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## LEAN, AGILE, BETTER-EQUIPPED: THE SAME OLD WICKED PROBLEM OF DEFENCE POLICY IN CANADA

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**JCSP 42**

***Exercise Solo Flight***

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EXERCISE *SOLO FLIGHT* – EXERCICE *SOLO FLIGHT*

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## **LEAN, AGILE, BETTER-EQUIPPED: THE SAME OLD WICKED PROBLEM OF DEFENCE POLICY IN CANADA**

*Tackling wicked problems is an evolving art. They require thinking that is capable of grasping the big picture, including the interrelationships among the full range of causal factors underlying them. They often require broader, more collaborative and innovative approaches. This may result in the occasional failure or need for policy change or adjustment.*

- Australian Public Service Commission, in *Tackling Wicked Problems*

### **INTRODUCTION**

In the December 2015 speech from the Throne, the newly elected Liberal government indicated their intention to build a “leaner, more agile, better-equipped military,” a reinvigorated Canadian Armed Forces (CAF) capable of keeping Canadians safe and “ready to respond when needed.” According to the speech from the Throne, planned investments will ensure the CAF can contribute to “greater peace throughout the world” through further commitments to United Nations peacekeeping and continued participation with allies to fight terrorism.<sup>1</sup>

However, except for indications to continue as a partner in the North American Air Defence (NORAD) program and the North Atlantic Treaty Organisation (NATO), and plans to increase focus on control of Canadian territory and approaches, particularly in the Arctic,<sup>2</sup> neither the speech from the Throne nor the subsequent spring budget detailed how these goals will be achieved. It is expected that further details on how Canada will achieve its ‘lean, agile, better-equipped’ military will come as part of the recently announced public consultations aimed at reviewing defence requirements and developing a comprehensive defence policy.<sup>3</sup> As part of the announcement, Defence Minister Sajjan stated that no part of the CAF was ‘off the table’

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<sup>1</sup> Governor General of Canada, *Making real change happen: speech from the Throne to open the first session of the forty-second Parliament of Canada*, Ottawa, 4 December 2015.

<sup>2</sup> David Pugliese, “Sajjan readies start of policy consultations; Move toward ‘agile and lean’ Forces expected,” *The Ottawa Citizen*, 6 April 2016.

<sup>3</sup> *Ibid.*

with regards to reduction or elimination in order to achieve savings and focus investment to meet Canada's foreign and security policy needs.<sup>4</sup>

This is certainly not the first attempt by a sitting government to provide a leaner, more agile and better-equipped military. Numerous 'transformations' have occurred within the Department of National Defence (DND), usually with the intended goal of producing a CAF capable enough to support the extant foreign and security policies, but small enough not to break the bank. Unfortunately, successive attempts to fundamentally transform defence have become bogged down in a quagmire of political will, funding shortages, military conservatism, undefined strategic policy and evolving threats. As this paper will demonstrate, creating a 'lean, agile, better-equipped' military capable of meeting the needs of the sitting government and the expectations of Canadian citizens requires treatment of the issue as a 'wicked' problem.<sup>5</sup> Unless political and military leaders come to realize that planning the future of defence is a 'wicked' problem, they will continue to seek solutions based on linear, scientific processes and standard government planning frameworks that have, to-date, resulted in unsustainable solutions. At best these missteps in approach will result in wasted resources, at worst they will result in unnecessary loss of life for ill-equipped Canadian soldiers.

One of the major challenges facing the defence review is determining what are meant by the terms 'lean', 'agile' and 'better-equipped'. This paper will start with an examination of possibilities for what these terms may mean for the CAF, including recent proposals to define similar direction from previous governments. The lack of clarity inherent in the 'lean, agile, better-equipped' statement will be discussed with a number of other issues inherent to

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<sup>4</sup> David Pugliese and Lee Berthiaume, "Nothing off limits in defence review: Sajjan; Force Structure," *The Ottawa Citizen*, 7 April 2016.

<sup>5</sup> For a more complete description of Wicked Problem theory, see Horst W.J. Rittel and Melvin M. Webber, "Dilemmas in a General Theory of Planning," *Policy Sciences* 4 (1973): 155-169.

developing defence policy in Canada to demonstrate the wickedness of the issue. This will be followed by an examination of the issues preventing defence leaders from truly thinking ‘outside the box’ on this issue and a presentation of potential approaches to overcoming those limitations.

### **THE WICKED PROBLEM**

To begin a meaningful consideration of potential approaches to developing an effective and sustainable defence policy in Canada, it is necessary to characterize the issue as a ‘wicked problem’.<sup>6</sup> With wicked problems, the linear development of possible solutions is hindered by multiple, intertwined socio-political aspects. Wicked problems are difficult to clearly delineate as the nature of the problem is often a matter of dispute and the identification of solutions is highly dependent on how the problem is defined.

Wicked problems are also typified by many interdependencies, are often multi-causal and are prone to unforeseen consequences as solutions are attempted. According to Rittel and Webber, “wicked problems have no stopping rule” so it is difficult to tell when success has been achieved and “the would-be planner can always try to do better.”<sup>7</sup> These problems are often unstable, are socially complex, hardly ever sit conveniently within the responsibility of one organization, and are characterized by chronic policy failure.<sup>8</sup> Finally, with wicked problems there must be a willingness to accept failure and learn from that failure to adjust the solution.<sup>9</sup> According to Linton Wells, professor at the United States (US) National Defense University, defence issues “are populated with ‘wicked’ problems ... which do not lend themselves well to

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<sup>6</sup> Rittel and Webber, “Dilemmas...”: 155-169.

<sup>7</sup> *Ibid.*: 162.

<sup>8</sup> Australian Public Service Commission, *Tackling Wicked Problems: A Public Policy Perspective* (Canberra: Australian Public Service Commission, December 2007): 3-4.

<sup>9</sup> Trevor Taylor, “The limited capacity of management to rescue UK defence policy: a review and a word of caution,” *International Affairs* 88, no. 2 (2012): 240.

classical forms of analysis and for which there are no common definitions of the problems or agreement on the solution.”<sup>10</sup>

## **DEFINING THE PROBLEM DEFINES THE SOLUTION**

According to Trevor Taylor, British research fellow in defence management, defence policy issues are demonstrably wicked problems because “the information needed to understand the problem depends on one’s idea for solving it... the process of formulating the problem and conceiving a solution... are identical.”<sup>11</sup> Western countries with major modern economies are cutting defence budgets to enable social program funding. These cuts to defence are exacerbated by growing manpower costs and a military need for capital-intensive systems.<sup>12</sup> As a result, Canada and a majority of her allies have been trying to create lean, efficient and sustainable forces by reviewing the roles required of the military and the capabilities needed to fulfill those roles.<sup>13</sup> This challenge is not new to the CAF or any of our allies, but is one with which governments and militaries continually wrestle.

In the case of Canada’s recently announced defence policy review, this means creating a ‘lean, agile, better-equipped’ CAF. However, the current Liberal government provides little illumination on what these terms mean specifically. Most statements from officials have involved details on which military capabilities the government plans to maintain or expand, vice reduce or eliminate to make the force lean. Expansion includes a return to peacekeeping, increased humanitarian operations, and additional surveillance and control of sovereignty, while maintaining participation in NORAD and NATO.<sup>14</sup> To create a leaner force, the Liberal defence

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<sup>10</sup> Linton Wells, “Transformation and Tidewater,” *Signal* 64, no. 9 (May 2010): 96.

<sup>11</sup> Taylor, “The limited capacity of management...”: 240.

<sup>12</sup> Gregory R. Copley, “Safeguarding Long-Term Security as Budgets Fall,” *Defense & Foreign Affairs Strategic Policy* 38, no. 11 (2010): 6-8.

<sup>13</sup> Department of National Defence, *Report on Transformation 2011* (Ottawa: DND Canada, 2011), 11.

<sup>14</sup> David Pugliese, “Sajjan readies start of policy consultations...”

policy platform from the 2015 election indicates a plan to adopt all of the recommendations from the *Report on Transformation 2011* which includes significant reductions in administrative and headquarters staff to refocus resources on the field force. However, the platform also indicates an intention to maintain planned defence spending increases to ensure an “effective, agile, responsive, and better-equipped military force that can appropriately respond to a spectrum of operations within a whole of government context.”<sup>15</sup> This spectrum of operations will include defending Canada, defending North America, and contributing to international peace and security operations, from humanitarian support to combat.<sup>16</sup>

On the surface, this guidance seems to differ little from previous governments, yet there is an expectation of change in order to make the CAF leaner, more agile and better-equipped. Such vague defence policy guidance increases the risk of capability gaps as the government potentially interprets requirements for the availability of military capabilities differently from defence planners.<sup>17</sup> Possibilities for creating a ‘lean, agile, better-equipped’ Canadian military are numerous and range from reducing the size and overall capability of the force to leaning out the force by reducing process, administration and bureaucracy. A review of some of the dominant opinions follows to demonstrate the multiplicity of viewpoints defence planners must contend with.

### **Leaner but Bigger, Robust but Agile, Better-equipped**

If the Liberal election platform is any indication, one of the most likely definitions of the ‘lean, agile, better-equipped’ problem can be found in the *Report on Transformation 2011*.

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<sup>15</sup> Liberal Party of Canada, “A New Plan to Strengthen the Economy and Create Jobs with Navy Investment,” last accessed 20 April 2016, <https://www.liberal.ca/files/2015/09/A-new-plan-to-strengthen-the-economy-and-create-jobs-with-navy-investment.pdf>.

<sup>16</sup> Department of National Defence, *Defence Policy Review, Public Consultation Document 2016*, last accessed 16 April 2016, <http://dgpapp.forces.gc.ca/en/defence-policy-review/docs/defence-policy-review-consultation-paper.pdf>.

<sup>17</sup> Robert Michael Hartfiel, “Planning without guidance: Canadian defence policy and planning, 1993-2004,” *Canadian Public Administration* 53, no. 3 (September 2010): 325-326.

Although it does not specifically use those terms, possibilities for what they may mean can be found in the report. The report, commissioned under the previous Conservative government, recommended ways for DND “to reduce overhead and improve efficiency and effectiveness, to allow reinvestment from within for future operational capability despite constrained resources.”<sup>18</sup> The report did not conduct a detailed examination of the DND capital programme nor the “deployable output – the ships, the regular and reserve battalions and regiments, the flying squadrons and the ranger patrols,” as the authors felt these programs were already lean enough.<sup>19</sup> Instead, the report recommended a reduction and re-allocation of personnel from headquarters and non-operational jobs to operational and/or deployable jobs to improve CAF agility, lean out the force and re-focus the resulting savings to equipment improvements.<sup>20</sup>

A similar solution was proposed by former Chief of Defence Staff (CDS), General Rick Hillier, who argued a leaner military meant one focussed on operations vice staff processes. General Hillier saw Canada’s international military contribution becoming “increasingly rudimentary, unresponsive to mission needs, and providing Canada a poor return on investment.”<sup>21</sup> He saw this loss of operational focus resulting from a conventional force structure and doctrine, a bureaucratic command and control framework, and service oriented cultures.<sup>22</sup>

Several experts on defence policy consider the recommendations of the *Report on Transformation 2011* as an effective way to get more ‘bang from the buck’ without reducing military agility. They argue that a leaner military is a good thing, but that the CAF is already too

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<sup>18</sup> Department of National Defence, *Report on Transformation 2011* (Ottawa: DND Canada, 2011), 3.

<sup>19</sup> *Ibid.*, 4.

<sup>20</sup> *Ibid.*, 6.

<sup>21</sup> Michael K. Jeffery, “Inside Canadian Forces Transformation,” *Canadian Military Journal* 10, no. 2 (2010): 13; see also Allan English, “Outside CF Transformation Looking In,” *Canadian Military Journal* 11, no. 2 (Spring 2011): 12.

<sup>22</sup> Jeffery, “Inside ...”: 13.



small to provide responsiveness and agility to the Canadian government.<sup>23</sup> Competent, better-resourced and multi-role armed forces are essential to any meaningful Canadian foreign policy, whether that force is used for peacekeeping or participating in international combat operations. In their opinion, a lean military should focus on developing a national security strategy across all departments, and should reduce bureaucracy and back-room processes while increasing the size of the Army, restoring a blue-water Navy, and building-up an interoperable Air Force. They contend that Canada should meet its NATO funding commitments of 2% Gross Domestic Product and avoid cutting capabilities.

### **Leaner and Smaller, Lighter and Agile, Equipped as Needed**

Jones and Lagassé, from the University of Ottawa, state a ‘strong preference’ for an increase in defence spending but recognize the reality of decreasing defence budgets and the future requirement of the Canadian government to ‘balance the books’. These two competing interests can only be achieved through a reduction in CAF capabilities.<sup>24</sup> The requirement for reduced capabilities is supported by others who advocate for a greater focus on ‘niche’ capabilities able to ‘plug-in’ to larger allied or coalition forces.<sup>25</sup> Allan English, Canadian military expert, considers whether “more frequent, lower intensity but less costly interventions that could be provided by maritime and air forces might be more influential [than large ground

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<sup>23</sup> Matt Gurney, “A ‘leaner’ military? Uh oh,” *National Post*, 7 December 2015; Hugh Segal, “If ‘Canada’s back’, we’ll need a military,” *National Post*, 6 January 2016; J.L. Granatstein *et al.*, “A roadmap to a stronger military,” *National Post*, 28 September 2015; Conrad Black, “Canada’s planned defence review is an opportunity for our nation to take a giant stride,” *National Post*, 6 February 2016.

<sup>24</sup> Peter Jones and Phillipe Lagassé, “Rhetoric versus reality: Canadian defence planning in a time of austerity,” *Defence & Security Analysis* 28, no. 2 (June 2012): 146-149.

<sup>25</sup> Jim Cooperman, “Canadians deserve a peace dividend, but first they need to participate in Canada’s Defence Review,” *National Observer* (19 April 2016), <http://www.nationalobserver.com/2016/04/19/opinion/canadians-deserve-peace-dividend-first-they-need-participate-canada%E2%80%99s-defence>; David Pugliese, “Sajjan readies start of policy consultations...”; Murray Brewster, “Liberals’ Defence Review to Decide Future Size of Canada’s Military,” *Huffington Post*, last modified 6 April 16, [http://www.huffingtonpost.ca/2016/04/06/lib-launch-review-to-decide-future-size-and-shape-of-canada-s-military\\_n\\_9626492.html](http://www.huffingtonpost.ca/2016/04/06/lib-launch-review-to-decide-future-size-and-shape-of-canada-s-military_n_9626492.html).

based operations] in the long run.”<sup>26</sup> Paul Mitchell, professor at the Canadian Forces College, recommends that the CAF follow an approach he calls ‘full spectrum influence’.<sup>27</sup> Mitchell argues that the provision of salient, relevant and interoperable ‘niche’ forces to our larger allies, particularly the US, will allow the CAF to continue to provide a valued capability that the Canadian Government can leverage on the international stage.<sup>28</sup> Similarly, George Petrolekas and Dave Perry, Canadian Global Affairs Institute fellows, recommend a smaller CAF to enable further capital spending on equipment. They argue that DND is mired in ‘rampant’ administration efficiencies and a ‘sclerotic procurement process’. In their view, “the optics of accountability have overtaken the efficiency of management.”<sup>29</sup> Proposed niche capabilities range from a ‘marine-corps like’ land force, a focus on a better-equipped Navy able to plug-in to US naval task groups, or an Air Force focussed on battlefield information control.<sup>30</sup>

Timothy Edmunds, editor-in-chief of the *European Journal of International Security*, however, points out problems that may be caused through specialization of a force. “Any specialization introduces a risk of fragility into the force structure as a whole, with specialized armed forces unable to adapt to or incorporate unforeseen missions or demands.”<sup>31</sup> Chief of Defence Staff, General Jonathan Vance, echoes the opinion of those who believe the military must remain robust and agile to ensure a capable response to a variety of threats. He disagrees

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<sup>26</sup> Allan English, “Outside CF Transformation Looking In,” *Canadian Military Journal* 11, no. 2 (Spring 2011): 15.

<sup>27</sup> Paul T. Mitchell, “A Transformation Agenda for the Canadian Forces: Full Spectrum Influence,” *Canadian Military Journal* (Winter 2003-2004): 59.

<sup>28</sup> *Ibid.*: 60.

<sup>29</sup> George Petrolekas and Dave Perry, “Deal of the century: Trudeau’s defence review will reverberate for decades,” *The Globe and Mail*, 21 January 2016.

<sup>30</sup> Mitchell, “A Transformation Agenda ...”: 61-62.

<sup>31</sup> Timothy Edmunds, “The defence dilemma in Britain,” *International Affairs* 86, no. 2 (2010): 385.

with options for a ‘niche’ military, indicating the CAF must be prepared to offer the government multiple options for dealing with threats or crises.<sup>32</sup>

Another proposal for ‘lean’ and ‘agile’ militaries involves relying on contracted services for the delivery of capabilities that may be too expensive to maintain constantly throughout periods of relative peace. Contractors offer value for money as military resources and operational capabilities meet their limits regarding logistics and support personnel, equipment, training, and defensive security.<sup>33</sup> Contracted services allow militaries to maintain smaller and leaner force structures but provide the agility of increasing capacity within short timeframes. However, contracted solutions are limited in their application depending on the willingness of governments to use ‘mercenary’ services. As well, the ability to accurately measure cost effectiveness is “no easy tightrope to walk,” as the requirement to succeed on operations, the interest of the public purse and private interests of the contractors become muddled once operations are underway.<sup>34</sup>

### **The Wickedness of Lean, Agile, Better-equipped**

Whether a ‘lean, agile, better-equipped’ military means a smaller, ‘niche’ force or a force more focussed on deployable capabilities, there is agreement that DND is much too bureaucratic and top-heavy. In the private sector, businesses become lean and agile by focussing on their core activities and eliminating non-efficient business lines, reducing process and/or devolving authority and accountability to the lowest possible levels.<sup>35</sup> In the DND context, this would likely translate to fewer and smaller headquarters, a smaller civil service component, and perhaps the shedding of ‘non-core’ responsibilities to contractors or other departments. The

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<sup>32</sup> General Jonathan Vance *as quoted by* Bruce Camption-Smith, “General looks forward to Forces review: Chief of defence staff says Canada must continue to punch above its weight,” *Toronto Star*, 30 December 2015.

<sup>33</sup> Christopher Spearin, “Contemporary military contracting and the future: Teeth, tails, and concerns,” *International Journal* 69, no. 4 (2014): 472.

<sup>34</sup> *Ibid.*: 473.

<sup>35</sup> Lean Enterprise Institute, “What is Lean?” last accessed 14 April 2016, <http://www.lean.org/WhatsLean/>.

recommendations in the *Report on Transformation 2011* most closely resemble the Liberal commentary on ‘lean, agile, better-equipped’ and align with opinions from academics, reporters and CAF leaders. Thus, it is likely that “lean, agile, better-equipped” will result in few changes to the capability set currently provided by the CAF and few, if any, changes to the announced equipment replacement priorities. Savings will likely be sought through another reorganization and reduction of headquarters personnel and bureaucracy and through value engineering of existing programs.

However, even if there is agreement on what “lean, agile, well-equipped” means and how it will be implemented, the problem is still wicked. Smaller headquarters and less civilian oversight require significant compromise in certain ‘back-office’ responsibilities and ‘auxiliary’ tasks, such as levels of accountability and support to social initiatives. Activities like civilian oversight, financial auditing, the ability to manage grievances or performance, and the ever increasing requirement to provide information to defence leaders and the public would suffer from a thinning of headquarters. Even if smaller headquarters and less bureaucracy seem like a good start, the willingness of citizens and politicians to accept reduced departmental oversight or accountability is unlikely to last far beyond the first negative headline.

Further, due to their size and costs, military institutions also become a vehicle for advancing societal goals such as addressing social injustice and redistribution of wealth.<sup>36</sup> Examples of these ‘auxiliary’ tasks in DND include the National Shipbuilding Procurement Strategy, Operation Honour, bilingualism in the military officer corps, or policies on sexual preference, transgenderism, minority recruitment, aboriginal contracting and even regional basing. As proposed efficiency approaches begin to threaten these auxiliary tasks, the willingness

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<sup>36</sup> Peter D. Feaver, “The Civil-Military Problematique: Huntington, Janowitz, and the Question of Civilian Control,” *Armed Forces & Society* 23, no. 2 (Winter 1996): 155-156.

of political leaders to support such solutions will wane. According to Edmunds, “the military role is conceived as being interlinked with, and to some degree, subordinate to, a much wider set of security goals, priorities and instruments, in what has been called ‘the comprehensive approach’.”<sup>37</sup> For example, some argue that Canada must be prepared to respond to a military threat from China by increasing resources in the Asia-Pacific region. At the same time, Canadian economic policy calls for increased trade between the two countries, which serves to increase China’s economic growth and further enable their military improvements.<sup>38</sup> Thus, when concerns over departmental oversight and accountability are combined with other government priorities such as job creation, trade intentions, and social policy, even a relatively clear definition of “lean, agile, better-equipped” does little to reduce the wickedness of the defence policy problem.

### **MULTIPLE CORRECT SOLUTIONS, MANY VIEWPOINTS**

Wicked problems are further defined by their distinct lack of true or false answers and by the “many parties... equally equipped, interested, and/or entitled to judge the solutions... [according to] their group or personal interests, their special value-sets, and their ideological predilections.”<sup>39</sup> This is typical of Canadian defence issues, even within the limited and ideologically similar parties found within DND.

Conley and Ouellet, Canadian defence scholars, examined three significant DND transformation initiatives in the 1960s, 1970s, and 2000s. During each of the three transformation initiatives, norms and values within the three individual services were directly threatened by the proposed changes aimed at increasing efficiency and effectiveness. In each case, key military leaders felt the issues were being defined in such a way that the military

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<sup>37</sup> Edmunds, “The defence dilemma...”: 390.

<sup>38</sup> Joel Sokolsky and Joseph Jockel, “A defence review? Not really necessary: But if Canada necessarily must, here are some things to keep in mind and to avoid,” *CDA Institute Blog: The Forum*, April 2016, [http://www.cdainstitute.ca/images/Analysis/Sokolsky\\_Jockel\\_Analysis\\_April\\_2016.pdf](http://www.cdainstitute.ca/images/Analysis/Sokolsky_Jockel_Analysis_April_2016.pdf).

<sup>39</sup> Rittel and Webber, “Dilemmas...”: 163.

institution or their service was being threatened. These leaders then proposed alternate approaches which undermined the validity of the chosen solution and evoked a ‘visceral reaction’ within the services against the changes.<sup>40</sup> The belief in alternate problem definitions, and therefore solutions, became so pervasive that efforts to revert back to previous norms were still being pushed years later. For example, use of the ‘Royal’ appellation for the Navy, Air Force and units of the Army was restored more than 40 years after being removed. This deep entrenchment of service-related norms and values led Conley and Ouellet to conclude that the different institutional view of each service prevents any establishment of economies of scale through solutions that cross all three.<sup>41</sup>

This is reinforced by Lieutenant-General (ret’d) Michael K. Jeffery, who noted in his review of the 2005 Transformation initiative, that General Hillier considered the strong service cultures as part of the road block to achieving better efficiency.<sup>42</sup> General Hillier took an approach “founded upon his personal operational experience and philosophy.”<sup>43</sup> His failure to effectively engage key stakeholders early on, such as the environmental chiefs-of-staff, prevented his vision from really becoming understood or communicated effectively and resulted in a fragmented implementation as other possible solutions began to arise and challenge the validity of Hillier’s approach.<sup>44</sup>

In each of the cases examined by Conley and Ouellet, the unwillingness of the change proponent to engage stakeholders early and remain open to alternate solutions contributed to the wickedness of the problem. The ‘visceral’ responses to normative changes observed in each of

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<sup>40</sup> Devin Conley and Eric Ouellet, “The Canadian Forces and Military Transformation: An Elusive Quest for Efficiency,” *Canadian Army Journal* 14, no. 1 (2012): 81; a similar finding was made by the Australian Public Service Commission in their examination of the effects of wicked problems on public policy development, see Australian Public Service Commission, *Tackling Wicked Problems...: 17*.

<sup>41</sup> Conley and Ouellet, “The Canadian Forces and Military Transformation...”: 81.

<sup>42</sup> Jeffery, “Inside ...”: 12-13; see also English, “Outside ...”: 16.

<sup>43</sup> Jeffery, “Inside ...”: 14-15.

<sup>44</sup> English, “Outside ...”: 15; see also Jeffery, “Inside ...”: 15-16.

the major transformation initiatives demonstrates a subjectiveness in the determination of which solutions were ‘good’ or ‘bad’ based on the assessor’s viewpoint, a typical characteristic of wicked problems.

### **ONE-SHOT, NO FAIL OPERATIONS WITH LIMITLESS APPROACHES**

Rittel and Webber further describe wicked problems as ‘one-shot’ operations as each solution attempt causes fundamental changes to the problem system due to complex causal interrelationships and the considerable amount of time and resources involved.<sup>45</sup> In the defence context, it takes years or decades and hundreds of millions or billions of dollars to determine the success or failure of capital equipment programs or force structures. Wrong decisions are irreversible, as funds and time spent on a failed initiative cannot be recouped.

According to Edmunds, the “competition for resources, the long-term nature of the procurement process and established political, economic and institutional interests build a significant degree of path dependency” into defence planning.<sup>46</sup> Examples in Canada include the unarmoured G-Wagon which proved inadequate to protect troops in Afghanistan years after procurement and the creation of the operational commands in 2006 followed by their dissolution into the Canadian Joint Operations Command in 2012. In other cases, the decision to procure a defence platform dictates possible solutions for newly identified capability requirements. This was evident when the CAF decided to retrofit the existing CP-140 Aurora aircraft to provide an over-land intelligence, surveillance and reconnaissance capability vice seeking alternate solutions.

In the United Kingdom (UK), repeated defence reviews resulted in “massive and damaging pressures for change” within the Ministry of Defence but still failed to achieve

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<sup>45</sup> Rittel and Webber, “Dilemmas...”: 163.

<sup>46</sup> Edmunds, “The defence dilemma...”: 385.

efficiency goals.<sup>47</sup> These failed attempts left the UK government with two unanswered questions regarding their national defence: which tasks should be done by uniformed personnel, which by civil servants, and which by contracted capabilities; and whether defence capabilities should be prioritized, organized and assessed from a joint framework or based on the existing single service standpoint.<sup>48</sup> It is interesting to note that similar questions are apparent in the current Canadian defence review.<sup>49</sup> These are questions that affect the defence environment even in their asking. As the issues become defined by defence leaders, stakeholders begin to envision potential answers to the posed questions, ignore alternate solutions that may be generated from un-posed questions, and form arguments to reject the viewpoints of fellow interested parties.

The wickedness created by the irreversibility of defence policy decisions is exacerbated by the limitless possibilities for solutions.<sup>50</sup> The uncertainty of the changing geopolitical picture and the evolving nature of conflict further complicate the identification of the ‘right’ structures, forces and equipment to be ‘lean, agile, better-equipped’. Any plans are confounded by hostile or indifferent social environments, unpredictable budgets and changing threats.<sup>51</sup> Too often strategic defence reviews, transformation programs or White Papers are developed in isolation with politicians and military commanders. This results in policy changes being driven by personal agendas and protectionist attitudes in the development of potential approaches.<sup>52</sup> As demonstrated during the 2005 Transformation, multiple views of future conflict held within the

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<sup>47</sup> Taylor, “The limited capacity of management...”: 230.

<sup>48</sup> *Ibid.*: 231.

<sup>49</sup> Department of National Defence, *Defence Policy Review, Public Consultation ...* 27.

<sup>50</sup> According to Rittel and Webber, these are characteristics of wicked problems, see Rittel and Webber, “Dilemmas...”: 164, 166.

<sup>51</sup> Copley, “Safeguarding ...”: 6-8; Mitchell, “A Transformation Agenda ...”: 56; Sokolsky Jockel, “A defence review... ”

<sup>52</sup> Copley, “Safeguarding ...”: 9-11.



services, several of which competed with one another, complicated problem definition and confounded implementation.<sup>53</sup>

This situation is aggravated as the number of stakeholders increases. The Liberal government's decision to open the 2016 Defence Review to the public creates a significantly larger number of viewpoints and therefore a larger pool of potential solutions. This may increase the probability that a 'good' solution will be offered but it will also make identifying and accurately assessing that solution considerably more difficult. Proposed solutions will undoubtedly be extremely varied and range into the completely unpalatable to one or more influential stakeholders. Such a multiplicity of potential solutions serves to decrease the definition of the problem and therefore the definition of the solution.<sup>54</sup>

### **WHY CAN'T WE ADJUST OUR THINKING TO WICKED PROBLEMS?**

All of the above conditions combine to demonstrate the wickedness of defence issues that must be faced by policy planners and implementers. Failure to effectively consider each of these complex facets of wicked problems has resulted in policies or changes that provide only the appearance of transformation, achieve partial success, repeat missteps of the past, or undergo reversion to previous policy states. Yet, policymakers continue to apply linear thinking to develop logical solutions to their viewpoint of the issue.

According to British Vice Admiral Sir Jeremy Blackham, Vice President of RUSI and former Deputy Chief of the Defence Staff (Equipment Capability), the existing methods of military policy analysis are not sufficient to understand a problem that is dependent on one's idea for solving it. He argues political prescriptions that adhere to the principles of scientific planning solutions, such as the Capability Based Planning (CBP) process used in Canada, are bound to

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<sup>53</sup> English, "Outside ...": 13.

<sup>54</sup> Rittel and Webber, "Dilemmas...": 164.

fail. Bureaucratic defence mindsets and traditional, top-down organizations are at the root of the problem as they are risk adverse and deal poorly with complex, dynamic and ambiguous problems which require experimental and innovative approaches.<sup>55</sup> Instead, they seek “long term, carefully prepared, fully ‘justified’, scrutinized, and frequently delayed” solutions. Further, defence leaders tend “to deal with unfamiliar and challenging problems by translating them into a format which fits the existing analytical and decision-making... structures, ‘illustrative scenarios’, and processes.”<sup>56</sup> Though the Canadian CBP process purports to encourage different perspectives from those which would enhance or maintain current solutions for military capabilities,<sup>57</sup> a review of the strategies and capabilities developed using this process for the future CAF finds little but expansion plans and ‘like-for-like’ replacements. Some of the plans include rationalization of similar equipment fleets to enable multi-role functionality, but there are no indicated reductions in stated capability.<sup>58</sup> Such linear thinking limits identification of possible outcomes and reinforces path dependencies in potential solutions.

Adding to the challenges posed by bureaucratic inertia and restricted thought processes within defence are the traditional divisions between the Army, Navy and Air Force. These divisions must become “more blurred” to prevent the services from resisting new capabilities that may threaten their existing doctrine or capabilities.<sup>59</sup> Such service loyalty places personal agendas ahead of the greater institutional good and, according to Jeffery, “seemingly [inhibit] the

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<sup>55</sup> Australian Public Service Commission, *Tackling Wicked Problems...*: 9.

<sup>56</sup> Jeremy Blackham, “Dealing with ‘Wicked Problems’,” *The RUSI Journal* 152, no. 4 (August 2007): 37; a similar conclusion was made by Mark Gunzinger, *Shaping America’s Future Military: Toward a New Force Planning Construct* (Washington: Center for Strategic and Budgetary Assessments, 2013): 22.

<sup>57</sup> Department of National Defence, *Capability Based Planning Handbook* (Ottawa: DND Canada, 2014): 6.

<sup>58</sup> Department of National Defence, *Canada First Defence Strategy* (Ottawa: DND Canada, 2008); Royal Canadian Navy, *Securing Canada’s Ocean Frontiers: Charting the Course from Leadmark* (Ottawa: Directorate of Maritime Strategy, 2005); Canadian Army, *Designing Canada’s Army of Tomorrow* (Kingston: Directorate of Land Concepts and Designs, 2011); Royal Canadian Air Force, *Air Force Vectors* (Ottawa: Director General Air Force Development, 2014).

<sup>59</sup> Andrew Cranfield, “Some Further Thoughts on Addressing ‘Wicked Problems’,” *The RUSI Journal* 152, no. 6 (December 2007): 74.

ability to make the really tough choices.”<sup>60</sup> This drive to protect empires by military leaders is so engrained that they are willing to sacrifice the potential success of future capital investments rather than reduce capability today.<sup>61</sup> This is evident in the delays to establishing viable cyber and space capabilities within the CAF, which would require the services to reduce existing capability. As described by Lieutenant-General (Retired) Andrew Leslie, when military leaders view themselves “as individuals who may lose status, resources or power... they have delayed making the hard choices.”<sup>62</sup> In times of reduced resources, this inability to make hard choices causes politicians and defence leaders to lose focus on the larger security picture in order to placate the demand of competing interests and protect their own interests.<sup>63</sup>

Despite the wickedness of the defence policy development problem, research and analysis continues to focus efforts on creating measurable processes for defence planning. According to Webb *et al*, establishing a link between development and resourcing is one of the greatest difficulties of defence planning and is best achieved through the process of Capability-Based Planning.<sup>64</sup> However, the *Guide to Capability-Based Planning* identifies challenges with the process indicative of wicked problems, including pluralism amongst defence interests, a high level of abstraction and the need to consider government constraints.<sup>65</sup> Robert Hartfiel, defence policy scholar, argues that military long-term planning exercises such as CBP examine possible scenarios for the future and then work backwards to determine solutions for gaps that exist in the current structure. However, these forms of planning are hampered by the requirement for a clear

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<sup>60</sup> Jeffery, “Inside ...”: 17.

<sup>61</sup> John Ivison, “Forces turn teeth into tail; Redeploying capital funds to make ends meet,” *National Post*, 6 December 2012.

<sup>62</sup> Department of National Defence, *Report on Transformation 2011* (Ottawa: DND Canada, 2011), 2.

<sup>63</sup> Michael J. Meese, “Strategy and Force Planning in a Time of Austerity,” *Strategic Studies Quarterly* 8, no. 3 (Fall 2014): 20.

<sup>64</sup> Natalie J. Webb, Anke Richter, and Donald Bonsper, “Linking Defense Planning and Resource Decisions: A Return to Systems Thinking,” *Defense & Security Analysis* 26, no. 4 (December 2010): 387-388.

<sup>65</sup> The Technical Cooperation Program, *Guide to Capability-Based Planning* (Washington: TTCP Joint Systems and Analysis Group — Technical Panel 3, 2004) 5.

definition of both the future environment and the government's preferred level of capability to deal with predicted threats.<sup>66</sup> This level of clarity is difficult to achieve as governments are rarely willing to choose between a military without the capability to meet its needs and spending public funds to protect against a threat that never materializes. Instead, risk aversion causes them to adopt a strategy of doing 'just enough' to achieve their aims.<sup>67</sup>

In general, the top-down, protectionist, service-oriented stove pipes inherent in DND create a bureaucratic inertia which resists change and inhibits innovation.<sup>68</sup> The sclerotic reliance on logic-based solutions, developed within isolated defence communities prevents planners from realizing the wickedness of the issues they are trying to solve. This results in a "Canadian defence policy [that] just keeps 'rollin' along' ... no matter how much, extensively or how often it is reviewed."<sup>69</sup>

## **A CHANGE IN THINKING**

Although the current CBP process provides an effective tool for identifying required military capabilities based on a set of future scenarios, as stated above, the ability to envision potential futures and provide 'outside-the-box' solutions is limited by factors such as a lack of clear strategic political goals, bureaucratic inflexibility, an aversion to risk, isolated thinking and protectionist attitudes. Mark Gunzinger, Senior Fellow at the Center for Strategic and Budgetary Assessments, argues the CBP can be improved by adjusting future scenarios to better challenge existing defence programs and structures, prioritizing military roles, determining where risk may

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<sup>66</sup> Hartfiel, "Planning without guidance...": 336-337.

<sup>67</sup> Sokolsky Jockel, "A defence review...."

<sup>68</sup> Department of National Defence, *Report on Transformation 2011* (Ottawa: DND Canada, 2011), 10.

<sup>69</sup> Sokolsky Jockel, "A defence review...."

be accepted in those roles, considering different concepts for victory and providing clear strategic direction.<sup>70</sup>

US Brigadier-General (Retired) Michael Meese argues the solutions to the force planning issues in budget restrained environments are threefold. First, it is incumbent upon defence leaders to realize that they are operating within fiscally constrained limits and conduct a credible dialogue regarding defence policy that recognizes this fact. Second, military leaders must focus more on other parts of government and realize that changes or expansion in areas outside defence will have an effect on the portion of the pie available to national security. Finally, defence leaders must be prepared to make strategic choices regarding national security priorities, given the limitations imposed by the civil government.<sup>71</sup>

The Australian Public Service Commission (APSC) recommends a more collaborative approach which would benefit defence planners by increasing their awareness of the many stakeholders, dispersed power players and the links between them. Such awareness would improve the ability of planners to coordinate, involve and ensure the commitment of such groups in implementing any long term plans and evaluating their success. Collaborative approaches help to overcome or mitigate the interactions between causal factors, conflicting policy objectives and disagreement over possible solutions.<sup>72</sup> The APSC further recommends re-examining the requirement to tightly specify programme outputs and outcomes and reconsidering accountability frameworks to ensure organizations have the flexibility to work towards outcomes that take years to materialize.<sup>73</sup> A similar approach was used by the Netherlands in their 2013 defence review. According to Srdjan Vucetic, professor of international affairs at the University of Ottawa, the

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<sup>70</sup> Gunzinger, *Shaping America's Future Military...*: 30-31, 33-35, 37-38.

<sup>71</sup> Meese, "Strategy and Force Planning ...": 23-24.

<sup>72</sup> Australian Public Service Commission, *Tackling Wicked Problems...*: 7-8; see also Taylor, "The limited capacity of management...": 239.

<sup>73</sup> Australian Public Service Commission, *Tackling Wicked Problems...*: 10, 16.

broadly consultative approach used by the Dutch succeeded in establishing sustainable capabilities for the Dutch forces by “getting the government, the media, and the public to think harder about the various trade-offs that arise in deciding what the main threats and risks are... as well as determining which operational capabilities to prioritize in light of the available resources.”<sup>74</sup>

The current Liberal government is certainly signalling that they are open to such an approach in their public defence review which is seeking recommendations for achieving a ‘lean, agile, better-equipped’ military from a broad cross-section of Canadian stakeholders. However, George Petrolekas believes the Liberal approach is flawed due to the absence of an associated discussion of the fiscal framework the government is willing to consider for the multitude of options available.<sup>75</sup> It remains to be seen if this approach will provide innovative solutions and enable a long-term, sustainable and achievable defence policy or if decisions have been pre-determined and the review is simply meant to provide the appearance of involvement for a broad cross-section of stakeholders.

## CONCLUSION

The formulation and implementation of an effective defence policy to sustain a ‘lean, agile, well-equipped’ CAF is a wicked problem. The vagueness of phrases such as ‘lean, agile, better-equipped’ require further definition in order to enable meaningful discussion on how to achieve those goals. However, that increased definition leads to the development of path dependencies towards potential solutions that limit possibilities for those solutions. Wickedly,

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<sup>74</sup> Srdjan Vucetic, “Thinking About Strategic Posture Options: Dutch Lessons for Canada?” Centre for International Policy Studies, last modified 6 April 2016, <http://www.cips-cepi.ca/2016/04/06/thinking-about-strategic-posture-options-dutch-lessons-for-canada/>.

<sup>75</sup> Murray Brewster, “Libs launch review to decide future size and shape of Canada’s military,” *The Chronicle Herald*, 6 April 2016, <http://thechronicleherald.ca/canada/1354727-libs-launch-review-to-decide-future-size-and-shape-of-canadas-military>.

providing further definition of those terms is dependent on the solution envisioned as each possibility has a direct influence on how ‘lean’, ‘agile’ and ‘better-equipped’ the future CAF can become. Experts from various fields have proposed potential solutions to meet these vague government objectives. Often these solutions conflict with one another or require changes to the military institution that would result in considerable internal resistance or would require the commitment of public resources at levels not acceptable to the Canadian government or the public. Determining a way ahead is further confounded by extended time lines for implementation, as is the case for capital equipment acquisitions, as well as difficulty in measuring success or even determining when a “lean, agile, better-equipped” military has been achieved.

Further exacerbating the challenges in developing sustainable defence policy is the pervasive influence of any solution attempts on the nature of the problem itself. Any attempt, successful or not, results in the expenditure of large sums of public money, which cannot be recovered, over long periods of time, which cannot be replaced. Further, when billions of dollars of public funds, the security of a nation, and the lives of soldiers are at stake, planners do not have the luxury of getting the solution wrong. When all of these factors are combined it demonstrates a wickedness in defence policy development that must be recognized in order to consider effective approaches to problem definition and eventual resolution. As demonstrated above, recent attempts to achieve a sustainable solution, such as the 2005 Transformation, have not achieved lasting success due to a failure to recognize how wicked the problem is. This lack of recognition leads to a focus on using logic-based processes, such as CBP, which have limited effectiveness in dealing with the complex interactions between stakeholders and causal factors that are the epitome of the wicked problem.

Establishing a “lean, agile, better-equipped” military in Canada will require holistic, vice partial or linear, thinking, innovative and flexible approaches, interagency cooperation, flexible approaches to accountability frameworks, effective engagement of a broad selection of stakeholders to define the problem and possible solutions, a clear and comprehensive strategy, a tolerance for uncertainty, and acceptance of long-term assessment and focus. Sole reliance on the same old thinking methods will likely continue the cycle of unsustainable defence transformations and prevent the development of effective, lasting change. As stated by Blackham, “Once it has been grasped that we are in the world of the ‘wicked problem’, much that is now causing difficulty may become more obvious and more doable.”<sup>76</sup>

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<sup>76</sup> Blackham, “Dealing with ‘Wicked Problems’” ...: 38.



## BIBLIOGRAPHY

- Australia. Australian Public Service Commission. *Tackling Wicked Problems: A Public Policy Perspective*. Canberra: Australian Public Service Commission, December 2007.
- Bandali, Naveed and Jessica Bryant. "Transforming the Tooth-to-Tail Ratio: An Interview with Brigadier General Craig A. Peterson (Ret.)." *Journal of International Peace Operations* 4, no. 6 (May-June 2009): 22-23.
- Blackham, Jeremy. "Dealing with 'Wicked Problems'." *The RUSI Journal* 152, no. 4 (August 2007): 36-38.
- Canada. Canadian Army. *Designing Canada's Army of Tomorrow*. Kingston: Directorate of Land Concepts and Designs, 2011.
- Canada. Department of National Defence. *Canada First Defence Strategy*. Ottawa: DND Canada, 2008.
- Canada. Department of National Defence. *Capability Based Planning Handbook*. Ottawa: DND Canada, 2014.
- Canada. Department of National Defence. *Report on Transformation 2011*. Ottawa: DND Canada, 2011.
- Canada. Department of National Defence. *Defence Policy Review, Public Consultation Document 2016*. Last accessed 16 April 2016. <http://dgpaapp.forces.gc.ca/en/defence-policy-review/docs/defence-policy-review-consultation-paper.pdf>.
- Canada. Governor General. *Making real change happen: speech from the Throne to open the first session of the forty-second Parliament of Canada*. Ottawa, 4 December 2015.
- Canada. Royal Canadian Air Force. *Air Force Vectors*. Ottawa: Director General Air Force Development, 2014.
- Canada. Royal Canadian Navy. *Leadmark: The Navy's Strategy for 2020*. Ottawa: Directorate of Maritime Strategy, 2001.
- Canada. Royal Canadian Navy. *Securing Canada's Ocean Frontiers: Charting the Course from Leadmark*. Ottawa: Directorate of Maritime Strategy, 2005.
- Castelli, Christopher J. "Pentagon: Afghanistan Ops Show Tooth-to-Tail Ratio is Obsolete." *Inside the Pentagon* 26, no. 17 (29 April 2010). <http://search.proquest.com/docview/1010762065?pq-origsite=summon>.
- Conley, Devin and Eric Ouellet. "The Canadian Forces and Military Transformation: An Elusive Quest for Efficiency." *Canadian Army Journal* 14, no. 1 (2012): 71-83.

- Copley, Gregory R. "Safeguarding Long-Term Security as Budgets Fall." *Defense & Foreign Affairs Strategic Policy* 38, no. 11 (2010): 6-12.
- Cranfield, Andrew. "Some Further Thoughts on Addressing 'Wicked Problems'." *The RUSI Journal* 152, no. 6 (December 2007): 72-75.
- Edmunds, Timothy. "The defence dilemma in Britain." *International Affairs* 86, no. 2 (2010): 377-394.
- English, Allan. "Outside CF Transformation Looking In." *Canadian Military Journal* 11, no. 2 (Spring 2011): 12-20.
- Feaver, Peter D. "The Civil-Military Problematique: Huntington, Janowitz, and the Question of Civilian Control." *Armed Forces & Society* 23, no. 2 (Winter 1996): 149-178.
- Gunzinger, Mark. *Shaping America's Future Military: Toward a New Force Planning Construct*. Washington : Center for Strategic and Budgetary Assessments, 2013.
- Hartfiel, Robert Michael. "Planning without guidance: Canadian defence policy and planning, 1993-2004." *Canadian Public Administration* 53, no. 3 (September 2010): 323-349.
- Howlett, Michael. "Policy analytical capacity and evidence-based policy-making: Lessons from Canada." *Canadian Public Administration* 52, no. 2 (June 2009): 153-175.
- Jeffery, Michael K. "Inside Canadian Forces Transformation." *Canadian Military Journal* 10, no. 2 (2010): 9-18.
- Jones, Peter and Phillipe Lagassé. "Rhetoric versus reality: Canadian defence planning in a time of austerity." *Defence & Security Analysis* 28, no. 2 (June 2012): 140-151.
- McGrath, John J. *The Other End of the Spear: The Tooth-to-Tail Ratio (T3R) in Modern Military Operations*. The Long War Series Occasional Paper 23. Fort Leavenworth, Kansas: Combat Studies Institute Press, 2007.
- Meese, Michael J. "Strategy and Force Planning in a Time of Austerity." *Strategic Studies Quarterly* 8, no. 3 (Fall 2014): 19-29.
- Mitchell, Paul T. "A Transformation Agenda for the Canadian Forces: Full Spectrum Influence." *Canadian Military Journal* (Winter 2003-2004): 55-62.
- Rittel, Horst W.J. and Melvin M. Webber. "Dilemmas in a General Theory of Planning." *Policy Sciences* 4 (1973): 155-169.
- Spearin, Christopher. "Contemporary military contracting and the future: Teeth, tails, and concerns." *International Journal* 69, no. 4 (2014): 470-474.

Taylor, Trevor. "The limited capacity of management to rescue UK defence policy: a review and a word of caution." *International Affairs* 88, no. 2 (2012): 223-242.

The Technical Cooperation Program. *Guide to Capability-Based Planning*. Washington: TTCP Joint Systems and Analysis Group — Technical Panel 3, 2004.

United States of America. Department of Defense. *Quadrennial Defense Review 2014*. Washington: United States DoD, March 2014.

United States of America. Department of Defense. *Quadrennial Defense Review 2010*. Washington: United States DoD, February 2010.

United States of America. Department of Defense. *Quadrennial Defense Review 2006*. Washington: United States DoD, February 2006.

United States of America. Department of Defense. *Quadrennial Defense Review 2001*. Washington: United States DoD, September 2001.

Webb, Natalie J., Anke Richter, and Donald Bonsper. "Linking Defense Planning and Resource Decisions: A Return to Systems Thinking." *Defense & Security Analysis* 26, no. 4 (December 2010): 387-400.

Wells, Linton. "Transformation and Tidewater." *Signal* 64, no. 9 (May 2010): 96.