Strategic Planning Operational Research Team Reviews of High Level Mandatory Requirements from 2014–2017

Issues and Observations

M. Dixson
P.L. Massel
DRDC – Centre for Operational Research and Analysis

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IMPORTANT INFORMATIVE STATEMENTS

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Abstract

For several years, defence scientists have provided informal, independent assessments of the Business Need (BN) statements and high level mandatory requirements (HLMR) as a necessary part of DND's approval process for significant projects. This report provides an overview of the Departmental guidance governing the review process, the methods employed by the scientists to carry out the reviews and observations resulting from reviews conducted over the period from October 2014 to April 2017.

Résumé

Pendant plusieurs années, les scientifiques de la Défense ont fourni des évaluations informelles et indépendantes des déclarations des besoins opérationnels (BO) et des exigences obligatoires de haut niveau (EOHN) dans le cadre du processus d'approbation du MDN pour les projets importants. Le présent rapport trace les grandes lignes de la directive ministérielle régissant le processus d'examen, les méthodes employées par les scientifiques pour effectuer les examens et faire des observations en réponse aux examens effectués, pendant la période du mois d'octobre 2014 au mois d'avril 2017.

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1 Introduction

When the Department of National Defence (DND) establishes a procurement project, the Project Approval Process (PAP) is initiated, governed by the Project Approval Directive (PAD). The PAP consists of five phases: identification (ID), options analysis (OA), definition, implementation, and close out. The results of the ID and OA phases come together in the Business Case Analysis (BCA), which is used to inform senior decision makers and is a compulsory component of the funding submission [1].

Among other things, the BCA outlines the rationale for the project and presents potential options to address the problem. Within the BCA are a Business Need statement (BN) and a set of high level mandatory requirements (HLMRs), which give high-level descriptions of the project's objectives expressed in terms that that are understandable by non-specialists and provide the basis for the options analysis. HLMRs were established to enhance senior-level decision making and the governance of procurement projects. In 2017, the PAD (2015) was augmented by a Project Guidance Memorandum (PGM) [2], intended as the basis for a future amendment to the PAD. However, the observations and issues discussed in this paper arose from HLMR reviews that were conducted before this update and so this document will exclusively make reference to the 2015 directive.

At the request of the Director General of Structure and Capability Integration (DGCSI), a subordinate of the Vice Chief of Defence Staff (VCDS), scientists from the DRDC – Centre for Operational Research and Analysis (CORA) Strategic Planning Operational Research Team (SPORT),[1] have been reviewing project BNs and HLMRs (including any associated metrics[2]) in order to provide an independent assessment of whether or not they meet the guidelines released by the VCDS [3]. Although these reviews do not constitute a formal step in the project approval process, they have provided DGCSI and project staff with opinions and suggestions to be used as they saw fit with the goal of strengthening the project's business case. Although these reviews have been conducted since September 2013, this Reference Document pertains to HLMR reviews conducted by the authors between October 2014 and April 2017.[3] During this time, approximately 75 reviews[4] related to over 40 projects have been conducted.

We begin by reviewing the rationale behind the use of HLMRs and the guidance in the VCDS Directive for their development. We then describe the process and methods that were used to review HLMRs and provide feedback. Next, key observations and issues that arose from the conduct of the reviews is summarized. Lastly we discuss the evolution of the review process and its future direction.

[1] For this paper the term CORA will be used to refer to the cadre of defence scientists on the SPORT team who work with DGCSI staff on HLMR reviews and issues. It is common for projects and DGCSI to refer to HLMR reviews as "CORA reviews."

[2] References to HLMR reviews in this paper should be considered to encompass review of the BN and metrics in addition to the HLMRs.

[3] A list of the projects reviewed over this period and a link to the review documents themselves on GCDOCS is provided at Annex A.

[4] What constitutes a review will be discussed below. This count includes multiple reviews for the same project because of projects requesting reviews of updated versions of their BN and HLMRs.

2 HLMRs in the project approval process

DND has been employing the Treasury Board (TB) Business Case Analysis framework since 2009 which incorporates the concept of the HLMR. An audit in 2013 by the Chief of Review Services (CRS) concluded that a method or process needed to be developed to standardize the development and validation of the HLMRs. This eventually resulted in the creation of the set of guidelines for developing the BN and HLMRs released by the VCDS in 2015 [3].

These guidelines were initially drafted by CORA following a review of Government of Canada requirements as well as best practices from the United States and United Kingdom [4]. This preliminary research on the definition of HLMRs is described in DRDC publications [5–6]. A DRDC-led working group was tasked with developing guidelines for a process and roles and responsibilities for providing analytical support to Defence Capabilities Board (DCB) project decisions. The working group included members from CORA, the Directorate of Strategic Coordination (D Strat Coord), the Directorate of Capability Integration (DCI), and Directorate of Costing Services (D Cost S). The results were briefed to DCB in October 2013. A parallel activity developed the guidelines for HLMR reviews and briefed them to DCB in March 2014. Reviews used to test and adjust the review guidelines commenced in September 2013.

SPORT was tasked with conducting HLMR reviews for two main reasons. First, SPORT staff were familiar with the guidance and review process as they had drafted those sections of the VCDS Directive and therefore had the knowledge and expertise to assist with the reviews.[5] The second reason relates to the SPORT staff being seen as able to act in an impartial manner. Impartiality is critical in order to ensure that the HLMRs, being foundational to the business case and ultimately a measure of the success of the project, are subjected to independent and unbiased review.

2.1 The purpose of HLMRs

The fundamental purpose of HLMRs (taken as a whole) is to provide senior decision makers with a brief, high-level description of the objectives of an acquisition project that is free from specialist language, focused on the required capability,[6] and not suggestive of any specific solution. The HLMRs must link to and expand upon the BN, which consists of a sentence or short paragraph describing the capability deficiency or user requirement at its most fundamental level [3]. The HLMRs break down the general BN statement into a list of more specific requirements specifying what capability the Canadian Armed Forces (CAF) needs without placing constraints on how the proposed project should deliver the requisite capability. HLMRs support decision making by providing straightforward descriptions of the desired capabilities, making it easier to evaluate a projects' alignment with the department's strategic goals. Most importantly, the HLMRs represent fundamental criteria that are used to choose between various capability options in the options analysis (OA) phase.

[5] There were concerns, which remain today, as to whether this role is appropriate for DRDC defence scientists.

[6] Defining "capability" can be a challenge as there are many official definitions and we will not debate the point here. In the HLMR context, capability is defined simply as "…the ability to do something…."

As shown below in Figure 1, the Project Approval Process is composed of five phases from identification (ID) to close out. The ID phase is where the BN and HLMRs are most relevant. Of note is how the HLMRs are intended to be a product of the BN and business outcomes and then themselves provide inputs for the Statement of Requirements (SOR).

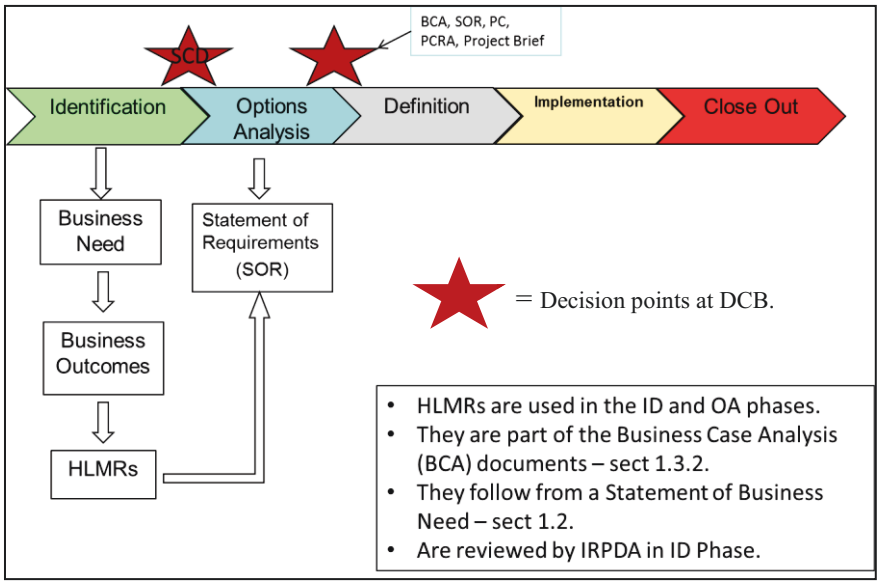

Figure 1: *HLMRs and the Project Approval Process.*

Figure 2 below provides a depiction of the conceptual framework that underlies the early sections of the BCA document and shows how the BN and HLMRs fit in and are related.

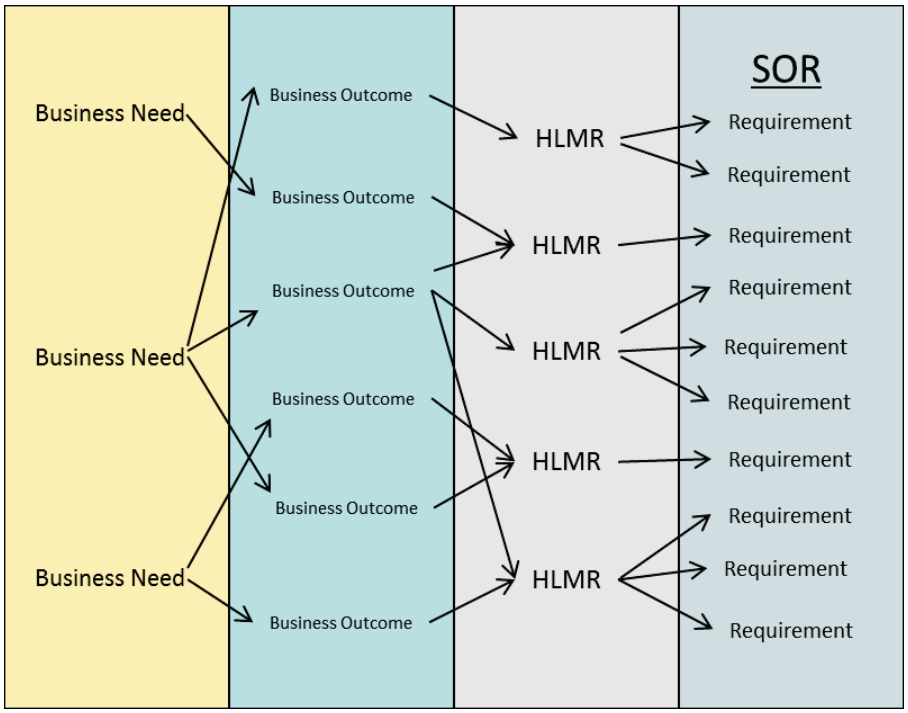

Figure 2: *Conceptual structure of BN and HLMRs.*

Although not depicted in either figure, the Drivers for Change are always present and alter the CAF operating environment in some way. These drivers are influenced by government policy, Statements of Capability Deficiency (SOCD), the Force Capability Plan (FCP), the Future Security Environment (FSE), the Departmental Results Framework (DRF), and the Capability Based Planning (CBP) process, and point to a targeted Business Need describing the reasons for initiating the project. Although the BCA should have only one BN statement, it is possible for projects to have a few business needs combined. Regardless, the concept is that the desired improvements to the operating environment follow logically from the BN and are articulated using the Business Outcomes. The HLMRs and associated metrics articulate the "what has to be done" to realize the Business Outcomes.

As we will discuss below, projects struggled with the difference between an HLMR and an SOR requirement. In the framework above, the idea is that the HLMR is the higher level capability requirement that is derived first and is not solution specific. The requirements in the SOR are more detailed and specific and they follow naturally and logically from the HLMRs but are only derived once a solution has been determined. Overall, this conceptual framework provides a logically self-consistent structure for articulating the high level objectives of the project.

Another important goal of the framework HLMR construct is to promote thinking in terms of capability and not platforms. While there are a number of constructs available to describe specific aspects of capability,[7] in this context, it is intentionally defined at its most basic level as "the ability to do something." This helps ensure that the requirements do not imply a specific platform

[7] In the CAF, the capability construct is called PRICIE. Such a construct is not necessary to conduct the HLMR reviews.

or solution. The HLMR development, review, and approval process is therefore aimed at getting project staff to think in terms of filling capability gaps and to resist the temptation to automatically replace the existing platform with the newest version of the same type of platform.

2.2 Principles of HLMRs from the VCDS Directive

The VCDS Directive provides descriptions of the characteristics that are expected of the BN, HLMRs and the associated metrics. These characteristics were used to form the foundation for the SPORT reviews and are reviewed below.

Statement of Business Need:

- Describes, in at most a few sentences, the fundamental capability that the project is planning to acquire or, equivalently, the capability gap that the project intends to fill.
- Along with other early sections of the BCA document (such as the Drivers for Change and Business Outcomes), provides the basis for the HLMRs. HLMRs must be traceable back to the BN.

High Level Mandatory Requirements:

- Are about capability and not platforms.
- Should be very brief, very focused descriptions of a capability requirement that is necessary to deliver on the business outcomes. As they should be very focussed, HLMRs should not overlap with each other.
- As they are high level, they should be quite limited in number.
- Must be "binary," meaning that any viable solution option must meet all HLMRs in a pass/fail assessment. HLMRs must be a complete description of the capability need and consequently, if an option falls short on even one HLMR, then the option is deemed to have failed because it did not fill the capability gap by meeting all *mandatory* requirements.
- Should be written using non-specialist language and avoid the use of acronyms.
- Should be accompanied by one or more Measures of Effectiveness (MoE) that are used to assess whether a solution option satisfies the HLMR. An MoE should also have a minimum or *essential* level defined so that a solution option can be assessed against it. An option unable to meet this minimum standard is not viable.
- Should comprise a complete description of the capability need.

3 SPORT and the HLMR review process

3.1 Establishing SPORT's review guidelines

After having conducted a few HLMR reviews in the Fall of 2014, the SPORT reviewers quickly determined that the process would benefit from the development of a common approach that would ensure greater consistency, both between reviews and between reviewers. As a result, a common review template was developed (Annex B).[8] This template allows the reviewer space to provide both general comments and specific feedback on the BN statement and individual HLMRs. For the benefit of the project staff, it also provides a summary of the criteria upon which the review was based and which were based upon the principles in the VCDS Directive reviewed in Section 2.2.

3.2 Overview of the SPORT HLMR review process

HLMR reviews are carried out under the auspices of Project 00ba,[9] with each review being carried out by one of three or four defence scientists (DSs) in SPORT (depending on staffing levels). In general, the process is straightforward:

- BCAs for HLMR review are passed from a DCI desk officer (the Office of Primary Interest (OPI)) assigned to the specific project to SPORT's HLMR Coordinator, Dr. Murray Dixson who then assigns the review to one of the DSs in SPORT. The reviews are assigned on a rotating basis and a spreadsheet is maintained to track them.
- The DS conducts an independent review and generates a report using the template, which they return to the DCI OPI. The SPORT DSs endeavour to provide the review within 2 weeks.
- If follow-up is required, the assigned DS works with the DCI OPI to resolve any questions or issues. Occasionally a face-to-face meeting with the project staff is also necessary (as determined and arranged by the DCI OPI) to address and resolve any issues arising from the review.
- In unique or challenging cases,[10] DSs may consult with each other or even conduct a joint review in order to discuss complex requirements and ensure consistent application of the review criteria. This also helps guarantee high-quality reviews for more complicated projects.

[8] While the template has been updated according to the May 2017 PGM, the previous template is included as part of this report as it has been used for the majority of HLMR reviews.
[9] Project 00ba refers to the agreed-to program of work under which SPORT's Defence Scientists undertake various research and analytical projects for DGCSI. As of April 2017 these services are provided under a successor Project, 00bf.
[10] An example is a case where three projects were required to combine into one but still be trying to fill three separate capability gaps. Therefore the single project had three sets of BN and HLMRs.

To conduct the actual review, a DS will typically carry out the following tasks:

- Read the BN, the HLMRs, and occasionally some of the introductory sections of the BCA, for context.
- Ensure that each HLMR is directly linked to the BN.
- Determine how well each HLMR meets the criteria set out in the VCDS Directive:
  - Clarity (free of jargon, understandable by a non-expert);
  - Results orientation (about a capability and solution independent);
  - Essentiality (required for project success);
  - Sufficiency;
  - Comprehensiveness.
- Verify that the requirements include appropriate metrics (See Section 4.4) allowing for a pass/fail assessment and that are able to support an options analysis.
- Provide comment on the use of certain types of requirements. Some requirements stated as HLMRs are associated with running the project (such as having a project office) and contribute to the project's success in filling the capability gap. However, these project or program related requirements are generally not HLMRs and projects need to be so advised. HLMRs seek to capture the rationale for the project.

Following this review, the DS will draft a response identifying any general issues with the BN and the HLMRs and providing specific observations or feedback for individual HLMRs. This typically includes an opinion as to whether or not the BN and HLMRs are consistent with guidance and sufficient to support the development of credible criteria for the OA phase of the PAP. This review is then returned to the DCI OPI.

Most initial HLMR submissions fall short of the VCDS guidelines in some way and need revision and improvement. Therefore, the DS will usually be asked to help improve them through discussions and exchanges with the DCI OPI and/or the project staff (via e-mail or face-to-face meeting). The involvement of the DS is limited to providing suggestions and guidance as to how the HLMRs can be made more consistent with the principles of the guidance. It is the responsibility of the project staff working with their DCI OPI to decide on the final form for their BN and HLMRs.

Finally, copies of each completed HLMR review are retained by SPORT for archival purposes. The archive is currently held on GCDOCS at the link provided in Annex A.

4 Issues and observations arising from the HLMR reviews

In this section of the report, we present a discussion of a variety of issues related to reviewing HLMRs and the review process that arose over the course of conducting reviews of some 70 sets of HLMRs, the related metrics and the BN statements. These issues were ones that appeared frequently and became the basis for the majority of the feedback SPORT provided to the project staffs and reflect the principles described in the VCDS Directive.

4.1 Issues with the HLMR review process

By the time the HLMR review is conducted, project staff have invested a great deal of effort into producing the BCA and have made significant progress in the drafting and approval process. It was noted that it was extremely frustrating for project staff when progress was halted or delayed as a result of the HLMR review. This could be mitigated by carrying out the drafting, review, and approval of the HLMRs earlier in the process [7].

In a department as large and complex as DND, the range and variety of different projects under consideration for investment makes it very difficult to have one-size-fits-all guidelines for drafting acceptable HLMRs that all projects will be able to satisfy. For example, the guidelines implicitly assume that a project will have one set of HLMRs to describe one capability need. But the authors reviewed cases where a project had been mandated to merge, say, three projects into one for economy and therefore had three sets of HLMRs that were only generally related. In other cases, project staffs were required by their superiors to include certain HLMRs even though those would be contrary to the Guidance (such as specifying a solution). A final example is when an already approved project was required to update its documentation to be consistent with the VCDS Directive. In those cases, there was little benefit to be gained from the HLMR review as the project was not going to put a lot of effort into it.

The implication is that the Guidance needs to allow for some flexibility and variation in the HLMR product that projects produce. Both the review process and the reviews themselves need to allow for specific project circumstances and should focus on ensuring that the projects' HLMRs are consistent with the intent of the VCDS Directive if not the specific tenets.

As discussed above, SPORT's role is to provide an informal and independent review of the BN and HLMRs and the feedback provided was to be treated as suggestions for improvement and not as direction to the project staffs. However, as time went by, SPORT's reviews became commonly referred to as the "CORA approval" step. At times, some senior leaders would ask a project if they had "received CORA's approval" for their HLMRs. This interpretation of the review as a formal rather than informal requirement was problematic because it caused most projects to want to confer directly with SPORT to resolve the issues resulting from the review. This increased workload for everyone and caused an increasingly frequent "back-and-forth" with several projects who sought SPORT "approval" for their latest version of the HLMRs. In some cases, SPORT was asked to review several alternate versions of HLMR sets and recommend the set that was "best." This situation was of concern for several reasons. First, it was causing higher workload for the

SPORT and DGCSI staffs than was necessary. Second, it was forcing SPORT to take on a more direct, consultative role with the projects that risked the independence of the reviews and was contrary to the way that DRDC Management wanted SPORT to handle the reviews. As of this writing, the issue remains unresolved.

4.2 Observations concerning the Business Need statement

In general the reviews conducted over the period found that BNs often fail to clearly capture the essence of the requirement. More often they focussed on defining and explaining a particular problem or they described a broad and often unbounded solution, rather than articulating the capability gap to be addressed by the project. Moreover, they were often unnecessarily long because they included descriptions of the consequences arising from the failure to address the stated capability gap. Explanations of this nature are not required within a BN because they are necessary components of other sections of the BCA.

4.3 Observations concerning HLMR statements

The most common problems observed over the period with the HLMRs are described below:

- As was seen with the BNs, the draft HLMRs often focussed on specific platforms or solutions rather than the capability need. In contrast, the Guidance is that they should describe the desired effect or capability to be delivered, leaving room for creative approaches to achieving the stated goal as well as a truly competitive process for the provision of solutions.
- There was a frequent tendency to use military terminology, expressions and abbreviations that are not easily understood by a non-expert reader. In this context, it is important to appreciate that HLMRs should be able to stand on their own and must be easily understood by a non-expert who may be either from another government department or from industry.
- HLMRs were often written too generally or broadly whereas the Guidance advises that HLMRs should articulate a unique and specific capability. An illustrative example might be "…the ability to do the mission…." In this example, there is no specific capability mentioned. A related observation is that HLMRs often lacked clarity. An example might be "…the ability to be transported by CC-130…." In this case, the reviewer may be unsure about just what the transportation requirement really was. Such an HLMR leaves it unclear whether rail or strategic lift transport are also required when it would seem logical that they would be. When drafting an HLMR, finding the balance between one that is overly detailed and constraining versus one that is too broad and ill-defined is an ever-present challenge.
- It was rare to see draft HLMRs that attempted to articulate the "no fail" level of capability the project must achieve; rather, they were often framed in terms of a desired end state. The Guidance is clear that a minimum level of capability should be described because there is no operational benefit and the project cannot be considered successful unless that is achieved.
- The reviewed draft HLMRs often included requirements that pertained to the success of the project beyond the capability needs of the project. Examples would be "…the ability to have adequate funding for…" or "…the ability to have adequate staffing levels for…." The

Guidance mentioned a variety of issues that were considered to be constraints on the project that were not to be considered as HLMRs.

- HLMRs often appeared to be SOR requirements because the statements described very specific aspects of the capability such as that the capability needed to be tracked versus wheeled or that it needed to meet a specific NATO specification.

4.4 Observations about HLMR metrics

The general reason for having metrics associated with HLMR statements was to provide a measure of effectiveness (MoE) so that the DCB could assess the desired capability goals of the project. The VCDS guidance was that each HLMR have one or more such measures (if possible) along with a minimum essential level and a desired level. The reviews revealed that the project staffs found this requirement very hard to fulfill and this generated considerable debate amongst the DGCSI staff and with SPORT as to what to do about it and how to make this easier.

- In general, it was relatively rare that a project included metrics with their initial set of HLMRs. When metrics were included, they most often appeared to be measures of performance (MoPs) rather than MoEs. Project staffs appeared to struggle with the basic concept of an MoP versus an MoE even though the VCDS Directive provides definitions and an example for projects to follow.[11] MoPs are more "concrete," measurable characteristics of a capability like speed, range, payload and so on and that makes them easier to define. In contrast, an MoE is a more abstract entity and that makes them harder to create. The authors note that people differ in their aptitude for concrete and abstract thinking and this reasonably must have an effect on how difficult a project staff finds developing their MoEs.
- The projects rarely expressed their HLMRs and metrics in the format suggested in the VCDS Directive which is to write the HLMR set in a table with each row containing one HLMR statement and the related metrics. An excerpt from the Guidance is shown in Table 1 below. Most commonly, if any metrics were provided, they were merged with the HLMR capability statement. A separate MoE column was rarely seen.
- The VCDS Directive asks that essential and, possibly, desired levels of effectiveness be provided along with the MoEs. Very few of the 40 projects attempted to do this. The few that did, provided the essential level only and only for MoPs.
- Another challenging aspect of the MoEs was for projects to define them so as to make them measurable. Of the projects that attempted to define MoEs, most tried to define them quantitatively but this resulted in a debate about whether the quantitative measure was actually an MoP. As of this writing, there has been no clear resolution of this problem and remains a matter of individual judgement.

[11] The guidance distinguishes an MoP from an MoE by defining the MoE as "performance in context" and using a sprinter as an example. The speed of the sprinter is the MoP whereas the MoE is the ability of the sprinter to win races.

Table 1: *Example of a suggested HLMR table from [3].*

Requirement	Description	MoE
HLMR #1	The ability to deploy or recover groups of personnel up to platoon size up to 50 km from shore in a single move.	MoE 1: Distance inland at which personnel can be deployed or recovered. Minimum essential = 50 km. MoE 2: Number of platoon-equivalents that can be deployed in a single move. Minimum essential = 1 Platoon.
HLMR #2	The ability to deploy or recover any CAF vehicle and equipment types to/from a beach.	MoE 1: Proportion of CAF vehicle and equipment types earmarked for expeditionary operations that can be landed or recovered. Minimum essential level = 95% of vehicle types.

The observations just described generated considerable debate amongst the DGCSI staff and with SPORT about what to do about them and how to help the projects better achieve this VCDS Directive requirement. One issue was whether HLMR metrics were required at all. The decision[12] was that HLMRs should have metrics because the reason for their existence is valid. There needs to be a way for projects and decision makers to assess the capability needs, compare them and determine whether different options are viable. Metrics are a way to achieve those ends.

Although the VCDS Directive only calls for MoEs, the decision was made to accept both MoEs and MoPs as part of an HLMR and to allow either to be quantitative or qualitative but still be measureable. Since the projects struggled with the MoP and MoE concepts, there was a choice to move away from those labels toward a generic label of "metric."[13]

The MoEs were intended to be measureable things that could act as a way of determining the viability of a capability solution. To be viable, it had to satisfy the HLMR and meet the standards described by the metrics. No project reviewed to date was able to meet this standard in a way consistent with the Guidance. Even after post-review discussions with the projects, developing good MoEs remained elusive demonstrating what a challenge this part of the BCA is.

4.5 Observations on interactions with the Independent Review Panel on Defence Acquisition

The Independent Review Panel on Defence Acquisition (IRPDA) [8] was created as part of the Defence procurement strategy and is aimed at improving the Defence procurement process. By

[12] The decisions discussed in this section were informal and were intended to help alleviate the short-term problems and also serve as the basis of lessons learned to inform the evolution of the BCA process.
[13] The crafters of the new PGM Guidance extended this idea and invoked the idea of "screening criteria" (scored as pass/fail) and "rated criteria" (projects have to define a scoring system to conduct the rating). The HLMRs form the basis of the screening criteria but the project must define a new set of metrics that become the rated criteria.

validating requirements, the IRPDA provides an independent challenge function for major (> $100 million) procurement projects. The panel was appointed in 2015 by the Governor in Council and reports directly to the Minister and Deputy Minister of National Defence (MND and DM respectively). The panel is comprised of five members, who must be external to DND.

There is ongoing debate within DGCSI, CORA, and the IRPDA itself over the crafting and reviewing of HLMRs. Since 2015, the authors have attended two meetings with the IRPDA support staff, as well as one meeting with the Panel itself.[14] In general, the purpose of these meetings was to have all parties reach an agreement regarding the characteristics of HLMRs and how they should be articulated. At these meetings, the authors presented their views on the role of HLMRs, their interpretation of the VCDS Directive, and their approach to the reviews. The meetings concluded with agreement on the basic principles underlying HLMRs which were the same as those articulated in the VCDS Directive. Of particular note was that everyone acknowledged that crafting HLMRs and the associated metrics was challenging, and that it would be difficult to ensure consistency across projects. These discussions later prompted the VCDS to approve the release of a new PGM [2] establishing new guidelines to aid project staff in drafting their HLMRs and associated metrics.

An ongoing concern of both SPORT and the DGCSI staff was that HLMR review suggestions and recommendations might be contrary to those of the IRPDA. In fact, this concern was borne out by two cases where project staff reported that they had received feedback from the IRPDA that was contradictory to SPORT's guidance; however, a review of the details of these claims revealed no such contradictions. Nevertheless, there remains a concern that the recommendations emerging from HLMR reviews will not be consistent with the views of the IRPDA.

One reason for this ongoing concern is that neither the reviewers nor their DGCSI points of contact (POC) receive feedback from the IRPDA regarding projects. Formally, the IRPDA only reports to the Minister of National Defence (MND) and the Deputy Minister (DM). In practice, the office of the panel sometimes provides informal feedback to the CFD organisation; however, SPORT DSs have not been privy to this feedback. As such, it is not possible to determine how the observations presented herein compare to the outputs of the IRPDA analyses.

As of this writing,[15] the perception within the project management community remains that SPORT's guidance is inconsistent with what IRPDA wants. In particular, it is perceived that SPORT is advising project staff to frame their HLMRs in more general terms, whereas IRPDA desires more detail [9]. The authors believe this perception may be false because it is likely that the detail that IRPDA refers to is contained within the metrics that project staff struggle to provide. As discussed above, it was relatively rare for project staffs to attempt to include metrics, and when they have, they have not been well formulated. SPORT's suggestion has been to split the HLMR into a description and list of MoEs (as per the Guidance [3]), with the HLMR description focused solely on the capability need. This generalizes the HLMR statement and improves the readability of the HLMR by moving some of the detail into the MoEs. The IRPDA could, therefore, interpret these generalized HLMRs—if still lacking the associated metrics—as lacking sufficient detail. The best approach to guiding project staff to consistently draft HLMRs with sufficient detail and appropriate metrics in a way acceptable to the IRPDA, remains to be determined.

[14] This meeting was also attended by the IRPDA support staff, DG CSI, DGCSI staff and SPORT.
[15] In June 2017.

4.6 The evolution of the HLMR review process

The original intent of SPORT's reviews of the BNs and HLMRs was to provide an independent challenge function so that the project BCA would be better prepared to pass the IRPDA review. SPORT was to provide an assessment of whether the BNs and HLMRs were consistent with the VCDS Directive, and project staffs were expected to consider this advice and make adjustments at their discretion. In practice, this process has evolved in several ways over the period covered by this paper and we discuss this evolution below.

In preceding sections of this paper, we've discussed a number of issues and problems that were observed by reviewing the many sets of HLMRs. It was recognized that something needed to be done to reduce the impact of them and to make it easier for the project staffs to achieve the objectives of using HLMRs as part of the PAP.

4.6.1 Evolution of the VCDS Directive

Due to the issues and problems discussed in Sections 4.1 through 4.5, it was recognized by senior decision makers in the CFD organisation that some new and updated guidance should be developed to help the project staffs but also that the problems they were having went beyond just the issues in this paper and that a broader update to the PAP was needed. However, that option was considered a more complicated and longer term approach whereas a near term update was a higher priority. As a result, it was decided that updated HLMR guidance would be issued as part of the previously-mentioned PGM.

The PGM preserves the basic idea of the HLMR and the need for them to be measurable. It seeks to clarify the definition of an HLMR but preserves the recommended characteristics they should have as listed in Section 2.2. It also explicitly distinguishes an HLMR from an operational requirement that would be found in the SOR (as did the VCDS Directive).

A new aspect of the guidance is that there is guidance on the form of a five step process for how an HLMR should be crafted so that it is articulated with the recommended level of detail. This attempts to help achieve the correct balance between a capability statement that is too general ("…the ability to do the mission…") and one that is too detailed ("…the door handles must be flush with the body…").

SPORT contributed to this update by providing inputs to the definition and characteristics of HLMRs, inputs on the new guidance on measurability, and updated examples of HLMRs. SPORT also provided inputs on the use of multi-criteria decision aids as a way for projects to objectively select the best options in their business cases. As of this writing, one HLMR review has been undertaken since the promulgation of the update but it falls out of the scope of this paper.

4.6.2 Evolution of HLMR metrics

In Section 4.4 of this paper, we reviewed some issues surrounding the use of metrics to support HLMRs. The difficulties projects had defining MoEs and the confusion around MoEs versus MoPs resulted in the new PGM guidance using a different approach to the metrics.

The need for metrics and for HLMRs to be measurable is preserved. HLMRs remain "binary" and are assessed as pass/fail. What was changed is that the MoE label has been replaced with the generic label "measure." The intent of this was to avoid the confusion around the difference between an MoE and an MoP. The new guidance states that measures can be either qualitative or quantitative and it introduces the concepts of "screening criteria" and "rated criteria." The screening criteria are intended as an initial filter on solution options and are really intended to be what the original HLMR metrics (MoEs) were there for. They provide a way to filter out solutions that cannot meet 100% of the HLMRs and are therefore not viable solutions.

The rated criteria are only part of the OA phase and would not factor into the HLMR review. Their function is to provide a way to compare viable solution options by applying some form of scoring system to the criteria. A draft of the PGM guidance suggested that projects employ a scoring system[16] for rating the criteria but one of the authors (Massel), was engaged to provide advice on the use of an alternative ranking system.[17] The idea was that a project could choose to use either a scoring or a ranking system but after consultations with CFD and DGCSI, it was decided to focus the PGM on scoring systems because they are simpler and easier to understand.

4.6.3 Evolution of SPORT's role

Section 3 and 4.1 outline the original intent for SPORT's role in the HLMR review process and how that evolved into a larger and more direct role for the DSs in assisting projects with developing their HLMRs and BN.

A further evolution of the role arose from ideas proposed in a short study requested of SPORT by DGCSI [7]. One key idea from that paper was to hold workshops with project staff at the earliest stages of the project. The idea was that the workshop would set the project staff on the right path for developing the BN and HLMRs either by helping the project better understand them or by directly assisting with drafting them. It was felt that such workshops would save a great deal of staff time later on and avoid much of the back-and-forth that was occurring. A problem with the idea was that if SPORT participated, it would remove the benefit of an unbiased and independent review. SPORT's role within the HLMR review process was always intended to be more or less temporary, as the review task is not seen by DRDC management as a particularly appropriate one for DSs. DRDC management would therefore prefer that SPORT disengage from the HLMR review process and pass on the responsibility making a role for SPORT in workshops unlikely. At present, it is not clear who or what other agent could step in to fill this role. Nonetheless, it is very possible that SPORT's role will diminish in the coming months, and that SPORT will review HLMRs by exception, rather than for every project.

[16] In such a system, each criterion would be assigned a numerical value, say, from 1 to 100.
[17] In a ranking system, the set of criteria are ranked highest to lowest according to some defined standard.

5 Summary

This report has reviewed how members of SPORT have provided an informal, independent review function for BNs and HLMRs that are part of the BCA documentation for acquisition projects with budgets over $100 million.

Although the BN and HLMRs are intended to provide a simple, high level description of the objectives of a project, they turn out to be remarkably difficult to craft and articulate in a way that is satisfactory to different audiences. Even when DGCSI staff provide brief and focused written guidance and coaching, project staffs find it very difficult. Although the purpose of this paper was not to discover the reasons for these difficulties, it seems logical that one key reason is simply that different people interpret and apply written guidance differently. As well, it seems reasonable that a contributing factor is that some people have a greater aptitude for abstract thinking which is required when drafting HLMRs and MoEs. To a certain extent, there is an art to writing BNs and HLMRs, and the subtleties can only be grasped with experience. It is also the case that many projects are launched with a preconceived idea as to precisely what is to be procured. Project staff balk at having to document the rationale for the project and articulate the basic requirements because they have already envisaged an obvious solution to bridge the capability gap. However, while frustrating, the discipline of review through DGCSI, SPORT, and finally at DCB and IRPDA, demonstrates to Treasury Board that DND is discharging good stewardship of public resources.

Reviewing the HLMRs of over 40 projects has exposed a number of issues and problems. Project staffs have become frustrated with crafting HLMRs as they feel they get contradictory advice from different stakeholders, making it impossible to satisfy everyone. These problems have been acknowledged, and new guidance has been written to try and alleviate them and provide more clarity. While the impact of the updated guidance is not clear and whether workshops will be implemented is uncertain, what is evident is that the need for HLMRs within the BCA remains. Their role as a simple, high-level description of essential project objectives is sufficiently important that they will be preserved.

References

[1] VCDS, Project Approval Directive (PAD) 2015, 16 December 2014.

[2] VCDS, Update to Identification (ID) and Options Analysis (OA) Phases of the Project Approval Process (PAP), PGM 1-17, 24 May 2017.

[3] VCDS, Internal Directive on High Level Mandatory Requirements in Support of Business Case Analysis, 25 May, 2015.

[4] Foundations for the business case – Operational Analysis. A structured approach to planning, preparation and presentation of cost effectiveness analysis via an Operational Analysis Supporting Paper (OASP) to the Business Case, Director General, Scrutiny and Analysis, UK MoD, 2003.

[5] Brown, M., AMTEK Engineering Services Ltd., Operational analysis support to project approvals process, DRDC-RDDC-2014-C182, Defence Research and Development Canada, April 2015.

[6] Brown, M., AMTEK Engineering Services Ltd., High level mandatory requirements, DRDC-RDDC-2014-C183, Defence Research and Development Canada, April 2015.

[7] Dixson, M., et al., Evolution of the High Level Mandatory Requirements Review Process, DRDC-RDDC-2017-D015, Defence Research and Development Canada, February 2017.

[8] IRPDA Terms of Reference, http://www.forces.gc.ca/en/business-how-to-do/irpda-terms-of-reference.page, (Access date: 17 May 2017).

[9] Murray, L. (Chair), et al., Independent Review Panel for Defence Acquisition, 2015–2016 Annual Report, 2017, http://www.forces.gc.ca/en/business-how-to-do/irpda-2015-2016-annual-report-.pdf, (Access date: 17 May 2017).

Annex A HLMR meta-data review

This Annex contains basic data about the HLMR reviews including which projects were reviewed, how many reviews were conducted for each project and when the reviews were released to the client. For reference, all of the HLMR review documents created by SPORT have been archived on GCDOCS here: https://gcdocs.gc.ca/forces/llisapi.dll/link/5410316.

Table A.1: *Record of projects receiving HLMR reviews.*

Year	Month	# of Reviews	Projects Reviewed
2014	Oct	3	DCSS, Multirole Boat, RCN ISTAR
	Nov	1	WST
	Dec	3	IRMS, NetC2ISAC, Digital Biometric
2015	Jan	1	CF118 Life Extension
	Feb	4	FCE, SOF SBRNE, Strongbow, GLLE
	Mar	0	-
	Apr	4	CHRCT, RDS, Combined Joint Intel
	May	2	RSIP, iFPT
	Jun	4	LOCAL Bio, Armament Loader, CND, TNS
	Jul	5	CPAV, Land Vehicle Crew Training
	Aug	0	-
	Sep	4	ERC, Common Hvy Equipment, TIC3 Air
	Oct	9	FPT, Open Skies Imager, AEW SetUp, HRPC, MAISR, SNIC
	Nov	5	CC144, FAcT, AFEC
	Dec	2	LVM, Mercury Global
2016	Jan	1	TNS
	Feb	0	-
	Mar	0	-
	Apr	1	Heavy Support Equipment
	May	0	-
	Jun	2	ESC
	Jul	2	CT114 LE, WES
	Aug	4	OSCER, ASV, CC144 LE, TNS-Geo
	Sep	3	Naval EW Subsurface, BGCM, AFEC Fly Away Kits
	Oct	4	TIC3 Air, BGCM, WES, AFEC Fly Away
	Nov	3	ESCP-P, CF188 LE, AFEC Fly Away
	Dec	3	IFCP, SELEX, Future Fighter Capability
2017	Jan	0	-
	Feb	3	CH149 MLU, UOR ECM, SoSII
	Mar	1	CMLU
	Apr	1	ACCP

A.1 Project title abbreviations

1. ACCP—Advanced Cryptographic Capabilities Project
2. AFEC Fly Away Kits—Air Force Expeditionary Capability Fly Away Kits
3. AFEC—Air Force Expeditionary Capability
4. BGCM—Bridging and Gap Capability Modernization
5. CC144 LE—CC144 Life Extension
6. CH149 MLU—CH149 Cormorant Mid-Life Upgrade
7. CHRCT—Civilian Human Resources Capability Transformation
8. CMLU—Cormorant Mid-Life Upgrade
9. CND—Computer Network Defence
10. CPAV—Commercial Pattern Armoured Vehicle
11. CT114 Life Extension
12. ECM PSO—Electronic Countermeasures in support of Peace Support Operations
13. ERC—Enhanced Recovery Capability
14. ESC—Enhanced Satellite Communication
15. ESCP-P—Enhanced Satellite Communications Project—Polar
16. FAcT—Future Aircrew Training
17. FCE—Federated Coalition Environment
18. FPT—Future Pilot Training
19. Future Fighter Capability
20. GLLE—Griffon Limited Life Extension
21. HRPC—High Readiness Personnel Equipment
22. IFCP—Interim Fighter Capability Project
23. iFPT—Interim Future Pilot Training
24. LOCAL Biological Defence

25. LVM—Logistics Vehicle Modernisation
26. MAISR—Manned Airborne ISR
27. Mercury Global SDT—Strategic Deployable Terminals
28. MODIS—Multinational Open Skies Digital Imaging System
29. Naval EW Sub-surface—Naval Electronic Warfare Sub-surface
30. OSCER—On-Scene Control and Emergency Response
31. RCN ISTAR UAS—Royal Canadian Navy Intelligence Surveillance Target Acquisition Reconnaissance Unmanned Aircraft System
32. RDS—Radiation Detection System
33. RSIP—RCAF Simulation Integration Project
34. SELEX—Submarine Equipment Life Extension
35. SNIC—SNow and Ice Control
36. SOF CBNRE—Special Operations Forces Chemical Biological Nuclear Radiological Explosive
37. SoS II—Surveillance of Space II
38. Strongbow
39. TIC3 Air—Tactical Integrated Command, Control and Communications Air
40. TNS—Tactical Narrowband SatCom
41. TNS-GEO—TNS Geosynchronous
42. WES—Weapons Effects Simulator

Annex B SPORT BN and HLMR review template

Annex B presents an example of the template that CORA has used to report on its HLMR review to the requesting DCI Staff Officer.

Review of The Business Need and High Level Mandatory Requirements for:

Project Name

Date 2017

Dr Bloggins
DRDC CORA
Strategic Planning Operations Research Team

In conducting this review the following principles were applied:

The statement or description of the Business Need needs to be a clear, simple, straightforward statement of what the capability is going to provide; and it must be easily understood by a non-expert.

High Level Mandatory Requirements (HLMRs) should:
- be brief and clear
- be solution independent and not impose constraints that imply a specific solution
- define the expected outcomes, effects or services that would be delivered
- be sufficiently critical that the project would be deemed to fail if the HLMR is not satisfied

In reviewing the Statement of the Business Need and the HLMRs presented in the Business Case Analysis (BCA) for the Project Name, the following comments pertain to sections x.x.x and y.y.y. of subject BCA :

x.x.x Business Need

This statement is a …. insert comments and observations

y.y.y High Level Mandatory Requirements

In general and with some exceptions these HLMRs are …. insert comments and observations

Specific observations to respective HLMRs are offered below.

HLMR #1: the following issues speak to ….

HLMR #2: this HLMR is broadly written and does not define the ‘no fail’ outcome that needs to be attained to satisfy this HLMR

HLMR #3: this conclusion of this HLMR reads awkwardly and is not clear. The non-expert reader will not know which operational units this refers to nor will he/she be familiar with the expression ‘high readiness posture’.
HLMR #4: a non-expert may not be familiar with the terms xxxx and yyyyy – to provide clarity suggest a footnote for these terms

HLMR #5-8: brevity – these are all similar and overlapping requirements and for brevities sake should be combined

Overall, this business case`s Statement of the Business Need is acceptable and, with some refinements and improvements its, HLMRs should support the development of credible criteria in a follow on Options Analysis effort. It is recommended that they be re-visited with a view to addressing the issues raised above.

Dr Bloggins
Defence Scientist
SPORT

DRDC CORA

List of symbols/abbreviations/acronyms/initialisms

BCA	Business Case Analysis
BN	Business Need
CBP	Capability Based Planning
CFD	Chief of Force Development
CORA	Centre for Operational Research and Analysis
DCB	Defence Capabilities Board
DCI	Director Capability Integration
D Cost S	Directorate Costing Services
DG CSI	Director General Capability and Structure Integration
DM	Deputy Minister of National Defence
DND	Department of National Defence
DRDC	Defence Research and Development Canada
DRF	Defence Results Framework
DS	Defence Scientist
D Strat Coord	Director Strategic Coordination
FCP	Force Capability Plan
FSE	Future Security Environment
HLMR	High Level Mandatory Requirement
ID	The Identification Phase of the Project Approval Process
IRPDA	Independent Review Panel on Defence Acquisition
MND	Minister of National Defence
MoE	Measure of Effectiveness
MoP	Measure of Performance
OA	Options Analysis
OPI	Office of Primary Interest
PAD	Project Approval Directive
PAP	Project Approval Process
PGM	Project Guidance Memorandum
POC	Point of Contact

PRICIE	Personnel, R&D and Ops Research, Infrastructure and organization, Concepts doctrine collective training, Information and management, Equipment and materiel
SCD	Strategic Context Document
SOCD	Statement of Capability Deficiency
SOR	Statement of Requirements
SPORT	Strategic Planning Operational Research Team
TB	Treasury Board
VCDS	Vice Chief of the Defence Staff

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For several years, defence scientists have provided informal, independent assessments of the Business Need (BN) statements and high level mandatory requirements (HLMR) as a necessary part of DND's approval process for significant projects. This report provides an overview of the Departmental guidance governing the review process, the methods employed by the scientists to carry out the reviews and observations resulting from reviews conducted over the period from October 2014 to April 2017.

Pendant plusieurs années, les scientifiques de la Défense ont fourni des évaluations informelles et indépendantes des déclarations des besoins opérationnels (BO) et des exigences obligatoires de haut niveau (EOHN) dans le cadre du processus d'approbation du MDN pour les projets importants. Le présent rapport trace les grandes lignes de la directive ministérielle régissant le processus d'examen, les méthodes employées par les scientifiques pour effectuer les examens et faire des observations en réponse aux examens effectués, pendant la période du mois d'octobre 2014 au mois d'avril 2017.

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strategic planning; high level mandatory requirements (HLMR); project approval directive (PAD); independent review panel for defence acquisition (IRPDA)