



FFI Norwegian Defence
Research Establishment

Analytic response to the Russian invasion of Ukraine: Balancing military aid to Ukraine and national defence

Mr. Brynjar Arnfinnsson

Agenda

1. Introduction
2. The security dilemma of donations
3. The analytical method
4. Concluding remarks



Ukraine is advancing. Slowly.

- Minefields and fortifications.
- No air superiority.
- Relatively few units with modern western equipment.

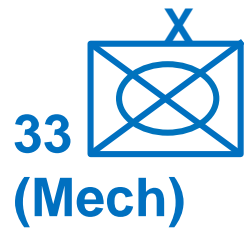


Western material in the Spring Offensive – 10th Mech. Corps

- 9 brig
- 30.000 pax
- 200 MBT
- 700 IFV



Challenger Mk 2 (14)
Marder IFV (t)
Stryker IFV (w)



Leopard 2A4/A6 (32)
MaxxPRO MRAP (90)



AMX-10RC
Mastiff MRAP

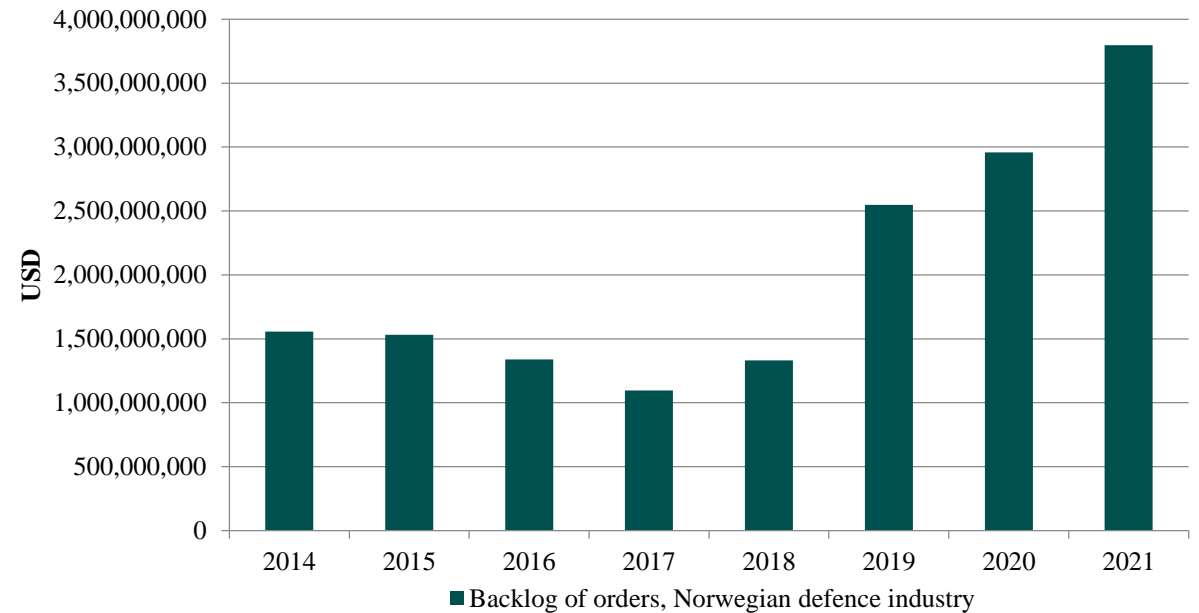


M-55 S1
M2 Bradley IFV



Defence industry is not keeping up

- Increasing backlog of orders before the invasion.
- Lean, peacetime production line.
- Who will take the capital risk of scaling up production?



Source: FFI report 22/02210

The security dilemma of donations

- How much of our own defence capability should we sacrifice in order to help save Ukraine?
- We need to consider:
 - National security threats
 - How donations affect our ability to handle these threats
 - How donations affects Ukrainian capability



Updated threat description to national security

- Scenario portfolio describing possible threats to Norwegian security.
- Russia cannot fight a conventional two front war.
- The most demanding conventional scenarios are off the table, for now... But for how long?
 - Depends on duration of war.
 - Outcome of war.
 - Rearmament after the war.
- Unconventional and limited threats are still relevant.



Photo: The Danish Armed Forces / NTB

Donations affect national capability

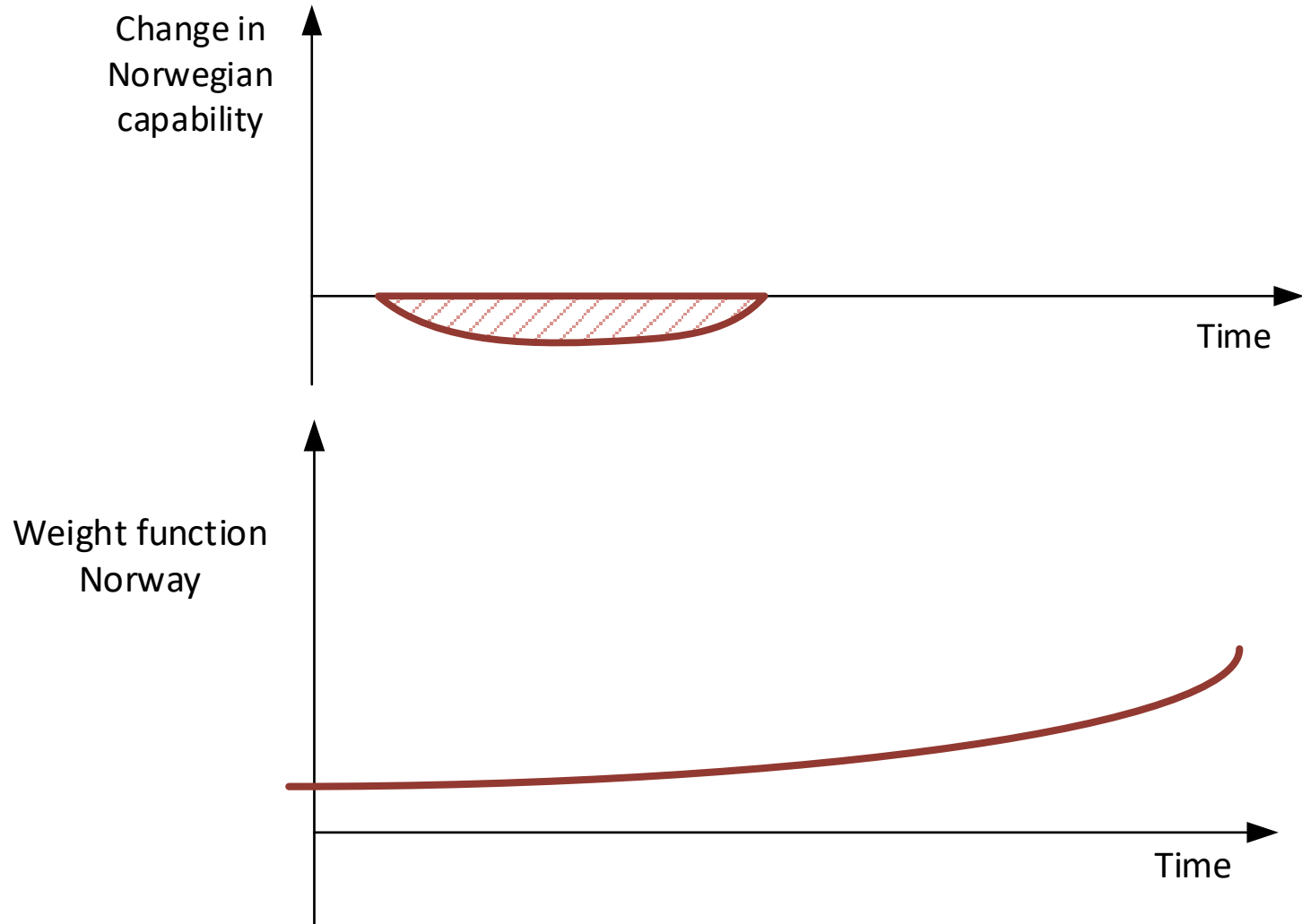
- Donations decrease national capability.
 - Measurable with established method.
- But strengthening Ukraine also strengthens national security.
 - Tricky/impossible to measure.
- Risk of losing specialized military skills.



Photo: www.president.gov.ua

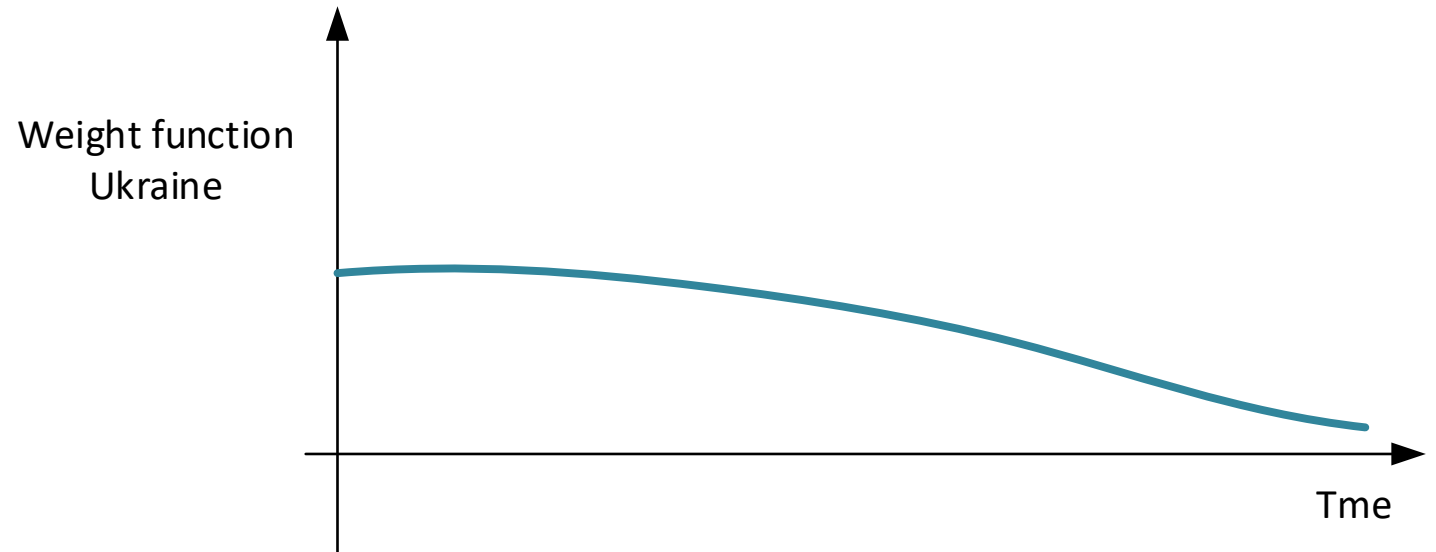
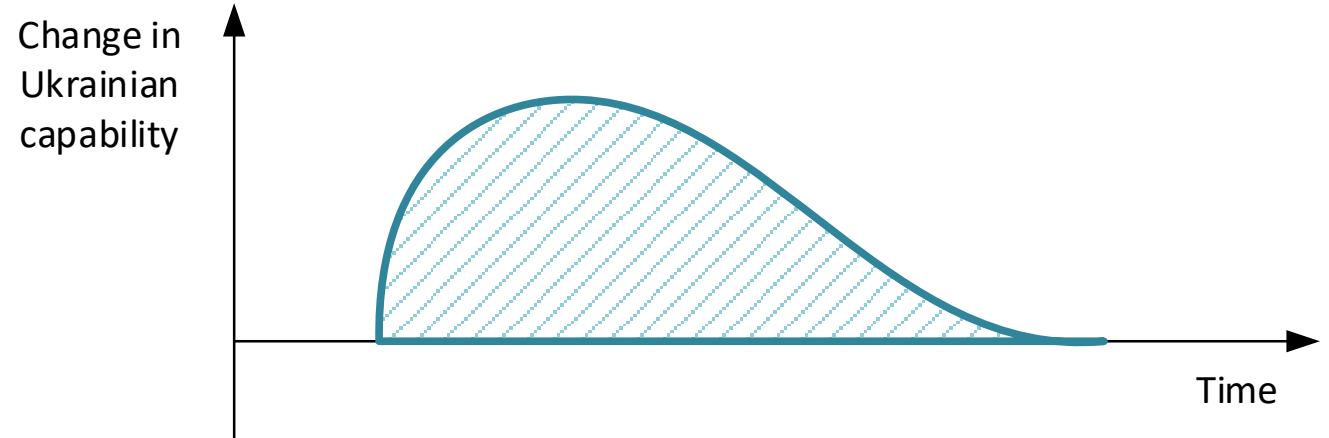
Modelling the consequence for Norwegian capability

- Capability change: Relative change in the Norwegian Armed Forces ability to handle scenario(s).
- The capability change due to each possible donation are weighed with a weight function.
- Different weight function for each scenario.



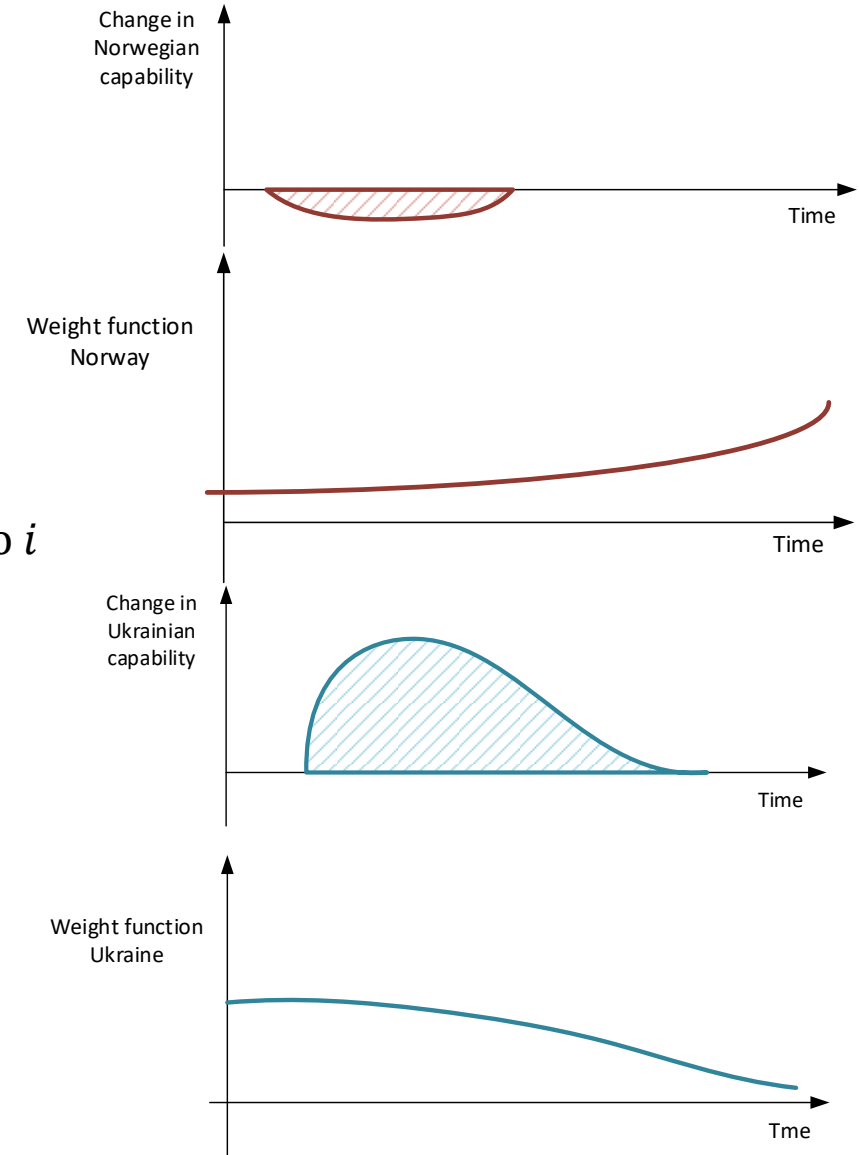
Modelling the consequence for Ukrainian capability

- Capability change: Scoring according to “Ukrainian wish-list”.
- The capability change due to each possible donation are weighed against a threat level.
- The threat level is high now, and uncertain in the future.
 - High immediate needs leads to high discount rate.
- For now only one scenario: Continued full scale conventional war.



The mathematics:

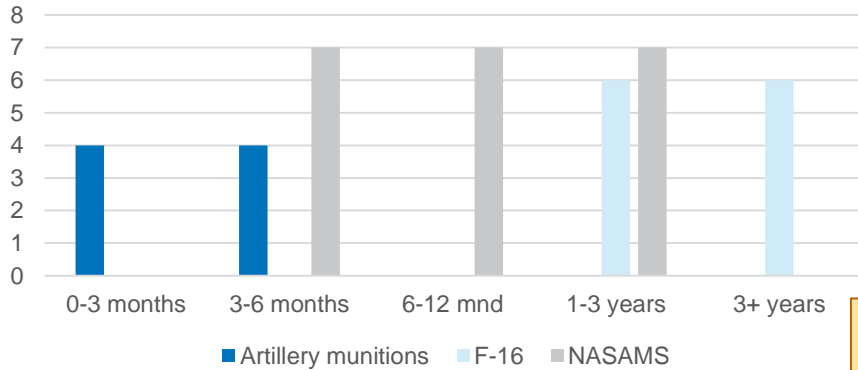
- Utility for Norwegian security:
 - $\sum_{i=1}^m \theta_{Ni} \int_0^{\infty} \varepsilon_{Ni}(t) \tau_{Ni}(t) dt$
 - Where
 - m is the number of scenarios
 - θ_{Ni} is the consequence of scenario i
 - $\varepsilon_{Ni}(t)$ is the change in the Armed Forces' ability to handle scenario i
 - $\tau_{Ni}(t)$ is the weight function in Norway for scenario i
- Utility in Ukraine:
 - (Only one scenario is considered – continued war)
 - $\theta_U \int_0^{\infty} \varepsilon_U(t) \tau_U(t) dt$
 - Where
 - θ_U is the consequence of continued war
 - $\varepsilon_U(t)$ is the change in Ukrainian capability
 - $\tau_U(t)$ is the weight function in Ukraine



Examples:

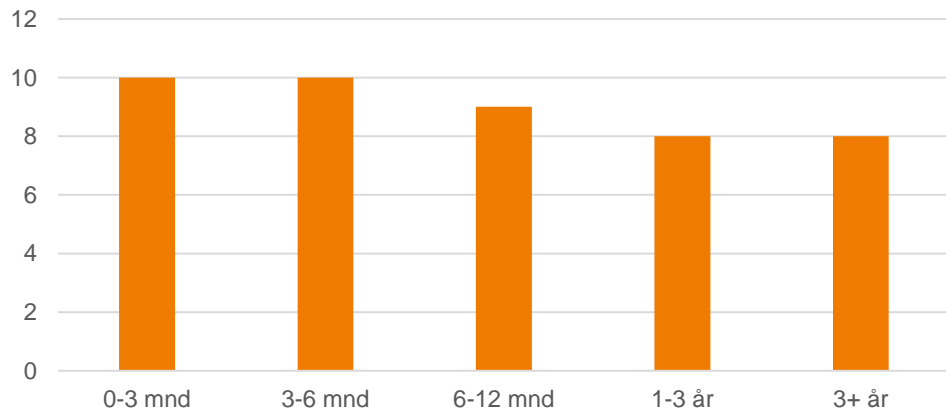
(only one Norwegian scenario)

Change in Ukrainian capability

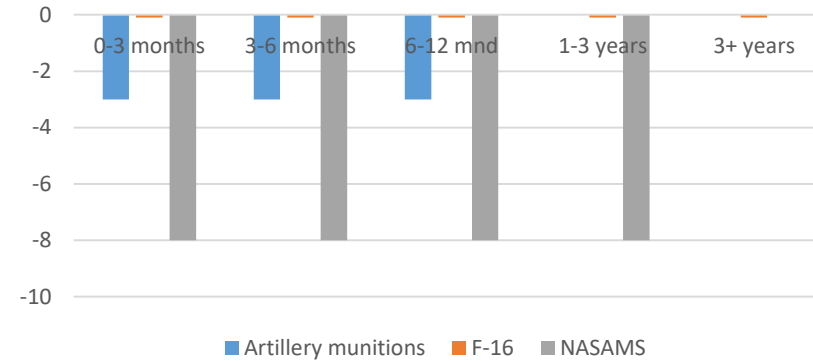


Results:	
Art.m:	+80
F-16:	+96
NASAMS:	+189

Weigh function Ukraine

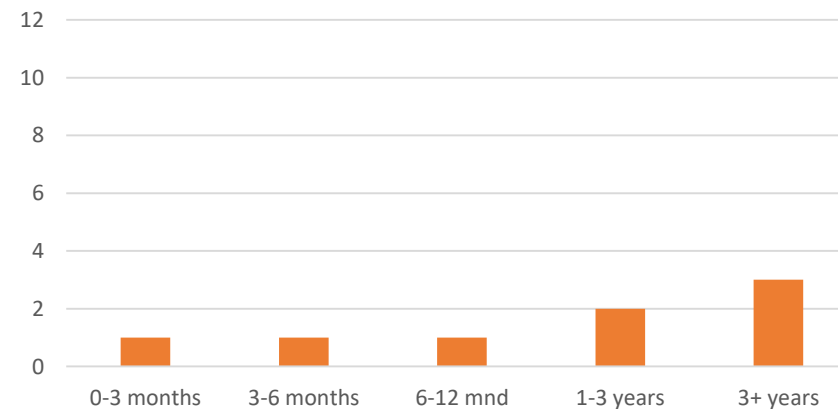


Change in Norwegian capability



Results:	
Art.m:	-9
F-16:	0
NASAMS:	-40

Weight function Norway



Total results:	
Art.m:	71
F-16:	96
NASAMS:	149

Methodological challenges and strong points

- Considering different numbers of platforms for donations:
 - Non-linear effects.
- Comparing different platforms is tricky.
- Subjective weights.
- Problem structuring.
- Forces assessments.
- Balancing different defence needs.
- Easy to find good candidates for donation.
- Overcoming organizational bias.



Possible ways forward (analytically)

- Fine-tuning weights.
- Developing scenarios for Ukraine.
- Long-term donation planning.

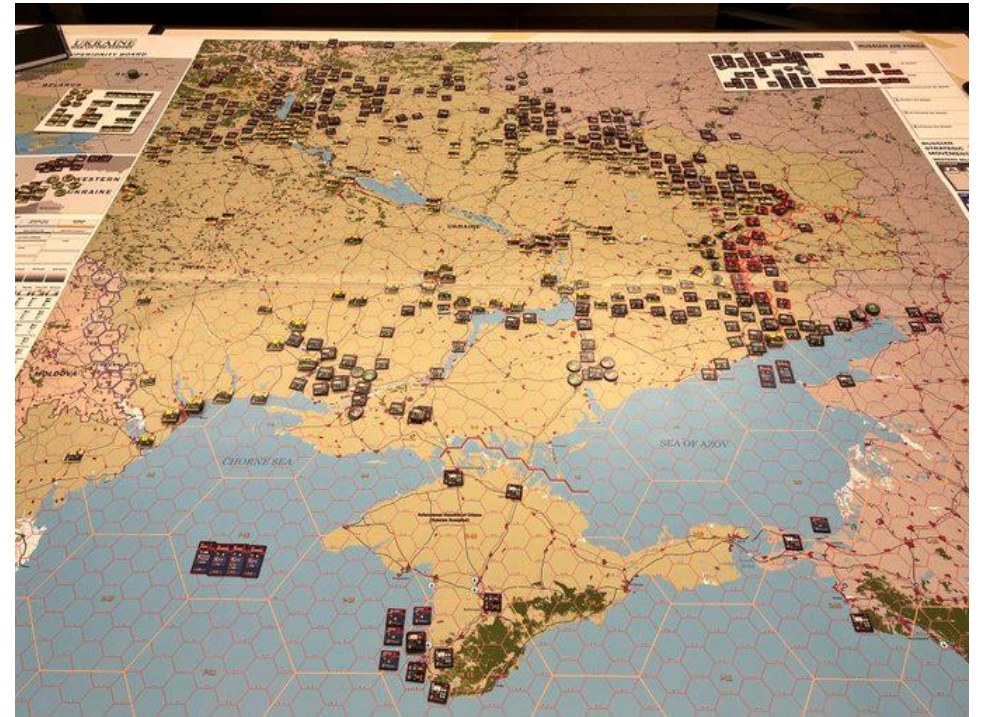


Photo: Tim Barrick

Concluding remarks: Not losing sight of the big picture...

- Russia cannot handle a two front conventional war.
- Strengthening Ukraine strengthens all sovereign nations.
- The current level of donations is not sufficient for a “quick win”.
 - Will the F-16’s change the course of the war?
- Industry capacity bottleneck.

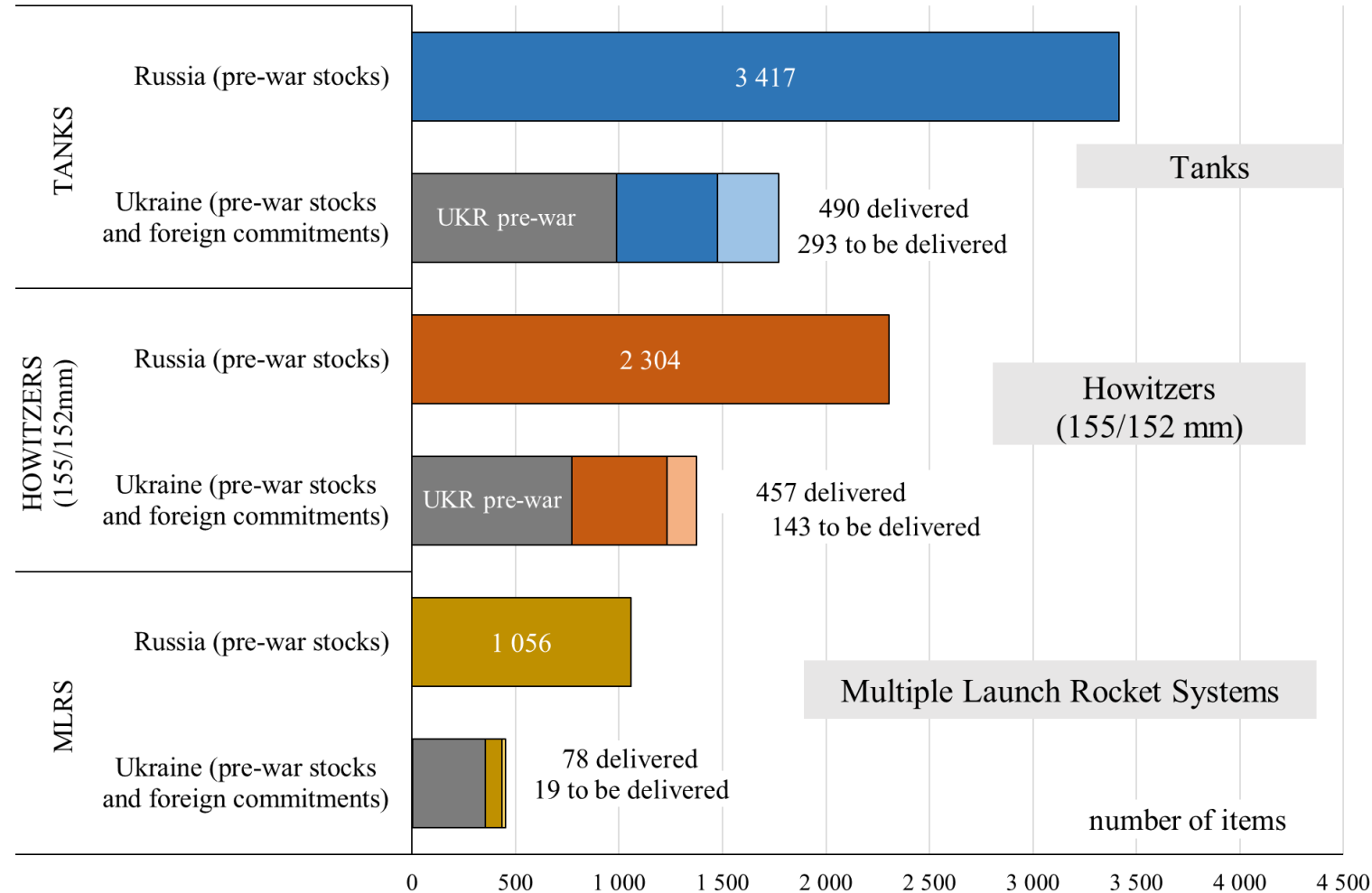


Chart: Ukrainian Support Tracker, 13th release

Questions?



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**FFI turns knowledge and ideas
into an effective defence**