



Force Mix Analysis in the Context of the Canadian Armed Forces

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21 July 2015



NOTICE

(U) This document has been reviewed and DOES NOT CONTAIN controlled goods.

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Outline

- Overview of the CAF Establishment Study
- Force Mix Analysis
 - CFDS and Recommendation of Scenarios
 - Supply Estimation
 - Demand Estimation
 - Results
- Summary

CAF Establishment Study – Overview

| Phase | Status |
|--|---|
| <p data-bbox="253 238 954 274">Phase I – Analysis of Force Components</p> <p data-bbox="69 298 1136 386">To better understand the size and other characteristics of the various components of the CAF population:</p> <ul data-bbox="69 398 1136 611" style="list-style-type: none"><li data-bbox="69 398 620 434">• Trained Effective Strength (TES);<li data-bbox="69 443 1112 479">• Basic Training List/Subsidized University Training List (BTL/SUTL);<li data-bbox="69 487 1136 567">• Non-Effective Strength (NES)/Service Personnel Holding List (SPHL); and<li data-bbox="69 575 548 611">• Leave Without Pay (LWOP). | <p data-bbox="1174 338 1367 374">- Complete</p> |
| <p data-bbox="324 647 884 683">Phase II – Analysis of Force Mix</p> <p data-bbox="69 707 1136 844">To inform the discussion around the force mix required to maximize the CAF's ability to meet its mandate through an investigation of related parameters.</p> | <p data-bbox="1174 695 1367 732">- Complete</p> |
| <p data-bbox="200 894 1006 930">Phase III – Design of Sustainable Occupations</p> <p data-bbox="69 954 1136 1042">To ensure that occupation structures will be sustainable in the long term.</p> | <p data-bbox="1174 946 1348 982">- Ongoing</p> |

Canada First Defence Strategy

■ Six core missions :

1. Conduct daily domestic and continental operations
2. Support a major international event in Canada
3. Respond to a major terrorist attack
4. Support civilian authorities during a crisis in Canada, such as a natural disaster
5. Lead and/or conduct a major international operation for an extended period
6. Deploy forces in response to crises elsewhere in the world for shorter periods

Recommendation of Scenarios

■ Top 10 mutually exclusive combinations of CFDS missions:

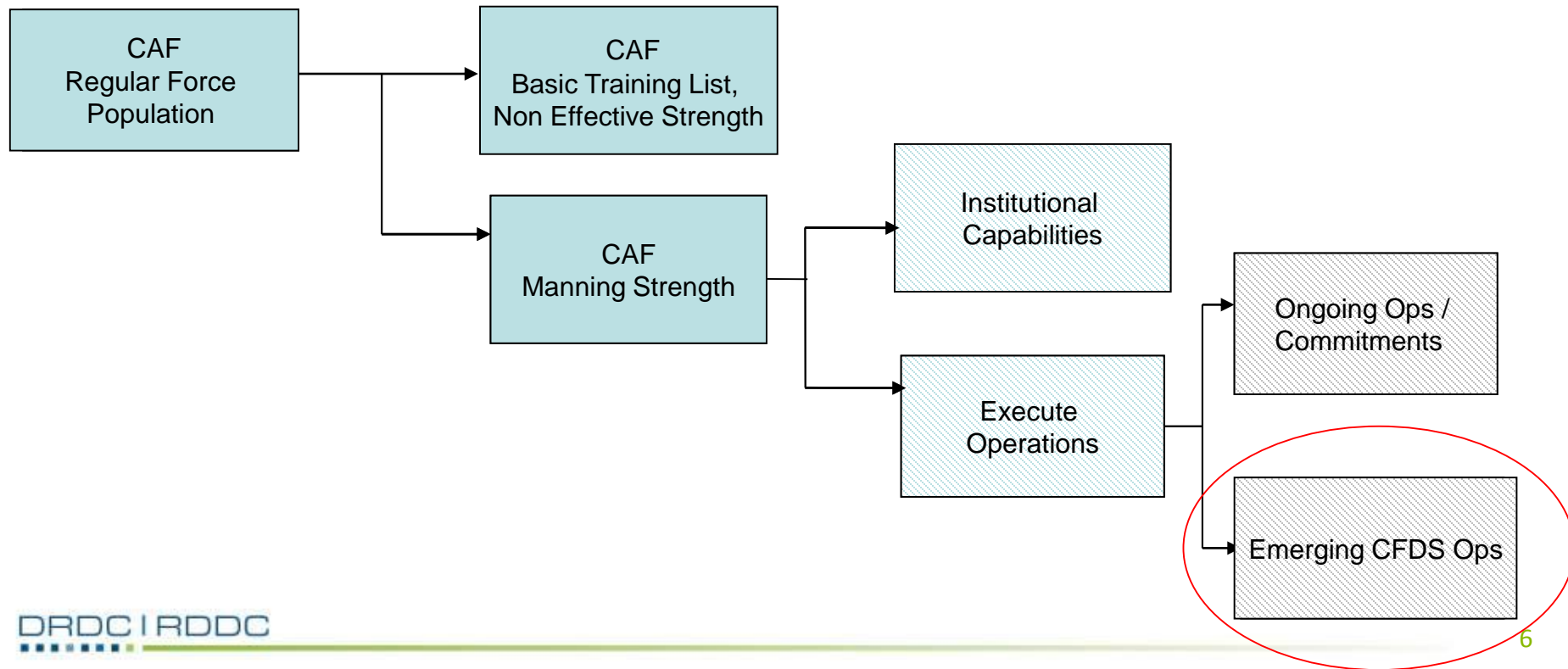
| Combination | Description | % of Simulation Time |
|--|-------------------------------------|----------------------|
| 1 | Mission 5 - 1 op | 9.1% |
| 2 | Mission 5 - 2 ops | 8.4% |
| 3 | Mission 5 - 3 ops | 6.0% |
| 4 | Mission 1 - 1 op, Mission 5 - 1 op | 3.7% |
| 5 | Mission 1 - 1 op, Mission 5 - 2 ops | 3.6% |
| 6 | Mission 5 - 4 ops | 3.4% |
| 7 | Mission 1 - 1 op, Mission 5 - 3 ops | 2.5% |
| 8 | Mission 1 - 1 op | 2.0% |
| 9 | Mission 4 - 1 op, Mission 5 - 1 op | 2.0% |
| 10 | Mission 4 - 1 op, Mission 5 - 2 ops | 1.9% |
| Combinations consisting solely of excluded ops | | 4.8% |
| Total | | 47.5% |

■ Additional combinations:

| Combination | Description | % of Simulation Time |
|-------------|--|----------------------|
| 11 | Mission 2 - 1 op, Mission 5 - 1 op | 0.32% |
| 12 | Mission 2 - 1 op, Mission 5 - 2 ops | 0.30% |
| 13 | Mission 3 - 1 op, Mission 5 - 3 ops | 0.01% |
| 14 | Mission 3 - 1 op, Mission 5 - 2 ops | 0.03% |
| 15 | Mission 5 - 1 op, Mission 6 - 1 op | 1.4% |
| 16 | Mission 5 - 2 ops, Mission 6 - 1 op | 1.3% |
| 17 | Mission 2 - 1 op, Mission 5 - 1 op, Mission 6 - 1 op | 0.05% |
| Total | | 3.4% |

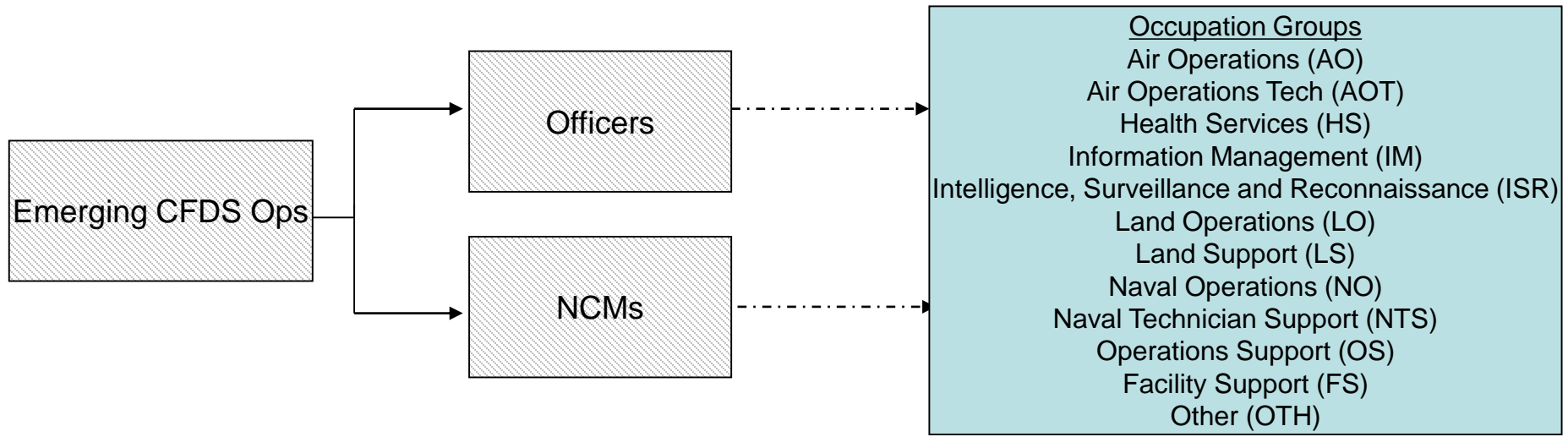
Supply Estimation

- **Supply** is defined as the Regular Force members that are available to deploy and support operations



Emerging CFDS Operations

- The number of officers and NCMs available for operations that are not currently ongoing and/or mandated commitments come from the *Emerging CFDS Ops* component mapped to occupation groups



Demand Estimation – Methodology

- Two methods were used to look at how well the deployable CAF meets future operations. They differ on how they quantify demand:
 - *Method 1 demand* is based on historical data on personnel supplied to meet past missions (led by DGMPRA)
 - *Method 2 demand* is based on a force element analysis that uses SJS and CBP generated packages to meet CFDS mission requirements (led by DRDC CORA)
- To make the results of the two methods comparable:
 - Both methods use the same *future operations* and *supply*

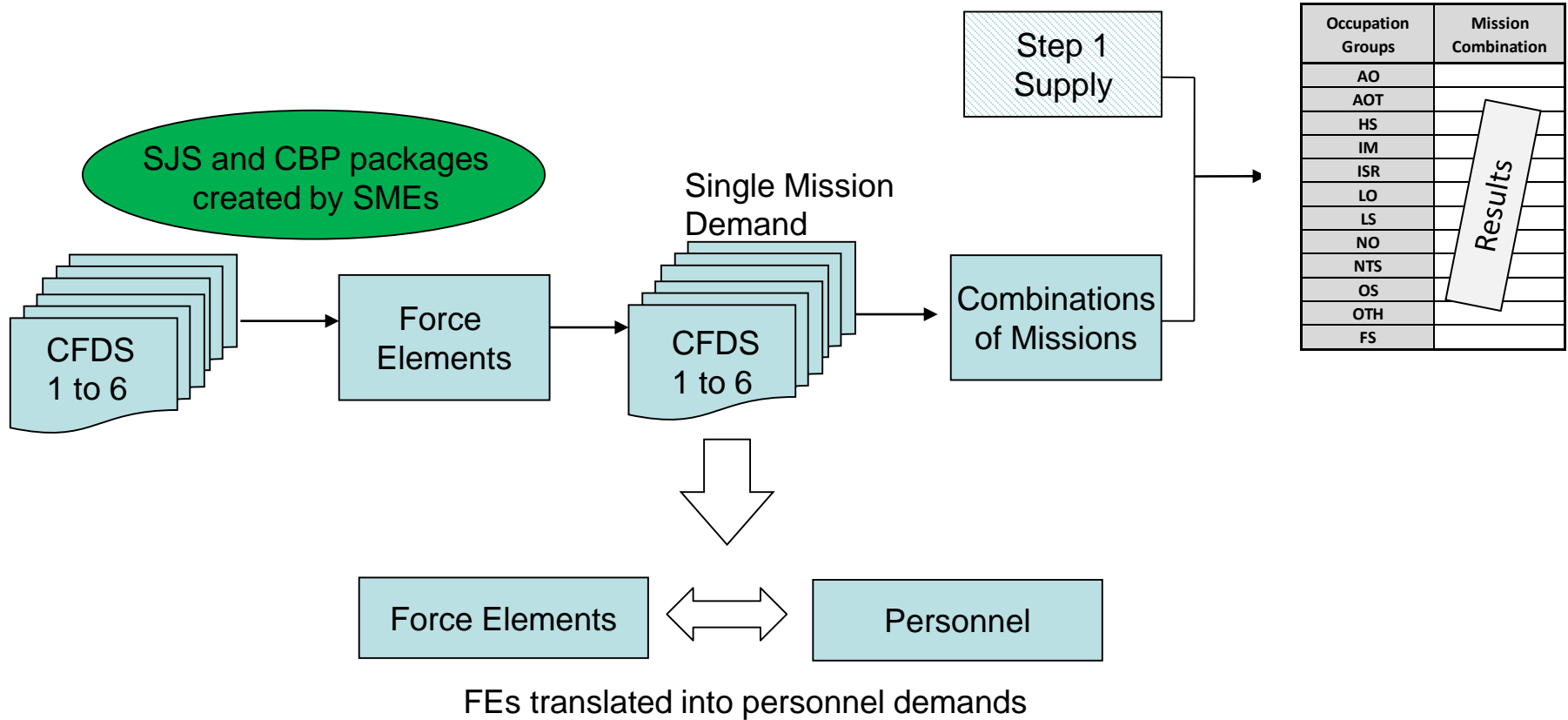
Overview of Method 1 – Demand using Historical Data

- The 48 operations selected to represent demand are shown in the following table:

| CFDS Mission | Number of ops | Operations |
|--------------|---------------|---|
| 1 | 8 | NUNALIVUT, NANOOK, NEVUS, POSEIDON, HURRICANE, NARWHAL, CARIBBE, LOBOS |
| 2 | 3 | CADENCE, PODIUM, GRIZZLY |
| 3 | 1 | SUPPORT |
| 4 | 8 | PEREGRINE, PONTOON, CANTON, LAMA, LENTUS, LOTUS, UNISON, PERSISTENCE |
| 5 | 20 | APOLLO, ATHENA, PALLADIUM, RECORD, HARMONY, CAVALIER, FRICTION, MATADOR, MOBILE, ALLIANCE, MARQUIS, AFGHANISTAN, ECLIPSE, DELIVERANCE, CONSTABLE, HALO, TOUCAN, PRUDENCE, BRONZE, MATCH |
| 6 | 8 | HESTIA, ICELAND, TATOU, JAMAICA, HORATIO, FORAGE, CARAVAN, PARAPET |

- For each rotation of each operation, the number of officers and NCMs that were deployed is calculated
- For each combination of missions, rotations from each CFDS mission are randomly selected and then added across occupation groups

Overview of Method 2 - Demand based on Force Elements



Results – Officers – Method 1

- NO, OTH (PA, legal, MP), NTS and HS experiencing shortfalls
- ISR and LO also experiencing shortfalls with the supply reduced by 15%

| FY 13/14 Manning Strength - 15% DAG Factor | | Maximum Shortage | | | | | | | | | | |
|--|--|------------------|---------|--------|--------|---------|--------|--------|--------|---------|--------|---------|
| Combination | Mission Description | OFF AO | OFF AOT | OFF HS | OFF IM | OFF ISR | OFF LO | OFF LS | OFF NO | OFF NTS | OFF OS | OFF OTH |
| 1 | Mission 5 - 1 op | | | | | | | | | | | |
| 2 | Mission 5 - 2 ops | | | | | | | | | | | 36 |
| 3 | Mission 5 - 3 ops | | | 29 | | | | | 53 | 15 | | 51 |
| 4 | Mission 1 - 1 op, Mission 5 - 1 op | | | | | | | | 23 | | | |
| 5 | Mission 1 - 1 op, Mission 5 - 2 ops | | | | | | | | 54 | 16 | | 33 |
| 6 | Mission 5 - 4 ops | | | 38 | | | | | 100 | 28 | | 64 |
| 7 | Mission 1 - 1 op, Mission 5 - 3 ops | | | 17 | | | | | 55 | | | 60 |
| 8 | Mission 1 - 1 op | | | | | | | | | | | |
| 9 | Mission 4 - 1 op, Mission 5 - 1 op | | | | | | | | | | | |
| 10 | Mission 4 - 1 op, Mission 5 - 2 ops | | | | | | | | | | | 41 |
| 11 | Mission 2 - 1 op, Mission 5 - 1 op | | | | | | | | 46 | | | 36 |
| 12 | Mission 2 - 1 op, Mission 5 - 2 ops | | | | | | | | 120 | 18 | | 66 |
| 13 | Mission 3 - 1 op, Mission 5 - 3 ops | | | 29 | | 9 | 22 | | | | | 75 |
| 14 | Mission 3 - 1 op, Mission 5 - 2 ops | | | | | | | | | | | 35 |
| 15 | Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | | | | 9 |
| 16 | Mission 5 - 2 ops, Mission 6 - 1 op | | | | | | | | 56 | 14 | | 42 |
| 17 | Mission 2 - 1 op, Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | 37 | | | 58 |

Results – Officers – Method 2

- NO, OTH (PA), NTS, HS and ISR experiencing shortfalls
- IM also experiencing shortfalls with the supply reduced by 15%

| FY 13/14 Manning Strength - 15% DAG Factor | | Maximum Shortage | | | | | | | | | | |
|--|--|------------------|---------|--------|--------|---------|--------|--------|--------|---------|--------|---------|
| Combination | Mission Description | OFF AO | OFF AOT | OFF HS | OFF IM | OFF ISR | OFF LO | OFF LS | OFF NO | OFF NTS | OFF OS | OFF OTH |
| 1 | Mission 5 - 1 op | | | | | | | | | | | |
| 2 | Mission 5 - 2 ops | | | | | | | | | | | |
| 3 | Mission 5 - 3 ops | | | 30 | | 42 | | | 111 | 31 | | 47 |
| 4 | Mission 1 - 1 op, Mission 5 - 1 op | | | | | | | | 73 | | | |
| 5 | Mission 1 - 1 op, Mission 5 - 2 ops | | | | | 18 | | | 175 | 39 | | 41 |
| 6 | Mission 5 - 4 ops | | | 98 | 42 | 87 | | | 213 | 62 | | 87 |
| 7 | Mission 1 - 1 op, Mission 5 - 3 ops | | | 33 | 30 | 63 | | | 278 | 70 | | 81 |
| 8 | Mission 1 - 1 op | | | | | | | | | | | |
| 9 | Mission 4 - 1 op, Mission 5 - 1 op | | | | | | | | | | | |
| 10 | Mission 4 - 1 op, Mission 5 - 2 ops | | | | | | | | 77 | 13 | | |
| 11 | Mission 2 - 1 op, Mission 5 - 1 op | | | | | | | | | | | |
| 12 | Mission 2 - 1 op, Mission 5 - 2 ops | | | | | | | | 78 | 13 | | |
| 13 | Mission 3 - 1 op, Mission 5 - 3 ops | | | 31 | | 50 | | | 176 | 44 | | 50 |
| 14 | Mission 3 - 1 op, Mission 5 - 2 ops | | | | | | | | 74 | 13 | | 10 |
| 15 | Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | | | | |
| 16 | Mission 5 - 2 ops, Mission 6 - 1 op | | | | | 15 | | | 105 | 30 | | 29 |
| 17 | Mission 2 - 1 op, Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | 72 | | | |

Results – NCMs – Method 1

- Only OTH (MP) experiencing shortfalls (with and without 15% reduction factor)

| FY 13/14 Manning Strength - 15% DAG Factor | | Maximum Shortage | | | | | | | | | | | |
|--|--|------------------|---------|--------|--------|---------|--------|--------|--------|---------|--------|---------|--------|
| Combination | Mission Description | NCM AO | NCM AOT | NCM HS | NCM IM | NCM ISR | NCM LO | NCM LS | NCM NO | NCM NTS | NCM OS | NCM OTH | NCM FS |
| 1 | Mission 5 - 1 op | | | | | | | | | | | | |
| 2 | Mission 5 - 2 ops | | | | | | | | | | | | |
| 3 | Mission 5 - 3 ops | | | | | | | | | | | 48 | |
| 4 | Mission 1 - 1 op, Mission 5 - 1 op | | | | | | | | | | | | |
| 5 | Mission 1 - 1 op, Mission 5 - 2 ops | | | | | | | | | | | | |
| 6 | Mission 5 - 4 ops | | | | | | | | | | | 97 | |
| 7 | Mission 1 - 1 op, Mission 5 - 3 ops | | | | | | | | | | | 65 | |
| 8 | Mission 1 - 1 op | | | | | | | | | | | | |
| 9 | Mission 4 - 1 op, Mission 5 - 1 op | | | | | | | | | | | | |
| 10 | Mission 4 - 1 op, Mission 5 - 2 ops | | | | | | | | | | | 26 | |
| 11 | Mission 2 - 1 op, Mission 5 - 1 op | | | | | | | | | | | 41 | |
| 12 | Mission 2 - 1 op, Mission 5 - 2 ops | | | | | | | | | | | 103 | |
| 13 | Mission 3 - 1 op, Mission 5 - 3 ops | | | | | | | | | | | 38 | |
| 14 | Mission 3 - 1 op, Mission 5 - 2 ops | | | | | | | | | | | | |
| 15 | Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | | | | | |
| 16 | Mission 5 - 2 ops, Mission 6 - 1 op | | | | | | | | | | | 18 | |
| 17 | Mission 2 - 1 op, Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | | | | 85 | |

Results – NCMs – Method 2

- ISR, NTS and OTH (MP) experiencing shortfalls
- NO and HS also experiencing shortfalls with the supply reduced by 15%

| FY 13/14 Manning Strength - 15% DAG Factor | | Maximum Shortage | | | | | | | | | | | |
|--|--|------------------|---------|--------|--------|---------|--------|--------|--------|---------|--------|---------|--------|
| Combination | Mission Description | NCM AO | NCM AOT | NCM HS | NCM IM | NCM ISR | NCM LO | NCM LS | NCM NO | NCM NTS | NCM OS | NCM OTH | NCM FS |
| 1 | Mission 5 - 1 op | | | | | | | | | | | | |
| 2 | Mission 5 - 2 ops | | | | | 43 | | | | | | | |
| 3 | Mission 5 - 3 ops | | | | | 271 | | | | | | 68 | |
| 4 | Mission 1 - 1 op, Mission 5 - 1 op | | | | | | | | | | | | |
| 5 | Mission 1 - 1 op, Mission 5 - 2 ops | | | | | 93 | | | | 22 | | 8 | |
| 6 | Mission 5 - 4 ops | | | 26 | | 499 | | | | 187 | | 145 | |
| 7 | Mission 1 - 1 op, Mission 5 - 3 ops | | | | | 321 | | | 97 | 405 | | 86 | |
| 8 | Mission 1 - 1 op | | | | | | | | | | | | |
| 9 | Mission 4 - 1 op, Mission 5 - 1 op | | | | | | | | | | | | |
| 10 | Mission 4 - 1 op, Mission 5 - 2 ops | | | | | 57 | | | | | | | |
| 11 | Mission 2 - 1 op, Mission 5 - 1 op | | | | | | | | | | | | |
| 12 | Mission 2 - 1 op, Mission 5 - 2 ops | | | | | 56 | | | | | | | |
| 13 | Mission 3 - 1 op, Mission 5 - 3 ops | | | | | 284 | | | | 17 | | 69 | |
| 14 | Mission 3 - 1 op, Mission 5 - 2 ops | | | | | 57 | | | | | | | |
| 15 | Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | | | | | |
| 16 | Mission 5 - 2 ops, Mission 6 - 1 op | | | | | 146 | | | | | | 20 | |
| 17 | Mission 2 - 1 op, Mission 5 - 1 op, Mission 6 - 1 op | | | | | | | | | | | | |

Mitigation

- Up to 10% of the institution could be used to mitigate shortages
- The maximum shortfall for each occupation group over all 17 CFDS scenarios considered was used and expressed as a percentage of the institutional component
- Overall resolution of shortages appears feasible by temporary vacancies in *Institutional Capabilities*

| Occupation Groups | Shortage as % of Institution | |
|-------------------|------------------------------|-------------|
| | Method 1 | Method 2 |
| HS | 6.2% | 16.1% |
| IM | 0.0% | 7.5% |
| ISR | 8.0% | 77.0% |
| LO | 1.9% | 0.0% |
| NO | 27.4% | 63.5% |
| NTS | 6.8% | 16.9% |
| OTH | 8.9% | 10.3% |
| Total | 1.9% | 9.2% |

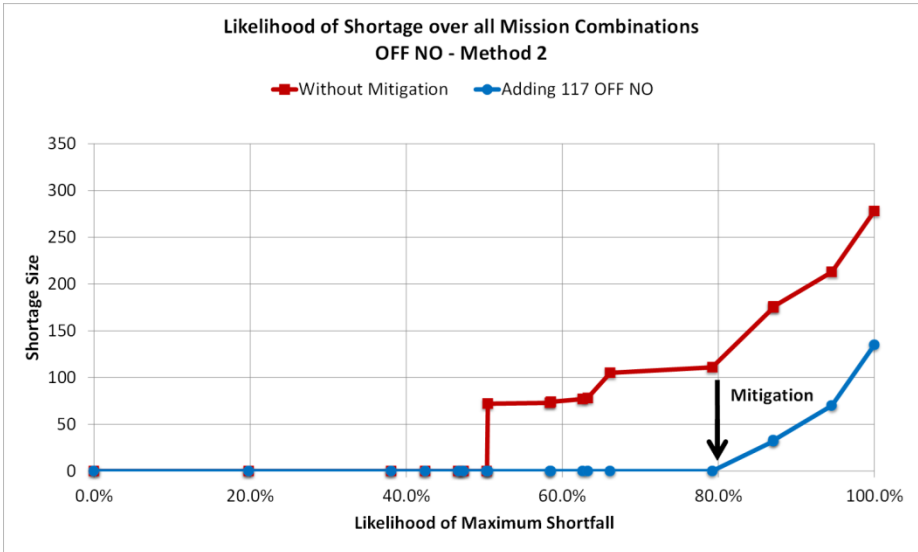
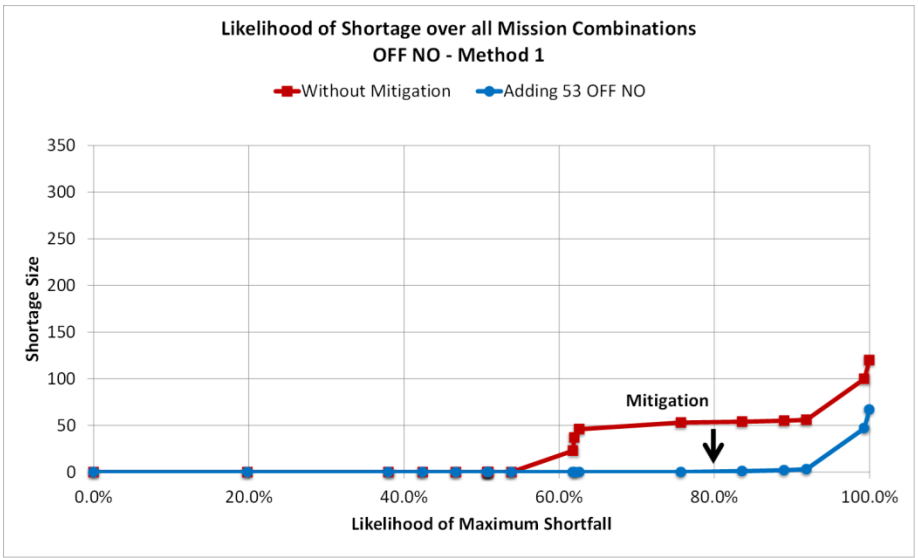
| Occupation Groups | Shortage as % of Institution | |
|-------------------|------------------------------|-------------|
| | Method 1 | Method 2 |
| HS | 0.0% | 2.9% |
| ISR | 0.0% | 107.8% |
| NO | 0.0% | 12.7% |
| NTS | 0.0% | 32.2% |
| OTH | 8.3% | 11.6% |
| Total | 0.0% | 1.3% |

Mitigation

- Additional officers/NCMs required by occupation group to resolve 80% of maximum shortfalls over all combinations

| Occupation Groups | Method 1 | Method 2 |
|-------------------|----------|----------|
| OFF HS | 17 | 14 |
| OFF IM | 0 | 0 |
| OFF ISR | 0 | 29 |
| OFF NO | 53 | 117 |
| OFF NTS | 15 | 32 |
| OFF OTH | 47 | 44 |

| Occupation Groups | Method 1 | Method 2 |
|-------------------|----------|----------|
| NCM HS | 0 | 0 |
| NCM ISR | 0 | 203 |
| NCM NO | 0 | 0 |
| NCM NTS | 0 | 17 |
| NCM OTH | 44 | 42 |



Summary

- For the officers, both demand estimation methods identified shortfalls in the occupation groups NO, OTH (public affairs), NTS, ISR and HS.
- For the NCMs, shortfalls were identified by both techniques for the occupation group OTH (military police).
- Mitigating these personnel shortages could be done by:
 - reaching out to the institutional component of the CAF establishment;
 - using Reserve Force personnel and civilians;
 - rebalancing the various occupation groups within the officers and NCMs populations.
- The need to sustain CFDS Mission 5 needs to be taken into account. This is done in:

L. Arseneau, M. Couillard, C. Eisler and B. Taylor, *Analysis of Force Mix for the Canadian Armed Forces Establishment*, NATO OR&A Conference, 22-23 October 2015, Munich, Germany.



QUESTIONS?



DRDC | RDDC