAR: Federal Acquisition Regulation
GFP: Government Furnished Property
RMO: Resident Management Office
RMOs: Resident Management Offices
SME: Subject Matter Expert

1. Introduction

In the intricate landscape of major aerospace programs, particularly those involving collaborations between NASA and industry partners, a unique and critical role is played by individuals within the Agency's Resident Management Offices (RMO). These representatives are embedded within industry partners facilities, acting as vital links for oversight and insight mechanisms, ensuring program success and accountability.

Government personnel working in contractor facilities is not new. This is a practice followed by different agencies of the government and it is fully authorized by the United States Federal Acquisition Regulation (FAR) system [1]. Terms used for this role vary per agency, program, or project. The FAR referred them as Contract Administration Office (CAO) or Resident Administrative Contracting Officer (ACO) [2]. The responsibilities range across specific needs of the agency, program, or project. Some of the most commons responsibilities are administration functions such as monitoring performance, conducting reviews, safety audits, and supporting investigations. The oversight of Government Furnished Property (GFP) management also tends to be a common responsibility [3].

Similarly, the RMO role at NASA has been used for many years, and programs or projects use variations of names for the role, such as Resident Lead, Resident Office Manager, Resident Manager, Resident Office Lead, Liaison, Program Representative, Project Representative, etc. These individuals' scope of work

can also vary based on the needs of the customer, which are the programs or projects they are representing at the contractor facilities. It ranges from project, engineering, safety, quality, insight, tests visits coordination and product assurance. Such tasks depend on the lifecycle phase in which the project or program is and aligns to the needs of both NASA and the industry partner.

The RMO was established to be able to expedite communication and decision-making. Individuals working in RMOs act as liaisons between government and contractor teams ensuring large and complex projects meet contractual requirements for cost, schedule, and technical performance [4]. This 'boots on the ground' office aims to overcome challenges related to oversight, insight, real-time coordination, and contract compliance by helping to expedite answers to questions coming from both the government and the contractor while ensuring ethical conduct and protection of contractor confidentiality [5].

There is not a prescribed position description nor a predefined checklist for the RMOs supporting various programs and projects across NASA. Individuals serving in this role have had to come up with creative ways that work for them in their specific situations working with their industry partners under different acquisition models. This article provides a compilation of best practices that have been used by individuals in this role, which involves creativity, patience, adaptability, and flexibility.

2. A Unique Vantage Point and Access

RMO representatives, often situated at core manufacturing facilities, enjoy unparalleled access. This includes the manufacturing floor, internal engineering and quality systems, and in some cases even direct communication channels with technicians. Levels of access may vary depending on type of contract and contractor flexibility. They may operate with both a contractor provided computer and an Agency computer, allowing for comprehensive insight and oversight. In other cases, RMO representatives may gain access to industry partner's tools that allows them to follow hardware development, testing, and processes. This direct access is crucial for maintaining transparency and building a robust case for true insight into the contractor's operations. Agreements to access provided may be detailed in the government's program plan and contractor's insight implementation plan. Examples of those NASA documents can be found in the Commercial Crew Program and Human Landing System Program [6,7].

3. Navigating Contractual Structures and Relationships

The contractual structure governing these partnerships can be challenging, often influenced by previous endeavours. RMO representatives play a key role in navigating these complexities, including interacting with material review systems and ensuring compliance with evolving contract structures, such as the shift towards performance-based agreements and the contractor assuming design authority for key elements. RMOs act as interpreters and facilitators, ensuring smooth communication between the contractor and NASA's project or program.

Horizontally integrated organizations require greater staffing for RMO roles, as well as greater coordination and approvals in order to maintain a valuable level of presence. This coordination and approval process can easily run into subcontractual roadblocks preventing hardware monitoring and tracking from being performed in the same way as the prime contractor. In addition, differing levels of data access may be requested but may not be contractually agreed upon to be shared, and therefore either no data is shared, or a level of filtered data is agreed to be shared.

On the other hand, vertically integrated organizations require less staffing for RMO roles as production and integration are in house. This reduced distribution of work allows the RMO to maintain visibility on hardware from the subcomponent level through integrated testing and data access, as it is centralized, can be granted easier as approvals do not necessarily need to go through subcontractual approvals, which also have termination dates once the contracted hardware is delivered.

4. Core Responsibilities and Daily Operations

The responsibilities of an embedded representative extend beyond mere oversight and insight. Those can include managing visitor access and training, providing day-to-day work guidance despite lacking a direct supervisor at the contractor site, and participating in contractor program and contract meetings to ensure proper communication and procurement processes. RMO representatives are responsible for providing an unbiased reporting detailed weekly or biweekly progress notes to the program office, safety and mission assurance, and engineers at NASA. This can include fleetwide awareness of issues that may become notable to the project or program. This overall observation provides insight into produced hardware that may eventually become assigned to the customer, and trending issues that may not be presented at weekly

metrics meetings by the provider. To minimize cultural friction and potential conflicts of interest, this reporting often necessitates careful handling of sensitive information, balancing transparency with contractor confidentiality.

The RMO can provide a Subject Matter Expert resource to both sides' engineering teams to assist in deep dive analysis and technical problem resolution to determine if designs meet contractually approved criteria. The RMO integrates with the provider's production teams to report floor level production statuses that may be too detailed to be presented at program status briefings. This detailed view of production can identify hiccups that could manifest into fleetwide nonconformances that could result in hardware reallocations and possibly schedule slips. It is important to keep in mind that if production and integration are not centralized to one geographical location, there may be a critical need for multiple individuals to be collocated with the provider.

Most RMOs represent Safety and Mission Assurance for NASA and perform duties for various engineering disciplines as part of the Certification of Flight Readiness. A Certification of Flight Readiness Plan example can be found in the flight certification approach for Space Launch System Program [8]. These duties include Product Assurance Action execution, which are part of the contractually required certification of the vehicles presented at the Flight Readiness Reviews, as well as mission specific and fleet hardware followings during production.

RMOs can also have seats at the table during failure investigations. The benefit is that the program or project can obtain details of the investigative pathways prior to formal customer briefings. The seat at the table may also allow some level of customer input that can assist the provider to steer their resolution to a point that is amicable to both NASA and the industry partner.

RMO personnel can also have opportunities to participate in both internal and external AS9100 audits and assessments at some providers [9]. Their roles are strictly limited to silent observers in the process so that the provider can accurately assess their own processes and controls as well as respond to external auditors' observations and potential findings. This is a quality element that, again, can provide potential unpublished details to the customer and is critical to mission assurance and certification.

5. Cultivating Relationship and Ensuring Compliance

Beyond technical and contractual duties, developing strong relationships with industry partner personnel, particularly program level individuals, is paramount to the effectiveness of the RMO. While RMO representatives might not have direct signature authority on certain boards, their role can involve verifying compliance with directives and participating in acceptance reviews and pre-Flight Readiness Review boards. They are crucial for advocating for the Agency's needs, such as ensuring access to hardware for inspection, which can significantly improve efficiency by reducing the need for extensive hand holding during inspections.

The RMO strives to maintain excellent relationships with both the provider's engineering and production teams as well as the NASA's program or project teams. Depending on the contract, those relationships can expand to other onsite customers who are also performing their own fleet following, increasing reliability. This collaborative effort is critical to ensuring a complete picture is presented to all customers back in the Agency, unbiased by the providers motivation which can be contractual or other.

6. A Foundation Built on Experience and Adaptation

Many RMO representatives bring extensive experience from previous programs or projects and navigate the unique challenges of new technology development without being involved in its initial startup struggles. It is recommended that RMO personnel hold deep systems engineering backgrounds and have previously been subject matter experts on subsystems that they may be observing. Having technical depth, often coupled with technical breadth coming from years of experience, is critical to ensuring that accurate messages are conveyed to the customer (program or project). Failure to staff an individual or individuals to this type of role without this expertise and understanding can easily result in the incorrect interpretation of the deliverable to the customer. Their continuous quest to understand and compare industry partner quality systems with NASA's own standards underscores their commitment to excellence and continuous improvement within this vital oversight and insight function.

7. Conclusion

Drawing from a foundation of experience and adaptation, NASA RMOs serve as a vital, multifaceted liaison embedded within industry partner facilities. They offer a unique vantage point, ensuring program success and accountability through access to manufacturing, engineering, and quality systems. By

navigating complex contractual structures, fostering strong relationships, and providing continuous insight, these individuals act as interpreters and facilitators between NASA and its partners. Ultimately, the RMO personnel's unbiased reporting, mission assurance expertise, and participation in crucial reviews and investigations are indispensable for mitigating risks, ensuring compliance, and delivering safe, reliable, and successful outcomes for NASA's major aerospace programs. Their role, which adapts depending on the program's lifecycle and contractual needs, is critical for achieving mission success while balancing transparency and contractor confidentiality.

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