



NOTICE

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

Benchmarking National Military Forces through Comparison with Allies

16th NATO OR&A Conference

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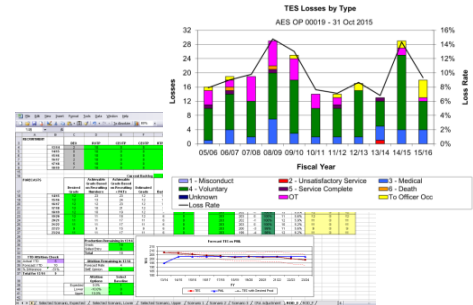
17 October 2022





Benchmarking

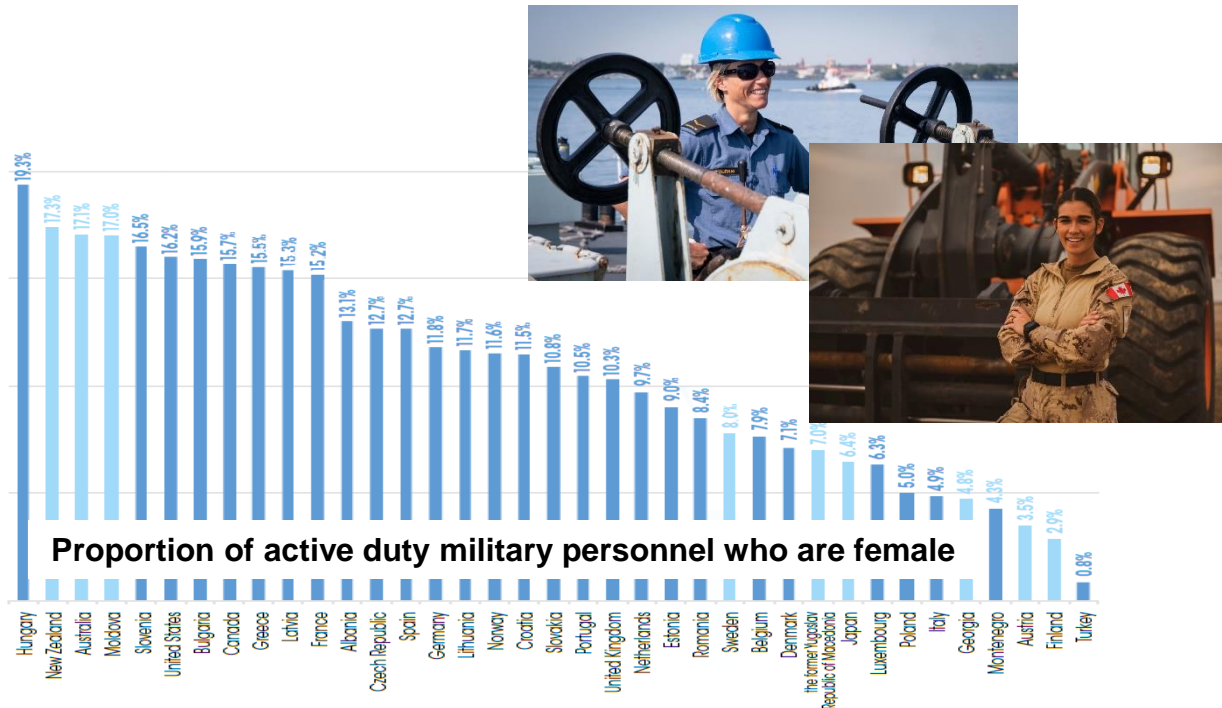
- Common Military Personnel OR methods:
 - Analytics
 - Modelling and Simulation
- Less-often used: Benchmarking
 - “continuous process of measuring products, services and practices against [our] toughest competitor”*
 - Low hanging fruit: comparing stats among allies



* R. C. Camp, *Learning from the Best Leads to Superior Performance*, Journal of Business Strategy, 13(3), pp. 3-6, 1992.



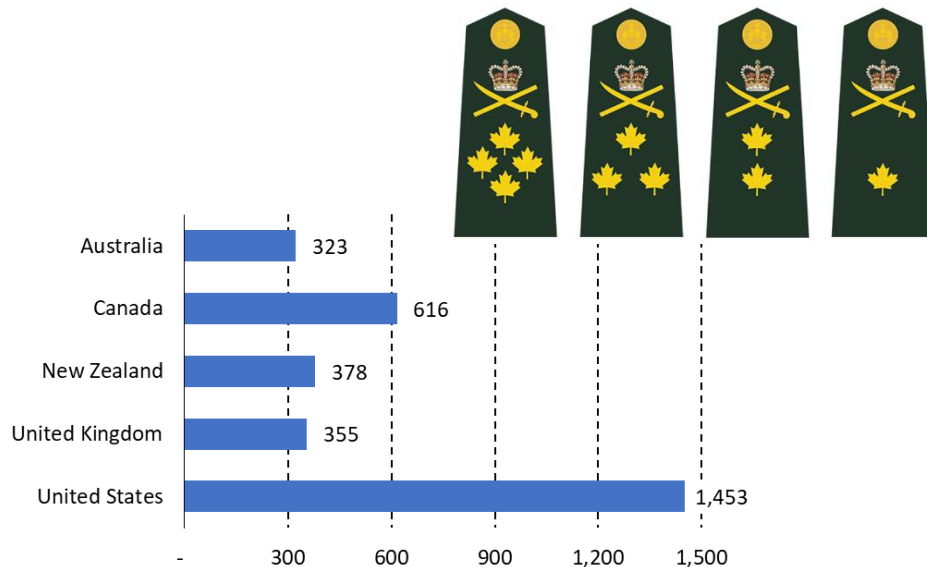
First Example: Representation of Women



Modified from: *Summary of the National Reports of the NATO Member and Partner Nations to the NATO Committee on Gender Perspectives*, NATO, 2017.



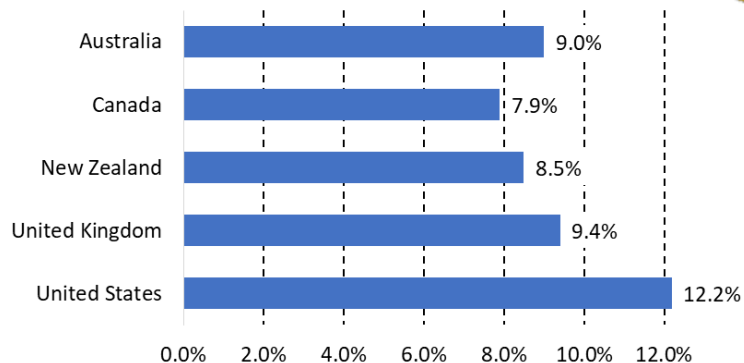
Second Example: General and Flag Officers



Number of Regular Force members per Regular Force GOFO, 2016



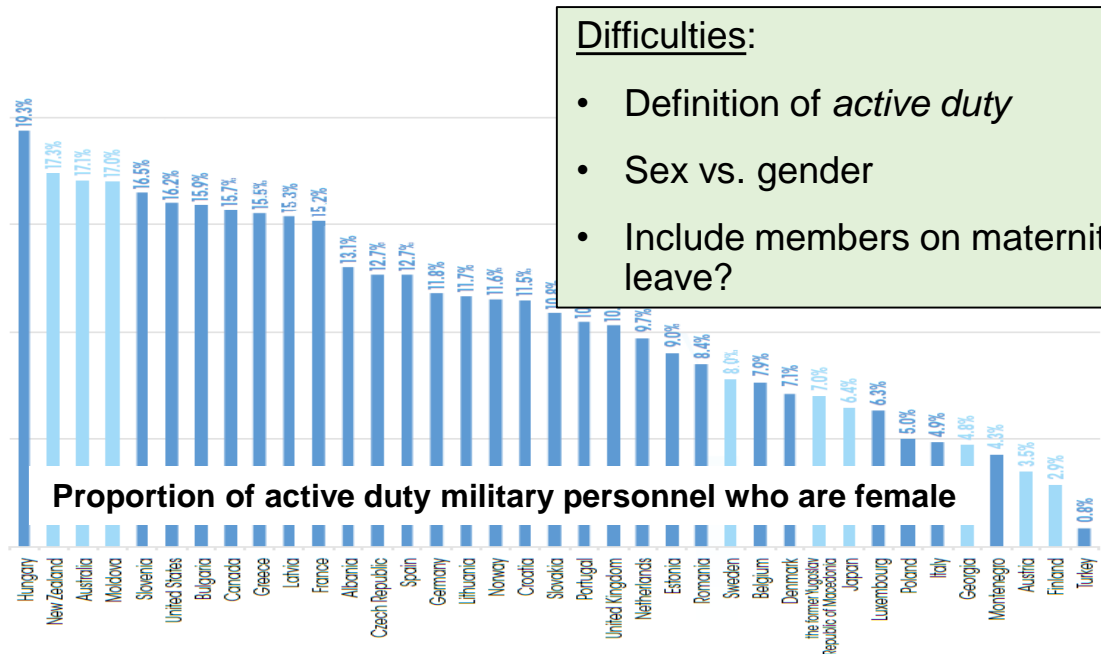
Third Example: Retention



Regular Force attrition rate, latest available as of July 2020.



First Example: Representation of Women



Difficulties:

- Definition of *active duty*
- Sex vs. gender
- Include members on maternity leave?

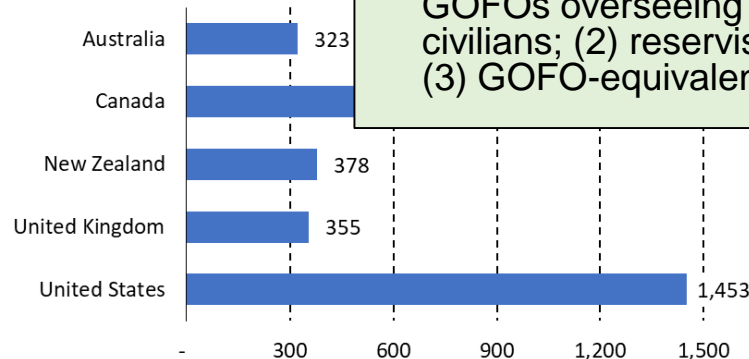
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Second Example: General and Flag Officers

Difficulties:

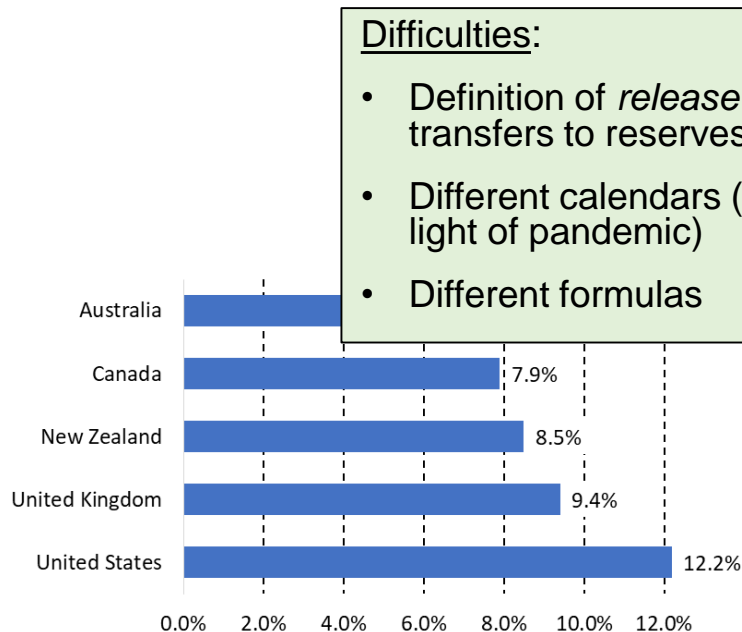
- Definition of *Regular Force*
- Treatment of acting ranks
- Consideration of (1) Regular Force GOFOs overseeing reservists and civilians; (2) reservist GOFOs; and (3) GOFO-equivalent civilians



Number of Regular Force members per Regular Force GOFO, 2016



Third Example: Retention



Regular Force attrition rate, latest available as of July 2020.



Different Formulas: Attrition Rate

	Scenario 1	Scenario 2
Transition Attrition $\frac{a}{p_0}$	19.0%	20.0%
Mean Attrition $\frac{a}{(p_0+p_1)/2}$	19.9%	21.1%
Half-Intake $\frac{a}{p_0+\frac{r}{2}}$	18.1%	19.0%
General Formula $1 - \prod_{i=1}^n \frac{p_i}{p_i+a_i}$	19.0%	18.2%

See: E. Vincent, S. Okazawa and D. Calitoui, *Attrition, Promotion, Transfer: Reporting Rates in Personnel Operations Research*, Proc. ICORES, pp. 115-122, Feb 2021.



Obstacles

- No designated point of contact
- Privacy: raw data cannot be shared
- Different formulas
- Different calendars
- Different conventions (e.g., personnel on long-term leave, acting, serving part-time...)
- Different definitions (e.g., attrition)
- Different breakdown categories (e.g., by occupation)
- Different components (where to draw line between Active Duty and Reserve, but also who is military (e.g., Canadian Rangers))
- Different services (Army / Navy / Air Force, but then Marines, Space Force...; Canadian services were abolished in 1968)
- Different ranks



Activities Underway



- ET HFM-189 “Workforce Analytics Exchange: Standards for Military Personnel Data”
 - Work concluded in 2021
 - Confirmed need to enable easier benchmarking and workforce model sharing
- Follow-on joint HFM-SAS RTG “Standards for Military Personnel Data and Analytics Exchanges”
 - Approved in August 2022
 - Expected participants: CAN, CZE, DEU, GBR, ITA, NLD, USA (more would still be welcomed)
 - POC: Marcin.Pilat@Forces.gc.ca
- Next step: NSO activity to create a NATO Standardization Agreement (STANAG)





Long Term Ambition



Concept:

- Nations keep personnel data in own databases abiding to national standards
- But nations add database *views* that comply with a NATO standard
- A nation desiring to benchmark a given statistic develops a query to extract it from NATO standard-compliant views
- Allies are asked to run such queries and share the output with the requestor

Outcome:

- Consistent outputs are obtained from the participating nations
- Raw data is not shared between nations (privacy is respected)
- Once the NATO standard-compliant views are in place, the main burden of effort lies with requestors



Expanded Possibilities: Representation of Women

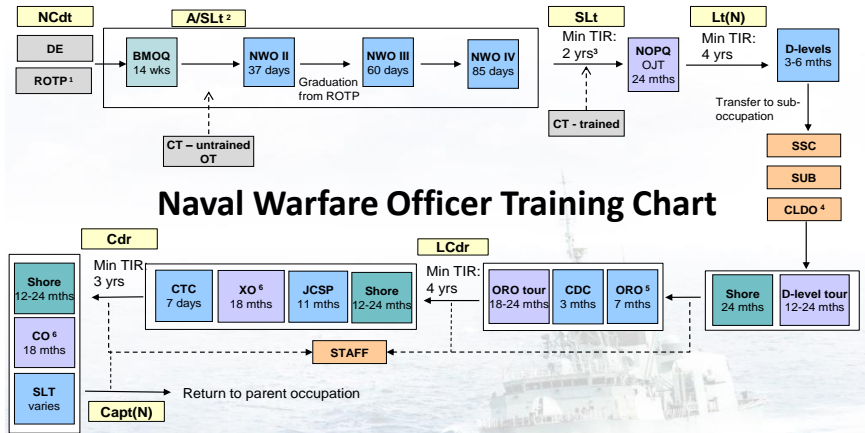
- Go beyond simplest basic representation stats
 - Breakdowns by occupational groups
 - Recruitment
 - Retention rates
 - Release reasons (e.g., medical)
 - Career progression statistics
 - Other demographics (e.g., age, education, ...)
 - Marital status, family composition
 - Deployments, postings
 - etc.





Expanded Possibilities: Career Analysis

- Current Approach: Stochastic Simulation of alternatives
 - based on distributions extracted from national HR database
- Additional Analysis Enabled: Expand the scope of analysis by comparing parameters obtained from national HR database to those from allies



Credit: J. Henderson and L. Arseneau, *Modelling the force flow of the Naval Warfare Officer occupation*, DRDC Scientific Letter, 2020.



Conclusion

- Benchmarking is a valuable and underused tool for Personnel OR
- Currently substantial obstacles
- NATO standards for correspondences between national definitions/categories are needed
- Joint HFM-SAS RTG “Standards for Military Personnel Data and Analytics Exchanges”

Thank You!

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